

**NUTRITIONAL STATUS OF FREE LIVING AND INSTITUTIONALIZED  
ELDERLY AND ASSOCIATED FACTORS IN TRANS NZOIA COUNTY, KENYA**

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**DECLARATION**

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**DEDICATION**

This work is dedicated with love to my son Tietjens David Maumo. May you live to achieve even more.

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**ABBREVIATIONS AND ACRONYMS**

ADL	Activities of Daily Living
AIDS	Acquired Immune Deficiency Syndrome
B.P	Blood Pressure
CBO	Community Based Organizations
CBHC	Community Based Health Center
CSFII	Continuing Survey of Food Intake by Individuals
CHWs	Community Health Workers
DHMT	District Health Management Team
DHP	District Health Plan
DSS	Demographic Surveillance System
FGDs	Focus Group Discussions
HFMC	Health Facility Management Committee
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information Systems
ICPD	International Conference on Population and Development
IADLs	Instrumental Activities of Daily Living
IDI	In-Depth Interview
KDHS	Kenya Demographic and Health Survey
KEPH	Essential Package for Health
KNBS	Kenya National Bureau of Statistics
KSPSA	Kenya Service Provision Assessment Survey
MDGs	Millennium Development Goals

MUAC	Mid-Upper-Arm circumference
NGOs	Non-Governmental Organisations
PEM	Protein Energy Malnutrition
M&E	Monitoring and Evaluation
MNAC	Mini Nutritional Assessment Checklist
RDA	Recommended Dietary Allowance
WHO	World Health Organization
WHtR	Waist-to Hip ratio

## DEFINITION OF OPERATIONAL TERMS

**Activities of daily living:** Daily self-care activities within an individual's place of residence

**Arm span:** Measurement of outstretched arms from the tip of the middle finger of one hand to another.

**Body Mass Index:** A measure of body weight relative to height used to determine whether people are underweight, at a healthy weight, overweight or obese.

**Calf Circumference:** An average of three measurements taken at a maximum horizontal distance around the left calf as the subject stands, with the weight distributed evenly on both feet.

**Care givers:** Professionals whose activity involves helping individuals, groups or communities enhance or restore their capacity for social functioning and creating societal conditions favorable to the population of interest.

**Elderly:** persons aged 60 years and above.

**Exercise:** planned, structured and repetitive bodily movement for enhancing and maintaining one or more components of physical fitness engaged in by the elderly.

**Dependency:** Level of assistance needed by the elderly in carrying out any parts of ADLs.

**Fluids:** Plain water, milk, porridge, fruit juice and other beverages.

**Functional capacity:** Maintaining the ability to perform activities of Daily Living (ADL).

**Geriatric nutrition:** A study that applies nutrition principles to delay effects of aging and disease, to aid the management of the physical, psychological and psychosocial changes commonly associated with growing old.

**Half span:** Measurement of one outstretched arm, from the tip of the hand to the neck.

**Hunger:** A strong craving or urgent need for food or specific nutrient.

**Independence:** Without supervision, direction or active personal assistance.

**Individual factors:** Refers to barriers to, or facilitators of an elderly individual's nutrition status relating to self-consciousness, self-creation and self-awareness determinants leading to disorders of nutritional status, prevention barriers, including disorders resulting from a deficiency of nutrient intake or impaired nutrient metabolism.

**Institutionalized elderly:** An adult aged 60 years and above who is committed to an institution.

**Malnutrition:** Any disorder of nutritional status, including disorders resulting from a deficiency of nutrient intake, impaired nutrient metabolism, or over-nutrition.

**Mid Upper Arm Circumference:** A measurement of circumference of the arm at midpoint between the tip of the acromial process of the scapula and the olecranon process of the ulna.

**Mini Nutritional Assessment:** An assessment tool that can be used to identify older adults who are at risk of malnutrition, with the components of screening and assessment.

**Mode of Feeding:** A mechanism by which the elderly obtains and utilizes food materials.

**Non- institutionalized Elderly:** An adult aged 60 years and above who is not committed to an institution.

**Loss of appetite:** Decrease or loss in food intake.

**Perceptions:** The conscious recognition and interpretation of sensory stimuli that serves as a basis for understanding and knowing or motivating a particular action or reaction.

**Physical activity:** any bodily movement involved in by the elderly and produced by skeletal muscles that result in energy expenditure as well as maintaining physical fitness and overall health, whether it is incidental. Occupational, leisure, structured or supervised.

**Physical exercise:** Any bodily activity undertaken by the elderly to enhance or maintain their physical fitness and overall health and wellness.

**Population Ageing:** Refers to a decline in the proportion of children and young people and an increase in the proportion of people aged 60 and above years.

**Protein-energy under-nutrition:** The presence of clinical (i.e., physical signs such as wasting, low body mass index (BMI) and biochemical (i.e., albumin or other serum protein) evidence of insufficient intake. B. Etiology and/or Epidemiology. Older adults are at risk for under-nutrition due to dietary, economic, psychosocial and physiological factors.

**Residence of the elderly:** The place where the elderly lives, either in the institution or non-institution.

**Sedentary living:** lifestyle characterized by mainly sitting, lying down with no or with very limited movements from one place to another.

**Self-view:** A persons self-image or view of one's self specifically, carefulness or regard for one's own interests.

**Severe loss of appetite:** Severe decrease in food intake.

**Structural factors:** Those barriers to, or facilitators of an elderly individuals nutrition status relating to economic, social, policy, organization or other aspects of the environment leading to disorders of nutritional status, prevention barriers, including disorders resulting from a deficiency of nutrient intake or impaired nutrient metabolism.

**Transferring:** independent movement in and out of bed, chair, toilet e.t.c

## ABSTRACT

Adequate nutrition, healthy ageing, and the ability to function independently are essential components of a good quality of life. Though it is recognized that nutritional challenges account for a significant proportion of elderly morbidity and mortality, less has been determined on nutritional status of the old age men and women living freely and in institutions. This study investigated the relationship between nutritional status of the elderly and related factors in free living and institutionalized elderly of Trans Nzoia County. It also determined the extent to which functional and dependence of the Elderly impacts on their nutritional status. A semi-structured interview questionnaire, Key Informant Interview guide, Focused Group Discussion guide and Observation checklists were used to measure the nutritional status of the Elderly, individual and structural activities affecting the Elderly nutrition status and the performance of functional activities of daily living by the Elderly. Three hundred elderly men and women who met the inclusion criteria were sampled, 69 from three institutions of the Elderly and the other 231 from the seven sub-counties. Data were coded and entered in Nutri Survey. Nutri Survey and QSR Nvivo were used to analyze data. Participants were randomly selected with a response rate of 98.6% for the free living elderly and 97.2% for the institutionalized Elderly. Pearson's product moment correlation and chi-square were used to test the hypotheses. There was a significant relationship between gender and Mid Upper Arm Circumference of the elderly ( $\chi^2 = 8.173$ ,  $df = 2$ ,  $P = 0.000$ ) with the mean MUAC measure for women ( $0.67 \pm 0.152$ ) being higher than that of men ( $0.61 \pm 0.130$ ),  $t = 6.414$ ,  $df = 298$ ,  $p = 0.732$ ,  $t = 6.414$ ,  $df = 298$ ,  $p = 0.732$ . There were more (4%) obese free living elderly as compared to those in institutions (0.7%). Majority of women (20.3%) had a MUAC of less than 21 cm as compared to their male counterparts (7.5%), there was a significant relationship between gender and MUAC of the elderly ( $\chi^2 = 8.173$ ,  $df = 2$ ,  $P = 0.000$ ) with the MUAC mean measure for women ( $0.67 \pm 0.152$ ) being higher than that of men ( $0.61 \pm 0.130$ ),  $t = 6.414$ ,  $df = 298$ ,  $p = 0.732$ . Majority (13.7%) of elderly who were overweight reported to have a very poor health status as compared to only 1% of those reporting to have a very good health status; with the results showing a significant relationship between BMI and self-view of their health status ( $\chi^2 = 7.983$ ,  $df = 3$ ,  $P = 0.036$ ), and a positive correlation between health status and BMI which was also significant ( $r = 1.437$ ,  $P = 0.051$ ). Elderly nutritional status was being influenced by sources of food with food from farms being mostly preferred ( $2.793 \pm 2.640$ ) than food in institutions ( $2.991 \pm 2.940$ )  $t = 1.313$ ,  $df = 299$ ,  $p = < 0.022$ . The greatest impediment to the elderly acquisition of food was their culture with level of significance indicating that the nutritional status mean measure for culture ( $2.493 \pm 2.411$ ) being higher than that of market reach ( $2.173 \pm 2.319$ ),  $t = 5.451$ ,  $df = 299$ ,  $p = 0.765$ . There were more dependent elderly in non-institutions (11%) as compared to those in institutions. Functional ability of the elderly was found to be significant to nutritional status ( $\chi^2 = 4.440$ ,  $df = 4$ ,  $P = 0.000$ ). BMI was found to correlate positively with bathing ( $r = 1.349$ ,  $p = 0.006$ ), money handling ( $r = 1.065$ ,  $p = 0.024$ ) and bladder control ( $t = 1.334$ ,  $p = 0.006$ ). National and County governments should develop elderly focused nutritional interventions geared towards combating malnutrition.

## CHAPTER ONE: INTRODUCTION

### 1.1 Background of the Study

Nutritional problems are a challenging health issue in the world. The World Health Organization (WHO) defines old age as of over 65 years of age. In 1950, there were 200 million people over 65 years; by 2025, statistics predict that there will be 1.2 billion, of whom nearly 70% will live in developing countries (Grebmer et al., 2009). The majority of poor elderly people in developing countries enter old age after a lifetime of poverty and deprivation, poor access to health care, and a diet that is usually inadequate in quantity and quality. Poverty, death of younger adults from AIDS, and rural to urban migration of younger people are among factors that compel older people to continue working. Adequate nutrition, healthy ageing, and the ability to function independently are thus essential components of a good quality of life. Many elders experience changes in social, economic and medical conditions which often impact on the amount and quality of food that they have. It is understood that the older one gets, the greater the risk of developing certain diseases such as cancer, heart disease, obesity, osteoporosis, hypertension, and diabetes mellitus all of which are related to nutritional status. With the onset of such diseases, elderly people are treated with a host of prescriptions and over the counter medications, some of which contribute to poor absorption of nutrients and /or reduced appetite (Coull et al., 2008).

The support of this ever-expanding population has become of increasing concern. Today, the population aged 65 years and older is estimated at nearly 1 person in 10

worldwide, with a gender ratio of 302 million women to 247 million men (McCormack, 2010).

The absolute number of people aged 65 and above has doubled from 5.7 million in 1980 to 10.4 million in 2000 and was expected to increase to 14 million by 2010 and 21.3 million by 2020. In 1990 almost half a billion people in the world were over 65 years old (UNDP, 2012). In only 40 years' time this number will nearly triple. By the end of those same 40 years three-quarters of the world's elderly population will be living in developing countries (WHO, 2011).

A study by Moyer and Balsam, (2006) found out that physiologic and functional change during aging result in changes in nutrient needs. Research has shown that older adults do have specialized requirements for a variety of nutrients because of aging effects on absorption, utilization, and excretion. Living longer comes at a price. Extra years will not necessarily be years of good health. In the complicated context of ageing biology, transitions from disease to disability rather than disease to death take on prime importance for older people (Besdine, 2003). Moreover, the presence of illness as measured by objective clinical data does not necessarily determine the presence or severity of dependency. And of course for many elderly people in developing countries the luxury of access to such knowledge is often unavailable. With risk of death increasingly likely, and both the long- and short-term effects of disease, diet and life style hard to disentangle, the traditional health measures of life expectancy and morbidity begin to appear inadequate outcomes against which to

measure any health or nutritional indicator in older people, or evaluate preventive strategies.

It is in this respect that the research sought to determine in detail the nutritional status of free living and institutionalized elderly and their associated factors in Trans Nzoia County of Trans Nzoia County.

### **1.2 Statement of the problem**

Despite significant medical advancements, elderly nutrition status in developing countries has continued to deteriorate as noted in a study carried out by Beswick et al., (2008). It determined that common disorders affecting the elderly population arise when a highly individual constellation of interacting physiologic, economic, and psychosocial causes have the common effect of reducing nutrient intake. Currently very little is known about the nutritional situation of the elderly in communities and elderly homes in Kenya.

Unprecedented rise in the population aged 65 years and older in Kenya currently estimated at nearly 1 person in 10; with 7 out of 10 having communicable diseases, body aches, urinary incontinence and urinary tract infections, presents a major challenge to their wellbeing in the society, (KNCHR, 2007). These figures correlates with the world study figures which show that absolute number of people aged 65 and above has doubled from 5.7 million in 1980 to 10.4 million in 2000 with almost half of them having suffered falls, fractures, osteoporosis and rheumatoid arthritis

afflictions preventing mobility and is expected to increase to 21.3 million by 2020 (Hobbs et al., 2000).

The county government of Trans Nzoia restricts its assistance of donations allocated by the Ministry of Health to the elderly occupying the elderly homes. Therefore, the situation of the Trans Nzoia County elderly still receives the minimum assistance especially in the field of health care; a situation similar to what is experienced in other counties of Kenya (Ruel, 2003). Traditional normative patterns where the elderly in a family were regarded as treasures of knowledge, respected and cared for are changing. Joint families are giving way to nuclear families where the problem of housing and caring for the elderly is worsening and a new form of living and care (institutionalization) is taking shape (GOK, 2008).

### **1.3 Justification of the study**

The elderly deserve social protection due to the fact that they are an important group of the country's demographic strata. Although the world economy is experiencing hard times, the elderly population is continuously increasing with more than one third of the world population experience nutritional problems hence causing some difficulties in providing needed protection to the elderly. As a result, the aged population is being put at bay or isolation leading to most of them being depressed hence becoming more vulnerable in all aspects especially on nutritional status. Figures for elderly population in the country are hard to find due to the fact that most of undertaken research and public health activities are focused on women in reproductive age, children and young adults. This shows that little is being done on the elderly

population with the aim of addressing their physical, social, economic and physiological needs to improve their quality of life (Sen, 2010).

Kenyan Government is a signatory to a range of international rights declarations and treaties which advocate for the rights to social security in old age and aims to prevent poor dietary habits and malnutrition which occur through changing life circumstances action to secure longer healthier lives for the people of Kenya; such as the Livingstone Declaration of 2006 by the African Union on aging and the UN proclamation in aging, 1992. In articles 21, 43 and 57 under the bill of rights in the Kenyan constitution of 2010, it provides social protection for the elderly members of the society as a vulnerable lot (GoK, 2010). Article 21 states that the state shall enact and implement legislation to fulfill its international obligations in respect of human and fundamental freedoms. The guarantee of all Kenyans of their economic, social and cultural rights (ESC), while the state provides appropriate social security to persons unable to support themselves and their dependents; is stipulated in article 43. Article 57 makes sure that old age persons participate in the society and personal development while living in dignity with support of state and family (GOK, 2010).

Aging is prescribed with the onset of diseases treated with a host of prescriptions and over the counter medications (Bestine, 2003). Adequate nutrition, healthy ageing, and the ability to function independently are thus essential components of a good quality of life (WHO, 1999). These being factors that achieve active ageing and improvement of the elderly individuals' quality of life (Donald et al., 2011).

Nutritional status and functionality of the elderly promotion is seen as a measure to lighten up the social protection burden experienced by the elderly. It is understood that the older one gets, the greater the risk of developing certain diseases such as cancer, heart disease, obesity, hypertension, and diabetes mellitus all of which are related to nutritional status of the individual (Coull, 2008).

Nutritional challenges account for a significant proportion of elderly morbidity and mortality in Trans Nzoia County, impeding progress in reducing the factors (KNBS, 2010). Many elders experience changes in social, economic and medical conditions which often impact on the amount and quality of food that they take (Grebmer, 2008). In promotion of their nutritional status and functionality, it will anchor well with African modern socialization from socialistic to individualistic societies, fueled by migration and urbanization by young employable persons in economic pursuit (GOK, 2011).

Trans Nzoia County is a cosmopolitan and an example of what is to become of other counties in the new county government in the republic of Kenya and therefore an ideal area for this study. This study findings are aimed to providing and informing the government of Kenya on importance of proper nutrition for the aged individuals while acting as an eye opener to the community in general, especially those involved in taking care of older people regarding nutritional management of old age diseases. The study has also contributed to how the government can effectively train its elderly persons' care givers who respond to health needs of this population. This was also

added value to the ongoing contribution of sustainable developments goals 2, 3, 5 and 10 which are: Zero hunger, Good health and well-being, Gender equality and reduced inequalities (Pelchat et al., 1995).

The research was not undertaken as a comparison study between the two elderly groups (free living and institutionalized); but to determine any notable different characteristics the free living and institutionalized elderly exhibit in their respective residences. The study has stimulated further research in related areas and appropriate nutritional interventions in old-age. It has referenced further studies on the elderly in Kenya and other parts of the world. It has also generated data to prompt county governments to design policies and effective ways to manage and/or address the needs in the community on the relevance and importance of regular physical activities and exercise, equipping care givers with skills on nutritional knowledge and physical activities that correspond to elderly physiological needs.

#### **1.4 Research questions**

1. What are the social-demographic characteristics of the institutionalized and free living elderly in Trans Nzoia County
2. What is the nutritional status of institutionalized and free living elderly in Trans Nzoia County?
3. What are the individual and structural factors determining nutritional status of the elderly population in Trans Nzoia County?

4. What is the ability of the elderly in Trans Nzoia County to perform functional and instrumental activities of daily living?

### **1.5 Hypothesis**

H<sub>01</sub> There is no significance influence of individual and structural factors on the elderly nutritional status in Trans Nzoia County.

H<sub>02</sub>The elderly functionality does not impact on the nutritional status of institutionalized and non-institutionalized elderly.

### **1.6 Objectives**

#### **1.6.1 General objective**

To determine nutritional status of the elderly and associated factors in Trans Nzoia County.

#### **1.6.2 Specific objectives:**

1. To determine social-demographic characteristics of the institutionalized and free living elderly in Trans Nzoia County.
2. To establish nutritional status of institutionalized and free living elderly in Trans Nzoia County.
3. To identify individual and structural factors affecting nutritional status in elderly population.
4. To assess the ability of the institutionalized and free living elderly in Trans Nzoia County in performing functional activities of daily living.

### **1.7 Study limitations and delimitations**

The study was slightly limited by the insecurity in some parts of Kaplamai and Endebes sub-counties which has been on the increase. However, the location chiefs helped in providing security and escort during data collection hence able to minimize security challenges. The Sub-Counties in Trans Nzoia County are cosmopolitan in nature and heterogeneous - there are diverse cultural practices and at the same time majority of the people are farmers hence posed some challenge to data collectors on how they ask certain questions and how they approach certain households. This challenge was addressed by acquiring services of local translators and recruiting data collectors (nurses) from those communities.

There was a great challenge of recall bias from the clients (elderly) which was minimized by guiding the respondents and probing intensively where applicable and where possible sort the services of a care taker, a family member or the spouse if available. BMI was used among the elderly and from past research it was noted that BMI is not the most appropriate tool among the elderly due to differences in body composition and demineralization of bones, and stooping due to natural aging processes. This was addressed through undertaking other anthropometric measures including development of other participatory and qualitative tools.

### **1.8 Assumptions of the study**

In undertaking this study the following assumption were made; all the respondents both freely living in the community and those in targeted institutions including old age homes in the County were considered at first to be cooperative and provide reliable responses. The investigator was to focus on the community as the site in which functional impairment first appears most often and his bias was towards under-nutrition in the county as depicted in other studies done in developing countries. The researcher also referred to previous fieldwork experience amongst elderly slum dwellers in Kibera - Nairobi, studies undertaken in the great lakes region in Nyanza and also studies done in Kilifi at the Kenyan coast but no data was presented. This study aims to serve as an introduction to a new issue of growing practical importance in both nutritional gerontology and nutritional factors in the third world countries like Kenya. The assumption that of the available old age homes would provide access to the researcher and his team was also made. The three old age homes are run with help of donors hence strict on such kinds of investigations-research in public health.

## 1.9 Conceptual Framework

The conceptual framework in Figure 1.1 of elderly nutrition status and associated factors as adopted and adjusted from the UNICEF, 1998 report on causes of malnutrition and Help age, 2012 status of the world elderly report tries to highlight relationship between nutritional status and associated factors.

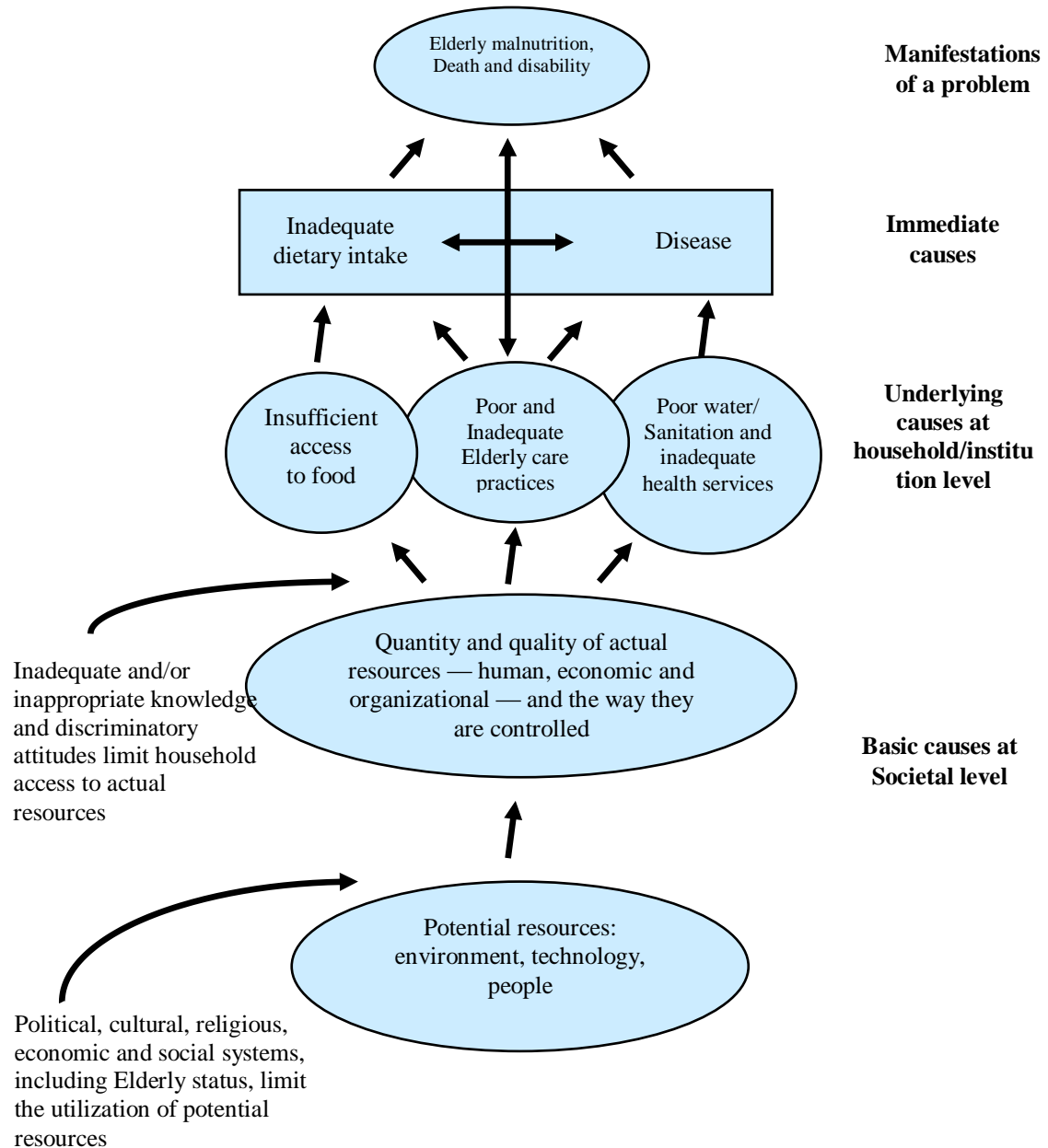


Figure 1.1: Conceptual Framework of elderly nutrition status and associated factors as adapted from the UNICEF, 1998 report on causes of malnutrition and Help age, 2012 status of the world elderly report

### **1.9.1 Nutritional status of the elderly**

Malnutrition is any disorder of nutritional status, including disorders resulting from deficiency in nutrient intake, impaired nutrient metabolism or over nutrition. According to the above conceptual framework of elderly nutrition status and associated factors as adapted and adjusted from the UNICEF, 1998 report on causes of malnutrition and Help age, 2012 status of the world elderly report; elderly malnutrition, death and disability occur when dietary intake is inadequate and health is unsatisfactory, being immediate causes of nutritional problems of the elderly population. The intake of their data is shown to be influenced by other underlying factors such as little or no appetite, eating or swallowing problems, inadequacies of nutrients in food they eat and eating of less than two meals a day. Also, other socio-economic factors influencing elderly nutritional status include limited income and one either being in an institution that most often causes elderly persons restrictions in the number of meals eaten per day including quality of meals eaten (Kaiser et al., 2010).

Infectious diseases such as diarrheal diseases and acute respiratory diseases (ARI) are responsible for most nutrition-related health problems. Some elderly individuals may find it difficult to undertake simple activities of daily living due to disabilities or inabilities associated with chronic illnesses and chronic conditions which in turn affect their nutritious food intake. These factors might in turn lead to the immediate causes of elderly malnutrition, death and disability.

### **1.9.2 Associated factors of elderly nutrition**

When taking care of elderly individuals especially those living in institutions, it is wise to take into account the underlying causes of death, disability and malnutrition in the elderly linked to dietary intake and those factors causing diseases such as readily available food, appropriate health systems and an enabling environment which are effective unless available resources are used ineffectively. Objectives setting and data collection had to take into account the previous nutritional findings from other sources that the absence of proper care in households and communities is the third necessary element of the underlying causes of malnutrition hence there was need of data triangulation using different methods of data collection.

Underlying causes of nutritional problems such as poor and inadequate elderly care practices leads to the manifestation of inadequate dietary intake or diseases. These factors most of the time leads to either; institution owners or home care givers to use drugs to modify the nutrient needs and metabolism of these elderly persons. Restrictive diets, malnutrition, changes in patterns, alcoholism and chronic diseases with longer term drug treatment are some of the factors that predispose the elderly to the risk of drug-nutrient interactions (Baldwin et al., 2007).

### **1.9.3. Elderly performance of functional activities of daily living**

Among the elderly population, disability rates increase steadily with the increase in age and are noted to be high in those elderly individuals of more than 80 years (Briggs et al., 2003). Activities of daily living among the elderly (ADL's) are those basic tasks of everyday life. The activities include among others, self-bathing, feeding, toileting,

stair cases climbing, toileting, ambulation, self-dressing and transferring (which including getting in and out of bed). Though people from all ages may encounter problems performing activities of daily living as noted in the paragraph above, these problems are mostly common among the old age population as they are tied to not only the age differences but also on societal level trends recognizing that human, environmental resources, economic systems including political and ideological factors are basic variables that do significantly contribute to it.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 The ageing process

In Kenya, elderly are defined as those individuals of age 60 years and above (GOK, 2010) as it conforms to the African union (AU) and United Nations (UN) definitions. The elderly can be categorized into two stages i.e. early seniors/elders (60-74 years) and Elders (>75 years). Among the elderly population, there are many who grow on healthy diets and remain so as life progresses as tied to improved nutrition, medical care and fitness (Fahey et al., 2003). The process of which physical, nervous and mental capacities of the human body gradually break down is determined as ageing (HAI, 2007). Ageing decreases someone's physical fitness levels and after the age of thirty muscles mass decrease, less mobile due to joint problems, hormonal imbalance that lowers hormone levels creeps in leading to lowered immune system (Buttler et al., 1998).

The older one gets, the decrease in brain mass due to ones cells of the central nervous system dying since they do not regenerate. This leads to inability of the cardiovascular system to function properly as a result of it being impaired since the arterial walls become thicker and less elastic (Heath et al., 1997). The result might lead to coronary heart defects and diseases that account for more than 70% of deaths in those individuals who are over the age of 60 years and above.

## **2.2 The Global, Africa and Kenya elderly trend**

The segment of the population aged 60 and older is rapidly expanding in Africa, a growth expected to continue through the 21st century. The number of Africans age 60 and older grew from about 5 million in 1900 to approximately 32 million in 2000, a figure that is expected to more than double by the year 2030. The proportion of people 60 years of age and older has also increased, from 6.4 to 18.4 percent of the U.S. population during 1900-2000, a share that is expected to expand to almost one-fourth of the population by 2030. The elderly account for about 30 percent of all health care expenditures in the Africa. They also use hospitals at nearly three times the rate of younger people, average seven to eight medical visits per year, and occupy the majority of nursing residence beds (ADA, 2005). The maintenance of health and functional independence of older persons is never any Countries national priority, as identified in Africa (Anwer et al., 2003).

It is reported that in certain developed countries and countries with economies in transition, the number of older persons already exceeds the number of children, and birth rates have fallen below replacement levels. In some developed countries, the number of older persons will be more than twice that of children by 2050. (Holmes et al., 2008). Thus, it is no longer possible to ignore the commencing ageing phenomenon in Kenya and therefore it is vital to anticipate requirements of this age group in Kenya to plan appropriate policies to address their growing needs and to support their quality of life. One of the most serious problems in health care today is the growing rate of nursing home negligence and abuse. In recent years, the rate of

births and mortality is decreasing especially in developed countries and the population is gradually becoming older. This trend started to be observed in developing countries as well. It is estimated that by 2050 nearly 80 percent of 60 years or over are expected in those countries. The Kenya national census in 2009 showed that 22.1% of the Kenyan population is over 65 years old and the percentage has been estimated to rise about 19% in 2030, and this figure is expected to reach 25.6% by the year 2050 (KNBS, 2010).

Under nutrition, low body-mass index (BMI) and unintentional weight loss have negative impacts on the functional status and psychosocial well-being of elderly individuals and they are also factors for increased mortality. The prevalence of protein calorie malnutrition (PCM) in nursing home residents has reached 85% in some nursing homes and is linked to increased mortality among them. The role of nutrition in the maintenance of aged individuals' health, management of chronic conditions, treatment of serious illnesses, and rehabilitation of functional limitations has risen to the top of the agenda for public interest and research during the last decades. There are many tools for identifying the nutritional risks, but the most extensively evaluated tool is the Mini Nutritional Assessment test (MNA) according to Greyvenstein et al., 2010.

### **2.3 The Elderly nutritional status and associated factors**

There is increased interest in nutritious diets as a vital component of the health care delivery system for the elderly (Blumberg et al., 1997). It is reported that there is need to assist the elderly population who are in need of specific dietary management through the health care delivery system in non-institutionalized residences who are

vulnerable to nutritional deficiencies; this is however becoming increasingly challenging but very important. The nutritional status of elderly individuals and the quantitative effect of individual, dietary, and environmental factors are inadequately understood, at best. researchers have stressed the difficulties inherent in determining the scope of nutritional problems among the elderly, the intricacies of studying the requirements for nutrients as age progresses, and an inadequate understanding of nutrient requirements among the aging (Blumberg et al., 1997).

With the fact that life expectancy has risen sharply, population ageing has become a great global challenge due to the fact that the number of people reaching old age is more than double what it was 20 years ago (WHO, 1998). It is expected that the life expectancy will still be on the rise as long as innovations and improvement in various aspects of life such as medical, nutrition and sanitation continue with the noted level of advancement hence the reduction of premature mortality rates. There is also a decline in the number of children being born to each family because of controlled fertility rates (WHO, 1998) which denotes that with time there is going to be a large number of older adults compared to the children and youth. The end result will be that the retirement age might be increased to allow older adults to continue serving their communities. Kenya and Australia have already revised their retirement age to 60 and 70 years respectively for public servants and it's been widely agreed that older adults possess a wide range of knowledge and contribution that shouldn't be lost (WHO, 2003).

Elderly nutritional status and functionality affects their quality of life (WHO, 1998). If the elderly are to remain productive and active community members in whatever countries they are in, their nutritional status and functionality is of much importance and something for the society to be aware of.

As highlighted by the Pender's health promotion model, malnutrition among the elderly is attributed to a number of factors which includes cognitive decline, changes in biological or physical functions and decreased appetite. Psychological and social challenges like depression, life events and loneliness may also lead to malnutrition (Saedlou et al., 2011). These factors can be grouped into the following subheadings; psychological, social challenges, normal ageing and functional impairments, incompetence among care professionals and faulty policy, medication and hospitalization.

Decreased appetite, insufficient foods intake and malnutrition-causes among the elderly are multi factorials since the elderly people are very heterogeneous (Morley, 2002). Each elderly individual who is at risk of malnutrition should have a prepared an individualized care plan based on their desires, needs and resources (Kondracki, 2009). Holmes et al., (2008) identified that increased drug intake and or medication usage, dental problems and gastrointestinal tract disorders as factors that may lead to malnutrition in the elderly. Most of the drugs used by the elderly might have major effects on their appetite, taste and smell. Drugs can have adverse effects to elderly body consumption and digestion of food while at the other hand drug-nutrient

interactions can lead to increased or reduced nutrient requirements including other effects such as nausea and diarrhea.

In a study by Lengyel et al., 2004 it was determined that ordinary food for the elderly in Non-institutions and in Institutions was important. More than one third of elderly residents in institutions in long term care expressed concerns over food variety, quality, taste and appearance as well as with the menus. It was determined that residents were less satisfied in areas related to their autonomy such as food choice and snack availability. In a study carried out by Evans et al., 2005 in twenty nursing home residents, it was found out that food which was reflecting the family background of the elderly individual is a source of comfort in nursing homes residents. Food was found out to be playing an important role in recovery from illness or adaptation to institutions of the elderly. The study also found that individualized nutritional care based on food can promote nutritional status and quality of life in nursing home residents.

#### **2.4 Dietary diversity of the elderly**

While the diets of the elderly population in general are deficient in a number of essential vitamins and minerals, the diets of certain subgroups of the elderly, namely the poor, those with little education, blacks, and women, are much more deficient than the rest. The report, based on data from USDA's 2009-01 Continuing Survey of Food Intake by Individuals, correlates socio-economic status of the elderly (age 60 and over) with their dietary consumption of calories and 11 nutrients: fat, protein, niacin, calcium, phosphorus, magnesium, iron, zinc, and vitamins E, C, and B-6. Diets of the

more highly educated elderly and the higher income elderly were less-deficient in nutrients than the diets of the other elderly. The more highly educated elderly consumed more of vitamins E, C, and B-6, niacin, calcium, phosphorus, and magnesium than the other elderly. The lower income elderly (those whose income is below 130 percent of the poverty level) consumed significantly less calories and the 11 nutrients except vitamin E, calcium, and iron. The diets of the elderly who live in central cities were generally more deficient in iron than the diets of the elderly who resided in either suburban or rural areas. Diets of elderly women were generally more deficient in all the nutrients, except for vitamin C, than the diets of elderly men.

Nutritional survey conducted to older persons by Maccabi Health services in Tel Aviv found out that over 40% of the elderly were consuming less than the recommended dietary allowances (RDA) for energy, protein and calcium. These findings were also confirmed by Cox (2005) of what are widely considered as well established institutions for the aged in Israel and as well was further confirmed by the large national surveys including the United States Department of Agriculture (USDA) food consumption surveys, national health and Nutrition Examination survey which determined that there was inadequate intake of a lot of nutrients in high proportions of older people.

#### **2.4.1 Elderly Health care Expenditure**

The elderly account for about 30 percent of all health care expenditures in the United States. They also use hospitals at nearly three times the rate of younger people, average seven to eight medical visits per year, and occupy the majority of nursing

residence beds (ADA, 2005). The maintenance of health and functional independence of older persons is a national priority, as identified in the report *Healthy People* undertaken by the U.S. Department of Health and Human Services (USDHHS, 1992).

#### **2.4.2 Health promotion and Quality of life**

Health promotion encourages people to control and improve their own health. Goals of increasing the healthy life expectancy, improving the quality of life for all, reducing mortality and morbidity rates, and increasing life expectancy are emphasized in all regions of the world. Average life expectancy throughout the world increases year by year, leading to an increase in the overall proportion of elderly people. The aging population is described by the WHO as being those individuals who are aged 60 or above. The support of this ever-expanding population has become of increasing concern. Today, the population aged 60 years and older is estimated at nearly 1 person in 12 in Africa, with a gender ratio of 302 million women to 247 million men. The relationships between nutrition, aging, and quality of life are recursive. Aging-caused or aging-associated factors alter certain aspects of nutrition, such as the sense of smell and taste, ability to chew and swallow, and gastrointestinal and bowel function, and these in turn may influence quality of life. At the same time, poor nutrition and lack of physical activity can lead to lack of appetite, inability to perform activities of daily living [ADLs], changes in quality of life, morbidity, and mortality. Acknowledgement of the constraints in these self-report instruments has led to the development of physical tests which represent more objective and quantifiable performance measures. These are thought to add more appropriate information on overall functional ability as

they simulate some physical attributes essential to the satisfactory performance of activities of daily living (Dawson et al., 2008).

### **2.5 Reliance and non-reliance of institutionalized and Non-Institutionalized elderly**

Reliance is defined by Bond et al., (1993) as a state in which an individual is dependent upon the other or others for assistance in meeting their needs. Coping with everyday tasks in the non-institutions is critical to the maintenance of independent existence (Oshaung, 1994). In a study carried out by Help Age international in 2007, it was noted that elderly individuals in developing countries including Kenya identify morbidity as the incapacity and disability as one of the key issues lacking in public awareness and information. This is due to the fact that independence and self-care nature of elderly individuals are usually taken for granted or too often unknown, ignored or violated by most people (HAI, 2007). With the age catching up, it's noted that deterioration in function and the restriction in performance of activities of daily living serve to reduce their sense of control.

Obtaining a higher physical activity level with ageing could overcome the depicted unfavorable pathways. Although it's been found that middle aged runners develop an energy intake that is 40% to 60% greater than sedentary men and women of the same age, there is not much information available in the change in food intake produced by an active life-style or an exercise program in elderly subjects. It was shown through research undertaken by Del et al., 2006 that free-living elderly in rural areas had

higher energy intakes than elderly in urban settings or those living in institutions, due to greater physical demands.

Factors that influence morbidity and mortality of the elderly includes diet and lifestyle. The adverse diet and lifestyle related factors accumulate overtime and it is therefore important for the elderly to adopt healthy diets and lifestyle habits which minimize the risks of morbidity thereby contributing to healthy aging (WHO, 2006).

The society has different resources for older people who lose the ability to live independently. They get individual care either in the institutions or the non-institutions if the elderly in carrying out domestic tasks among other tasks. Loneliness is however a factor that impedes care-giving. These affects societal life of the elderly such as the ability of the elderly to keep and maintain a social network leading to poor health status, poor vision, functional status and loss of hearing hence increasing the prevalence of loneliness (Savikko et al., 2005). The above conditions leads to the need of the elderly to move from one location to another hence adjusting to new surroundings. The noted adjustments can or may be painful and could result to trauma, therefore a decline in physical vitality, depression, malnutrition including cognitive impairment (Robertson, 2004). Older persons sometimes also fail to remember to eat and how to eat or even take medication, which is a great risk factor to malnutrition and poor health (Kagansky et al., 2005).

With muscle mass, joint morbidity and stability, vision and hearing declining with age; physical activities and exercises are required to rejuvenate the strength, flexibility and balance that are needed for movement. Impaired mobility decreases one's ability to keep in contact with other people (WHO, 1998), hence a certain level of physical and health fitness is required for one to keep in contact with others and to be involved in social activities.

An individual's health status and their fitness dictates their capacity of involvement in economic activities. Older persons usually suffers from chronic illnesses like high blood pressure, diabetes and respiratory diseases among others which may render them unhealthy and unfit to engage in economic activities. For example, 80% of older Kenyans do not have access to formal income security, and are therefore vulnerable to poverty. The proposal for a minimum income in old age would be more cost effective and have a substantial impact on poverty beyond that of older people. Approximately 6% of the Kenyan older population now stands to benefit from the cash transfer scheme. This signals, however, that there is still much to do to ensure income security or social safety nets in old age in Kenya and specifically in Trans Nzoia County. After the motion for a universal pension to everyone over 60 was submitted in parliament, the announcement raised questions about the future of the programme and how long it will take to emerge as an entitlement for all. Although the expansion of the Older Persons Cash Transfer is slow, its increased allocation has come as part of additional investment in other cash transfers to vulnerable children and people with disabilities,

which see Kenya closer to achieving the minimum package of social protection as defined by the African Union Social Policy Framework (HAI, 2007).

In the year 2009, the Kenya government Ministry of Finance announced an increase in the money allocated to the cash transfer programme for older people. He allocated an additional Kshs 470 million (USD 5.4 million) to the social pension, known as the "Older Persons Cash Transfer", bringing the allocation to Kshs 1 billion (USD 11.4 million). Older people in the programme will now receive Kshs 2,000 (USD 25) a month as to opposed the previous 1,500. The announcement came following support from Help Age International to the Ministry of Gender, Children and Social Development on the cash transfer. This move also cements the achievements of last year's Age Demands Action campaign by Help Age Kenya and older people in Kenya. They met with the Ministry of Finance and the budget team led by the permanent secretary and demanded an increase in the number of districts receiving the cash transfers as well as in the amount allocated (Brownie, 2006).

As per (WHO, 2003) report, in countries like South Africa and Namibia where they have national old age pension, the benefits are a major source of income for survival for many people and their families. In more developed countries, there is old age security and gradual retirement that promotes active living, functionality and participation in family and social functions. This is because one is able to pay for the exercise program or specialists services.

## **2.6 Functional and physical activities of the elderly**

Functional and physical activity comprises of all forms of being active including exercise, sport and the activities that are part of day to day life such as gardening, washing clothes or car manually and walking. While ageing almost inevitably brings with it decline in functional capacity due to the physiological changes that occur in the older peoples body (Burbank and Riebe, 2002), participation in physical activity on a regular basis is associated with improved health.

Physical activity is key risk factor for mortality, morbidity and reduced functional ability among older persons (Astrand et al., 2003). Among the problems affecting the elderly is the problem of being inactive which most of the time affects their quality of life and functional independence. Regular exercises has been determined to delay the onset of degenerative conditions and cardiac diseases such as diabetes, obesity, cancers, cardiac related diseases, osteoporosis among others and to also reduce the risk of falls (Nijs et al., 2006). Moderate, vigorous, intensity physical activities have health benefits more so in reducing chronic diseases.

Lack of physical activity and poor diet are major factors that lead to manifestation of obesity in the elderly population which directly affect them as well as middle aged and younger populations. Based on available research, it is noted that the impact of lack of physical activity on medical care costs are likely to grow as a result of an ageing population, unless trends in physical activities change. Physical activities are important due to the impacts they have on nutrition by molding the requirements of

energy. Energy intake and expenditure must be strongly regulated to prevent weight loss or weight gain. With the generally observed decrease in energy expenditure with ageing. Less energy will have to be provided by the food (WHO, 2011).

### **2.7 Previous analytical studies done on nutrition status and functional ability of the elderly**

In a study conducted in Nairobi County, Kenya on the association of functionality and nutritional status of elderly persons being a comparison between institutionalized and non-institutionalized elderly, there was a difference between the nutritional status of the institutionalized and Non-institutionalized elderly where more men (52.4%) were obese compared to women (33.3%) using BMI. Also, more women were underweight (16.7%) compared to the men (9.5%) (Mugo, 2015). It was also determined that the elderly do develop malnutrition due to a number of factors which make them vulnerable and susceptible to malnutrition as a result of decreased physical, psychological and or social functions (Morley, 2002). There was also noting of a wide variation of the prevalence of malnutrition in the institutionalized elderly individuals where they had the highest number of underweights (20.2%).

In a study conducted in Central Uganda on the nutritional status and functional ability of the elderly aged 60 years and 90 years, the overall prevalence of undernutrition were 33.3% based on body mass index ( $<18.5 \text{ kg/m}^2$ ) and 52% based on mid-upper arm circumference ( $<24\text{cm}$ ). Also to note, there was a large significant difference between prevalence of malnutrition by sex whereby 68% of women were undernourished (BMI index  $<18.5 \text{ kg/m}^2$ ) compared with 32.4% of men. Ability of

the elderly individuals to undertake basic activities of daily living showed that 33% of the elderly were independent in all activities of daily living except on morbidity and feeding (Kikafunda et al., 2009).

When it came to the comparison of the relationship between body mass index and those variables associated with functional ability, it was significant with regards to morbidity, continence and feeding ( $P < 0.05$ ). The study determined that a large percentage of older men and women were malnourished which influenced their daily activities. The study also recommended that the elderly needed to be incorporated into health and policy programmes (Kikafunda et al., 2009).

A study by Ethangatta et al., 1996, where low income women in Nairobi slum dwellers were compared with the poor urban area inhabitants noted that the PEM group was older (Chi=68 years) had lost more teeth, had more subnormal values than the slum dwellers and the poor urban for serum albumin, hemoglobin, hematocrit, serum, transferrin and serum iron. The major problem was insufficient dietary intakes taking into consideration that the foods regularly consumed by the elderly are short of a variety of rich-nutrient foods. Although elderly institutions serve meals at appropriate times, the elderly decide when they would eat this food. Poor timing, poor preparation and poor choices of foods are some of the caution given on nutrition in order to promote healthy eating (Posner et al., 1993) noted that frequent intake of whole-grain, fiber, fruits and vegetables is associated with low cardiovascular mortality risks.

In a study carried out in Embu district of Kenya by Waswa (1985), showed that the elderly had weight got height below 88% of the standard and hemoglobin was below 13% for men and 8% for women. Fifty nine percent of all the elderly sampled in the study were below 80% MUAC standard. It was also reported that 15-20% of the elderly were malnourished and most of them (695) had health problems. Many didn't have constant income and most of those who were living alone were over seventy years.

In a study undertaken in the urban areas of the Lake Victoria Basin, to determine the prevalence of malnutrition and to investigate factors affecting nutritional status of older persons living in the urban areas of Lake Victoria basin; inadequate food access, poor health, living arrangements and poor eating patterns were the main nutritional risk factors. The prevalence of underweight was 16.5% with men (24.1%) being significantly more likely to be underweight ( $P < 0.05$ ) than women (12.3%). Overall, sixty one point two percent had normal body mass indices, 13.2% were obese and 9.1% were obese (Cheserek et al., 2012).

## **2.8 Summary of the reviewed literature**

Literature on the nutritional status of the elderly and associated factors is sparse in Kenya. So little has been done in Kenya on the association between the factors and nutritional status of both Institutionalized and Non-institutionalized elderly. This study has been designed to determine the status of elderly nutrition in Trans Nzoia County in relation to nutrition related challenges and analyse those predictors of the elderly nutritional status in both Institutions and free living environments.

## **CHAPTER THREE: MATERIALS AND METHODS**

### **3.1 Study design**

The study adopted descriptive retrospective and cross-sectional study design which was used to determine the nutritional status of the elderly in Trans Nzoia County and associated factors. The descriptive study survey technique was used to further explore any notable differences and challenges (characteristics) faced by the elderly who are both free living and in institutions. This study was not in any way a comparative in nature of the two elderly groups' i.e. free living and institutionalized. The survey was employed in the study due to the fact that it helps find out the differences among various variables in the natural setting and also helps allow for extensive data collection within the shortest period of time including at the same time allowing the quantitative and qualitative data collection.

### **3.2 Research variables**

#### **3.2.1 Independent variable**

Independent variables for this study were factors influencing nutritional status of the elderly both individuals and structural. Specifically, they were related to socio demographic characteristics of the elderly, functionality and morbidity elderly educational status, age, occupation, gender, disability status, activities of daily living, other salient factors of the elderly.

#### **3.2.2 Dependent variable**

The dependent variable in this study was of nutritional status of the elderly gathered through analysis of the elderly by use of anthropometry; and the association of both individual and structural factors.

### **3.3 Location of the study**

The study was carried out in Trans Nzoia County, of the former Rift Valley Province in Kenya. Trans Nzoia County lies between latitude  $1^{\circ} 35^{\circ}$  south and longitude  $37^{\circ} 10^{\circ}$  east and covers an estimated area of 2,496km<sup>2</sup> which represents 0.42 percent of the Republic of Kenya's total surface area. It has a population of approximately 818,757 (KBS, 2009) comprising of 407,172 males and 411,585 females, and with a population growth rate of 3.7%. of which 65,501 (GOK, 2010) are elderly (60 years and above). Land rises slightly below 1,800m above sea level in white highlands of Kenya and the southern end of the district to an altitude of 3,200m at Mount Elgon. The district experiences two rainfall seasons namely; long rains (March - August), short rains (November - December) averaging 1500-1900 mm/year. Mean temperatures ranges from  $12.2^{\circ}\text{c}$  to  $19.6^{\circ}\text{c}$  (averaging  $15.4^{\circ}\text{c}$ ). The district is divided into 7 Sub-counties with 17 locations and 36 sub locations. Trans Nzoia County thus was chosen for the study because it is one of the districts in Kenya with high prevalence number of geriatrics (KNBS, 2010) with health indicators showing that the elderly hospital visiting trends due to varied health challenges has tremendously increased.

### **3.4 Study population**

The study targeted the elderly, both men and women above 60 years of age and living in Trans Nzoia County. The respondent's age was determined by caregivers or by use of national identification cards. The case of loss or misplacement of identification cards meant the employment in use of dates of important historical and social events as applied by the registrar of persons with the same questions coming in handy during the determination of the elderly person's soundness of mind.

### **3.4.1 Inclusion criteria**

The study targeted the elderly men and women aged 60 years and above living either in the 3 institutions of the elderly in the county or freely living in their homes or out of an institution with family members in the last one year.

### **3.4.1 Exclusion criteria**

The study excluded the elderly who were critically ill with either communicable or non-communicable diseases including those who refused to participate in the study-refused to give consent.

### **3.5 Sampling techniques**

Trans Nzoia County was selected purposively for the study; since it is one of the counties with the highest number of the elderly (KNBS 2010) and many elderly institutions/elderly homes as compared to other counties in the Country. An assessment on the proportion of elderly individuals living in the three institutions in the county was undertaken. The institution welfare officer in the three sampled elderly homes (Institutions) was purposely and conveniently sampled. A list of the elderly living in the institutions was obtained from the institutions information management officers as directed by the institutions heads. Those elderly persons in the sampled institutions who did not meet the inclusion criteria were eliminated from the list. The remaining elderly individuals were systematically sampled with every 3<sup>rd</sup> case in the sampling frame chosen for inclusion in the sample (Mugenda and Mugenda, 1999). Since all institutions had different number of elderly individuals, old age individuals were then sampled proportionately to how many they were in those specific institution. A total of 69 elderly individuals were sampled from the three institutions.

**Table 3.1: Institutions of the Elderly persons in Trans Nzoia County**

<b>S. No.</b>	<b>Institution Name</b>	<b>Population size</b>	<b>Sample size</b>
1.	Kwanza	178	25
2.	Centre of wisdom and hope	92	14
3.	Liyavo Centre for the elderly	216	30
Total		486	69

Source: Open data Africa - Kenya report, 2009

For those elderly individuals living out of institutions or in their homes (free living elderly individuals), the adoption of a multi stage sampling design was undertaken. Cluster sampling techniques was employed to select the households with elderly individuals. A list of the elderly living in the 7 Sub-Counties of Trans Nzoia County was obtained from the respective Chiefs through the directive of the County Commissioner with the assistance of Community Health Workers. An assessment of elderly fit for interview was undertaken with care givers or the elderly individuals, this was to determine if they met the inclusion criteria or not. A total of two hundred and thirty one free living elderly individuals were sampled. The number of households sampled in each of the 7 Sub-counties were selected proportionally to the size of the County.

**Table 3.2: Target Group Composition of free living elderly persons**

<b>S. No.</b>	<b>Sub County</b>	<b>Population size</b>	<b>Sample size</b>
1.	Central	328,868	67
2.	Cherangany	72,974	24
3.	Endebes	62,700	20
4.	Kaplamai	89,858	33
5.	Kiminini	64,685	21
6.	Kwanza	89,727	32
7.	Saboti	109,945	34
Total		818,757	231

Source: County statistics report; KNBS, 2013

### 3.6 Sample size determination

The sample size was determined using Fisher et al., (1998) formula recommended by Mugenda & Mugenda (1999) as effective for social sciences.

$$N = \frac{Z^2pq}{d^2}$$

**Where:**

N= the desired size (when population is greater than 10,000)

Z= the standard normal deviate at the required confidence level.

P= the proportion in the target population estimated to have a particular characteristic being measured and in this case, the elderly, (25% as per KNBS, 2010).

$$q=1-p$$

d= the level of statistical significance set/ degree of accuracy.

Thus the sample size will be calculated as follows:

$$N = \frac{Z^2pq}{d^2}$$

$$\begin{aligned} N &= \frac{(1.96^2 \times 0.25 \times 0.75)}{0.05^2} \\ &= 288.12 \approx 300 \end{aligned}$$

A total of 69 elderly were sampled from Institutions and 231 from non- institutions.

These two samples were derived to determine nutritional status and if there were any difference in their national status.

### **3.7 Pre-test of research instruments**

The research instruments pretesting of survey tools (semi-structured free living and Institutionalized questionnaire) was conducted in 3 villages of Tongaren and Sinyereri Elderly Holding Home (SEHH) which were not included in the actual study with a sample of 42 households. This was undertaken two days before the main data collection started; after which the entire team met to review and share experiences before teams were dispatched to their respective clusters to embark on the definitive survey. This was done to ensure the validity and reliability of the data collection tools. The exercise was used to make corrections, clarifications, and suggestions and highlight omissions used in improving the research instruments. This pretesting exercise helped indicate and provide a platform showing that there is likelihood of obtaining sufficiently sound, consistent and relevant data for addressing objectives and hence helped drop troublesome items.

The researcher undertook a five days training of enumerators before the pre-testing of research instruments. After the pre-testing of the research instruments in 3 villages of the Tongaren Sub-County and Sinyereri Elderly holding Home, the team came back to the training venue to review the tools accordingly before finally being trained on sampling methodologies, how they should interpret the questions into local languages, interviewing techniques, anthropometric measurement procedures, research ethics and the logistics in carrying out the assessment.

One important result from the questionnaires pre-testing exercise was that the researcher was able to think behind the answers and accurately determine whether the

questionnaire is being filled out properly by the interviewers (data collectors). Another important result was that the questions were actually understood by respondents and helped assess whether respondents were able and willing to provide the needed information. During this exercise, it was noted that some of the respondents were thinking out loud as they answered some questions which allowed the responsible interviewers to consider different wordings for some of the questions, and sometimes introduce another word to see which works best.

### **3.7.1 Validity**

Validity is the quality attributed to measures of the degree to which they conform to the established knowledge. It refers to the extent to which an instrument asks the right questions in terms of accuracy (Mugenda & Mugenda 1999). The face validity of the questionnaires and interview schedules (research instruments) were established by presenting for critiquing to the experts in the School of Public Health for their inputs and dealing with ambiguities and irrelevancies which were then included in the final draft. The content validity index was calculated after the pre-test study to ensure adequate content presentation of the study.

Training of research assistants effectively and focusing on the purpose of the study was done. This enhanced on how questions can be phrased to capture data and how to take and record measurements using the scales and height boards. Some items were modified by wording to improve clarity with some being reorganized to improve the sequence of flow. To determine reliable measures where some of the elderly who couldn't stand upright or hold one position for their measures to be taken, lying down

flat was advised by enumerators or arm span measures were taken to cater for their height measures.

### **3.7.2 Reliability**

Reliability is defined as the consistency of measurements or the degree to which an instrument measures the same way each time it is used (Mouton, 2001). Previous researchers have demonstrated reliability of the nutrition assessment tools such as mini nutrition assessment and BMI tools. It's noted that the overall physical high-rater reliability (0.89) as well as high correlations (0.74-0.8) with other measures of physical. Other studies have demonstrated reliability range from 0.51 to 0.89 (Guigoz, 2006). The semi-structured questionnaires and interview tools were checked for accuracy and completeness using a test-retest method. The different items that needed adjustment were addressed as necessary before retesting. Some items were modified by rewording to improve clarity while others were organized to improve the flow including sequence.

### **3.8 Data Collection Instruments**

Data collection was carried out using interviewer administered semi structured questionnaires by the trained research assistants. The six FGDs were conducted using an FGD guide and key informants were interviewed using key informant interview guide. Data checking and cleaning was done simultaneously during data collection. At the end of every field day, all the incoming data were checked for completeness and consistency.

### **3.8.1 The questionnaire**

The 300 individual questionnaires were administered by an interviewer to the older adults. They were designed to assess quantitative data on food intake, individual anthropometric measures, demographic, social, cultural and economic factors that determine nutrition status of the elderly. To determine functionality of the elderly, a version of Modified Barthel Index (MBI) was appended in the questionnaire which consists of 10 items that measures elderly daily functioning, specifically activities of daily living and ability (Freeman et al., 1999). These items included in the MBI are feeding, moving (relocation), grooming, transferring to and from toilet, bathing, walking on level surface, going up and down the stairs, dressing, continence of bowels and bladder. These items were weighed and an elderly received a score based on whether they have received help while undertaking the tasks. The total score was gotten by summing up the scores for each of the items and the higher the score, the more independent the elderly individuals. Independence meant that the person needed no assistance at any part of the task hence if an elderly person did about fifty percent of the tasks independently then the 'middle' score applied.

### **3.8.2 Focus group discussion (FGD)**

A FGD guide was used to collect qualitative data to complement quantitative data. Each team implemented 2 FGDs, one for men and another for women in the assigned villages while three teams were tasked to undertake one FGD each in the elderly institutions. The FGD's were conducted in the targeted villages in a manner that ensured adequate representation of socio-economic and ecological differentials among the selected villages in the seven Trans Nzoia Sub-counties. The men and women

making the FGD's comprised elderly who were free living and those living in institutions; health educators, community health workers/volunteers, community leaders and other opinion leaders.

### **3.8.3 Key informant interview**

Using Key informant guides, Key informants were interviewed in the sampled institutions for the elderly and the community as a whole (for the free living) to ascertain institutional and free living characteristics that promote nutritional status of the elderly and determine both individuals, structural factors and functionality of the elderly in Trans Nzoia County. Two doctors, two clinical officers, six care givers, four nurses who are attached to the elderly homes, and two nutritionists were interviewed using the key informant guide to establish the nutritional status of the elderly and its associated factors at the facility, elderly homes and at community levels. This helped in pointing out factors leading to nutritional status of the elderly and its associated factors.

### **3.9 Data collection procedures**

Data collection was undertaken using an inclusive individual questionnaire, Focussed Group Discussion Guide and the Key Informant Interview Guide in both the sampled three Institutions and the sampled villages. This was due to the fact that the elderly have various needs and challenges including poor eyesight, language problems, mobility issues and illiteracy (Ethangatta, 1988). The Data collection tools were translated into Kiswahili to cater for those who could not understand English and for easier translation into local languages by the enumerators. Nutrition screening and assessment was undertaken for both Institutionalized and Non-institutionalized elderly

as well as interview on their ability to undertake the activities of daily living. To determine the characteristics of health care providers and those care givers either at home or institutions, Focussed Group Discussions and Key Informant Interviews were undertaken with various stakeholders.

### **3.9.1 Administration of the Questionnaire**

The interview questionnaire, the key informant interview and focussed groups discussion tools were used to collect quantitative and qualitative data on BMI, height, psychological stress, mid upper arm circumference, food intake, self-view of their nutrition and health status among others.

The key informant interviews were conducted with community gate keepers, public health and medical health professionals and care givers in homes and elderly institutions. The focus group discussions were made possible by utilization of chief's weekly community meetings i.e. Baraza's and care givers who made arrangements to have between eight to twelve elderly individuals for a question and answer session.

For the individual questionnaire, the purposive and deliberate targeting was used where enumerators were using the list of villages they had been provided which included household occupants names especially elderly individual's, household size and other socio-demographic characteristics tied to the household. Once an enumerator arrived in a village, they would first ask to confirm the participant name, sex and age through a series of questions to determine the whether the individual is

best fit to engage in the interview process. Age was also confirmed either by checking their government provided identification card, medical check book or medical card if available.

### **3.9.2 Weight Measurements**

The elderly individuals (both in Institutions and Free Living) weight was measured using a bathroom scale to the nearest 0.1 Kg (Plate 1). The beam balance was carefully calibrated for accuracy with a use of a known weight before each measuring session. The scale was set at zero on a flat surface. The elderly were requested to stand upright and with minimum clothing and no shoes. The measures of their weight were read once the needle stopped wobbling. This procedure and recording of the elderly weight was repeated twice and the average weight recorded (Cogill, 2000).

### **3.9.3 Height Measurement**

The elderly individuals were asked to stand still while their height measures are undertaken with a height meter. The height meter was placed on an even level, flat surface against a wall, tree or door post in relation to where the elderly were found during the assessment. For those elderly who could not stand, the half-arm span distance (from the midline at the sternal notch to the tip of the middle finger taken in centimeters. Height is then calculated by doubling the half arm-span measure). First, the researcher or an individual taking the measurement had to locate and mark the edge of the right collar bone (in the sternal notch) with the pen then asked the elderly individual to place the non-dominant arm in a horizontal position before proceeding to check that the arm is horizontal and in line with shoulders. Using the tape measure, the distance from the mark on the midline at the sternal notch to the tip of the middle

finger was checked before checking that arms are flat and wrist is straight and lastly taking readings in cm. The reading was taken in the nearest 0.5 cm with the head piece being removed and instructions repeated once more and an average height recorded (Cogill, 2000).

### 3.9.4 Body Mass Index

Height and weight were used to compute the nutritional indicator BMI, which is a generic way to estimate the ratio of lean body mass to fat percentage in one's body. This was calculated by dividing the weight in kilogram by height in meters squared. This was then compared to the WHO/FAO reference chart with BMI cut of points, which are categorized as: Underweight (BMI < 18.5 Kgs/M<sup>2</sup>), normal (BMI 18.5 - 24.9 Kgs/M<sup>2</sup>), Overweight (BMI 25 - 29.9 Kgs/M<sup>2</sup>) and Obese (BMI 30 or greater) (WHO/FAO, 2003). However, for those elderly individual who were unable to stand on the bathroom scale, their BMI was established by the use of MUAC, where a MUAC < 23.5 cm is likely to have a BMI of < 20 Kg/M<sup>2</sup> and if the MUAC measure was less than 32.0 cm, then the BMI was likely to be > 30 Kg/M<sup>2</sup> (Table 3.3).

**Table 3.3: BMI cut-off points for classification of Nutritional Status**

<b>BMI</b>	<b>Nutritional status</b>
<18.5 Kgs/M <sup>2</sup>	Underweight
18.5 - 24.9 Kgs/M <sup>2</sup>	Normal
25 - 29.9 Kgs/M <sup>2</sup>	Overweight
30 or greater	Obese

Source: WHO, 2011.

### 3.9.5 Mid Upper Arm Circumference

Elderly persons were asked to bend their non-dominant arm at the elbow at a right angle the palm up. The distance between the acromial surface of the scapula and the

olecranon process of the elbow on the back of the arm was measured. The mid-point between the two was marked with a pen. The elderly individual was then asked to let the arm hang loosely by their side. The tape measure was then positioned at the mid-point on the upper arm and tightened snugly. Pinching or causing indentation was avoided and the measure recorded in centimeters.

### **3.10 Data analysis, data quality control and presentation**

The Data collected from elderly institutions in elderly institutions and in their free living settings including record reviews provided the quantitative information for the study while the key informants and focus group discussions were largely qualitative and were therefore collated and verified for accuracy. Quantitative data were entered into a password protected computer database and content analyzed using Nutri-survey data analysis software to determine nutritional status and factors affecting the nutritional status of the free living and institutionalized elderly. Qualitative data were entered into a password protected database and content analyzed using QSR Nvivo to determine factors affecting the nutritional status of the free living and institutionalized elderly in Trans Nzoia County. The recordings of the FGDs were transcribed and main concepts identified. The qualitative data were triangulated with the quantitative data to enhance validity and reliability of the study findings. Used questionnaires were kept in a lockable cabinet only accessible to the lead investigator.

Data quality was enhanced at all stages of data collection, entry and analysis. The entered data were coded and for the specified questions and cleaning done. Each record was assigned a unique identifier and individual's names were dropped so as to

maintain participants' confidentiality. Respondent's characteristics are represented in form of tables, texts figures, charts and graphs which illustrates the distribution of social demographic factors, Factors, Socio economic status and their functionality and physical activities, health seeking behavior leading to certain food selection in areas of nutrition and development of basic essential nutrition actions in the study area as a set of proven interventions. Qualities of data were assessed by conducting consistency checks. Continuous variables such as age were summarized using central tendency measures such as mean, mode, median and measures of dispersion such as standard deviation and variance. Associations of categorical variables were also demonstrated using the chi square tests and all statistical tests performed at 5% significance level (95% confidence level). Logistical regression analyses were performed to determine independent predictors of different causes of malnutrition while their relationship determined using correlation. All data were checked for anomalies, continuous variables were presented as mean plus-minus standard error and categorical variables expressed as frequencies and percentages.

Differences in nutritional status were analyzed by the chi-square test for categorical variables. Pearson moment correlation coefficients (Pearson's  $r$ ) were determined in correlation analysis for linear relations between total nutrition status scores and continuous variables. Multivariate analyses with logistic regression analysis were used to determine the relationship between qualitative and quantitative independent verses dependent variables, and to find independent variables influencing nutritional status of the group. The total score of nutrition status was used as the dependent variable for

multiple regression analysis. A P-value of  $< 0.05$  was considered significant in the analysis and interpretation of study results.

### **3.11 Logistical and ethical Considerations**

Permission to carry out study were sought from Kenyatta University Ethics Review Committee and research permit sought from the National council for Science and Technology (NACOSTI) prior to the study. Informed consents were obtained from the study participants. All participants were informed about the objectives of the study while confidentiality and anonymity was maintained by not using names of the study participants in the research instruments. McLeod, 2004 states that a feasible research adheres to professionalism, obligations to respondents and potential users of the research findings. Ethics are moral principles that guide the ways in which individuals treat their fellow human beings in situations where they can cause actual or potential harm and also in case of funding one compromises the quality of findings-research to save money or time or sponsors demanding that findings be distorted. Participants were informed about their rights to discontinue his/her participation from the study at a by point of data collection. Nutrition and health counselling was given to all the elderly participants including their care givers especially those found to be malnourished or at risk of malnourishment including those who were overweight with the aim of improving their overall nutrition status.

## CHAPTER FOUR: RESULTS

### 4.1 Overview

This chapter provides the findings of the study with regard to the stated objectives, hypotheses and research questions. It provides detailed information on the main study findings and descriptive explanation of those results.

### 4.2 Socio demographic characteristics of the elderly

The study showed that the oldest elderly individual was aged 106 years while the youngest elderly person having 60 years with a mean age of  $75.37 \pm 9.767$  as shown in Table 4.1.

#### 4.2.1 Respondents Gender and Type of Residence by age

The elderly average weight as determined was  $54.63 \pm 9.190$  where the minimum weight as measured was 31 Kgs and the highest being 71 Kgs. The mean height of the elderly was  $157.45 \pm 10.11$  with the minimum being 106 cm and the maximum height measured noted as 182 cm.

**Table: 4.1 Distribution of respondents by type of residence and gender**

Age Category	Elderly Residence by Gender			
	Institutionalized		Non-Institutionalized	
	Male n (%)	Female n (%)	Male n (%)	Female n (%)
60 – 65	3 (1.0)	3 (1.0)	20 (6.7)	68 (22.7)
66 – 70	0 (0.0)	2 (0.7)	14 (4.7)	35 (11.7)
71 – 75	2 (0.7)	3 (1.0)	9 (3.0)	23 (7.7)
76 – 80	3 (1.0)	4 (1.3)	12 (4.0)	19 (6.3)
81 – 85	7 (2.3)	8 (2.7)	8 (2.7)	11 (3.7)
86 – 90	7 (2.3)	13 (4.3)	2 (0.7)	7 (2.3)
91 +	4 (1.3)	10 (3.3)	2 (0.7)	1 (0.3)
Total	26 (8.7)	43 (14.3)	67 (22.3)	164 (54.7)

**$\chi^2 = 6.442, df = 6, P = 0.000$**

The number of respondents in total was 300. Sixty nine (23%) of the participants were living in institutions while two hundred of interviewed participants were living freely i.e. in non-institutions. Most of participants were 207 (69%) were female with only 93% (31%) of those interviewed being male (Table 4.1). Most of participants were 207 (69%) were female with only 93% (31%) of those interviewed being male (Table 4.1). As shown in Table 4.1, there was a significant relationship between the elderly age and type of residency with gender ( $\chi^2 = 6.442$ ,  $df = 6$ ,  $P = 0.000$ ).

### 4.3 Socio-economic characteristics of the Elderly

On elderly marital status, it was determined that majority of them were married (56.3%) as compared to those who were widowed or widowers (30%), those who were divorced (7%) and those who had separated because of one reason or another (2%) (Table 4.2).

**Table 4.2 Socio-economic characteristics of respondents**

<b>Socio-demographic characteristics</b>	<b>Variables</b>	<b>n (%)</b>
Marital status	Married	178 (56.3%)
	Divorced	7 (7.0%)
	Separated	6 (2.0%)
	Widow/Widower	95 (30.0%)
	Never married	14 (4.7%)
Level of Education	Primary	127 (42.3%)
	Secondary	131 (43.7%)
	Tertiary	42 (14.0%)
Occupation	Farmers (Casual/manual jobs)	92 (30.7%)
	Social safety nets (GoK transfers)	40 (13.3%)
	Self Employed	87 (29.0%)
	Retired (pension)	81 (27.0%)
Bread winner	Self	189 (63.0%)
	Husband	72 (24.0%)
	Relative	28 (9.3%)
	Other-Institution	11 (3.7%)

Most of the elderly had secondary school knowledge (43.7%) with a significant number having a Primary school knowledge (42.3%) and only 14% of the elderly having a tertiary level educational knowledge. In terms of the elderly occupational status tied to income provision, it was determined that some of them relied on Social safety nets such as GoK cash transfers e.t.c. (13.3%) or self-employed (29%) while 27% of the interviewed elderly had retired from active employment hence relying on pension with 30.7% of them noting to be farmers or being engaged in menial works in the community. On the question of who was the bread winner in the households and/institutions (those who were paying for their upkeep in those institutions), majority (63%) of the elderly reported that they were the breadwinners followed by those who reported that husbands were the bread winners (24%), 9.3% of the interviewed elderly reporting that relative(s) being the bread winner while the rest (3.7%) noting that either institutions or other faucets do provide for them (Table 4.2).

#### **4.4 Nutritional status of institutionalized and free living elderly**

Nutritional status of the elderly population in Trans Nzoia district is presented in Table 4.3; in relation to variables linked to age, gender and place of residence.

##### **4.4.1 Nutritional status of respondents by Mid Upper Arm Circumference (MUAC)**

Majority 221 (73.7%) of the elderly had a MUAC of more than 22 cm or greater while those who had a MUAC of between 21-22 cm were the least at 30 (10%) with those having MUAC of less than 21cm proportioning to 16.3%.

**Table 4.3: Anthropometric measures by age of the Elderly**

Age Category	Mid Upper Arm Circumference (MUAC) in cm		
	MUAC less than 21 cm n (%)	MUAC 21 to 22 cm n (%)	MUAC 22 cm and Above n (%)
60 – 65	10 (3.3)	8 (2.7)	76 (25.3)
66 – 70	4 (1.3)	1 (0.3)	46 (15.3)
71 – 75	6 (2)	4 (1.3)	27 (9)
76 - 80	10 (3.3)	1 (0.3)	27 (9)
81 - 85	6 (2)	9 (3)	19 (6.3)
86 - 90	5 (1.7)	4 (1.3)	20 (6.7)
91 +	8 (2.7)	3 (1)	6 (2)
Total	49 (16.3)	30 (10)	221 (73.7)

$\chi^2 = 16.072, df = 12, P = 0.258$

There was no significant relationship between the age of the elderly and MUAC with the Chi-Square of ( $\chi^2 = 16.072, df = 12$ ),  $P = 0.258$ .

#### 4.4.2 Nutritional status of respondents by Body Mass Index

Nutritional status as measured by BMI was tabulated with the age of the elderly to determine their level of significance and correlation as shown in Table 4.4.

**Table 4.4 Body Mass Index by age of the Elderly**

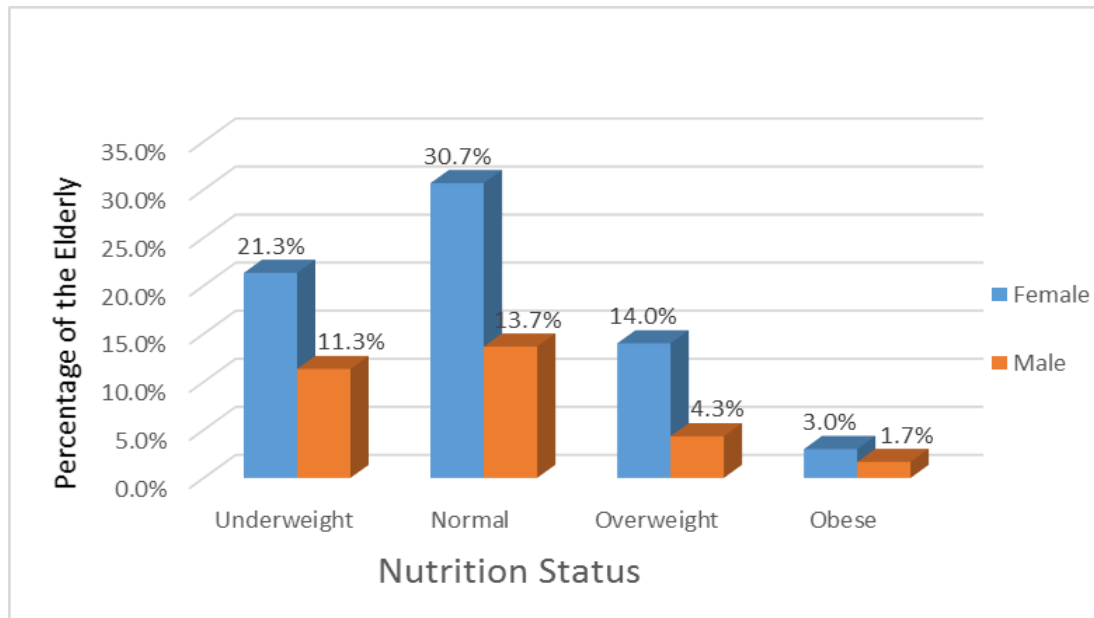
Age Category	Body Mass Index				Total n (%)
	Underweight (<18.5 Kgs/M2) n (%)	Normal (18.5 - 24.9 Kgs/M2) n (%)	Overweight (25 - 29.9 Kgs/M2) n (%)	Obese (30 or greater) n (%)	
60 - 65	12 (4)	50(16.7)	26 (8.7)	6 (2)	94 (31.3)
66 - 70	6 (2)	29 (9.7)	14 (4.7)	2 (0.7)	51 (17)
71 - 75	5 (1.7)	22 (7.3)	8 (2.7)	2 (0.7)	37 (12.3)
76 - 80	17 (5.7)	14 (4.7)	5 (1.7)	2 (0.7)	38 (12.7)
81 - 85	21 (7)	11 (3.7)	2 (0.7)	0 (0)	34 (11.3)
86 - 90	21 (7)	7 (2.3)	0 (0)	1 (0.3)	29 (9.7)
91 +	16 (5.3)	0 (0)	0 (0)	1 (0.3)	17 (5.7)
Total	98 (32.7)	133 (44.3)	55 (18.3)	14 (4.7)	300 (100)

$\chi^2 = 76.506, df = 18, P = 0.000$

As shown in table 4.4, about 33% (n=98) of the elderly were underweight with almost 5% (n=14) of the elderly being Obese. It was also determined that there was a

significant relationship between the age of the elderly and their body mass index ( $\chi^2 = 76.506$ ,  $df = 18$ ,  $P = 0.000$ ).

#### 4.4.2.1 Body Mass Index by gender of the Elderly



**Figure 4.1: Body Mass Index by gender of the Elderly**

Figure 4.1 shows how there were more women than men in all nutritional status levels. The proportion of women to men who were underweight is 21.3% to 11.3% with those women who were overweight being more (14%) than Men (4.3%). Results also showed that only 1.7% of men were underweight as compared to 3% of women who were found to be underweight. This measure of the elderly showed that there was no significant relationship between Body Mass Index and gender ( $\chi^2 = 2.167$ ,  $df = 3$ ,  $P = 0.539$ ).

#### 4.4.2.2 Body Mass Index of the elderly and their place of residence

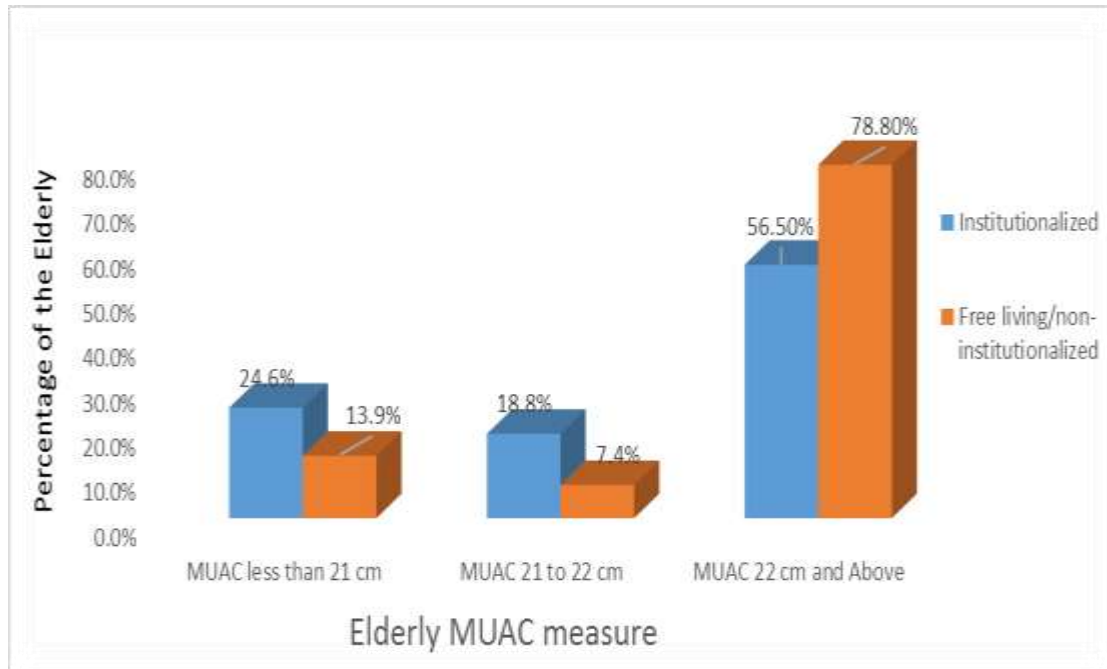
Nutritional status was cross tabulated by the elderly type of residence to determine any correlation thereof in the two variables as shown in table 4.5.

**Table 4.5: Body Mass Index by Elderly Residency**

<b>Body Mass Index</b>	<b>Institutionalized</b>	<b>Non-institutionalized</b>	<b>Total</b>
	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>
Underweight	43 (14.3)	55 (18.3)	98 (32.7)
Normal	20 (6.7)	113 (37.7)	133 (44.3)
Overweight	4 (1.3)	51 (17.0)	55 (18.3)
Obese	2 (0.7)	12 (4.0)	14 (4.7)
Total	69 (23.0)	231 (77.0)	300 (100.0)
<b><math>\chi^2 = 7.163, df = 3, P = 0.001</math></b>			

In determining the distribution of elderly in relation to their Body Mass Index and their residence i.e. whether they live freely or in institutions (Table 4.5). Results showed that majority (18.3%) of the elderly who were underweight were living freely. Results showed also determined that majority of both institutionalized and non-institutionalized were of normal BMI (44.3%). As for those elderly who were obese, majority (4%) were those who are non-institutionalized as compared to a small margin (0.7%) of those who were institutionalized. There was a significant relationship between Body Mass Index and institutionalization of the elderly in Trans Nzoia County ( $\chi^2 = 7.163, df = 3, P = 0.001$ ).

#### 4.3.4 The Mid Upper Arm Circumference Measurement by residence of the Elderly



**Figure 4.2: Mid Upper Arm Circumference by Elderly residence status**

Most of the elderly in who were both living freely (78.8%) and in institutions (56.5%) had a Mid Upper Arm Circumference of 22 centimeters and above as shown in figure 4.2. Majority (24.6%) of elderly in institutions had a Mid Upper Arm Circumference of less than 21 centimeters as compared to their counterparts who were free living or in non-institutions (13.9%). Same scenario was illustrated in the elderly who were freely living (7.4%) and institutionalized (18.8%) with a Mid Upper Arm Circumference of between 21 centimeters to 22 centimeters. There was no significant relationship between the Mid Upper Arm Circumference and the residence of the elderly in the county ( $\chi^2 = 5.363$ ,  $df = 2$ ,  $P = 0.219$ ).

### 4.3.5 The distribution of the Mid Upper Arm Circumference of the Elderly by Gender

As shown in computed table 4.6 of Mid Upper Arm Circumference by gender of the elderly, a higher proportion of women (20.3%) had a Mid Upper Arm Circumference of less than 21 cm as compared to their male counterparts (7.5%).

**Table 4.6: Mid Upper Arm Circumference by Elderly Gender**

Gender	Mid Upper Arm Circumference (MUAC) in cm			Total n (%)
	MUAC less than 21 cm n (%)	MUAC 21 to 22 cm n (%)	MUAC 22 cm and Above n (%)	
	Female	42 (20.3)	18 (8.7)	
Male	7 (7.5)	12 (12.9)	74 (79.6)	93 (100.0)
Total	49 (16.3)	30 (10.0)	221 (73.7)	300 (100.0)

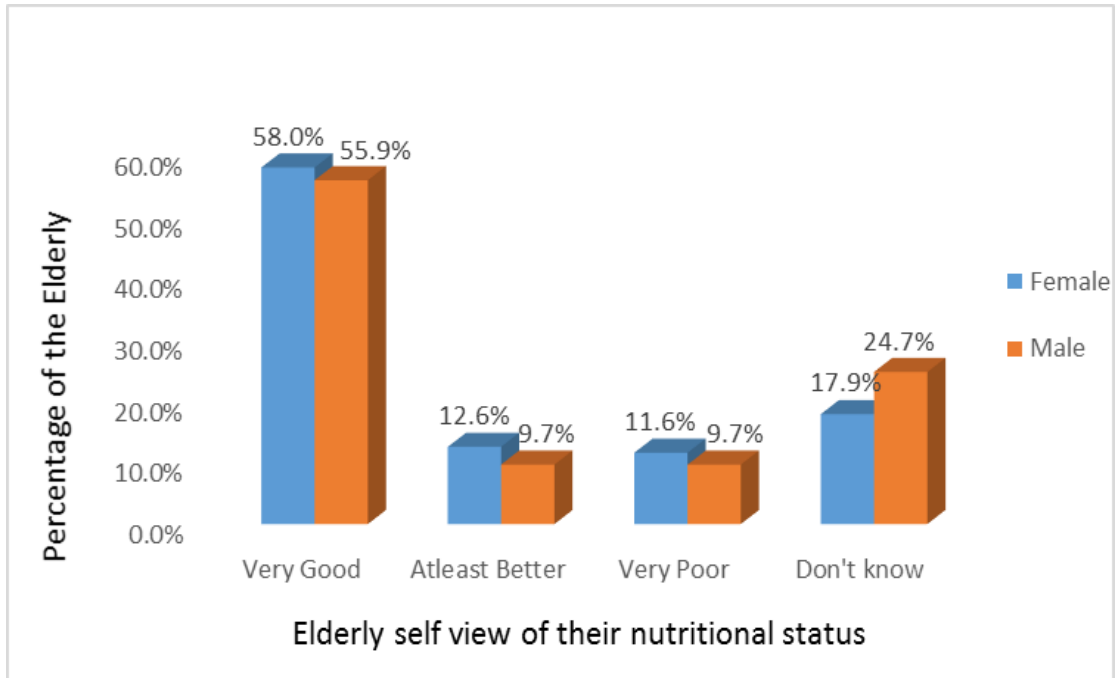
**$\chi^2 = 8.173, df = 2, P = 0.000$**

On the other hand, there were more male (79.6%) with a Mid Upper Arm Circumference of 22 centimeters and above as compared to female (71%) with almost the same margin of the elderly with a Mid Upper Arm Circumference of between 21 centimeters to 22 centimeters of male (12.9%) and women (8.7%). The measured results showed that there was a significant relationship between gender and Mid Upper Arm Circumference of the elderly ( $\chi^2 = 8.173, df = 2, P = 0.000$ ). T-test was then undertaken to determine the level of significance which indicated that the Mid Upper Arm Circumference mean measure for women ( $0.67 \pm 0.152$ ) was higher than that of men ( $0.61 \pm 0.130$ ),  $t = 6.414, df = 298, p = 0.732$ .

### 4.3.6 Self-view of Nutrition status by the Elderly

Figure 4.3, shows that many (58%) female elderly reported that their nutritional status was very good as compared to their male counterparts (55.9%).

#### 4.3.6.1 Self-view of Nutrition Status by Gender of the Elderly



**Figure 4.3: Self-view of Nutrition Status by Gender of the Elderly**

Figure 4.3, shows that many (58%) female elderly reported that their nutritional status was very good as compared to their male counterparts (55.9%). On a similar level, it was reported that many females (11.6%) viewed their nutritonal status as being very poor as comapred to males (9.7%). It is also noted that-of all respondents who didn't know or give any view of their nutritional status, most were men (24.7%) as compared to women (17.9%). The results did show that there was no significant relationship between elderly self view of their nutritional status by Gender ( $\chi^2 = 2.227$ ,  $df = 3$ ,  $P = 0.527$ ).

#### 4.3.6.2 Self-view of nutrition status By Residence of the Elderly

Most of the elderly (57.3%) reported to have a very good nutritional status i.e. having no nutritional problems. Of those who reported to not having nutritional problems, 63.8% were living in institutions as shown in Table 4.7.

**Table 4.7: Self-view of Nutrition Status By Elderly residence**

Elderly self-view of Nutrition Status	Institutionalized	Non-Institutionalized	Total
	n (%)	n (%)	n (%)
Very Good	44 (63.8)	128 (55.4)	172 (57.3)
At least Better	8 (11.6)	27 (11.7)	35 (11.7)
Very Poor	8 (11.6)	25 (10.8)	33 (11.0)
Don't know	9 (13.0)	51 (22.1)	60 (20.0)
Total	69 (100.0)	231 (100.0)	300 (100.0)

**( $\chi^2 = 2.845$ ,  $df = 3$ ,  $P = 0.416$ )**

Eleven percentage of the elderly reported to have self-viewed their nutritional status as very poor with the majority (10.8%) of them living in Non- Institutions-free living. There was no significant relationship between the places of residence (Institution vs free living-Non-Institution) by residency ( $\chi^2 = 2.845$ ,  $df = 3$ ,  $P = 0.416$ ).

#### 4.3.6.3 Self-view of Nutrition Status By BMI of the Elderly

More than half of respondents (57.3%) reported to have very good nutritional status (no nutritional problems) (Table 4.8).

**Table 4.8: Self-view of Nutrition Status by Elderly Body Mass Index**

<b>Body Mass Index</b>	<b>Elderly Self-View of Nutrition Status</b>				<b>Total n (%)</b>
	<b>Very Good n (%)</b>	<b>At least Better n (%)</b>	<b>Very Poor n (%)</b>	<b>Don't know n (%)</b>	
Underweight	57 (19.0)	14 (4.7)	11 (3.7)	16 (5.3)	98 (32.7)
Normal	77 (25.7)	13 (4.3)	13 (4.3)	30 (10.0)	133 (44.3)
Overweight	29 (9.7)	8 (2.7)	7 (2.3)	11 (3.7)	55 (18.3)
Obese	9 (3.0)	0 (0.0)	2 (0.7)	3 (1.0)	14 (4.7)
<b>Total</b>	<b>172 (57.3)</b>	<b>35 (11.7)</b>	<b>33 (11 )</b>	<b>60 (20.0)</b>	<b>300 (100)</b>

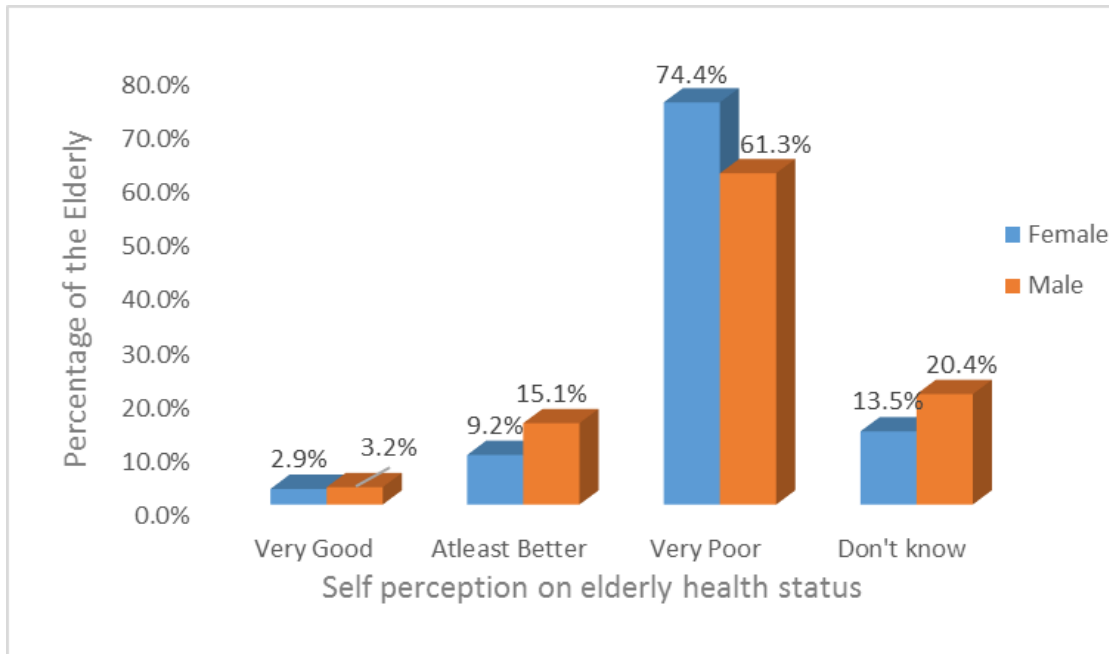
**( $\chi^2 = 4.932$ ,  $df = 3$ ,  $P = 0.840$ )**

A significant proportion (19%) of those who reported to be of very good nutritional status were underweight. Only 4.3% of those who were normal reported to have a very poor nutritional status with a bigger proportion of elderly (20%) reporting of not knowing what their nutritional status were at the time of interview. There was no significant relationship between Body Mass Index and Elderly nutritional status among the elderly in Trans Nzoia County ( $\chi^2 = 4.932$ ,  $df = 3$ ,  $P = 0.840$ ).

#### **4.3.7 Self-view of Health Status by the Elderly**

As highlighted in figure 4.4, most of the Female Elderly (74.4%) reported to have a very poor health status as compared to their male counterparts (61.3%).

#### 4.3.7.1 Self-view of Health Status by Gender of the Elderly



**Figure 4.4: Self-view of Health status by Gender of the Elderly**

A small proportion of female (2.9%) as compared to their male counterparts (3.2%) reported that their health status was very good with 15.1% of Men reporting that their health status was at least better as compared to 9.2% of interviewed women. The results showed that there was no significant relationship between elderly self-view of their status and gender ( $\chi^2 = 5.556$ ,  $df = 3$ ,  $P = 0.135$ ).

#### 4.3.7.2 Self-view of Health Status By Residence of the Elderly

Most of the elderly (69.3%) who live freely reported to have a very poor health status as compared to those elderly who reported to have a very good health status (2.2%). As for those who live in institutions, most of them (73%) reported to be of a very poor health status with only 5.8% reporting to be of very good health status (Table 4.9).

**Table 4.9: Self-view of Health Status By Elderly residence**

<b>Elderly self-view of health status</b>	<b>Institutionalized</b>	<b>Non-Institutionalized</b>	<b>Total</b>
	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>
Very Good	4 (5.8)	5 (2.2)	9 (3.0)
At least Better	7 (10.1)	26 (11.3)	33 (11.0)
Very Poor	51 (73.9)	160 (69.3)	211 (70.3)
Don't know	7 (10.1)	40 (17.3)	47 (15.7)
Total	69 (100.0)	231 (100.0)	300 (100.0)

$(\chi^2 = 4.304, df = 3, P = 0.230)$

It was also noted that 10.1% of those living in institutions and 17.3% of those living freely (Non-institutions) reported to not knowing or unable to self-evaluate their health status. There was no significant relationship between elderly self-view of their health status and their place of residence ( $\chi^2 = 4.304, df = 3, P = 0.230$ ).

#### 4.3.7.3 Self-view of Health Status by the Body Mass Index of the Elderly

When the elderly were asked to describe their health status as compared to other people of same age group, varied responses were noted then categorized in relation to the best fitting as per the researchers coded option which included; very Good, at least Better and very poor including don't know for those elderly who were not able to gauge or self-evaluate themselves.

**Table 4.10: Self-view of Health Status By the Elderly Body Mass Index**

<b>Body Mass Index</b>	<b>Elderly view on their status</b>				<b>Total n (%)</b>
	<b>Very Good n (%)</b>	<b>At least Better n (%)</b>	<b>Very Poor n (%)</b>	<b>Don't know n (%)</b>	
Underweight	3 (1.0)	14 (4.7)	69 (23.0)	12 (4.0)	98 (32.7)
Normal	3 (1.0)	14 (4.7)	89 (29.7)	27 (9.0)	133 (44.3)
Overweight	3 (1.0)	4 (1.3)	41 (13.7)	7 (2.3)	55 (18.3)
Obese	0 (0.0)	1 (.3)	12 (4.0)	1 (0.3)	14 (4.7)
Total	9 (3.0)	33 (11.0)	211 (70.3)	47 (15.7)	300 (100)

$(\chi^2 = 7.983, df = 3, P = 0.036)$

Table 4.10 denotes that a small proportion of the elderly (3%) thought that their health was very good with the majority (70.3%) self-evaluating themselves of having a very poor health status. Majority (13.7%) of elderly who were overweight reported to have a very poor health status as compared to only 1% of those who reported to having a very good health status. The results showed that there was a significant relationship between BMI and health status ( $\chi^2 = 7.983$ ,  $df = 3$ ,  $P = 0.036$ ), and a positive correlation between health status and BMI which was also significant ( $r = 1.437$ ,  $P = 0.051$ ).

#### **4.4 Individual and Structural Factors Influencing Nutritional Status of the Elderly**

These are individual related conditions and internal factors influencing nutritional status in old age individuals. Most of the common nutritional related challenges the study found are as outlined in the sections that follows.

##### **4.4.1 Individual Factors Influencing Nutritional Status of the Elderly**

###### **4.4.1.1 Elderly nutrition status by reliance to a care giver**

Table 4.11 shows the reliance of the elderly to care givers both in institutions and Non institutions. Results show that 45.7% of those elderly interviewed rely on the services of care givers while 54.3% do not have care givers or anybody to help them with chores.

**Table 4.11: Body Mass Index By Reliance to a Care Giver**

Body Mass Index	Caregiver as a helper in undertaking household chores		Total n (%)
	Having a caregiver n (%)	No Caregiver n (%)	
Underweight	39 (13.0)	59 (19.7)	98 (32.7)
Normal	63 (21.0)	70 (23.3)	133 (44.3)
Overweight	28 (9.3)	27 (9.0)	55 (18.3)
Obese	7 (2.3)	7 (2.3)	14 (4.7)
Total	137 (45.7)	163 (54.3)	300 (100.0)
<b>(<math>\chi^2 = 2.232</math>, <math>df = 3</math>, <math>P = 0.526</math>)</b>			

Of those elderly who rely on care givers, it was shown that 9.3% of them are overweight while 13% are of them are underweight. Of those who did not have or don't rely on care givers, it was reported that 19.7% were underweight as compared to 23.3% who were normal. The proportion of elderly who were obese and relied on caregivers and those who didn't were both 2.3% in proportion. The results showed that there was no significant relationship between nutrition status and reliance on care giver ( $\chi^2 = 2.232$ ,  $df = 3$ ,  $P = 0.526$ ).

#### 4.4.1.2 Elderly Nutrition Status by Ingestion of Drugs

Table 4.12 shows the proportion of the elderly who were ingesting prescribed drugs and medicine.

**Table 4.12: Body Mass Index By Ingestion of Drugs Among the Elderly**

Body Mass Index	Ingestion of Prescribed drugs-Medicine		Total n (%)
	Ingest n (%)	Doesn't ingest n (%)	
Underweight	86 (28.7)	12 (4.0)	98 (32.7)
Normal	109 (36.3)	24 (8.0)	133 (44.3)
Overweight	43 (14.3)	12 (4.0)	55 (18.3)
Obese	12 (4.0)	2 (.7)	14 (4.7)
Total	250 (83.3)	50 (16.7)	300 (100.0)
<b>(<math>\chi^2 = 2.670</math>, <math>df = 3</math>, <math>P = 0.445</math>)</b>			

It was noted that majority of the elderly (83.3%) were ingesting drugs as compared to 16.7% who were not on any drugs. It was also determined that 32.7% of underweight elderly were utilizing drugs while 18.9% of those who were overweight were on drugs as compared to 4.7% of those in drugs who were obese. There was no significant relationship between nutritional status and ingestion of prescribed drugs or medication ( $\chi^2 = 2.670$ ,  $df = 3$ ,  $P = 0.445$ ).

#### 4.4.1.3 Gender of the Elderly by Ingestion of Prescribed Drugs

Table 4.13 denotes that there were more female (58%) than male (25.3%) who were on prescribed drugs.

**Table 4.13 Gender and Ingestion of Prescribed Drugs by the Elderly**

Elderly Gender	Ingestion of Prescribed drugs- Medicine		Total n (%)
	Ingest n (%)	Doesn't ingest n (%)	
Female	174 (58.0)	33 (11.0)	207 (69.0)
Male	76 (25.3)	17 (5.7)	93 (31.0)
Total	250 (83.3)	50 (16.7)	300 (100.0)

**( $\chi^2 = 1.252$ ,  $df = 1$ ,  $P = 0.615$ )**

Only 11% of interviewed female respondents reported to not using prescribed drugs or medication while only 5.7% of male reported to not using any drugs or medication. The results showed that there was no significant relationship between gender and use of prescribed drugs among the interviewed elderly ( $\chi^2 = 1.252$ ,  $df = 1$ ,  $P = 0.615$ ).

#### 4.4.1.4 Elderly Nutrition Status by Smoking

Most of the underweight elderly (43.5%) were not sure of their eating habits while a large proportion (36%) of the underweight reported to be eating unhealthy (Table 4.14).

**Table 4.14: Body Mass Index and Smoking Among the Elderly**

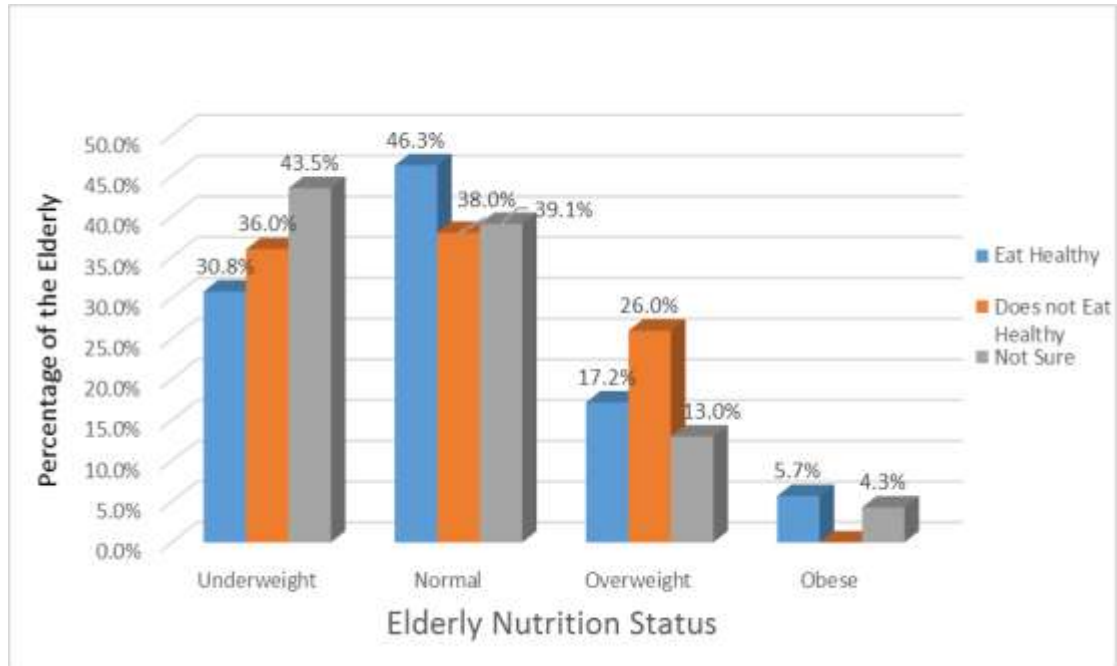
Body Mass Index	Smoke cigarettes		Total n (%)
	Smoking n (%)	Not Smoking n (%)	
Underweight	23 (30.3)	75 (33.5)	98 (32.7)
Normal	32 (42.1)	101 (45.1)	133 (44.3)
Overweight	17 (22.4)	38 (17.0)	55 (18.3)
Obese	4 (5.3)	10 (4.5)	14 (4.7)
Total	76 (100.0)	224 (100.0)	300 (100.0)

**( $\chi^2 = 1.276$ ,  $df = 3$ ,  $P = 0.015$ );  $t = 6.944$ ,  $df = 299$ ,  $p = < 0.025$ )**

Though majority of the elderly are not smokers (74.7%), a significant proportion (22.4%) of those who are at risk of obese were smokers with a large proportion (30.3%) of those who were underweight also reporting to be smokers. There was a significant relationship between nutrition status of the elderly and smoking ( $\chi^2 = 1.276$ ,  $df = 3$ ,  $P = 0.015$ ) with those elderly who were smoking having negative health effects ( $1.747 \pm 1.703$ ) than those who were non-smokers ( $1.937 \pm 1.801$ ),  $t = 6.944$ ,  $df = 299$ ,  $p = < 0.025$ .

#### **4.4.1.5 Nutrition Status by Healthy or Unhealthy Eating Patterns of the Elderly**

Majority (46.3%) of those with normal nutrition status reported to be eating healthy. As for those who were overweight, majority of them (26%) reported to eat unhealthy with 13% of them not sure if their eating habits were healthy or unhealthy (Figure 4.5).



**Figure 4.5: Body Mass Index and Healthy or Unhealthy Eating Among the Elderly**

There was a significant relationship between elderly nutrition status and eating habits ( $\chi^2 = 3.011$ ,  $df = 6$ ,  $P = 0.020$ ).

#### **4.4.1.6 Nutrition Status by Lack of Appetite Among the Elderly**

Another individual factor as determined to affect nutritional status of the Elderly was meal skipping by the elderly due to lack of appetite as shown on Table 4.15.

**Table 4.15: Body Mass Index and Lack of Appetite Among the Elderly**

Body Mass Index	Skipping meals due to lack of appetite		Total n (%)
	Has ever lacked Appetite n (%)	Never lacked appetite n (%)	
Underweight	92 (33.7)	5 (19.2)	97 (32.4)
Normal	120 (44.0)	13 (50.0)	133 (44.5)
Overweight	47 (17.2)	8 (30.8)	55 (18.4)
Obese	14 (5.1)	0 (0.0)	14 (4.7)
Total	273 (100.0)	26 (100.0)	299 (100.0)

$$(\chi^2 = 5.531, df = 3, P = 0.143)$$

It was reported that most (33.7%) of those who were underweight did skip meals due to lack of appetite for food while 17.2% of those who were overweight did skip meals due to lack of appetite for food (Table 4.15). There was no significant relationship between nutritional status and skipping of meals due to lack of appetite ( $\chi^2 = 5.531, df = 3, P = 0.143$ ).

#### 4.4.1.7 Elderly Nutrition Status by Source of Food

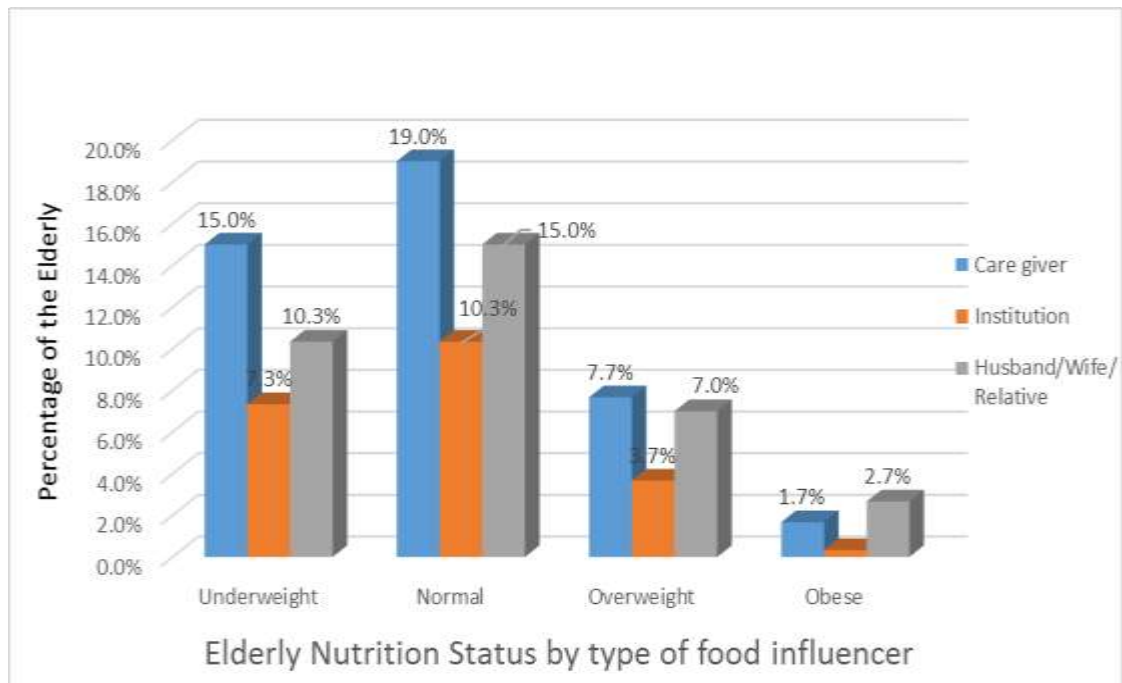
**Table 4.16: Body Mass Index By Food Source Among the Elderly**

Body Mass Index	Source of Food				Total n (%)
	Purchase n (%)	From the farm n (%)	Institution n (%)	Welfare n (%)	
Underweight	8 (2.7)	42 (14.0)	41 (13.7)	7 (2.3)	98 (32.7)
Normal	18 (6.0)	70 (23.3)	21 (7.0)	24 (8.0)	133 (44.3)
Overweight	3 (1.0)	35 (11.7)	4 (1.3)	13 (4.3)	55 (18.3)
Obese	1 (0.3)	10 (3.0)	3 (1.0)	1 (0.3)	14 (4.7)
Total	31 (10.0)	157 (51.0)	69 (23.3)	43 (14.7)	300 (100.0)

$$(\chi^2 = 4.2341, df = 9, P = 0.000); t = 1.313, df = 299, p = < 0.022$$

The elderly nutritional status were also being influenced by sources of food as shown in Table 4.17. It was recorded that most (52%) foods were being sourced or gotten from the farms with a large proportion (23.3%) of them getting food from the institutions they reside in. It was also noted that for those who get their foods in institutions, 13.7% of them are underweight while only 7% of them have a normal nutrition status. There was a significant relationship between nutrition status and source of food ( $\chi^2 = 4.2341$ ,  $df = 9$ ,  $P = 0.000$ ) with food from farms being mostly preferred ( $2.793 \pm 2.640$ ) than food in institutions ( $2.991 \pm 2.940$ )  $t = 1.313$ ,  $df = 299$ ,  $p < 0.022$ .

#### 4.4.1.8 Elderly Nutrition Status by Person who Influences Food Intake



**Figure 4.6: Body Mass Index and Food Influencer Among the Elderly**

It was reported that care givers are the most influencers of the type and amount of food to be taken by the elderly (Figure 4.6). In all nutritional situation, it was also noted that husbands or wives or any relative to the elderly person had a great influence

too but not as big as that of care giver or helper. The institutions were the last option of influence when it came to elderly choice of food types and amount to be ingested. There was no significant relationship between nutrition status of the elderly and the influencer of food intake ( $\chi^2 = 4.491$ ,  $df = 6$ ,  $P = 0.611$ ).

#### 4.5 Structural Factors Influencing Nutritional Status of the Elderly

Various structural factors affecting nutritional status of the elderly also came into play during the interview, these factors leads to either risky effects on the elderly or influence level of their economic status.

##### 4.5.1 Elderly Nutrition Status by Reasons for either or not Accessing Food

###### Markets

It was reported that the greatest impediment to the elderly reaching food markets was culture or taking food as prescribed by culture (66%) as compared to those who reported to be relying on caregiver (17.3%) and markets being far for their reach (16.7%) (Table 4.17).

**Table 4.17: Body Mass Index By Market Access Among the Elderly**

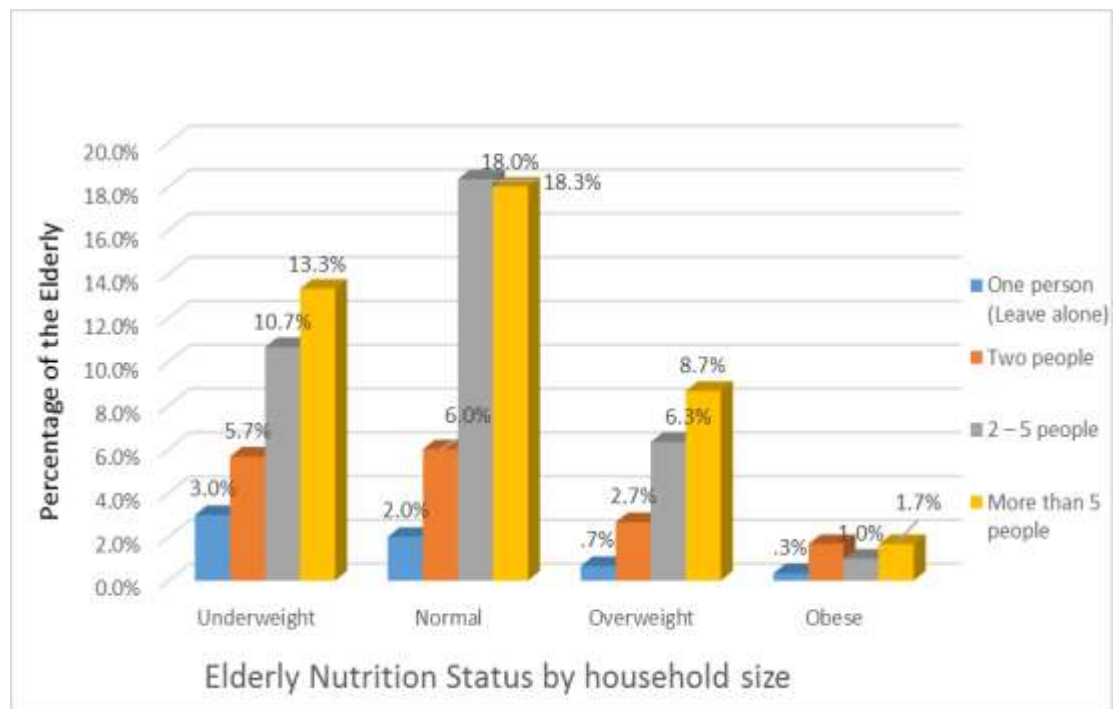
Body Mass Index	Reasons for not being able to access food markets			Total
	Markets are far away from our rural homes	Rely on care givers	Due to culture	
	n (%)	n (%)	n (%)	n (%)
Underweight	29 (9.7)	10 (3.3)	59 (19.7)	98 (32.7)
Normal	18 (6.0)	23 (7.7)	92 (30.7)	133 (44.3)
Overweight	2 (0.7)	13 (4.3)	40 (13.3)	55 (18.3)
Obese	1 (0.3)	6 (2.0)	7 (2.3)	14 (4.7)
Total	50 (16.7)	52 (17.3)	198 (66.0)	300 (100.0)

**( $\chi^2 = 7.989$ ,  $df = 6$ ,  $P = 0.000$ )**

Those who were underweight were the most affected with culture at (19.7%) as compared to those who were overweight. There was a significant relationship between nutrition status and impediments to market access among the Elderly ( $\chi^2 = 7.989$ ,  $df = 6$ ,  $P = 0.000$ ). A t-test was then undertaken to determine the level of significance which showed that-nutritional status mean measure for culture as the main reason impeding elderly from accessing markets was ( $2.493 \pm 2.411$ ) higher than ( $2.173 \pm 2.319$ ) and ( $1.116 \pm 1.714$ ) the other reason tied to markets being far away from their residence, hence making elderly not be able to access the food markets easily,  $t = 5.451$ ,  $df = 299$ ,  $p = 0.765$ .

#### 4.5.2 Elderly Nutrition Status By Size of Household

Majority (13.3%) of the underweight Elderly individuals were reported to be living in a households with the highest number of individuals i.e. more than 5 people (Figure 4.7).



**Figure 4.7: Body Mass Index and Household Size Among the Elderly**

As for those who were of normal nutrition status, it was shown that most (18.3%) of them live in a households with two to five people while most of those households with elderly who were overweight showed to be having more (8.7%) than five individuals. There was no significant relationship between nutritional status and household size of the Elderly ( $\chi^2 = 9.559$ ,  $df = 9$ ,  $P = 0.387$ ).

#### 4.5.3 Elderly Nutrition Status by Impediments to Health Facility Access

Another structural factor as determined was the reasons impeding the elderly to access hospitals in case of need (Table4.18).

**Table 4.18: Body Mass Index and Impediments to Health Facility Access Among the Elderly**

Body Mass Index	Reasons for the elderly not accessing a health facility				Total n (%)
	Lack of transport	Long distance	Too tired and too old to walk	Lack of money to pay for medical services	
	n (%)	n (%)	n (%)	n (%)	
Underweight	42 (14.0)	25 (8.3)	18 (6.0)	13 (4.3)	98 (32.7)
Normal	66 (22.0)	28 (9.3)	24 (8.0)	15 (5.0)	133 (44.3)
Overweight	29 (9.7)	9 (3.0)	11 (3.7)	6 (2.0)	55 (18.3)
Obese	9 (3.0)	2 (0.7)	3 (1.0)	0 (0.0)	14 (4.7)
Total	146 (48.7)	64 (21.3)	56 (18.7)	34 (11.3)	300 (100)

**( $\chi^2 = 5.422$ ,  $df = 9$ ,  $P = 0.134$ )**

Results showed that most (48.7%) were encountering the problem with accessing transport from their residence to the hospital. Most underweight elderly (8.3%) reported that another reasons for their inaccessibility of a health facility was the long distance of the facilities from their residences with most (3%) of those who are obese reporting lack of transport followed by being too tied to walk to the health facilities (1%). There was

no significant relationship between nutritional status and impediments to health facility access among the elderly ( $\chi^2 = 5.422$ ,  $df = 9$ ,  $P = 0.134$ ).

#### 4.5.4 Elderly Nutrition Status by Causes of Elderly hospitalization

Table 4.19 shows the problems facing the elderly leading to their hospitalization.

**Table 4.19: Body Mass Index and Causes of Elderly Hospitalization**

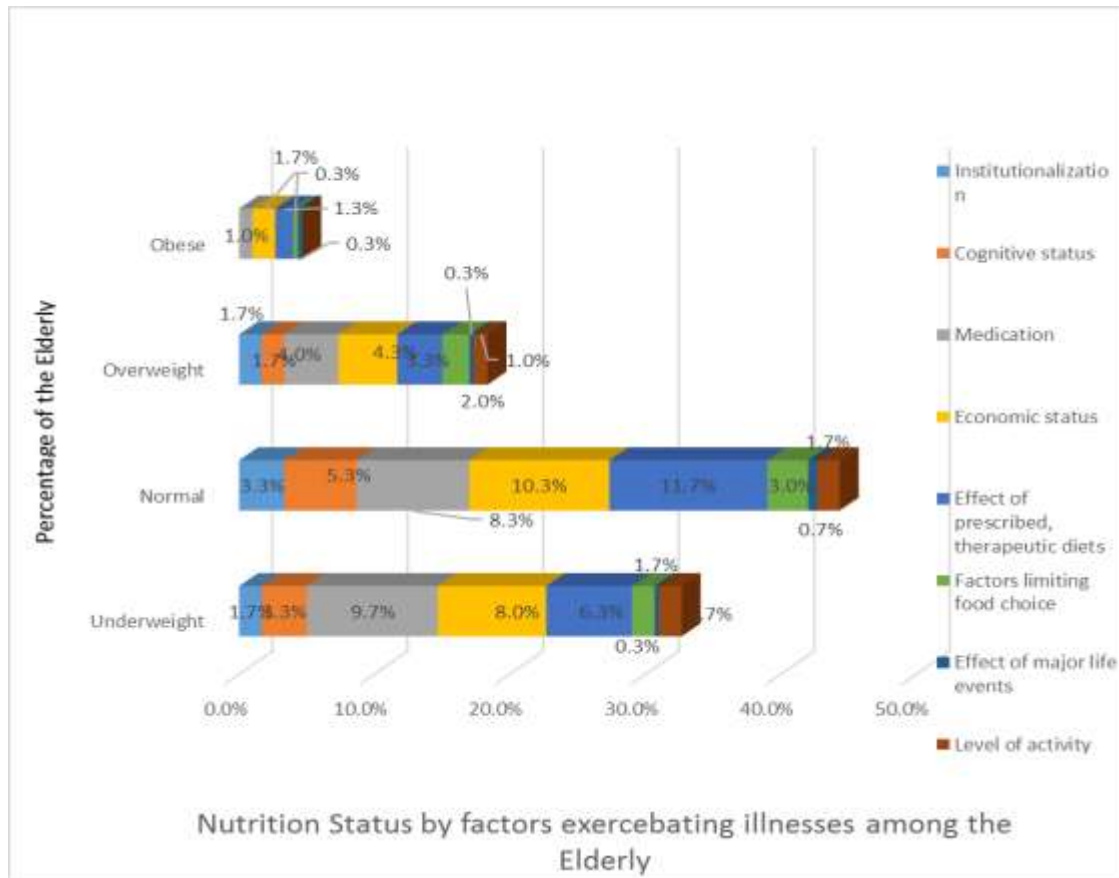
Body Mass Index	Problems leading to hospitalization							Total
	Memory Loss	Chronic or Acute Illnesses	Deterioration of Health Status	Body pains or Muscle pains	Loss of Appetite	Loss of Strength	Dental Problems	
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Underweight	4 (1.3)	4 (1.3)	11 (3.7)	18 (6.0)	26 (8.7)	27 (9.0)	8 (2.7)	98 (32.7)
Normal	5 (1.7)	5 (1.7)	21 (6.7)	32 (11.)	28 (9.3)	32 (10.7)	10 (3.3)	133 (44.3)
Overweight	1 (0.3)	5 (1.7)	5 (1.7)	12 (4.0)	11 (3.7)	16 (5.3)	5 (1.7)	55 (18.3)
Obese	0 (0.0)	1 (0.3)	2 (0.7)	4 (1.3)	5 (1.7)	2 (0.7)	0 (0.0)	14 (4.7)
Total	10 (3.3)	15 (5)	39 (13)	66 (22)	70 (23.3)	77 (25.7)	23 (7.7)	300 (100)

**( $\chi^2 = 10.140$ ,  $df = 18$ ,  $P = 0.110$ )**

Results showed that loss of strength (25.7%) was the major effects/problem followed by loss of appetite (23.3%), and effects of body pains/muscle pains (22%). Apart from those who had normal nutrition status, the underweight (9%) and those overweight (5.3%) were the most affected by loss of strength. There was no significant relationship between nutrition status and causes of elderly hospitalization ( $\chi^2 = 10.140$ ,  $df = 18$ ,  $P = 0.110$ ).

#### 4.5.5 Elderly Nutrition Status by Factors Exacerbating Illnesses

Figure 4.8 denotes that prescribed drugs and therapeutic diets subscribed by the elderly are the exacerbators to elderly illnesses especially those of normal nutrition status (11.7%) followed by underweight (6.3%).



**Figure 4.8: Body Mass Index and Factors Exacerbating Illnesses Among the Elderly**

Economic status followed as the other main cause of underweight elderly nutritional problems (8%) with medication of the underweight elderly (9.7%) being the other main reason that increases illnesses in the elderly population. There was no significant relationship between nutritional status and those noted factors exacerbating illnesses among the elderly population ( $\chi^2 = 15.019$ ,  $df = 21$ ,  $P = 0.282$ ).

#### 4.6 Ability of the elderly in performing functional activities of daily living

On determining the functionability and physical activities of the elderly in trans Nzoia County, the study put into test these key activities of daily living needed to be undertaken by the elderly among other factors such as the elderly dependence and

reliance to various variables. The results weren't any different with small variations or how far one undertakes one activity or is dependent on those variations in relation to the nutrition status.

#### 4.6.1 Dependency Level Among Institutionalized and Free Living Elderly

There were more (11%) free living elderly than Institutionalized ones (6.3%) that were severely dependent (Table 4.20).

**Table 4.20: Level of Dependency By Residence of the Elderly**

Dependency level	Residence		Total n (%)
	Institutionalized n (%)	Free Living n (%)	
Severe	19 (6.3)	33 (11.0)	52 (17.3)
Moderate	20 (6.7)	79 (26.3)	99 (33.0)
Minimal	30 (10.0)	119 (39.7)	149 (49.7)
Total	69 (23.0)	231 (77.0)	300 (100.0)

**( $\chi^2 = 6.510$ , df = 2, P = 0.039); t = 5.425, df = 299, P = < 2.323**

However, severe dependence (11%), moderate dependence (26.3%) and minimal dependence (39.7%) in free living was higher than that of the elderly who were institutionalized. There was a significant relationship between elderly level of dependence and residence ( $\chi^2 = 6.510$ , df = 2, P = 0.039) with institutionalized elderly ( $2.291 \pm 2.242$ ) being more dependent than Free living ( $2.455 \pm 2.416$ ), t = 5.425, df = 299, P = < 2.323.

#### 4.6.2 Dependency Level by Gender of the Elderly

Table 4.21 shows that there were more female (32.3%) who had minimal dependence in carrying out those activities of daily living (ADLs) as compared to their male counterparts (17.3%).

**Table 4.21: Level of dependency and Gender of the Elderly**

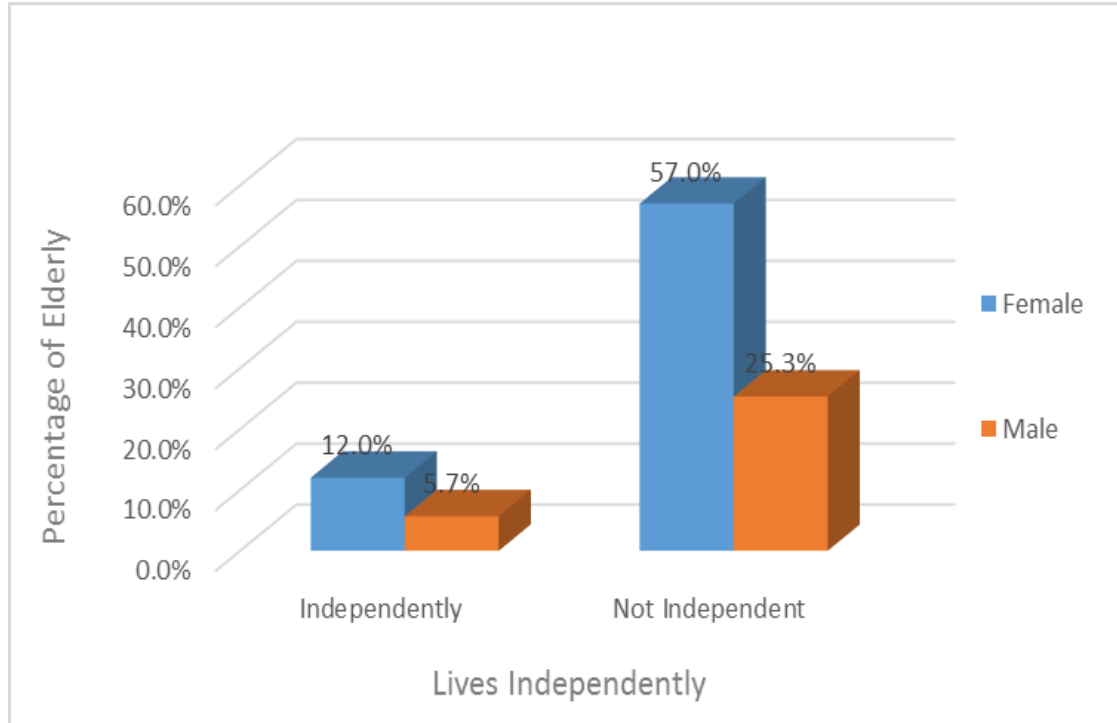
Dependency level	Gender		Total n (%)
	Female n (%)	Male n (%)	
Severe	37 (12.3)	15 (5.0)	52 (17.3)
Moderate	73 (24.3)	26 (8.7)	99 (33.0)
Minimal	97 (32.3)	52 (17.3)	149 (49.7)
Total	207 (69.0)	93 (31.0)	300 (100.0)

**( $\chi^2 = 2.211$ ,  $df = 2$ ,  $P = 0.331$ )**

Majority of both male and female elderly had minimal dependence in carrying out activities of daily living (ADLs) (49.7%). The results showed that there was no significant relationship between gender of the elderly and dependency level ( $\chi^2 = 2.211$ ,  $df = 2$ ,  $P = 0.331$ ).

#### **4.6.3 Ability to Live Independently by Gender of the Elderly**

As presented in figure 4.9 on the ability of the elderly to live independently by gender, results showed that about 12% of female elderly were living independently (alone) compared to 5.7% of their male counterparts.



**Figure 4.9: Elderly Ability to Live Independently By Gender**

Majority of female (57%) reported not to be living alone i.e. dependent on care givers or helpers as compared to 25.3% of males who reported to be dependent on care givers. There was no significant relationship between gender and ability of the elderly to live independently ( $\chi^2 = 1.035$ ,  $df = 1$ ,  $P = 0.852$ ).

#### **4.6.4 Dependency Level by Elderly Residence**

Table 4.22 denotes that 18.7% of the elderly who were not able to live independently were living in institutions while 13.3% of those who were living independently were living in non-institutions.

**Table 4.22: Dependency Level by Elderly Residence**

Residence	Ability to live independently		Total n (%)
	Yes n (%)	No n (%)	
Institutionalized	13 (4.3)	56 (18.7)	69 (23.0)
Free Living	40 (13.3)	191 (63.7)	231 (77.0)
Total	53 (17.7)	247 (82.3)	300 (100.0)

**( $\chi^2 = 1.085$ ,  $df = 1$ ,  $P = 0.771$ )**

Majority (63.3%) of those who were not able to live independently were free living or living in non-institutions. There was no significant relationship between the elderly ability to live independently and the type of residence ( $\chi^2 = 1.085$ ,  $df = 1$ ,  $P = 0.771$ ).

#### 4.6.5 Dependency Level By MUAC of the Elderly

In showing the level of assistance required by the elderly from their caregivers in carrying out activities of daily living (ADLs), results showed that majority of the elderly (49.7%) required minimal assistance in carrying out activities of daily living with most of them being reported to have a MUAC of more 22cm and above (38.7%) (Table 4.23).

**Table 4.23: Dependency Level by MUAC of the Elderly**

Dependency level	Mid Upper Arm Circumference (MUAC) in cm			Total n (%)
	MUAC less than 21 cm	MUAC 21 to 22 cm	MUAC 22 cm and Above	
	n (%)	n (%)	n (%)	
Severe	24 (8.0)	3 (1.0)	25 (8.3)	52 (17.3)
Moderate	11 (3.7)	8 (2.7)	80 (26.7)	99 (33.0)
Minimal	14 (4.7)	19 (6.3)	116 (38.7)	149 (49.7)
Total	49 (16.3)	30 (10.0)	221 (73.7)	300 (100.0)

**( $\chi^2 = 4.440$ ,  $df = 4$ ,  $P = 0.000$ );  $t = 53.425$ ,  $df = 299$ ,  $p = < 0.001$ )**

Results also showed that only 1% of the Elderly with a MUAC of 21-22 cm and 8% of those with a MUAC of less than 21 cm were highly dependent on their care givers or helpers in carrying out activities of daily living. The results showed that there was a significant association between functionality and malnourishment among the Elderly

( $\chi^2 = 4.440$ ,  $df = 4$ ,  $P = 0.000$ ) with those elderly with severe dependency being most likely malnourished with a significance variance between dependency level ( $2.32 \pm 0.246$ ) and MUAC ( $2.411 \pm 0.161$ ),  $df = 299$ ,  $p = < 0.001$ .

#### 4.6.6 Dependency Level By Body Mass Index of the Elderly

Table 4.24 shows that those elderly who had a normal BMI and were able to carry out activities of daily living were 37.3% as compared to those who had a normal BMI but moderately dependent (7%) on care givers in carrying out activities of daily living.

**Table 4.24: Dependency Level by Body Mass Index of the Elderly**

BMI	Reliance and dependency level			Total n (%)
	Severe n (%)	Moderate n (%)	Minimal n (%)	
Underweight	52 (17.3)	16 (5.3)	30 (10.0)	98 (32.7)
Normal	0 (0.0)	21 (7.0)	112 (37.3)	133 (44.3)
Overweight	0 (0.0)	48 (16.0)	7 (2.3)	55 (18.3)
Obese	0 (0.0)	14 (4.7)	0 (0.0)	14 (4.7)
Total	52 (17.3)	99 (33.0)	149 (49.7)	300 (100.0)

**( $\chi^2 = 6.696$ ,  $df = 6$ ,  $P = 0.654$ )**

There were no elderly with normal BMI with severe dependence to care givers nor those who were at risk or overweight or obese and severely depending on care givers to undertake activities of daily living. However, 16% of those who were overweight had a moderate dependency level with 4.7% of the obese elderly being noted to be of moderate dependency levels. There was no significant relationship between body mass index and dependency level of the Elderly ( $\chi^2 = 6.696$ ,  $df = 6$ ,  $P = 0.654$ ).

#### 4.6.7 Gender Differences and Performance of Activities of Daily Living (ADLs)

Independent t-test analysis was carried out on gender differences and activities of daily living of the elderly (Table 4.25).

**Table 4.25: Gender Differences in Performing the Activities of Daily Living (ADLs)**

Activities of Daily Living	Gender	n	Mean	Std. Error Mean	t	Sig
Bathing	Male	93	7.577	.014	1.3	0.006
	Female	207	7.615	.010	49	
Dressing	Male	93	2.381	.022	0.7	0.124
	Female	207	2.442	.020	63	
Toileting	Male	93	3.15	.15	0.2	0.583
	Female	207	3.10	.56	16	
Transferring	Male	93	1.013	.055	0.0	0.911
	Female	207	1.125	.056	56	
Feeding	Male	93	1.811	.007	0.6	0.179
	Female	207	1.830	.005	70	
Housekeeping	Male	93	1.062	.018	-	0.804
	Female	207	1.095	.018	0.1 24	
Shopping	Male	93	2.381	.022	0.7	0.124
	Female	207	2.442	.020	63	
Handling money	Male	93	5.131	.036	-	0.024
	Female	207	5.166	.038	1.0 65	
Mobility	Male	93	2.381	.022	0.7	0.124
	Female	207	2.442	.020	63	
Bladder control	Male	93	7.598	.035	1.3	0.006
	Female	207	7.715	.032	34	

It was determined that there were no major differences between men and women in carrying out activities of daily living with exception of bathing ( $t = 1.349$ ,  $df = 298$ ,  $p = 0.006$ ), money handling ( $t = 1.065$ ,  $df = 298$ ,  $p = 0.024$ ) and bladder control ( $t = 1.334$ ,  $df = 298$ ,  $p = 0.006$ ). The findings showed that 18.6% of women were fully independent in taking a bath as compared to 23% of their male counterparts. It also

showed that there were no differences in men and women on dressing, toileting, relocating, feeding, housekeeping, shopping and mobility.

#### 4.6.7 Functionality of Respondents by Dependency

Functionality of the elderly were weighed and scored based on whether they had received help while doing the tasks (Table 4.26). The items were then summed up to create a total score. The higher the score, the more indecent the person which meant that the respondent needed no assistant at any part of undertaking the task. If a person did 50% of the tasks independently then the ‘moderate’ score would apply and when the respondent did <75 and above then the minimal score would apply and <25 then the “Severe” score would apply. The results also showed that only 17.3% of the elderly had severe reliance and dependency in undertaking activities of daily living (ADLs).

**Table 4.26: Functionality of Respondents by Dependency**

<b>Dependency</b>		
<b>Severe n (%)</b>	<b>Moderate n (%)</b>	<b>Minimal n (%)</b>
11 (3.7)	32 (10.7)	51 (17)
5 (1.7)	21 (7)	25 (8.3)
5 (1.7)	14 (4.7)	18 (6)
10 (3.3)	12 (4)	16 (5.3)
7 (2.3)	9 (3)	18 (6)
6 (2)	8 (2.7)	15 (5)
8 (2.7)	3 (1)	6 (2)
52 (17.3)	99 (33.0)	149 (49.7)
<b><math>\chi^2 = 9.445, df = 12, P = 0.078</math></b>		

The results showed that there was a significant relationship between elderly age and dependency levels ( $\chi^2 = 9.445, df = 12, P = 0.078$ ) i.e. the more an individual ages the higher chances that she or he will be highly dependent on others.

## **CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1. Discussion**

#### **5.1.1 Socio demographic characteristics of the elderly**

Three hundred elderly individuals were selected for interview forming the sample of the study. Majority of the respondents were female 207 (69 %) while male were 93 (31 %). Two groups of elderly individuals were determined for the study i.e. those living in institutions 69 (23%) and those living freely 231 (77%). Weight, height and MUAC were measured and Body Mass Index BMI (Weight in kg/height<sup>2</sup>) calculated.

The mean ( $\pm$ SD) age was 73.08 ( $\pm$ 10.5) in years in both Institutionalized and Free living groups. The oldest elderly individual was aged 106 years while the youngest elderly person having 60 years with a mean age of  $75.37 \pm 9.767$ . These are the age groups in which other studies did find out most of the nutritional challenges were being manifested including problems such as memory loss, forms of chronic or acute illness e.g. diabetes, hypertension e.t.c, deterioration of their health statuses among others (Sakineh et al., 2011). The elderly average weight as determined was  $54.63 \pm 9.190$  where the minimum weight as measured was 31 Kgs and the highest being 71 Kgs. The mean height of the elderly was  $157.45 \pm 10.11$  with the minimum being 106 cm and the maximum height measured noted as 182 cm. In a study conducted in Venezuela by Diaz et al., 2005, it was noted that the average age of the

institutionalized group was 77.3 +/- 7.5 years old and 69.5 +/- 7.6 years old for the free-living Elderly group.

It was also noted that the proportion of interviewed elderly female was higher than that of male counterparts in each and every age group with the biggest margin of 41 female respondents more than male being witnessed in those of age group 60 – 65 years. With the majority of the elderly population falling in the 60 – 65 years age group bracket i.e. 31.3%; this informed the research that many more young elderly are in the making than the older adults who are diminishing yearly hence the study is in agreement with the World Health Organization findings that in the coming decade the number of the elderly in the world population will double (WHO, 2011). The results also agree with the study undertaken by Smith, 1998 denoting that women live longer than men and are more likely than men to live alone.

Majority (73.7%) of the elderly had a MUAC of more than 22 cm or greater with those who had a MUAC of between 21-22 cm proportioning to 10% and those with a MUAC of less than 21cm being 16.3%. It was determined that a great proportion of the elderly had severe reliance and dependency in undertaking activities of daily living (ADLs). The results do show that the MUAC measures were within the normal reference range for the elderly in the County with no significance in reference by the ages of the elderly persons (James' et al., (1997). About 33% of the elderly were underweight with almost 5% of the elderly being obese. A similar study undertaken by Diez et al., in 2005 found out that more of the older adults who were institutionalized

had a higher prevalence of having nutritional deficit hence an underweight nutritional status.

Most of the elderly had secondary school knowledge (43.7%) with a significant number having a primary school knowledge (42.3%) and only 14% of the elderly having a tertiary level educational knowledge. With a majority having at least a secondary education with the state of nutritional status of the elderly in the County, it was noted that the two do compare in relation as one factor do really affect the other. The results do agree with the study undertaken by Godlewska and Klerebinski, 2001 which found out that a higher level of education helps in improved nutrition, demonstrating the usefulness of applied didactic method and the effectiveness of learning.

In terms of the elderly occupational status tied to income provision, it was determined that some of them relied on Social safety nets such as GoK cash transfers e.t.c. (13.3%) or self-employed (29%) while 27% of the interviewed elderly had retired from active employment hence relying on pension with 30.7% of them noting to be farmers or being engaged in menial works in the community. On the question of who was the bread winner in the households and/institutions (those who were paying for their upkeep in those institutions), majority (63%) of the elderly reported that they were the breadwinners followed by those who reported that husbands were the bread winners (24%), 9.3% of the interviewed elderly reporting that relative(s) being the

bread winner while the rest (3.7%) noting that either institutions or other faucets do provide for them.

According to Adrian and Daniel (2006), it is reported that the degree of economic status may reflect a composite effect of a number of different factors: potential for home food production, diversity of types of stores, differences in cultural and economic opportunities, and exposure to mass media. There were differences in cultural and economic opportunities which includes a possibility of having a care giver or one being sent to an elderly home with the other remaining option being taking care of themselves. These differences were noted with a significant number reporting that the urban study population depended mainly on purchased food from the markets unlike their rural counterparts who often produce most of their food from owned farms, a view also supported elsewhere by (Ruel, 2003). Food availability refers to the overall quantities and types of foods in any particular place in quantities and quality sufficient to satisfy the dietary needs of individuals, free from adverse substances and acceptable in a given culture (Ruel, 2003).

### **5.1.2 Nutrition status of institutionalized and free living elderly in Trans Nzoia County**

Someone's nutritional status determines the process of ageing and the health status of the population. The higher the age group or some body's age increases a greater risk of deteriorating immunity hence susceptible to morbidity, impairment and reduced physical and functional ability, which in turn affect their nutritional status, forming a vicious cycle which is in agreement with findings by Cheserek et al. (2012). In her

study she found out that the elderly with a low body mass index mostly exhibit or are at risk of deteriorating immunity hence susceptible to morbidity and reduced functional ability.

In the findings of the research, results showed that there was a significant difference between nutritional status of institutionalized and free living elderly. It is reported as highlighted that there were more women who were underweight than men using Body Mass Index measures. There were also more women (14%) who were obese than their male counterparts (4.3%). The results were similar to the findings from a study undertaken by Guigoz in 2006 which found out that among the elderly people living freely in Sweden, the prevalence of malnutrition was only 2% compared to institutionalized elderly who were living in institutions (21%).

According to the distribution of elderly in relation to their Body Mass Index and their residence i.e. whether they live freely or in institutions, results showed that majority of the elderly who were underweight were living freely. Results showed that majority of both institutionalized and non-institutionalized were of normal BMI. These results were in agreement with the study undertaken by McCormack, 2010 on under-nutrition in the elderly population living at home in the community who found out that fifty percent of free living Elderly individuals fall within normal range of nutrition status and would more likely shift to the risk of overweight and becoming obese unlike the institutionalized elderly. As for those elderly who were obese, majority were those who are non-institutionalized as compared to a small margin of those who were

institutionalized. There was a significant relationship between Body Mass Index and institutionalization of the elderly in the county. These results are in agreement with what the 2013 Statistical Year Book by Food and Agricultural Organization of the United Nations reported on factors that enhance malnutrition in the elderly (WHO/FAO, 2003). The results also agree with findings by Morley, 2002 which found out that the elderly do develop malnutrition due to a number of factors linked with decreased physical, psychological and social functions making them vulnerable and susceptible to undernutrition.

Mid Upper Arm Circumference is an alternative measure of BMI in determining illness in older persons and is currently incorporated in two screening instruments that can be used to assess the risks of undernutrition. Unlike BMI, MUAC is not influenced by spinal deformities rather is influenced to a lesser extent by fluid changes or limb amputations that often occur in older persons. With MUAC being a simple measure that requires a tape measure, it is specifically suitable for measuring thinness since there is evidence suggesting that a low MUAC is more valid measure than a low BMI to define thinness in older persons (Mugo, 2015).

Most of the elderly who were both living freely (78.8%) and in institutions (56.5%) had a Mid Upper Arm Circumference of 22 centimeters and above. Majority of elderly in institutions had a Mid Upper Arm Circumference of less than 21 centimeters as compared to their counterparts who were free living or in non-institutions. Same scenario was determined in the elderly who were freely living (7.4%) and

institutionalized (56.5%) with a Mid Upper Arm Circumference of between 21 centimeters to 22 centimeters. There was no significant relationship between the Mid Upper Arm Circumference and the residence of the elderly in the county as was determined in a study undertaken by Hammond et al., 2008 in elderly persons which reported that MUAC is more specific and sensitive than BMI identifying populations at risk of undernutrition. In another study, it was reported that a low MUAC is more strongly associated with 15 year mortality than a low BMI (Wijnhoven et al., 2012).

A higher proportion of women (20.3%) had a Mid Upper Arm Circumference of less than 21 cm as compared to their male counterparts (7.5%). On the other hand, there were more male (79.6%) with a Mid Upper Arm Circumference of 22 centimeters and above as compared to female (71%) with almost the same margin of the elderly with a Mid Upper Arm Circumference of between 21 centimeters to 22 centimeters of male (12.9%) and women (8.7%). The measures determined that there was a significant relationship between gender and Mid Upper Arm Circumference of the elderly with a strength test measure undertaken to determine the level of significance which indicated that the Mid Upper Arm Circumference mean measure for women was higher than that of men. These results were in agreement with findings by Sakineh et al., 2014 on assessing nutritional status of the Elderly and associated factors in a nursing home where it was reported that malnutrition and risk of malnutrition were significant and more frequently in the group of older people living in institutions.

When the elderly were asked to describe their health status as compared to other people of same age group, varied responses were noted then categorized in relation to the best fitting as per the researchers coded option which included; very Good, at least Better and very poor including don't know for those elderly who were not able to gauge or self-evaluate themselves. Many (58%) female elderly reported that their nutritional status was very good as compared to their male counterparts (55.9%). On a similar level, it was reported that many females (11.6%) viewed their nutritional status as being very poor as compared to males (9.7%).

It is also noted that-of all respondents who didn't know or give any view of their nutritional status, most were men (24.7%) as compared to women (17.9%). Most of the elderly (57.3%) reported to have a very good nutritional status i.e. having no nutritional problems. Of those who reported to not having nutritional problems, 63.8% were living in institutions. Eleven percentage of the elderly reported to have self-viewed their nutritional status as very poor with the majority (10.8%) of them living in Non- Institutions-free living. A study undertaken by Yvonne in 2009 did find out that more than half of men and women the elderly interviewed perceived themselves as healthy. The similarities and differences sighted in the study were found in women and men self-perceived health status. With respect of how the elderly perceived their health, no cognitive impairment was found among women or men.

There was the establishment that a majority of those elderly who reported to be of very good nutritional status were underweight. Only a small fraction of those who were

normal reported to have a very poor nutritional status with a bigger proportion of elderly reporting of not knowing what their nutritional status were at the time of interview. Most of the Female elderly (74.4%) reported to have a very poor health status as compared to their male counterparts (61.3%). A small proportion of female (2.9%) as compared to their male counterparts (3.2%) reported that their health status was very good with 15.1% of men reporting that their health status was at least better as compared to 9.2% of interviewed women (Caroline, 2004).

Most of the elderly (69.3%) who live freely reported to have a very poor health status as compared to those elderly who reported to have a very good health status (2.2%). As for those who live in institutions, most of them (73%) reported to be of a very poor health status with only 5.8% reporting to be of very good health status. It was also noted that 10.1% of those living in institutions and 17.3% of those living freely (Non-institutions) reported to not knowing or unable to self-evaluate their health status (Forestell, & Mennella, 2008).

A small proportion of the elderly (3%) thought that there health was very good with the majority (70.3%) self-evaluating themselves of having a very poor health status. Majority (13.7%) of elderly who were overweight reported to have a very poor health status as compared to only 1% of those who reported to having a very good health status. The results showed that there was a significant relationship between BMI and health status, and a positive correlation between health status and BMI which was also significant (Adrian & Daniel, 2006).

### **5.1.3 Individual and structural factors influencing nutritional status of the elderly**

The study also sought out certain individualized and structural factors that are associated with influencing nutritional status in old age individuals. Most of the common nutritional related challenges the study found includes reliance of the elderly to care givers both in institutions and non-institutions, results showed that 45.7% of those elderly interviewed rely on the services of care givers while 54.3% do not have care givers or anybody to help them with chores. Of those elderly who rely on care givers, results showed that 9.3% of are overweight while 13% are of them are underweight. Of those who did not have or don't rely on care givers, it was reported that 19.7% were underweight as compared to 23.3% who were normal. The proportion of elderly who were obese and rely on caregivers and those who don't were both 2.3% in proportion. In a similar study by Holmes and Robers (2009), it was reported that when it comes to the 'eating environment' at home, the food consumption data of those who ate alone may be substituting a cooked meal or hot meal for food that can be easily prepared such as sandwiches.

It's reported that those who ate alone and those who ate on their lap (as opposed to at a table) appeared to be most likely to have a nutritionally inadequate diet. It outlined that older people living in households where they had less developed cooking skills generally had a less healthy and nutritionally adequate diet and this was particularly noticeable in the older men. The results do indicate that older men were not only less likely to eat out, but also less likely to cook when at home (Holmes, and Roberts, 2009).

This study also sought to find out that the proportion of the elderly who were ingesting prescribed drugs and medicine. It was noted that majority of the elderly (83.3%) were ingesting drugs as compared to only 16.7% who were not on any drugs. Results showed that 32.7% of underweight elderly were utilizing drugs while 18.9% of those who were overweight were on drugs as compared to 4.7% of those on drugs who were obese. This agrees with a study undertaken by Akar et al. (2011), who found out that changes in the oral cavity, such as periodontitis and other manifestations of poor oral health are common in old age and may contribute to increased morbidity and mortality because of systemic consequences such as inflammation, infections, protein-energy wasting and atherosclerotic complications thus represent an important, but often overlooked problem.

There were more female (58%) than male (25.3%) who were on prescribed drugs. Only 11% of interviewed female respondents reported to not using prescribed drugs or medication while only 5.7% of male reported to not using any drugs or medication. Also, most of the underweight elderly (43.5%) were not sure of their eating habits while a large proportion (36%) of the underweight reported to be eating unhealthy. Majority (46.3%) of those with normal nutrition status reported to be eating healthy. As for those who were overweight, majority of them (26%) reported to eat unhealthy with 13% of them not sure if their eating habits were healthy or unhealthy. There was a significant relationship between elderly nutrition status and eating habits of the elderly. The results are also supported by Holmes and Roberts (2008) who found out that men who experienced difficulty in chewing consumed less fruit, vegetables,

whole meal bread and meat and meat dishes; and had lower intakes of protein and selected nutrients. They also provided suggestions about changing the focus to improvement of cooking skills, especially for those elderly living freely or alone and find ways to increase their fruit and vegetables consumption for those with poor oral health manifested by difficulty in chewing foods.

In a study undertaken by Posner et al., 1993 on nutrition and health risks in the elderly it was established that most of the respondents were preferring quick fixes to hunger or cheap leisure measures as compared to the rest of the population i.e. they would prefer sleeping than engage in other time consuming or energy consuming leisure activities. Though similar findings were observed in this research such as majority of the elderly being non-smokers (74.7%) with some contradictions on how a significant proportion (22.4%) of those who are overweight being smokers and a big proportion (30.3%) of those who were underweight also reporting to be smokers. There was a significant relationship between nutrition status of the elderly and smoking with those elderly who were smoking having negative health effects than those who were non-smokers.

Nutritional status of the elderly was also being affected by meal skipping due to lack of appetite. It was reported that most (33.7%) of those who were underweight did skip meals due to lack of appetite for food while 17.2% of those who were overweight did skip meals due to lack of appetite for food; it was determined that there was an association between the elderly nutritional status and economic activities status. This

study also brought out the understanding that social interactions provide positive influence in elderly nutritional status (that is, the quality of elderly diets may be improved when the meal is shared with others rather than eaten alone). Conversely, to insist, it's believed that when the elderly eat or leave alone, they experience a decrease in appetite and interest in food, resulting in poor nutritional intake. This agrees with other studies and investigations that have shown that social isolation may adversely affect dietary quality (Beswick et al., 2008), whereas others have shown no relationship between living arrangements and nutrient intake (Butler et al., 1998).

When determining the influence of source of food to nutritional status, it was reported that 52% of the elderly residents consider foods sourced from farms or their gardens hence providing an indication that households in Trans Nzoia County serve foods rich in one or a few nutrients (e.g. carbohydrates and proteins which are the most common food crops as cultivated in the county) hence limiting them from getting other foods that can provide them with the remaining nutritional components to reach a balanced diet. This meant that the elderly feed on diets with either high carbohydrates or plant proteins hence little complementarity realized by the residents as they take only same types of foods without regarding quality and nutritional value of the foods to acquire a balanced diet for a healthy lifestyle. It was also observed that a large proportion (23.3%) of the elderly get their food from the institutions they reside in with 13.7% of them being underweight while only 7% of them have a normal nutrition status. The relationship between elderly nutrition status and source of food being significant with food from farms being mostly preferred by elderly than food in institutions. These

results show similar levels as reported by Holmes et al., 2008 on the influence of social and physical factors and out-of-home eating on food consumption and nutrient intake in the materially deprived older population which showed that levels of underweight in the low income older population who live at home are low being classified as malnourished.

After computation on relationship between the elderly persons food choice influence and their living conditions, it was seen that there was strong relationship between the persons who influenced the elderly in choosing food to eat and their living condition.; To note, it was reported that care givers were the most influencers of the type and amount of food to be taken by the elderly of all nutritional status. In all nutritional status, it was also noted that husbands or wives or any relative to the elderly persons had a great influence too but not as big as that of care giver or helper. The institutions were the last option of influence when it came to elderly choice of food types and amount to be ingested. Similar findings were reported from the National Diet and Nutrition Survey of people aged 65 years where over were 3% for men and 6% for women (free living), while figures for those in residential care were higher, 16% and 15% respectively (Eisenberg et al., 2011).

#### **5.1.3.1 Structural factors influencing nutritional status of the elderly**

It is noted from the structural factors influencing nutritional status that a number of influencers were not that easy to deal with as elderly individuals while others were. The greatest impediment to the elderly reaching food markets was culture or taking food as prescribed by their culture (66%) as compared to those who reported to be

relying on caregiver (17.3%) and markets being far for their reach (16.7%). Those who were underweight were the most affected with culture (19.7%) as compared to those who were overweight. There was a significant relationship between nutrition status and impediments to market access by the elderly ( $\chi^2 = 7.989$ ,  $df = 6$ ,  $P = 0.000$ ). A t-test was then undertaken to determine the level of significance which indicated that the nutritional status mean measure for culture was ( $2.493 \pm 2.411$ ) higher than that of faraway markets. These results do agree with findings by Sakineh et al., 2014) which states that nutritional problems of the elderly and especially “malnutrition is a multidimensional concept encompassing physical and psychological elements.

Majority (13.3%) of the underweight elderly individuals were reported to be living in a household with the highest number of individuals i.e. more than 5 people. As for those who were of normal nutrition status, results showed that most (18.3%) of them live in a household with two to five people while most of those households with elderly who were overweight were determined to be having more (8.7%) than five individuals (James, et al., 1997).

Another structural factor as results showed, was the reasons impeding the elderly to access hospitals in case of need. It was determined that most (48.7%) were encountering the problem with accessing transport from their residence to the hospital. Most underweight elderly (8.3%) reported that another reasons for their inaccessibility of a health facility was the long distance of the facilities from their residences with most (3%) of those who are obese reporting due to lack of transport followed by being

too tired to walk to the health facilities (1%). Also noted by (Ruel, 2003), a major impeding factor to the elderly accessing health facilities includes opportunity cost of travelling time including time one takes in the line waiting to be treated, education of caregiver e.t.c

Beswick et al., 2008 on the complex interventions to improve physical function and maintain independent living in the elderly people noted that elderly ability to fulfill their socio-economical and psychosocial needs deteriorates with age. It was established that their loss of strength (25.7%) was the major problem followed by loss of appetite (23.3%), and effects of body pains-muscle pains (22%). Apart from those who had normal nutrition status, the underweight (9%) and those overweight (5.3%) were the most affected by loss of strength. These results did bring out the point of structural and individuals factors impacting on the nutritional status of the elderly and therefore the proposed null hypothesis denoting that structural and individual factors do not impact on nutritional status of the elderly is rejected.

Ahroneim, 2000 study on effect of family style mealtimes on quality of life, physical performance, and body weight of nursing home residents stated that certain medications such as tranquilizers and diuretics due produce effects of vulnerability in relation to dehydration, neurological problems and dementia that is characterized with reduced fluid intake. Prescribed drugs and therapeutic diets subscribed by the elderly are the exacebertors to elderly illnesses especially those of normal nutrition status (11.7%) followed by underweight (6.3%). Economic status followed as the other main

cause of underweight elderly nutritional problems (8%) with medication of the underweight elderly (9.7%) being the other main reason that increases illnesses in the elderly population. There was no significant relationship between nutritional status and those noted factors exacerbating illnesses in elderly population. Availability and accessibility of health services would probably affect their nutrition status outcomes and consequently the realization of factors influencing the health statuses. It was realized that the elderly not only experience difficulties in undertaking certain duties but also that they suffer from diseases that ultimately cause them loss of appetite, reduction in food intake including reduced absorption of nutrients leading to under-nutrition which further compromises the immune system as FANTA, 2010 study reported.

#### **5.1.4 The ability of the institutionalized and free living elderly in Trans Nzoia County to perform functional activities of daily living**

On determining the functionability and physical activities of institutionalized and free living elderly in Trans Nzoia County, the study put into test key activities of daily living needed to be undertaken by the elderly among other factors such as the elderly dependence and reliance to various variables. The results weren't any different with small variations or how far one undertakes one activity or is dependent on those variations in relation to the nutrition status (Schmid et al., 2003).

The research determined that functionality do have a significant effect on the nutrition status of the elderly (both free living and institutionalized) hence the rejection of the

null hypothesis that elderly functionality does not impact on the nutritional status of institutionalized and non-institutionalized elderly.

There were more free living elderly than institutionalized ones that were severely dependent on caregivers. However, severe dependence (11%), moderate dependence (26.3%) and minimal dependence (39.7%) in free living was higher than that of the elderly who were institutionalized. There was significant relationship between elderly level of dependence and their residence with institutionalized elderly being more dependent on caregivers than free living. These results do contrast with a study undertaken by Damian et al., 2008, who found out that close to a quarter elderly population living freely or out of institutions received support and more than a third of them (32.8%) showed severe dependency in comparison with only a tenth of the elderly population who didn't need the help of caregivers or a helper.

As Holland et al., 2003 states that activities of daily living provide a basic framework to evaluate an older person's ability to live independently with each activity of daily living being closely related to another and therefore when a person is not able to perform one activity, it impacts on the other elderly population. The research determined that there were more (32.3%) female elderly who had minimal dependence in carrying out those activities of daily living (ADLs) as compared to their male counterparts (17.3%). Majority of both male and female elderly had minimal dependence in carrying out activities of daily living (ADLs) (49.7%). The results showed that there was no significant relationship between gender of the elderly and

their dependency level which really compares with the study done by Cheserek et al. (2012) on anthropometric characteristics and nutritional status of older adults in the Lake Victoria Basin of East Africa on region, sex, and age differences; where it's stated that there were energy depletion and loss of muscle mass on free living elderly, with significant differences in regions, and in the sex and age group. The decline in anthropometric measurements with age indicated poor nutritional status with aging. Thus, nutrition and health interventions should be specific to regions.

On the ability of the elderly to live independently by gender, it was determined that about 12% of female elderly were living independently (alone) compared to 5.7% of their male counterparts. More than half (57%) of female elderly reported to not living alone i.e. dependent on care givers or helpers as compared to a quarter of males who reported to be dependent on care givers. The results did show that there was no significant relationship between gender and the ability of the elderly to live independently which contrasts with a study done by Muszalik et al., 2010 that demonstrated that the functional nature of the Elderly and their ability to undertake some specified activities of daily living is tied to and dependent on age and whether those roles are suited to be undertaken by either male or female Elderly individuals. In another study by James, 2004, it was noted that overall limitations of men and women were compared and women were more likely to report functional limitations at 52% and had a degree of disability mean of 0.30 against 0.18 among men with women also reporting limitations in more of the eight functional categories than did men.

Gerber et al., 2003 in a research did found out that the elderly people who are dependent on caregivers help and who have challenges with skills in undertaking activities of daily living or in mobility are specifically at high risk of malnutrition. In showing the level of assistance required by the elderly from their caregivers in carrying out activities of daily living (ADLs), it was determined that almost half of the elderly required minimal assistance in carrying out activities of daily living with more than a third of them being reported to have a MUAC of more 22cm and above. It was also determined that only 1% of the Elderly with a MUAC of 21-22 cm and 8% of those with a MUAC of less than 21 cm were highly dependent on their care givers or helpers in carrying out activities of daily living. The results showed that there was a significant association between functionality and malnourishment in the elderly by use of MUAC with those elderly with severe dependency being most likely malnourished with a significance variance between dependency level ( $2.32 \pm 0.246$ ) and MUAC ( $2.411 \pm 0.161$ ),  $df = 299$ ,  $p = < 0.001$ . The results do agree with a study undertaken by Gerber et al., 2003 that found out the elderly people who are dependent on others or caregivers in carrying out activities of daily living and mobility are at high risk of malnutrition.

Elderly who had a normal BMI in carrying out activities of daily living were 37.3% as compared to those who had a normal BMI but moderately dependent (7%) on care givers in carrying out activities of daily living. There were no elderly with normal BMI with severe dependence to care givers nor those who were at risk or overweight or obese and severely depending on care givers to undertake activities of daily living.

However, 16% of those who were overweight had a moderate dependency level with 4.7% of the obese elderly being noted to be of moderate dependency levels hence no significant relationship between body mass index and dependency level of the elderly. The research results do contradict with the study undertaken by Saeidlou et al., 2011 which showed that there was a low occurrence of malnutrition among free living Elderly which is often associated with functional impairment, disability and impaired health.

Independent t-test analysis was carried out on gender differences and activities of daily living of the elderly. It was determined that with exception of bathing ( $t = 1.349$ ,  $df = 298$ ,  $p = 0.006$ ), money handling ( $t = 1.065$ ,  $df = 298$ ,  $p = 0.024$ ) and bladder control ( $t = 1.334$ ,  $df = 298$ ,  $p = 0.006$ ); there were no differences in men and women on dressing, toileting, relocating, feeding, housekeeping, shopping and mobility. A similar study undertaken by Lengyel et al., 2004 determined that the differences in mobility functions were less but still greater among women; and that women including men who had reported carrying out activities of daily living were not statistically different in any of the eight categories as determined.

## **5.2 CONCLUSION, RECOMMENDATIONS AND FURTHER RESEARCH**

### **5.2.1 Conclusion**

Nutritional status of the elderly is dependent on individual and structural factors affecting them including their functional ability and dependence on care givers or helpers both in the institutions and non-institutions. Barriers to, or facilitators of an elderly individual's nutrition status relating to self-consciousness, self-creation, self-awareness determinants, economic, social, policy, organization or other aspects of the environment leading to an Elderly's nutritional status are important for public health planning and timely provision of health interventions.

### **5.2.2 Nutritional Status of the elderly**

The prevalence of underweight Elderly in institutionalized subjects was more than in the free living elderly individuals. More women were underweight than men using Body Mass Index (BMI) measures. There were also more women who were obese than their male counterparts.

Majority of the elderly who were underweight were living freely. Results also showed that majority of both institutionalized and non-institutionalized were of normal BMI. For those elderly who were obese, majority were non-institutionalized thus a significant relationship between Body Mass Index and institutionalization of the elderly in the county.

With MUAC being a simple measure suitable for measuring thinness since there is evidence suggesting that a low MUAC being more valid measure than a low BMI to define thinness in older persons it was determined that most of the elderly who were both living freely and in institutionalized had a Mid Upper Arm Circumference of 22 centimeters and above with a mean measure for women being higher than that of men.

Many females perceived their nutritional status as being very poor as compared to males. Of all the respondents who didn't know or give any view of their nutritional status, majority were men. Most of the elderly who perceived themselves of not having nutritional problems, close to three quarter in proportion were living in institutions. Majority of those elderly who reported to be of very good nutritional status were underweight as measured by BMI.

Most of the elderly who live freely reported to have a very poor health status with majority of those who live in institutions reporting to be of a very poor health status.

### **5.2.3 Individual factors influencing nutritional status of the elderly**

Reliance on care givers by the elderly who live in both institutions and Non-institutions was deemed to be one of the most nutritional related challenges i.e. most of those elderly interviewed rely on the services of care givers with a significant number reporting to not receiving care givers or anybody's. Many older people modify their diets to help control chronic and acute illnesses which are more common in old age and were significantly present in elderly population interviewed. There was also

interest in the potential of an increased intake of antioxidants to benefit eye health, vitamin A and Mineral supplements intake to boost the elderly nutritional statuses.

It was reported that majority of the elderly were ingesting prescribed drugs or other notable off the counter drugs. Of those who were on drugs, it was noted that close to a fifth of them were overweight as compared to 4.7% of those on drugs who were obese. For those elderly who were Overweight, majority of them reported to eat unhealthy with thirteen percent of them not sure if their eating habits were healthy or not. Almost a third of the respondents who were overweight reported to be smokers while a third of those who were underweight reported to be also smokers.

Lack of appetite by the elderly was noted to be affecting the nutritional status of the elderly hence an n association between the elderly nutritional status and economic activities status. The socio-economic characteristics of elderly individuals also influenced the elderly intake of the needed body nutrients which intern affect their nutritional status and they include educational attainment, and employment status. General household characteristics reported included degree of urbanization, geographic region, socialization, food variety availability, and receipt or buying of surplus commodity foods.

The understanding that social interactions provide positive influence in elderly nutritional status (that is, the quality of elderly diets may be improved when the meal

is shared with others rather than eaten alone) conversely determine the level of ones nutritional status where it's believed that when the elderly eat or leave alone, they experience a decrease in appetite and interest in food, resulting in poor nutritional intake.

The elderly consider foods sourced from farms or their gardens hence providing an indication that households do serve foods rich in one or a few nutrients hence limiting them from getting other foods that can provide them with the remaining nutritional components to reach a balanced diet. Care givers, husbands or wives were the most influencers of the type and amount of food to be taken by the elderly hence affecting their living condition and nutritional status.

#### **5.2.4 Structural factors influencing nutritional status of the elderly**

The greatest impediment to the elderly to acquire food from the markets was culture or taking food as prescribed by their culture as compared to those who reported to be relying on caregiver and markets being far for their reach. Those who were underweight were the most affected with culture as tied to food acquisition as compared to those who were overweight.

Majority of the underweight elderly individuals were seen to be living in a household with the highest household size i.e. of more than five individuals as compared to the average county household size.

Accessing transport from their residence to the hospital by underweight elderly was noted as the main reason of not accessing a health facility due to the long distance of the facilities from their residences.

Elderly ability to fulfill their socio-economical and psychosocial needs deteriorates with age. It was determined that their loss of strength was the major problem followed by loss of appetite and effects of body pains-muscle pains.

Prescribed drugs and therapeutic diets subscribed by the elderly are the exacerbators to Elderly illnesses especially those of underweight status as measured by BMI.

#### **5.2.5 Ability of the Elderly to perform functional, physical and instrumental activities of daily living**

Functionality do have a significant effect on the nutrition status of the elderly (both free living and institutionalized) hence the rejection of the null hypothesis that elderly functionality does not impact on the nutritional status of institutionalized and non-institutionalized elderly.

Many free living elderly as compared to institutionalized elderly were severely dependent on caregivers. However, severe dependence, moderate dependence and minimal dependence to care givers in free living subjects was higher than to those elderly who were institutionalized.

There were more female elderly who had minimal dependence in carrying out those activities of daily living (ADLs) as compared to their male counterparts. Majority of female elderly were living independently (alone) compared to their male counterparts. More than half of female elderly reported to not living alone i.e. dependent on care givers or helpers as compared to a quarter of males who reported to be dependent on care givers. Almost half of the elderly required minimal assistance in carrying out activities of daily living with more than a third of them being reported to have a MUAC of more 22cm and above.

It was determined that there were no elderly with normal BMI who had severe dependence on care givers nor those who were at risk or overweight or were directly obese verses severely depending on care givers to undertake activities of daily living. However, 16% of those who were overweight had a moderate dependence level with 4.7% of the obese elderly being noted to be of moderate dependency levels on care givers.

There were no differences in gender on dressing, toileting, relocating, feeding, housekeeping, shopping and mobility with exception of bathing, money handling and bladder control hence denoting that the differences in mobility functions being less but still greater among women; and that women including men who had reported carrying out activities of daily living were not statistically different in any of the categories as determined.

### **5.3 Recommendations**

Unless measures are taken to address the observed scenarios, it is clear that the nutritional status of the elderly will continue to deteriorate. The research recommends that, the following measures should be carried out in order to mitigate the factors that influence elderly nutritional status as reported by the study.

#### **5.3.1 Practice recommendations**

- There is need to relook at institutionalization and institutional care of the elderly by allowing them to choose and be provided with independence to make mistakes through taking calculated risks on how to live their lives.
- Those people with skills and professionalism and working in institutions for the elderly should be capacity build on how to effectively run and understand these institutions while at the same time determine where to go for help or who to ask in case of any elderly needs that might arise.
- Care givers and health care staff should caution the elderly on taking medications and off the counter drugs since those drugs effects do cause imbalance in their health status with some altering food intake and interfering with their body metabolism.
- There is need for health workers and care giver to enhance health education programs for the elderly, especially those who with limited education. This was seen as a way that can be used to promote health services especially in rural areas. This

recommendation coupled with nutritional counseling for the aged in order to decrease the prevalence of malnutrition among these age groups-is also emphasized.

- On individual and structural factors, there is need to undertake more community events and dialogue by the health care staff in the county-g geared towards educating the majority on elderly nutritional status to supplement the role of health institutions especially for stakeholders like the older people participating and contribute to peace building initiatives in the county.
- There is a great need of health care providers including nutritionists to acknowledge the challenges; and research on strategies of how the elderly acquire the right kinds of nutritious foods to eat.

### **5.3.2 Policy recommendations**

- Not all elderly over the recommended Government of Kenya age category (70 years) are on the social protection framework i.e. monthly elderly cash-transfer stip end. There is need for the ministry of finance of the national government to solicit for more funds and increase the budget allocation-then enlist the rest of vulnerable elderly who are verifiable as social protection cash transfer beneficiaries. There should be an incubation period where the new old age entrants (those who enter the age group of the elderly) are registered and supported and weaned over slowly.

- Members of the county assembly should consider clearly articulating and passing elderly policy framework in collaboration with County, central government and other stakeholders to help determine, intervene and reduce individual and structural factors affecting nutritional status among the elderly.
- It is also recommended that the members of the county government should strive to come up with elderly focused nutritional interventions that are geared towards reducing or combating malnutrition among the elderly (apart from reliance on national government monthly social protection stip ends).
- There is need of the County health staff to start utilizing anthropometric measurement for regular surveillance of elderly nutritional status; in both free lining and the elderly homes so as it may be easier for those concerned to check the trend of the elderly nutritional status from time to time.

#### **5.4 Further Research**

Although this study was important in establishing nutritional status of the elderly in relation to individual and structural factors, it will take prospective studies to help determine the direction of association.

There is need of research on nutritional interventions which optimize nutritional status of elderly.

There is need of undertaking a study on reliance and dependence of the elderly on cultural factors exacerbating nutritional problems.

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## APPENDICES

### **APPENDIX A: STUDY PARTICIPANTS SEMI STRUCTURED QUESTIONNAIRE**

Hallo, my name is Charles Anguba Maumo. A Master of Public Health (Monitoring and Evaluation) student at Kenyatta University, Nairobi. I am conducting a study to determine nutritional status of the elderly and associated factors in Trans Nzoia County, Kenya. The results from this study will enable health care providers and policy makers to address issues related to nutritional problems that affect the Old aged people and their associated factors. It will also assist policy makers to formulate policies which are sensitive to the local socio-economic and cultural context. All information you give is confidential, your name will not be written in the questionnaire to protect your identity. Your participation is voluntary and you can choose to decline to answer any questions you are not comfortable with. Your participation is highly appreciated. Thank you for your cooperation.

Study participant's signature (Thumb Print).....

Date.....

**Semi structured questionnaire for the institutionalized and Non-Institutionalized Elderly**

Questionnaire No.....Interview Number.....

Date.....

**A: Socio-demographic characteristics**

Sex Female [ ] 1 Male [ ] 2

Date of birth \_\_\_\_/\_\_\_\_/\_\_\_\_

Age in Years :

60 – 65 [ ] 1

66 – 70 [ ] 2

71 – 75 [ ] 3

76 – 80 [ ] 4

Over 80 [ ] 5

Highest level of Education:

None [ ] 1

Primary [ ] 2

Secondary [ ] 3

Tertiary [ ] 4

Marital status:

Single [ ] 1

Married monogamous [ ] 2

Married polygamous [ ] 3

Divorced [ ] 4

Separated [ ] 5

Widowed [ ] 6

Number of Children

None [ ] 1

One [ ] 2

Two – Five [ ] 3

Six – Ten [ ] 4

More Than Ten [ ] 5

Religion:

Catholic [ ] 1

Protestant [ ] 2

Muslim [ ] 3

Other (Specify) ..... [ ] 4

**B: Socio- Economic Characteristics**

Employment:

**Social safety nets such as pension, GoK cash transfers e.t.c. [ ] 1**

Self-employment [ ] 2

Casual labour [ ] 3

Unemployed [ ] 5

If employed, how much was your income in the last month?

Less than 1000 [ ] 1

1000-2999 [ ] 2

3000-4999 [ ] 3

5000 – 9999 [ ] 4

Above 10,000 [ ] 5

Who is the main bread winner in your household?

Self [ ] 1

Husband [ ] 2

Relative [ ] 3

Other (specify) ..... [ ] 4

What is your main source of food for your household?

Purchase [ ] 1

Household farm/garden [ ] 2

Relatives and friends [ ] 3

Welfare/NGO [ ] 4

Elderly Home [ ] 5

Others (specify)..... [ ] 6

What did you eat yesterday?

i) In the morning.....  
.....

ii) Midmorning.....  
.....

iii) Lunch.....  
.....

iv) Mid-afternoon.....

v) Supper.....

vi) Before bed.....

Have you ever gone without food more than a day in the past 6 months?

Yes [ ] 1

No [ ] 2

Do you have a house-helper or a relative assisting you with housework and the care of the home? (To be asked to those not in Elderly homes)

Yes [ ] 1

No [ ] 2

**C: Medical History of the Institutionalized and Non-Institutionalized Elderly**

How many Hospital visits did you make for the past three months?

One [ ] 1

Two [ ] 2

Three [ ] 3

Four [ ] 4

Above five [ ] 5

None [ ] 6

Did you have any problems accessing a health facility for medical care? (tick all appropriate)

Lack of transport [ ] 1

Long distance [ ] 2

Too tired and too old to walk [ ] 3

Lack of money to pay for medical services [ ] 4

Other (specify).....

What were the symptoms?

Loss of Strength [ ] 1

Diarrhea [ ] 2

Body Weakness [ ] 3

Body pains/Muscle pans [ ] 4

Headache [ ] 5

Loss of memory [ ] 6

Dental pain [ ] 7

Suffered or Suffering from Diseases and? Name the conditions if possible.

Yes [ ] 1                      No [ ] 2

Taking any Medicine?

Yes [ ] 1                      No [ ] 2

Taking Vitamin A Supplements?

Yes [ ] 1                      No [ ] 2

Taking Mineral Supplements?

Yes [ ] 1                      No [ ] 2

**D. Relationship between Nutrition Status and Factors of the Geriatrics**

(a) Do you take Alcohol or any Drugs?

Yes [ ] 1

No [ ] 2

(b) If yes in 19 above, how long have you been taking alcohol or using the Drug?

.....

(c) Why do you take Alcohol or the said drug?

.....

Do you Smoke

Yes [ ] 1

No [ ] 2

Do you undergo or suffer from one or more of the following? (Tick as appropriate)

Chronic illness e.g. Cancer [ ] 1

Acute illness e.g. Poisoning [ ] 2

Oral/dental pains [ ] 3

Depression [ ] 4

Social support/isolation [ ] 5

What do you think are the reasons for your suffering on any of the above mentioned?

Institutionalization [ ] 1

Cognitive status [ ] 2

Medication [ ] 3

Economic status [ ] 4

Ethnic status [ ] 5

Effect of prescribed, therapeutic diets [ ] 6

Other factors limiting food choice (meal sites, etc) [ ] 7

Effect of major life events [ ] 8

Level of activity [ ] 9

Anthropometric measures; (Use provided tools)

Weight (Kg).....

Length (cm).....

MUAC (cm).....

Knee height measure (cm) .....

Respondents BMI (calculate as Appropriate) - BMI (kg/m 2) as classified below;

< 18.5 - Underweight [ ] 1

18.5 - 24.99 - Normal Range [ ] 2

25.0 - 29.99 - Overweight [ ] 3

> 30.0 - Obese [ ] 4

Do you know your HIV Status? (If No, Jump to the next section)

Yes [ ] 1 No [ ] 2

If Yes, Are you currently HIV +ve Yes [ ] 1 No [ ] 2

If Yes, Are you currently on ARVs Yes [ ] 1 No [ ] 2

How many times have you attended clinic since being diagnosed with HIV?

.....

**E. Functionability and Physical Activities of the Elderly**

Household Size as at the time of interviewing?

One person (Leave alone) [ ] 1

Two people [ ] 2

2 – 5 people [ ] 3

More than 5 people [ ] 4

Living condition before

Alone [ ] 1

With Others [ ] 2

Household setting

Central cities 30 percent [ ] 1

Suburban 37 percent [ ] 2

Rural [ ] 3

Can you please tell me whether you are capable of performing the following tasks by yourself or with assistance? (Ask the Subject or family member and/or care taker in proxy reporting).

<b>TASK</b>	<b>SELF</b>	<b>WITH ASSISTANCE</b>
Bathing		
Dressing		
Toileting		
Transferring/Relocating		
Continence		
Feeding		
Housekeeping		
Shopping		
Handling money		
Mobility such as using public transport		

What foods have you been taking frequently? ( Read out the list and fill the table to below)

Complementary food	Tick
1. Water	
2. Sugared water/glucose	
3. Juice/mango/orange/passion	
4. Tea/Cocoa/Soya/Milo	
5. Fresh milk/goat/kcc	
6. Wheat/mandazi/chapatti	
7. Maize/ uji/ugali	
8. Rice	
9. Sorghum/Millet/Uji/Ugali	
10. Cassava	
11. Potatoes	
12. Bananas	
13. Eggs	
14. Fish/omena	
15. Vegetables/greens/pumpkin	
16. Pulses/ beans/ndegu/lentils	
17. Any other	

Yesterday during the day and night, did you take the following? (tick where applicable)

<b>FOODS TAKEN YESTERDAY</b>	<b>YES</b>	<b>NO</b>
1. Plain water		
2. Fruit juice		
3. Fresh milk		
4. Ugali and vegetables or any food made from wheat, maize, rice, sorghum or local grains		
5. Eggs, fish, beef, poultry		
6. Herbal foods or indigenous vegetables		
7. Any other foods		

What are your reasons for the additional foods/ liquids?

.....

In your culture, what foods or liquids are fed to people of your age or the Elderly?

(Tick all applicable answers)

Cow's milk     [   ] 1

Porridge        [   ] 2

Mashed foods [ ] 3

Boiled Herbs [ ] 4

Very hard Solid Foods [ ] 5

Others (specify)..... [ ] 6

Who influenced your decision on the type of feeding you are practicing? (Tick all mentioned)

Health care worker [ ] 1

Peer counselor [ ] 2

Husband [ ] 3

Elderly home menu [ ] 4

Other relative [ ] 5

Friends [ ] 6

Others (specify)..... [ ] 7

Have you disclosed your HIV status to;

Partner if Alive [ ] 1

Relative(s) [ ] 2

Friend(s) [ ] 3

Others (specify)..... [ ] 4

**F: Knowledge and Attitudes on Nutrition**

Is Eating healthy a way of reducing diseases and factors leading to old age problems?

Yes [ ] 1                      No [ ] 2                      don't know [ ] 3

Do you know that aging central nervous system and perhaps other organs, is much more sensitive to the deleterious effects of alcohol.

Yes [ ] 1                      No [ ] 2                      don't know [ ] 3

How would you consider your health status in comparison with other people of the same/your age?

Good [ ] 1

Bad [ ] 2

Poor [ ] 3

Very Poor [ ] 4

What do you think can be done to encourage proper nutrition to the elderly?

.....

**Thank you for your cooperation.**

**APPENDIX B: FOCUSED GROUP DISCUSSION GUIDE**

Hallo, my name is Charles Anguba Maumo. A Master of Public Health (Monitoring and Evaluation) student at Kenyatta University, Nairobi. I am conducting a study to determine nutritional status of the elderly and associated factors in Trans Nzoia County, Kenya. The results from this study will enable health care providers and policy makers to address issues related to nutritional problems that affect the Old aged people and their associated factors. It will also assist policy makers to formulate policies which are sensitive to the local socio-economic and cultural context. All information you give is confidential, your name will not be written in the questionnaire to protect your identity. Your participation is voluntary and you can choose to decline to answer any questions you are not comfortable with. Your participation is highly appreciated. Thank you for your cooperation.

Study participant's signature..... Date.....

**Focused Group Discussion Guide For the Institutionalized and Non-institutionalized Elderly**

Date of the Interview.....

Time.....

1. What are the common nutritional problem affecting the Elderly in this division/area?
2. What is the best way to counteract the nutritional problem discussed?
3. What are the cultural beliefs regarding certain foods for the Elderly and how is it affecting their nutritional status?
4. What do you think is the importance of taking balanced diet meals/foods among the elderly?
5. What factors are influencing choice of foods and nutritional status of the Elderly in the area?
6. How does the community relate with the Elderly in relation with provision of food?

**APPENDIX C: KEY INFORMANT INTERVIEW GUIDE**

Hallo, my name is Charles Anguba Maumo. A Master of Public Health (Monitoring and Evaluation) student at Kenyatta University, Nairobi. I am conducting a study to determine nutritional status of the elderly and associated factors in Trans Nzoia County, Kenya. The results from this study will enable health care providers and policy makers to address issues related to nutritional problems that affect the Old aged people and their associated factors. It will also assist policy makers to formulate policies which are sensitive to the local socio-economic and cultural context. All information you give is confidential, your name will not be written in the questionnaire to protect your identity. You are free to drop out of the study at any moment and you can choose to decline to answer any questions you are not comfortable with. Your participation is highly appreciated. This interview will take approximately half an hour. I will write down our discussion to capture the information. Thank you for your cooperation.

Study participant's signature..... Date.....

**Key Informant Interview Guide For Institutionalized And Non-Institutionalized Elderly Care Givers, Opinion Leaders and health care staff**

Date of the interview.....

Age (years).....

Sex.....

Health facility.....

Profession.....

1. Have you ever undergone through Any Nutrition training? If yes, when?
2. How many sessions of geriatrics nutrition education do you give to the Elderly?
3. What are some of nutritional problems among the Elderly do you know exist in the area?
4. In these geriatrics nutrition education sessions, what information do you share with the Elderly and care givers? (Attend 2 sessions of geriatrics nutrition education to verify content)
5. In your own opinion, which are the major factors leading to nutritional problems among the Elderly you have experienced that could lead to nutritional problems?
6. What are the Cultural and socio-economic factors that lead to nutritional problems among the Elderly in the area?
7. What are the challenges faced by the health facilities that could affect compliance to proper nutrition and reducing factors among the Elderly?

**APPENDIX D: RESEARCH PERMIT**

**PAGE 2**

**THIS IS TO CERTIFY THAT:**  
Prof./Dr./Mr./Mrs./Miss/Institution  
Charles Argube Maumo  
of (Address) Kenyatta University  
P.O Box 43844-00100, Nairobi,  
has been permitted to conduct research in


Trans-Azola	Location
Rift Valley	District
	Province

on the topic: Nutritional Problems of the  
Elderly in Trans-Azola County, Kenya.

for a period ending: 30<sup>th</sup> September, 2013.

**PAGE 3**

Research Permit No. NCST/RCD/12A/013/01  
Date of issue 26<sup>th</sup> June, 2013  
Fee received KSH. 1000



*[Signature]*  
Applicant's  
Signature

*[Signature]*  
For Secretary  
National Council for  
Science & Technology

## APPENDIX E: NACOSTE RESEARCH AUTHORIZATION LETTER

REPUBLIC OF KENYA



## NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2241349, 254-020-2673550  
 Mobile: 0713 788 787 , 0735 404 245  
 Fax: 254-020-2213215  
 When replying please quote  
 secretary@ncst.go.ke

P.O. Box 30623-00100  
 NAIROBI-KENYA  
 Website: www.ncst.go.ke

Our Ref: **NCST/RCD/12A/013/91**Date: **26<sup>th</sup> June 2013**

Charles Anguba Maumo  
 Kenyatta University  
 P.O Box 43844-00100  
 Nairobi.

**RE: RESEARCH AUTHORIZATION**

Following your application dated **19<sup>th</sup> June, 2013** for authority to carry out research on "*Nutritional Problems of the Elderly in Trans-Nzoia County, Kenya.*" I am pleased to inform you that you have been authorized to undertake research in **Trans-Nzoia District** for a period ending **30<sup>th</sup> September, 2013.**

You are advised to report to **the District Commissioner, District Education Officer and Medical Officer of Health, Trans-Nzoia District** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

A handwritten signature in blue ink, appearing to read 'M. K. Rugutt'.

**DR. M. K. RUGUTT, PhD, HSC.**  
**DEPUTY COUNCIL SECRETARY**

Copy to:

The District Commissioner  
 The District Education Officer  
 The Medical Officer of Health  
 Trans-Nzoia District.

**APPENDIX F: RESEARCH AUTHORIZATION FROM THE DISTRICT  
COMMISSIONER**

**REPUBLIC OF KENYA  
OFFICE OF THE PRESIDENT**

Telegraphic Address:  
Telephone: 054-30720  
Fax No: 054 – 31617  
E-MAIL: [dctnzoiawest@gmail.com](mailto:dctnzoiawest@gmail.com)  
*When replying please quote*



THE DISTRICT COMMISSIONER  
TRANS NZOIA WEST  
P.O. BOX 11  
KITALE.

Ref. No. ADM.15/8/VOL.III/190

18<sup>TH</sup> September, 2013

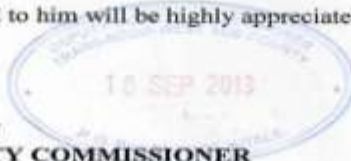
**TO WHOM IT MAY CONCERN**

**RE: RESEARCH AUTHORIZATION  
CHARLES ANGUBA MAUMO**

The above named person is **A student at Kenyatta University undertaking Masters in Public Health**, he has been authorized to undertake research on **"Nutritional Problems of the Elderly in Trans-Nzoia County"** for a period ending **30<sup>th</sup> September, 2013**.

Any assistance accorded to him will be highly appreciated.

  
**MOSES G. GICHARU**  
**AG. DEPUTY COUNTY COMMISSIONER**  
**TRANS-NZOIA WEST SUB COUNTY**



**APPENDIX G: RESEARCH AUTHORIZATION - DISTRICT EDUCATION OFFICER**

**MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY**

Telegrams:.....  
Telephone: Kitale 054-31653  
Fax: 054-31109  
When replying please quote



DISTRICT EDUCATION OFFICE  
TRANS NZOIA DISTRICT  
P.O. BOX 659  
**KITALE**

Ref: TN/ED/GEN/78/VOL.IV/205

Date: 18<sup>th</sup> September 2013

Charles Anguba Maumo  
ID/NO. 24019156

**RE: AUTHORITY FOR RESEARCH**

Reference is made to your letter NCST/RCD/12A/013/91 of 26<sup>th</sup> June, 2013 from the National Council for Science and Technology authorizing you to carry out research in Trans-Nzoia County.

You are hereby authorized to undertake the same in Trans-Nzoia West District till 30<sup>th</sup> September, 2013.

All concerned are requested to accord you all the necessary support.

**S. K. MATUIY**  
FOR: DISTRICT EDUCATION OFFICER  
**TRANS-NZOIA WEST**

## APPENDIX H: KENYATTA UNIVERISTY ETHICAL REVIEW APPROVAL LETTER



KENYATTA UNIVERSITY  
ETHICS REVIEW COMMITTEE

Fax: 8711242/8711575  
Email: [kuerc.chairman@ku.ac.ke](mailto:kuerc.chairman@ku.ac.ke)  
[kuerc.secretary@ku.ac.ke](mailto:kuerc.secretary@ku.ac.ke)  
Website: [www.ku.ac.ke](http://www.ku.ac.ke)

P. O. Box 43844  
Nairobi, 00100  
Tel: 8710901/12

Our Ref: KU/R/COMM/51/161

Date: May 8<sup>th</sup>, 2013

Maumo Charles Anguba  
School of Public Health  
Kenyatta University  
P. O. Box 43844, Nairobi.

Dear Mr. Maumo,

APPLICATION NUMBER PKU/111/I199 OF 2013 – ‘NUTRITIONAL PROBLEMS OF THE ELDERLY AND ASSOCIATED RISK FACTORS IN TRANS NZOIA COUNTY, KENYA’.

### 1. IDENTIFICATION OF PROTOCOL

The application before the committee is with a research topic, ‘Nutritional Problems of the Elderly and Associated Risk Factors in Trans Nzoia County, Kenya’ received on 5<sup>th</sup> April 2013.

### 2. APPLICANT

Maumo Charles Anguba  
School of Public Health  
Kenyatta University  
P. O. Box 43844, Nairobi.

### 3. SITE

Trans Nzoia County, Kenya

### 4. DECISION

The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines, and is of the view that against the following elements of review,

- (i) Scientific design and conduct of study,
- (ii) Recruitment of research participant,
- (iii) Care and protection of research participants,
- (iv) Protection of research participant’s confidentiality,
- (v) Informed consent process,
- (vi) Community considerations.

AND APPROVED and that the research may Proceed ON CONDITION that you incorporate its advise below.



**APPENDIX I: KENYATTA UNIVERISTY GRADUATE SCHOOL RESEARCH  
AUTHORIZATION LETTER**



**KENYATTA UNIVERSITY  
GRADUATE SCHOOL**

E-mail: [dean-graduate@ku.ac.ke](mailto:dean-graduate@ku.ac.ke)

Website: [www.ku.ac.ke](http://www.ku.ac.ke)

P.O. Box 43844, 00100  
NAIROBI, KENYA  
Tel. 8710901 Ext. 57530

Our Ref: P57/20207/10

DATE: 28<sup>th</sup> January, 2013

The Permanent Secretary,  
Ministry of Higher Education, Science & Technology,  
P.O. Box 30040,  
**NAIROBI**

Dear Sir/Madam,

**RE: RESEARCH AUTHORIZATION FOR MAUMO CHARLES ANGUBA- REG. NO.  
P57/20207/10**

I write to introduce Mr. Maumo Charles Anguba who is a Postgraduate Student of this University. He is registered for M.P.H degree programme in the Department of Community Health.

Mr. Maumo intends to conduct research for a proposal entitled, "Nutritional Problems of the Elderly and Associated Risk Factors in Trans-Nzoia County, Kenya".

Any assistance given will be highly appreciated.

Yours faithfully,

A handwritten signature in black ink, appearing to be 'Lucy N. MBAABU'.

**MRS. LUCY N. MBAABU  
FOR: DEAN, GRADUATE SCHOOL**

JMO/rwm

**APPENDIX J: KENYATTA UNIVERSITY GRADUATE SCHOOL RESEARCH  
PROPOSAL APPROVAL LETTER**



**KENYATTA UNIVERSITY  
GRADUATE SCHOOL**

E-mail: [dean-graduate@ku.ac.ke](mailto:dean-graduate@ku.ac.ke)

Website: [www.ku.ac.ke](http://www.ku.ac.ke)

P.O. Box 43844, 00100  
NAIROBI, KENYA  
Tel. 810901 Ext. 57530

**Internal Memo**

**FROM:** Dean, Graduate School

**DATE:** 10<sup>th</sup> November, 2012

**TO:** Maumo Charles Anguba  
C/o Community Health

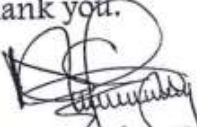
**REF:** P57/20207/2010

**SUBJECT: APPROVAL OF RESEARCH PROPOSAL**

=====

This is to inform you that Graduate School Board, at its meeting of 8<sup>th</sup> November, 2012 approved your Research Proposal for the M.P.H Degree **subject to editing the title to read, " Nutritional Problems of the Elderly and Associated Risk Factors in Trans Nzoia County, Kenya"**

Thank you.

  
**DAVID N. NJOROGE**  
**FOR: DEAN, GRADUATE SCHOOL**

c.c. Chairman, Department of Community Health  
Supervisors:

1. Prof. Judith Waudo  
C/o Department of Foods, Nutrition and Dietetics  
Kenyatta University
2. Dr. John Paul Oyore  
C/o Department of Community Health  
Kenyatta University