ASSOCIATION OF FUNCTIONALITY AND NUTRITIONAL STATUS OF ELDERLY PERSONS: A COMPARISON BETWEEN INSTITUTIONALIZED AND NON – INSTITUTIONALIZED ELDERLY IN NAIROBI COUNTY, IN KENYA

MUGO WAIRIMU JUDY (MPHE)

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DECLARATION

This Thesis is my original work and has not been presented for a degree in any other University

Signature ..... Date 27th Oct, 2015

Mugo Judy Wairimu

P97/11064/2008

This Thesis has been submitted for examination with our approval as University supervisors

Signature ..... Date 9.11.2015

Dr. Otieno George Ochieng

Department of Health Management and Informatics

Signature Jwaudo Date 10/11/2015

Prof. Judith N. Waudo

Department of Foods, Nutrition and Dietetics

Signature ..... Date 10/11/2015

Dr. Vincent O. Onywera

Department of Recreation Management and Exercise Science

DEDICATION

I dedicate this thesis to my family; my dear husband Eddie Mungami, daughters Audrey and Trudyrose, my parents James Mugo and Rosemary Wairimu as well as my siblings and most of all to God Almighty for this far He Has seen me.

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LIST OF ABBREVIATIONS

ADL	Activity of Daily Living
BMI	Body Mass Index
BMR	Basal Metabolic Rate
BW	Body Weight
CC	Calf Circumference
CMMS	Centers for Medicare and Medicaid Services
ER	Energy Requirement
FFM	Fat Free Mass
FM	Fat Mass
FMI	Fat Mass Index
HAI	Help Age International
Kcal	Kilocalories
KNCHR	Kenya National Commission on Human Rights
KSSR	Kenya Security Sector Reform
MCH	Mean Corpuscular Hemoglobin
MCHC	Mean Corpuscular Hemoglobin Concentration
MNA	Mini Nutritional Assessment
MUAC	Mid Upper Arm Circumference
NHAHES	National Health and Nutrition Examination Survey
PAL	Physical Activity Level
PSR	Potential Support Ratio
RDA	Recommended Dietary Allowance
SPSS	Statistical Package for the Social Sciences
SRH	Self-reported Health Status
TSF	Triceps Skin Fold
EPUAP	European Pressure Ulcer Advisory Panel
WHO	World Health Organization

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 the other

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

Elderly: Persons aged 60 years and above

Enteral tube feeding: Nutrition support directly into the gut via a tube

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 part of ADLs

Fluids: Plain water, milk, porridge, fruit juices 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

Halfspan: Measurement of one outstretched arm, from the tip of the hand to the neck

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

Independence: Without supervision, direction or active personal assistance

Institutionalized elderly: An adult aged 60 and above, officially placed in or committed to a specialized Institution

Kyphosis: Curvature of the vertebral column due to aging that causes stooping

Non-Institutionalized elderly: An adult aged 60 and above who is not 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 measure 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

Moderate Loss of Appetite: Moderate decrease in food intake

Parenteral nutrition: The provision of nutrition support through intravenous administration of nutrients such as amino acids, glucose, fat, electrolytes, vitamins and trace elements

Perceptions: The conscious recognition and interpretation of sensory stimuli that serves as a basis for understanding, learning and knowing or for 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

Pressure Sores: a chronic ulcer of the skin caused by prolonged pressure on it (as in bedridden patients). Pressure ulcers, also sometimes known as bedsores *or* pressure sores, are a type of injury that affects areas of the skin and underlying tissue.

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 respondent 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 interest

Self Esteem: Confidence in one's own worth or abilities; self-respect

Skin Ulcers: A skin ulcer is a type of wound that develops on the skin. A *skin ulcer* happens when an area of skin breaks down to reveal the underlying flesh.

Severe Loss of Appetite: Severe decrease in food intake

Social Workers: Professionals whose activity involves helping individuals, groups or communities enhance or restore their capacity for social functioning and creating societal conditions favorable to this goal

Transferring: Independent moves in and out of bed, chair, toilet etc

ABSTRACT

Malnutrition has been recognized as a common problem among the elderly persons and is associated with certain diseases and impaired functioning, but less is known about its relationship with nutrition intake and nutritional care among the elderly residents. This study determined the association of functionality and nutritional status of the Institutionalized elderly and compared with that of the elderly living with their family or community members. It also compared the functionality of the two categories of elderly men and women, and determined the extent to which functional independence impacts on the nutritional status of the elderly in the Nairobi County, Kenya. The Mini Nutritional Assessment questionnaire and the Modified Barthel Index were used to measure the nutritional status and functionality of the elderly. One Questionnaire was administered to the social welfare officer in each of the sampled institutions and a similar questionnaire administered to the care-giver of the elderly in the community to collect information on Institutions and Non- Institutional characteristics that relate to nutritional status and functionality of the elderly. Two hundred and seventy elderly men and women who met the inclusion criteria were sampled, 135 from 4 Institutions and 135 from Gumba, Kariobangi, Huruma and Kawangware divisions. Data were coded and entered using EPI Info version 9 and were analyzed using SPSS version 17. The participants were randomly selected and the response rate was 98.5% for the Non-Institutionalized elderly and 96.5% for the elderly living in the Institutions of the elderly. There was a significant relationship between gender and MUAC ($\chi^2 = 12.745$, df = 2, p = 0.002) with the mean MUAC measure among women (0.77 ± 4.13) being higher than that of men (0.75 ± 0.388), t = 4.446, df = 268, p = 0.714. There were more overweight non-institutionalized elderly (20.5%) compared to those in the institutions of the elderly (14.7%). There was a significant relationship between MUAC measure and CC ($\chi^2 =$ 68.563, df = 2, p = 0.001), with the mean MUAC measure being higher (0.76 ± 0.401) and mean measure of CC being 0.72 ± 0.448, f = 45.28, df = 1, p = < 0.001. Eighty eight percent of the Institutionalized elderly consume 3 or more meals per day compared to 54.8% of the non-institutionalized elderly. There were more totally dependent elderly at Institutions (13.6%), compared to 3% who were Non-institutionalized. Functionality level was found to correlate positively with self-view of health status (r = + 0.133, p = 0.046) and the intake of 3 or more prescription drugs per day (r = + 0.139, p = 0.034). Body mass index of the elderly was found to correlate negatively to Calf Circumference (r = - 0.156, p = 0.027) and Stair Climbing (r = - 0.148, p = 0.025). Protein intake was found to correlate positively to the consumption of fruits and vegetables (r = +0.139, p = 0.029). Nutritional status of the elderly was found to correlate with functional ability. National and County governments should make and implement policies that would promote the nutritional status and functionality of the institutionalized and Non-institutionalized elderly.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

This chapter gives a background to the the nutritional status and functionality of both the institutionalized and the non-institutionalized elderly, the objectives of the study as well as the theoretical framework used in these study

1.2 Background to the Study

The population of older persons is increasing at a very rapid rate, all over in the world. It was about 200 million in 1950, rose to 606 million in the year 2000 and is projected to reach 1.2 and 2.0 billion in 2025 and 2050 respectively. In Africa, the population of older persons, 60 years and above is currently estimated to be 42 million and is projected to reach between 205 to 212 million by the year 2050. One of the biggest increases in population ageing in Africa is expected to occur in Kenya where it is projected that by 2050, there will be a 470% increase in the number of older persons who will represent approximately 10% of the Kenyan population (KNCHR, 2009).

Malnutrition poses a huge economic cost to society. The malnourished elderly are more likely to require health and social services, have more hospitalizations, and cause a burden on caregivers. Without comprehensive and coherent frameworks guiding nutrition and functional independence, of the old in Kenya, substantial resources and efforts continue to be wasted (GOK, 2009 b)

As people get older, degenerative conditions and diseases like diabetes, high blood pressure, cancers, joint and back pains tend to set in (Komi, 2005). These conditions often lead to impaired

mobility, degeneration and deterioration of the human systems especially the musco-skeletal system (Abernethy *et al*., 2005). According to the WHO (1998), a high number of older people in most parts of the world live sedentary lives. Sedentary living leads to loss of muscle function and physical impairment.

In Africa, as elsewhere in the world, food intake and food patterns of older people are influenced by financial status (Howarth, 1991). Lack of social contact, loneliness, bereavement and feelings of worthlessness or rejection can lead to a loss of interest in food and eating. The Kenya poverty data showed that out of the total old persons in Kenya (1.3M), 78.6% are poor with 53.2% absolute poor and 25.4% hardcore poor. Kenya's economic survey of 2011, found that of the 38.6M population, about 17 Million make up the labour force with approximately 10 Million employed and about 8.8 Million in the informal labour sector. According to World Bank (2011), Age dependency ratio in Kenya was reported at 82%, Mozambique-90%, Zimbabwe -74%, Zambia-98%, Singapore -36%, USA-50%, South Africa-53% (IESE, 2012).

A study conducted in Mathare slums in Kenya found out that 90% of the elderly reported that physiological factors that affected food choices were loneliness and chronic diseases and 90% of them reported weight loss. The nutritional status of the elderly in Mathare slum was generally fair though 31% were underweight using BMI whereas 21% were malnourished using MUAC standards (Makori, 2003).

In a study conducted in Dagoretti Nairobi, Kenya 43.7% of the study population had no independent source of livelihoods. However, 80% of them were independent in performing activities of daily living (Waweru, 2002). The study found that there was a significant association between the social support available and the health status of the elderly ($p<0.001$).

1.3. Problem Statement

Despite significant medical advances, under nutrition among the elderly remains a significant and highly prevalent public health problem of developing countries. The overall prevalence is 22.6%. Nearly 40% of hospitalized elderly and 50% of those in rehabilitation facilities are malnourished, and 86% are either malnourished or at risk for malnutrition. Up to 67% of elderly in nursing homes are malnourished or at risk for malnutrition. Of elderly living the community 38% are malnourished or at risk of malnutrition (NNI, 2009).

Malnutrition significantly increases morbidity and mortality and compromises the outcomes of other underlying conditions and diseases. Malnutrition may delay recovery and prolong hospitalization, lead to increased susceptibility to infection, impede individuals' independence and quality of life, and even increase the risk of death in many patients (WHO, 2011). The physiological and pathological change experienced by the elderly culminates to the growing dependence on caregivers, which translates into an indispensable need for help in performing activities of daily living (Ferreira *et al*., 2010).

The unprecedented rise in number of older persons presents a major challenge to the sustenance of their well being in the society. This is particularly due to the unfavorable environments characterized by social conflicts, globalization, socio-economic difficulties, deterioration of cultural values and morals and the HIV and AIDS pandemic (GOK, 2009a).

Few countries in Africa offer social and welfare assistance programmes for older adults. In terms of formal economic support, only three countries—South Africa, Namibia and Mauritius—provide an old-age pension system that is noncontributory and means tested. Kenya is currently

implementing a similar pilot programme, but unfortunately, the money received is not used to purchase food (GOK, 2009b). Furthermore, the elderly are not currently viewed as a priority group for nutrition services. Nutrition interventions in African countries, when available, are directed primarily toward infants, young children, and pregnant and lactating women (GOK, 2006).

The traditional normative patterns where the elderly of the 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, 2011).

1.4. Justification

The elderly are an important component of Kenya's demographic strata and deserve social protection. The population of the elderly is increasing rapidly worldwide, despite the Globe experiencing hard economic times, which cause difficulties in protecting the elderly. As a result, the elderly are slowly being isolated in desperation and becoming more vulnerable in all aspects, among them nutritional status and level of functionality. The situation is further complicated by the rapid urbanization, with increased rural urban migration (KSSR, 2012).

Kenya is a signatory to a range of International human rights Declarations and treaties which advocate for the rights to social security in old age such as the Livingstone Declaration of 2006 by the African Union on aging and the UN proclamation on Aging, 1992. The Kenyan Constitution 2010 under the bill of rights and fundamental freedoms, Articles 21, 43 and 57 provides for social protection for 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 rights and fundamental freedoms. Article 43 gurantees all Kenyans their economic, Social and Cultural Rights (ESC), while the state will provide appropriate social security to persons unable to support themselves and their dependents. Article 57 ensures that older persons participate in the Society and personal development while living in dignity with support of state and Family (GOK, 2010).

Kenya is experiencing rapid urbanization as the youth seek employment in the urban areas leving the elderly to fend for themselves. This has resulted to changes in the social structure of the community and created a more individualistic society. The study established the association between functionality of the elderly and their nutritional status prompted by the need to have elderly persons with full ability to perform ADLs and who are of good nutritional status. The bulk of nutritional problems among the elderly can be attributed to dietary inadequacies and increasingly problems of overnutrion associated with the nutrition transition being experienced in the country.

When aging is not associated with the word active, it is represented by the words losses and disabilities. Despite the existence of losses during the process, active aging should be encouraged among the elderly as it means living a quality, plentiful life. This is the first step to achieving active aging and thus improving their quality of life. The expanding and strengthening evidence on the relationship between physical activity and health necessitates the important public health challenge to increase physical activity levels throughout the elderly population for functional independence. Physical activity interacts positively with strategies to improve a wide range of

public health concerns such as nutrition status, functional capacity and independence (Ferreira *et al*., 2010).

Promoting the nutritional status and functionality of the elderly will lighten the social protection burden of the elderly, a move in tandem with African modern socialization from Socialistic to Individualistic societies, fueled by migration and Urbanization by young employable persons in economic pursuit (GOK, 2011).

The Nairobi County is cosmopolitan and an example of what is to become of the other 46 counties in new County government in Kenya and therefore ideal for this study. The findings of this study will be replicated in the 46 new counties. The findings of this study will inform the government of Kenya in its plan to train personnel able to respond to the health needs of older persons, while encouraging and supporting applied research in geriatric nutrition, for policy making and training of health workers in geriatric nutrition, in line with the National policy on older persons and Ageing. They will also contribute to the social protection of the elderly contributing to the attainment of Millenium Development Goals 1, 3 and 6 as contained in the Millenium Declaration. These are: Eradicate extreme poverty and hunger, Promote gender equality and empower women, Combat HIV/Aids, Malaria and other diseases respectively (KSSR, 2012).

The study will reference for further studies on the elderly in Kenya and other parts of the world. It will also prompt tertiary institutions of learning to design new training programs and review existing programs to address the needs in the community on the relevance and importance of regular physical activities and exercise, equipping trainees with skills on designing exercise and physical activity regimens that respond to different physical activity needs.

1.5. Research Questions

1. What are the Socio-demographic characteristics of the institutionalized and non-institutionalized elderly in Nairobi County, Kenya
2. What is the nutritional status of institutionalized and non-institutionalized elderly in Nairobi County, Kenya?
3. What is the functionality of the institutionalized and non-institutionalized elderly in Nairobi County in Kenya?
4. To what extent does functionality impact on the nutritional status of the institutionalized and non-institutionalized elderly living in Nairobi County, Kenya?
5. What institutional and non-instituutional characteristics relate with nutritional status and functionality of the elderly in Nairobi County, Kenya?

1.6. Null Hypotheses

1. There is no difference between the nutritional status of the institutionalized and the non-institutionalized elderly in Kenya
2. There is no difference between the functionality of the institutionalized and the non-institutionalized elderly in Kenya
3. The functionality of the elderly does not impact on the nutritional status of the institutionalized and non-institutionalized elderly in Kenya

1.7.1 Main objective

The main objective of this study was to establish the association between functionality and nutritional status of the elderly living in institutions of the elderly and compare them with the non-institutionalised elderly in Nairobi County in Kenya.

1.7.2 Specific Objectives

1. To identify the Socio-demographic characteristics of the institutionalized and non-institutionalized elderly
2. To assess the nutritional status of the institutionalized and the non-institutionalized elderly in Nairobi County, Kenya
3. To determine the Functionality of the institutionalized and the non-institutionalized elderly in Nairobi County, Kenya
4. To establish the extent to which functionality impacts on nutritional status of the institutionalized and non-institutionalized elderly living in Nairobi County, Kenya
5. To determine institutional and non-institution characteristics relate with nutritional status and functionality of the elderly in Nairobi County, Kenya

1.8. Conceptual Framework

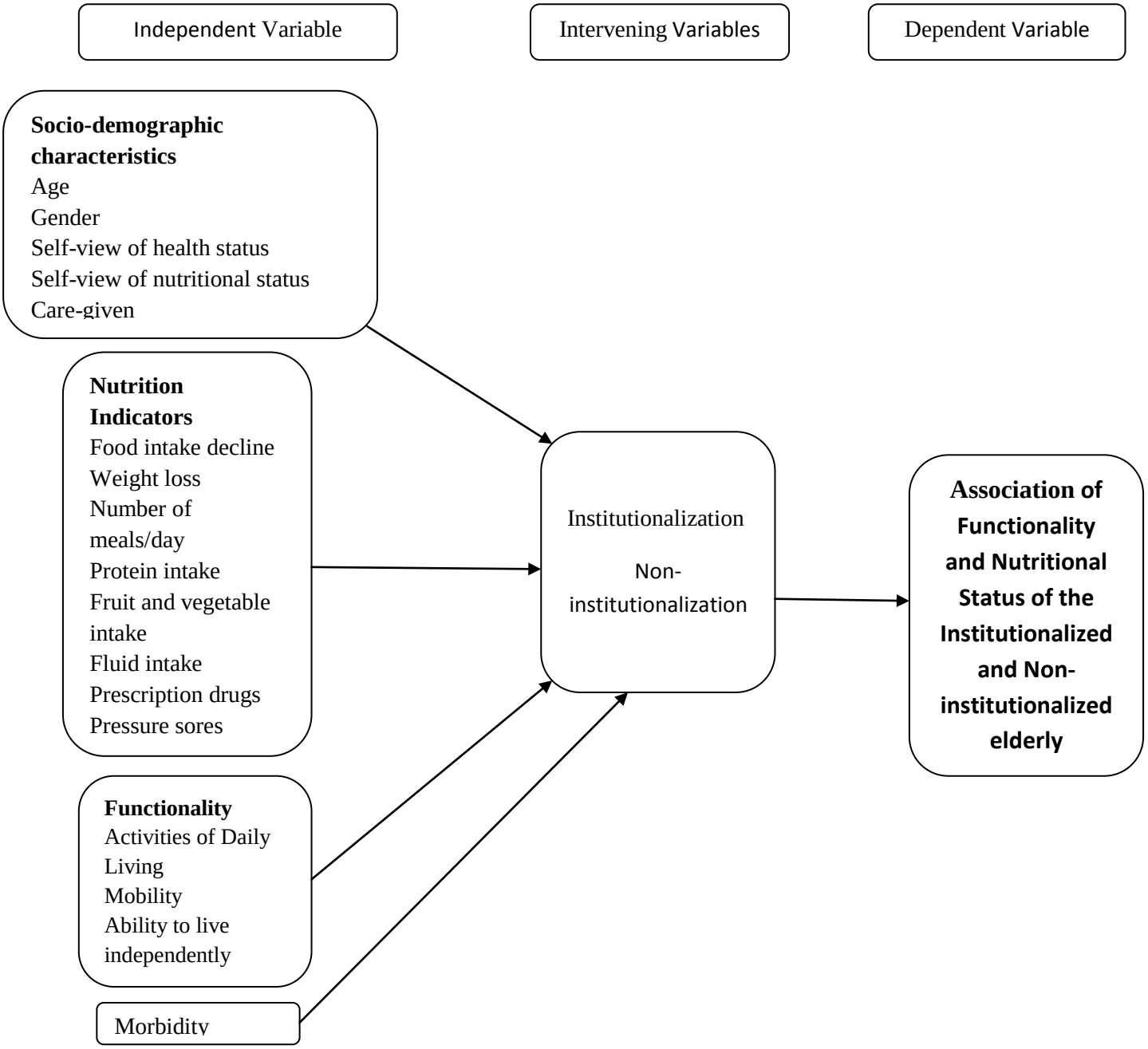

Fig 1: Conceptual Framework on factors impacting on Nutritional status of the institutionalized and Non-institutionalized elderly

1.8.1 Malnutrition among the Elderly

Malnutrition is any disorder of nutritional status, including disorders resulting from a deficiency of nutrient intake, impaired nutrient metabolism, or over-nutrition. Older adults are at risk for under-nutrition due to dietary, economic, psychosocial, and physiological factors. Their dietary intake could be influenced by little or no appetite, problems with eating or swallowing, eating inadequate servings of nutrients and eating fewer than two meals a day. Limited income may cause restriction in the number of meals eaten per day or dietary quality of meals eaten (Kaiser *et al*., 2010).

Older adults who live alone may lose desire to cook because of loneliness while the appetite of those widowed may decrease. Some elderly men and women may have difficulties in cooking due to disabilities, inability to buy food, chronic illnesses and chronic conditions that can affect food intake. Disabilities could also hinder their ability to ingest food, thereby requiring assistance from care-givers. Depression on the other hand could cause decreased appetite same as poor oral health would (Jeffries *et al*., 2011).

Medications given to the elderly in the management of chronic conditions and diseases such as antidepressants, antihypertensives and bronchodilators can contribute to xerostomia (dry mouth), thereby impairing the ability to lubricate, masticate and swallow food. Drug–nutrient interactions: Drugs can modify the nutrient needs and metabolism of older people. Restrictive diets, malnutrition, changes in eating patterns, alcoholism, and chronic disease with long-term drug treatment are some of the risk factors in older adults that place them at risk for drug–nutrient interactions (Capra *et al*., 2007)

Physiological changes among the elderly result in lean body mass and redistribution of fat around internal organs leading to decreased caloric requirements. Change in taste (from medications, nutrient deficiencies, or taste bud atrophy) can also alter nutritional status of the elderly (Guigoz *et al*., 2006).

1.8.2 Activities of Daily Living Among the Elderly

The "activities of daily living" or ADLs are the basic tasks of everyday life. They include personal hygiene, bathing self, feeding, toileting, stair climbing, dressing, bowel control, bladder control, ambulation and chair-bed transfers (i.e., getting in and out of a bed or chair). Although persons of all ages may have problems performing the ADLs, disability prevalence rates are much higher for the elderly than for the nonelderly. Within the elderly population, disability rates rise steeply with advancing age and are especially high for persons aged 85 and over (Balzi *et al*., 2010). Measurement of the activities of daily living is critical because they have been found to be significant predictors of admission to institutions of the elderly, use of home care, use of hospital services, change in living arrangements and overall Medicare expenditures. For research on the elderly, the ability to perform the ADLs has become a standard variable to include in analyses, like age, sex, marital status and income (Onder *et al*., 2005).

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This Chapter presents literature that was reviewed in relation to the study. It gives literature on aging and the aging process, the nutritional status of Institutionalized and Non-Institutionalized elderly, the functionality of Institutionalized and non-institutionalized elderly, the extent to which functionality impacts on nutritional status and the Institutional and Non-institutional characteristics that relate to the nutritional status and functionality of the elderly in Nairobi County.

2.2 Ageing and the Ageing Process

In conformity with the African Union and United Nations (UN) definitions, older persons in Kenya have been defined as those of age 60 years and above (GOK, 2009). Senior adulthood can be divided into two stages: early seniors (60-74 years) and seniors (≥ 75 years). This population group has an increasing number of whom remain healthy and active for many years due to improved medical care, nutrition and fitness (Fahey *et al*., 2003). The ageing process is a change in which the physical, nervous and mental capacities of the human body gradually break down (HAI, 2007). Ageing affects the body in many ways, decreasing the person's physical fitness levels. After the age of 30, muscle mass decreases, joints become less mobile, hormone levels are lowered and the immune system becomes less effective (Buttler *et al*., 1998). The brain mass also decreases as a person gets older because once the cells of the central nervous system die, they do not get replaced. The function of the cardiovascular system becomes impaired as the artery walls become thicker and less lastic (Heath & Fentem, (1997) and Shepherd, (1997). This

results to coronary heart diseases which account for 70% of deaths in those over the age of 65. As muscle mass decreases with age, a person's energy requirements will also decrease (Stafford *et al*., 2003).

2.2.1 The Impact of Population Ageing

Population ageing is one of the global challenges in the 21st Century, due to the fact that life expectancy has risen sharply thus the number of people reaching old age is increasing (WHO, 1999). Life expectancy is expected to go on rising as long as innovations and improvement in various aspects of life like medical, nutrition and sanitation continue advancing which leads to reduced premature mortality rates. Additionally, there is a decline in the number of children being born to each family because of controlled fertility rates (WHO, 1999). This means that with time, there is going to be a bigger number of older adults compared to the children and youth. The implications are that the retirement age may be elevated to allow the older adults to continue serving their countries and, or communities. In some countries like Kenya in Africa and Australia, the retirement age has already been reviewed to 60 and 70 years respectively. It is widely agreed that older adults possess a wide experience of knowledge and contribution that should not just be lost (WHO, 2002).

Nutritional status and functionality of older persons is mandatory if they are to remain productive and active citizens in their families and society as a whole. The quality of life is affected by nutritional status and functionality (WHO, 1999).

2.2.2. Nutritional Care of the elderly

Pender's health promotion model attributes malnutrition among the elderly to a number of factors which include cognitive decline, changes in biological cum physiological functions and decreased appetite. Psychological and social challenges like depression, life events and loneliness may also lead to malnutrition (Saeidlou *et al*. 2011). These factors can be grouped into the following subheadings; psychological, social challenges, normal ageing and functional impairements, Incompetence among care professionals and faulty policy, medication and hospitalization.

Holmes (2008) identified increased drug and or medication usage, dental problems and gastrointestinal track disorders as factors that may lead to malnutrition. Many drugs commonly used by the elderly may have major effects on appetite, taste, and smell. Drugs can have an adverse effect on both consumption and digestion of food. Drug-nutrient interactions can lead to increased or reduced nutrient requirements and to side effects such as nausea and diarrhea.

The causes of decreased appetite, insufficient food intake and malnutrition among the elderly are multi factorial since the elderly people are very heterogeneous (Morley, 2002). An individualized care plan should be developed for every elderly individual at risk of malnutrition, based on the individuals' desires, needs and resources. (Kondrup, 2003). Studies designed to improve the nutritional status of the elderly focus on standardized actions, such as oral supplementations in addition to regular meals.

Milne (2005) in a Cochrane database systematic review of of randomized controlled trials (RCT) found that evidence from trials for improvement in nutritional status and clinical

outcomes included 49 trials revolving around 4790 randomised elderly people, where extra protein and energy were provided, usually in the form of commercial 'sip-feeds'. Oral supplementation was shown to produce a small but consistent weight gain in the elderly people. Majority of the trials showed a reduction in mortality rates which was observed in the supplemented group, as compared with the control group. There was however no evidence of improved functionality or reduction in length of hospital stays.

Ordinary food for the elderly in Non-institutions and in Institutions was shown in a study by Lengyel *et al*., 2005 to be important. One third of elderly residents in long-term care expressed concern over food variety, quality, taste and appearance as well as with the menus. It was found out that the residents were less satisfied with areas related to their autonomy, such as food choice and snack availability. Evans *et al.,* 2005carried out a study in 20 nursing home residents which showed that food which was reflecting the family background of the elderly individual is a source of comfort in nursing home residents. Food was found to play an important role in recovery from illness or adaptation to institutions of the elderly. That study also found that individualized nutritional care based on food can promote nutritional status and quality of life in nursing home residents.

Staff education is suggested to be a basic prerequisite for giving residents appropriate nutritional care. In two Swedish studies (Christensson *et al*., 2001; Faxén-Irving *et al.,* 2005), education was given to staff in resident homes, in order to improve the nutritional status of the residents malnutrition and fulfill individual nutritional requirements.

A lot of countries have developed standard intakes (allowances) of nutrients that are set high enough to protect almost all of the population against deficiency. Since the nutrient needs of

adults are based mainly on studies made on young adults, many of the allowances for older adults are largely estimated by extrapolation. In the Dutch Recommended Dietary Allowances, adults are classified into three age groups: age 22 to 50, age 50 to 65, and 65 years and over. Since the latter categories cover an extensive period of continuous bodily changes, which individually take place at very different rates, the single allowance for each nutrient can only be a gross approximation. In addition, many older people have some chronic disorder for which the Recommended Dietary Allowances make no provision.

2.3. Dietary habits of the elderly population

In a nutritional survey of older people conducted by Maccabi Health services in Tel Aviv (2002), over 40% of the elderly population were found to consume less than the Recommended Dietary Allowances (RDA) for energy, protein and calcium. Dror (1996) confirmed these findings in what are widely considered well established institutions for the aged in Israel. This is further confirmed by in the large national surveys including the United States Department of Agriculture (USDA) food consumption surveys, national health and Nutrition Examination Survey (NHAHES) I, II, III (USDA, 1995, 1996 and 1999) that found inadequate intake of many nutrients in high percentages of older people.

2.4 Functional Dependency and Independency of Institutionalized and Non-Institutionalized elderly

In Bond *et al*., (1993), Wilkin defines dependency as a state in which an individual is reliant upon other(s) for assistance in meeting recognized needs. The ability to cope with everyday tasks in the Non-institution is critical to the maintenance of an independent existence (Occupational Therapy Practice Framework, 2003). Loss of mobility with age is traumatic because it places the person concerned in a dependent, restricted and functioning situation (McPhillips *et al*., 1989). Independence has been viewed as an ideal state in which the elderly are not reliant on staff for conducting broad categories of customary activity – the clusters of daily activities that sorrround sleeping, grooming, toileting and bathing (Cox, 1999). According to the US vital and Health Statistics survey cited by Scwartz and Peterson (1979), some 37% of persons 65 and older experience some kind of limiting chronic disability, more than 62% of all older people are able to carry on most kinds of activities of Daily living. Only 64% according to the same survey are judged unable to carry on primary ADLs. This is in sharp contrast to the popular view of old people as generally 'sick' and 'disabled'.

A study carried out by Help Age International in 2007 shows that old people in developing countries including Kenya, identified mobility in terms of incapacity and disability as one of the Key issues lacking in Public awareness and information. This is because independence and self-care principles of old people are usually taken for granted or too often unknown, ignored or violated by most people (HAI, 2007). As individuals age, the accompanying deterioration in function and the restriction in performance of ADLs serve to reduce their sense of control (Bandura, 1997).

2.5. Physical Inactivity and Ageing

Physical inactivity is a key risk factor for mortality, morbidity and reduced functional ability among older persons (Astrand, 2003). Among the problems affecting older adults is the problem of being inactive which often affects their quality of life and functional independence. According to Wilmore and Costill (2004), prolonged physical inactivity leads to bone fragility, which is due to demineralization in the skeletal bone structure through accelerated urinary excretion of calcium. Loss of calcium can lead to osteoporosis, the risk of which increases with age particularly in women at post-menopause.

Lack of physical activity and poor diet are the major causes of an epidemic of obesity that is affecting the elderly as well as middle-aged and younger populations. Based on the available evidence, 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 inactivity change. This may cause inflation in the economy especially of developing countries like Kenya.

2.6. Health Benefits of regular physical activity

There is substantial scientific evidence that regular physical activity is helpful in combating health problems and diseases (Bird *et al*., 2002). Specifically in older adults, physical activity has been found helpful in lowering the risk of developing health-related conditions like high blood pressure and improving the ability to function and stay independent even with condititions like arthritis (DiPietro, 2001). It is important to note that regular physical activity sustains the ability of older adults to live actively and independently.

In a study done in Bakateyamba home for the elderly in Kampala by Kasoma, 2012, a eight week PAP caused significant effect on the lower body strength p=0.001, the gait quality, p=0.013, the diastolic blood pressure p=0.016 and the heart rate p=0.010 of the elderly. Changes were also noted in the activity patterns of the elderly. Significant improvements were noted in the sleep patterns p=0.006 and the nutritional problems were significantly improved p=0.025. Additionally, the frequency of chronic illness attacks reduced significantly p=0.012. The study concluded that the 8 week PAP was safe and effective in improving the functional independence and health of the elderly. A recommendation was made to encourage the elderly to involve in adequate and regular forms of physical activity and exercise at least three days a week for 30-50 minutes each day (Kasoma, 2012).

2.7. The interaction of Nutrition, Physical activity and Ageing

As delineated above, physical activity has an impact on nutrition by modulating the requirements of mainly energy. Energy intake and energy 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).

However, as requirements for most other nutrients are not basically influenced by the ageing process, the nutrient density of the foods consumed in relatively small quantities by old people must be consistently high. Two main pathways of undesirable regulation are about to take place. One possibility is that the adjustment of energy intake to reduced energy expenditure takes place, but is not accompanied by an increase in nutrient density. Nutrient deficiencies may develop, which might in turn result in a further decrease in physical activity due to disease and

listlessness. A second, unfavorable possibility is a lack of adjustment of energy intake to reduced energy expenditure level, which could lead to a positive energy balance, resulting in a gain in body weight or fat mass. This again could lead to a further decrease of physical activity due to overweight. Both pathways result in a vicious circle leading to less physical activity and impairments (Michael, 2009).

The maintenance or the obtaining of a higher physical activity level with ageing could overcome the depicted unfavorable pathways. A higher energy expenditure allows a higher energy consumption that facilitates the meeting of micronutrient requirements without the need to increase nutrient density. On the other hand, increased energy expenditure allows ahigher energy consumption without risk of weight gain and development of obesity and associated impairments. Although it has been described 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. Debry *et al.,* 2009 showed that elderly living in rural areas had higher energy intakes than elderly in urban settings, due to greater physical demands. Very low energy intakes were found less among elderly people who are physically active. This illustrates the potential beneficial effect of physical activity on energy and nutrient supply.

2.8 Institutional and Non-institutional Characteristics related to Nutritional Status and Functionality of the elderly

There are a number of factors that influence the quality of life and well being of the elderly. These include the nutritional status and functionality of the elderly.

2.8.1 Diet

Diet and the lifestyle of the eldery are factors that influence morbidity and mortality of the elderly. 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 risk of morbidity, thereby contributing to healthy aging (WHO, 2002). The food habits of the elderly are influenced by among other factors loneliness, economic situation of the elderly and disabilities. The older the elderly, the poorer their diet (Wakimoto *et al*., 2005). The elderly have a decreased energy and macronutrient intake, compared to other age groups due to variation in meal patterns and dietary intake. The diet of the elderly is also characterized by changes in diet composition and a reduction in the variety of foods consumed in the elderly population. (Roberts *et al*., 2006).

2.8.2 Care-giving

The human 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 of the elderly in carrying out domestic tasks among other tasks. Loneliness is however a factor that impedes care-giving. It affects societal life of the elderly such as the ability of the elderly to keep and maintain a social network. This would be due to poor health status, vision, functional status and loss of hearing which increases the prevalence of loneliness (Savikko *et al.,* 2005). These changed conditions e.g. disability as a result of old age or restricted money may make the elderly move from one location to another, requiring them to adjust to new sorroundings. These adjustments can or may be painful and could result to trauma, therefore a decline in physical vitality, depression, malnutrition and even cognitive impairment (Robertson, 2004). The elderly

also sometimes fail to remember to eat and how to eat or even take medication, which is a great risk factor for malnutrition and poor health (Kagansky *et al*., 2005).

2.8.3 Physical Activity

Physical activity comprises all forms of being active including exercise, sport and the activities that are part of day to day life such as gardening, washing the car manually and walking. While aging almost inevitably brings with it decline in functional capacity due to the physiological changes that occur in the ageing body (Burbank & Riebe, 2002), participation in physical activity on a regular basis is associated with improved health. The physiological changes affect the speed at which certain movements are made and the range of movement at the joints.

Regular physical activity has been found to delay the onset of degenerative conditions and chronic diseases such as diabetes, obesity, cancers, cardiac related diseases, osteoporosis, and arthritis and to reduce the risk of falls (Cerny & Burton, 2000; Nieman, 1999). Moderate and vigorous intensity physical activities have health benefits, especially in reduction of several chronic diseases.

Regular physical activity should be promoted for the general health and well being of older adults. This will promote their functional ability and independent living (Brukner, Khan &Kron, 2004). Research indicates that the elderly involved in a physical activity training or exercise training program experience a lower rate of falls compared to those who are sedentary.

2.8.4 Social Factor

The muscoskeletal system degenerates and deteriorates as one advances in age and thus affects mobility (Abernerthy *et al*., 2005). Since muscle mass, joint miblity and stability, vision and hearing decline with age, physical activities and exercises are required to rejuvenate the strength, flexibility and balance that are needed for movement. Impaired mobility decreases ones ability to keep in contact with other people (WHO, 1998), therefore 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. Architectural plans of many buildings and out door spaces in Kenya are not age friendly, thus hindering the older adults from accessing venues for social gatherings. This also discourages the elderly from leaving their homes to enjoy their social rights.

2.8.5 Economic factor

The health status of an individual and their fitness dictates the capacity of involvement in economic ventures. The 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 generating activities. In addition they experience disabilities resulting from falls and impairments such as vision impairment, hearing impairment; memory loss, due to the physiological changes that occur in their bodies. If these are not controlled and or treated, they weaken the elderly and disable them from participating in the economic and social development.

According to WHO (2000), older people require skills and confidence in order to live productively. This is more important now more than ever before because the numbers of older adults are increasing and the older adults will therefore be needed to support the economy

In Mozambique, females are referred to as aged when they reach 55 and the men at 60 years. According to Velkof & Kowal (2007) and Kanyoni & Phillips (2009), 60 years is not appropriate to characterize one as aged for Sub-Saharan Africa; instead 55 years was adopted to qualify one as elderly. This is due to the fact that in this region, most countries have a life expectancy at birth of less than 55 years. Diseases such as HIV and AIDS have taken a stall on many families thus older persons have no choice but to take grand children left behind by their children after death (NanKwanga & Phillips, 2009). This means the older persons must have an income in order to take on this role ably.

According to the WHO 2002, in countries like South Africa and Namibia where they have a national old age pension, the benefits are a major source of income for survival to many people and poor families. In more developed countries, there is old age security and gradual retirement. This old age pension promotes active living, functionality and participation in family and social functions. This is because one is able to pay for the exercise program or for a specialist to prescribe relevant exercises and activities in addition to accessing medical care.

According to Nayiga (2002), developing nations in Africa and Kenya in particular need to institute mechanisms and support systems to care for the aged. This is because the family that has the fundamental responsibility of providing social, moral and financial support to their family members has been weakened by the social-economic changes that have taken place (Nayiga, 2002). Due to the escalating food prices and living costs, urban migration and rising

unemployment, many older adults fail to have regular support from their children (Chronicles, 2009). The Older adults are also vulnerable to diseases (Chronicles, 2010). According to Chronicles (2010), issues related to old age get very little attention and few older adults have a voice.

2.8.6 Potential Support Ratio (PSR)

The PSR is the number of persons aged 15 to 64 years per one older person aged ≥ 65 years. The ration indicates the dependency burden on potential workers. The impact of demographic aging is visible in the PSR, which has fallen and will continue to fall. Between 1950 and 2002, the PSR fell from 12 to 9 people in the working ages per each person aged 65 years or older. A decrease of the potential support ratio, which implies a rise in the old-age dependency ratio, indicates in most societies that an increasing number of beneficiaries of health and pension systems (that is, persons aged 65 years or over) have to be supported by a relatively smaller number of contributors (that is, persons of working age, usually between the ages of 15 and 64). Such a change is likely to pose heavier demands on the working-age population, whether in the form of higher taxes or other contributions, so as to maintain a stable flow of benefits to the older population. Even though there may also be a sharp decline in the youth dependency ratio, this reduction may not be sufficient to offset the increased costs related to an ageing population because the costs involved in supporting older persons are, in general, higher than those involved in supporting children and adolescents (United Nations, 1988, 2007; Baldacci and Lugaresi, 1997).

2.8.7 Earlier Studies on Nutritional Status and Functionality of the Elderly

In a study conducted in Bangoua, Cameroon, men had an average BMI which was significantly lower than that of women (22.8 and 25.0, respectively). Similar results were observed using MUAC (27.0 cm and 29.1 cm for men and women respectively). Men were taller than women (165.9 vs 155.5 cm respectively) and heavier (63.9 kg and 60.7 kg, respectively). The prevalence of underweight (BMI<18.5) was 5.5% (7.7% among men and 4.2% for women). Older adults over 70 years had a higher prevalence of underweight (7.0%) than those younger than 70 (4.5%). Using MUAC, 6.7% of men were classified as being malnourished, compared to 1.5% of the women. On the contrary, 23.3% of men and 16.5% women were obese with
BMI >30 kg/m² (Sibetcheu, 2002).

In another study by Ethangatta *et al*., 1998, low income women in Nairobi, slum dwellers were compared with the poor urban area inhabitants. Dietary intakes were assessed quantitatively by four 24-hour dietary recalls, anthropometric and biochemical data was also obtained. 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, MCHC, MCH, Serum, Transferrin and Serum iron. Inferior diets were found to be a contributing factor.

The major problem was insufficient dietary intakes taking into consideration that the foods regularly consumed by the elderly are short of variety of rich-nutrient food groups. The foods available in the home are short of a variety of rich-nutrient foods. Although the institutions for the elderly 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 (Dietary Guidelines for America, 2005; Reese, 2007;

Remig, 2002). Additionally, Osler *et al*. (2001) shows that frequent intake of whole-grain, fibre, fruits and vegetables is associated with low cardiovascular mortality risks.

2.9. Analytical Studies done on aging

In a study done by Lin, Wu Hsiung and Kuo, (2004) compared the Functional Independence Measure between urban and Rural residents living in Long-term Care facilities in Taiwan. The subjects were interviewed to obtain the basic data, and the Functional Independent measure score. Most of the subjects in urban and Long Term Care facilities were males, less than 80 years old, single or widowed, having multiple diseases, using more than one support device, and having social welfare financial support. The results showed that motor ability and cognition in rural Long term care Facilities subjects were significantly higher than those in urban areas as shown in the Functional Independent Measure assessment. It was concluded that some of the functional performance of subjects in rural Long Term care facilities was better than those in urban areas. This was a comparative study between the resident in a rural home and those in urban areas. The study does not however explain why those in the rural home had significantly higher motor and cognition abilities as compared to those in an urban home.

In a study carried out 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 urban areas of the 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, 61.2% had normal body mass indices, 13.2% were overweight, and

9.1% were obese. Energy intake was low (1596.3 -1630.5 kcal), with only 22% and 38% of men and women respectively, meeting their daily requirement (Cheserek *et al*., 2012).

In another study conducted in Central Uganda on the nutritional status and functional ability of the elderly aged 60 to 90 years, the overall prevalences of undernutrition were 33.3% based on body mass index (<18.5 kg/m(2)) and 52% based on mid-upper arm circumference (<24 cm). There was a large, significant difference between prevalences of malnutrition by sex. Sixty eight percent of the women were undernourished (body mass index < 18.5 kg/m(2)) compared with 32.4% of men. Evaluation of the ability of elderly people to perform basic activities of daily living showed that 33% of subjects were independent in all activities of daily living, except for mobility and feeding (Kikafunda *et al*., 2009).

The relation between body mass index and variables associated with functional ability were significant with regard to mobility, continence, and feeding ($P < 0.05$). This study found that a large percentage of older men and women are malnourished. This influenced their daily activities, especially mobility and feeding. The elderly need to be incorporated into health programs and policy (Kikafunda *et al*., 2009).

A study carried out in Embu district of Kenya by Waswa (1985), showed that the elderly had weight for height below 88% of the standard and haemoglobin 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. The study also revealed that 15-20% of the elderly were malnourished and most of them (69%) had health problems. Many didn't have constant income and most of those living alone were over 70 years.

2.10. Summary of the Reviewed Literature

Data on the association between Functionality and the Nutritional status of the elderly is sparse in Kenya. Little has been done in Kenya on these association and its relation to the residence of the elderly be they institutionalized or non-insitutionalized. The study sought to establish these associations and to analyse the predictors of functionality and nutritional status of the elderly in the institutions and non-institutions.

CHAPTER THREE: MATERIALS AND METHODS

3.1 Introduction

This chapter gives information on the methodology used in carrying out the study on the Nutritional Status and Functionality of Institutionalized and Non-Institutionalized elderly. It focuses on the study design, study area, study variables, sampling techniques and sample size, research instruments used and the target population.

3.2 Research Design

The study was design was comparative, retrospective and cross sectional. The study design was used to determine the food selection and intake patterns in the last three months, nutritional status, functionality level, satisfaction or dissatisfaction with consumption patterns and nutritional status as well as the socio-demographic characteristics of their care-givers. A survey was used because it explores relationships between different variables in their natural setting and it also allows for extensive data collection within a short period of time. The design also allows for collection of both quantitative and qualitative data at the same time.

3.3. Research Variables

3.3.1. Independent variables

Socio-demographic characteristics of the elderly, their nutritional status, functionality and morbidity

3.3.2. Dependent Variables

Association of functionality and nutritional status of the elderly

3.3.3. Intervening Variable

The residence of the elderly

3.4 Location of the study

The study was carried out in Nairobi County, Kenya (appendix 5). Its geographical coordinates are 1° 17' 0" South, 36° 49' 0" East and occupies 696 square kilometers (270 square miles). Nairobi County is cosmopolitan and multicultural. It has experienced one of the highest growth rates any city in Africa, and has grown to become the largest city in East Africa, despite being the youngest city in the region. The growth rate is currently 4.1% (CIA, 2008).

There is increased urbanization and movement of people from rural areas to urban areas in Kenya. It is home to 5 Institutions of the elderly, one of these being public institution and the other three private. It is the most populous city in East Africa and according to the 2009 Census, in the administrative area of Nairobi, 3,138,295 inhabitants. The elderly in Nairobi (60 years and above) are 60, 356 (GOK, 2009). The county has nine sub-counties namely, Westlands, Dagoretti, Kasarani, Langata, Starehe, Kamukunji, Embakasi, Njiru and Makadara (CIA, 2008).

3.5. Study Population

The study targeted the elderly, both men and women above 60 years (WHO). The age of the respondents was determined by their care-givers or by use of identity cards. This was also deduced from dates of important historical and social events as applied by the Registrar of births and deaths. This question was also used to determine the soundness of mind of the elderly.

3.5.1. Inclusion Criteria

The study targeted elderly men and women aged 60 and above years living in the 4 institutions of the elderly in Nairobi County, who had lived in the Institution or with their family members for the last one year.

3.5.2. Exclusion Criteria

It excluded subjects with cancer, end-age renal disease/terminal illnesses, those receiving artificial/parenteral nutrition, cognitive impairment and those attending day care centers of the elderly.

3.6. Sampling Technique

A census of four institutions that consented to the study out of five was carried out. The Social welfare officer in each sampled institution was purposefully and conveniently sampled. A list of the elderly living in the Institutions was obtained from the Institution management and with information from the officer, those elderly who did not meet the inclusion criteria were eliminated from the list. The remaining elderly were systematically sampled and every 4^{th} case in the sampling frame selected for inclusion in the sample (Mugenda and Mugenda, 1999). The elderly were sampled proportionately to the number of elderly living in the institutions, since some institutions had more elderly than others.

A list of elderly living in Kariobangi North, Huruma, Gumba and Kawangware divisions was obtained from the respective chiefs by the assistance of Social workers and Community health workers. A brief interview was done with either the care-giver of the elderly or the elderly person, to determine if they meet the inclusion criteria. A total of 34 people were sampled from

each of the four clusters. In cases where there were two elderly in a household, the older one was interviewed because they had a longer experience.

Table 3.1: Names of Institutions of the Elderly in Nairobi County

	Name of Institution	Population Size	Sample Size
1.	Mji wa Huruma, Runda	240	57
2.	Nyumba ya wazee Ruaraka	38	11
3.	Kariobangi Cheshire home	177	42
4.	Mother Teresa, Huruma	105	25
	Total	**560**	**135**

3.7. Sample Size Determination

The total sample size was determined by use of Fisher *et al*., (1998) formula recommended by Mugenda and Mugenda (1999) as effective for social sciences, for samples less than 10,000. Where;

n = the desired sample size for target population <10,000,

Z = normal standard deviation corresponding to 95% confidence interval, that is 1.96,

P = Proportion of the population estimated to have desired characteristics, in this case Institutionalized and Non-Institutionalized elderly in Nairobi County, who are suffering from malnutrition, who make up 87% of the total population.

D=Design effect (2)

Hence;

$n = \frac{Z^2 Pq}{d^2}$ $= \frac{1.96^2 * 0.87 * 0.13}{0.05^2} = 173.76 \approx 174$

Desired sample size nf for populations < 10,000 = $\frac{n}{1+n/N}$ $= \frac{174}{1+174/560} = 132.7 \approx 133$

A total of 135 elderly were sampled from the non-instituions and 135 from institutions

A total of 135 elderly men and women were sampled from the 560 living in the 4 Institutions for the elderly. Another sample of 135 Non-Institutionalized men and women was sampled from the community for comparison in order to cater for any attrition.

3.8. Pre-testing the instruments

A pre-test of the Mini Nutritional assessment (short form) tool, Modified Barthel Index, the questionnaire and the KII was done in Thogoto home for the elderly, where 10 elderly persons with similar characteristics were identified and sampled for conveneience. This allowed for the collection of valid and reliable data before the actual study. Training of the data enumerators was conducted before the pilot study.

The Researcher trained the data enumerators for 1week. After the training, the team pre-tested the survey tools and procedures at the Thogoto Home for the elderly. The team then reviewed the survey tools accordingly, before being trained on Sampling methodologies, interpretation of the questions to the local languages, interviewing techniques, anthropometric measurement procedures, research ethics and the logistics in carrying out the survey.

3.8.1. Validity

Previous researches have demonstrated the validity of the MNA and MBI tools (Guigoz, 2006). MNA has a sensitivity of 98%, Specificity of 100% and diagnostic accuracy of 99% for predicting undernutrition (NNI, 2009). The interview schedules were designed by the researcher and critiqued by other researchers and supervisors to deal with ambiguities and irrelevancies. Content validity index was calculated after the pre test study to ensure adequate content representation.

3.8.2. Reliability

Previous researches have demonstrated the reliability of the MNA and MBI tools. The overall MBI high-rater reliability (0.89) as well as high correlations (0.74-0.8) with other measures of physical disability (O'Sullivan *et al*., 2007). Other studies have demonstrated –reliability range from 0.51 to 0.89 (Guigoz, 2006). The interview schedules and questionnaires 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 reorganized to improve the flow and sequence.

3.9. Data Collection Techniques

The Mini nutritional Assessment tool was used to collect quantitative data on Food intake, Calf circumference, BMI, Height, Psychological stress and mid arm circumference.The Modified Barthel Index was used to measure functionality in the elderly. An open and closed ended questionnaire was used in order to collect information on the socio-demographic characteristics of the caregivers and the Institutional characteristics. A key informant Interview was conducted

in each of the sampled institutions in Nairobi County and the heads of four institutions participated in order to give more information on Institutional characteristics that relate to nutritional status and functionality of the elderly. The data collection tools were used as follows;

3.9.1 Mini nutritional Assessment – Short Form

Nutritional status was assessed using the Mini Nutritional Assessment (MNA) which is easy-to-use but comprehensive assessment tool for older persons. It includes anthropometric assessment including weight, height, weight loss, and arm and calf circumferences; general assessment that includes lifestyle, medication, mobility, and presence of signs of depression or dementia. In addition, MNA includes a short dietary history of number of meals consumed, fruit intake, and autonomy of feeding, as well as the self perception of health and nutrition. The complete MNA includes 18 items and the score distribution is between 0 (zero) and 30. A score less than 17 points indicates malnutrition; scores between 17 and 23.5 indicate 'at risk of malnutrition', and a score _24 indicates a well-nourished state.

Previous studies have demonstrated the MNA as a 'gold standard', with a sensitivity of 90.2% percent and specificity of 96.4% percent in identifying well nourished and malnourished elderly. The use of BMI only as a 'gold standard' also showed that MNA had excellent sensitivity (95.4 %) and specificity (93.9%) in identifying malnutrition. With respect to Mid Upper Arm Measurements, the sensitivity of MNA was only 90.9% percent whereas the specificity was average (59.3%).The sensitivity of MNA was found to be fair (73.4 %) on using calf circumference as the gold standard. The use of the three tools in measuring the nutritional status of the elderly in the MNA gives it the highest specificity which is rated at 98.21%, and therefore the three tools were used in determining the nutritional status of the elderly in this study.

The MUAC measure, BMI and CC measures were all used in determining the nutritional status of the elderly due to thechallenges of each measures independent use among the elderly. The BMI reference values may not be appropriate for identifying poor nutritional status in the elderly people because of changes in body composition and kyphosis. MUAC is easy to perfom but its ability to identify true well nourished subjects (specificity) is 59.3%. On the other hand, CC in MNA misclassifies the elderly with a low CC as being well-nourished.

3.9.2 Measuring Functionality

Functionality of the elderly was assessed using a Modified Barthel Index. The index consists of 10 items that measure a person's daily functioning, specifically the activities of Daily living and mobility (Freeman *et al*., 1999). The items included feeding, moving from wheel chair to bed and return, grooming, transferring to and from toilet, bathing, walking on level surface, going up and down stairs, dressing, continence and bowels and bladder. The items were weighted and the person received a score based on whether they have received help while doing the task. The scores for each of the items were summed to create a total score. The higher the score, the more 'independent' the person. Independence means that the person needed no assistance at any part of the task. If a person did about 50% independently, then the 'middle' score would apply.

Table 3.2: Assessment of Functionality using the Modified Barthel Index (the higher the score, the greater the level of functionality)

Item	1. Unable to perform task	2. Attempts Task but unsafe Needs max help	3. Consistent help & supervision required Ass. Device and structuring.	4. Occasional Help and supervision required and ass device.	5. Fully Independent	Score –Initial assessment Dd/mm/yy __/__/20__
Personal Hygiene	0	1	3	4	5	
Bathing self	0	1	3	4	5	
Feeding	0	2	5	8	10	
Toilet	0	2	5	8	10	
Stair climbing	0	2	5	8	10	
Dressing	0	2	5	8	10	
Mobility	0	3	8	12	15	
Transfer	0	3	8	12	15	
*Bowel control	0		5		10	
**Bladder control	0		5		10	
Total						

Table 3.3 Categorization of the Levels of Functionality among the elderly

Categories	MBI Total Scores	Dependency Level
1	0-49	Severe
2	50-74	Moderate
3	75-99	Minimal

3.9.3 Interview Schedule

The interview schedule had questions on Institutional and Non-institutional /community characteristics that related to the nutritional status and functionality of the elderly. The social welfare officers and the head of household respectively responded to the questionnaire.

3.9.4 Key Informant Interview Guide

Key informant interviews were conducted in each of the sampled Institutions for the elderly to ascertain Institutional characteristics that promote the nutritional status and functionality of the elderly in Nairobi County. The key informants were either the Social Welfare Officer or a representative from the Institutions management.

3.10 Data collection procedures

Data was collected using an interview schedule because the elderly have various literacy problems e.g. poor eyesight, illiteracy and language problems (Ethangatta, 1988). The instrument was translated to Kiswahili to cater for those who could not understand English and allow for ease in translation by the enumerators. Nutritional Screening and Assessment was done for the Institutionalized and the Non-institutionalized elderly as well as interview on their ability to

carry out activities of Daily living. To collect information on characteristics of the care-givers, an interview schedule for the care-givers was also conducted and a KII with the heads of Institutions of the elderly.

Mini nutritional assessment, Functional Independence Measure tool, interview schedules and a Key informant Interview guide were used for collecting data on various variables as follows;

3.12.1 Weight Measurements

Body weight was measured using a bathroom scale to the nearest 0.1 kg (Plate 1). The beam balance was carefully calibrated for accuracy with the 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 on the scale upright and with minimum clothing and no shoes. The weight measurements were read once the needle stopped wobbling. This procedure of reading and recording the elderly weight was repeated twice and the average weight recorded (Cogill, 2000).

Plate 1: Weight Measurement

3.12.2 Height Measurements

The elderly were measured while standing using a height metre. The height metre was placed on a smooth level, flat hard surface against a wall, tree or a doorpost, depending on where the elderly was. For the elderly who could not stand, the half arm-span distance (from the midline at the sternal notch to the tip of the middle finger) was taken in centimeters and doubled. The edge of the right collar bone would be located and marked. The non-dominant arm of the elderly would be placed in a horizontall position and in line with the shoulders. A tape measure was used to measure the distance from the midline at the sterna notch to the tip of the middle finger. The arm was confirmed to be flat and the wrist in a straight position then a reading taken. For the elderly who could stand, the measures were read to the nearest 0.5 cm from a scale marked in centimeters up to a height of 2 metres and fixed to the vertical plane. Subjects were requested to stand erect, without shoes, with heels, buttocks and shoulder blades in a vertical line. The head was held upright and the head piece lowered to make contact with the head, crushing the hair gently. The reading was then taken to the nearest 0.5 cm. the head piece was removed and instructions repeated once more and an average height recorded (Cogill, 2000)

Plate 2: Height measurements of the elderly

3.12.3 The Body Mass Index

The height and weight were used to compute the nutritional indicator BMI, which is a generic way of estimating the ratio of lean body mass to fat percentage in ones body. This was calculated by dividing the weight in kilogram by height in metres squared. This was then compared to the WHO/FAO reference chart with BMI cut off points, which are categorized as: Underweight (BMI<19kg/m^2), normal (BMI 19 - 21 kg/m^2), at risk of being overweight (BMI 21-23kg/M^2) and Overweight (23 or greater) (WHO/FAO, 2003). However for the elderly who were not able 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^2 and if the MUAC measure was less than 32.0 cm, the BMI was likely to be > 30 kg/m^2.

Table 3.4: BMI cut-off points for classification of Nutritional Status

BMI (Kg/M^2)	**Nutritional Status**
Less than 19	Underweight
19 to less than 21	Normal
21 to less than 23	At risk of being Overweight
23 or greater	Overweight

3.12.4 The Mid Upper Arm Circumference

The elderly were asked to bend their their non-dominant arm at the elbow at a right angle with 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 were 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 tightens snugly. Pinching or causing indentation was avoided and the measure recorded in centimeters.

3.12.5 The Calf Circumference

The calf circumference measure was taken from the elderly with the tape held at the right angle to the length of calf and recorded to the nearest 0.1 cm with the elderly sitting with the left leg hanging loosely or standing with their weight evenly distributed on both feet. The elderly were asked to roll up the trouser to uncover the calf. A measuring tape was wrapped around the calf at the widest part and the measurement noted. Additional measurements were taken above and below the widest part to ensure that the first measure taken was the largest.

In bed bound elderly, the calf circumference measure was taken with their knees bent at 90° angle.A loop of the tape measure was slipped around the left calf until the largest diameter is located. The measurements were recorded to the nearest 0.1 cm.

3.13. Data Analysis

Both qualitative and quantitative data was collected for the study. Common themes were obtained from the data collected and clustered in a patterned order as addressed by the objective so as to identify variables that depict general concepts. Inferences and conclusions were then drawn from the findings. Data from the study was coded and entered using the EPi Info version 9 programs. Analysis was done using the SPSS version 17 programme. Descriptive analyses were performed to report the distribution of the data and presented as frequencies and percentages *n* (%), and discrete and continous data presented as mean and standard deviation (SD). Univariate tests of differences between the functionality of the elderly, their nutritional statusand residence were perfomed using Pearson's χ^2-test and independent t-tests. For multivariate analyses, multinomial logistic regression models were used with nutritional assessment status as the dependent variable. The analyses were performed in two steps. In the first step, a base model was constructed by including as independent variables all significant variables in the univariate

analysis, except for those that contributed directly or indirectly to the MNA score, together with interaction effects. In the second step, a final model was constructed using a backward stepwise selection procedure with an entry probability of 0.05 and removal probabilities of 0.2 for the main effects and 0.05 for the interaction effects. The participants residence was considered as a potential confounder.

The analysis was performed in four steps. In the first step, nutritional status and functionality and residence of the elderly were entered into separate Cox regression models. In the second step, variables that were significant were entered in the first step were entered into a multivariate Cox regression model (base model). In the third step, non-significant variables were removed from the base model through a backward selection procedure until the model included only significant variables (reduced model). In the fourth step, all confounding variables included in the reduced model were tested for interaction effects with nutritional status and significant effects were then added to the reduced model. Finally, non-significant variables were removed through a backward selection procedure until the model included only significant variables (final model). All regression models were hierarchical. For all statistical tests, a two-sided p-value < 0.05 was considered significant.

3.14 Logistical and Ethical Considerations

Prior to the study, approval was sought from Kenyatta University Ethical Clearance Committee and research Authorization sought from the National Council for Science, Technology and Innovation (NACOSTI) (Appendix 1 and 2 respectively). All participants were informed about the objectives of the study and informed consent was obtained before non-institution and institutions interviews and taking the anthropometric measurements. Participants were also

informed about their right to discontinue his/her participation from the study at any point of data collection. Informed consent was also sought from the elderly and their care –givers, both at non-institutions and in institutions and confidentiality was maintained on all the information and data collected. Nutritional and health counseling was given to all the elderly participants and the care-givers of those who were found to be malnourished or at risk of malnutrition with an aim of improving their levels of functionality and nutritional status.

CHAPTER FOUR: RESULTS

4.1 Introduction

This Chapter presents the results collected from the respondents, detailed analysis of the data and interpretation with regard to the stated research questions, hypotheses and objectives

4.2 Socio-demographic characteristics of the respondents

Table 4.1 Demographic Characteristics of the Respondents

Age	Residence of the Elderly		Gender	
	Non-institution	**Institution**	**Male**	**Female**
60-65	26 (10.2%)	46 (17.1%)	36 (13.2%)	38 (14.1%)
66-70	34 (12.7%)	29 (10.7%)	32 (11.7%)	32 (11.7%)
71-75	26 (9.8%)	17 (5.9%)	16 (5.9%)	26 (9.8%)
76-80	29 (10.7%)	23 (8.3%)	25 (9.3)	26 (9.8%)
81 and above	20 (7.3%)	20 (7.3%)	21 (8.3%)	18 (6.3%)
Total	135 (50%)	135 (50%)	130 (48.3%)	140 (51.7%)
	χ^2 = 2.394, df = 4, p= 0.664		χ^2 =6.432, df = 4, p= 0.169	

Age	**Max** 113	**Min** 60	**Mean** 70.53
Weight (Kg)	**Min** 31	**Max** 71	**Mean** 52.904
Height (cm)	**Min** 104	**Max** 182	**Mean** 157.31

The total number of respondents was 270. One hundred and thirty five (50%) of the participants were living in non-institutions whereas 135 (50%) were living in institutions of the elderly (Table 4.1). Majority of the participants 140 (51.7%) were female. The youngest elderly was aged 60 years and the oldest 113 years. The mean age was 70.53 ± 11.336. The average height of the elderly was 157.31 ± 11.211cm and an average weight of 52.904 ± 8.064. There was no

significant relationship between age, gender and place of residence (χ^2 = 2.394, df = 4, p= 0.664; χ^2 =6.432, df = 4, p= 0.169) respectively (Table 4.1).

Table 4.2 Anthropometric Measurements by Age of the Elderly

Age	Mid Upper Arm Circumference (MUAC) in cm			Calf Circumference (CC) in cm		Dependency Level		
	MUAC less than 21 cm	MUAC 21 to 22 cm	MUAC 22 cm or greater	CC Less than 31	CC 31 or Greater	Severe	Moderate	Minimal
60-65	19 (7.2%)	3 (1.0%)	56 (20.6%)	8 (3.1%)	65 (24.1%)	9 (3.4%)	20 (7.3%)	45 (16.6%)
66-70	11 (4.1%)	3 (1.0%)	46(17.0%)	21 (7.9%)	42 (15.7%)	3 (1.0%)	17 (6.3%)	43 (16.1%)
71-75	10 (3.6%)	4 (1.5%)	26(9.8%)	13 (4.7%)	27 (9.9%)	9 (3.4%)	5 (2.0%)	28 (10.2%)
76-80	12 (4.6%)	1 (0.5%)	38(13.9%)	13 (4.7%)	38 (14.1%)	9 (2.9%)	16 (5.9%)	28 (10.2%)
81 and above	4 (1.5%)	8 (3.1%)	28(10.3%)	14 (5.2%)	28 (10.5%)	4 (1.5%)	15 (5.4%)	21 (7.8%)
Total	57 (21.1%)	19 (7.2%)	194(71.6 %)	69 (25.7%)	201 (74.3%)	33 (12.2%)	72 (26.8%)	165 (61.0%)
	χ^2 = 12.928, df = 8, p= 0.114)			χ^2 = 8.377, df = 4, p= 0.079		χ^2 = 10.404, df = 8, p= 0.238		

A majority of the elderly (71.6%) had a MUAC of 22 or greater, whereas 201 (74.3%) had a Calf Circumference of 31 or greater (Table 4.2). There was no significant relationship between age, MUAC and CC of the elderly (MUAC (χ^2 = 12.928, df = 8, p= 0.114); CC ((χ^2 = 8.377, df = 4, p= 0.079) respectively. Only 12.2 % had Severe dependency in carrying out ADLs and there was no significant relationship between the age of the elderly and dependency level (χ^2 = 10.404, df = 8, p= 0.238).

Table 4.3 Body Mass Index by Age of the Elderly

Age	Body Mass Index				
	Underweight	**Normal**	**At Risk of Over Weight**	**Overweight**	**Total**
60-65	9 (3.4%)	39 (14.6%)	17 (6.2%)	11 (3.9%)	76 (28.1%)
66-70	15 (5.6%)	27 (10.1%)	14 (5.1%)	8 (2.8%)	64 (23.6%)
71-75	6 (2.2%)	23 (8.4%)	6 (2.2%)	5 (1.7%)	40 (14.5%)
76-80	6 (2.2%)	27 (10.1%)	3 (1.1%)	12 (4.5%)	48 (17.9%)
81 and above	12 (4.5%)	14 (5.1%)	5 (1.7%)	12 (4.5%)	43 (15.8%)
Total	49 (18.0%)	130 (48.3%)	44 (16.3%)	47 (17.4%)	270 (100%)
χ^2 =15.822, df = 12, p= 0.200					

About 17% (n = 47) of all the elderly were overweight while 18.0% (49) were underweight (Table 4.3). There was no significant relationship between the age of the elderly and their body mass index (χ^2 =15.822, df = 12, p= 0.200).

Table 4.4 Socio-Demographic Characteristics of the care-givers and Common Ailments among the elderly in Non-institutions

Socio-demographic Characteristic	Variables	Frequency
Gender	Female	84(61.9%)
	Male	51(38.1%)
Marital Status	Divorced	8(5.7%)
	Married	111(81.9%)
	Married Before	8(5.7%)
	Widow/Widower	9(6.7%)
Education Level	Primary	31(22.9%)
	Secondary	99(73.3%)
	Tertially	5(3.8%)
Common Known Ailments	Blood Pressure	55(40.9%)
	Diabetes	43(31.6%)
	Cancer	14(10.5%)
	Ulcers	13(9.8%)
	Others	10(7.2%)
Period of Taking Care for Elderly	Mean	7.6 Yrs
	Min	1 Year
	Max	30 Yrs

Majority of those who were taking care of the elderly in non-institutions were female (61.9%), compared to males at 38.1%. Eighty one point nine percent of them were married with 5.7% having been married before and 6.7% either widowed or widowers (Table 4.4). The majority of the care-givers (73.3%) had secondary school level of education and only 3.8% of them had attained tertiary level of education. The majority of the care-givers reported that the elderly under their care were being treated for blood pressure (40.9%), 31.6% for diabetes, 18.3% reported to have both blood pressure and diabetes, 10.5% for cancer and 9.8% were being treated for ulcers while 7.2% were being treated for other ailments namely; asthma, fractures, pneumonia and urinary tract infections. The least period of time taken in caring for the elderly

was 1 year, an average of 7.6 years, with some institutional care-givers reporting to have taken care of the elderly for the last 30 years.

4.3 The nutritional status of the Institutionalized and the non-institutionalized elderly in Nairobi County, Kenya

4.3.1 Introduction

This section presents results on anthropometric measurements of the elderly and other components that relate to the nutritional status of the elderly and shows the variations that may arise due to differences in age, gender and place of residence.

4.3.2 Body Mass Index of the Elderly

This sections looks at the relationship between the BMI as a measure of nutritional status and the socio-demographic characteristics of the elderly.

4.3.2.1 Body Mass Index by Gender of the Elderly

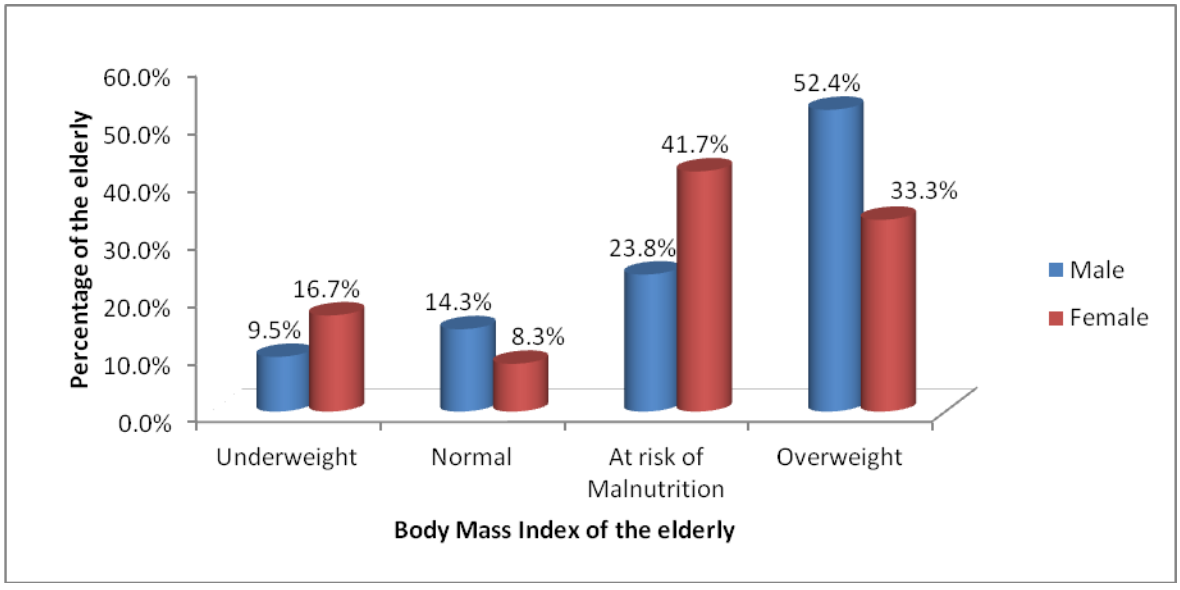

Fig 4.1 Body Mass Index of the Elderly by Gender

Figure 4.1 shows that more women (41.7%) were at risk of being overweight compared to men (23.8%). Only 9.5% of the men were underweight, compared to 16.7% of women who were found to be underweight. The results showed that there was no significant relationship between the BMI and gender (χ^2 =1.958, df = 3, p= 0.581)

4.3.2.2 Body Mass Index of the Elderly and their place of Residence

Table 4.5 Body Mass Index by Residence of the Elderly

Body Mass Index	Non-institution	Institution	Total
Underweight	23 (17.2%)	28 (20.2%)	50 (18.6%)
Normal	63 (46.7%)	62 (45.9%)	125 (46.3%)
At Risk of Becoming Over Weight	21 (15.6%)	26 (19.3%)	47 (17.3%)
Overweight	28 (20.5%)	19 (14.7%)	48 (17.7%)
Total	**135 (100.0%)**	**135 (100.0%)**	**270 (100.0%)**
χ^2 = 1.831, df = 3, p= 0.608			

Table 4.5 shows the distribution of elderly by BMI in non-institution and in institutions. Majority of the elderly both at institutions and non-institutions were of a normal BMI (46.3%) and only 17.7% were overweight, with 20.5% of the elderly in Non-institutions being overweight. There was no relationship between BMI and institutionalization of the elderly (χ^2 = 1.831, df = 3, p= 0.608)

4.3.3 Mid Upper Arm Circumference of the elderly

This section presents results on the relationship between the MUAC, a measure of nutritional status and the socio-demographic characteristics of the elderly.

4.3.3.1. The Mid Upper Arm Circumference by Residence of the Elderly

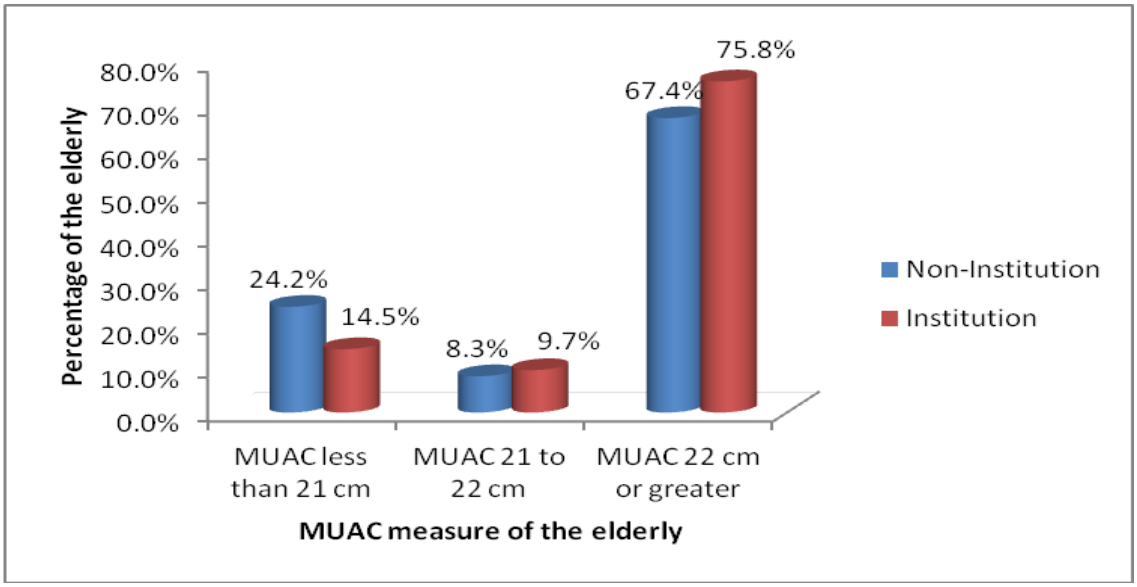

Fig 4.2 Mid Upper Arm Circumference by residence of the Elderly

Majority of the elderly, both in non-institutions (67.4%) and at institutions (75.8%) had a MUAC of 22 or greater (Fig 4.2). More of the elderly in non-institutions (24.2%) had a MUAC of less than 22 cm, compared to 14.5% of their counterparts in the institutions. However there was no significant relationship between the Mid upper arm circumference and residence of the respondent (χ^2=3.85, df = 2, p=0.146).

4.3.3.2 The Distribution of the Mid Upper Arm Circumference of the Elderly by Gender

Table 4.6 Distribution of MUAC by Gender

Mid Upper Arm Circumference (MUAC) in cm				
Gender	**MUAC less than 21 cm**	**MUAC 21 to 22 cm**	**MUAC 22 or greater**	**Total**
Male	23 (17.4%)	20 (15.7%)	87 (66.9%)	130 (100%)
Female	30 (21.5%)	4 (3%)	106 (75.6%)	140 (100%)
Total	**53 (19.5%)**	**24 (9%)**	**193 (71.5%)**	**270(100%)**
t = 4.446, df = 268, p = 0.714				

Table 4.6 shows mid-arm circumference by gender. A higher percentage of women (75.6%) had a MUAC of 22 or greater compared to men (66.9%). Only 17.4% of the men had a MUAC less than 21 cm. There was a significant relationship between gender and mid upper arm circumference (χ^2=12.745, df= 2, p=0.002). Further tests by t-test on the level of significance indicated that the MUAC mean measure for the women (0.77 ± 0.413) was higher than that of men (0.75 ± 0.388), t = 4.446, df = 268, p = 0.714.

4.3.4 Calf Circumference of the elderly

This section presents the results of the Calf circumference measure by the socio-demographic characteristics of the elderly as a measure of nutritional status.

4.3.4.1 The Calf Circumference by Gender of the Elderly

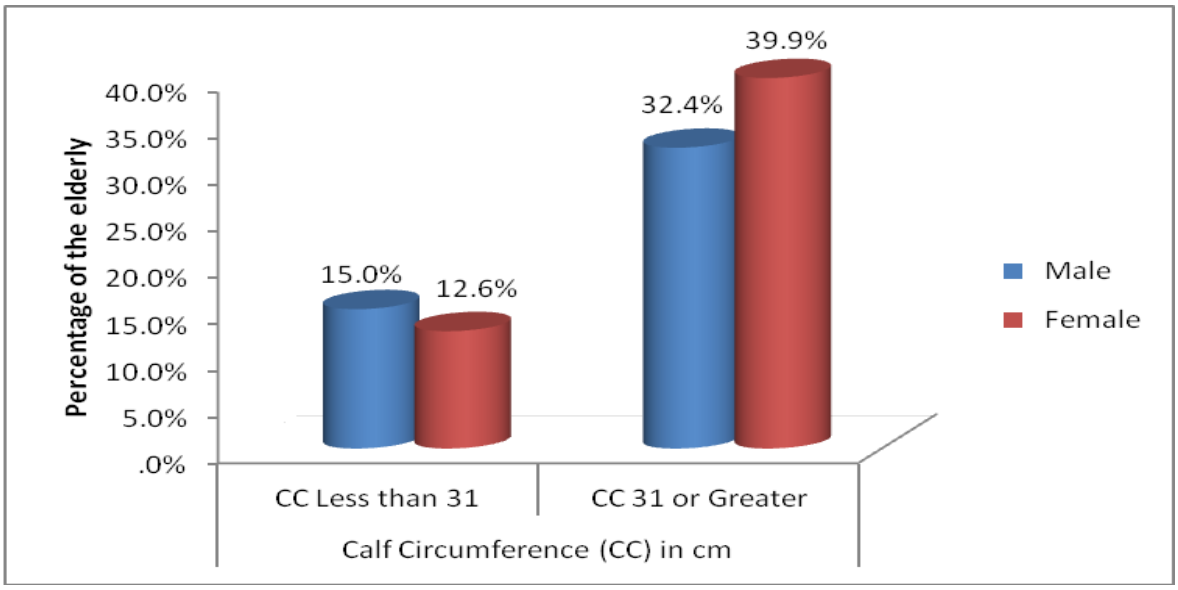

Fig 4.3 Calf Circumference by Gender of the Elderly

Figure 4.3 shows the calf circumference by gender. More women (75.9%) than men (68.3%) had a CC of 31 cm or moreTwelve point six percent of the women had a CC less than 31 cm. More women than men had a CC of less than 31. There was no significant relationship between CC and gender (χ^2 = 1.824, df = 1, p=0.177)

4.3.4.2 Calf Circumference Measure by Mid Upper Arm Circumference of the Elderly

Table 4.7 Calf Circumference measure by Mid Upper Arm Circumference

MUAC Measure	Calf Circumference (CC) in cm		
	CC Less than 31	CC 31 or Greater	Total
MUAC less than 21 cm	27(10.0%)	27(10.0%)	54(20.0%)
MUAC 21 to 22 cm	22(8.0%)	3(1.2%)	25(9.2%)
MUAC 22 or greater	27(10.0%)	164(60.8%)	191(70.8%)
Total	**76(28.0%)**	**194(72.0%)**	**270(100.0%)**
f = 45.287, df = 1, p = <0.001			

The majority of the elderly had a MUAC of 22 cm or greater and a CC of 31 cm or greater. Only 3 (1.2%) elderly people had a MUAC of 21 to 22 cm and a CC of 31 cm or greater. There was a significant relationship between MUAC and CC (χ^2 = 68.563, df = 2, p=0.001) and a significant variance between MUAC (0.76 ± 0.401) and (CC 0.72 ± 0.448), (f = 45.287, df = 1, p = <0.001).

4.3.4.3Calf Circumference by residence of the Elderly

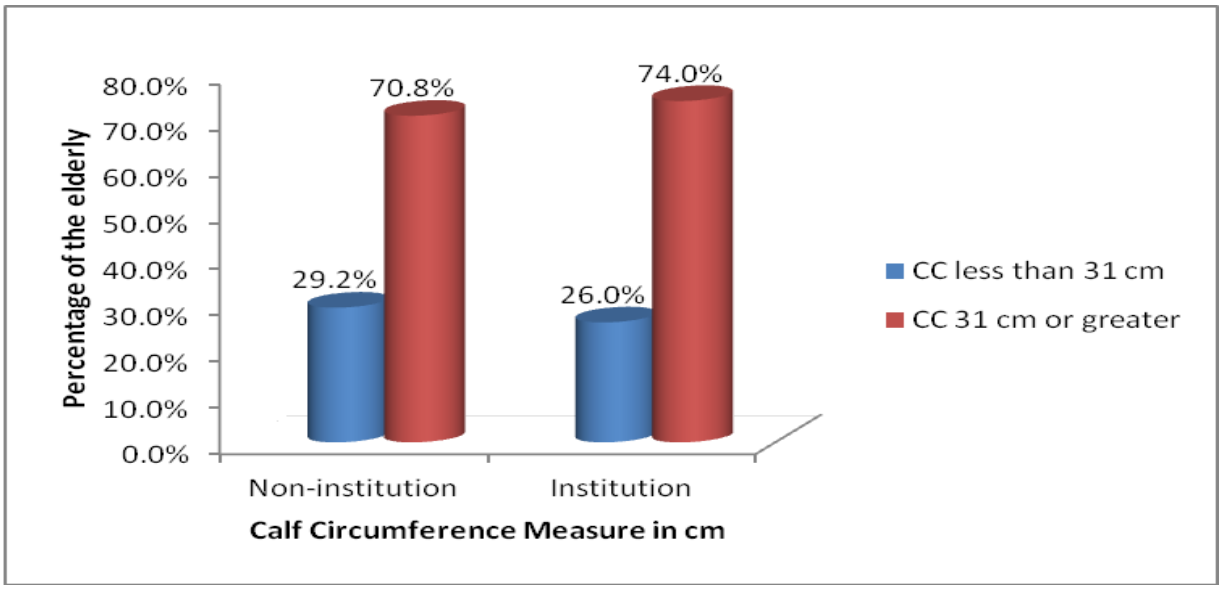

Fig 4.4 Calf Circumference and Residence of the Elderly

Both the Institutionalized and the Non-institutionalized elderly had a CC of 31 cm or greater, with the elderly in institutions having a higher calf circumference (74.0%). Twenty six percent of the elderly living in institutions had a CC less than 31 (Fig 4.4). There was no significant relationship between Calf Circumference and being Institutionalized or living in a Non-institution (χ^2=0.326, df = 1, p=0.568)

4.3.5 Number of Full Meals consumed by the elderly

Number of full meals consumed by the elderly is a determinant of the amount of nutrients available for use by the elderly. This section presents results on the relationship between number of full meals and socio-demographic characteristics of the elderly.

4.3.5.1 Number of full meals consumed by the Gender of the Elderly

Table 4.8 Number of full meals consumed by Gender of the Elderly

Number of Full meals Eaten per day				
Gender	**1 Meal**	**2 Meals**	**3 Meals**	**Total**
Male	5 (4.1%)	30 (22.8%)	95(73.2%)	130(100.0%)
Female	2 (1.6%)	40 (28.7%)	98(69.8%)	140(100.0%)
Total	**7 (2.8%)**	**70 (25.8%)**	**(193)71.4%)**	**270(100.0%)**
χ^2 =2.39, df=2, p=0.303				

Table 4.8 shows the relationship between full meals eaten by the patient per day by gender. More males (73.2%) were able to consume three full meals per day compared to 69.8% of women. Only 2.8% of all the elderly consumed 1 meal per day. The results showed that there was no significant relationship between the number of meals consumed and the two genders (χ^2 =2.39, df=2, p=0.303)

4.3.5.2. Number of Meals Consumed by Residence of the Elderly

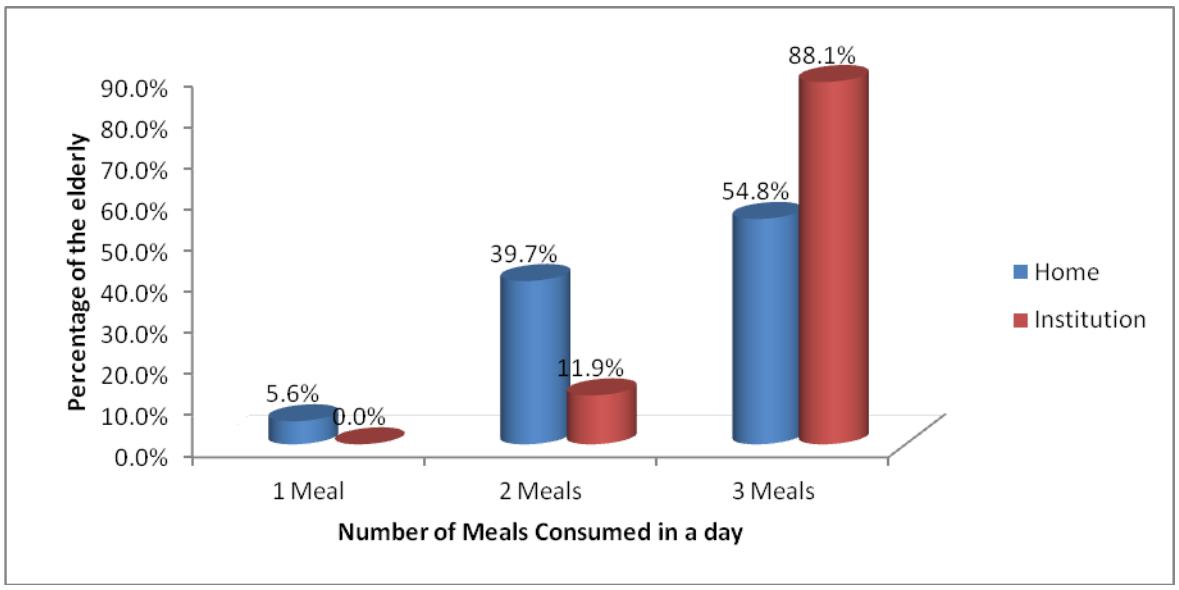

Fig 4.5 Number of Meals Consumed by Residence of the elderly

A large percentage (88.1%) of the institutionalized elderly reported that they consume 3 or more meals per day compared to 54.8% of the elderly living in non-institution (Fig 4.5). None of the institutionalized elderly took 1 meal per day, compared to 5.6% of the elderly in institutions who did. The results showed that there was a significant association between taking full meals and residence of the elderly ($\chi 2=35.6$, df = 2, $p<0.001$) with those institutionalized being more likely to take more meals per day than those in non-institutions. The mean number of meals consumed by the institutionalized elderly ($1.88 \pm .325$) was higher than that of the elderly in non-institutions (1.49 ± 0.603), $t = 6.370$, df = 268, $p < 0.001$.

4.3.6. Consumption of Fruits and Vegetables by the elderly

Fruits and vegetables are important sources of macro and micro-nutrients for the elderly. This section presents results on the relationship between Consumption of fruits and vegetables and the socio-demographic characteristics of the elderly.

4.3.6.1 The Consumption of Fruits and Vegetables by Residence of the Elderly

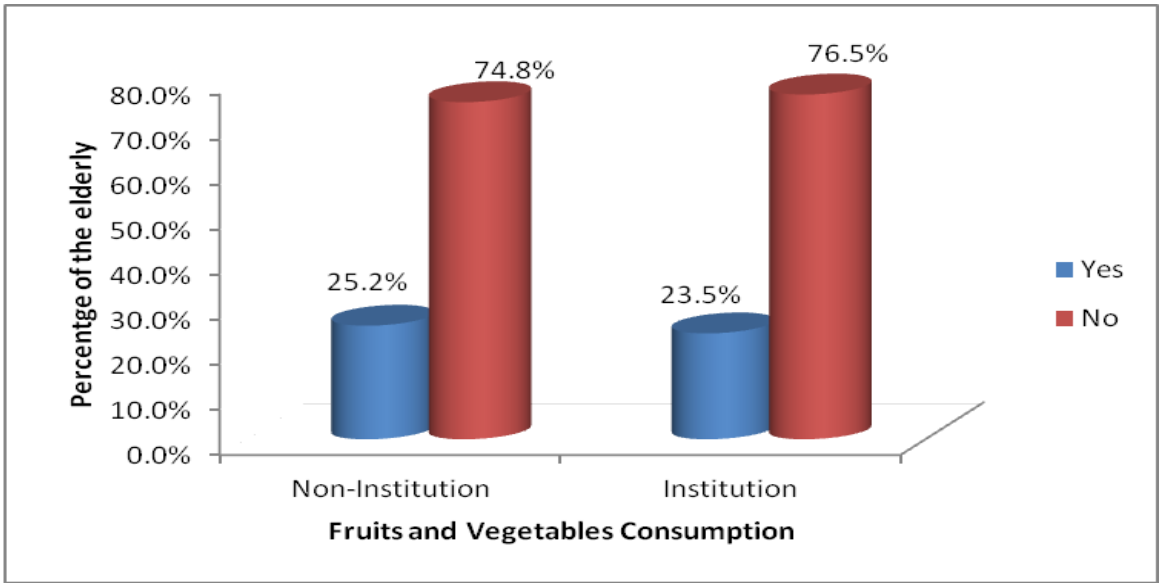

Fig 4.6 Consumption of Fruits and Vegetables by the elderly

About 67% of the elderly living in Institutions reported to consume 2 or more servings of fruits and vegetables compared to 74.8% of those the elderly in Non-institution (Fig 4.6). There was no significant association between taking fruits and vegetables and being Institutionalized or in Non-institutions ($\chi 2=0.097$, df = 1, p=0.777)

4.3.6.2 The Consumption of Fruits and Vegetables and gender of the elderly

More males (80.7%) consumed two or more servings of fruits or vegetables per day compared to 70.9% of women. The results show that there was a significant relationship between consumption of fruits and vegetables and the gender of the elderly ($\chi 2$ =3.202, df = 1, p=0.073) The mean intake of fruits by males was higher (0.81 ± 0.397) than that of the females (0.71 ± 0.456), t = 1.794, df = 268, p = 0.074).

4.3.7. Fluid Intake by the elderly

Plain water, milk, porridge, fruit juices and other beverages are important sources of energy for the elderly, besides supporting the biochemical processes that occur in water. This section presents results on fluid intake by characteristics of the elderly.

4.3.7.1. Fluid Intake by gender of the elderly

Table 4.9 Fluid Intake by Gender of the Elderly

Amount of Fluid consumed per day by Gender				
Gender	**Less than 3 Cups**	**3 to 5 Cups**	**More than 5 Cups**	**Total**
Male	25 (19.1%)	68 (52.2%)	37 (28.7%)	130 (100.0%)
Female	34 (24.2%)	57 (40.9%)	49 (34.8%)	140 (100.0%)
Total	**59 (21.9%)**	**125 (46.2%)**	**86 (32.0%)**	**270 (100.0%)**
$\chi 2$ =3.152, df = 2, p= 0.217				

Table 4.9 shows fluid intake per day by gender. The majority of the elderly (46.2%) consumed 3 to 5 cups of fluid per day. Women reported the highest consumption (34.8%) of more than 5

cups per day. The results showed that there was no significant relationship between fluid consumption and gender ($\chi 2$ =3.152, df = 2, p= 0.217)

4.3.7.2. Fluid Intake by Residence of the Elderly

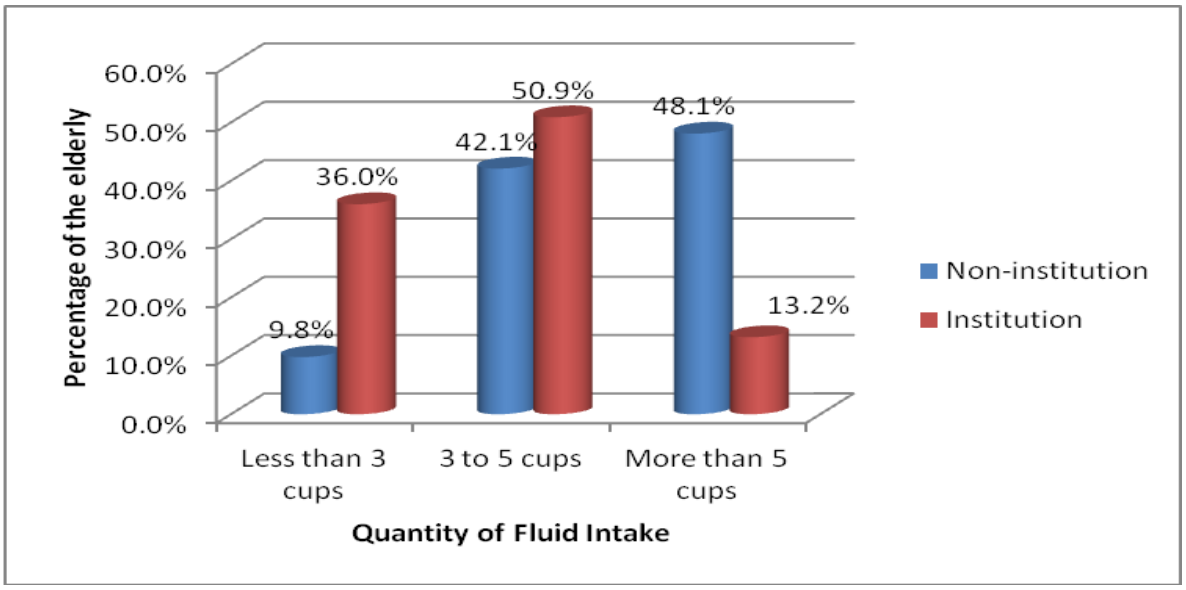

Fig 4.7 Fluid Intake by Residence of the Elderly

Findings show that 48.1% of the elderly in non-institutions consumed more than 5 cups of fluid, compared to only 13.2% of the elderly in Institutions (Fig 4.7), while 9.8% of the elderly in non-institution consumed less than 3 cups in a day, compared to 36% of the elderly in institutions. The results showed that there was a significant association between taking more fluids and residence of the elderly ($\chi 2$=43.7, df = 2, p<0.001) with those in non-institution being more likely to take more fluids per day than those in institutions. The mean fluid intake in the non-institutions was 0.69 ± 0.330, whereas that of the institutions was 0.39 ± 0.333, t = 7.233, df = 268, p = <0.001.

4.3.7.3 Fluid Intake by Mobility of the elderly

Table 4.10 Fluid Consumption by Mobility of the Elderly

	Fluid consumed per day			
	Less than 3 Cups	**3 to 5 Cups**	**More than 5 Cups**	**Total**
Bed or Chair Bound	8(2.9%)	11(4.1%)	6(2.1%)	**25(9.1%)**
Able to get out of chair or bed	22(8.3%)	21(7.9%)	37(13.7%)	**80(29.9%)**
Goes Out	28(10.4%)	91(33.6%)	46 (17.0%)	**165(61.0%)**
Total	**58(21.6%)**	**123(45.6%)**	**89 (32.8%)**	**270 (100.0%)**
f = 1.170, df = 2, p = 0.312.				

The majority of the elderly who took more than 5 cups of fluid per day (17%) were those able to get out of bed or chair and go out (Table 4.10). The bed or chair bound elderly were the least consumers of more than 5 cups of fluids (2.1%). There was a significant relationship between fluid intake and mobility of the elderly ($\chi 2$= 17.998, df = 2, p=0.001) and there was no significant variance between fluid intake (0.55 ± 0.364) and mobility (1.50 ± 0.673), f = 1.170, df = 2, p = 0.312.

4.3.8. Consumption of Selected markers for Proteins intake

The elderly and or their care-givers in the non-institutions were asked about their protein consumption whereas acompleted food intake record was used to determine the consumption of protein in the institutions of the elderly.

4.3.8.1. Consumption of protein intake by age

Table 4.11 Protein intake by Age of the Elderly

Age	Consumption of Protein markers			Total
	At least one serving of dairy products	2 or more servings of legumes or eggs per week	Meat, fish or poultry everyday	
60-65	34(12.7%)	5(2.0%)	55 (20.5%)	95 (35.1%)
66-70	22 (8.3%)	9(2.9%)	17(6.3%)	47 (17.6%)
71-75	36(13.2%)	0(0.0%)	5(2.0%)	41 (15.1%)
76-80	24(8.8%)	6(2.4%)	15 (5.4%)	45(16.6%)
81 and above	26 (9.8%)	3(1.0%)	13(4.9%)	42(15.6%)
Total	142 (52.7%)	23 (8.3%)	105(39.0%)	270 (100.0%)
$\chi 2 = 32.885$, df = 2, $p<0.001$; f = 4.436, df = 4, p = 0.002.				

Results indicate that 20.5% of the elderly aged 60-65 years were consuming meat,fish or poultry everyday compared to only 2.0% of the elderly aged 71-75 years (Table 4.11), while only 1% of the elderly aged 81 years and above consumed 2 or more servings of legumes or eggs per week. There was a significant relationship between age and protein intake with the elderly in the age bracket of 60-65 years having the highest consumption of proteins at 35.1% ($\chi 2 = 32.885$, df =

2, p<0.001). There was a significant variance between age (2.70 ± 1.423) and consumption of proteins (0.45 ± 0.470), f = 4.436, df = 4, p = 0.002.

4.3.8.2. Consumption of Selected markers for Proteins intake by gender of the elderly

Table 4.12 Consumption of Selected Markers for Proteins Intake by Gender of the Elderly

Selected consumption markers for protein intake			
Gender	**At least one serving**	**Two or more servings**	**Total**
Male	79 (60.5%)	51 (39.5%)	130 (100.0%)
Female	85 (60.9%)	55 (39.1%)	140 (100.0%)
Total	**164 (60.7%)**	**106(39.3%)**	**270(100.0%)**
t = 1.505, df = 268, p = 0.133			

Table 4.11 shows selected consumption markers for protein intake by gender of the elderly. Women reported the highest consumption of two or more servings of legumes or eggs per week at 39.1% compared to the men at 39.5%. The results showed that there was a significant relationship between protein intake and gender ($\chi 2$ =20.494, df = 1, p<0.001). The mean protein intake by gender was higher in males (0.49 ± 0.451) compared to females (0.41 ± 0.485), t = 1.505, df = 268, p = 0.133).

4.3.8.3. Consumption of Selected markers for Proteins intake and residence of the elderly

Table 4.13 Consumption of Selected Markers for Proteins Intake by Residence of the Elderly

Protein Intake Marker	Non-Institution	Institution	Total
At least one daily serving of dairy products	104 (77.0%)	30 (22.0%)	134 (49.8%)
Two or more servings of legumes or eggs per week/meat, fish or poultry everyday	31 (23.0%)	105 (77.0%)	136 (50. 0%)
Total	**135(100.0%)**	**135(100.0%)**	**270 (100.0%)**
t = 8.663, df = 268, p = < 0.001			

About half of all the elderly (49.8%), either living in non-institution or in institutions consumed at least one daily serving of dairy products (Table 4.13). The majority of these were the elderly residing in non-institutions. On the other hand, the elderly in institutions (56.1%) reported the highest consumption of animal proteins namely meat, fish or poultry. There was a significant relationship between residence of the elderly and intake of proteins ($\chi 2$ = 88.880, df = 2, p<0.001) and a significant variancein protein consumption between the institutionalized (0.67 ± 0.409) and the non-institutionalised elderly (0.23 ± 0.422), t = 8.663, df = 268, p = < 0.001.

4.3.9. Mode of Feeding among the Elderly

Mode of feeding was determined by asking the elderly, their care-givers or reviewing their medical records on whether they were able to feed themselves, whether they needed help while eating and on whether they needed help in setting up meals e.g. in opening containers, buttering bread or cutting meat on table. The elderly who needed assistance in feeding or in holding the fork would score 0, while those who needed help in setting up meals but were able to feed themselves would score 1 point. Those who were able to feed without any problems scored 2.

4.3.9. 1. Mode of Feeding by Age of the Elderly

Table 4.14 Mode of Feeding and Age of the Elderly

Age	Mode of Feeding		
	Unable to Feed/help is required to feed	**Fully independent in feeding**	**Total**
60-65	12(4.0%)	83(30.7%)	95(35.1%)
66-70	1(0.9%)	46(17.1%)	47(17.6%)
71-75	9(3.0%)	33(12.2%)	41(15.1%)
76-80	12(4.4%)	33(12.2%)	45(16.6%)
81 and above	9(3.0%)	33(12.2%)	42(15.6%)
Total	**42(16.0%)**	**228(84.4%)**	**270(100.0%)**
$\chi 2 = 23.307$, df = 3, p=0.003; f = 2.959, df = 4, p = 0.021			

A majority of the elderly of all ages (84.4%) were able to independently feed themselves (Table 4.14). A majority of 30.7% aged 60-65 years were fully independent in feeding, followed by age 66-70 at 17.1.0%. There was a signifincant relationship between age and mode of feeding ($\chi 2 = 23.307$, df = 3, p=0.003) and a significant variance between age (2.70 ± 1.423) and mode of feeding (1.66 ± 0.601), f = 2.959, df = 4, p = 0.021.

4.3.9.2. Mode of Feeding and Gender of the Elderly

Table 4.15 Mode of Feeding by Gender of the Elderly

Mode of feeding				
Gender	**Unable without Assistance**	**Self-Fed with some Difficulties**	**Self Fed without any Problem**	**Total**
Male	(7.5%)	(19.6%)	(72.9%)	(100.0%)
Female	(6.1%)	(22.0%)	(72.0%)	(100.0%)
Total	**(6.7%)**	**(20.9%)**	**(72.4%)**	**(100.0%)**
$\chi 2$ =.339, df = 2, p= 0.844				

Table 4.15 shows the mode of feeding by gender. Only 6.7% of all the elderly were unable to feed without assistance. Majority of them were female (6.1%). There was no significant relationship between the mode of feeding and the gender of the elderly ($\chi 2$ =.339, df = 2, p= 0.844)

4.3.9.3. Mode of Feeding among the Elderly living in Non-institution and in institutions

Table 4.16 Mode of Feeding and Residence of the Elderly

Mode of Feeding	Non-institution	Institution	Total
Unable to feed without Assistance	9(6.9%)	9 (6.4%)	18 (6.7%)
Self fed with Some Difficulties	27 (20.0%)	39 (22.0%)	56 (20.9%)
Self Fed without any problem	99 (73.1%)	97 (71.6%)	196(72.4%)
Total	**135 (100.00%)**	**135 (100.00%)**	**270 (100.00%)**
$\chi 2$ =.157, df = 2, p= 0.925			

Majority of the elderly were able to feed themselves without any problem (72.4%) while only 6.7% were unable to feed without assistance (Table 4.16). The institutions of the elderly had the lowest number of elderly who were unable to feed without assistance. There was no significant relationship between the mode of feeding and the residence of the elderly ($\chi 2$ =.157, df = 2, p= 0.925)

4.3.9.4. Body Mass Index and Mode of Feeding

The body Mass Index is an anthropometric evaluation and an essential feature of geriatric nutritional evalution for determining malnutrition, being overweight, obesity, muscular mass loss, fat mass gain and adipose tissue redistribution. This section presents results on mode of feeding by the elderly and their BMI.

4.3.9.4.1. Body Mass Index and Mode of Feeding among the Elderly Living in Non-institution

Table 4.17 Body Mass Index by Mode of Feeding among the Elderly in Non-institution

BMI	Unable without Assistance	Self-fed with some difficulties	Self fed without any problem	Total
Underweight	(0.0%)	2 (1.7%)	19(14.3%)	21(16.0%)
Normal	3(2.5%)	14(10.1%)	47(34.5%)	64(47.1%)
At Risk of Over Weight	1 (0.8%)	3 (2.5%)	17(12.6%)	22 (16.0%)
Overweight	5 (3.4%)	9 (6.7%)	15(10.9%)	28(21.0%)
Total	**9 (6.7%)**	**28 (21.0%)**	**98(72.3%)**	**135(100.0%)**
$\chi 2$=9.7, df = 2, p=0.138				

There were no elderly underweight (0.0%) people in non-institution who were able to feed without assistance (Table 4.17). However 14.3% of the underweight elderly were able to feed themselves without any problem. About 34 % of the elderly in non-institution were of normal

BMI and able to feed without any problem. There was no significant relationship between the mode of feeding and BMI for the elderly living in non-institutions ($\chi 2$=9.7, df = 2, p=0.138)

4.3.9.4.2. Body Mass Index and Mode of Feeding among the Elderly Living in Institutions

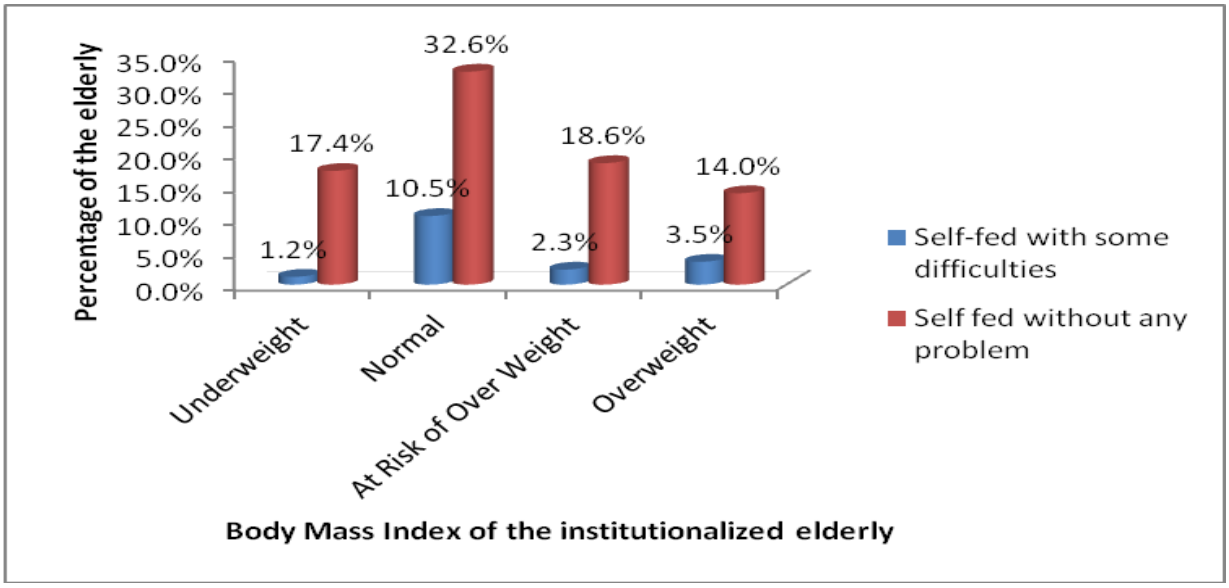

Fig 4.8 BMI by Mode of Feeding among the Elderly living in Institutions

About 17% of the institutionalized elderly were found to be underweight and reported that they can feed themselves without any problems (Fig 4.8). Only 1.2% of the elderly in institutions were underweight and had difficulties in feeding themselves. About 3% of the elderly in institutions were found to be overweight despite having some difficulties in feeding themselves. There was no significant difference between the mode of feeding and the BMI of the elderly living in Institutions ($\chi 2$=3.178, df = 3, p=0.365)

4.3.10. Self-view of Nutrition status by the Elderly

4.3.10.1. Self-View of Nutrition Status and the Gender of the Elderly

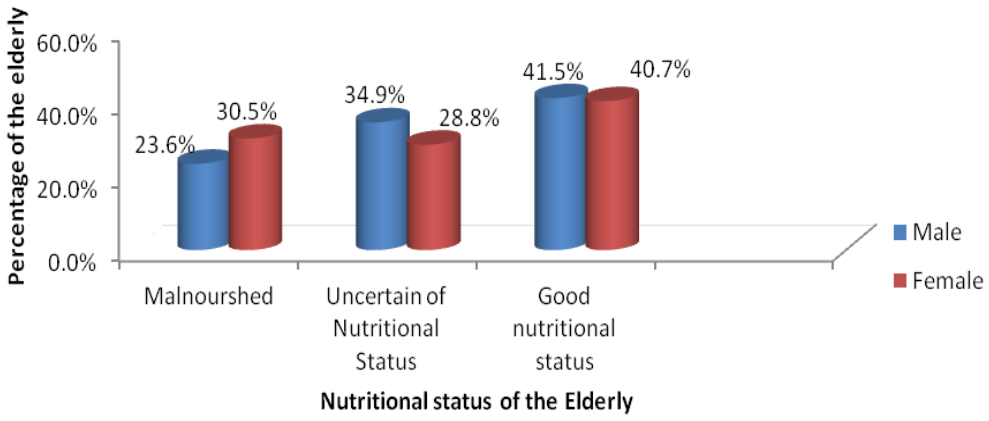

Fig 4.9 Self-view of Nutrition Status by Gender of the Elderly

Figure (4.9) shows gender and self-views of nutrition status. More males (41.5%) than females (40.7%), felt that they had no nutritional problem, whereas 30.5% of the women compared to 23.6% of the men felt that they were malnourished. The results showed that there was no significant relationship between the two variables ($\chi 2$ =1.646, df = 2, p= 0.439).

4.3.10.2. Self-view of Nutrition status and Residence of the Elderly

Table 4.18 Self-view of Nutrition status and Residence of the Elderly

Elderly opinion on Nutritional Status	Non-institution	Institution	Total
Malnourished	34(25.2%)	41(30.1%)	74 (27.2%)
Uncertain of Nutritional Status	36(26.7%)	52(38.7%)	86 (31.7%)
Good nutritional status	65 (48.1%)	42 (31.2%)	110 (41.1%)
Total	**135(100.0%)**	**135(100.0%)**	**270(100.0%)**
$\chi 2$ =6.737, df = 2, p=0.034; t = 1.984, df = 268, p = 0.048			

Majority of the elderly (41.1%) did not think they had any nutritional problem (Table 4.18). Majority of these (48.1%) were living in non-institution. Twenty seven point two percent of the elderly thought they were malnourished with the elderly in the institutions (30.1%) making up the majority of these group. There was a significant relationship between the place of residence and self-view of nutritional status by the elderly ($\chi 2$ =6.737, df = 2, p=0.034) with those in the non-institution having a better self-view of their nutritional status by a mean of 1.23 ± 0.828 compared to 1.01 ± 0.787 in the institution, t = 1.984, df = 268, p = 0.048.

4.3.11. Self-view of Health Status of the Elderly

4.3.11.1 Self-View of Health Status by Gender of the Elderly

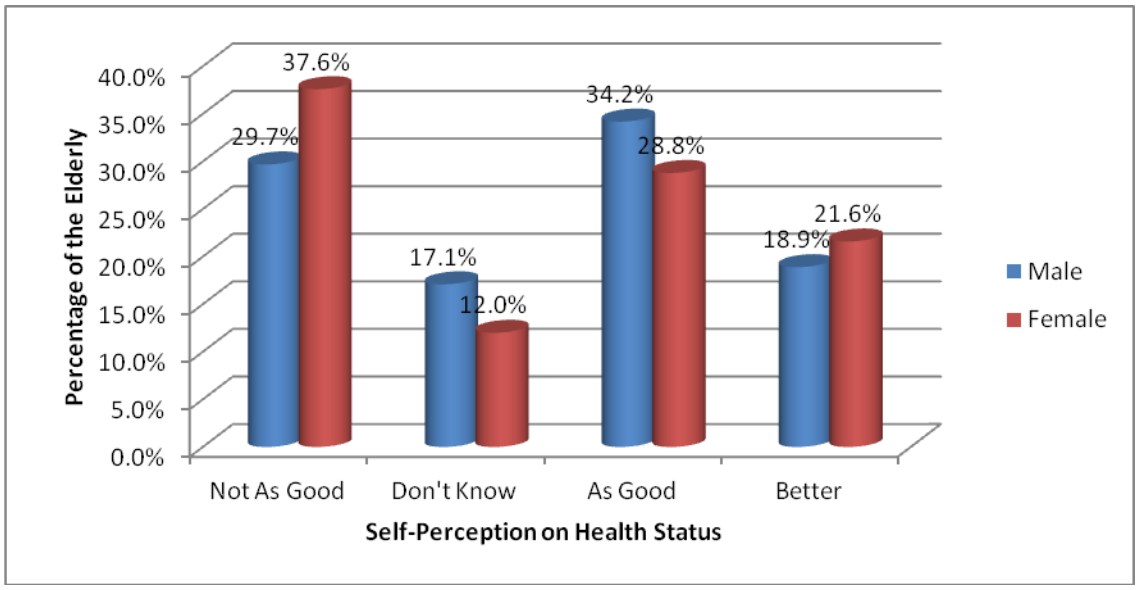

Fig 4.10 Self-view of Health status by Gender of the Elderly

Figure 4.10 shows self-view of health status by gender. Thirty seven point six percent of the females both in non-institution and in the institutions felt that their health status was not as good, compared to 29.7% of the males. More women (21.6%) reported to have a better self-view of health status in comparison with the men. The results showed that there was no significant relationship between self-view of health status and gender ($\chi 2 = 2.904$, df = 3, p= 0.407)

4.3.11.2. Self-View of Health Status and residence of the elderly

Table 4.19 Self-view of Health Status and Residence of the Elderly

Self-view of Health Status	Non-institution	Institution	Total
Not As Good	46(34.1%)	45(33.7%)	91(33.9%)
Don't Know	21(15.9%)	17(12.5%)	38(14.4%)
As Good	41(30.3%)	44(32.7%)	85(31.4%)
Better	27(19.7%)	29(21.2%)	56(20.3%)
Total	**135(100.0%)**	**135(100.0%)**	**270(100.0%)**
$\chi 2=0.639$, df = 3, p= 0.887			

Majority of the elderly (33.9%) viewed themselves as not healthy compared to 14.4% who did not know their health status (Table 4.19). The elderly living in institutions reported that they did not know their health status (12.5%). There was no significant relationship between self-view of health status and place of residence ($\chi 2=0.639$, df = 3, p= 0.887).

4.3.11.3. Self-view of Health Status and the Body Mass Index of the Elderly

4.3.11.3.1. Self-View of Health Status and the Body Mass Index of the Elderly Living in Institutions

The elderly or their caregivers were asked to describe their state of health compared to the others of their age. Their responses were categorized as either not as good as others, not sure, not as good as others of your age and better.

Table 4.20 Self-view of Health Status by BMI of the Elderly Living in Institutions

BMI	Elderlys opinion on their nutritional status				Total
	Not As Good	Don't Know	As Good	Better	
Underweight	9(6.7%)	3(2.5%)	6(4.2%)	4(3.3%)	23(16.7%)
Normal	18(13.3%)	15(10.8%)	18(13.3%)	12(9.2%)	63(46.7%)
At Risk of Over Weight	7(5.0%)	2(1.7%)	9(6.7%)	3(2.5%)	21(15.8%)
Overweight	11(8.3%)	1(0.8%)	9(6.7%)	7(5.0%)	28(20.8%)
Total	**45(33.3%)**	**21(15.8%)**	**42(30.8%)**	**27(20.0%)**	**135(100.0%)**
$\chi 2=17.038$, df = 3, p=0.048					

A majority of those who were underweight (6.7%) thought that their health ws not as good. The highest population of elderly in institutions (6.7%) who were found to be at risk of becoming over weight reported to view their health status as good as that of their colleagues in the institutions (Table 4.20). However, only 0.8% (1) of the elderly who were overweight in the institutions did not know about their health status. There was a significant relationship between the BMI and self-view of health status ($\chi 2=17.038$, df = 3, p=0.048), and a positive correlation between health status and BMI, though not significant (r = 0.028, p = 0.692).

4.3.11.3.2. Self-View of Nutritional Status and BMI of the Elderly living in Non-institution

Table 4.21 Self-View of Nutritional Status by BMI of the Elderly Living in Non-institutions

BMI	Elderlys opinion on their nutritional status				Total
	Not As Good	Don't Know	As Good	Better	
Underweight	9(6.7%)	6(4.5%)	6(4.5%)	3(2.2%)	24(18.0%)
Normal	21(15.7%)	3(2.2%)	23(16.9%)	14(10.1%)	61(44.9%)
At Risk of Over Weight	5 (3.4%)	3(2.2%)	8(5.6%)	14(10.1%)	29(21.3%)
Overweight	9(6.7%)	5 (3.4%)	8(5.6%)	0(0.0%)	21(15.7%)
Total	**44(32.6%)**	**17(12.4%)**	**44(32.6%)**	**30(22.5%)**	**135(100.0%)**
$\chi 2=6.96$, df = 3, p=0.641					

About 22% of the elderly in non-institutions thought that they had no nutritional problem (Table 4.21). None of the elderly who were overweight (0%) thought that they had no nutritional problem. Only 15.7% of those who were found to be of normal nutritional status reported to view themselves as malnourished. There was no significant difference between BMI and self-view of nutritional status among the elderly living in non-instituions ($\chi 2=6.96$, df = 3, p=0.641)

4.3.12. Consumption of Prescription Drugs by the elderly

Information on prescription drug use was obtained from the elderly and their care-givers as well by reviewing the elderly medical records.

4.3.12.1. Consumption of more than 3 Prescription Drugs by Residence of the Elderly

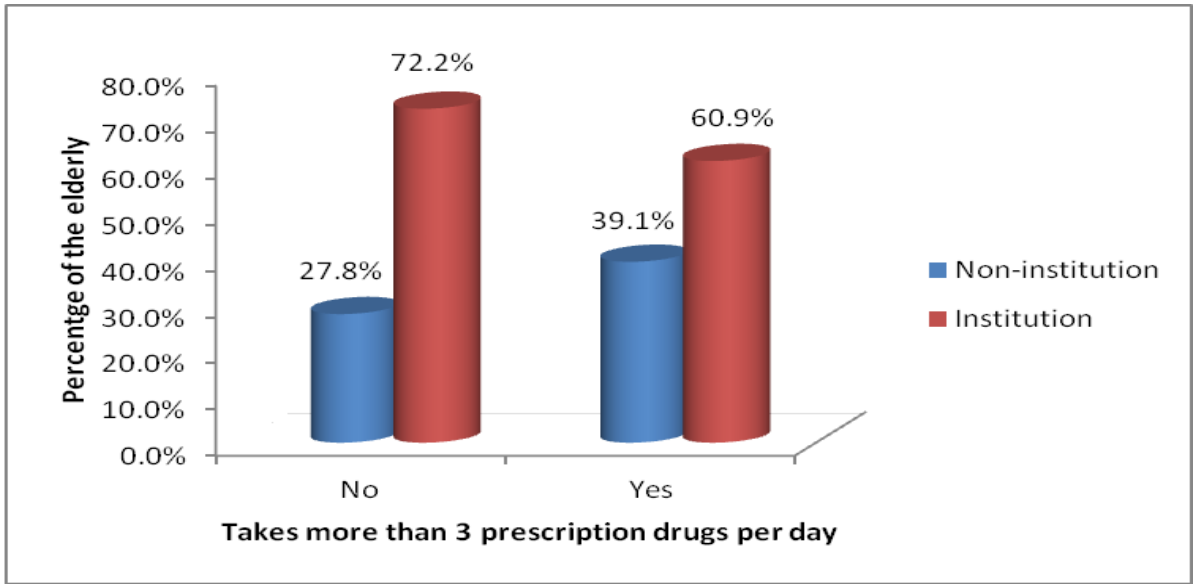

Fig 4.11 Consumption of more than 3 Prescription Drugs by Residence of the Elderly

Figure 4.11 shows that there was a higher population of the elderly living in non-institution (72.2%) who were on more than three prescription drugs compared to the elderly living in institutions (60.9%). There was no significant association between taking prescription drugs and being institutionalized or non-institutionalized ($\chi 2=3.632$, df = 1, p=0.057). There a significant relationship between the consumption of prescription drugs and gender, with more females (53%) than men (47%) consuming more than 3 prescription drugs. ($\chi 2= 97.520$, df = 1, p<0.001). Further analysis by t-tests revealed that the mean consumption of prescription drugs by men (1.60 ± 0.121) was higher than that of the women (1.55 ± 0.097) t = 3.959, df = 268, p=<0.001)

4.3.13. Decline in food Intake in the last three months due to loss of appetite

Food intake decline among the elderly may be due to physiological changes in appetite regulation. The findings seeks to establish between the relationship between decline in food intake and the nutritional status of the elderly.

4.3.13.1. Decline in Food Intake in the last three Months due to Loss of Appetite by Gender of the Elderly

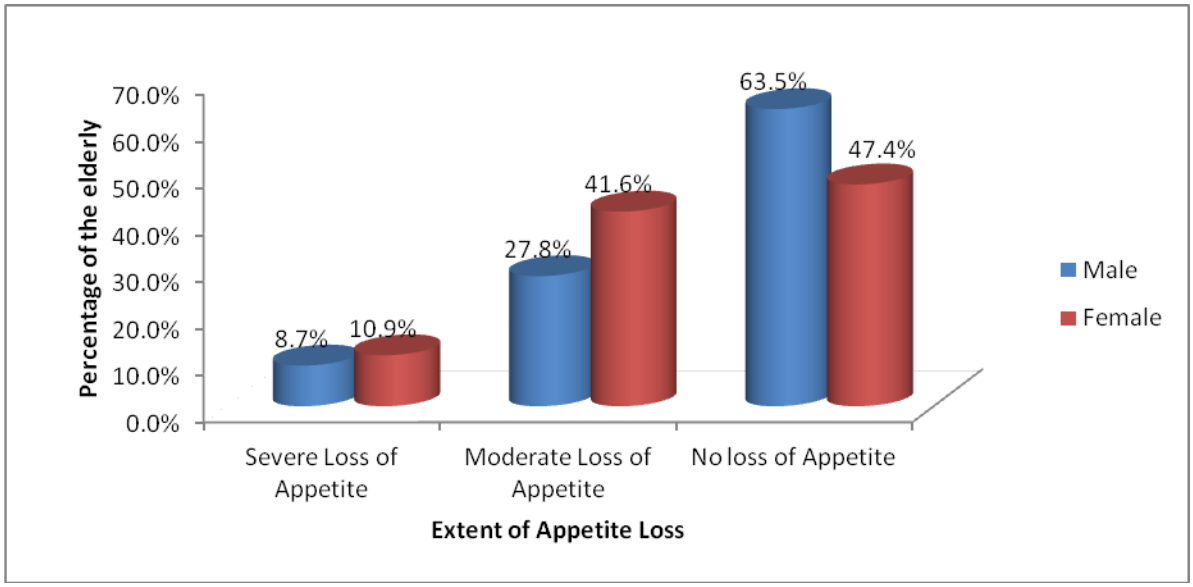

Fig 4.12 Decline in Food Intake by Gender of the Elderly

Figure Fig 4.12 shows that gender and food intake declined over the last three months due to loss of appetite. Results show that 47.4% of the female elderly reported no loss of appetite in the last three months with males making the majority of this category at 63.5%. About 10.9% of the women reported to have had severe loss of appetite in the last three months, compared to 8.7% of the males. There was a significant relationship between loss of appetite and gender of the elderly. ($\chi 2$ =6.98, df= 2, p=0.030) with more males reporting decline in food intake compared to the

men. The mean decline in food intakeby men was 1.55 ± 0.652, while that of women was 1.36 ± 0.674, t = 2.230, df = 268, p = 0.027.

4.3.13.2. Decline in Food Intake in the last three Months due to Loss of Appetite by Residence of the Elderly

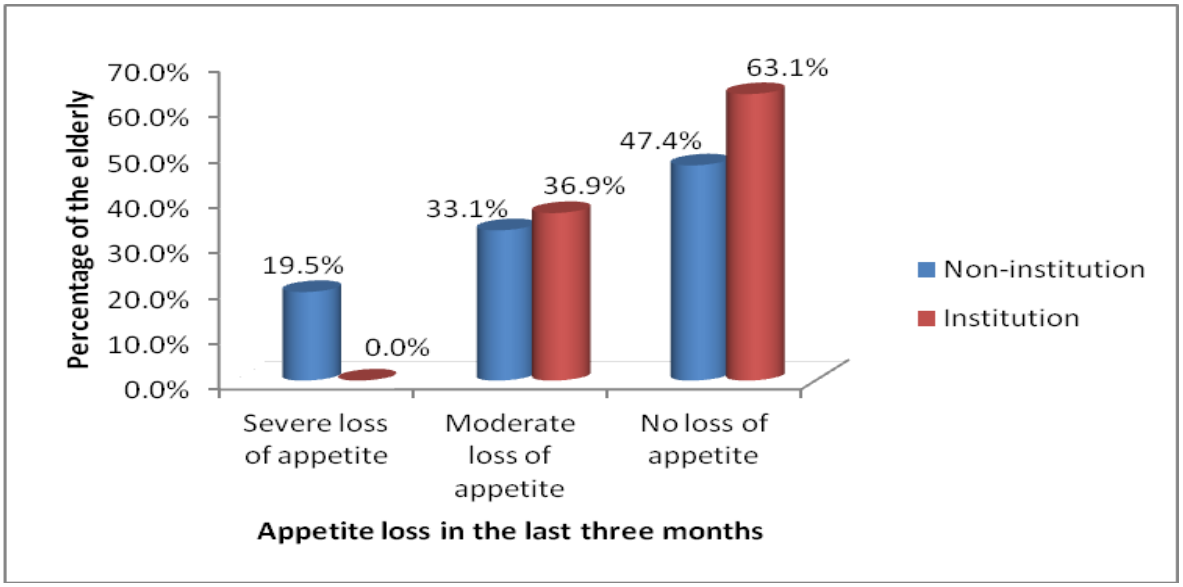

Fig 4.13 Appetite Loss in the last three months by Residence of the Elderly

There was no severe loss of appetite among the elderly living in institutions (0.0%). Majority of the elderly in the institutions (63.1%) had no loss of appetite in the last three months, compared to 47.4% of those in non-institutions (Fig 4.13). There was a significant relationship between food intake due to appetite loss and residence of the elderly ($\chi 2 = 28.633$, df = 2, p=<0.001), with the independent t-tests showing that the mean of decline in food intake in the institutions (1.63 ± 0.484) was higher than in the non-institutions (1.28 ± 0.772), t = 4.424, df = 268, p = < 0.001.

4.3.14. Weight Loss of the elderly

This study explored the relationship between weight loss and the socio-demographic characteristics of the elderly in determining the nutritional status of the elderly and their functionality.

4.3.14.1. Weight Loss by Gender of the Elderly

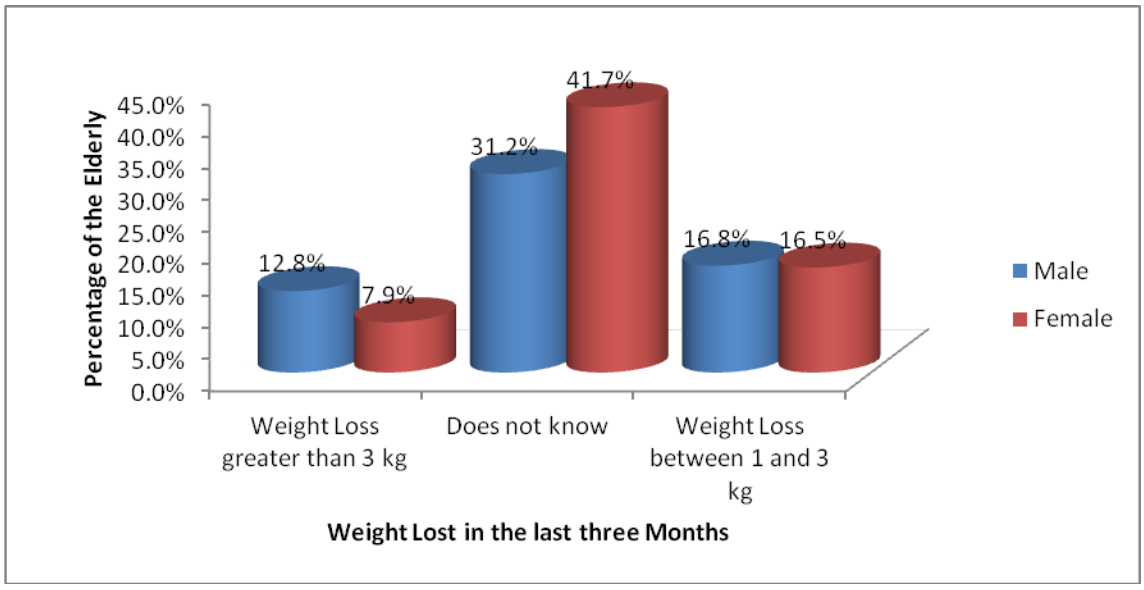

Fig 4.14 Weight Loss by Gender of the Elderly

More males (39.2%) reported to have had no weight loss in the last three months compared to 33.9% of the women (Fig 4.14). However, it was more males (12.8%) who reported greater weight loss (greater than 3 kg) compared to 7.9% of women. There was no significant relationship between weight loss in the last three months and the gender of the elderly. ($\chi 2$ =3.891, df = 3, p= 0.274)

4.3.14.2. Weight Loss by Residence of the Elderly

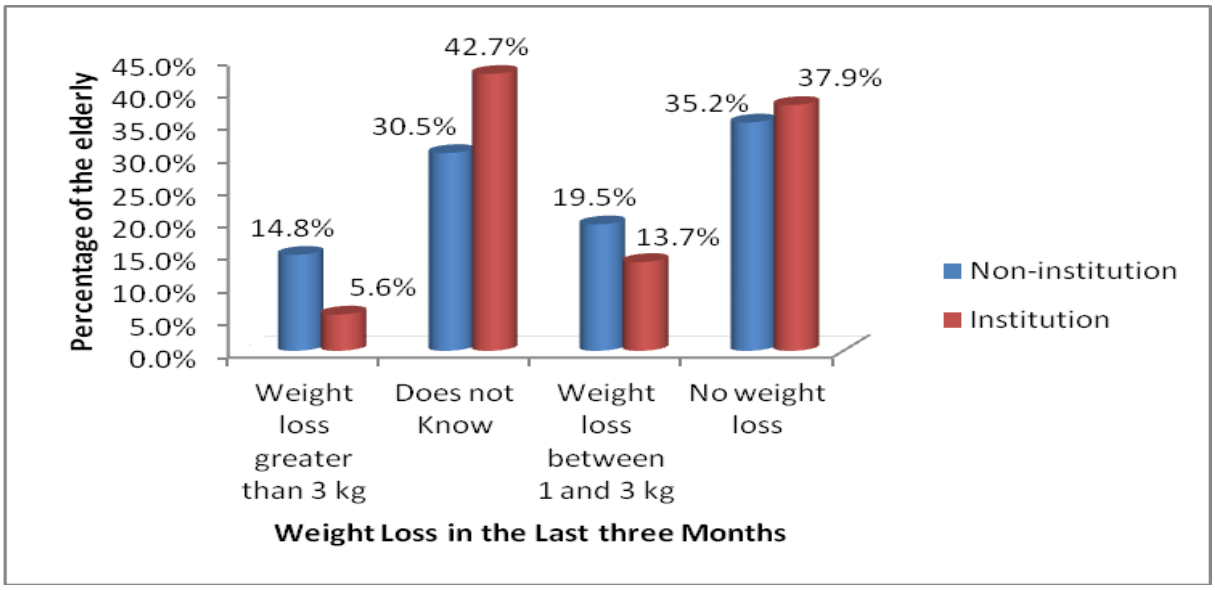

Fig 4.15 Weight Loss in the last three Months by Residence of the Elderly

The results reported that 5.6% of the elderly living in institutions reported to have lost more than 3 kilograms in the last three months compared to 14.8% of the elderly living in non-institutions (Fig 4.15). The majority of the elderly living in institutions (42.7%) did not know if they had lost weight in the last three months. There was a significant relationship between weight loss in the last three months and the type of residence for the elderly ($\chi 2 = 9.175$, df = 3, p= 0.027), with the elderly in the institutions having lost more weight (1.84 ± 1.007) compared to the non-institutionalised elderly (1.75 ± 1.094), t = 0.669, df = 268, p = 0.504.

4.4. The Functionality of the Institutionalized and the Non-institutionalized Elderly in Nairobi County, Kenya

4.4.1. Introduction

This section presents results on the level of functionality of the elderly, the various factors impacting on the functionality of the elderly and the differences in levels of functionality that result from variations in age, residence and gender of the elderly

4.4.2. The Dependency Level among the Institutionalized and Non-Institutionalized Elderly

Table 4.22 Dependency Level by Residence of the Elderly

Modified Barthel Index (MBI)	Residence		Total
	Non-institution	Institution	
Severe dependency	6 (2.2%)	25 (9.4%)	31 (11.6%)
Moderate dependency	41 (15.0%)	29 (10.9%)	70 (25.8%)
Minimal dependency	90 (33.3%)	79 (29.2%)	169 (62.5%)
Total	**135 (50.0%)**	**135 (50.0%)**	**270 (100%)**
$\chi 2 = 14.147$, df = 4, p=0.007; t = 2.530, df = 268, p = < 0.012.			

There were more totally dependent elderly at institutions (9.4%), compared to non-institutions (2.2%) (Table 4.22). Severe dependency (2.2%), Moderate dependency (15.0%) and Minimal dependency (33.3%) of the elderly in non-institution was however higher than that of the elderly living in the institutions. There was asignificant relationship between dependency level and residence of the elderly ($\chi 2 = 14.147$, df = 4, p=0.007) with the elderly in non-institutions (2.615 ± 0.573) being more dependent than those in institutions (2.402 ± 0.789), t = 2.530, df = 268, p = < 0.012.

Table 4.23 Dependency Level by Gender of the Elderly

Dependency Level	Sex		Total
	Male	**Female**	**Total**
Severe	11 (4.1%)	20 (7.5%)	31(11.6%)
Moderate	39(14.6%)	30 (11.2%)	70(25.8%)
Minimal	80(29.6%)	89(33.0%)	169(62.5%)
Total	**130(48.3%)**	**140(51.7%)**	**270(100.0%)**
$\chi 2 = 3.973$**,** df = 2, p=0.137			

There were more females (33.0%) who had minimal dependence on their care-givers in carrying out ADLs compared to males (29.6%) (Table 4.23). Majority of the elderly (both male and female) had minimal dependence in carrying out ADLs (62.5%). There was no significant difference between the gender of the elderly and their dependency level ($\chi 2 = 3.973$**,** df = 2, p=0.137).

4.4.3. Mobility of the Elderly

4.4.3.1. Mobility by Age of the Elderly

Table 4.24 Mobility by Age of the Elderly

Age	Mobility		Total
	Bed or chair bound and able to get out	Goes out	
60-65	32(12.0%)	62(23.0%)	95(35.0%)
66-70	11(4.0%)	36(13.5%)	47(17.5%)
71-75	24(9.0%)	18(6.5%)	42(15.5%)
76-80	20(7.5%)	24(9.0%)	45(16.5%)
81 and above	11(4.0%)	31(11.5%)	42(15.5%)
Total	**99(36.5%)**	**171(63.5%)**	**270(100.0%)**
$\chi 2 = 23.307$, df = 3, p=0.003; f = 2.903, df = 4, p = 0.023			

Twenty three percent of the elderly aged 60-65 years were able to get out of bed or chair and go out, whereas only 9% of those aged 76-80 were able to go out (Table 4.24). Four percent of the elderly aged 81 and above were either bed or chair bound or only able to get out of chair or bed and 11.5% were able to go out. There was a significant relationship between age and mobility of the elderly ($\chi 2 = 23.307$, df = 3, p=0.003) and a significant variance between age (2.70 ± 1.423) and mobility (1.50 ± 0.673), f = 2.903, df = 4, p = 0.023.

4.4.3.2. Mobility by Gender of the Elderly

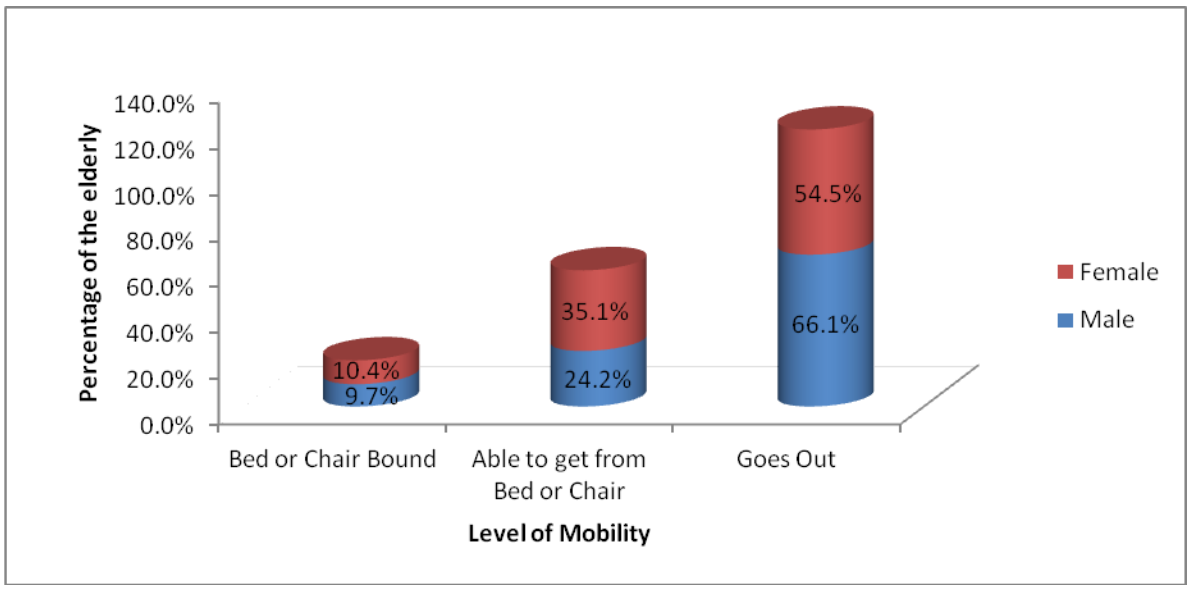

Fig 4.16 Mobility and Gender of the Elderly

Figure 4.16 shows that ten point four percent of the elderly females were bed or chair bound compared to 9.7% of the men. . A majority (66.1%) of the elderly men and 54.5% of the females could go out. There was no significant relationship between mobility and gender ($\chi 2$ =4.048, df = 2, p= 0.132).

4.4.3. 3. Mobility by Residence of the Elderly

Table 4.25 Mobility by Residence of the Elderly

Mobility	Non-institution	Institution	Total
Bed or Chair Bound	1(0.8%)	26(19.5%)	27 (10.1%)
Able to get from bed or chair	50(36.9%)	31(22.7%)	81 (29.8%)
Goes Out	84(62.3%)	78(57.8%)	162 (60.1%)
Total	**135(100.0%)**	**135(100.0%)**	**270(100.0%)**
$\chi^2 = 27.144$, df = 2, $p < 0.001$; t = 1.455, df = 268, p = 0.147			

The largest population of elderly who were either chair or bed bound (19.5%) were found to be living in the institutions of the elderly with only 0.8% living in Non-institutions (Table 4.25). About 62% of the elderly who could go out were living in Non-institutions compared to 57.8% of the elderly who were living in institutions. There was a significant relationship between the type of residence and mobility of the elderly ($\chi^2 = 27.144$, df = 2, $p < 0.001$). The mean mobility of the elderly in institutions was higher (1.48 ± 0.501) than that of the non-institutionalized elderly (1.38 ± 0.488), t = 1.455, df = 268, p = 0.147.

4.4.4. Ability to Live Independently

4.4.4.1. Ability to Live Independently by Gender of the Elderly

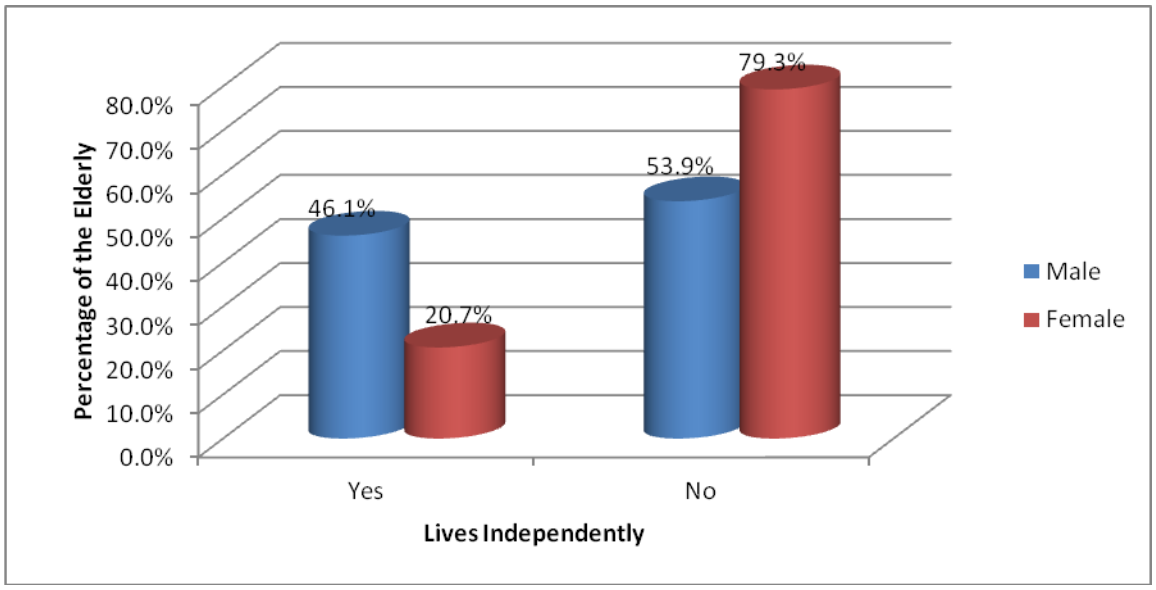

Fig 4.17 Ability to live independently and gender of the elderly

Figure 4.17 presents the ability of the elderly to live independently by gender. About 46.1% of the elderly men lived alone, compared to 20.7% of the women. The majority of Females (79.3%) reported to be living with care-givers. There was a significant relationship between the gender of the elderly and their ability to live on their own. ($\chi 2$ =16.7, df = 1, $p<0.001$) and a significant variance between gender (1.52 ± 0.501) and ability to live independently (0.67 ± 0.472), f = 17.917, df = 1,p = < 0.001.

4.4.4.2. Ability to Live Independently by Residence of the Elderly

The results show that 46.3% of all the elderly not able to live independently were living in the institutions of the elderly, compared to 6.3% who were living in non-institutions. The majority of those living in non-institutions (93.7%) were able to live independently. There was a significant relationship between the ability to live independently and the type of residence for the elderly ($\chi 2$ = 92.773, df = 1, p = <0.001) with the mean of ability of the non-instititionalized elderly to live independently (0.94 ± 0.244) being higher than that of the institutionalized elderly (0.34 ± 4.75), t = 12.397, df = 268, p = <0.001.

4.4.5. Pressure Sores

Pressure sores or skin ulcers are a type of injury that breaks down the skin and underlying tissue. They are caused when an area of skin is placed under pressure. This section presents results on the relationship between pressure sores or skin ulcers and gender, residence andBMI of the elderly.

4.4.5.1 Pressure Sores by Gender of the Elderly

Table 4.26 Pressure Sores by Gender of the Elderly

	Pressure sores or skin ulcers		
Gender	**Yes**	**No**	**Total**
Male	32 (24.8%)	98 (75.2%)	130 (100.0%)
Female	24 (17.4%)	116 (82.6%)	140 (100.0%)
Total	**56 (21.0%)**	**214 (79.0%)**	**270 (100.0%)**
$\chi 2$ =2.212, df = 1, p=0.014)			

Table 4.26 shows the relationship between the pressure sores and the gender of the elderly. Twenty four point eight percent of the elderly males had pressure sores compared to 17.4% of

the females. There was no significant relationship between gender and pressure scores ($\chi 2$ =2.212, df = 1, p=0.014)

4.4.5.2 Pressure Sores and the Residence of the Elderly

Twenty two percent of the elderly had pressure sores or skin ulcers compared to 20.0% of those living in non-institutions. The majority of the elderly had no pressure sores or skin ulcers (79.0%), with those in non-institutions leading in this group (80.0%). There was no relationship between the presence of pressure sores or skin ulcers and the place of residence ($\chi 2$ = 0.156, df = 1, p= 0.403).

4.4.5.3 Pressure Sores by BMI of the elderly

Table 4.27 Pressure Sores by BMI of the elderly

	Body Mass Index				
Presence of Pressure Sores/ Skin Ulcers	**Underweight**	**Normal**	**At Risk of Over Weight**	**Overweight**	**Total (%)**
Yes	9 (3.5%)	26 (9.5%)	8(3.0%)	8(3.0%)	**51(19.0%)**
No	41(15.2%)	99 (36.8%)	39(14.3%)	40(14.7%)	**219(81.0%)**
Total	**50(18.6%)**	**125(46.3%)**	**47(17.3%)**	**48(17.7%)**	**270(100.0%)**
$\chi 2$ = 0.330, df =3, p= 0.954					

The underweight elderly (3.5%) had pressure sores and or skin ulcers compared to 3.0% among the overweight (Table 4.27). Majority of the elderly who had no pressure sores (36.8%) are the elderly who had a normal BMI. There was no significant relationship between the BMI of the elderly and the presence of pressure sores or skin ulcers (($\chi 2$ = 0.330, df =3, p= 0.954).

4.4.6. Determinants of Functionality among the Institutionalized and Non-Institutionalized Elderly.

Table 4.28 Indicators of Functionality among the Elderly

	Unable to Perform Tasks	Attempts Task but Unsafe	Moderate Help is Required	Minimal Help is Required	Fully Independent	Chi-Square	Df	P-Value
Personal Hygiene	13.5%	0.7%	5.2%	4.5%	76.0%	**26.4**	**4**	**0.000****
Bathing Self	14.2%	1.1%	3.7%	4.5%	76.4%	**35.0**	**4**	**0.000****
Feeding	6.0%	0.4%	3.7%	8.6%	81.3%	**5.6**	**4**	**0.232**
Toileting	11.6%	1.1%	1.9%	7.9%	77.5%	**14.4**	**4**	**0.006****
Stair Climbing	30.3%	12.7%	12.0%	8.6%	36.3%	**52.3**	**4**	**0.000****
Dressing	8.6%	1.9%	4.5%	4.9%	80.1%	**20.3**	**4**	**0.000****
Bowel Control	8.2%	0.7%	3.7%	7.5%	79.8%	**11.7**	**4**	**0.020****
Bladder Control	9.4%	2.6%	4.9%	8.2%	74.9%	**11.7**	**4**	**0.039****
Ambulation (Wheelchair)	49.1%	3.4%	9.4%	4.5%	33.7%	**32.9**	**4**	**0.000****
Chair-bed Transfers	21.3%	1.1%	3.0%	8.6%	65.9%	**20.1**	**4**	**0.000****

** Significantly affects the institutionalization of the elderly

A majority of the elderly (65.9%) were found to be fully independent, whereas 21.3% were unable to perform Activities of Daily Living (ADLs). Personal hygiene ($\chi2$=26.4, df = 4, p=0.000), bathing self ($\chi2$=35.0, df =4, p=0.000), toileting ($\chi2$=14.4, df = 4, p=0.006), stair climbing ($\chi2$=52.3, df = 4, p=0.000), dressing ($\chi2$=20.3, df = 4, p=0.000), Bowel Control ($\chi2$=11.7, df = 4, p=0.020), Bladder Control ($\chi2$=11.7, df = 4, p=0.039)ambulation (Wheel Chair) ($\chi2$=32.9, df = 4, p=0.000) and chair-bed transfers ($\chi2$=20.1, df = 4, p=0.000) were found to be highly significant in determining Institutionalization of the elderly (Table 4.28).

However, Feeding was not significant in determining the Institutionalization of the elderly ($\chi 2$=5.6, df = 4, p=0.232). There was a significant difference between both genders in bowel control (r = 2.448, df = 4, p = 0.048) and bladder control (r = 2.600, df = 4, p = 0.037)

4.4.6.1 Gender Differences in performing ADLs

Table 4.29 Gender Differences in performing ADLs

Activity of Daily Living	Sex	N	Mean	Std. Deviation	Std. Error Mean	t	Sign
Personalhygiene	Male	130	4.26	1.632	.144		
	Female	140	4.04	1.834	.156	1.067	0.287
Bathingself	Male	130	4.15	1.728	.152		
	Female	140	4.10	1.838	.156	0.21	0.834
Feeding	Male	130	9.19	2.278	.201		
	Female	140	8.84	2.798	.238	1.127	0.261
Toileting	Male	130	8.54	3.223	.284		
	Female	140	8.46	3.383	.288	0.213	0.832
Stairclimbing	Male	130	4.48	4.453	.392		
	Female	140	5.83	4.094	.348	-2.572	0.011
Dressing	Male	130	8.81	2.883	.254		
	Female	140	8.53	3.229	.275	0.759	0.449
Bowelcontrol	Male	130	8.76	2.901	.255		
	Female	140	8.80	2.938	.250	-1.105	0.917
Bladdercontrol	Male	130	8.33	3.280	.289		
	Female	140	8.56	3.109	.265	-0.575	0.566
Ambulation	Male	130	5.89	6.887	.606		
	Female	140	6.92	6.819	.580	-1.226	0.221
Chairbed	Male	130	11.51	6.075	.535		
	Female	140	10.90	6.185	.526	0.816	0.415

Further analysis by independent t-tests showed that there was no difference between men and women in carrying out ADLs except in stair Climbing (t= 2.572, df = 268, p = 0.011***).*** The findings showed that 20.6% of the women were fully independent in stair climbing, compared to

15.7% of the men (Table 4.29), while 10.5% of the women were fully unable to climb stairs compared to 19.9% of the men who could not.

4.5. The impact of Functionality on the Nutritional status of Institutionalized and Non-institutionalized Elderly living in Nairobi County, Kenya

4.5.1. Introduction

The study sought to establish the relationship between functionality and nutritional status by highlighting different variables on the elderly and how they impact on the anthropometric measurements of the elderly, thus the nutritional status of the elderly. It also shows variations on the relationship between functionality and nutritional status, brought about by age, gender and residence of the elderly.

4.5.2. Dependency Level by MUAC of the Elderly

4.5.2.1. Dependency level by MUAC of the Elderly

Dependency level is an indicator of the level of assistance required by the elderly from their caregivers in carrying out ADLs. This section presents results on the relationship between dependeny and MUAC, CC, BMI, Presence or absence of Pressure sores, protein intake, ability to live independently, Neuropsychological stress and psychological stress.

Table 4.30 Dependency Level by MUAC of the Elderly

Dependency Level	Mid Upper Arm Circumference (MUAC) in cm			Total
	MUAC less than 21 cm	MUAC 21 to 22 cm	MUAC 22 or greater	
Severe	8(3.1%)	1(0.4%)	18(6.6%)	28(10.2%)
Moderate	31(11.3%)	6(2.3%)	32(11.7%)	69(25.4%)
Minimal	14(5.1%)	17(6.3%)	143(53.1%)	174(64.5%)
Total	**53(19.5%)**	**3(9.0%)**	**193(71.5%)**	**270(100.0%)**
$\chi 2$=43.7, df = 4, p= <0.001; f = 23.550, df = 2, p = <0.001				

Majority of all the respondents (both from non-institutions and institutions of the elderly) required minimal assistance in carrying out activities of daily living (64.5%) and were found to have a MUAC of 22 or greater (Table 4.30). Only 0.4% of those who had a MUAC of 21 to 22 cm were highly dependent on their care-givers in carrying out activities of Daily Living. The results showed that there was a significant association between functionality and being malnourished using the MUAC ($\chi 2$=43.7, df = 4, p= <0.001) with those with severe dependency being more likely to be malnourished and a significant variance between dependency level (2.509 ± 0.696) and MUAC (0.76 ± 0.401), f = 23.550, df = 2, p = <0.001.

4.5.2.2. Dependency level by MUAC of the Elderly Living in Non-institutions

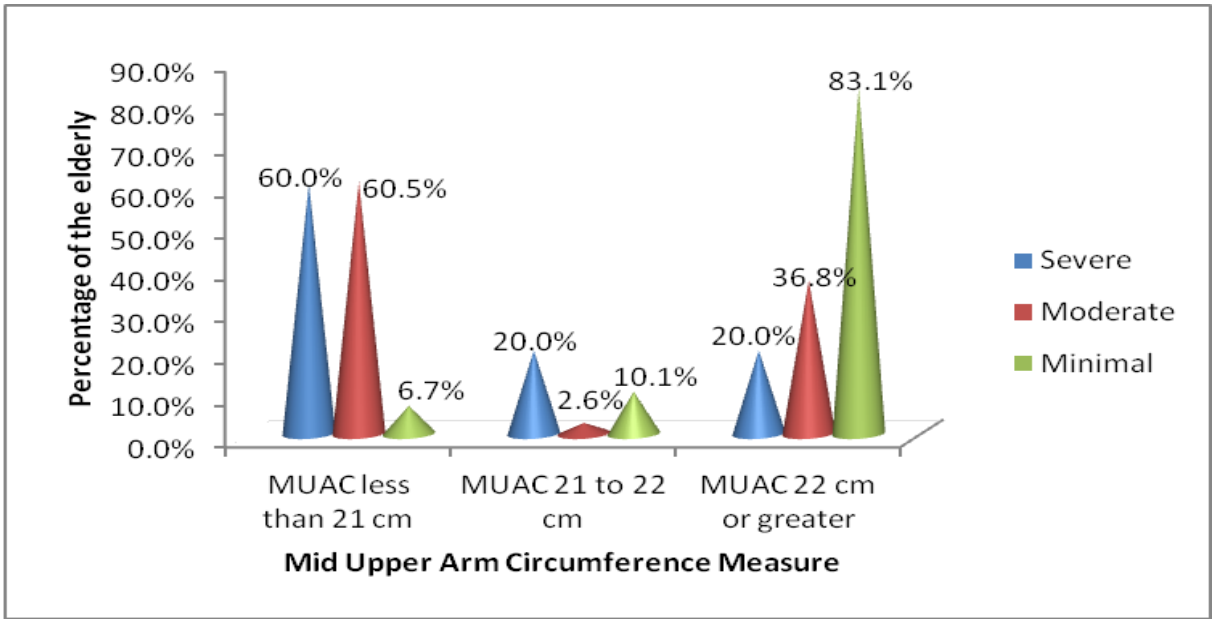

Fig 4.18 Dependency Level and Mid Upper Arm Circumference Measure of the Elderly in Non-institutions

About 83.1% of all the elderly living in non-institutions had minimal dependency in carrying out activities of daily living (ADLs) and a MUAC of 22 or greater (Fig 4.18). It is only 6.7% of the elderly who had minimal dependency in carrying out activities of daily living that had a MUAC of less than 21cm. Dependency level in non-institutions was found to be significantly associated to good nutritional status ($\chi 2=43.4$, df = 2, $p<0.001$) and a significant variance between dependency level (2.509 ± 0.696) and MUAC (0.76 ± 0.401), $f = 6.08$, df = 4, $p = 0.014$.

4.5.2.3. Dependency Level by MUAC of the Elderly Living in Institutions

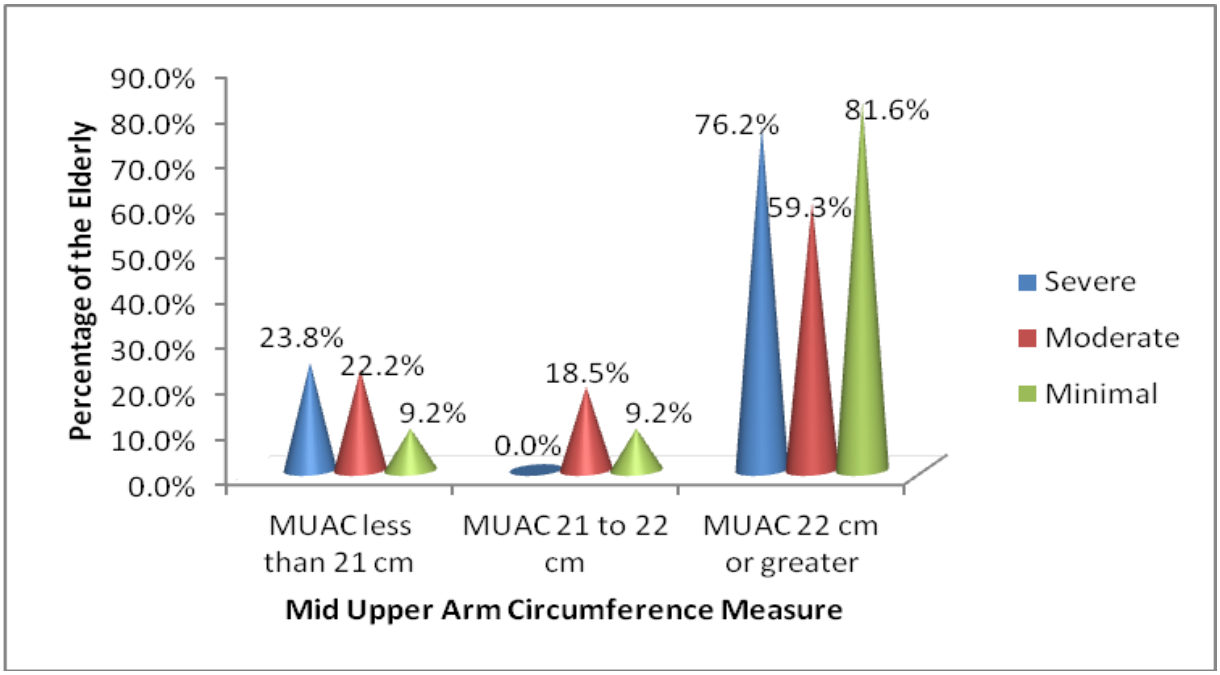

Fig 4.19 Dependency Level and Mid Upper Arm Circumference Measure of the Elderly in Institutions

A majority of the elderly (81.6%) of the elderly who had MUAC of 22 or greater reported minimal dependency, while 23.8% of the elderly who had a MUAC measure of less than 21 cm were severely dependent on their care-givers or independent colleagues in the institutions (Fig 4.19). Good Functional Independence Measure (FIM) at institution was found to be significantly associated to good nutritional status ($\chi 2=9.4$, df = 2, p=0.053).

4.5.2.4. Dependency Level and Body Mass Index of the Elderly

4.5.2.4.1. Dependency level by Body Mass Index of the Elderly Living in Non-institutions

Table 4.31: Dependency Level and Body Mass Index of the Elderly in Non-institutions

BMI	Dependency Level			Total
	Severe	Moderate	Minimal	
Underweight	1(0.4%)	16(6.1%)	33(12.1%)	50(18.6%)
Normal	6(2.2%)	25(9.1%)	95(35.1%)	125(46.3%)
At Risk of Over Weight	1(0.4%)	14(5.2%)	32(11.7%)	47(17.3%)
Overweight	4(1.3%)	18(6.5%)	27(10.0%)	48(17.7%)
Total	**12(4.3%)**	**72(26.8%)**	**186(68.8%)**	**270(100.0%)**
$\chi 2=7.44$, df = 3, p=0.281				

Those who had a normal BMI had minimal dependency in carrying out activities of daily living were 35.1% compared to 2.2% only who were of nomal BMI, but had severe dependency (Table 4.31). About 1% of the elderly who had severe dependency were overweight. Five point two percent of the elderly who had moderate dependency were however at risk of becoming overweight. There was no significant difference between the BMI and dependency level of the elderly ($\chi 2=7.44$, df = 3, p=0.281)

4.5.2.4.2. Dependency Level and Body Mass Index of the Elderly Living in Institutions

Table 4.32 Dependency Level and Body Mass Index of the Elderly in Institutions

BMI	Dependency Level			Total
	Severe	Moderate	Minimal	
Underweight	1(0.4%)	16(6.1%)	33(12.1%)	50(18.6%)
Normal	6(2.2%)	25(9.1%)	95(35.1%)	125(46.3%)
At Risk of Over Weight	1(0.4%)	14(5.2%)	32(11.7%)	47(17.3%)
Overweight	6(1.3%)	18(6.5%)	27(10.0%)	48(17.7%)
Total	**12(4.3%)**	**72(26.8%)**	**186(68.8%)**	**270(100.0%)**
$\chi 2=11.791$, df = 3, p=0.067				

Only 0.4 % of the elderly living in institutions were underweight and with severe dependency (Table 4.32). Two point two percent of all the elderly who reported severe dependency in carrying out activities of daily living were of a normal BMI. However 35.1% of those found to have a normal BMI had minimal dependency in carrying out ADLs. There was no significant relationship between the BMI and dependency level among the elderly living in institutions ($\chi 2=11.791$, df = 3, p=0.067)

4.5. 2. 5. Dependency Level and Calf Circumference

4.5.2.5.1. Dependency level by Calf Circumference of the Elderly living in Non-institutions

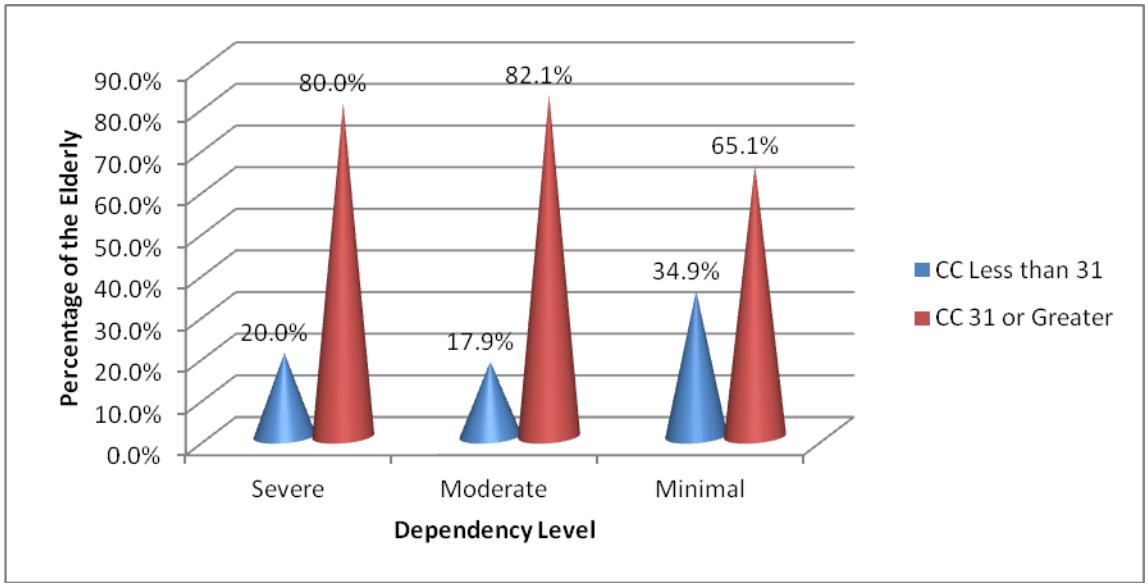

Fig 4.20. Dependency Level and Calf Circumference of the Elderly in Non-institutions

Eighty percent of the elderly people living in non-institutions had Severe Dependency in performing ADLs but had a CC of 31 or more centimeters (Fig 4.20). However 65.1% of the elderly had a CC of 31 or more and had minimal dependence on their care-givers in non-institutions. There was a significant relationship between the CC in cm and the Level of Dependency among the elderly living in non-institutions ($\chi 2=3.93$, df = 2, p=0.014)

4.5.2.5.2. Dependency level by Calf Circumference of the Elderly living in Institutions

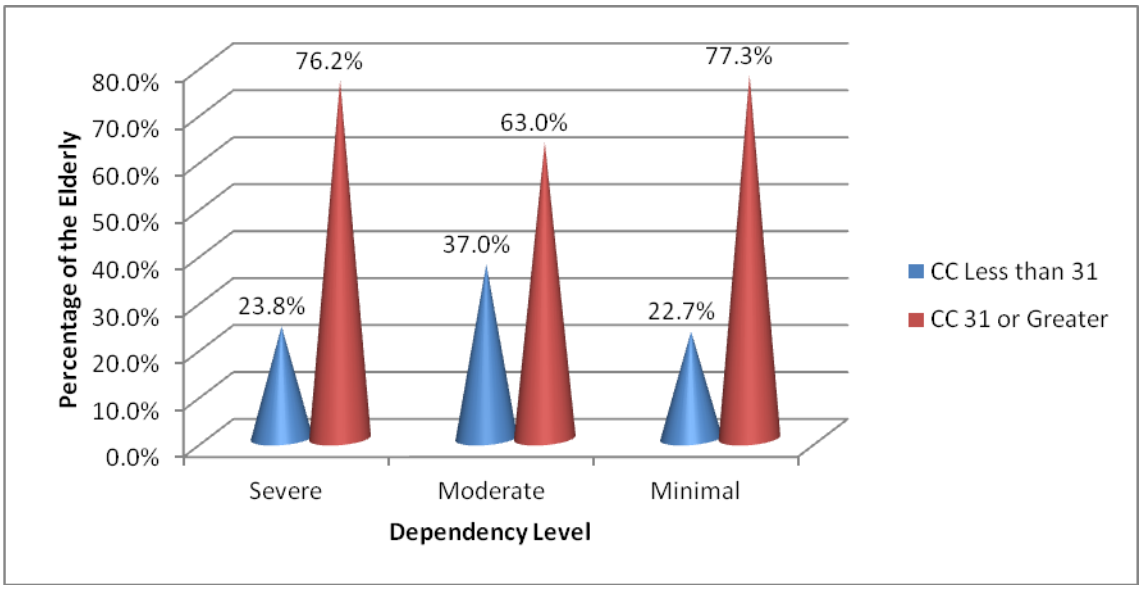

Fig 4.21 Dependency Level and Body Mass Index of the Elderly in Institutions

The majority of the elderly who had a Calf Circumference of 31 or greater (77.3%) had minimal dependence on their care-givers in the Institutions of the elderly, compared to 22.7% of the elderly who had a Calf Circumference of 31 cm or less (Fig 4.21). There was no significant relationship between Calf Circumference and the Level of Dependency ($\chi 2=2.19$, df = 2, p=0.334)

4.5.2.6. Dependency Level and Pressure Sores and Skin Ulcers

4.5.2.6.1. Dependency Level by presence of Pressure Sores and Skin Ulcers among the Elderly Living in Institutions

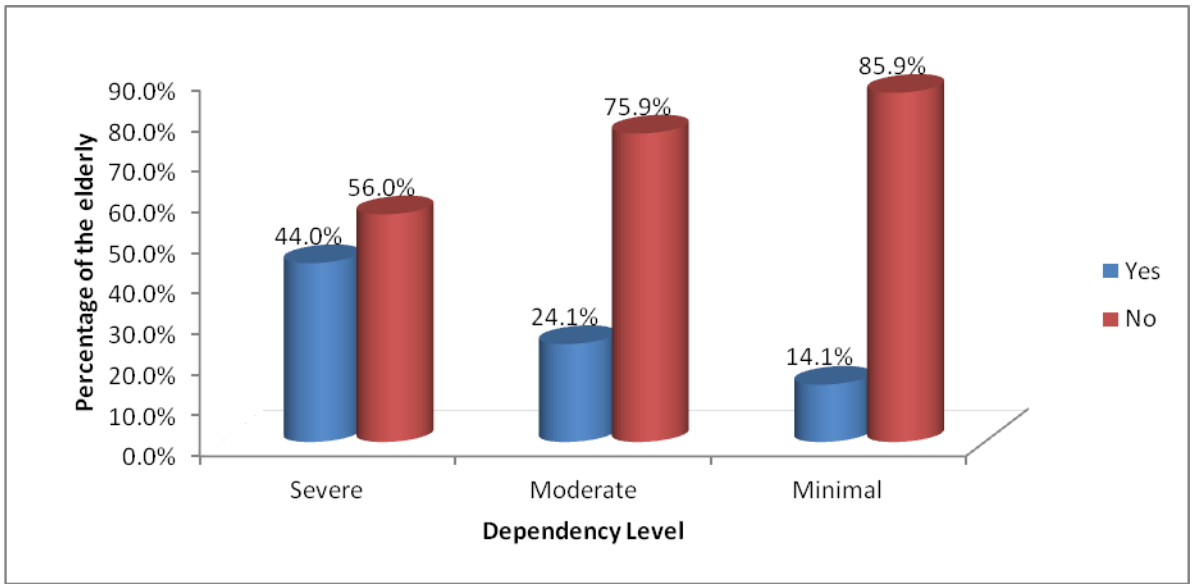

Fig 4.22 Dependency Level and Presence of Pressure Sores and Skin Ulcers for the Elderly in Institutions

Most of all the elderly in institutions (85.9%) had no pressure sores or skin ulcers and reported minimal assistance in carrying out Activities of Daily Living compared to 44% of those who had pressure sores and reported severe dependency on their care-givers in carrying out ADLs (Fig 4.22). There was a significant relationship between FIM and the presence or absence of pressure sores and skin ulcers ($\chi 2=9.97$, df= 2, p=0.007) and a significant variance between dependency level (2.509 ± 6.96) and pressure sores (0.79 ± 0.408), f = 4.288, df = 1, p = 0.039.

4.5.2.6.2. Dependency Level by presence of Pressure Sores and Skin Ulcers among the Elderly Living in Non-institutions

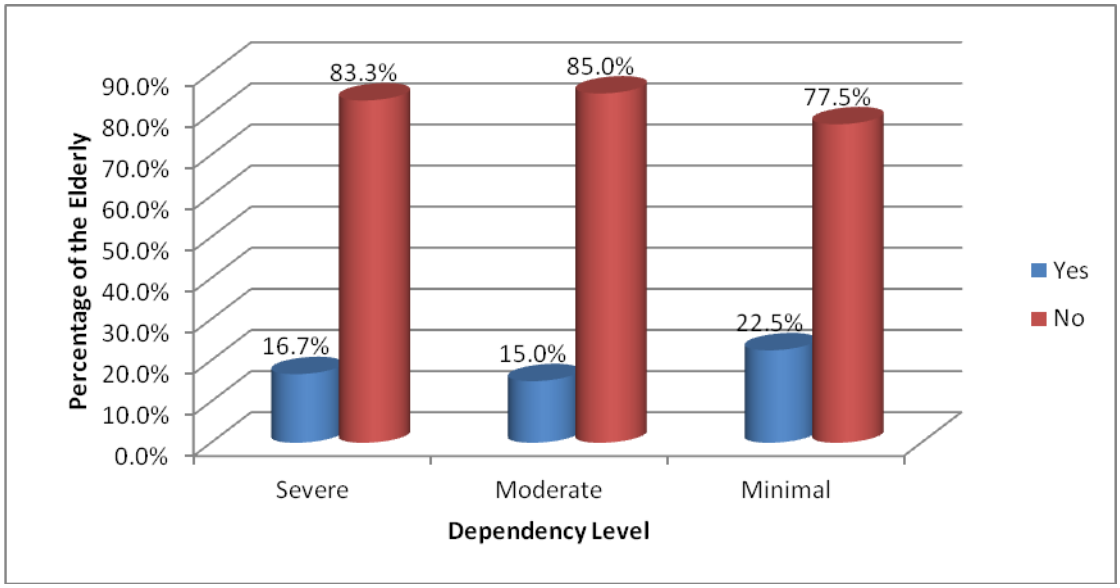

Fig 4.23 Dependency Level and Presence of Pressure Sores and Skin Ulcers for the Elderly in Non-institutions

A majority of the elderly men and women living in non-institutions had minimal dependency (77.5%) and had no Pressure Sores or Skin Ulcers (Fig 4.23). While 16.7% of the elderly who had severe dependency on their care-givers in carrying out ADLs had either Pressure Sores or Skin Ulcers. There was no significant difference between Dependency level among the elderly and the presence of Pressure Sores or Skin Ulcers ($\chi 2=1.000$, df = 2, $p=0.605$)

4.5.2.7. Dependency Level by Consumption of Protein Intake Markers

Table 4.33 Dependency level by Consumption of proteins

Protein Intake Markers	Dependency Level			Total
	Severe	Severe/Moderate	Minimal	
At least one serving of dairy products	12 (4.5%)	35 (13.1%)	86 (32.2%)	133 (49.8%)
Two or more servings of legumes or eggs per week	0 (0.0%)	11 (4.1%)	18 (6.7%)	29 (10.9%)
Meat, Fish or Poultry everyday	19 (7.1%)	23 (8.6%)	63 (23.6%)	105 (39.3%)
Total	**31 (11.6%)**	**70 (25.8%)**	**169 (62.5%)**	**270 (100%)**

Majority of the elderly (23.6%) who reported to consume meat, fish or poultry everyday had minimal dependency in carrying out activities of daily living (Table 4.33). There were no elderly people consuming two or more servings of legumes or eggs per week who had severe dependency in carrying out activities of daily living, while 6.7% required minimal assistance in carrying out ADLs. There was a significant relationship between the consumption of protein and dependency level (($\chi 2$= 10.424, df = 4, p=0.034).

4.5.3. Protein Consumption and Ability to Live Independently

Table 4.34 Consumption of Proteins by Ability to Live Independently

Protein Intake	Ability to live Independently		Total
	No	Yes	
At least one serving of dairy products	16(6.10%)	120(44.60%)	136(50.60%)
2 or more servings of legumes or eggs per week	32(11.70%)	0(0.00%)	32(11.70%)
Meat, fish or poultry everyday	42(15.60%)	60(22.10%)	102(37.70%)
Total	**90(33.30%)**	**180(66.70%)**	**270(100.00%)**

About 6% of the elderly who were not able to live independently were consuming at least one serving of dairy products per day (Table 4.34). A majority of 44.6% were consuming at least one serving of dairy products and able to live independently. Another 22.1% of the elderly would consume meat, fish or poultry everyday and were able to live independently. There was a significant relationship between protein intake and the ability of the elderly to live independently ($\chi 2= 80.57$, df = 2, p= < 0.001) and a significant variance between protein intake (0.45 ± 0.470) and ability to live independently (0.67 ± 0.472).

4.5.4. Neuropsychological Stress of the elderly

Neuropsychological stress or Dementia was probed for among the elderly by indication of forgetfulness, losing track of time and becoming lost in familiar places. This section presents results on their Neuropsychological stress by gender and residence of the elderly.

4.5.4.6. Neuropsychological Problems by Gender of the Elderly

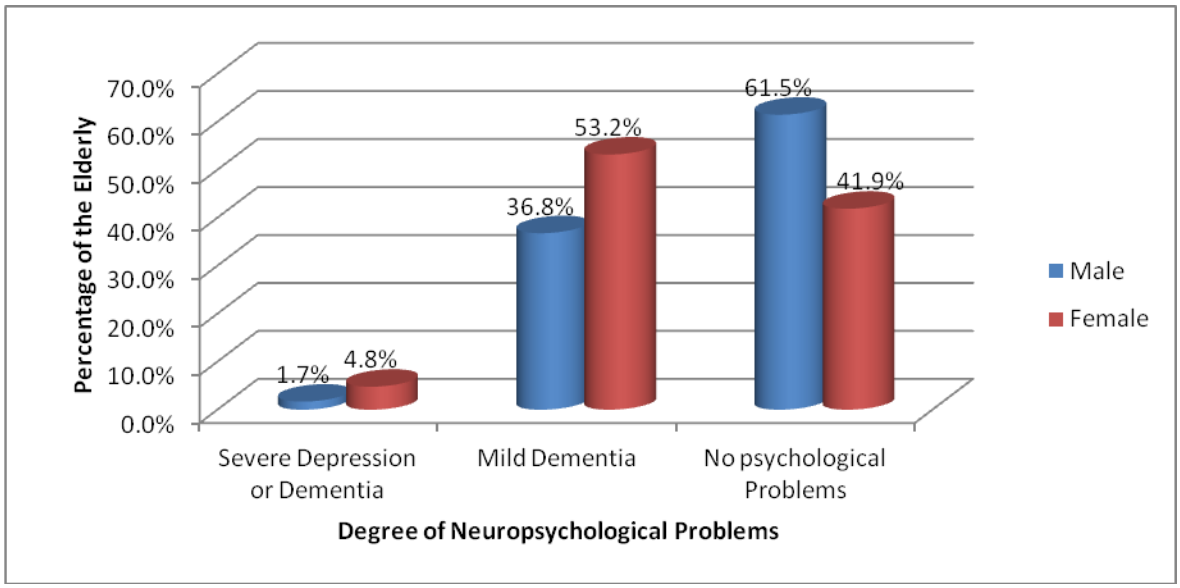

Fig 4.24 Neuropsychological Stress and Gender of the Elderly

Figure 4.24 shows neuropsychological stress by gender, where 53.2% of all the elderly women reported to have mild dementia whereas 4.8% had severe or mild Dementia compared to only 1.7% of the men who had Severe Depression or Dementia. There was a significant relationship between both genders ($\chi 2$ =9.884, df = 2, p= 0.007) with the mean stress level among men (1.60 ± 0.526) being higher than that of women (1.37 ± 0.577), t = 3.190, df = 268, p = 0.002.

4.5.5. Neuropsychological Problems and residence of the elderly

Table 4.35 Neuropsychological Problems by Residence of the Elderly

Neuropsychological problems	Non-institution	Institution	Total
Severe Depression or Dementia	2(1.6%)	7(5.4%)	9(3.3%)
Mild Dementia	79(58.1%)	41(30.4%)	120(45.2%)
No Psychological Problems	54(40.3%)	87(64.3%)	141(51.5%)
Total	**135(100.0%)**	**135(100.0%)**	**270(100.0%)**

Table 4.35 shows Neuropsychological Problems by residence of the elderly. Severe Depression or Dementia was highest in the institutions of the elderly (5.4%), compared to Non-institution (1.6%). However, it is the institutions of the elderly that were housing the highest number of elderly people with no psychological problems. Fifty eight point one percent of the elderly in non-institutions had Mild Dementia. There was a significant relationship between Neuropsychological problems and the type of residence ($\chi 2 = 19.546$, df = 2, p = <0.001). the mean prevalence of neuropsychological problems in institutions was higher (1.59 ± 0.594) than in the non-institutions (1.39 ± 0.520), t = 2.812, df = 268, p = 0.005.

4.5.6. Psychological Stress or Acute Disease among the elderly

Stressful life events tend to depress daily mood and erode feelings of well-being in later life. This section presents results on the relationship between psychological stress by gender and residence of the elderly

4.5.6.1 Psychological Stress or Acute Disease by Gender of the Elderly

Table 4.36 Psychological Stress by Gender of the Elderly

Psychological Stress or Acute Disease	Gender		Total
	Male	Female	
Yes	42(15.6%)	46(15.7%)	33(27.3%)
No	89(32.9%)	93(34.5%)	182(67.5%)
Total	**131(48.6%)**	**139(51.4%)**	**270(100.0%)**

Table 4.36 shows psychological stress by gender.Majority of the elderly had no psychological Stress or Acute disease (67.5%). Women reported more absence of psychological stress (34.5%) than their male counterparts. There was no relationship between psychological stress and gender ($\chi 2 = 5.142$, df = 1, p=0.076)

4.5.6.2 Psychological Stress or Acute Disease by Residence of the Elderly

More elderly living in non-institution (34.6%) had suffered more psychological stress or Acute disease, while 69.6% of the elderly living in institutions had not. There was no significant relationship between psychological stress or acute disease and the place of residence ($\chi 2 = 3.966$, df = 1, p=0.138).

4.6. Characteristics that relate with Nutritional Status and Functionality of the Elderly in Nairobi County, Kenya

4.6.1. Introduction

Results on the role of caregivers in the promotion of nutritional status and functionality of the elderly are presented in figure 4.25.

4.6.2. Reasons for taking care of the elderly

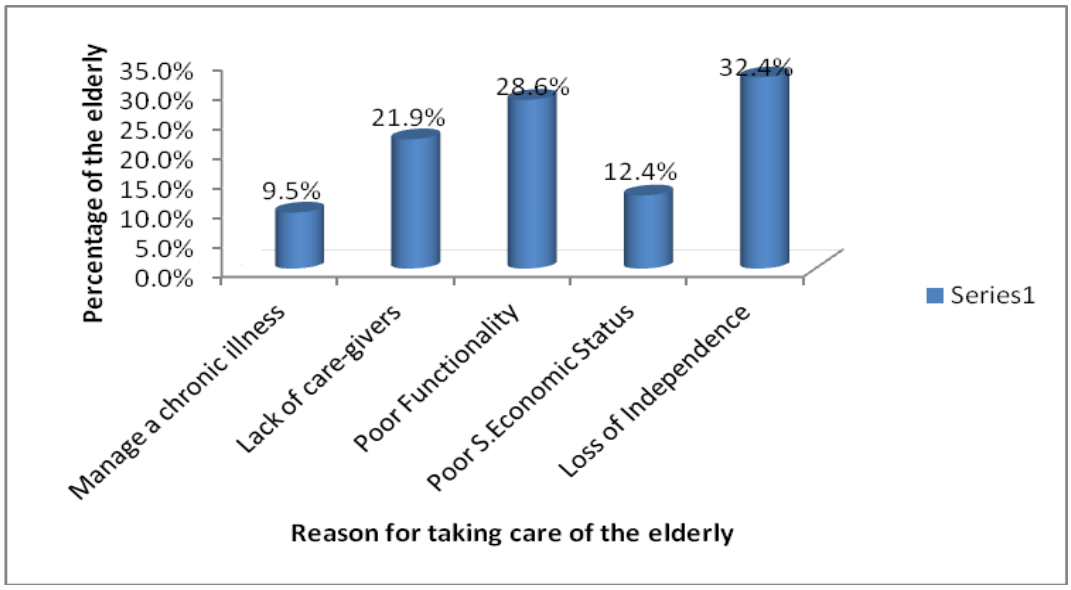

Fig 4.25Reasons for taking care of the Elderly

Several reasons were given as to why the care-givers opted to stay with the elderly (Fig 4.25). The majority of the care-givers pointed out loss of independence (32.4%) as the main reason why they chose to live with and take care of the elderly. Only 9.5% of the care-givers decided to take care of the elderly in order to manage chronic illnesses.

4.6.3. Participation of the elderly in different activities

Table 4.37 Activities of the elderly

Participation in different activities	N	Percent
Recreational Activities		
Relaxing/Resting/Sleeping	144	53.3
Listening to the radio	75	27.6
Visiting Friends	9	2.9
Watching television	5	1.9
Taking walks	5	1.9
Others (farming, knitting, playing)	34	12.4
Indoor and Outdoor Activities		
Assisting in cooking/Food preparation	182	67.3
Assisting in cleaning	87	32.1
Assisting in child care	48	17.9
Visiting the temple/mosque	63	23.4
Going for Shopping	38	14.2
Others	23	8.4
Activities of Daily Living		
Personal Hygiene	198	73.3
Bathing Self	219	81.0
Feeding	242	89.5
Toileting	231	85.7
Stair Climbing	136	50.5
Dressing	219	81.0
Chair to Bed transfers	213	79.0

The care-givers reported that 37.1% of the elderly were assisting in non-institutions on their own volution in cooking, 67.3%, 32.1% in cleaning and 14.2% in shopping (Table 4.37).

Plate 3: Elderly taking rest outside their Institution of residence

Majority of the elderly in Nairobi (53.3%) like to spend their free time relaxing, sleeping or resting (Plate 3). About 27% of the elderly like to listen to the radio and only 1.9% reported to take walks during their free time. A majority of the elderly in non-instiutition were able to feed themselves (89.5%), toileting (85.7%) and observing personal hygiene (73.3%). Only 50.5% reported that they were able to climb stairs if they came across them.

4.6.4. Ability of the Elderly to Move Freely

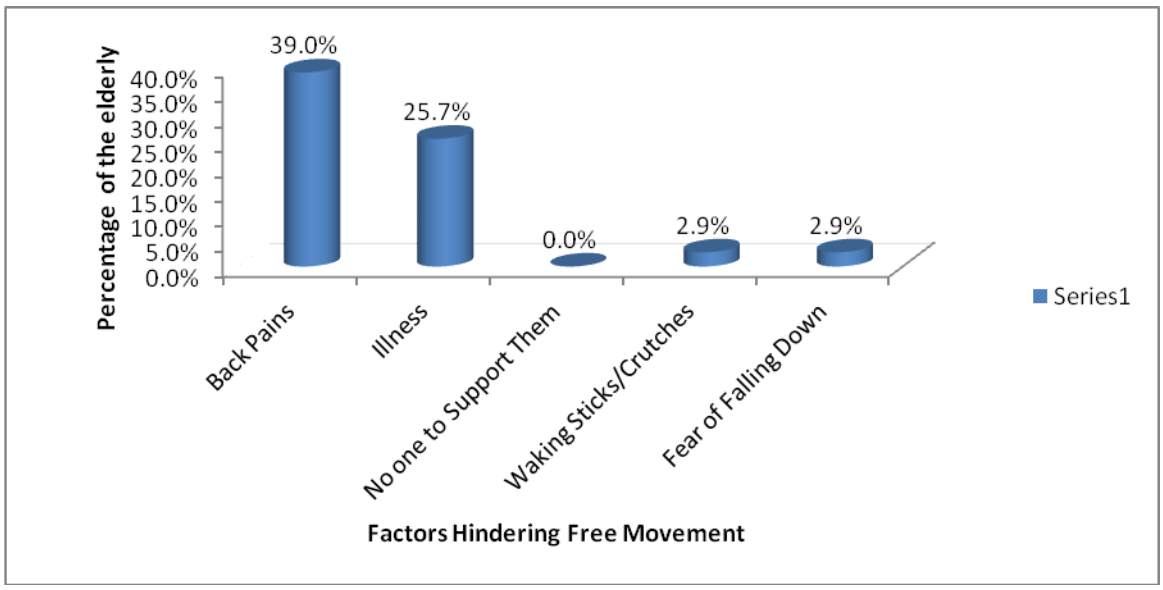

Fig 4.26Ability of the elderly to Move Freely

About 43% of the elderly reported that they were able to move freely, compared to 41% who could not move move freely without assistance (Fig 4.26). Their ability to move was mainly hindered by back pains for 39% of the respondents compared to 2.9% who had no walking stick or crutches and another 2.9% who feared that they would fall. No one attributed their inability to walk to the absence of someone to support them. However upon probing, 12 % of the elderly confirmed that they have no one to support them in walking.

4.6.5. What should be done to Improve the Ability of the Elderly to Move Freely

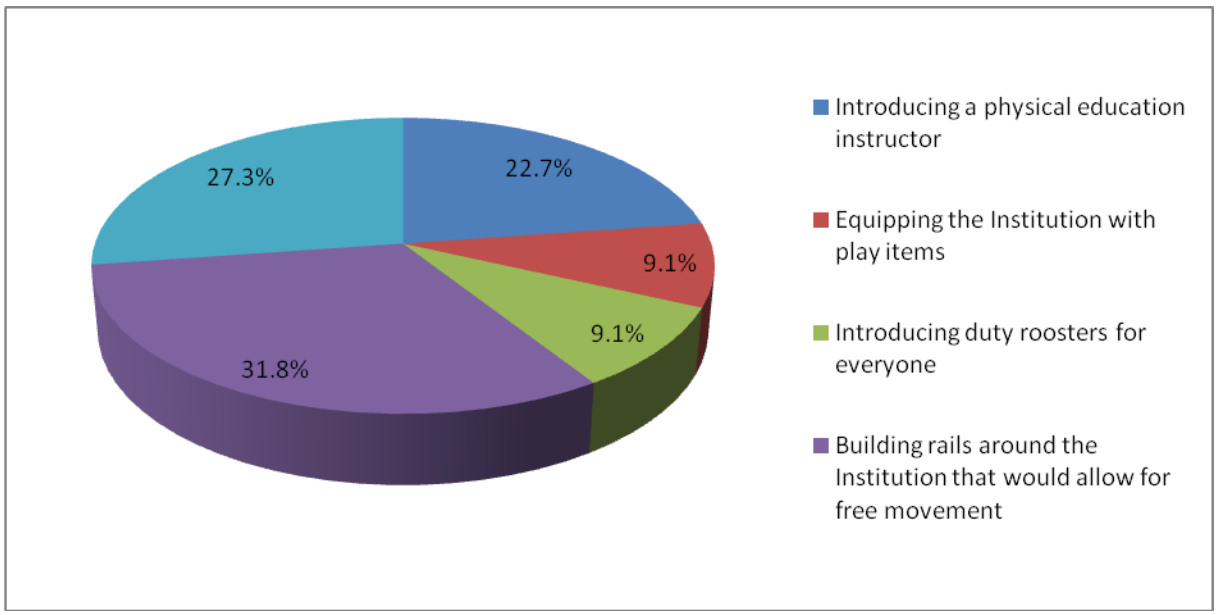

Fig 4.27How to Improve the Ability of the Elderly to Move Freely

Suggestions were sought from the care-givers of the elderly on how to promote their level of physical activity in the non-institution (Fig 4.27). A majority of 31.8% suggested that rails should be made in the non-institution to allow the elderly free movement around the non-institution without requiring support. About 9.1% of the care-givers were of the opinion that a duty rooster should be made inorder to make the elderly participate freely in activities of daily living, with the elderly at home also being assigned tasks to carry out.

4.6.6. Rating of Meals by the Elderly in Non-institutions

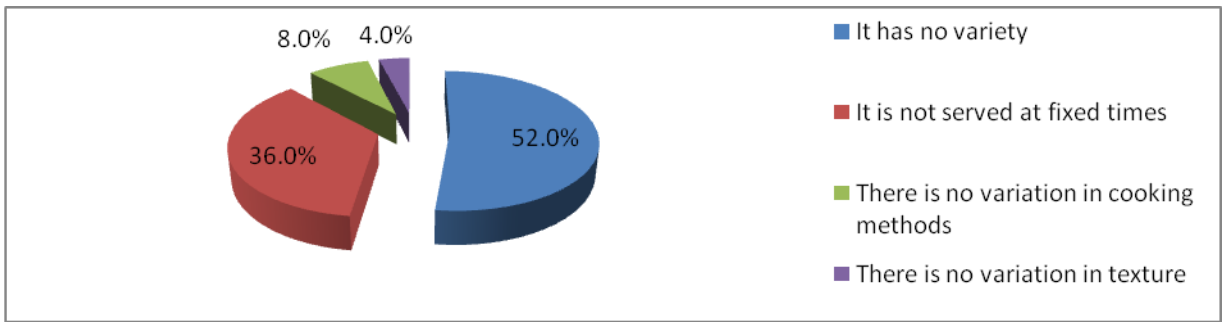

Fig 4.28 Ratings of the Meals Provided in Non-institutions

About 55% of the elderly living in non-institutions felt that the meals served in non-institution were adequate compared to 44.1% who felt that the meals were not adequate (Fig 4.28). The meal inadequacy was due to lack of variety in the food served (52%), lack of fixed meals time (36%), lack of variation in cooking methods (8%) and lack of variation in the food texture (4%).

4.6.7. How to improve the Food given in Non-institution

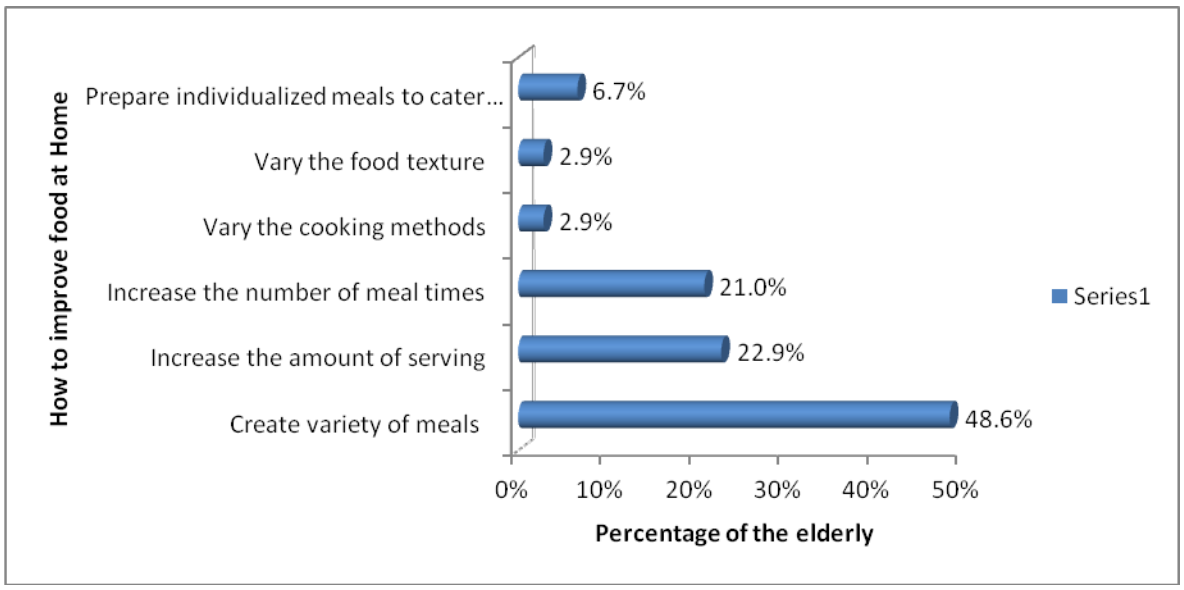

Fig 4.29 How to Improve the Food given in Non-institutions

Different suggestions were given on how to improve on the quality and adequacy of the food served to the elderly in Non-institution (Fig 4.29). The majority (48.6%) felt that there was need to create a variety of meals and only 2.9% felt that there was need to vary the cooking methods and vary the food texture.

4.6.8. Whether to Institutionalize or Care for the Elderly in Non-institutions

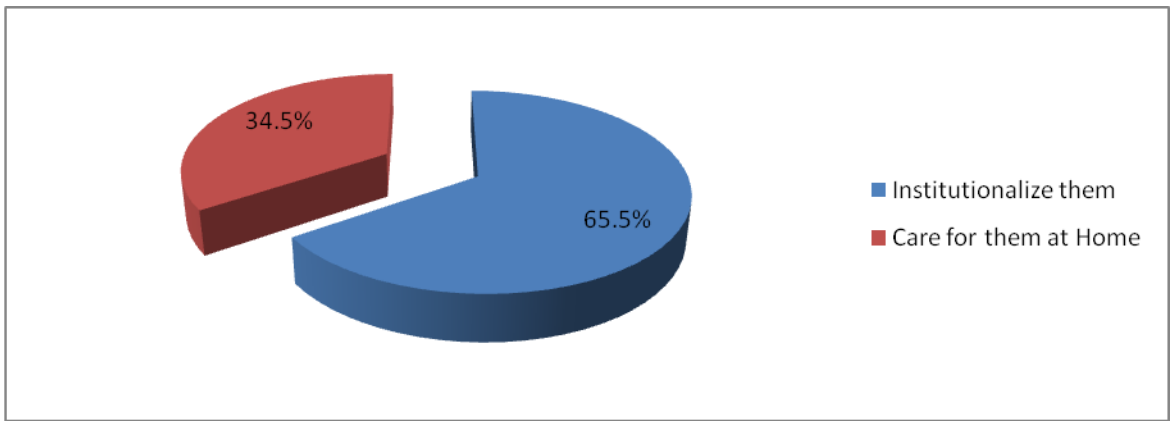

Fig 4.30 Whether or not to Institutionalize the Elderly

A majority of the care-givers of the elderly in Non-institutions (65.5%) were comfortable in caring for the elderly in Non-institutions compared to 34.5% who wished to commit their elderly loved ones to Institions of the elderly (Fig 4.30).

Spearmans correlation was done to determine the relationship between the nutritional status of the elderly and their care-givers. Functionality was found to correlate positively with the number of years spent with the care-givers ($r = + 0.242$, $p = 0.018$) and the Mid Arm circumference of the elderly ($r = + 0.555$, $p = 0.000$). The CC of the elderly was found to correlate negatively with the number of years spent in giving care to the elderly ($r = - 0.231$, $p = 0.024$).

4.7. Institutional and Non-institutional Characteristics that relate with Nutritional Status and Functionality of the Elderly in Nairobi County, Kenya

4.7.1. Introduction

Presented here are results from the demographic characteristics of the elderly and their care-givers, the nutritional status of the elderly, the functionality of the elderly, the impact of functionality on nutritional status and the characteristics of care-givers to propose a model on characteristics that relate to Nutritional status and functionality of the elderly, whether in non-institutions or in the institutions of the elderly.

Table 4.38 Immediate Characteristics that relate to Nutritional status and Functionality of the Elderly

Variables		Frequency	Spearmans rho	Significance	Strength
Food Intake Decline	Gender	267	0.137	0.027	*
	Protein Intake	267	0.150	0.015	**
	Mode of Feeding	267	- 0.137	0.036	*
Neuropsychological problems					
	Mobility	267	- 0.128	0.048	*
	Mid Arm Circumference	267	0.149	0.022	*
	Toileting	267	- 0.127	0.049	*
Takes more than 3 prescription drugs					
	Lives Independently	267	0.176	0.012	**
	Self-view of Nutritional Status	267	0.164	0.021	*
Number of Full Meals					
	Self-view of health status	267	0.148	0.025	*
	Mode of Feeding	267	- 0.127	0.044	*
	Toileting	267	- 0.127	0.044	*
	Bowel Control	267	- 0.125	0.047	*
Protein Intake	Food Intake Decline	267	0.150	0.015	**
	Mobility	267	- 0.126	0.043	*
	Consumption of Fruits and Vegetables	267	0.139	0.029	*
	Amount of Fluid Consumed	267	- 0.130	0.042	*
	Personal Hygiene	267	- 0.129	0.036	*
	Dressing	267	- 0.015	0.016	**
Amount of Fluid Consumed	Psychological stress	267	-0.014	0.036	*
	Protein Intake	267	- 0.130	0.042	*
	Self-view of Health Status	267	0.138	0.036	*
	Personal Hygiene	267	0.126	0.047	*
	Bathing Self	267	0.150	0.018	**
Presence of Pressure Sores or Skin Ulcers					
	Mobility	267	0.128	0.041	*
	Lives Independently	267	0.148	0.024	*
	Mode of Feeding	267	0.142	0.029	*
	Bathing Self	267	0.124	0.043	*
	Feeding	267	0.135	0.027	*
Mobility	Neuropsychological problems	267	0.128	0.048	*
	Pressure Sores	267	0.128	0.041	*
	Protein Intake	267	-0.126	0.043	*
	Fruit and Vegetable Intake	267	-0.143	0.027	*
Personal Hygiene	Protein Intake	267	-0.129	0.036	*
	Fluid Intake	267	0.126	0.047	*

* Significant ** Highly significant

The immediate characteristics are individual factors which were found to impact positively on the Functionality and Nutrirional Status of the elderly. Food intake was found to be an immediate factor impacting on the functionality and nutritional status of the elderly among others (Table 4.38). It was found to relate positively with the gender of the elderly ($r = 0.137$, $p = 0.027$), protein intake ($r = 0.150$, $p = 0.015$) and mode of feeding ($r = 0.137$, $p = 0.036$).

Table 4.39. Underlying Characteristics that relate with the Nutritional Status and Functionality of the Elderly

Variables	Frequency	Spearmans rho	Significance	Strength
Living Independently				
Takes more than 3 prescription drugs	267	0.176	0.012	**
Pressure Sores	267	0.148	0.024	*
Mode of Feeding	267	0.248	<0.001	**
Meal Ratings				
Number of Full meals	267	0.145	0.021	**
Fruit and Vegetable Intake	267	0.143	0.027	*
Mid Upper Arm Circumference	267	0.127	0.049	*
Mode of Feeding				
Food Intake Decline	267	0.137	0.036	*
Lives Independently	267	0.143	0.040	*
Pressure Sores	267	0.142	0.029	*
Ambulation	267	0.143	0.027	*
Opinion on Instituionalization				
Ability to Live Independently	267	0.176	0.012	**
Indoor and Outdoor Activities	267	0.150	0.015	**
Experince in caring for the elderly				
Mobility	267	0.143	0.027	*
Amount of Fluid Consumed	267	0.129	0.036	*
Mode of Feeding	267	0.124	0.043	*
Reason for caring for the elderly				
Ability to Live independently	267	0.143	0.040	*
Calf Circumference	267	0.126	0.045	*
Weight loss in the last three months				
Self-view of Health Status	267	0.135	0.043	*
Feeding	267	0.127	0.045	*
Time Spent in the Institution				
Lives Independently	267	0.142	0.029	*
CC measure	267	0.169	0.017	**
Pressure Sores	267	0.126	0.043	*
Residence of the elderly				
Number of meals	267	0.148	0.025	*
Personal Hygiene	267	0.015	0.016	*
Taking more than 3 prescription drugs	267	0.176	0.012	*
Mid Arm Circumference				
Neuropsychological problems	267	0.149	0.022	*
Ambulation	267	0.160	0.011	**
Free time activitities				
Ability to live independently	267	0.176	0.012	*
Psychological stress	267	0.014	0.036	*
Body Mass Index	267	0.148	0.025	*

* Significant ** Highly significant

Underlying characteristics are those that relate to the setting in which the elderly are housed which were found to impact on the Funtionality and Nutritional status of the elderly (Table 4.39). The ratings of the meal by the elderly was a factor impacting on the amount of food consumed by the elderly and was found to positively correlate to number of full meals taken by the elderly (r = 0.145, p = 0.021), fruit and vegetable intake (r = 0.143, p = 0.027) and mid upper arm circumference measure (r = 0.127, p = 0.049).

Table 4.40. Basic Characteristics that relate with the Nutritional Status and Functionality of the eldery

Self-view of health status				
Weight loss	267	0.135	0.043	*
Number of Full meals	267	0.148	0.025	*
Fluid Intake	267	0.138	0.036	*
Ambulation	267	0.128	0.049	*
Self-view of Nutritional Status				
Residence of the elderly	267	-0.132	0.048	*
Takes more than 3 prescription drugs	267	0.164	0.021	*
Dressing	267	0.160	0.016	**
Education level of care-givers				
Ability to live independently	267	0.143	0.040	*
Pressure Sores	267	0.128	0.048	*
Mode of Feeding	267	0.137	0.036	*
Protein Intake	267	0.150	0.015	**
Professional training of care-givers				
Self-view of health status	267	0.135	0.043	*
Neuropsychological problems	267	0.149	0.022	*
Number of full meals	267	0.127	0.044	*
No. of care-givers in the institution				
Ambulation	267	0.160	0.011	**
Stair Climbing	267	0.128	0.036	*
Residence of the elderly	267	0.154	0.012	**
Bathing self	267	0.126	0.045	*

* Significant ** Highly significant

The basic characteristics relate with the place of residence of the elderly (either institutions or non-institutions) and the National or County government of the day and its impact on the nutritional status and functionality of the elderly (Table 4.40). Education level of the care-givers

was one of the basic factors and it was found to positively correlate with ability of the elderly to live independently ($r = 0.143$, $p = 0.040$), presence of Pressure Sores ($r = 0.128$, $p = 0.048$), mode of feeding by the elderly ($r = 0.137$, $p = 0.036$) and protein intake ($r = 0.150$, $p = 0.015$).

CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1. Discussion

5.1.1. Socio-demographic Characteristics of the elderly and their care-givers

A group of elderly people both in the Institutions (135) and Non-institution (135) was studied in Nairobi County. Weight, height, MUAC and CC were measured and BMI (Weight in kg/height^2) was calculated. The total number of respondents was 267. One hundred and thirty five (50.6%) of the participants were living in non-institutions with their family members whereas 135 (50.0%) were living in institutions of the elderly. Majority of the participants 140 (51.7%) were female, while the men were 130(48.3%). The youngest elderly was aged 60 years and the oldest 113 years. This is because women live longer than men, and are more likely than men to live alone in old age. Living alone and having lower average incomes are factors that lead women into institutional care at higher rates than men at older ages (Smith, 1998).

The mean age was 70.53 ± 11.336. The average height of the elderly was 157.31 ± 11.211cm and an average weight of 52.904 ± 8.064. According to the National Council for Population and Development, the life expectancy of all the elderly has been rising for females, with a woman who reaches the age of 55 expecting to live for another 24 years. However the male pattern rose and begun to decline (NCAPD, 2011). A similar study carried out in Venezuela found 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 (Diaz *et al*., 2005).

About 17.4% of all the elderly were overweight and 18.0% were underweight. The majority of the elderly (71.6%) had a MUAC of 22 or greater, whereas 74.3% had a Calf Circumference of

31 or greater. Only 12.2% of all the elderly had severe dependency in carrying out ADLs. The mid upper arm circumference means were within the normal reference range for both groups, without significant differences by sex. Diaz *et al* in 2005, in a similar study found lower MUAC in older adults, with 16% of nutritional deficit, 45% of normal status and 39.7% with of excess weight were found in institutionalized elderly, while in the elderly living at home, the prevalences were 8%, 62% and 29.7% respectively.

5.1.2. The nutritional status of the Institutionalized and the non-institutionalized elderly in Nairobi County, Kenya

The nutritional status of an individual determines the process of aging and the health of the elderly. On the other hand, advanced age predisposes people to excesses or deficits of dynamic tissue for example fat or deficiencies of static tisssues such as muscles and bones. These changes result to a decline in metabolic rate linked to a replacement of metabolically active skeletal muscle tissue with less active adipose tissue which influences their nutritional requirements (Stini, 2000).

The findings of this research indicate that there is a difference between the nutritional status of the Institutionalized and Non-institutionalized elderly, thus rejecting the null hypothesis that there is no difference between the nutritional status of the Institutionalized and Non-instituitionalized elderly.

More men (52.4%) were overweight compared to the women (33.3%) using the BMI. More women were underweight (16.7%) compared to the men (9.5%). The elderly develop malnutrition due to a number of factors. These factors make the elderly vulnerable and

susceptible to malnutrition as a result of decreased physical, psychological and or social functions (Morley, 2002). The risk of the elderly suffering from malnutrition is low in healthy elderly persons and it is therefore important to have the elderly nutritional status regularly monitored (Guigoz, 2006).

There is a wide variation in the prevalence of malnutrition in the institutionalized elderly people. The Institutions of the elderly had the highest number of underweight elderly (20.2%). These results are similar to the research findings of Guigoz in 2006 who found that among the community – dwelling elderly people in Sweden, the prevalence of malnutrition was only 2%, compared to the Institutionalized elderly people who had 21% prevalence of malnutrition. The underweight phenomena among the elderly could be attributed to eating difficulties, difficulties in chewing due to poor dental status as well as dry mouth, red mucus membranes and oral sores which can greatly affect eating and the nutritional status of elderly people (Chen *et al*., 2005).

More women (41.70%) were at risk of being overweight, compared to men (23.8%). There is a tendency among the elderly to gain fat mass, which increases the risk of obesity, cardiovascular disease and non insulin dependent diabetes. Only 9.5% of the elderly men were underweight, compared to 16.7% of women who were found to be underweight. Majority (46.3%) of the elderly were of a normal BMI. The results showed that there was no significant relationship between the BMI and gender.

According to a study done in Brazil by Batista-Filho *et al*., 2003, 24.7% of the elderly were found to be overweight using BMI. At the same time that malnutrition rates fall, there is a noticeable increase in the rates of overweight and obesity in the Brazilian population. In another study done by Velazquuez-Alva *et al*., 1996, BMI was used to determine malnutrition and

overweight. Malnutrition was found in 1.4% of the population (< 18.5 BMI); with 1.6% of women and 1.2% men being malnourished. Malnutrition was observed in 0.8% of 60–64 year-olds and 3.3% of > 80 year-olds. About 62.3% of the population was overweight (BMI ≥ 25.0; 65.4% of women and 59.9% of men).

Some authors have indicated that BMI thresholds should be modified for the elderly population. Sergi *et al*., 2005 recommended as threshold to malnutrition in the elderly a BMI of < 20.0. Using this cut-off point 4.5% of the Mexican population were found to have malnutrition. Other studies by Kyle (2002) suggested that a BMI between 25.0 and 29.9 should be considered desirable. Such a modification would result in many elderly currently classified as overweight being re-categorized as normal. It is necessary to consider the convenience of adopting this cut-off point, since a BMI under this point has been set as a protective factor for mortality and morbidity in chronic-degenerative diseases (Keller, 2005). However, health results suggest the desirable BMI range is greater in the elderly compared to young adults. This difference relates to body composition changes in old age. With this cut-off point in this population (BMI ≥ 30.0) that percent of overweight could be 19.4%, also a more realist proportion (21.5% women and 17.7% men) (Perissinoto, 2002). Elderly with low BMI can be treated to gain weight by giving being encouraged and supported to consume energy content meals at breakfast for the greatest impact compared to dinner, where the least impact is felt (Young *et al*., 2001).

Mid Upper arm Circumference (MUAC) is one alternative measure of BMI in determining thinness in older persons and is currently incorporated in two screening instruments that can be used to assess the risk 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. Besides being a simple assessment that requires a tape measure only, it is especially suitable for measuring thinness since there is evidence suggesting that a low MUAC is a more valid measure than a low BMI to define thinness in older persons (Wijnhoven *et al*., 2012). A study previously done among older persons living in sheltered accommodation, based on a dieticians assessment found that MUAC is more specific and sensitive than BMI identifying populations at risk of undernutrition (Harris *et al*., 2008). Another study on community dwelling older persons showed that a low MUAC is more strongly associated with 15 year mortality than a low BMI (Wijnhoven *et al*., 2010).

Majority of the elderly, both in non-institutions (67.4%) and in the institutions of the elderly (75.8%) had a MUAC of 22 or greater. Seventy five point six percent of the women had a MUAC of 22 or greater compared to 66.9% of the men. More of the elderly in non-institutions (24.2%) had a MUAC less than 22 cm, compared to 14.5% of their counterparts in the institutions. It was found that there was no significant relationship between the Mid-arm circumference and being Institutionalized or non-institutionalized. There was however a significant relationship between gender and MUAC of the elderly.

Calf Circumference is considered to provide the most sensitive measure of muscle mass in the elderly, and is superior to arm circumference. It indicates the changes in fat free mass that occur with aging and with decreased activity (WHO, 2011). More women (75.9%) than men (68.3%) had a CC of 31 cm or greater. Women who had a CC of less than 31 were 24.1%, compared to 31.7% of the men. There was no significant relationship between CC and gender of the elderly. Most of the elderly living in institutions (74.0%) had CC of 31 or greater. Twenty six percent of

the elderly in institutions had a CC less than 31cm. There was no significant relationship between CC and place of residence. In a study done in Iran on elderly women, Calf circumference was positively associated with anthropometric variables that assess muscle mass and fat tissue (Khadivzadeh, 2002).

Reported energy intakes tend to be lower than the measured intakes (John, 2009). More males (73.2%) were able to consume at least three meals per day compared to 69.8% of the women. There was no significant relationship between the two genders. The majority of the elderly livings in institutions (88.1%) were able to consume 3 or more meals per day compared to 54.8% of the elderly living in Non-institutions. None of the elderly living in institutions reported to consume 1 meal per day, whereas 5.6% of those living in non-institution. There was a significant relationship between the number of meals consumed and the place of residence of the elderly. Ortega *et al*., 1998 found that women subjects who took 2-3 meals per day showed greater body mass indices and a greater proportion were overweight/obese compared to those who took 4-5 meals per day.

> "The elderly are entitled to at least three meals per day. The staff here assist in feeding some elderly, although roommates are encouraged to help". – Social Welfare Officer

Fruits and vegetables contain essential vitamins, minerals, fibers and other bioactive compounds. These reduces many chronic diseases such as stroke and cardiovascular diseases, metabolic disease and some cancers, besides the therapeutic and preventive actions of fiber against hemorrhoids, constipation, diarrhea, colon cancer, breast cancer amongst other malignancies. The elderly living in Institutions (76.5%) reported to consume 2 or more vegetable servings per day compared to 74.8% of the elderly living in non-institution. More males (80.7%) consumed

two or more servings of fruits and vegetables, compared to 70.9% of the women. These results are similar to the findings of a study conducted in Iran by Ali *et al*., in 2010, where the prevalence of fruit and vegetable consumption 5 or more servings/day was 38.7% in men and 36.8% in women. There was no significant association between taking fruits and vegetables and the type of residence of the elderly, but there was a significant relationship between consumption of fruits and vegetables and the gender of the elderly. This contrasts with the findings of Ali *et al*., 2010 who found no associations between fruit and vegetable consumption and gender of the elderly.

Water is a nutrient that is important and critical in the maintenance and sustenance of life. Aging is a factor that declines the body's ability to maintain homeostasis significantly, making the elderly vulnerable to dehydration (Sansevero, 1997). The decrease in total body water from adulthood to old age is very gradual, until it constitutes less than 50% of the total body weight (below the normal range of 50 to 65%) (Bozetti, 2003). There are also many factors that can make the elderly vulnerable to dehydration, among them a blunted thirst mechanisms, decreased total body weight as a proportion to body weight due to loss of lean muscle mass and decline in the function of the renal system, which results from loss of nephrons which reduces filtration and and chronic diseases (Ahroneim, 2000). The majority of the elderly (46.2%) consumed 3 to 5 cups of fluid per day. The majority of these elderly were living in institutions (50.9%), compared to those living in non-institution (42.1%). The high number of institutionalized elderly consuming more fluids could be as a result of physical and neurological impairments, being the main causes of disability among the elderly, which could be the reason why they were living in the institutions (Ahroneim, 2000).

More women (34.8%) reported to consume more than 5 cups of fluid, compared to 28.7% of the men and there was no significant relationship between fluid consumption and gender of the elderly. These findings differ with those of Sansevero who in 1997 observed that women were more likely to avoid fluids than men, in order to reduce their fluid intake and thereby decrease incontinence and eliminate embarrassment. This is because incontinence is a factor that contributes towards dehydration among the elderly.

There was a significant association between taking more fluids and the type of residence of the elderly, where 13.2% of the elderly living in institutions reported to consume more than 5 cups of fluid per day, compared to 48.1% of the elderly living in Non-institution. Many institutional factors among them insufficient number of care-givers underlie the problem of dehydration in the nursing home population. As a result of the care-givers and the elderly ratio, the care-givers in institutions of the elderly are overworked and therefore not able to spend appropriate time with each elderly in order to assist in eating and drinking during the mealtimes (Garcia, 2001). Simple measures such as opening the bottle for the elderly or drawing drinking water for them into a cup or a glass can affect the health of the resident elderly.

There was a significant relationship between the consumption of at least three prescription drugs and the amount of fluid intake ($\chi 2$= 136. 272, df = 2, p=0.000). This can be attributed to the fact that certain medications such as sedatives, antipsychotics, tranquilizers and diuretics are known to make one vulnerable to dehydration (Ahroneim, 2000). Neurological problems and dementia are also characteristics that result to reduced fluid intake. This is because neurological

impairements alter the function of the pituitary gland and the hypothalamus, thereby affecting the thirst sensation and fluid regulation (Ahroneim, 2000). There was a significant relationship between the presence of Neurological problems and amount of fluid intake ($\chi 2$= 14.868, df = 2, p=0.005).

Majority of the elderly were taking more than three prescription drugs. About 60% of the elderly living in institutions were taking more than 3 prescription drugs, compared to 39.1% who were not. Over 72% of the elderly living in Non-institution were taking more than 3 prescription drugs compared to 27.8% who were not. There was also a significant relationship between the consumption of prescription drugs and gender, with more females (53%) than men (47%) consuming more than 3 prescription drugs. ($\chi 2$= 97.520, df = 1, p=0.000). There was no significant association between taking prescription drugs and being institutionalized or in Non-institutions. The consumption of medication may lead to distortion in the way nutrients are absorbed, digested and expelled from the body. This may lead to changes in food choices and malnutrition (Brownie, 2006). A similar study conducted by Saeidlou *et al*., in 2011 indicated that older people in institutions who take an average of 3 or more different medications a day have a higher risk of malnutrition. This is because medications like anticonvulsants, diuretics, and antidepressants may change taste perception (Holmes 2008). Brownie in 2006 reported that a lot of medications are known to affect directly the sense of smell and taste. Some of these medications include calcium channel blockers, lipid-lowering drugs and anti-inflammatory drugs.

> 'They collect their prescription drugs from the dispensary when the doctor is available, that is on Thursdays and Saturdays only' – a manager to an institution of the elderly

Functional barriers in the institutions of the elderly are factors predisposing the elderly to dehydration. This is because immobility of the elderly may result from physical impairments and disabilities and these can adversely affect the patient's ability to move and get water for themselves (Sansevero, 1997). There was a significant relationship between mobility of the elderly and hydration ($\chi 2$= 17.998, df = 2, p=0.00), with a majority of 41 elderly who were able to go out on their own reporting to take more than 5 cups of fluids every day.

The United States National Academy for Science recommends a Dietary Allowance (RDA) of 0.8 g protein/kg body weight/day for all adults regardless of age. This is the minimum amount of protein required to avoid progressive loss of lean body mass, which is characteristic of the aging adult (Wolfe *et al*., 2008). Most of the elderly men (39.5%) reported to consume two or more servings of protein intake then women (39.1%). There was a significant relationship between protein intake and gender.

About 50% of the elderly reported to consume at least one daily serving of dairy products. The majority of them (77.0%) were living in non-institutions, whereas 22% were living in institutions. Majority of those who reported to consume meat, fish or poultry (56.1%), were living in institutions of the elderly compared to 23.0% of those living in non-institutions. There is evidence that protein intake, greater than the recommended RDA of 0.8g/kg/day can improve among other things, the muscle mass, function level in carrying out ADLs and general body strength (Wolfe *et al*., 2008). There was a significant relationship between the residence of the elderly and intake of proteins

Concerns about the detrimental effects likely to result from increased consumption of proteins such as poor bone health, renal function, cardiovascular function and neurological function are unfounded. Intake of 1.5 g of protein/kg/day or 15-20% of the total caloric intake by the elderly is ideal for those elderly who may wish to improve on their health and function levels (Wolfe *et al*., 2008).

Majority of the elderly (23.6%) who reported to consume meat, fish or poultry everyday had minimal dependency in carrying out activities of daily living, compared to 7.1% who had severe dependency. Beasley *et al*., 2010 in a cross sectional study assessed the effect of protein source (animal protein) or protein quality (essential amino acids) on frailty and dependency level and found that high intake of protein was associated with a lower risk of frailty, and that these associations were independent of animal protein and essential amino acid intake. There were no elderly people consuming two or more servings of legumes or eggs per week who had severe dependency in carrying out activities of daily living, while 6.7% required minimal assistance in carrying out ADLs. A study that examined the association of protein intake and frailty reported that low intake of total protein was significantly associated with frailty (Bartali *et al.*, 2006) This contrasted with the findings of another study in which Bollwein *et al*., 2013 showed that the amount of protein intake was not associated with frailty, but the distribution of protein intake during the day (in the morning, at noon and in the evening) was significantly associated with frailty.

Generally, the elderly have decreased ability to regulate food intake. Only 6.9% of the elderly living in Non-institutions. Of these 7.5% were male and 6.1% were female. The inability to

regulate food intake makes it difficult to compensate for insufficient food intake, resulting to weight loss. If not checked or realized in good time, the elderly face the risk of their nutritional status deteriorating (Das *et al*., 2001). Majority of the elderly who were underweight (89.5%) and residing in Non-institutions were self-fed without any problem. Seventy three percent of those of normal BMI were self-fed without any problem. Majority of those who were unable to feed without assistance were overweight. There was no significant relationship between the mode of feeding and BMI for the elderly living in Non-institutions.

About 17% of the institutionalized elderly were found to be underweight and reported that they can feed themselves without any problems. However, 1.2% of the elderly living in institutions were underweight and had difficulties in feeding themselves. There was no significant difference between the mode of feeding and the BMI of the elderly living in Institutions. Although the menus in the institutions of the elderly provide adequate energy and other nutrients requirements, food wastage results in energy and protein intakes less than 80% of the recommended intake levels. The elderly living in institutions of the elderly who were underweight and had difficulties in feeding themselves accounted for 60.2%. These may be the elderly who did not receive enough assistance during mealtimes and about one-third of these elderly leave more than two-thirds of their meals un consumed (Xia and McCutcheon, 2006).

Majority of the elderly were able to independently feed themselves. The largest majority of these were aged between 60 and 65 years. The significant relationship between age and mode of feeding could be attributed to the degenerative effects of aging, where the more elderly one got, the more dependent they are likely to become. These could further be explained by the variations that occurred between age and mode of feeding.

Majority of the elderly (41.1%) did not think they had any nutritional problem, with the majority being the non-institutionalised elderly. The significant relationship between place of residence and self-view of nutritional status by the elderly could be attributed to the association of institutions of the elderly with poor nutritional status.

More women (37.6%) than men (29.7%) felt that their health status was not as good compared to other elderly people. Over 34.1% of the elderly living in non-institutions felt that their health status was not as good compared to 33.7% of the elderly living in institutions. Twelve percent of the women did not know their health status compared to 17.1% of the men. Over 15% of those who did not know their health status were living in non-institutions, compared to 12.5% of those living in institutions of the elderly. The results showed that there was no significant relationship between self-view of health status and gender and also between self-view of health status and place of residence. In a similar study conducted by Yvonne in 2009, more than half of the participants, (54% n=314) perceived themselves as healthy, 50% (n=139) among women and 57.8% (n=175) among men. Both similarities and differences were found in women's and men's self perceived health. Irrespective of how they perceived their health, no cognitive impairment was found among women or men (Yvonne, 2009)

Self-perception of health status and the BMI was correlated and the highest population of elderly in institutions (47.4%) who were found to be at risk of becoming over weight reported to view their health status as being better than that of their colleagues in the Institutions. About 15.8% of those at risk of being overweight felt that they were not as good. There were no elderly overweight elderly in the Institution who thought that they had better health status than\heir

colleagues. Yvonne in the year 2009 studied the Swedish elderly population and realized that Women with self-perceived good health had a lower BMI mean 25.4 kg/m²(SD 3.5) compared with less healthy women, 27.5 kg/m² (SD 4.5) ($p<0.001$). Men in the healthy group also had a lower BMI, mean 25.7 kg/m² (SD 3.0) compared with less healthy men 26.1 kg/m² (SD 3.0) ($p=0.2$). Women with self-perceived good health had a lower BMI mean 25.4 kg/m² (SD 3.5) compared with less healthy women, 27.5 kg/m² (SD 4.5) ($p<0.001$). Men in the healthy group also had a lower BMI, mean 25.7 kg/m² (SD 3.0). Yvonne (2009), further found that at baseline, the women who perceived themselves as being healthy had fewer symptoms of illness (73%) compared to 23% who were in the group that felt less healthy ($p = 0.001$). Thirty one percent of the healthy women had more than 3 prescribed medicines compared with 60% of the women who considered themselves as less healthy ($p = 0.001$).

Majority of the elderly had no decline in food intake in the last three months due to loss of appetite. The majority of these (63.5%) were men compared to 47.4% of the women. This decrease in food intake could be due to changes in taste thresholds and decreasing of olfaction, leading to decreased food intake in the elderly (Rolls, 1999). Only 8.7% of the men had severe loss of appetite in the last three months compared to 10.9% of the women. There was no elderly living in institutions who had severe loss of appetite compared to 19.5% of those living in Non-institutions. The majority of the elderly living in institutions of the elderly had no loss of appetite (63.1%) compared to 47.4% of those living in Non-institutions. There was a significant relationship between loss of appetite and gender of the elderly and between food Intake decline due to appetite loss and residence of the elderly.

Weight loss among the elderly is the gold standard measure of a nutritional problem in the aging population. A weight loss of 5% in any period up to a year is a clear indication of a problem, which could be poor nutrient intake or absorption, age –related loss of muscle mass (Sarcopenia), severe Osteoporosis, loss of fat and muscle mass (Cachexia) and dehydration (John, 2009). More males (39.2%) reported to have had no weight loss in the last three months compared to 33.9% of the women. However, it was more males (12.8%) who reported greater weight loss (greater than 3 kg) compared to 7.9% of women. There was no significant relationship between weight loss in the last three months and the gender of the elderly.

Weight loss and malnutrition are adverse health indicators (Sahyoun *et al*, 2004). About 5% of the elderly living in institutions reported to have lost more than 3 kilograms in the last three months compared to 14.8% of the elderly living in Non-institutions. This compares with a similar study which indicated that weight loss was a frequent complication among 40% of patients with dementia in the early stages and also before diagnosis. Weight loss and malnutrition also impairs immune responses, exposing the elderly people indirectly to infections and bed sores (Magri *et al*, 2003). Further risk factors associated with underweight and weight loss include cognitive and functional decline, Dementia, Parkinson's disease, eating dependencies and constipation (Mamhidir *et al*., 2003). The majority of the elderly living in Institutions (42.7%) did not know if they had lost weight in the last three months. There was a significant relationship between weight loss in the last three months and the type of residence for the elderly.

It may take longer to reverse weight loss and achieve weight gain among the elderly than it would among younger people. This is because ageing may change the metabolic response to any

kind of nutritional treatment that may be given. Another challenge is as a result of the multifactorial causes of malnutrition which makes individual elderly not respond in the same way to nutritional treatment (Hickson, 2006). There is however evidence that endurance exercise increases food intake among the elderly and this can be administered alongside dietician interventions to promote significant weight gain (Keller *et al*., 2003).

Over 50% of all the elderly women reported mild dementia and 4.8% had severe depression or dementia. This is because mental disorders such as Dementia and depression have a 30% prevalence among the elderly and they are also seen to increase with ageing (Skoog, 2004). Severe Depression and Dementia was highest in the Institutions of the elderly (5.4%), compared to Non-institutions (1.6%). The Institutions of the elderly were housing the highest number of elderly people with no psychological problems (64.3%). There was a significant relationship between Neuropsychological problems and the type of residence. Depression is characterized by a disturbance of several higher cortical functions namely comprehension, Calculation, learning capacity, language, judgment, memory, thinking and orientation (WHO, 2013). These impairments lead to reduced or no ability to understand or initiate feeding (Cole, 2012). In some cases the elderly are not able to express themselves and for that reason, it becomes very challenging to ensure that the elderly suffering from dementia receive adequate nutritional care (Best, Evans 2013).

There was a significant relationship between gender and Neuropsychological stress, with women reporting higher cases. Neuropsychological stress or Dementia seem to have a link between the risk for malnutrition and feeling less healthy. Having no symptoms of Neuropsychological stress or Dementia on the other hand is important for maintaining a good nutritional status and good

self-perceived health (Alpass & Neville, 2003; Damián *et al.*, 2008).Symptoms of Dementia among men are seen as strong predictors for developing malnutrition in combination with feeling less healthy. Among women however, Dementia or Neuropsychological stress are factors for health and good nutritional status in general (German *et al.*, 2008)

5.4. The Functionality of the Institutionalized and the non-institutionalized elderly in Nairobi County, Kenya

Aging is a progressive process that results to loss of adaptability to the environment and is considered a dynamic and progressive process. The decline in bodily functions tends to increase with time and varies from one system or organ to another and also among people of the same age. The physiological and pathological changes experienced by the elderly culminate in growing dependence of the elderly, translating into a need for help in performing ADLs.

Aging was seen by the elderly as both favorable and unfavorable, based on their experiences and their different way of looking at this period of their lives. Aging was favorable to those who were aging actively and able to perform ADLs and other domestic activities such as taking care of their grand children and leisure. The negative aspect of aging was expressed by the elderly who faced challenges everyday and in relation to the groups that they associate with. This group had lost their ability to carry out ADLs, making them experience difficulties in accepting aging as a biological process.

The findings of this research indicate that there is a difference in the level of functionality between the institutionalized and non-institutionalized elderly therefore rejecting the proposed

null hypothesis that there is no difference between the functionality of institutionalized and Non-institutionalized elderly in Nairobi County in Kenya.

Aging women experience lower rates of mortality and some chronic diseases compared to men. They also use health care services more often than men and consistently report more functional limitations and physical disability than their male counterparts (Crimmins *et al*., 2002). This findings support the fact that more women (7.5%) had Severe Dependency in carrying out ADLs compared to 4.1% of the men. In contrast however, more women (33.0%) had minimal dependency compared to 29.6% of the men. It is hypothesized that this difference between the genders may be because there is greater prevalence and severity of arthritis and musculoskeletal disease among older women. These differences may also be because of psychosocial factors which make women more likely to report or over report on their ill health and disabilities in carrying out ADLs, while the men may underreport their infirmities. Studies that describe gender differences in levels of activity and chronic health conditions among others are however limited (Leville *et al*., 2000).

A total 22 (8.2%) elderly people were totally dependent on their care-givers in carrying out ADLs. The highest majority (13.6%) of the totally dependent was living in institutions and 3.0% were living in non-institutions. More elderly living in institutions (5.3%) were severely dependent on their care-givers compared to only 1.5% of the elderly in Non-institutions. The majority of those who required minimal dependency (28.1%) were in Non-institutions. There was a significant relationship between the dependency level and place of residence. These results contrast with those of Gobnait *et al*., 2007, who found out that 24% of older people living in Non-institutions received support, with 32.8% of them exhibiting severe dependency in comparison with only 9.4% of the elderly requiring little involvement of the care-givers.

Activities of Daily Living provide a basic framework to evaluate an older persons' ability to live independently. Each ADL is closely related to another and therefore when a person is not able to perform one activity, it impacts on the others (Holland *et al*., 2003). A majority of the elderly (65.9%) were found to be fully independent, whereas 21.3% were unable to perform Activities of Daily Living (ADLs) without assistance.

There were no differences among the two genders in toileting, bathing self, Personal Hygiene, Feeding, Dressing, Bowel Control, Bladder Control, Ambulation and Chair –bed transfers, with the exception of stair climbing where more women than men reported to have the ability to climb stairs. In a similar study conducted by Kirsten *et al*., 2004 found that mean scores in carrying out ADLs were most significant 1.7 to 3 times greater among women ($p < 0.001$). The differences in mobility functions were less but still greater among women by 1.5 times. Women and men who reported limitations in carrying out ADLS were not statistically different in any of the 8 categories.

Physical disability in the elderly begins by deficit in mobility before proceeding in the ADLs (Barberger, 2000). The elderly without disability in mobility and who are able to carry out ADLs are relatively healthy and independent. Of the elderly females (10.4%) were bed or chair bound compared to 9.7% of the men. A majority of 66.1% of the elderly men and 54.5% of the females could go out. There was no significant relationship between mobility and gender ($\chi 2 = 4.048$, df = 2, $p = 0.132$).

The largest population of elderly who were either chair or bed bound (19.5%) were found to be living in the institutions of the elderly with only 0.8% living in Non-institution. This group of elderly men and women may have been institutionalized in order to benefit from more

specialized care of the professionals working in the institutions of the elderly. About 62.3% of the elderly who could go out were living in Non-institutions compared to 57.8% of the elderly who were living in institutions. There was a significant relationship between the type of residence and mobility of the elderly ($\chi 2 = 27.144$, df = 2, p = 0.000).

Over 46% of the elderly lived alone, compared to 20.7%. The majority of Females (79.3%) reported to be living with care-givers. There was a significant relationship between the gender of the elderly and their ability to live on their own. ($\chi 2 = 16.7$, df = 1, p=0.000). In 1997, Steinburg in a similar study found out that the perception of safety and security, availability of transport, poor image, poor self esteem, lack of confidence, stereotypes of women's inability to make informed choices and the society's devaluing of the elderly results to barriers in self-help by the women and therefore correlated to dependence of the women. In another study by Kirsten *et al*., 2004, overall functional limitations of men and women were compared and women were more likely to report functional limitations at 52% and had a greater degree of disability mean of 0.30 against 0.18 among men ($p < 0.001$). Women also reported limitations in more of the 8 functional categories than did men (1.8 vs 1.1, $p < 001$).

People are now living longer and may lose the functional capacities required to care for themselves in Non-institutions. Some elderly people may not have family members to care for them. This makes them require to be cared for in long term care institutions like nursing homes, community care and assisted living institutions (WHO, 2011). Majority of the elderly (66.3%) who were not able to live independently were living in the institutions of the elderly, compared to 6.3% who were living in Non-institutions. The majority of those living in Non-institutions (93.7%) were able to live independently. There was a significant relationship between the ability

to live independently and the type of residence for the elderly ($\chi 2$ = 92.773, df = 1, p=0.000). The population of the elderly that will need Institutional care due to inability to live independently will increase over the years. As a result, proper and adequate nutrition is an effective health-promoting lifestyle method in long term institutional care (Suominen 2007). A similar study carried out in Sweden showed that one third of residents in Municipal resident homes suffer from malnutrition, and this is therefore a problem not only for the individual, but also for the family, the community and the health care system (Suominen *et al*., 2005).

> "The elderly in institutions participate in chores such as preparing grains, cutting vegetables, washing clothes, cleaning the house, assisting in feeding and feeding cows". – a social welfare officer in an institution of the elderly

Pressure sores among the elderly result from an interplay of both extrinsic and intrinsic risk factors, among them immobility, advanced age and incontinence (EPUAP, 2003). Over 24% of the elderly male had pressure sores compared to 17.4% of the Females. There was however no significant relationship between gender and pressure sores ($\chi 2$ =2.212, df = 1, p=0.137). These results contrast the findings of a similar study in Sao Paulo, where more women (95.7%) were found to have pressure sores than men (4.3%) on the first visit during the survey and 76.5% of the women and 23.5% of the men during the second visit were found to have pressure sores (Julieta *et al*., 2009).

Underweight elderly (3.5%) had pressure sores or skin ulcers compared to 3.0% among the underweight. Majority of the elderly who had no pressure sores (36.8%) are the elderly who had a normal BMI. There was no significant relationship between the BMI of the elderly and the

presence of pressure Sores or Skin Ulcers. These results differ from the findings of the European Pressure Ulcer Advisory Panel, 2003 who reported that while there is an assumption that the consequences of immobility are often viewed as the key predisposing factors that lead to pressure Sores or Ulcers, and that there is a direct relationship between nutrition and pressure Ulcer development, there is no scientific basis for these assumption since there are not yet surveys that can link poor nutritional status and the development of pressure sores (EPUAP, 2003).

Aging is a risk factor for the development of pressure sores. There was no significant relationship between the presence of pressure sores and place of residence ($\chi 2 = 0.156$, df = 1, p= 0.403). Twenty two percent of the elderly living in Institutions had pressure Sores or Skin ulcers compared to 20.0% of those living in Non-institution. The majority of the elderly had no Pressure Sores or Skin Ulcers (79.0%), with those in Non-institution leading in this group (80.0%). The length of stay in institutions may be a cause of the pressure sore development and may also extend the time of stay in the Institutions of the elderly. A similar study revealed that the incidence of pressure sores was 7.7% among the elderly who had remained immobile for more than three weeks and among patients older than 70 years of age. The same study showed that pressure sores or skin ulcers were fourth in position among the leading causes of death among patients receiving home care (Julieta *et al*., 2009).

Muszalik *et al*., in 2010 demonstrated that the functionality of the elderly and ability to fulfil their biopsychosocial needs independently deteriorates with age. This limitation, coupled with multisystem diseases impair performance of the basic activities required for daily living. There

was a significant relationship between dependency level and presence or absence of pressure sores with 85.9% of the elderly living in institutions without Pressure Sores and Skin Ulcers requiring minimal assistance in carrying out ADL. For the elderly living in Non-institution, there was a minimal dependency on the majority of the elderly (77.5%) and no pressure sores or Skin Ulcers. There was no significant difference between dependency level and the presence of pressure Sores or Skin Ulcers. A similar study by Marta *et al*., 2013, demonstrated that these low level of independence among the elderly, especially as relates to movement limitations and impaired fulfillment ofADLs leads to increased risk of developing pressure sores and or skin ulcers. According to Plaszewska –Zywko, the intellectual ability of the elderly people deteriorates with age, which is related to decreased independence in daily activities (Pancorbo *et al*., 2006).

5.5. The impact of Functionality on the Nutritional Status of Institutionalized and Non-institutionalized elderly living in Nairobi County, Kenya

Physiological changes in the elderly, the type and quality of their diet as well as physical activity in the elderly are influenced by many factors among them psychological, demographic, socio-economic and cultural factors which are more pronounced in the developing countries (Solomons, 2002).

The functionality of the elderly was found to impact on the nutritional status of the elderly and therefore the proposed null hypothesis that functionality of the elderly does not impact on the nutritional status of the elderly was rejected.

The risk of suffering from malnutrition increases with age and with it, the weakening in carrying out ADLs. On the other hand, immobility is a major risk factor for the development of malnutrition (Schmid *et al*, 2003). Majority of all the respondents (both from non-institution and institutions of the elderly) required minimal assistance in carrying out activities of daily living (64.5%) and were found to have a MUAC of 22 or greater. Only 0.4 % of those who had a MUAC of 21 to 22 cm were highly dependent on their care-givers in carrying out activities of Daily Living. The results showed that there was a significant association between functionality and being malnourished using the MUAC ($\chi 2=43.7$, df = 2, p=0.000) with those with severe dependency being more likely to be malnourished. The elderly people who are dependent on others in carrying out ADLs and in mobility are especially at high risk of malnutrition (Gerber *et al*., 2003).

Over 80% of all the elderly living in institutions had minimal dependency in carrying out activities of daily living (ADLs) and a MUAC of 22 or greater. It is only 23.8 % of the elderly who had a MUAC measure of less than 21cm who were severely dependent on their care-givers or independent colleagues in the institution. Good Functional Independence measure (FIM) in non-institution was found to be significantly associated to good nutritional status ($\chi 2=43.4$, df = 2, p=0.000). According to Schmid *et al*., 2003, the risk for malnutrition increases with age and with a weakening of functional capabilities. The elderly people who are dependent on care-givers help and who have impaired ADL skills and mobility are especially at high risk of malnutrition (Gerber *et al*., 2003).

Sarcopenia is a geriatric syndrome which affects the functional status and mobility of individuals. It is characterized by progressive generalized loss of skeletal mass, strength and

muscle function (Visser *et al*., 2011). A majority of 83% of the elderly living in non-institutions had minimal dependency in carrying out ADLs and a MUAC of 22 or greater. Only 6.7% of the elderly who had minimal dependency in carrying out ADLs had a MUAC of less than 21 cm. This can be attributed to loss of muscle mass which is associated with weakness, loss of independence, disability, higher risk of falls and decrease in quality of life (Landi *et al*., 2012). Good Functional Independence measure (FIM) at institution was found to be significantly associated to positive nutritional status ($\chi 2=9.4$, df = 2, p=0.053)

Over 35% of those who had a normal BMI had minimal dependency in carrying out activities of daily living, compared to 2.2% who were of nomal BMI, but had severe dependency. About 1% of the elderly who had severe dependeny were overweight. Five point two percent of the elderly who had moderate dependency were at risk of becoming overweight. There was no significant difference between BMI and dependency level of the elderly ($\chi 2=7.44$, df = 3, p=0.281). According to Crocan and Pasvogel, 2003, malnutrition, low body mass index and unintentional weight loss have negative impacts on the functional status and psychosocial well-being of the elderly. There is however an increased risk of functional limitations among elderly women with very high BMI (> 35kg/m_2). This is because obesity acts synergistically with Sarcopenia causing disability in the elderly people, partly because of the low muscle quality (Villareal *et al*, 2004). There are proposals that Sarcopenic obesity be considered a significant health problem among the elderly (Villareal *et al*, 2004).

Only 0.4% of the elderly living in institutions of the elderly were underweight and with severe dependency. Only 2.2% of all the elderly who reported severe dependency in carrying out ADLs were of normal BMI. There was no significant relationship between the BMI and dependency level among the elderly living in institutions ($\chi 2=11.791$, df = 3, p=0.067). A study by Saeidlou

et al in 2011 contrasts these findings, since it was found that there was lower occurrence of malnutrition among non-institutionalized elderly. Malnutrition among the elderly is often associated with functional impairement, disability and impaired health. The progressive decline in the ability to perceive and recognize food taste may lead to decreased food intake (Brownie, 2006). Although ageing does not lead directly to malnutrition, physiological changes associated with ageing can increase the risk of malnutrition (Merell *et al.,* 2012).

Calf circumference is considered to provide the most senstitive measure of muscle mass in the elderly, and is superior to arm circumference. It indicates the changes in fat –free mass that occur with ageing and with decreased activity. Direct measurements of body composition are not possible in a large number of the elderly. It is therefore important to have good anthropometric reference data such as CC, which is fundamental in assessing the nutritional status and functionality of the elderly (Bonnefoy *et al*., 2002). Eighty percent of the elderly people living in Non-institutions had Severe Dependency in performing ADLs but had a CC of 31 or more centimeters. Sixty five point one percent of the elderly however had a CC of 31 or more and had minimal dependence on their care-givers in non-institutions. There was a significant relationship between the CC in cm and the Level of Dependency among the elderly living in non-institutions ($\chi 2=3.93$, df = 2, p=0.014). The majority of the elderly who had a Calf Circumference of 31 or greater (77.3%) had minimal dependence on their care-givers in the Institutions of the elderly, compared to 22.7% of the elderly who had a Calf Circumference of 31 cm or less. There was no significant difference between Calf Circumference and the Level of Dependency ($\chi 2=2.19$, df = 2, p=0.334). Calf circumference is a pertinent marker of nutritional state (Bonnefoy *et al*., 2002). In a study carried out in 2002, Bonnefoy *et al*., found that there was a significant correlation between CC and other nutritional anthropometric markers ($r = 0.706$, $p<0.0001$) with

body mass index (BMI) and r = 0.661, p<0.0001 with fat free mass. Multiple regression confirmed associations between CC and BMI (p<0.0001) for both men and women.

The majority of the elderly in Institutions (85.9%) had no pressure sores or skin ulcers and reported minimal assistance in carrying out activities of Daily Living compared to 44% of those who had pressure sores and reported severe dependency on their care-givers in carrying out ADLs. There was a significant relationship between FIM and the presence or absence of pressure sores and skin ulcers ($\chi 2$=9.97, df= 2, p=0.007). Pressure ulcers can decrease the quality of life, thereby increasing the need for intensive nursing and medical care, besides a rise in morbidity and mortality rates (De Laat, 2005). Various studies have identified a number of factors as risk factors for the development of pressure ulcers. Some of the elderly related factors are limited mobility and activity levels (Lindgren, 2004), medical conditions such as diabetes mellitus (Haleem, 2008) alzheimer disease (Zulkowski, 1998), cardiovascular problems (Capon, 2007), orthopedic problems (Haleem, 2008), medications such as sedatives, analgesics and anesthetics (Grey, 2006), malnutrition (Vangilder, 2009), skin moisture (Grey, 2006) and urinary fecal incontinence (Achterberg, 2008)

A majority of the elderly men and women living in non-institutions had minimal dependency (77.5%) and had no Pressure Sores or Skin Ulcers. Sixteen point seven percent of the elderly who had severe dependency on their care-givers in carrying out ADLs had either Pressure Sores or Skin Ulcers. There was no significant difference between Dependency level among the elderly and the presence of Pressure Sores or Skin Ulcers ($\chi 2$=1.000, df = 2, p=0.605). Nursing related interventions such as the application of repositioning and the performance of nutritional care are

also linked to the development of pressure ulcers (Posthaver, 2006) Structural factors in non-institutions and in institutions such as staffing, staff training and the presence and use of pressure ulcer guidelines (Alexander, 2008) play a role in the development of pressure ulcers.

Among the elderly women, 53.2% reported to have mild dementia whereas 4.8% had severe or mild dementia compared to only 1.7% of the men who had Severe Depression or Dementia. There was a significant relationship between both genders ($\chi 2$ =9.884, df = 2, p=.007) with females reporting more neuropsychological stress than their male counterparts. Elderly women and men aged 80 ± 7 years who have dementia have a BMI of less than 23and this is associated with an increased risk of 7 year mortality (Faxen-Irving *et al.*, 2005).

Dementia and depression are mental disorders found in approximately 30% of elderly people. They are seen to increase with age (Skoog, 2004). Severe Depression or Dementia was highest in the institutions of the elderly (5.4%), compared to non-institution (1.6%). However, it is the institutions of the elderly that were housing the highest number of elderly people with no psychological problems. Over 58% of the elderly in non-institution had Mild Dementia. There was a significant relationship between Neuropsychological problems and the type of residence ($\chi 2$ = 19.546, df = 2, p<0.001). Cognitive reserve decline may result in a reduced capability in functions such as orientation, memory, abstract thought and perception (Cullum *et al*., 2000). This is because dementia involves reduction in brain capacity, resulting to limitations in understanding and interpretation of the sorroundings (Whalley *et al*., 2004).

5.6. Institutional and Non-institutional Characteristics of care-givers that impact on Nutritional Status and Functionality of the elderly

Chronic diseases and disabilities among the elderly are common and bring about instability, confusion, osteoporosis, cancer, arthritis, incontinence; visual impairments, immobility and stroke may also lead to malnutrition (Brownie, 2006). The elderly need care-givers to support them in feeding and carrying out ADLs. Majority of the care-givers in non-institutions were female (61.9%), compared to males at 38.1%. Over 81% of them were married with 5.7% having been married before and 6.7% either widowed or widowers. The majority of the care-givers (73.3%) had secondary school level of education and only 3.8% of them had attained tertiary level of education. The majority of the care-givers reported that the elderly under their care were being treated for Blood pressure (40.9%), 31.6% for diabetes, 10.5% for cancer and 9.8% were being treated for ulcers and 7.2% were being treated for other ailments namely asthma, fractures, pneumonia and urinary tract infections. The least period of time taken in caring for the elderly was 1 year, an average of 7.6 years, with some care-givers reporting to have taken care of the elderly for the last 30 years.

Several reasons were given as reasons why the care-givers opted to stay with the elderly. The majority of the care-givers pointed out loss of independence (32.4%) as the main reason why they chose to live with and take care of the elderly. Only 9.5% of the care-givers decided to take care of the elderly in order to manage chronic illnesses. The presence or absence of family support has been found through research as a prime factor in determining whether or not an older person should continue to live independently (Richmond *et al*., 1995; Tilson and Fahey, 1990; Kendig and Brooke, 1997). Different cultures however regard institutional care differently. The

key factor influencing family care of the elderly is having a spouse in marriage and a daughter. Abbott and Koopman – Boyden (1994) found that over one-third of the total adult population is providing regular informal care to older people with people who are retired, unemployed and home makers providing the largest amounts of care.

The care-givers reported that 37.1% of the elderly were assisting in non-institutions on their own volution in cooking, 67.3%, 32.1% in cleaning and 14.2% in shopping. Majority of the elderly in Nairobi (53.3%) like to spend their free time relaxing, sleeping or resting. Twenty seven point six like to listen to the radio and only 1.9% reported to take walks during their free time. A majority of the elderly in non-institution were able to feed themselves (89.5%), Toileting (85.7%) and observing personal hygiene (73.3%). Only 50.5% were able to climb stairs.

A majority of 55.9% of the elderly living in non-institutions felt that the meals served in the non-institutions were adequate compared to 44.1% who felt that the meals were not adequate. The meal inadequacy was due to lack of variety in the food served (52%), lack of fixed meals time (36%), lack of variation in cooking methods (8%) and lack of variation in the food texture (4%). Changes in the menu in institutions of the elderly and the availability of a dietician for consultation on meal preparation has been found to promote weight gain among the elderly (Keller *et al*., 2003). The meal service should also be non-institution like as this has also been found to increase food intake among the institutionalized elderly as well as the number of people present during meal times and the art of eating with others which has also been found to increase energy intake up to 76% compared to eating alone (Nijs *et al*., 2006).

The elderly should participate in making decisions on their diet. This is in order to increase their desire to eat and also to enjoy the food (Pederson, 2005). Different suggestions were given on how to improve on the quality and adequacy of the food served to the elderly in non-institutions. The majority (48.6%) felt that there was need to create a variety of meals and only 2.9% felt that there was need to vary the cooking methods and vary the food texture. The participation of the elderly in making diet-related decisions decreases their risk of losing weight and of suffering from malnutrition (ADA report, 2005).

According to Nijs *et al*., 2006 b, many factors contribute to favorable food consumption by the elderly. These factors are ambient sounds in the dining area, food accessibility to all the elderly irrespective of their levels of functionality, the eating locations in the Institutions of the elderly, ambient temperatures, good lighting, color, the smell, texture, portion size and presentation of the food (Stroebele, 2004).

A majority of the care-givers of the elderly in non-institutions (65.5%) were comfortable in caring for the elderly in non-institutions compared to 34.5% who wished to commit their elderly loved ones to institutions of the elderly. A similar study carried out by Hennessy in 1996 found that the more institutional care an individual received, whether short-term or long term, the greater the likelihood of their entry into residential care. He noted that the entry into residential care occurs as a result of a long decline rather than as a result of sudden loss of faculty with injury or illness, followed by a spell in hospital receiving acute care. This brings up the need to focus on post –acute care and rehabilitation. According to the institutional care managers, the elderly would rather remain in non-institutions if they can eat, bathe and dress themselves.

Majority of the elderly feel that their family members and friends are busy and haven't even got time to do their own things, and cannot therefore be expected to help.

Although the nutritional care in the institutions of the elderly is aimed at maintaining the health of the elderly and improving on their general quality of life, unpleasant food may lead to poor food and fluid intake and this can result to weight loss and malnutrition among other undesirable health effects. Sometimes, it is lack of assistance in feeding that results to reduced food intake. Majority of the elderly in institutions reported that the food served was restrictive in salt and sugar, which created their own challenges. The flavor, food variety and food texture are important factors in determining the amount of food and fluid intake among the elderly (Cook *et al*., 2005).

In another study in New Zealand by Richmond *et al*., 1997, two thirds of the care-givers of the elderly in non-institutionalized were of the opinion that their relative would be better off in institutional care. The stress levels of non-institutional carers remained higher than those of the care-givers in the institutions, and the morale to continue serving the elderly was lower. Breakdown of care for the elderly can however occur due to the poor mental health of the elderly or that of their care-giver(s). Care-givers stress is an issue that is becoming increasingly of concern and can result to the abuse and neglect of the elderly (Keys and Brown, 1993).

Physical activity promotes physical fitness and also improves mental health and cognitive function, thereby reducing symptoms of anxiety and depression and enhances feelings of well-being among the elderly. Improved functionality also improves social interactions, increased sense of self-efficacy and sense of life meaning and purpose. About 42% of the elderly reported

that they were able to move freely, compared to 41% who could not move freely without assistance. Their ability to move was mainly hindered by back pains for 39% of the respondents compared to 2.9% who had no walking stick or crutches and another 2.9% who feared that they would fall. No one attributed their inability to walk to the absence of someone to support them.

Care-givers in non-institutions and in the institutions of the elderly may either be paid or unpaid and often need help in order to learn how to be competent or in-service trainings when need arises. Suggestions were sought from the care-givers of the elderly on how to promote their level of Physical activity in the non-institution. A majority of 31.8% suggested that rails should be made in the non-institution to allow the elderly free movement in the non-institution without requiring support. Nine point one percent of the care-givers were of the opinion that a duty rooster should be made inorder to make the elderly participate freely in activities of daily living.

Spearmans correlation was done to determine the relationship between the nutritional status of the elderly and their care-givers. Functionality was found to correlate positively with the number of years spent with the care-givers ($r = + 0.242$, $p = 0.018$) and the Mid Upper Arm circumference of the elderly ($r = + 0.555$, $p = 0.000$). The CC of the elderly was found to correlate negatively with the number of years spent in giving care to the elderly ($r = - 0.231$, $p = 0.024$).

5.7. Institutional and Non-institution Characteristics that relate with nutritional status and functionality of the elderly in Nairobi County in Kenya

5.7.1. Immediate factors

The mean decline of food intake in the institutions (1.63 ± 0.484) was higher than in the non-institutions (1.28 ± 0.772), t = 4.424, df = 268, p = < 0.001. Decline in food intake can be attributed to several factors namely loneliness, poverty, social isolation and depression. This is a main concern among the elderly as it results to poor nutritional status and functionality of the elderly. Age-related reduction in energy intake is a physiologic effect of healthy aging that becomes more frequent with aging. Chronic diseases that commonly affect the elderly are as a result of poor nutritional status. On the hand, protein-energy malnutrition is associated with impaired muscle function, decreased bone mass, immune dysfunction, anemia, reduced cognitive function; poor wound healing, delayed recovery from surgery and increased morbidity and mortality (Donini *et al*., 2003).

Severe Depression or Dementia was highest in the institutions of the elderly (5.4%) compared to non-institutions (1.6%). There was a significant relationship between Neuropsychological problems in institutions and the type of residence, with the mean prevalence of Neuropsychological problems in institutions being higher (1.59 ± 0.594) than in the non-institutions (1.39 ± 0.520). Depression or Dementia in the elderly can often lead to malnutrition or dehydration and thus induce other kinds of physical illnesses. On the other hand, malnutrition among other physical conditions can induce depression or Dementia among the elderly due to their psychological vulnerability. Depression leads to psychological issues and malnutrition due to the loss or breakage of social networks (Ahmadi *et al*., 2013). Several studies indicate that

Depression or Dementia is a major factor contributing to weight loss among the elderly. However, the causal relationship between depression and nutritional status is still unclear (Singh *et al*., 2014).

A majority of 72.2% of the elderly living in non-institutions were on more than 3 prescription drugs compared to the elderly living in insitutitions (60.9%). There was no significant relationship between consumption of prescription drugs and residence of the elderly. Polypharmacy among the elderly is associated with decline of functionality. In a study done among non-insitutionalised elderly, increased prescription drugs were associated with diminished ability to perform ADLs and decreased physical functioning (Crenstil, 2010). In a similar study conducted using data from the Womens Health and Aging study, it was found that the use of 5 or more prescription drugs was associated with a reduced ability to perform ADLs. Polypharmacy was also associated with incident disability in older women (Rosso *et al*., 2013).

About 88% of the institutionalized elderly reported that they consume 3 or more meals per day compared to 54.8% of the elderly living in non-institutions. There was a significant association between taking full meals and the residence of the elderly. The metabolic consequences of the consumption of a diet depend in part on the frequency and distribution of meals. Similar studies have found that there is a positive, significant relationship between the number of meals taken per day and the intake of fiber, thiamine and magenesium. Women subjects who took 2-3 meals per day showed greater body mass indices and a greater proportion were overweight/obese compared to those who took 4-5 meals per day. Subjects who took 4-5 meals per day showed higher levels of HDL-cholsetrol and lower levels of LDL-cholestrol/HDL-cholestrol and cholesterol/HDL-cholestrol than did those who took fewer meals per day. Consumption of 4-5

meals per day would seem more advisable for the elderly than taking fewer meals (Ortega, 1998).

The elderly in institutions (56.1%) reported the highest consumption of animal proteins namely meat, fish or poultry. There was a significant relationship between residence of the elderly and intake of proteins and a significant variance in protein consumption between the institutionalized and the non-insitutionalized elderly. Good nutrition, especially adequate protein intake, helps limit and treat age-related declines in muscle mass, strength and functional abilities. Nutrition in combination with exercise is considered optimal for maintaining muscle function (Boirie, 2009). A prospective nested case-control study of healthy community-dwelling adults older than 70 years was done and odds ratio of harmful weight loss in participants with low protein intakes (<0.8 g/kg BW/day) was 2.56 compared with participants with very high protein intakes (_1.2 g/kg/day) or 2.15 in participants with moderate protein intakes (0.8e1.0 g/kg BW/day) (Gray-Donald *et al*., 2014).

There was a significant association between taking fluids and residence of the elderly ($\chi^2 = 43.7$, df = 2, $p<0.001$). More elderly (48.1%) living in non-institutions consumed more than 5 cups of fluid, compared to 13.2% of those in the institutions. This could be because of the existence of feeding programs which comprise of fluids such as milk, tea, juice, porridge etc and the availability of care-givers who will almost always be available to assist the elderly in taking fluids as well as other meals.. Physiological and renal impairment and changes in thirst perception make the elderly prone to problems with fluid and electrolyte balance. Fluid intake can also be affected by physical disability and cognitive impairment. A Similar study by Singh in 2002 found that compared to younger people, older people do not consume adequate amounts of fluids to maintain ideal plasma electrolyte concentrations.

Pressure sores were found to play a role in determining the nutritional status and functionality of the elderly. In the research findings, there was no relationship between the presence of pressure sores or skin ulcers and the place of residence of the elderly. However the majority of the elderly who had no pressure sores (36.8%) are elderly who had a normal BMI. Compromised nutritional status among the elderly such as unintentional weight loss, undernutrition, protein energy malnutrition (PEM) and dehydration deficits are known risk factors for pressure ulcer development (CMMS, 2008). Other nutrition related risk factors associated with increased risk of pressure ulcers include low BMI, reduced food intake and impaired ability to eat independently (CMMS, 2008). Pressure ulcers can reduce the overall quality of life of the elderly due to pain, treatments and increased length of stay in hospitals (Russo *et al*., 2008).

Moblitiy of the elderly was a determinant of the nutritional status and functionality of the elderly. The majority of the elderly who were either chair or bed bound (19.5%) were found to be living in the institutions of the elderly with only 0.8% living in non-institutions. The mean mobility of the elderly in institutions was higher (1.48 ± 0.501) than that of the non-institutionalized elderly (1.38 ± 0.488). This is because the elderly in the institutions had better nutrition and good nutrition is important in maintaining muscle mass strength which, in turn maintains mobility. Mobility and physical activity assists with stimulating appetite and therefore assists with maintaining good nutrition (Yuri *et al*., 2010)

A majority of 26.4% of the elderly were fully independent in their personal hygiene with 13.5% completely unable to perform the task. There was no significant relationship between the ability

of the elderly to manage their personal hygiene and their residence. Good personal hygiene practices have both health and social benefits and is vital in combating and preventing illness for the elderly and those around them. In many cultures, poor personal hygiene is considered offensive and a sign of illness especially among the elderly who may need care-giving and support from those around them. Good personal hygiene can improve the appearance of the elderly as well as others perception of them and thus promote their social integration. Good personal hygiene can also improve the self-perception and image of the elderly.

A majority of the elderly who were not able to live independently were living in the institutions of the elderly. This would be because of their constant need for care and assistance which may not be available at home. About 6% of the elderly who were not able to live independently were living in non-institutions. The ability of the elderly to live independently is a factor that determines both the ability of the elderly to carry out ADLs and maintain good nutritional status. There is a clear connection between maintainance of muscle strength, cardiovascular tone, and ability to perform activities of daily living, to engage in leisure activities and maintain quality of life. Physical activity and appropriate nutrition contribute to the maintainance of muscle mass. With normal aging, a reduction in muscle mass does occur and participating in regular exercise program can help reduce the risk of developing Sarcopenia and its consequences (Singh, 2002).

More elderly in the non-insitutions (55.9%) rated their meals well compared to 44.1% who felt that their meals were not adequate, and therefore had reduced food intake. Eating difficulties caused by problems in chewing and swallowing are described as important causes of malnutrition or risk factors for malnutrition (Maitre & Vigneau, 2014). Saletti, in 2007

investigated the nutritional status of the elderly people in Sweden and found out that approximately a quarter of the population was malnourished and almost half of the population was found to be at risk of malnutrition due to problems with chewing, swallowing and reduced appetite as well as illness and depression. Another similar study by Edfors and Westergren (2012) found that the elderly requested for more varied old-fashioned food, cooked in the traditional way with well-known spices such as salt and pepper. Besides malnutrition which may result from eating difficulties, the elderly ability to carry out activities of daily living (ADLs) may be impaired. Lindholm et al., 2009 described motoric eating difficulties primarily affecting the pre-oral phase which included problems such as manipulating food on the plate and tranasporting food to the mouth. This could be due to tremors, weaknesses such as problems with gripping and/or lifting the arm and hand or involuntary arm movement.

Majority of the elderly who were unable to feed without assistance (6.9%) were living in the non-institions, same as the majority of those who were self fed without any problem (73.1%). Majority of those who were unable to feed without assistance (3.4%) were overweight, and lived in non-insitutions. This could be because elderly who are of poor nutritional status and who are dependent on ADLs are in greater need of help in food intake. A similar study by Soini, Routasalo and Lauri in 2006 found out that half of the patients living at home and receiving home care in Finland were at risk of malnutrition and 3% were malnourished.

More weight loss in the last three months was reported among the elderly living in non-institutions (14.8%) compared to the elderly in institutions (5.6%). Weight loss is an important risk factor for malnutrition and poor functionality among the elderly. It could be as a result of

declining chemosensory function, reduced efficiency of chewing, slowed gastric emptying and alterations to the neuroendocrine axis (Morley, 2007). Weight loss is often associated with an increased risk of in-hospital complications and a decline in ADLs or physical function (Lin *et al*., 2009).

The residence of the elderly was an important factor in determining the nutritional status of the elderly as well as their level of functionality. There was a significant relationship between the residence of the elderly and their ability to live independently ($\chi 2 = 92.773$, df = 1, p = < 0.001). The institutions of the elderly had a higher provision of legumes, pulses and animal sources of food compared to the non-insitutions where more fluids, fruits and vegetables were available in their diet. The institutions of the elderly may have a constant budget to ensure the availability of legumes and animal proteins whereas from the non-insitutions fluids and vegetables my be what is locally available and therefore affordable to the elderly and their care-givers.

A majority of 75.8% of the elderly living in institutions had a MUAC measure of 22 or greater. About 67% of those in the non-institutions had a MUAC measure of 22 or greater. The already established feeding programs and menus could explain why the institutionalized elderly with a MUAC measure of 22 cm and above were more in the institutions. Good nutritional status is related to good levels of functionality and therefore the reason why they had minimal dependency (80.1%).

A majority of the elderly (53.3%) liked preferred to relax, rest or sleep during their free time. The elderly also participated in Indoor and Outdoor activities such as assisting in food preparation (67.3%), assisting in cleaning (32.1%) and child care (17.9%) among others.

Engaging in physical activity often declines with age. However, it is important that the elderly engage in physical activities such as exercising large muscle groups used in weight bearing which helps to maintain mobility. For instance, exercises aimed at maintaining arm and leg strength to be able to perform light and heavy lifting needed to do housework. Such exercises are beneficial in maintaining the ability to participate in leisure activities such as gardening, knitting, going for shopping, dancing etc (Singh, 2002).

There was no significant relationship between self-view of health status and place of residence of the elderly, although the majority of the elderly (33.9%) viewed themselves as not healthy compared to 14.4% who did not know their health status. Self-reported health (SRH) is a way of evaluating the state of health in people which integrates information on the biological, mental, functional and spiritual dimensions of an individual's health (Manton, 2006). A similar observational analytical, cross-sectional study was carried out in the city of Manizales by Gomez *et al*., 2004, where SRH assessment was done and established a correlation with the presence of co-morbidity and functional state. The researcher found an important association among SRH, chronic disabling disease and functional capacity, measured via the Barthel Scale, which evaluates basic Daily Activities in the Physical aspect.

There was a significant relationship between the place of residence and self-view of nutritional status by the elderly with those in the institution having a better self-view of their nutritional status by a mean of 1.23 ± 0.828 compared to 1.01 ± 0.787 in the institution. This could be because the elderly in the institutions had access to more legumes and animal proteins (77.0%). The nutritional status of the elderly is an important component since there is a clear link between the intake of certain nutrients and physical functioning of the elderly. The macro and micro

nutrients considered most important for maintainance of bones and muscles in old age and thus most likely to affect physical limitations are protein for muscle.

5.8. CONCLUSION, RECOMMENDATIONS AND AREAS OF FURTHER RESEARCH

5.8.1 Conclusions

Nutritional status in the elderly strongly correlates with functional ability and quality of life in general and therefore assessment of functional ability, nutritional status and changes in body composition are important for public health planning and timely interventions.

More elderly in the institutions were underweight compared to the non-institutionalized elderly by BMI, MUAC and CC

Severe dependency on care-givers was reported more in the non-institutions compared to the institutions

Majority of the non-institutionalized elderly (60%) with less than 21cm MUAC measure had severe dependency

Functionality of the elderly correlated with presence of pressure sores, self-view of health status and nutritional status, consumption of 3 or more prescription drugs

Nutritional status correlated with education level of care-givers, opinion on institutionalization and food intake decline

More women were underweight compared to men with the majority being those living in the Institutions of the elderly both by BMI, MUAC and CC.

More males consumed at least 3 meals per day compared to women, with those in the institutions consuming 2 or more servings of fruits and vegetables.

The majority of the institutionalised elderly were consuming 3 to 5 cups of fluid per day and taking more than 3 prescription drugs and consuming meat, fish and poultry as protein sources. The elderly in non-institutions were consuming more daily servings of dairy products.

Majority of the elderly living in institutions of the elderly are not receiving the minimum fluid intake requirement of 1,500 mL/day.

More women than men felt that their health status was not as good compared to other elderly people and there was a positive correlation between self-perception of health status.

More women reported food intake decline in the last 3 months and there was a significant relationship between loss of appetite and gender of the elderly. More men on the other hand reported greater weight loss (greater than 3 kg) compared to women.

More women reported higher cases of neuropsychological stress or dementia and there was a significant relationship between stress and gender.

There was a significant relationship between mobility of the elderly and hydration with those able to go out on their own reporting to take more than 5 cups of fluid everyday

There was no evidence of water receptacles in the rooms of the institutionalized elderly e.g. a night stand and the elderly depended on the care-givers having time or making time to provide them with water.

Most elderly people consumed less than the recommended levels of fruits and vegetables.

The favorable perspective of the elderly on aging was associated with active aging and ability to carry out ADLs. The unfavorable perspective was potrayed by the difficulties faced by the elderly in carrying out ADLs and relating to those around them

The elderly from the institutions of the elderly and from non-institutions were functionally independent.

Education level of the care-givers of the elderly was positively related to the level of functionality of the elderly

Women needed more assistance from care-givers in old age in carrying out ADLs and personal hygiene, bathing self, toileting, stair climbing, dressing, Bowel Control, Bladder Control, Ambulation and Chair –bed transfers except feeding were found to be significant in determining Institutionalization of the elderly.

There were no gender differences in carrying out ADLs except in Stair Climbing where women were better able to climb stairs

The largest population of the elderly who were either chair or bed bound were found to be living in the Institutions of the elderly and there was a significant relationship between the type of residence and mobility of the elderly.

More men had pressure sores compared to women with the underweight elderly having more pressure sores. The prevalence of pressure sores was also more in the Institutions of the elderly.

Majority of the elderly who required minimal assistance in carrying out ADLs had a MUAC of 22 or greater, and there was a significant relationship between functionality and nutritional status

There was a significant relationship between CC and level of dependency among the elderly living in Non-institution.

Pressure sores were found to impact on the elderly dependency levels.

The Institutionalised elderly reported the lowest prevalence of Neuropsychological stress and in these were more women.

Dependency of the elderly on their care-givers should not be viewed as permanent, rather as a dynamic process since it can change, it can be reduced and prevented from occurring in the first place through proper nutrition

Functionality of the elderly was found to correlate with types of meals prepared, presence of pressure sores, self-view of health status and nutritional status, consumption of 3 or more prescription drugs, time spent in the institutions, residence of the elderly, professional training of care-givers, number of the institutionalized elderly per care-giver, mobility, amount of fluid consumed, mid arm circumference measure, personal hygiene, free time activities and opinion on institutionalization.

The nutritional status of the elderly was found to correlate with the education level of care-giver, their experience in caring for the elderly, reason for caring for the elderly, meal ratings, opinion

on institutionalization, food intake decline, weight loss in the last three months, neuropsychological problems, living independently, taking more than three prescription drugs, number of fullmeals, protein intake, amount of fluid consumed, mode of feeding, self-view of nutritional status and health status.

5.8.2 Recommendations

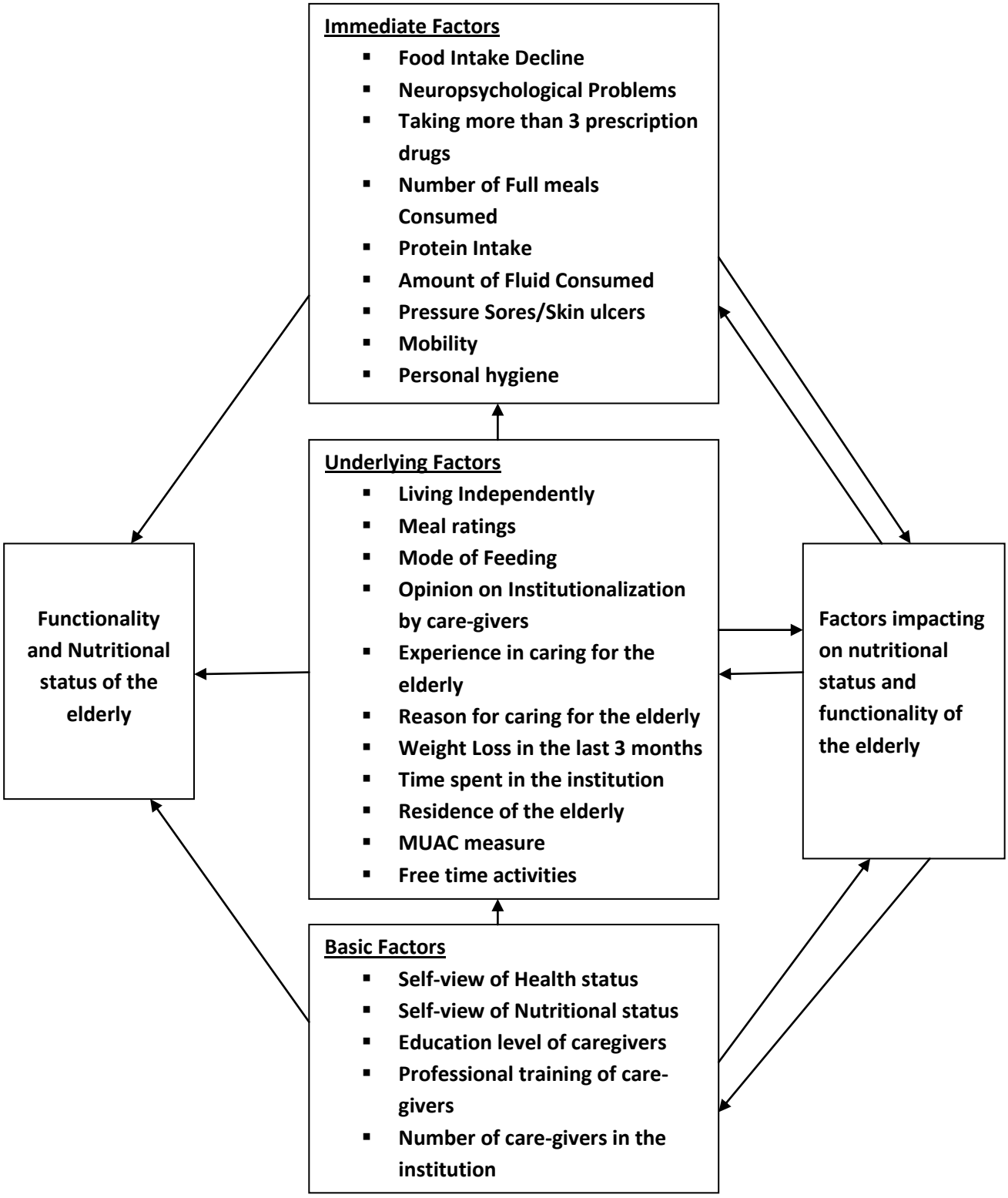

Fig 5.1Model on factors promoting the Nutritional Status and Functionality of the Elderly

5.8.2.1. Immediate Factors

Primary and Secondary care-givers of the elderly both in non-institutions and in the institutions of the elderly should be educated on best practices that can improve nutritional status and functionality of the elderly. Education of the care-giver has been found efficacious in improving the health of dependent patients. The role of the care-giver is crucial to the quality of life and for both prevention and treatment of malnutrition and functional impairement in dependent elderly.

In Finland, a nutrition education program based on Constructive Learning theory was developed to educate professional care-givers of patients with dementia and after a one year intervention period, it was observed that education had positive effects on the nutritional status and functionality of the elderly (Suominen *et al*., 2007).

> "The care-givers of the elderly should have some knowledge and understanding in social work and counseling of the elderly" – a manager of an institution of the elderly

Care-givers of the elderly should be experienced and willing to apply current standards of nutritional support among older people in their care. They should rely on standard nutritional screening tools in conducting broad assessment of older people at risk of malnutrition instead of relying on their own opinion. They should be able to identify the elderly who need help in feeding among other ADLs as this leads to low food intake and not see it as an extra responsibility. Inadequate staff and their attitude towards the elderly may lead to malnutrition.

The elderly should be allowed some degree of independence even for the dependent elderly, so that they can live their lives and take risks. Family support should be realistic and not

overprotective. In cases where there is lack of a family member to take care of the elderly, or the elderly prefers to live in an institution of the elderly, they can be supported to live in the institutions.

The elderly should rate well the meals prepared for them well in order to improve on their level of food intake. Their meals should be varied, served at fixed times, varied in methods of preparation and also in texture. They elderly should have a say and a role to play during meal planning and meal preparation. Healthy ageing is associated with a number of physiological, cognitive, social and lifestyle changes that influence dietary intakes and nutritional status of the elderly.

There is a need to shift away from the institutional or non-institutional care and to try and identify optimum transition points that will make one type of care more favorable than the other (Kane, OECD, 1996). This is because many studies have found benefits of the elderly remaining in non-institution with their loved ones. Some however have found that the Institutions of the elderly are better in meeting the needs of the elderly.

Researchers have over the years found loneliness to be a correlate of aging itself (Victor *et al*., 2000). Social support has a strong protective effect on health because the participation of the elderly is an indicator of healthy aging. The elderly at risk of loneliness or isolation due to either loss of contemporaries, cognitive impairments, disability and loss of social roles. The presence or absence of family support is a prime factor in determining whether or not an older person continues to live independently

The non-institutional and institutional internal and external environments of the elderly should provide opportunities in their sorroundings to design individual needs of the elderly, thereby optimizing the elderlys functionality. This promotes independent function and does not restrict the elderly in their ADLs.

> "An ideal hostel for the elderly should have bathrooms with good water supply insides, rails to support the elderly in movement, wheel chair paths and common eating places" – an institutionalized elderly

The elderly should be encouraged to have a frame of mind that affirms and embraces life by having a positive self-esteem on their health status. This attitude will make the elderly believe that they can manage their own health and be health conscious. Promoting their level of functionality and thus their independence can boost their sense of control over their lives.

Higher protein intake should be encouraged among the elderly since it may help elderly individuals function at higher levels physically, psychologically and socially.This is a modifiable indicator for early detection and prevention of higher-level functional decline in elderly adults. As people age, their ability to absorb or process protein may decline and to compensate for this loss, protein requirements may increase with age.

Caution should be practiced by the elderly taking several medications since they may alter food intake and cause reactions that interfere with normal nutrient metabolism and requirements. Appetite loss, nausea, diarrhea, weight changes, digestive system complications and malnutrition are common consequences associated with elderly persons undergoing polypharmacy for various

diseases. Low energy intake, adverse drug reactions, reduced drug efficiencies, deficiency of essential nutrients and adverse drug-nutrient interactions in the elderly undergoing polyphramacy can negatively affect overall health status.

The elderly should take new medications at about half the adult dose and at a slower rate. They should also approach the use of prescription medication with caution and report any unusual or new symptoms to their care providers because aging influences the aspects of physiologic drug processing. Presciption drugs are meant to improve symptoms of disorders, besides improving their quality of life. They however have the potential to cause dangerous side effects (Netwellness, 2014)

Good nutrition in at least three meals per day in old age can increase an elderly person's ability to have an active healthy life. While the elderly tend to eat less and may need to eat less due to reduced levels of activity, their vitamin and mineral needs may stay the same or even increase.

Older people with limited food intake need to consume nutrient dense high energy foods, while those who decrease their activity levels are at risk of becoming overweight if their food intake remains unchanged.

The diet of the elderly should contain meals rich in antioxidants such as Vitamin E and C, which have a preventive and protective effect against neuropsychological problems such as Alzeimers Disease (AD). Studies have found a reduced risk of AD was associated with intake of Vitamin E and Vitamin C. A Randomized Control Trial (RCT) with high doses of Vitamin E in patients with moderate to severe Alzeimers disease resulted in a longer time before Institutionalization and delayed time to deterioration of ADLs, although cognitive function did not reduce (Grodstein, 2003).

The elderly and their care-givers should be taught how toadjust food intake following periods of over –or underfeeding due to changes in chemosensory systems and those that regulate appetitive behaviours such as eating and drinking. Lack of this food regulation can put the elderly ar risk of nutritional disorders. Aging is associated with loss of body weight in some individuals due to physiological, behavioral and socio-economic changes that could have an impact on the diet and nutritional status of the elderly.

The elderly should be encouraged and facilitated to take six to eight glasses of fluid e.g. milk, tea, coffee, fruit juice and water because their thirst sensation is often diminished. Some older people may limit their fluid intake in order to minimize trips to the bathroom because of mobility problems. Inadequate intake of fluids can lead to dehydration, which is associated with elevated body temperature, low blood pressure and constipation. It can also lead to mental confusion, headaches and irritability. To further prevent constipation, a gradual increase in fibre-providing foods (such as wholegrain cereals, wholemeal bread, fruit, vegetables and pulses) should be encouraged, as well as plenty of liquids and gentle exercise.

As people age and their total water body decreases, their lean body mass is reduced, and their percentage of body fat increases. This increase in body fat expands the volume of distribution for lilophilic drugs and also decreases the volume of distribution hydrophilic drugs. Fluid intake can also affect salive production, which is essential for oral health. Decreased body water is associated with salivary dysfunction, especially in order adults. Inadequate fluid intake can also result in dehydration, makes the elderly more susceptible to urinary tract infection, pneumonia, pressure ulcers, hypotension, confusion and disorientation.

Physical activity levels of the elderly should be increased in order to increase their energy intake and reduce the risk of nutritional deficiency. Increased energy intake due to heightened expenditure allows a person to eat more food thus increasing nutrient intake, without the associated risk of weight gain. Older people are prone to nutritional deficiencies are as a result of lower energy intakes, physiological changes, disease and increased use of medications.

Mobility levels of the elderly should be promoted and upheld through health promotion interventions because while some elderly people attempt to keep fit and active, others remain frail, requiring additional care and support from family and friends. Aging brings about a variety of challenges and limitations which may pose risks to our health and nutrition. Reduced mobility will reduced ability to carry out ADLs and other instrumental activities of daily living such as shopping for food or preparing food. In extreme cases, elderly individuals can become malnourished, resulting in the prevention of recovery from illness and increased likelihood of developing more health problems.

Prevention of the development of pressure Ulcers and Skin sores should be the ultimate objective among the immobile elderly since it is a major cause of morbidity and mortality among them. This prevention will require the understanding of the pathophysiology and the means of reducing both intrinsic and extrinsic factors.

5.8.2.2. Underlying factors

Given the vulnerability of the elderly and changes in body composition that occur with aging, it is important to classify the elderly according to their needs in feeding and with the participation of care-givers in non-institutions, dieticians and nursing staff together with other staff in the

Institutions provide a healthy diet with adequate nutrients specific to the elderly, while at the same time assisting the elderly with their individual needs in feeding.

Regular weight screening among the elderly should be encouraged as it will prevent negative body image by the elderly and also ensures that interventions are put in place to promote ideal weight. These interventions will diminish the risk factors associated with being underweight or overweight.

Free –time activities among the elderly should be therapeutic and aimed at enhancing the quality of life, minimizing mental decline, maintaining self-esteem and enabling friendships (Hutchinson, 2000). There is evidence that physical activity among the elderly improves functionality, thereby eliminating the risk factor for disability among the elderly (Hughes *et al*., 2009). Free time activities also reduce boredom, loneliness, stress and depression with the objective of beneficial outcome to promote and maintain good moral and psychological health and fitness among the elderly.

Healthy Mid arm Circumference measurements should be promoted and maintained since MUAC is associated with Sarcopenia and level of functionality. In a study conducted among Italian elders by Landi *et al*., 2012 , those found to have a high MUAC measure had a good performance in carrying out activities of Daily Living (ADL). The Mid Upper Arm Circumference is also related with the risks of falls in elderly people. Another study carried out in Institutionalized Japanese elders; calf circumference was lower in bedridden persons as compared with the independent elderly (Tajima *et al*., 2004).

The elderly should be encouraged and integrated into the entire mealtime process by encouraging them to help plan, prepare, and set the table, pull out chairs or put dishes away and clean up. This

encourages the elderly to experience eating into a larger social context and as part of daily activity, as opposed to the elderly looking at mealtime as an isolated task. Participating in the mealtime process helps the person maintain functional skills and feelings of personal control. This is because as people age, their interest in eating and meal time enjoyment can change due to a decrease in taste and smell senses. Some eat less because of difficulties in chewing or digesting as they get older.

Care-giving among the elderly should encompass a wide array of medical, social, personal and supportive and specialized housing services needed and therefore the number of care-givers especially in the Institutions of the elderly should be adequate for the Institutionalized elderly. This is because the elderly lose some capacity for self-care due to chronic illnesses or aging and they need to attain an optimal level of functioning.

The Institutions of the elderly in Kenya should move from "institutional care" to more Non-institution style settings which enable residents to live full lives that reflect the lives they led prior to their admission. Kenya is currently at cross roads in the way the elderly are and should be taken care of. Previously, the extended family meant that the elderly would remain in the family and be cared for by their relatives. Since this is no longer the norm, and more and more people are moving to the institutions of the elderly, Kenya needs to ensure that all relevant National, regional and local health care agencies, owners and managers of residential care settings and the support staff are willing to meet the expressed needs and preferences of the elderly

Promoting personal hygiene among the elderly is one way of promoting their level of functionality. Personal hygiene is not only a health issue but also a social issue that is subjective.

Poor personal hygiene may be as a result of physical impairement among other causes such as depression, medications and Dementia resulting from Alzheimers disease. Physical impairements limit daily hygiene routines such as bathing and may be a consequence of arthritis and other joint diseases, resulting to paralysis, nerve and muscle diseases.

The opinion of care-givers on caring for the elderly should be positive in order to enable them feel at home. All the staff should be organized and take up domestic roles in the institution as it happens in the non-institutions, in order to create a homely environment. This would encourage the Institutionalized elderly to live on since they would prefer to remain in Non-instituions they are able to maintain the integrity of their social network, preserve environmental landmarks and enjoy a higher quality of life. Moreover, institutionalization is associated with several negative outcomes such as increased mortality, restricted quality of life as well as questionable quality of care.

5.8.2.3. Basic factors

Health related programs among the elderly should be designed and implemented to improve the overall well-being of the ageing population in order to improve on their self-assessed health status as there is no single factor that can be attributed to self-assessed poor health. Functionality is one of the determinants of self assessed health status and general health promotion among the elderly can improve their functionality.

Regular nutritional screening among the elderly should be carried out in order to correct the perceived nutritional status which directly impacts on their level of functionality. This is because the elderly had an erroneous self-perception of their nutritional status, mainly due to underestimation and this could impair their level of function also due to perception.

Family care should be included by geriatric professionals in the institutions of the elderly in order to promote the functionality of the elderly. There is evidence that the Institutionalized elderly become more dysfunctional when detached from their family members. The family members can take turns in actively participating in the daily activities of their elderly members lives while encouraging ongoing training of institution employees regarding inclusion and encouraging the family to be more committed to care-related task and to avoid deficiencies in the work team.

Care-givers of the elderly should learn the basics of caring for the elderly in order to be prepared for the task. Experience and training is a plus for the health of the elderly especially for those caring for the elderly in Institutions. Elderly care-giving is not for everyone and therefore only those who love doing it should be mandated with caring for the elderly. Care-giving in Non-institution requires dedication of time and effort from the primary care-givers. Adult children of the elderly parents should discuss their care-giving before the need to care for them arises.

5.8.2.4 Policy Recommendations

There is need to introduce Home-based care for older people living in non-institution, since the care-givers have no professional training in caring for the elderly and preventive home visits in order to facilitate early assessment of the elderly functional abilities and nutritional status as these assists them to live independently and promote their health and wellbeing by assessing the risk factors and facilitate environmental safety.

All the staff working in institutions of the elderly should be organized to take up other household chores in the institutions in order to demystify their role in the Institution as well as making the institution have a non-institution like environment

Health promotion, disease prevention, recovery and rehabilitation of the elderly should be put in place by institutions and in non-institutions through the community strategy as it directly impacts on the functional capacity of the elderly.

More institutions for the elderly or Assisted Living Facilities (ALF) are needed due to the fact that the number of healthier older people is increasing with improved health care. Moreover, the elderly want to live independently as long as possible, using minimal assistance when needed.

The Institutions of the elderly and non-institution should be designed or renovated to take care of the mobility needs of the elderly.

5.8.3.5. PRACTICE RECOMMENDATIONS

All the care-givers of the elderly should be trained and sensitized on the importance of nutrition of the elderly and understand their role in improving their nutritional status. This nutrition education will range from the performance of nutritional screening and assessment, the preparation of attractive, appetizing meals and the delivery and presentation of meals dependent upon the needs of individual elderly people.

The professionals working in the institutions of the elderly should be integrated in the running of the non - institutions and participate in carrying out household chores in order to demystify their role in the institution while at the same time learn individual needs of the elderly, some of whom may not be able to reach out for services that they may need.

Menus for the Institutionalized and Non-Institutionalized elderlyshould be expanded to include a variety of foods and more well-trained care-givers and institutional workers e.g. dietitians, nutritionists and certified nursing assistants should be hired

Menus for the Institutionalized and Non-Institutionalized elderlyshould be expanded to include a variety of foods and more well-trained care-givers and institutional workers e.g. dietitians, nutritionists and certified nursing assistants should be hired

All parents should in their adulthood discuss and develop an aging plan with their adult children

5.8.3.6. Interventional Recommendations

Community health workers uder the Community Strategy should conduct health education sessions for both the primary and secondary care-givers of the elderly focusing on among other topics the nutritional value of food, designing a healthy diet, advice on dietary adaptation to address the most common nutritional problems in this group such as energy, protein, vitamin, mineral and water deficiency and adaptation of textures as well as recommendations on basic cooking techniques.

5.8.4. Recommendations for further Research

A study on social factors impacting on nutritional status and functionality of the elderly

An interventional study on the role of care-giver in determining the Nutritional status and Functionality of the elderly

An interventional study on Food Supplements and their role in restoring nutritional status and functionality of the elderly

A study on the role of the physical home and Institutional environments in promoting the functionality of the elderly should be conducted

Research on correlates of fruit and vegetable intake among the elderly persons

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APPENDICES

Appendix 1: Kenyatta University Ethical Review Approval

KENYATTA UNIVERSITY
ETHICS REVIEW COMMITTEE

Fax: 8711242/8711575
Email: kuerc.chairman@ku.ac.ke
kuerc.secretary@ku.ac.ke
Website: www.ku.ac.ke

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

Our Ref: KU/R/COMM/51/167

Date: May 9th, 2013

Mugo Wairimu Judith
School of Public Health
Kenyatta University
P. O. Box 43844, Nairobi.

Dear Ms. Mugo,

APPLICATION NUMBER **PKU/108/197** OF 2013 – **'NUTRITIONAL STATUS AND FUNCTIONALITY OF INSTITUTIONALIZED AND NON-INSTITUTIONALIZED ELDERLY IN NAIROBI COUNTY, IN KENYA'.**

1. IDENTIFICATION OF PROTOCOL

The application before the committee is with a research topic, **'Nutritional Status and Functionality of Institutionalized and Non-Institutionalized Elderly in Nairobi County, in Kenya'** received on *5th April 2013.*

2. APPLICANT

Mugo Wairimu Judith
School of Public Health
Kenyatta University
P. O. Box 43844, Nairobi.

3. SITE

Nairobi County in Kenya

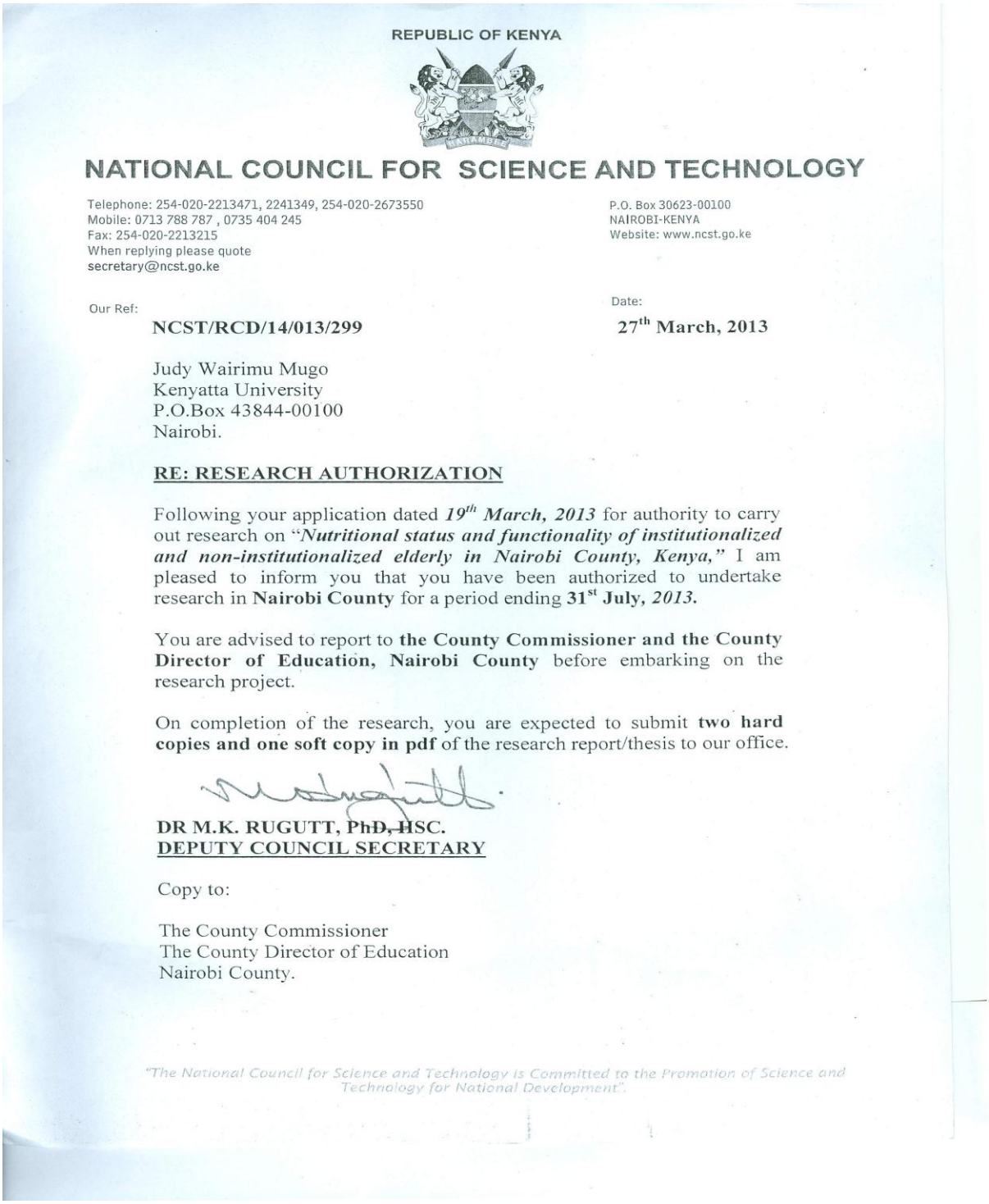
4. DECISION

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 for a period of ONE YEAR starting 9th May 2013. You are requested to consider the advice given below;

Appendix 2: National Council for Science, Technology and Innovation Research Authorization



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/14/013/299**

Date: **27th March, 2013**

Judy Wairimu Mugo
Kenyatta University
P.O.Box 43844-00100
Nairobi.

RE: RESEARCH AUTHORIZATION

Following your application dated ***19th March, 2013*** for authority to carry out research on "***Nutritional status and functionality of institutionalized and non-institutionalized elderly in Nairobi County, Kenya,***" I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for a period ending **31st July, *2013*.**

You are advised to report to **the County Commissioner and the County Director of Education, Nairobi County** 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.

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

Copy to:

The County Commissioner
The County Director of Education
Nairobi County.

"The National Council for Science and Technology is Committed to the Promotion of Science and Technology for National Development".

Appendix 3: KenyattaUniversity Graduate School Research Authorization

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

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

Our Ref: P97/11064/2008

DATE: 18th December, 2012

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

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION MUGO WAIRIMU JUDY – REG. NO. P97/11064/2008

I write to introduce Ms. Mugo Wairimu Judy who is a Postgraduate Student of this University. She is registered for Ph.d degree programme in the **Department Community Health.**

Ms. Mugo intends to conduct research for a proposal entitled, **"Nutritional Status and Functionality of Institutionalized and Non- Institutionalized Elderly in Nairobi County, in Kenya".**

Any assistance given will be highly appreciated.

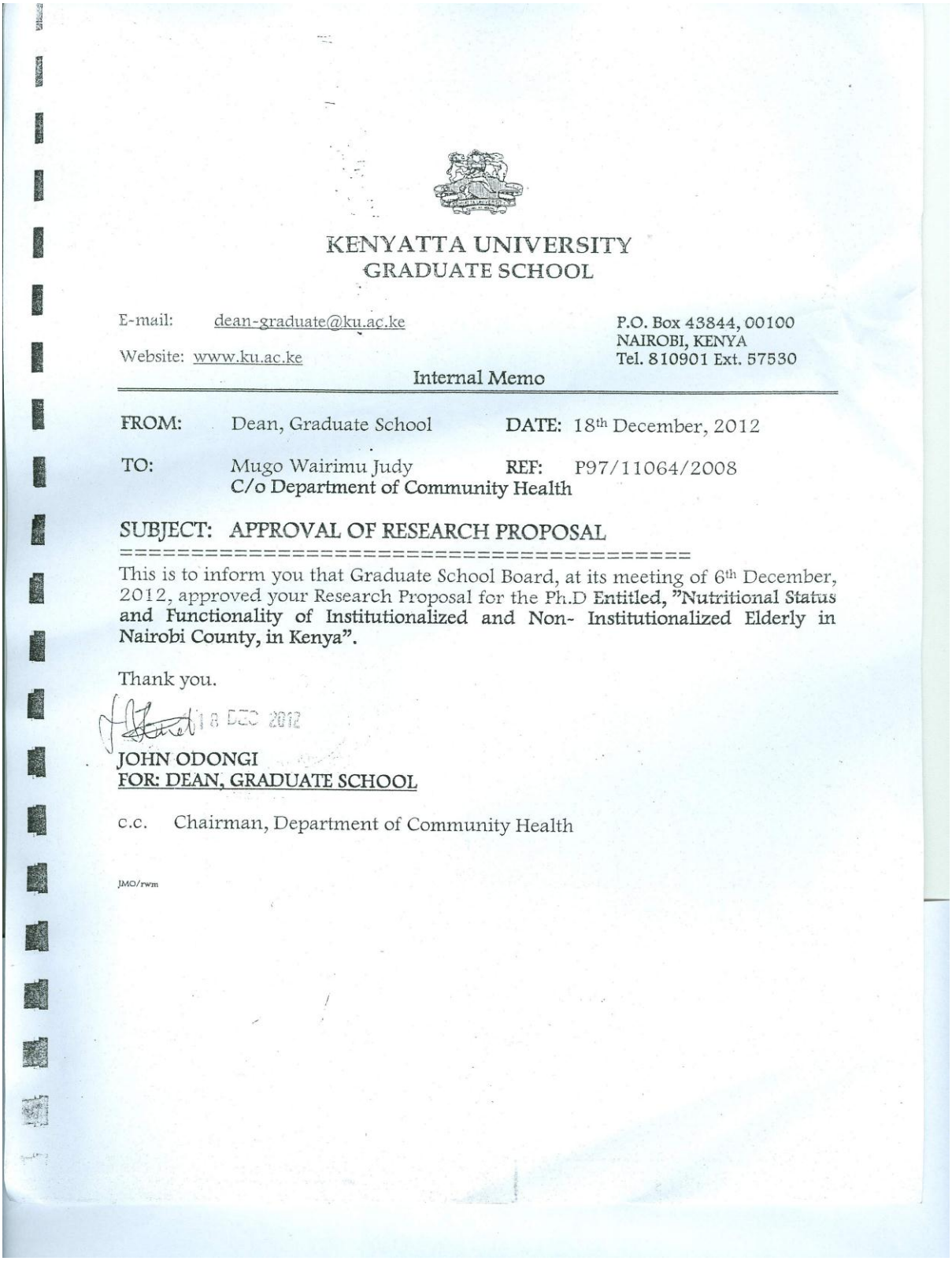
Yours faithfully,

18 DEC 2012

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

JMO/rwn

Appendix 4: Kenyatta University Graduate School Approval of Research Proposal



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

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

Internal Memo

FROM: Dean, Graduate School DATE: 18th December, 2012

TO: Mugo Wairimu Judy REF: P97/11064/2008
C/o Department of Community Health

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that Graduate School Board, at its meeting of 6th December, 2012, approved your Research Proposal for the Ph.D Entitled, "Nutritional Status and Functionality of Institutionalized and Non- Institutionalized Elderly in Nairobi County, in Kenya".

Thank you.

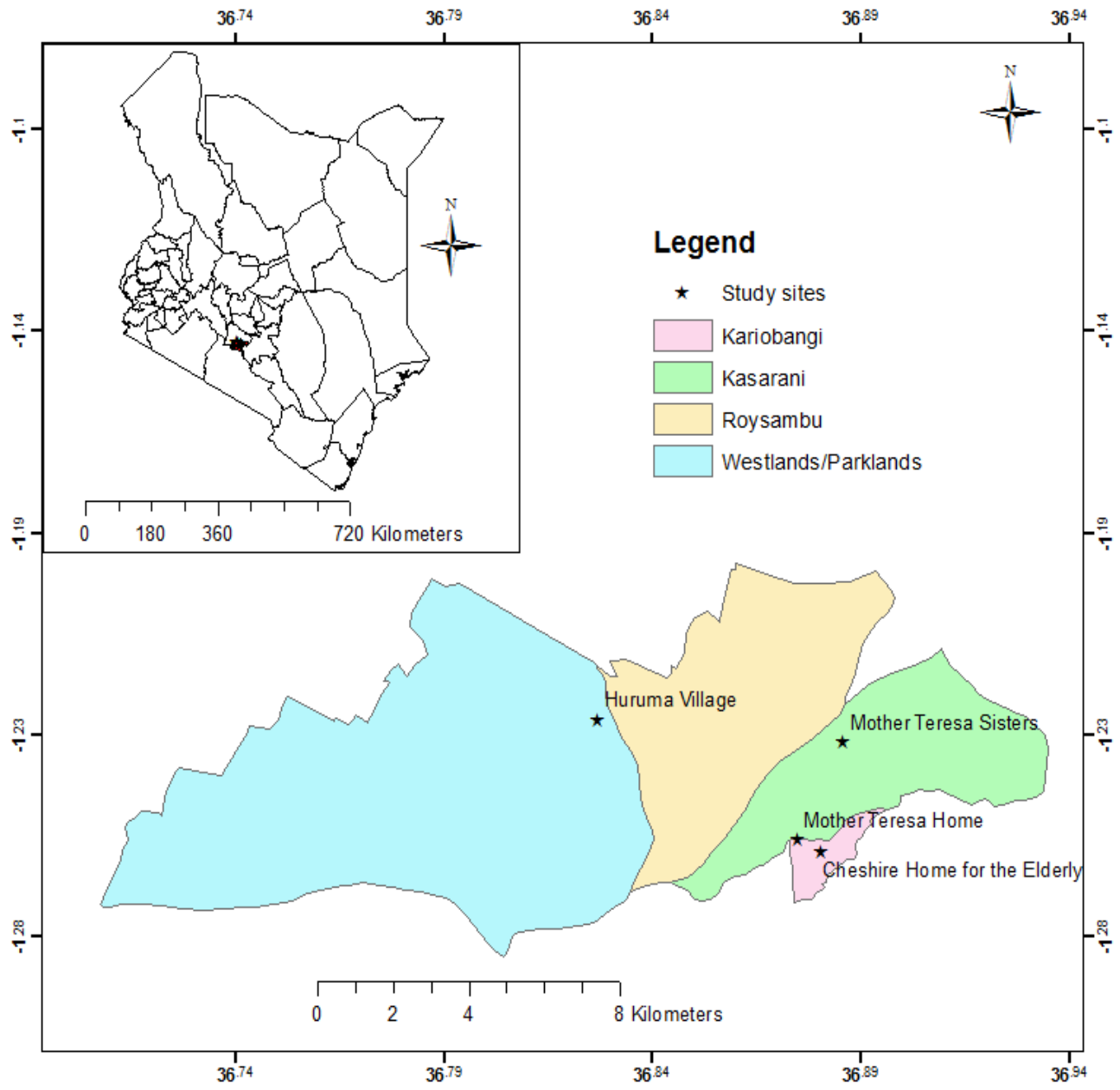
18 DEC 2012

JOHN ODONGI
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Department of Community Health

JMO/rwm

Appendix 5:The Map of the Study Area



Appendix 6: The Mini Nutritional Assessment Tool for the Institutionalized and Non-Institutionalized Elderly

My name is Judy Mugo, a PhD student in the Department of Community Health, Kenyatta University. I am conducting a study on the Nutritional status and Functionality of Institutionalized and Non-Institutionalized Eldelry in Nairobi County, in Kenya. Your voluntary participation, opinions, experiences and suggestions are very important to me for they will help me get accurate data and an understanding of the study. If you decide to take part you are still free to withdraw at any time and without giving a reason. Your name will not be recorded on the questionnaire and your responses will be anonymous. The Interview will take approximately 10 minutes. The data collected will be used strictly for academic purposes and will be treated with confidence. The results from this study will be used to improve on the care given to the elderly both at home and Institutions of the elderly in regard to their nutrition and functionality. If you are willing to participate, please sign below.

Signature ……..date……..

If you have any questions pertaining to this study, please contact

Judy Wairimu Mugo
Department of Environmental Health, Kenyatta University
P.O Box 43844- 00100
Nairobi, Kenya
Cell phone 0720 671 286
Email – wajudie@yahoo.com
Or
Director in charge of Research, Kenyatta University
P.O. Box. 43884-00100

Nairobi, Kenya.

Email: director-crd@ku.ac.ke

Website: www.ku.ac.ke

Thank you for your assistance.

NESTLÉ NUTRITION SERVICES

Mini Nutritional Assessment
MNA®

Last name: First name: Sex: Date:

Age: Weight, kg: Height, cm: I.D. Number:

Complete the screen by filling in the boxes with the appropriate numbers.
Add the numbers for the screen. If score is 11 or less, continue with the assessment to gain a Malnutrition Indicator Score.

Screening

A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?
0 = severe loss of appetite
1 = moderate loss of appetite
2 = no loss of appetite ☐

B Weight loss during the last 3 months
0 = weight loss greater than 3 kg (6.6 lbs)
1 = does not know
2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs)
3 = no weight loss ☐

C Mobility
0 = bed or chair bound
1 = able to get out of bed/chair but does not go out
2 = goes out ☐

D Has suffered psychological stress or acute disease in the past 3 months
0 = yes 2 = no ☐

E Neuropsychological problems
0 = severe dementia or depression
1 = mild dementia
2 = no psychological problems ☐

F Body Mass Index (BMI) (weight in kg) / (height in m)²
0 = BMI less than 19
1 = BMI 19 to less than 21
2 = BMI 21 to less than 23
3 = BMI 23 or greater ☐

Screening score (subtotal max. 14 points) ☐☐
12 points or greater Normal – not at risk – no need to complete assessment
11 points or below Possible malnutrition – continue assessment

Assessment

G Lives independently (not in a nursing home or hospital)
0 = no 1 = yes ☐

H Takes more than 3 prescription drugs per day
0 = yes 1 = no ☐

I Pressure sores or skin ulcers
0 = yes 1 = no ☐

J How many full meals does the patient eat daily?
0 = 1 meal
1 = 2 meals
2 = 3 meals ☐

K Selected consumption markers for protein intake
- At least one serving of dairy products (milk, cheese, yogurt) per day? yes ☐ no ☐
- Two or more servings of legumes or eggs per week? yes ☐ no ☐
- Meat, fish or poultry every day yes ☐ no ☐

0.0 = if 0 or 1 yes
0.5 = if 2 yes
1.0 = if 3 yes ☐.☐

L Consumes two or more servings of fruits or vegetables per day?
0 = no 1 = yes ☐

M How much fluid (water, juice, coffee, tea, milk…) is consumed per day?
0.0 = less than 3 cups
0.5 = 3 to 5 cups
1.0 = more than 5 cups ☐.☐

N Mode of feeding
0 = unable to eat without assistance
1 = self-fed with some difficulty
2 = self-fed without any problem ☐

O Self view of nutritional status
0 = views self as being malnourished
1 = is uncertain of nutritional state
2 = views self as having no nutritional problem ☐

P In comparison with other people of the same age, how does the patient consider his/her health status?
0.0 = not as good
0.5 = does not know
1.0 = as good
2.0 = better ☐.☐

Q Mid-arm circumference (MAC) in cm
0.0 = MAC less than 21
0.5 = MAC 21 to 22
1.0 = MAC 22 or greater ☐.☐

R Calf circumference (CC) in cm
0 = CC less than 31 1 = CC 31 or greater ☐

Assessment (max. 16 points) ☐☐.☐
Screening score ☐☐
Total Assessment (max. 30 points) ☐☐.☐

Malnutrition Indicator Score
17 to 23.5 points at risk of malnutrition ☐
Less than 17 points malnourished ☐

Ref.: Guigoz Y, Vellas B and Garry P.J. 1994. Mini Nutritional Assessment: A practical assessment tool for grading the nutritional state of elderly patients. *Facts and Research in Gerontology.* Supplement #2:15-59.
Rubenstein LZ, Harker J, Guigoz Y and Vellas B. Comprehensive Geriatric Assessment (CGA) and the MNA: An Overview of CGA, Nutritional Assessment, and Development of a Shortened Version of the MNA. In: "Mini Nutritional Assessment (MNA): Research and Practice in the Elderly". Vellas B, Garry P.J and Guigoz Y , editors. Nestlé Nutrition Workshop Series. Clinical & Performance Programme, vol. 1. Karger, Bâle, in press.

Appendix 7: Modified Barthel Index (MBI)

My name is Judy Mugo, a PhD student in the Department of Community Health, Kenyatta University. I am conducting a study on the Nutritional status and Functionality of Institutionalized and Non-Institutionalized Eldelry in Nairobi County, in Kenya. Your voluntary participation, opinions, experiences and suggestions are very important to me for they will help me get accurate data and an understanding of the study. If you decide to take part you are still free to withdraw at any time and without giving a reason. Your name will not be recorded on the questionnaire and your responses will be anonymous. The Interview will take approximately 10 minutes. The data collected will be used strictly for academic purposes and will be treated with confidence. The results from this study will be used to improve on the care given to the elderly both at home and Institutions of the elderly in regard to their nutrition and functionality. If you are willing to participate, please sign below.

Signature ……..date……..

If you have any questions pertaining to this study, please contact

Judy Wairimu Mugo
Department of Environmental Health
Kenyatta University
P.O Box 43844- 00100
Nairobi, Kenya
Cell phone 0720 671 286
Email – wajudie@yahoo.com
Or
Director in charge of Research, Kenyatta University
P.O. Box. 43884-00100
Nairobi, Kenya.
Email: director-crd@ku.ac.ke
Website: www.ku.ac.ke

Thank you for your assistance.

Name_____Rater_____Date_____

Items	**Unable to Perform task**	**Attempts task but unsafe**	**Moderate help is required**	**Minimal help is required**	**Fully independent**
Personal hygiene	0	1	3	4	5
Bathing self	0	1	3	4	5
Feeding	0	2	5	8	10
Toileting	0	2	5	8	10
Stair Climbing	0	2	5	8	10
Dressing	0	2	5	8	10
Bowel Control	0	2	5	8	10
Bladder Control	0	2	5	8	10
Ambulation (Wheelchair*)	0 (0)	3 (1)	8 (3)	12 (4)	15 (5)
Chair-bed Transfers	0	3	8	12	15
FIM (0-100)					

***Score only if the elderly is unable to ambulate and is trained in wheelchair management**

Appendix 8: Interpretation of the Modified Barthel Index (MBI)

Categories	MBI Total Scores	Dependency Level
1	0-49	Severe
2	50-74	Moderate
3	75-99	Minimal

Appendix 9: Interview for the Care-givers at home

My name is Judy Mugo, a PhD student in the Department of Community Health, Kenyatta University. I am conducting a study on the Nutritional status and Functionality of Institutionalized and Non-Institutionalized Eldelry in Nairobi County, in Kenya. Your voluntary participation, opinions, experiences and suggestions are very important to me for they will help me get accurate data and an understanding of the study. If you decide to take part you are still free to withdraw at any time and without giving a reason. Your name will not be recorded on the questionnaire and your responses will be anonymous. The Interview will take approximately 10 minutes. The data collected will be used strictly for academic purposes and will be treated with confidence. The results from this study will be used to improve on the care given to the elderly both at home and Institutions of the elderly in regard to their nutrition and functionality. If you are willing to participate, please sign below.

Signature ……..date……..

If you have any questions pertaining to this study, please contact

Judy Wairimu Mugo
Department of Environmental Health, Kenyatta University
P.O Box 43844- 00100
Nairobi, Kenya
Cell phone 0720 671 286
Email – wajudie@yahoo.com
Or
Director in charge of Research, Kenyatta University
P.O. Box. 43884-00100
Nairobi, Kenya.
Email: director-crd@ku.ac.ke
Website: www.ku.ac.ke

Thank you for your assistance.

Demographic Characteristics	
1. What is your age?	_____
2. Gender	1. Male 2. Female
3. Marital Status	1. Married 2. Married Before 3. Widow/Widower 4. Divorced
4. Education Level	1. Primary 2. Secondary 3. Tertiary
5. Number of Children	_____
6. Common(known) problem or ailment affecting (name)	_____
Socio-Economic Status (Tick appropriate space)	
7. For how long have you been taking care of (name)	_____
8. When did you start living with (name)?	_____
9. What made you stay with (name)?	1. Loss of independence due to old age 2. Poor socio-economic Status

(Add to the list)	3. Poor functionality 4. Lack of caregivers **5.** To manage a chronic illnesses
10. What activities is (name) involved in routinely at home (write all)	_____ _____
11. Do you ask (name) to participate or do they volunteer on their own?	1. Participates on their own volution 2. Has to be asked to participate
12. How does (name) spend his/her free time?	_____
13. What fears do you have in regard to your caring for (name)?	1. Poor health 2. Poor cooperation 3. Family Support 4. Financial support when need arises
14. What fears has (name) expressed?	1. Neglect by family 2. Inability to feed well 3. Inability to function
15. Does (name) move around freely?	1. Yes 2. No If Yes, move to question 17
16. If 'No' what hinders him/her	1. Back pains

from moving freely?	2. Illnesses 3. No one to support them 4. Walking sticks/crutches 5. Fear of falling down
17. What should be done to improve his/her ability to move around freely?	1. Introducing a physical education instructor 2. Equipping the Institution with play items 3. Introducing duty roosters for everyone 4. Building rails around the Institution that would allow for free movement 5. Introducing exercise sessions within the Institution
18. What activities can (name) do on their own?	1. Personal Hygiene 2. Bathing self 3. Feeding 4. Toileting 5. Stair climbing 6. Dressing 7. Chair to bed transfers
19 Have you required the services of a physiotherapist in the past one year for (name)?	1. Yes 2. No

NUTRITION	
20 Which meals do you prepare regularly for (name)?	1. Breakfast 2. Lunch **3.** Supper
21 What time are the meals? **(Record the different times for the different meals)**	6 – 9 am 10 – 12 pm 1-3 pm 4-6 pm 7-9 pm
22 What do you feed (name) on regularly? **(List foods as they are mentioned)**	1. Ugali 2. Mashed Potatoes 3. Sweetpotatoes/Yams 4. Chicken 5. Minced beef 6. Sukuma wiki 7. Spinach **8.** Uji/Porriddge
23 How do you rate the meals that you give to (name)?	1. Adequate (Give reasons) _____ _____ _____

	2. Inadequate (Give reasons) _____ _____ _____
24 Do you have any problems with the food given to (name)?	1. Yes 2. No If no, skip to question 26
25 If yes to 25 above (list them as they are mentioned)	1. It has no variety 2. It is not served at fixed times 3. There is no variation in cooking methods 4. There is no variation in texture
26 What do you think should be done to improve the food given to the elderly?	1. Create variety of meals 2. Increase the amount of serving 3. Increase the number of meal times 4. Vary the cooking methods 5. Vary the food texture 6. Prepare individualized meals to cater for the different needs of the elderly
27 Does (name) experience constipation?	1. Yes 2. No
28 Does (name) drink beer?	1. Yes 2. No

29 If given a choice, would you rather care for (name) or have them Institutionalised	1. Care for them 2. Have them Institutionalized If 1, got to 30 If 2, go to 31
30 Why would you want to care for them at home? (List the reasons given)	_____
31 Why would you rather have them Institutionalized? (list the reasons given)	_____

Appendix 10: Interview for the Care-givers of the Elderly in Institutions

My name is Judy Mugo, a PhD student in the Department of Community Health, Kenyatta University. I am conducting a study on the Nutritional status and Functionality of Institutionalized and Non-Institutionalized Eldelry in Nairobi County, in Kenya. Your voluntary participation, opinions, experiences and suggestions are very important to me for they will help me get accurate data and an understanding of the study. If you decide to take part you are still free to withdraw at any time and without giving a reason. Your name will not be recorded on the questionnaire and your responses will be anonymous. The Interview will take approximately 10 minutes. The data collected will be used strictly for academic purposes and will be treated with confidence. The results from this study will be used to improve on the care given to the elderly both at home and Institutions of the elderly in regard to their nutrition and functionality. If you are willing to participate, please sign below.

Signature ……..date……..

If you have any questions pertaining to this study, please contact

Judy Wairimu Mugo
Department of Environmental Health
Kenyatta University
P.O Box 43844- 00100
Nairobi, Kenya
Cell phone 0720 671 286
Email – wajudie@yahoo.com
Or
Director in charge of Research, Kenyatta University
P.O. Box. 43884-00100
Nairobi, Kenya.
Email: director-crd@ku.ac.ke
Website: www.ku.ac.ke

Thank you for your assistance.

Demographic Characteristics	
1. What is your age?	_____
2. Gender	1. Male 2. Female
3. Education Level	1. Primary 2. Secondary 3. Tertiary
4. What is your professional training? **(Add to the list)**	1. Social worker 2. Counselor 3. Nutritionist 4. Physiotherapist
5. What is your responsibility at the Institution? (Add to the list of responsibilities)	1. Managing interactions of the elderly 2. Counselling the elderly 3. Planning meals for the elderly 4. Improving the functionality of the elderly
6. How many elderly people are you in charge of?	____ ____
7. For how long have you been working at this Institution?	_____ _____
8. What in-service trainings have you received while in the Institution?	____ _____

9. What made you think of serving the elderly? **(Add to the list)**	1. Inspiration from other people caring for the elderly at home 2. A call 3. It is a form of employment
10. What is your opinion on institutionalizing the Elderly? **(Add to the list and give a reason for your response)**	1. It is the best form of care for the elderly _____ 2. It should specifically be for those without families _____ 3. It results to the abandonment of the elderly by their families _____
11. What concerns do the elderly that you care for express?	1. Loss of independence due to old age 2. Poor socio-economic Status 3. Poor functionality 4. Lack of caregivers **5.** Chronic illnesses that need to be managed 6. Neglect by family 7. Inability to feed well **8.** Inability to function **9.** Feeling of being a burden to others
12. What are some of the fears	1. Poor health

that you have in regard to your caring for the elderly?	2. Poor cooperation 3. Poor Support from the family **4.** Financial support when need arises
13. What fears have the elderly expressed?	
14. What household activities do you engage the elderly in? (write all)	
15. Do you ask them to participate or do they volunteer on their own?	1. Participates on their own volution 2. Has to be ask ed to participate 3. There is a duty roaster
16. How do the elderly spend their free time?	1. Watching the television 2. Outside warming 3. Socialising with friends 4. In making handicrafts
17. Do the elderly take walks around the Institution?	1. Yes 2. No If Yes, move to question 20
18. If 'No' what hinders them from moving freely? (Add to	1. Back pains

the list)	2. Illnesses 3. No one to support them 4. Walking sticks 5. Fear of falling down 6. Absence of a supportive physical environment
19. What should be done to improve their ability to move around freely?	1. Introducing a physical education instructor 2. Equipping the Institution with play items 3. Introducing duty roosters for everyone 4. Building rails around the Institution that would allow for free movement 5. Introducing exercise sessions within the Institution
20. What activities can an average elderly do on their own?	1. Personal Hygiene 2. Bathing self 3. Feeding 4. Toileting 5. Stair climbing 6. Dressing 7. Chair to bed transfers
21. What can be done to improve the functionality of the elderly in your Institution?	1. Introducing a physical education instructor 2. Equipping the Institution with play items 3. Introducing duty roosters for everyone

	4. Building rails around the Institution that would allow for free movement 5. Introducing exercise sessions within the Institution
22 Have you required the services of a physiotherapist in the past one year for (name)?	1. Yes 2. No
NUTRITION	
23 Which meals do you prepare regularly in the Institution?	1. Breakfast 2. Snacks 3. Lunch **4.** Supper **5.** All the above
24 What time are the meals? **(Record the different times for the different meals)**	1. 6 – 9 am 2. 10 – 12 pm 3. 1-3 pm 4. 4-6 pm **5.** 7-9 pm
25 What do you feed the elderly on regularly? **(List foods as they are mentioned)**	1. Ugali 2. Mashed Potatoes 3. Sweetpotatoes/Yams 4. Chicken

	5. Minced beef 6. Sukuma wiki 7. Spinach **8.** Uji/Porriddge
26 How do you rate the meals that you give to the elderly? (Give a reason for your answer)	1. Adequate (Give reasons) _____ 2. Inadequate (Give reasons) _____
27 Do you have challenges on the types of food given to the elderly?	1. Yes 2. No If No, skip to question 29
28 What challenges do you face on the types of food given to the elderly? (Add to the list)	1. It has no variety 2. It is not served at fixed times 3. There is no variation in cooking methods 4. There is no variation in texture
29 What do you think can be done to improve the food	1. Create variety of meals 2. Increase the amount of serving

given to the elderly?	3. Increase the number of meal times 4. Vary the cooking methods 5. Vary the food texture 6. Prepare individualized meals to cater for the different needs of the eldelry
30 Does the elderly in your Institution experience constipation?	1. Yes 2. No
31 Do you provide alcohol for the elderly in the Institution?	1. Yes 2. No
32 If given a choice, would you rather care for the elderly in an institution or at home?	1. Care for them at home 2. Institutionalize them **If 1, go to 33** **If 2, go to 33**
33 Why would you want to care for them at home? **(List the reasons given)**	_____ _____ _____
34 Why would you rather have them Institutionalized? **(list the reasons given)**	_____ _____ _____ _____

Appendix 11: Key Informant Interview guide

My name is Judy Mugo, a PhD student in the Department of Community Health, Kenyatta University. I am conducting a study on the Nutritional status and Functionality of Institutionalized and Non-Institutionalized Eldelry in Nairobi County, in Kenya. Your voluntary participation, opinions, experiences and suggestions are very important to me for they will help me get accurate data and an understanding of the study. If you decide to take part you are still free to withdraw at any time and without giving a reason. Your name will not be recorded on the questionnaire and your responses will be anonymous. The Interview will take approximately 10 minutes. The data collected will be used strictly for academic purposes and will be treated with confidence. The results from this study will be used to improve on the care given to the elderly both at home and Institutions of the elderly in regard to their nutrition and functionality. If you are willing to participate, please sign below.

Signature ……..date……..

If you have any questions pertaining to this study, please contact

Judy Wairimu Mugo
Department of Environmental Health
Kenyatta University
P.O Box 43844- 00100
Nairobi, Kenya
Cell phone 0720 671 286
Email – wajudie@yahoo.com
Or
Director in charge of Research, Kenyatta University
P.O. Box. 43884-00100
Nairobi, Kenya.
Email: director-crd@ku.ac.ke
Website: www.ku.ac.ke

Thank you for your assistance.

a) Nutritional status of the Institutionalized Elderly

1. What policies do you have in place on the nutrition of the elderly?
2. Who organizes the feeding program in your Institution?
3. How many full meals do you prepare in a day?
4. What do you do with the elderly who are not able to feed themselves?
5. What do you do with the elderly who do not fit the set feeding programs/schedules?
6. How do you monitor the nutritional status of the elderly in you institutions?
7. How are the elderly on prescription drugs fed?
8. What observation would you like to make on the nutritional status of the elderly in your Institution?

b) Functionality of the Institutionalized Eldelry

1. What household activities are the elderly frequently involved in?
2. What physical activities are organized for the elderly in your Institution? (List them)
3. Are there differences in the level of functionality among the elderly?
4. What would you attribute the differences in the levels of activity to?
5. What measures have you put in place to promote their level of functionality?
6. How are the elderly with low levels of functionality managed?
7. Do you allow the elderly of different activity levels to interact freely or are there different environments set aside to cater for the different activity levels?
8. What measures are inplace to promote the levels of functionality among the elderly?
9. What observation would you like to make on the functionality of the elderly?

c) Impact of Functionality on the Nutritional Status of the Elderly

1. What would you say is the relationship between functionality and the nutritional status of the elderly?
2. Are the elderly of good functional level of good nutritional status?
3. Does change in the level of functionality impact on the nutritional status of the elderly?
4. Do you think that there is a relationship between the feeding patterns of an elderly person and the level of their functionality?

d) Institutional Characteristics that relate with Nutritional status and Functionality

1. Are the facilities, equipment and materials that you have put in place with the aim of promoting the nutritional status of the elderly and their functionality?
2. What prompted you to come up with the facilties mentioned above?
3. Is there a forum where the different Insitutions hold meetings to learn from the practices of each other?
4. What cadre of professionals do you have in the institution?
5. What plans do you have in regard to capacity building the human resource already working for you?
6. Are there any changes that you have made in the design and arrangement of your institution in order to promote functionality?
7. What would you say has made you manage the nutrition of the elderly to date?
8. What do you hope to review in order to improve on the nutritional status of the elderly in your Institution?
9. What would you say has made your institution promote the functionality of the elderly?
10. What is planned by the Institution towards the promotion of the functionality of the elderly?

Appendix 12: INFORMED CONSENT FOR THE MINI NUTRITIONAL ASSESSMENT, THE MODIFIED BARTHEL INDEX AND THE QUESTIONNAIRE

Good morning/afternoon/evening. My name is _____.

I am student of Kenyatta University. I am conducting a research on Nutritional Status and functionality of the Institutionalized and Non-Institutionalized elderly in Nairobi County Kenya.

Objectives of the study

This study aims to know whether the nutritional status of the elderly is related to the functionality of the elderly people, both Institutionalized and Non-Institutionalized in the Nairobi County. I will do the following to try and establish this.

I will take body measurements of the elderly people, that is the middle upper arm circumference, the calf circumference, Body Mass Index and check on the mobility and activity which I will rate using the Modified Barthel Index.

I will ask various questions to determine changes in body weight in the last three months and care practices of the care-givers at home and in the Institutions for the elderly. I will have a Key Informant Interview with the Heads of Institutions for the elderly to discuss the Institutional characteristics and policies in place to promote the nutritional status and functionality of the elderly.

Why am I inviting you to participate in the study

I request you to be a participant in my study because your home is located within the area of study. Your house was chosen randomly from all households in the area. I will include around 140 households in this study.

What is expected from the participants of the research study

If you agree to participate you will answer or fill in a questionnaire with questions regarding the above topic and your body measurements will be taken. Your caregiver is also expected to answer or fill a questionnaire on how they care for you.

Risks and benefits

Your participation will help me to understand/ gain knowledge on whether your nutritional status is related to your level of functionality and therefore understand how best to promote both your

nutritional status and level of functionality. Your participation will also allow me understand how you feel about your care-givers.

I am aware you could be uncomfortable answering some of the questions in the questionnaire; however we do not expect any harm to come to you or your family because of this process.

Benefits to participants /community

After the study has been concluded and I have ascertained that the nutritional status of the elderly impacts on the functionality of the elderly, I will engage care-givers both at home and in the Institutions, together with the local government officials in charge of Public Health and Sanitation and the local community leaders in educating the care-givers and heads of Institutions on the dangers of poor nutritional status and how they can promote the nutritional status and levels of functionality of the elderly. I will also share best practices in the promotion of nutritional status and functionality among the Institutions.

I will also advise that the Institutions for the elderly and homes where the elderly are living with their loved ones be rehabilitated in order to be environments that favor improved fucntionality of the elderly.

Rights not to participate

Participation is voluntary.

Privacy, anonymity and confidentiality

I will not require you to write your name or address or phone number on any part of the questionnaire.

This research is for academic purposes and any findings will never be traced back to you. The data and information will be kept in a locked cabinet. No name will appear or be mentioned during presentations made on the findings regarding this research.

Future use of data

Information collected will only be used for the purposes stated earlier. No further use.

In case of any publications made from findings of this research, the Institutions for the elderly will be acknowledged (blanket acknowledgement)

Principle of compensation

You do not to pay me or my research assistant for taking part in this study. Similarly we will not pay you money for participating in the study

If you agree to participate in this study please sign below

The interview will last approximately 30 minutes.

Signature ……..date……..

Research assistants name ……..

Signature ……..date ……

In case of any questions regarding this research contact

Judy Wairimu Mugo

Department of Environmental Health

Kenyatta University

P.O Box 43844- 00100

Nairobi, Kenya

Cell phone 0720 671 286

Email – wajudie@yahoo.com

Or

Director in charge of Research
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P.O. Box. 43884-00100
Nairobi, Kenya.
Email: director-crd@ku.ac.ke
Website: www.ku.ac.ke

Appendix 13: INFORMED CONSENT FOR KEY INFORMANT INTERVIEW

Introduction and purpose of the research

Good morning/afternoon/evening. My name is _____.

I am student of Kenyatta University. I am conducting a research on Nutritional status and functionality of the elderly in Nairobi County Kenya.

Objectives of the study

This study aims to know whether the nutritional status of the elderly is related to the functionality of the elderly people, both Institutionalized and Non-Institutionalized in the Nairobi County. I will do the following to try and establish this.

I will take body measurements of the elderly people, that is the middle upper arm circumference, the calf circumference, Body Mass Index and check on the mobility and activity which I will rate using the Modified Barthel Index.

I will ask various questions to determine changes in body weight in the last three months and care practices of the care-givers at home and in the Institutions for the elderly. I will have a Key Informant Interview with the Heads of Institutions for the elderly to discuss the Institutional characteristics and policies in place to promote the nutritional status and functionality of the elderly.

Why am I inviting you to participate in the Study

I request you to be a participant in my study because your Institution for the elderly is located within Nairobi County. You were chosen randomly from a group of 14 Institutions for the elderly in the Nairobi County, which is my study site.

What is expected from the participants of the research Study

If you agree to participate, I will involve you in a Key Informant Interview as the head of this Institution on Institutional characteristics that promote the nutritional status and functionality of the elderly people.

Risks and benefits

Your participation will help me to understand/ gain knowledge on whether you are aware of the importance of promoting the nutritional status and functionality of the elderly and of the dangers of poor nutritional status and poor functionality of the elderly. It will also help me gain knowledge on whether the elderly are aware of their nutritional status and level of functionality.

I am aware you could be uncomfortable discussing these topics; however we do not expect any harm to come to you or your Institution because of this process.

Benefits to participants /community

After the study has been concluded and I have ascertained that the Nutritional status of the elderly is related to their level of functionality, I will engage the 14 Institutions for the elderly in the Nairobi County in discussing the Institutional Characteristics that were found to promote the nutritional status and functionality of the elderly and how to implement them in the County. This will later be disseminated to the other 46 Counties in the Country through the Ministry of Gender, Children and Social Services. The elderly will also be educated on the dangers of poor nutritional status and functionality and how to promote them.

The best Institutional characteristics that Promote nutritional status and functionality will be documented for use and adoption by those who may in the future wish to start Insitutitions for the elderly in the country.

Rights not to participate

Participation is voluntary.

Privacy, anonymity and confidentiality

I will not require you to write your name or address or phone number on any part of the questionnaire.

This research is for academic purposes and any findings will never be traced back to you. The data and information will be kept in a locked cabinet. No name will appear or be mentioned during presentations made on the findings regarding this research.

Future use of data

Any information collected will only be used for the purposes stated earlier. No further use. In case of any publications made from findings of this research, your Institution for the elderly will be acknowledged (blanket acknowledgement)

Principle of compensation

I will meet the Key Informants at places that are convenient to them and if away from their Institutions, I will provide tea or soft drink and a snack for them and pay bus fare for those participants who will have come to the meeting place by means of a bus. There will be no monetary allowance attached to participation to this study other than those mentioned above.

If you agree to participate in this study please sign below

The Key Informant Interview will last approximately 45 minutes.

Signature ……..date……..

Research assistants name ……..

Signature ……..date ……

In case of any questions regarding this research contact

Judy Wairimu Mugo

Department of Environmental Health

Kenyatta University

P.O Box 43844- 00100

Nairobi, Kenya

Cell phone 0720 671 286

Email – wajudie@yahoo.com

Or

Director in charge of Research

Kenyatta University
P.O. Box. 43884-00100
Nairobi, Kenya.
Email: director-crd@ku.ac.ke
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Data collection tools in Swahili

Appendix 14: CHOMBO KIDOGO CHA KUTATHMINI LISHE VIAMBATISHO

Mpango wa Huduma

Jina la mwisho la mteja: _____, Jina la kwanza_____ (Vifupi_____)

Umri: _____ Uzito kg. _____ Urefu cm._____

Alama yako ya lishe ni_____

Kulinanga na chombo cha kutathmini lishe, umepatikana kuwa:

_____Mwenye sia nzuri

_____Katika hatari wa kutapia mlo

_____Wa kutapia mlo

Kupendekeza –

____ Kuendelea na mpango wa sasa wa lishe –hakuna mabadiliko

____ Kufuatilia na mhudumu wa lishe

KUTATHMINI LISHE KWA UFUPI

SEHEMU I. KUTATHMINI VIPIMO

Maelekezo: Jaza dodoso hii kwa kuandika idadi ya alama zilizopatokana katika masanduku yaliyo katika upande wa kulia wa maswali.

Ongeza idadi katika masanduku na linganisha ujumla wa alama naza kiashiria cha utapia mlo kwenyea ukurasa 4.

1.	Kipimo cha uzani wa mwili(uzito kwa Kg)/(urefu kwa m) = a. Kipimo cha uzani < 19 = alama 0 b. Kipimo cha uzani 19 to < 21 = alama 1 c. Kipimo cha uzani 21 to < 23 = alama 2 d. Kipimo cha uzani > 23 = alama 3	**Alama** _____
2.	Kipimo cha uduara wa sehemu ya kati wa mkono (MAC) katika cm. a. MAC < 21 cm. = alama 0.0 b. MAC 21 < 22 cm. = alama 0.5 c. MAC >22 cm. = alama 1.0	_____
3.	Kipimo cha uduara wa sehemu ya nyuma ya mguu (CC) katika cm. a. CC < 31 cm = alama 0 b. CC > 31 cm = alama 1	_____
4.	Je umepoteza uzito kipindi cha miezi tatu zilizopita a Kupoteza uzito zaidi ya kilo 3 (6.6 lbs.) = alama 0 b. Hajui = alama 1 c. Kupoteza uzito kati ya kilo 1 na 3. (2.2 lbs. and 6.6 kg.) = alama 2 d. Hakuna kupoteza uzito = alama 3	_____

Jumla za alama kwa sehemu hii 1 = _____

Ongeza alama za sehemu II Utathmini kwa jumla = _____

Sehemu III Utathmini wa kibinafsi = _____

KUTATHMINI LISHE KWA UFUPI

SEHEMU YA II. UTATHMINI KWA JUMLA

Maelekezo: Jaza dodoso hii kwa kuandika idadi ya alama alizopata katika masanduku zilizoko kwenye kulia za maswali.

Ongeza idadi katika masanduku na linganisha utathmini kwa ujumla na alama ya ujumla wa utathmini wa utapia mlo katika uk. 4.

1.	**Je unaishi kwa kujitegemea?** (Sio kwenye nyumba ya uuguzi ama kusaidiwa kuishi) A La = alama 0 a. Ndiyo = alama 1	_____
2.	Je unatumia **zaidi ya madawa 3 zilozopendekezwa na daktari** kwa siku? a. Ndiyo = alama 0 b. La = alama 1	_____
3.	Je umepatwa na **msongo wa kisaikologia** ama **ugonjwa wa ghafla** katika miezi 3 **zilizopita?** a. Ndiyo = alama 0 b. La = alama 1	_____
4.	**Ugonjwa:** a. Unatumia kiti cha magurudumu = alama 0	

	b. Unaweza kutoka kwenya kitanda/kiti lakini huendi njee peke yako = alama 1 c. Unatoka njee peke yako = alama 2	_____
5.	**Matatizo ya ubongo na saikologia:** a. Ana shida za akili au unyogovu = alama 0 b. Shida za akili za ustani = alama 1 c. Hana shida za kisaikologia = alama 2 Alama za hali ya akili kwa ufupi _____/30	_____
6.	**Hali ya ngozi:** Una uvimbe au vidonda (kuangalia mwili) a. Ndiyo = alama 0 B La = alama 1	_____

SEHEMU YA III. UTATHMINI WA KIBINAFSI

1.	Kwa mtazamo wako unaona kama una matatizo ya lishe? a. Ndiyo –shida kubwa za utapia mlo = alama 0 b. Hajui au ana matatizo ya wastani = alama 1 c. La – hana matatizo ya lishe = alama 2	_____
2.	Ukilinganisha na wengine wa umri wako, unalinganishaje hali yako ya afya? a. Sio nzuri sana = alama 0.0 b. Sijui = alama 0.5 c. Ni kama wengine = alama 1.0 d. Nzuri kushinda wengi = alama 2.0	_____

Sehemu I Alama za kutathmini vipimo = _____

Sehemu II Alama za utathmini wa jumla = _____

Sehemu III Alama za utathmini wa kibinafsi = _____

KUTATHMINI LISHE KWA UFUPI

SEHEMU YA IV KUTATHMINI MLO

1.	Una kula mlo kamili mara ngapi kwa siku? a. Mlo 1 kamili kila siku =alama 0 b. Mlo 2 kamili kila siku = alama 1 c. Mlo 3 kamili kila siku = alama 2	_____
2.	Vipimo zilizo chaguliwa za kukadiria ulaji wa protini • Angalau uhudumu moja wa bidhaa za maziwa (maziwa, jibini, mtindi) kwa siku? Ndiyo____ La____ • Mbili au zaidi resheni ya kunde na maboga yake au mayai kwa wiki? Ndiyo___ La ____ • Nyama, Samamki, au kuku kila siku? Ndiyo____ La____ a. Kama majibu ya Ndiyo ni 0 au 1 = alama 0.0 b. Kama majibu ya Ndiyo ni 2 = alama 0.5 c. Kama majibu ya Ndiyo ni 3 = alama 1.0	_____
3.	Je unatumia resheni mbili au zaidi ya matunda au mboga kwa siku? a. La = alama 0 b. Ndiyo = alama 1	_____
4.	Ulaji wako wa chakula umepungua kati ya miezi tatu iliyopita kwa ajili ya kupoteza hamu ya kula, matatizo ya utumbo, kutafuna au shida za kumeza ? a. Hali kali ya kupoteza hamu ya chakula = alama 0 b. Kupoteza hamu ya kula kwa kadri = alama 1 c. Hakuna kupoteza hamu ya kulano loss of appetite = alama 2	_____
5.	Kiasi gain ya umaji (maji, juisi, chai, maziwa …) wewe hutumia kila siku? (kikombe 1 = 8 ounces)	

	a. Chini ya vikombe 3 = alama 0.0 b. Kati ya vikombe 3 na 5 = alama 0.5 c. Zaidi ya vikombe 5 = alama 1.0	_____
6.	Uwezo wa kujilisha a. Unahitaji usaidizi na mlo/kulisha = alama 0 b. Uwezo wa kujilisha, lakini kuna ugumu = alama 1 c. Uwezo wa kujilisha mwenyeweable (hakuna matatatizo) = alama 2	_____

Ujumla za alama za sehemu ya IV Kutathmini mlo = _____

Ongezea Sehemu I Alama za utathmini vipimo = _____

Sehemu II Alama za Utathmini wa jumla = _____

Sehemu III Alalma za utahmini wa kibinafsi = _____

JUMLA YA ALAMA YA CHOMBO CHA UTATHMINI (Upeo alama 30)

JUMLA =_____

KIASHERIA ZA ALAMA ZA UTAPIA MLO

> alama 24 = Siha nzuri _____

alama 17 hadi 23.5 = Katika hatari ya utapia mlo _____

< alama 17 = utapia mlo _____ ***Msahauri mtaalamu wa lishe

Kiambatisho 15: Vipimo vya Barthel (MBI)

Jina_____Anayeratibu_____Tarehe_____

___

Vitu	**Hawezi kufanya kazinable**	**Anajaribu kazi lakini si salama**	**Usaidiza kadri unatakikana**	**Usaidiza mdogo unatakikana**	**Kujitegemea kikamilifu**
Usafi wa kibinafsi	0	1	3	4	5
Kuoga mwenyewe	0	1	3	4	5
Kujilisha	0	2	5	8	10
Kuenda choo	0	2	5	8	10
Kupanda ngazi	0	2	5	8	10
Kuvaa	0	2	5	8	10
Kukimu choo	0	2	5	8	10
Kukimu kibofu	0	2	5	8	10
Matembezi (Kiti ya magurudumu*)	0 (0)	3 (1)	8 (3)	12 (4)	15 (5)
Kutoka kwa kiti hadi kitandani	0	3	8	12	15
FIM (0-100)					

***Weka alama tu kama mzee anashindwa kutembea na amefunzwa vyema kuthibiti kiti ya magurudumu**

Kiambatisho 16: Ufafanuzi wa vipimo vya Barthel (MBI)

Jamii	Alama jumla za MBI	Kiwango cha kutegemea
1	0-24	Jumla
2	25-49	zaidi
3	50-74	Kadri
4	75-90	Chini
5	91-99	Mdogo

Kiambatisho 17: Mahojiano kwa wanaopeana huduma nyumbani na katika taasisi

Takrimu za watu

35 Umri

36 Jinsia

37 Hali ya ndoa:

- Ashawahi olewa
- Hajawai olewa
- Mjane
- Talaka

38 Ngazi ya elimu

39 Idadi ya watoto Hai----------Waliofariki----------

40 Sehemu ya kuzaliwa

41 Tatizo au maradhi ya kawaida(inayo julikana)

UZOEFU WA ZAMAMNI

Hali ya kijamii na kiuchumi (Weka alama kwa nafasi mwafaka)

42 Hali ya kazi sasa/Cheo

43 Kwa muda gain umekuwa ukihudumia (jina) au kufanya kazi katika taasisi hii?

44 Lini ulianza kuishi na (jina)? Je, ni urefu gani kwa ustani wa kukaa na wazee katika taasisi hii?

45 Ninini ilikuhimiza kukaa na (jina)/ ni nini sababu za wazee kuletwa katika taasisi hii?

SHUGHULI

46 Ni shughuli zipi wewe hushiriki mara kwa mara nyumbani (andika yote)/ unafanya nini au kushiriki katika taasisi hii au nyumbani?

47 Je unauliza (jina) kushiriki? Je wakongwe ushiriki au kukusaidia?

48 Je, (jina) utumia aje mda wao wa bure? Jinsi gani wazee kutumia muda wao wa bure?

49 Ni nini baadhi ya hofu unazo kuhusiana na kujali kwako kwa (jina)? / Nini unaweza sema ni hofu kwa taasisi katika kutunza wazee katika taasisi hii?

50 Ni hofu gani (jina) ameonyesha kuwa nayo /Ni hofu gani za kawaida kwa wazee katika taasisi yako?

51 Je, (jina) uzunguka kwa uhuru? /Je wazee huzunguka kwa uhuru?

- Ndiyo
- La (Weka alama ipasavyo)

52 Kama 'La' nini inawazuia kutembea kwa uhuru?

53 Nini inaweza kufanywa ili kuboresha uwezo wao wa kutembea kwa uhuru?

54 Shughuigani zingine wazee wanaweza kufanya wenyewe?

55 Nini inaweza fanywa ili kuboresha kiwango cha utendaji kazi nyumbani?

56 Je, umehitaji huduma za daktari wa misuli katika mwaka mmoja uliyopita?/Taasisi imehitaji huduma za daktari wa misuli katika mwaka mmoja uliopita?

LISHE

57 Ni mlo zipi unaandaa mara kwa mara kwa (jina)?/Ni mlo gain wazee hupewa mara kwa mara?

58 Kiamsha kinyua----------Chakula cha mchana----------Chakula cha usiku----------

59 Ni lini wakati wa mlo? (nakili nyakati tofauti kwa ajili ya mlo mbalimbali)

60 Nini wajilisha mara kwa mara? (Andika orodha kama vile yanatajwa)

61 Unazilinganisha vipi mlo unazompa (jina) /Unazilinganisha vipi mlo wananopewa wazee katika taasisi yako?

- Ya kutosha (Toa sababu)
- Si ya kutosha (Toa sababu)

62 Je una matatizo yoyote na chakula anayopewa (jina)? Je, una matatizo yoyote na chakula wanayopewa wazee katika taasisi yako? (orodhesha hayo)

63 Nini unafikiri kifanyike kuboresha vyakula wanavyo pewa wazee?

64 Je, (jina) huwa na uzoefu wa kuvimba tumbo? Wazee katika taasisi huwa na uzoefu wa kuvimba tumbo?

65 Je, (jina) unyua bia? /Wazee katika taasisi yako huwa na uwezo wa kupata bia?

- Ndiyo
- La

Kiambatishi 18: Mwongonzo wa mahojiano

9. Ni shughuli gani wazee hushiriki maranyingi?
   (Weka alama kilichotajwa na chungunguza kisichotajwa, weka msalaba dhidi ya yale wanaweza kufanya)
   Kufagia sakafu----------
   Kumwagilia mimea maji----------
   Kuoga----------
   Kupanguza ----------
   Kusongesha vifaa vya nyumbani----------
   Kuosha manguo----------
   Kuosha vyombo----------
   Kupiga pasi----------
   Kutandika kitanda----------
   Kuvaa----------
   Kucheza mziki----------
   Kusoma mfano. Bibilia, gazeti
   Zingine (Taja)
10. Ni shughuli gain nyumbani, wazee wana nia zaidi ya yote?
11. Shughuli gani za kimwili zinatolewa kwa ajili ya wazee nyumbani? (orodhesha hayo)
12. Je, ni shughuli gani wazee hufanya mara kwa mara kwa kawaida katika taasisi hii?
13. Je ni vipi tabia ya kula ya wazee?
14. Je, taasisi yako inachunguza hali ya lishe ya wazee? Kama ndiyo, marar ngapi?
15. Je, kuna mtu wa kuwajibika kwa hali ya lishe ya wazee?
16. Je, ni vipi maoni yako kwa ujumla kuhusu hali ya lishe na maisha ya wazee?
17. Je, kuna kuna maoni mengine ungependa kueleza kuhusu hali ya lishe ya wazee katika taasisi hii?
18. Je, kuna maoni mengine ungependa kueleza kuhusu utendaji wa wazee katika taasisi yako?
19. Je, kuna kitu kingine chochote katika mazingira ambayo ungesema inachangia utendaji wao?

Kiambatisho 19: RIDHAA YA TATHMINI YA LISHE KWA UFUPI, VIPIMO VYA BARTHEL NA HOJAJI

Habari za asubuhi/mchana/jioni. Jina langu ni _____.

Mimi ni mwanafunzi wa chuo kikuu cha Kenyatta . Nafanya utafiti juu ya Hali ya lishe na utendaji wa wazee wa kitaasisi na wazee wasio wa taasisi katika jimbo la Nairobi Kenya.

Madhumuni ya utafiti

Utafiti huu unalenga kujua kama hali ya lishe ya wazee inahusiana na utendaji wa watu wazee, walio katika taasisi na wasio katika taasisi katika njimbo la Nairobi. Nitafanya yafuatayo kujaribu na kusawazisha haya.

Nitachukua vipimo vya mwili za watu wazee, zikiwa ni uduara wa sehemu ya katikati wa mkono, uduara wa sehemu ya nyuma ya mguu, Uzani wa mwili kulingana na urefu na kuangalia hali ya kutembea na uwezo wa kusonga ambazo nita ambatanisha na vipimo vya Barthel .

Nitauliza maswali mbalimbali ili kuelewa mabadiliko katika uzito wa mwili katika miezi mitatu iliyopita na mazoea ya uangalizi wa mtoa huduma nyumbani na katika taasisi za wazee.Nitakuwa na mahojiano muhimu na Wakuu wa taasisi za wazee na kujadli sifa za taasisi na sera zilizoko kukuza lishe na utendaji wa wazee .

Kwa nini nakualika kushiriki katika utafiti

Nakuomba kuwa mshiriki katika utafiti wangu kwa sababu nyumba yako iko ndani ya eneo la utafiti. Nyumba yako ilichaguliwa nasibu kutoka katika eneo hili. Nitajumlisha nyumba kama 140 katika utafiti huu.

Kinachotarajiwa kutoka kwa washiriki wa utafiti

Kama umekubali kushiriki utajibu ama kujaza dodoso na maswali kuhusu mada ilyo hapo juu na vipimo vyako zitachukuliwa.Mhudumu wako pia antarajiwa kujibu au kujaza dodoso jinsi wanavyokuhudumia.

Hatari na faida

Ushiriki wako utanisaidia kuelewa/ kupata maarifa juu ya kama hali yako ya lishe inahusiana na hali yako ya utendaji na kwa hiyo kuelewa namna bora ya kukuza hali ya lishe na kiwango cha utendaji. Ushiriki wako pia utaniwezesha kuelewa unavyohisi kuhusu wahudumu wako.

Natambua kuwa unaweza kuwa na wasiswasi kujibu baadhi ya maswaliya dodoso; hata hivyo hatutaraji madhara yoyote kwako au familia yako kutokana na mchakato huu.

Faida kwa washiriki /jamii

Baada ya utafiti kutamatishwa na nime bainisha kuwa hali ya lishe ya wazee ina athari juu ya utendaji wa wazee, Nitashirikisha wahudumu wa nyumbani na taasisi, pamoja na maofisa wa serikali za mtaa wanaohusika na Afya ya Umma na Usafi wa Mazingira na viongozi wa jamii katika kuwaelimisha wahudumu na wakuu wa taasisi juu ya hatari za lishe duni na jinsi gani wanaweza kukuza hali ya lishe na utendaji kati ya Taasisi.

Nami pia nitashauri kuwa Taasisi za wazee na majumba ambapo wazee wanaishi na wapendwa wao kukarabatiwa ili kuwa mazingira yanayofaa kuboresha utendaji wa wazee.

Haki ya kutoshoriki

Ushiriki ni wa hiari.

Faragha, kutojulika na usiri

Sitahitaji wewe kuandika jina lako au anwani au namba yako ya simu katika sehemu yoyote ya dodoso.

Utafiti huu ni kwa madhumuni ya kielimu na matokeo yoyote kamwe hayatafwatiliwa nyuma hadi kwako. Takwimu na taarifa yatawekwa katika sehemu iliyofungwa. Hakuna jina itaonekana au kutajwa wakati wa mawasiliano yaliyotolewa juu ya matokeo ya utafiti kuhusu utafiti huu.

Matumizi ya baadaye ya takwimu

Taaarifa zilizokusanywa zitatumika kwa madhumuni yaliyotajwa hapo hawali pekeyake.Hakuna matumizi mengine .

Kama kutakuwa na mchapisho yoyote kutokana na matokeo ya utafiti huu, Taasisi ya wazee litakiriwa (kukiri kwa jumla)

Kanuni ya fidia

Haufai kunilipa au msaidizi wangu kwa kushiriki katika utafiti huu. Vilivile hatutakulipa fedha kwa ajili ya kushiriki katika utafiti.

Kama unakubakali kushiriki katika utafiti huu tafadhali weka alama hapa chini.

Mahojiano yatadumu kwa takriban dakika 30.

Sahihi…….Tarehe……..

Jina ya msaidizi wa utafiti……..

Sahihi……..tarehe ……

Kwa maswali yoyote kuhusu utafiti huu wasiliana na

Judy Wairimu Mugo

Idara ya Afya ya Mazingira

Chuo kikuu cha Kenyatta

S.L.P 43844- 00100

Nairobi, Kenya

Rununu 0720 671 286

Barua pepe – wajudie@yahoo.com

Au

Mkurugenzi mkuu wa Utafiti
Chuo kikuu cha Kenyatta
S.L.P. 43884-00100
Nairobi, Kenya.
Barua pepe: director-crd@ku.ac.ke
Tovuti: www.ku.ac.ke

Kiambatishi 20: RIDHAA YA MAHOJIANO

Utangulizi na lengo la utafiti

Habari za asubuhi /mchana/ jioni. Jina langu ni _____.

Mimi ni mwanafunzi wa chuo kikuu cha Kenyatta. Ninafanya utafiti juu ya hali ya lishe na utendaji wa wazee katika jimbo la Nairobi Kenya.

Madhumuni ya utafiti

Utafiti huu unalenga kujua kama hali ya lishe ya wazee unauhusiano na utendaji wa watu wazee, walioko kwaenye taasisis na wasio kwenye taasisi katika jimbo la Nairobi . Nitafanya haya ili kubaini haya.

Nitachukua vipimo vya mwili za watu wazee, zikiwa ni uduara wa sehemu ya katikati wa mkono, uduara wa sehemu ya nyuma ya mguu, Uzani wa mwili kulingana na urefu na kuangalia hali ya kutembea na uwezo wa kusonga ambazo nita ambatanisha na vipimo vya Barthel.

Nitauliza maswali mbalimbali ili kuelewa mabadiliko katika uzito wa mwili katika miezi mitatu iliyopita na mazoea ya uangalizi wa mtoa huduma nyumbani na katika taasisi za wazee. Nitakuwa na mahojiano muhimu na Wakuu wa taasisi za wazee na kujadli sifa za taasisi na sera zilizoko kukuza lishe na utendaji wa wazee

Kwa nini nakualika kushiriki katika utafiti

Nakuomba kuwa mshiriki katika utafiti wangu kwa sababu nyumba yako ya wazee ikokatika jimbo la Nairobi. Ulichaguliwa nasibu kutoka kwa Taasisi 14 za wazee katika jimbo la Nairobi, ambayo ndiyo eneo langu la utafiti.

Kinachotarajiwa kutoka kwa washiriki wa utafiti

Kama umekubali kushiriki, nitakushirikisha katika dodoso kama mkuu wa Taasisi juu ya tabia ya taasisi zinazokuza lishe na utendaji wa watu waze

Hatari na faida

Ushiriki wako utanisaidia kuelewa/ kupata maarifa kama unafahamu umuhimu wa kukuza hali ya lishe na utendaji wa wazee na hatari ya lishe duni na utendaji mbovu wa wazee. Pia itasaidia kupata maarifa kama wazeewanafahamu hali zao za lishe na kiwango cha utendaji

Natambua kuwa unaweza kuwana wasiswasi kujadili baadhi ya mada hizi; hata hivyo hatutarajii madhara yoyote kwenu au taasisi yako kutokana na mchakato huu.

Faida kwa washiriki /jamii

Baada ya utafiti kutamatishwa na nime bainisha kuwa hali ya lishe ya wazee ina athari juu ya utendaji wa wazee, Nitashirikisha taasisi zote 14 za wazee katika jimbo la Nairobi katika kujadili tabia za taasisi ambazo zinakuza hali ya lishe na utendaji wa wazee na jinsi ya kuyatekeleza katika jimbo. Hii baadaye itasambazwa kwa majimbo mengine nchini kupitia Wizara ya Jinsia, Watoto na Huduma za Jamii.Wazee pia wataelimishwa juu ya hatari ya utapia mlo na utendaji na jinsi ya kuzikuza

Sifa nzuri za taasisi zinazokuza hali ya lishe na utendaji zitanukuliwa kwa matumizi na kupitishwa na wale ambao siku zijazo wataka kuanza taasisi za wazee katika nchi.

Haki ya kutoshiriki

Ushiriki ni wa hiari.

Faragha, kutojulika na usiri

Sitahitaji wewe kuandika jina lako au anwani au namba yako ya simu katika sehemu yoyote ya dodoso.

Utafiti huu ni kwa madhumuni ya kielimu na matokeo yoyote kamwe hayatafwatiliwa nyuma hadi kwako. Takwimu na taarifa yatawekwa katika sehemu iliyofungwa. Hakuna jina itaonekana au kutajwa wakati wa mawasiliano yaliyotolewa juu ya matokeo ya utafiti kuhusu utafiti huu

Matumizi ya baadaye ya takwimu

Taaarifa zilizokusanywa zitatumika kwa madhumuni yaliyotajwa hapo hawali pekeyake.Hakuna matumizi mengine .

Kama kutakuwa na mchapisho yoyote kutokana na matokeo ya utafiti huu, Taasisi ya wazee litakiriwa (kukiri kwa jumla.

Kanuni ya fidia

Nitakutana na wakuu wa habari katika maeneo ambayo ni rahisi kwao na ikiwa mbali na taasisi zao, nami nita gharamia chai au kinywaji laini na vitafunio kwa ajaili yao na kulipa nauli ya basi kwa ajili ya washiriki ambao watakuja mahali pa mkutano kwa njia ya basi. Hakutakuwa na posho ya kwa kushiriki katika utafiti huu zaidi ya yale yaliyotajwa hapo juu.fedha.Kama unakubali kushiriki katika utafiti huu tafadhali weak sahihi hapa chini

Mahojiano maalum yatadumu kwa takriban dakika 45.

Sahihi ……..tarehe……..

Jina la msaidizi wa utafiti……..

Sahihi ……..tarehe ……

Ikiwa una maswali yoyote kuhusu utafiti huu wasiliana na

Judy Wairimu Mugo

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