

**DETERMINATION OF PREVALENCE AND RISK FACTORS ASSOCIATED  
WITH MALNUTRITION AMONG THE ELDERLY IN KIAMBU COUNTY**

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## DECLARATION

I declare that this research thesis is my original work and has not been presented in another university.

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## **DEDICATION**

I dedicate this research thesis to my husband Alex and my children Joan, Lillian, Allan and Evelyn for their encouragement at all times.

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I thank the Almighty God for strength and good health through the whole project. I thank my supervisors Dr. Job Mapesa, PhD and Dr. Naftali Oirere, for their continuous correction, guidance and support. Yours has been an invaluable contribution, I am sincerely grateful. To all the respondents who consented to participate in this study and set aside their precious time to answer the questions, you are the heartbeat of this study and without you it could not have been a success. Last but not least is to all my classmates: Amina, Belinda, Nimo, Mafuko and Grace, this has been a journey and your support and presence has made it enjoyable and fun.

## ABSTRACT

Nutrition among the elderly persons is associated with the quality of life (QoL) and functional quality. Malnutrition is prevalent among the elderly who are a particularly vulnerable group. Studies show that up to half (6-48%) of elderly Africans in SSA are underweight. The percentage of older people at risk of malnutrition in most Kenyan Counties has increased to 29.6% from 20.1% in 2015 (Waudu et al., 2018). Kiambu County is one of the areas with a higher number of elderly people and one of the areas most affected by the malnutrition in this age group. This study sought to determine the prevalence of malnutrition among the elderly and its relationship with socio-economic status, meals patterns and nutritional status. The objectives of the study were to find out the prevalence of malnutrition among the elderly, establish the relationship between socio demographic and socio-economic characteristics and malnutrition among the elderly, to assess the effect of dietary practices on malnutrition among the elderly and determine the risk factors associated with malnutrition among the elderly. The study adopted a cross sectional descriptive design and the tools included Mini Nutritional Assessment (MNA) tool, tapes for measuring the Mid- Upper Arm Circumference and Calf Circumference, Weighing Scale and a dietary questionnaire. The study found that prevalence of malnutrition in the sample stands at 42%; 22% were at risk of malnutrition while 36% had normal nutrition status. Among the socio-demographic characteristics, gender ( $p=0.001$ ) and education level ( $p=0.035$ ) were significant. There was a significant relationship ( $p=0.000$ ) between socio economic status and the nutrition status of the respondents. Skipping of meals ( $p=0.003$ ) and number of meals ( $p=0.042$ ) were significant in the dietary practices domain. Regression analysis showed that socio-economic status ( $p=0.000$ ) was significant. This study revealed a 42.0% prevalence of malnutrition in the elderly. This was higher than most of similar studies reviewed and it indicates a public health problem that needs urgent attention. Overall, analysis showed that socio-economic status to the most important risk factor of malnutrition among the elderly. The lack of adequate income and reduced physical function to pursue employment meant that majority of the respondents were of low socio-economic status. The study therefore recommended that health policy makers should incorporate and include planning for the elderly as they have done with other vulnerable groups like children less than five years. Efforts should also be initiated to help the elderly to adopt healthy life style practices especially with regards to their food intake.

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## ABBREVIATIONS AND ACRONYMS

<b>ADL</b>	Activities of Daily Living
<b>Asymp Sig</b>	Asymptotic Significance
<b>BMD</b>	Bone Mineral Density
<b>COPD</b>	Chronic Obstructive Pulmonary Disease
<b>DDS</b>	Dietary diversity score
<b>df</b>	Degrees of Freedom
<b>HAI</b>	Help Age International
<b>IADL</b>	Instrumental Activities of Daily Living
<b>MNA</b>	Mini Nutrition Assessment for Elderly
<b>WHO</b>	World Health Organization

# CHAPTER ONE

## INTRODUCTION

### 1.1 Introduction

This chapter introduces the concepts, variables and boundaries of the study. It includes the background of the study and the statement of the problem. Also stated are the purpose, objectives and research questions of the study. The justification, limitations, delimitations, significance and assumptions of the study are also provided.

### 1.2 Background of the Study

Malnutrition is a term used to describe a lack of balance in nutrients consumed by an individual. Malnutrition amongst the elderly people frequently occurs due to functional and physiological adjustments that come with advancing age, insufficient food and lack of monetary support. The functional fame of the elderly is their capability to carry out their everyday activities, which consists of meals instruction and consumption thus, affecting their nutritional status (Ranganath et al., 2017). There is a perception that malnutrition among the elderly people is most common in hospitals and institutions for the elderly, however, that is not the case as malnutrition is most common for elderly people who are at home. They tend to be given less attention due to the necessities that come with taking care of them.

One in nine people are still hungry or undernourished, while 149 million children under 5 years of age are still affected by stunting globally according to World Health Organisation (WHO, 2020a). According to Food and Agriculture organisation (FAO, 2021), it is estimated that between 720 and 811 million people in the world faced

hunger in 2020. World Health Organisation (2017) reports that the prevalence of undernutrition in older people living in the community ranges between 1.3% and 47.8%. Studies around the world show a prevalence of malnutrition among elderly ranging from 13% to 54%. Studies also show that the prevalence of malnutrition among elderly is higher in developing countries compared to developed world (Damayanthi et al., 2018). In sub-Saharan Africa in particular, the prevalence is extremely high (over 30%) (WHO, 2017). Despite unavailability of nationally representative data available studies show a high prevalence of malnutrition among the elderly in Kenya. Based on WHO BMI cutoffs, 39.4% elderly persons were undernourished, 50.7% were normal, 7.2% overweight and 2.6% were obese in a study by Munoru (2018). Bore (2019) in Uasin Gishu County estimated the prevalence of undernutrition to be 41 percent. In a facility-based study at Mbagathi Achar (2019) found that the prevalence of the risk of malnutrition was 81.9% on admission and 77.6% on discharge.

For the healthy elderly people, intervention is also required since they tend to have poor diets hence, low intake of nutrients, which can lead to future complication (Nyberg et al., 2018). On an account of better health facilities, improved education, and significant increase in life expectancy, there has been an unprecedented increase in human longevity. Exponential growth among the elderly worldwide can be attributed to improved nutrition. The rapid rise in the elderly population has however, posed numerous challenges and daunting problems. Lack of guaranteed adequate income to support themselves, loss of recognition and social status, unavailability of opportunities for innovation and creativity during their free time, and persistent ailments associated with age (Jyväkorpä et al., 2015). The global number of the

elderly is projected to rise to nearly 1500 million in 2050 from 525 million in 2010 (Agarwalla et al., 2015).

Mortality and morbidity of the elderly in African countries is on the rise due to poverty, negligence, deprivation, poor access to health care, and inadequacy in quantity and quality of their diet. Nutrition interventions in African countries are primarily directed towards young children, infants, and lactating and pregnant women. Additionally, in crisis circumstances, old people are not designated as a need bunch for philanthropic help. Despite nutritional programmes including the elderly, they are often implemented within an environment where there is no expert guidance on the particular needs of this age group, resulting in interventions, which are often inappropriate (Kamiya et al., 2017).

Ageing is often associated with various physiological, social, pathological, and psychological needs as well as changes, which make elderly people susceptible to malnutrition. Traditionally, intake of food tends to decrease as one advances in age subsequently, in order to compensate for the diminished energy needs that are associated with lowered basal metabolic rate and physical activity, care for the elderly is imperative. Ageing is associated with health deterioration due to decreased resistance to diseases in the body. The cumulative effect of the interaction between decrease in nutrition and changes witnessed in ageing results in progressive under-nutrition which often goes undiagnosed among the elderly (Ghimire et al., 2017). Nutrition among the elderly persons is associated with the quality of life (QoL) and functional quality.

According to a study carried out by Agarwalla et al. (2016) on the assessment of the nutritional status of the elderly and its correlates, altered nutrition among the elderly

in India is mainly caused by physiological factors such as, decrease in neuromuscular coordination and gastrointestinal tract changes and socioeconomic factors such as income. Issues such as the loss of taste and smell highly contribute to altered nutrition status for the elderly. Decreased neuromuscular coordination causes less muscle movement, which results in conditions like arthritis. Gastrointestinal tract muscles grow weaker with ageing and constipation issue arises (Kohrs et al., 2016).

### **1.3 Statement of the Problem**

Aging is linked to significant changes in the physiological and consequently, immune function of the elderly, particularly cell-mediated immunity, which results in progressive generalized impairment that increases vulnerability to infectious diseases. Numerous strategies have been implemented with the aim of improving the health and well-being of elderly people in Kenya. Despite implementation of these strategies, malnutrition among the elderly persists. The percentage of older people at risk of malnutrition in most Kenyan Counties has increased to 29.6% from 20.1% in 2015 (Waudu et al., 2018). Kiambu County is one of the areas with a higher number of elderly people and one of the areas most affected by the malnutrition in this age group. However, data on prevalence of malnutrition in Kiambu is scanty, hence the need to determine the prevalence of the elderly population at risk of malnutrition that may predispose them to or enhance other geriatric diseases and disorders.

### **1.4 Purpose of the Study**

The study identified the prevalence and risk factors associated with malnutrition of the elderly people above sixty years in Kiambu County. The results and recommendations enhance care and welfare of the elderly by the health care providers

and provide a platform for policy generation, which is useful for policy makers and policy influencers.

### **1.5 Objectives of the Study**

The study was guided by the following objectives:

#### **Broad Objective**

To determine the prevalence and risk factors associated with malnutrition in the elderly people living in Kiambu County.

#### **Specific Objectives**

- (i) To find out the prevalence of malnutrition among the elderly in Kiambu County.
- (ii) To establish the relationship between socio demographic and economic characteristics and malnutrition among the elderly in Kiambu County.
- (iii) To assess the effect of dietary practices on malnutrition among the elderly in Kiambu County.
- (iv) To determine the risk factors associated with malnutrition among the elderly in Kiambu County.

### **1.6 Research Questions**

- (i) What is the prevalence of malnutrition among the elderly in Kiambu County?
- (ii) What is the Saiki relationship between socio demographic and economic characteristics and malnutrition among the in Kiambu County?



- (iii) What is the effect of dietary practices on malnutrition among the elderly in Kiambu County?
- (iv) What are the risk factors associated with malnutrition among the elderly in Kiambu County?

### **1.7 Justification of the Study**

Most Africans enter advanced age after a long period of neediness and hardship, helpless admittance to medical care and an eating regimen that is normally lacking in amount and quality. Sustenance intercessions in African nations are coordinated essentially toward babies and little youngsters, just as pregnant and lactating ladies. Under sustenance is more normal in older people than in more youthful grown-ups and they are in danger of expanded mortality, yet in addition in danger of different intricacies, helpless hungers, loose teeth and sore gums, which can altogether affect on their general personal satisfaction and have weighty jobs as well as are really focusing on youthful or sick family members. At present, impoverishment in this age bracket is a long way too common and efforts want to be stepped up to boost a countrywide machine to forestall this, in particular in growing international locations where Kenya is protected. According to Hall et al. (2005), efforts have to be put in place to come up with prevention strategies and management strategies, which will help reduce the possible high cost of healthcare that may result due to neglecting this population.

### **1.8 Limitation of the Study**

The current study was descriptive which means it is limited in establishing causation between selected variables and with malnutrition in the elderly in Kiambu County.

Use of a questionnaire was a limitation too as it is subject to social desirability bias, self-report bias and recall accuracy of respondents.

### **1.9 Delimitations of the Study**

A large number of risk factors were considered as predictors of malnutrition in the elderly in Kiambu County. A large sample size was also use to ensure generalizability of findings. Questionnaires were translated into Kiswahili and kikuyu to enable better communication between researcher and respondents.

### **1.10 Significance of the Study**

The findings of this study will be important to various stakeholders. The findings will help the future scholars and academicians in additional knowledge with some vital statistics of the risk factors contributing to under nutrition in older people in Kiambu. The study will also be important in the country and in Kiambu County since it will assist in policy making procedures to ensure that proper policies are made to promote older people health and reduce under nutrition associated with feeding habits in old. The study hopefully provides information that could help inform appropriate actions regarding feeding habits as age progresses. The study could also help the local community and the ministry of health policy makers involved in geriatrics nutrition. The study highlights issues related to nutrition knowledge among the elderly and the risk factors associated with malnutrition hence it highlights other factors that need to be considered while discussing nutrition particularly undernutrition among the geriatrics besides feeding habits in Kiambu County.

### 1.11 Assumptions of Study

In conducting this study, the researcher assumed that the respondents had the correct knowledge of healthy foods. The researcher assumed that any comorbidities that the respondents had did not affect their nutritional status. It was also assumed that the respondents were honest and accurate.

### 1.12 Operational Definition of Terms

**Malnutrition** Health status whereby the elderly consumes a diet that contains insufficient nutrients as a result of which health problems ensue.

**Socio demographic** Refers to individual characteristics of the elderly such as age, gender and level education

**Socio economic** Financial status of the elderly indicated by income

**Dietary practices** Nutritional habits including number of meals consumed, foods frequently consumed and cooking methods

**Risk factors** Predictors of malnutrition

**Elderly** Refers to people aged 65 years and above living in Kiambu.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

The present chapter examines an overview of nutritional status among the elderly, reviewed literature as per the objectives, strategies to dietary intake among the elderly, theoretical and conceptual framework and the chapter summary. Google scholar was the main source of majority of literature. Major health journals such as the National Center for Biotechnology Information, British Medical Journal and Public Library of Science were also used. Search terms included “elderly+nutrition”, “elderly+malnutrition” and “elderly+ dietary”.

#### 2.2 Overview Of Nutritional Status and Dietary Intake Among The Elderly

Environmental and lifestyle changes make the following dietary recommendations by elderly persons challenging. Changing relational intricacies infers that more established grown-ups have less help, while confronting critical difficulties in getting suggested supplement thick eating regimens. Numerous old people experience loss of craving, biting and dental issues, changes in smell and taste, versatility constraint, and admittance to excellent new food. This is of specific worry as older people need more supplement thick food varieties to meet their changing dietary prerequisites (Ghimire et al., 2017). Age-related shortcomings in usage and retention imply that the necessities for some fundamental supplements increment, regardless of lower energy needs. Shockingly, extensive and exhaustive clinical appraisals of healthful status, while fundamental, are costly, tedious, and awkward for older people (Agarwalla et al., 2016). Numerous initiatives around the globe have been launched with the

primary goal of implementing health policies that reduce social exclusion through targeted initiatives to improve circumstances and lives of the marginalized people such as the elderly (Grundy et al., 2016).

Elderly persons are the most varied age group thus; this diversity compounded with a fragmented system of care can result in marginalization, especially for those who are poor, frail, severely mentally compromised, and disabled. Elderly persons are among the excluded group of people that find it difficult to access income, good health care, proper nutrition, and an efficient social support networks (Agarwalla et al., 2016).

There are numerous physiological changes related with maturing and these include: smell and taste decreasing, xerostomia additionally alluded to as dry mouth which makes gulping of food varieties troublesome with ensuing evasion of food varieties, and malabsorption of imperative supplements which is because of gastrointestinal changes like atrophic gastritis. Gastric discharging eases back as one ages with a potential determinant impact on hunger. This load of variables either all in all or freely lead to decrease in food consumption (Leslie et al., 2015). Notwithstanding, as indicated by Stillwell et al. (2016), the key physiological variables influencing food choice and admission among older people are: dental issues, loss of taste and hunger and persistent illnesses and 90% of them revealed deficiency of weight.

Organic danger factors fall along a continuum from impacts of sound maturing to obsessive conditions. As one ages, there are unavoidable intellectual, physical, and emotional changes that add to the danger of ailments, including tactile, neurological, musculoskeletal, and digestion changes (Shlisky et al., 2017). Aging causes loss of motor neurons and a decline in anabolic hormones, reduction in the size and number

of myocytes, sarcopenia which is also referred to as loss of muscle mass, and decline in locomotor power and strength (Lorenzo-López et al., 2017).

As people age, there are changes in body composition, fat mass increments and lean weight (muscle) diminishes (sarcopenia) (Bruins et al., 2019). Loss of bulk begins when one is around fifty years old yet turns out to be more sped up following one turns 60 years. Moreover, fat mass keeps on expanding until an individual is around 75 years old. Loss of bulk results to 15% decrease in basal metabolic rate between ages 30 and 80, and this at last outcomes in an ensuing decrease in energy prerequisites of around 150 kilocalories each day after the age of 75. Decreases in energy necessities sway on the amounts or volumes of food devoured by the old. Subsequently, they will in general normally eat less and this compounded with the physiological changes portrayed, can prompt shortages in micronutrients consumption (Fayemendy et al., 2021).

Meeting the sustenance and diet needs of older people is fundamental for the upkeep of wellbeing, improving personal satisfaction, and upgrading utilitarian freedom. Food enrichment is also a crucial alternative to supplements and is ideal for older people going through physiological changes such as appetite loss (Bukania et al., 2014).

### **2.3 Prevalence of Malnutrition Among The Elderly**

Malnutrition is a persistent issue not only in Kenya but the entire world as well. According to Naseer et al. (2016), malnutrition is a disorder that has adverse impacts on the body of an individual from a functional or medical view which mostly occurs in the elderly population. In other words, the disorder entails the body lacking the

sufficient nutrients as recommended hence leading to abnormal functioning of the body due to lack of strength as a result of general body weakness. This condition is risky and affects the overall health status of the affected individual. The elderly in society, especially those aged 60 and above, are prone to malnutrition, which negatively affects their recovery speed among other complications. In Kiambu County, malnutrition among the elderly is not a new issue as the problem is witnessed in the region repeatedly due to the lack of measures to combat this illness. The best option is a prior assessment of the elderly to establish those at risk of malnutrition to prevent the adverse effects of the condition inclusive of severe weight loss and decline in the quality of life.

The condition is prevalent among the elderly as they are more vulnerable and are less concerned about their health compared to individuals in their youth or early adulthood. A study carried out by the World Health Organization (2018) revealed that there was a 23% prevalence of malnutrition among the elderly in Kenya. The most affected age groups are those people that are aged 60 years or above. In Kiambu County, the elderly populations are about a third of the entire population. As a result, the problem of malnutrition in older people affects a significant number of the total population. Other than that, most elderly individuals are not responsible for their health as they are unable to take care of themselves. Moreover, they also live alone or with the caretaker in the village whereas their children and grandchildren move to urban centers. The feeling of loneliness could take over, which could lead to a loss of appetite. Older individuals should take the daily required nutrient intake to manage their health that is affected by old age. Refusal to abide by that rule leads to malnutrition, which could ultimately lead to the death of an individual. In other

words, there is a relationship between old age and malnutrition. However, they are only complimentary if one does not take care of their nutrition during the old age.

Malnutrition is also common in older individuals who are hospitalized or suffering from a chronic condition (Aboderin et al., 2015). Older individuals are more vulnerable to illnesses in comparison with younger people. The elderly could have adverse symptoms like diarrhea and vomiting, which could ultimately lead to malnutrition due to the loss of nutrients and loss of appetite. Some hospitals, such as those in Kiambu County that lack the relevant resources such as supplements to address these problems increase the occurrence of malnutrition among older individuals.

Malnutrition is highest among individuals who are in rehabilitation centers. Individuals aged 60 and above are probably grandparents; hence, their greatest joy would be spending quality time with their grandchildren before their death. Thus, being confined in a rehabilitation facility is stressful to such people. This condition translates to the nutrition of an individual as one cannot eat properly when under stress. As a result, this leads to poor health conditions. The prevalence of malnutrition in these centers is 50% while in hospitals is close to 30% (Hamirudin et al., 2016). Most importantly, older people in nursing homes showcase a 13% prevalence of malnutrition which could be as a result of opposing the confinement in the institution (Damayanthi et al., 2018).

The elderly who lives in the community with their families have the lowest proneness to malnutrition. This happens as they are well taken care of as they live with their families. There is a positive correlation between company during old age and proper nutrition. Therefore, old individuals who reside with their families are most likely to



be less stressed hence eat better. Additionally, living with close relative guarantees the elderly ultimate care and love. In short, the prevalence of malnutrition among the elderly residents of Kiambu is higher in those individuals with less education, followed by those who live alone, then those with advanced age and lastly those widowed or widower. Nevertheless, more active measures ought to be taken by the Kiambu County officials to reduce this ailing menace.

#### **2.4 Regional Malnutrition among The Elderly**

The total populace of people matured 60 years or more has quickly expanded. Projections demonstrate that by 2025, the total populace of the older will arrive at 1.2 billion and by 2050, the number will ascend to roughly 2 billion. As of now, the number of inhabitants in the older is assessed to be around 48 million (Kohrs et al., 2016). Majority of older persons in almost every country around the globe are women. Essentially, food choices, nutrient intake, and dietary diversity are key determinants of the elderly nutritional status (Waudu et al., 2018). In Africa most elderly persons find themselves in a continued state of poverty from young and late adulthood and health care access is always a challenge or of poor quality. A new report reports that practically 50% of older Africans in sub-Saharan Africa are malnourished. Strangely, these discoveries in local area living older grown-ups are practically identical with discoveries from old individuals in emergency clinics or protected lodging in big league salary nations. In SSA, underweight is pervasive among (6–48%) of old and overweight among a quarter (2.5–21%). Inferior quality weight control plans add to poor dietary status, Poverty, HIV/AIDS, and complex helpful crises are significant determinants of under sustenance (Hall et al., 2005).

However, nutrition interventions that are started in countries across Africa are primarily or mostly focused on breastfeeding and pregnant women, young children and infants. To major points were focused on by the situational analysis with a view to determine primacies for policy development and future research: causes of under nutrition and older Africans' nutritional status.

Data on the nutritional status of elderly Africans are scarce since they are deemed a drain on a country's resources as they are perceived as making negligible contribution to society. Preliminary studies have been conducted by the London School of Hygiene and Tropical Medicine (LSHTM) in partnership with Help Age International (HAI) in Kenya, Benin, Sierra Leone, Botswana, Uganda, Cameroon, Sudan, Ghana, Malawi, Mozambique, Ethiopia, Senegal, Tanzania, and South Africa, from which 95% of extant data on the elderly in Africa was made available. Scholars have also failed to agree on the ideal definition of elderly adults with regard to age criterion.

This is owing to the African culture in which as opposed to functional age, social standing is regarded as a better marker in rural regions when defining the chronological age. The situation is worsened by both the lack of ability to aptly assess nutritional status and difficulty in locating the elderly (Furman, 2006). Because official records lack, a significant number of elderly people cannot ascertain when they were born. Age eligibility has been used for receiving a pension by a myriad of studies whereas formal age of retirement (55–65) years has been used as the standard. The institutionalization of the elderly remains relatively low and there is lack of the appropriate assessment tools to ease the challenge of both addressing the lack of capability to assess nutritional status and locating the elderly (Help Age International, 2011)

Anyway, dependent on the scant proof accessible, the predominance of under sustenance is high in old African men (9.5–36.1%) and ladies (13.1–27%) and in some metropolitan regions there is proof that old grown-ups are encountering the nourishment progress. An examination directed in South Africa; dark seniors appeared to have a low energy consumption. In an example of old living in casual settlements in peri-metropolitan Cape Town, more than a quarter (27%) of men and more than a third (36%) of ladies had energy admissions <67% of the RDA, a slice off regularly used to show a low admission. Micronutrient thickness was lacking and was clarified by the low mean admission from the vegetable and organic product gathering of <2.5 servings daily. Albeit 3/4 of the example had devoured leafy foods/vegetables in the 24-h time frame preceding the overview, just 20 and 26% had burned-through nutrient C-rich or carotene-rich sources, individually (Hall et al., 2005).

## **2.5 Malnutrition Among the Elderly in Kenya**

In Kenya a report by the assistance age global states that the commonness of lack of healthy sustenance among free living old reaches between 5 to 10%. As per the meeting paper number 1 of 2000 on the public arrangement on old people and the maturing, Kenya old are progressively deserted by their families constraining them to join the them desperate populace in metropolitan regions, especially the ghettos. Unhealthiness may happen because of an eating routine that is deficient in amount and quality, and a long period of constant sicknesses, illness and helpless admittance to medical care. The old populace is assessed at 95,592 in Kiambu area yet there is no documentation of the predominance of ailing health among this gathering (Hall et al., 2005).

In country regions like Baringo County, there are no particular projects proposed for the old all through the dry season period. Worldwide associations and NGOs that work in the zone don't have any designated contributions that incorporate the old. Sadly, old people get general apportion as the more youthful grown-up. Given the seriousness of the dry spell, the deficiency of animals, nonattendance of cultivating, ancestral conflicts make them more powerless against ailing health (Taghdisi et al., 2020).

Comparing the nutritional status in developed countries to that of developing countries highlights the significant differences in the factors that result to malnutrition among elderly population. It is evident that malnutrition of the elderly is caused by other factors that do not include poverty, which is the major cause of malnutrition in African countries. Due to this discovery, it is possible to curb malnutrition in developing countries by establishing measures that consider the elderly and their well-being. Measures to curb drought crisis can play a key role in reducing the number of lives lost to malnutrition. Lifestyles and obesity do not affect the elderly in Africa, which is an advantage when coming up with measures to consider the well-being of the elderly (Khagayi et al., 2020).

A study that looked into the numbers of elderly persons that were suffering from malnutrition in twelve countries found that overall, twenty three percent (23%) of the elderly in these countries were suffering from malnutrition (Kaiser, et al., 2010). Higher prevalence rates were found among those that were admitted in rehabilitation centers at slightly over fifty percent (50.5%). In hospitals, data showed that almost thirty nine percent (38.7%) were found to be suffering from malnutrition.

This is a reason for concern considering hunger adversely influences the strength of the more seasoned grown-up, for example it has been seen that old individual experiencing unhealthiness and especially under sustenance will in general have less fortunate wellbeing results. It has also been reported that this drastically increases the morbidity and disease burden among them and therefore prolonged hospital stay are expected. Under nutrition has also been associated with increased mortality rate (Kaiser, et al., 2010). The increased mortality rates are attributed to the possibilities of increased infections that are associated with under nutrition which is directly associated with compromised immunity due to lack of sufficient nutrients. Other important physiological changes that occur due to lack of sufficient nutrients brought by under nutrition are electrolyte imbalance, muscle wasting, and anemia and fatigue (Aeberhard, et al., 2014; Singh, et al., 2014). It has also been reported that under nutrition is also associated with falls among the elderly and these eventually lead to long-term in-patient care in hospitals or nursing homes (Vivanti et al., 2011).

Overall, malnutrition brought about by nutritional inadequacy decreases quality of life and increases risk for mortality, morbidity, and not to mention raises the costs of health care. This is basically because not only do physiological problems occur but also psychological problems occur due to malnutrition. As much as physiological and psychological problems can arise due to malnutrition, it is also important to note that pre-existing physiological conditions, pathological and sociological factors and psychological have been noted to cause malnutrition in the elderly (Al-Rasheed et al., 2018).

Social factors such as culture, religion, beliefs, and individual preferences have also been noted to cause malnutrition. This has been seen especially amongst elders in

certain communities that adhere to very restrictive diets which limit intake of particular foods. Though some studies have shown that these communities do have equally good replacements for these prohibited foods, in some cases access to and acquisition of these alternatives can be a challenge and since cultural norms are adhered to, this eventually may lead to under nutrition. In other cases, there are simply no substitutes providing the same nutrients as the prohibited food (Donini, et al., 2013).

Both the number and the extent of old people characterized as matured sixty and over are filling in for all intents and purposes all nations, and overall patterns are probably going to proceed unabated. The maturing populace is segregated or neglected, in spite of the way that the extent of this populace in sub-Saharan Africa (SSA) is expanding quickly.

Malnutrition in elderly people is undesirable and brings with it many adverse health outcomes. Alarmingly, malnutrition among the elderly is rarely noticed in good time and it is basically under diagnosed even for elderly patients that are admitted at the hospital. This has been attributed to the fact that there are no known criteria to specifically or correctly determine if an elderly person is suffering from malnutrition. According to Adams et al. (2008), in their study they found that the medical practitioners were not able to diagnose malnutrition even among patient due to lack of adequate knowledge on the same. This could possibly be due to the fact that their nutritional requirements for the elderly are not stipulated definitively as it is in infants and in fact may vary considerably depending on the individual patient. Nonetheless, the World Health Organization cites the need for coming up with such stipulated requirements to act as a guide in determining such incidences. Comparing the

nutritional status in developed countries to that of developing countries highlights the significant differences in the factors that result to malnutrition among elderly population. It is evident that malnutrition of the elderly is caused by other factors that do not include poverty, which is the major cause of malnutrition in African countries. Due to this discovery, it is possible to curb malnutrition in developing countries by establishing measures that consider the elderly and their well-being. Measures to curb drought crisis can play a key role in reducing the number of lives lost to malnutrition.

### **Causes of Under Nutrition in Elderly People in Kenya**

Average causes are biting or gulping problems, heart deficiency, gloom, social hardship and depression. Under sustenance is related with a more awful anticipation and is a free danger factor for grimness and mortality sufficient nourishment, sound maturing and the capacity to work autonomously are fundamental segments to safeguard a base personal satisfaction (Olayiwola & Ketiku, 2006).

Albeit a high commonness of overweight is available in older individuals, there is accounted for decrease in food admission that may be because of the deficiency of the inspiration to eat. This recommends the presence of issues related with the guideline of energy balance and the control of food consumption. A decreased energy admission causing body weight reduction might be brought about by friendly or physiological components, or a blend of both. Destitution, dejection, and social separation are the dominating social factors that add to diminished food consumption in the older. Discouragement, regularly connected with misfortune or disintegration of interpersonal organizations, is a typical mental issue in the old and a critical reason for loss of craving. The decrease in food admission might be because of the diminished drive to eat (hunger) coming about because of a lower need state or it

emerge on account of all the more quickly acting or more powerful inhibitory (satiety) signals (Hall et al., 2005). There is currently acceptable proof that, in spite of the fact that age-related decrease in energy admission is to a great extent a physiologic impact of sound maturing, it might incline to the unsafe anorectic impacts of mental, social, and actual issues that become progressively regular with maturing. Poor nourishing status and movement of ongoing illnesses generally influences the older. Protein-energy ailing health is related with hindered muscle work, diminished bone mass, invulnerable brokenness, weakness, decreased psychological capacity; helpless injury mending, postponed recuperation from medical procedure, and eventually expanded horribleness and mortality. There is expanding need to comprehend the variables that add to helpless nourishment in the old which add to the advancement of proper preventive and treatment techniques and improve the strength of more seasoned individuals (Lorenzo-López et al., 2017).

In Kenya lion's share of poor more established individuals do enter advanced age after a long period of and hardship because of an eating regimen that is lacking in amount and quality, and a long period of infection and helpless admittance to medical services. More over in the 20th century there has been an extraordinary progress from high birth and demise rates to low ripeness and mortality illnesses. For the greater part of these old individuals' retirement isn't an alternative. Destitution, absence of annuity retirement, passing of more youthful grown-ups from AIDS, and country to metropolitan movement of more youthful individuals are among the elements that constrain the older individuals to keep working. During seasons of food shortage, prevailing burdens victimize the old in intra-family food circulation. The specific food propensities for the old directed by monetary status, physical and practical capacity, and dental wellbeing, physiological and mental status could likewise add to lack of



healthy sustenance. Physical, social and enthusiastic issues revealed by the older could meddle with hunger, influence the capacity to buy, plan and devour a satisfactory eating regimen. Anyway, the reflection expressed here may likewise interpret in Kiambu. A report by the, "Food and Nutrition for Life Malnutrition and Older Americans", says that, there is no standard method to quantify unhealthiness in more established individuals and the quantity of Elders considered malnourished can change altogether relying on which proportion of Malnutrition, and the number of are utilized (Ngatia et al., 2008).

In Africa, cases of over nutrition are very rare as compared to USA and Russia. Most Africans lead a simple life which means that cases of obesity are not common. The current advancement in the health sector has led to increased population of the elderly people, however, sustaining their nutritional status is challenging as they age (Söderström, 2013). A large portion of the older in agricultural nations do resign and keep on making a crucial commitment to the family pay through arrangement of fundamental childcare or by assisting with family exercises. Being effectively associated with exercises that don't permit them to rest enough can influence their healthful status in a negative manner. In contrast to youngsters and moms, for whom numerous projects are intended to handle their weakness, next to no has been accomplished for the older populace. Associations that work in struggle and crisis circumstances neglect to consider the uncommon food prerequisites of the older (WHO, 2015). Additionally, information on this group of people is limited.

### **Nutrition Knowledge of the Elderly**

Nutrition knowledge is critical for the development of a healthy society, especially among the elderly who need special attention. It entails the particular cognitive

procedures concerning the data that a person has about food and nutrition that involves food choices and the prevention of non-communicable diseases (Agbozo et al., 2018). Nutritional knowledge is beneficial to older people as it helps in the development of healthy feeding habits in addition to the promotion of lifestyle changes that reduce an individual's risk of contracting diseases such as malnutrition. As a result, bearing knowledge of one's nutrition encourages abandonment of unhealthy habits, which leads to the general improvement of the nutritional status of an elder person. The older residents of Kiambu possessing nutritional knowledge are healthier and do not succumb to illnesses caused by nutritional disorders. On the contrary, those lacking nutritional knowledge are more vulnerable to malnutrition.

In connection to that, the older residents of Kiambu County aged 60 and above demonstrate detrimental nutritional knowledge. The individuals in this age category lack knowledge about various essential factors, such as the correlation between nutrition and illness (Khagayi et al., 2020). Other than that, the majority of older individuals residing in Kiambu County seldom pay attention to information about health. However, this depends on an individual's environment and the presence of family members in their family. For example, older individuals with close relatives who are actively involved in their lives and continuously checks on them have higher chances of attaining knowledge concerning their nutrition. This can be possible through one's children or grandchildren as they bear knowledge of the latest health information. Other than that, elderly persons who constantly visit the hospital for checkups have a higher probability of having nutritional knowledge than those who rarely go to hospital or depend on traditional methods of healing (Bruins et al., 2019). Moreover, those individuals with TV sets on their home or have daily access to it bear more information than those that only listen to the radio. The reason for this is that

visual advertisements are more effective as compared or audio or reading from a newspaper. Older people have poor vision; thus, reading magazines may be too tiresome and straining for the eye. Therefore, television is the most effective mode of advertisement for medical services and routine check-ups.

Most importantly, hospitalized individuals have more nutritional knowledge compared to those that are at home (Agbozo et al., 2018). The reason for this is that an individual can acquire relevant information about their health through frequent interactions with medical practitioners and nurses. Through this, an individual can devise the healthiest program to follow concerning their diet to avoid the adverse effects of poor nutrition. Therefore, the hospitalized older people in Kiambu County are more knowledgeable about matters concerning health.

### **Socio-economic Status and Malnutrition among the Elderly**

Socio-economic status regularly encompasses subjective perceptions of social magnificence and social reputation, profits, financial safety, and academic attainment. Poverty, especially, isn't a single component, however as a substitute is characterized by more than one psychosocial and bodily stressors. Socio-economic status refers to the income of an individual's academic qualifications, financial safety, in addition to social class (Naseer et al., 2016)

Financial status influences in general working of the human body, and this incorporates a person's physical and emotional well-being. Low financial status and its associates, like destitution, instructive accomplishment, and chronic weakness, at last influence the general public overall. Imbalances in asset appropriation, wellbeing conveyance, and personal satisfaction are on the ascent in generally creating and some

created nations (Shlisky et al., 2017). In the Ethiopian study mentioned earlier in this review of literature, the study findings also showed that socio-economic factors were significantly associated with malnutrition (Tessfamichael et al., 2014). The researchers indicated that indeed the wealth index directly caused under nutrition amongst the elderly in Ethiopia. Similarly, Agarwalla et al. (2015), in their study that they conducted in India, found that financial dependency among the elderly was one key factor that significantly affected how they ate and also the availability of food. Most of the elderly were found to be consuming inadequate calories for their daily needs and this led to under nutrition. Another study that was done in India also that most elderly persons that unemployed hence having no income or worked as home makers hence financially dependent on their children or relatives were also most likely to be suffering from under nutrition (Joymati et al., 2018).

In Kenya, individuals aged 60 and above lie in the retirement bracket. This situation illustrates that they are no longer employed hence; their monthly salary reduces to pension. For instance, an older person with no children will be forced to take care of themselves after retirement despite the pension being barely sufficient to meet all their needs. As a result, they opt for cheaper diets that may lack the required nutrients hence may lead to malnutrition. Additionally, some retired individuals feel that they are no longer useful to society as they are old; hence, no company wants them working there.

Generally, the socio-economic statuses together with the ability to function productively have been major factors in determining nutritional status among the elderly. Expenses such as housing costs, and hospital expenses for this group of people normally are given precedence over food which is viewed as a secondary

priority to medication. This has resulted in most elderly persons not having 3 meals and snacks that will meet their dietary/ nutrient need and worse of, they also procure food that could be lacking the nutrients they need because of the related costs.

Despite all this, most of the people aged above sixty in Kiambu County are poor. Unlike their counterparts that were lucky to land some jobs, other individuals in this category are dealing with extreme cases of poverty. People from impoverished backgrounds show a low capability of taking care of their nutritional health due to the adverse conditions of life (Hamirudin et al., 2016). For instance, an individual who's last born is still in school will be more focused on ensuring that their child completes their studies.

As an outcome, they lay less emphasis on their nutrition and adopting healthy feeding habits. In such homesteads, a balanced diet is not a priority. Thus, they may consume meals that only provide carbohydrates and lacks vitamins and proteins which are all necessary for normal body functioning. Also, most of the elderly individuals are unable to work hence finding the funds to purchase a decent and nutritious meal may be challenging. This situation illustrates that the population aged 60 and above is generally poor due to the reduced capacity to work as well as the harsh conditions of life that hinder the prevention of nutrition disorders.

The socio-economic status of an elderly resident of Kiambu depends on a variety of factors such as reduced financial security as a result of low social economic status, death of a spouse and social isolation. The majority of older individuals are prone to losing their significant other as a result of old age as well. As an outcome, a person may feel neglected and alone as their best friend and companion is no longer there

with them. This situation triggers an individual to isolate themselves from others, which could negatively affect their social life.

An older individual who separates themselves from others is likely to die quickly as the feelings of loneliness lead to poor feeding habits. Consequently, this causes malnutrition, which could result in mortality. In the case whereby the deceased spouse was the breadwinner, the alive partner may encounter financial challenges. In most cases, the breadwinner is mostly the man. Thus, the demise of the man could negatively affect a woman's socio-economic status, which translates to poor health habits hence malnutrition.

Lion's share of more established grown-ups is unequipped for having a stable employment in this way, they have less alternatives for proceeded with pay. Older people are in danger of increasing expenses of living, which may put them in a difficult situation and possibly at lower levels of financial status. Thus, relatives of the more established grown-ups are monetarily obliged to guarantee nourishing necessities are met and give great medical care. Significant degrees of social help address a defensive factor in diminishing feebleness and weakness of older people and decrease the danger of senior abuse (Boateng & Jeptanui, 2016).

According to Shlisky et al. (2017), after accounting for inflation, the average income of families with elderly members has increased by nearly 18% during the 15-year period from 2002-2017 in developed countries. Higher financial status among families with older people decreases openness factors that lead to handicap, grimness, and ultimately mortality. Accordingly, the more the family pay, the better the medical care, open to everyday environments, less openness to risks, and better eating routine, agreed to the older individuals (Nyberg et al., 2018).

Nevertheless, a better understanding of the income-mortality association in old age after retirement is needed. Family income dictates the quality of long-term care rendered to the elderly thus, elderly persons with families in low socioeconomic classes are more likely to suffer poor health due to substandard dietary plans, whereas wealthier families are able to provide proper nutritional requirements resulting in good health for the elderly person and also support needed for them to live independently in comfort. Family abundance and lodging conditions have been discovered to be acceptable proportions of financial status and can be utilized as a decent pointer of an individual's general status in the public eye just as pay and consumption (Naseer et al., 2016).

Further, the education background of an elderly individual determines their socioeconomic status. For example, those people with high education qualifications are most probably rich and have unlimited access to various health features. On the contrary, individuals with poor education are mostly impoverished and lack access to vital health services (Kiesswetter et al., 2014). Education status is an essential predictor of mortality among the elderly adults. Lower education levels among both the relatives dealing with the old and the old individual themselves, has been related with helpless infection the executives and other ailments among the older people bringing about avoidable passing (Wei et al., 2019).

Generally, the socio-economic statuses together with the ability to function productively have been major factors in determining nutritional status among the elderly. Expenses such as housing costs, and hospital expenses for this group of people normally are given precedence over food which is viewed as a secondary priority to medication. This has resulted in most elderly persons not having 3 meals

and snacks that will meet their dietary/ nutrient need and worse of, they also procure food that could be lacking the nutrients they need because of the related costs.

In the Ethiopian study mentioned earlier in this review of literature, the study findings also showed that socio-economic factors were significantly associated with malnutrition (Tessfamichael et al., 2014). The researchers indicated that indeed the wealth index directly caused under nutrition amongst the elderly in Ethiopia. Similarly, Agarwalla et al. (2015), in their study that they conducted in India, found that financial dependency among the elderly was one key factor that significantly affected how they ate and also the availability of food. Most of the elderly were found to be consuming inadequate calories for their daily needs and this led to under nutrition.

Another study that was done in India also that most elderly persons that unemployed hence having no income or worked as home makers hence financially dependent on their children or relatives were also most likely to be suffering from or at risk of suffering from under nutrition (Joymati et al., 2018).

In the study previously mentioned in this review that was undertaken in Iran also found similar results. The study sought to find out what socio-economic and health factors affected the nutritional status among the elderly who were in a nursing home in Uremia, Iran. A Mini Nutritional status assessment, a socio-economic and health status questionnaires were used. It was reported that slightly above forty nine percent (49.1%) of the respondents were malnourished while thirty-eight-point seven percent (38.7%) of the study participants were at risk of malnutrition (Nouri et al., 2011). The study revealed that respondents that lived alone were more likely to be under nourished. This reflected directly on their ability to obtain food and prepare them.



In another cross-sectional study that was done to determine whether the risk of malnutrition is associated with mental health symptoms in a community where elderly men and women lived, the study found that the medium and high risk of malnutrition was noted among over ten percent (10%) of the participants (Kvamme et al., 2011). Mental health symptoms were also noted among three-point nine percent (3.9%) of the men and nine-point one percent (9.1%) of the women. The study reported that inclusive of age, whether a participant was married or not, education and smoking habits, mental health symptoms were also significantly associated with malnutrition (Kvamme et al., 2011 ). This study involved over one thousand five hundred men and equal number of women who were aged between 65 and 87 years.

In a study that was carried out in Ethiopia, being female was also found to be a risk factor of suffering from under nutrition. This study sought to determine the prevalence of under nutrition among the elderly of which almost twenty two percent (22%) were found to be affected (Tessfamichael et al., 2014). Other socio-demographic factors that were found to have an impact on the participants' nutrition were their education, particularly their ability to read and write. Though the participants were already old, under nutrition seemed to increase as the participants become even older. Basically, their dietary diversity score was low.

An Indian community based cross-sectional study that was carried in Kongpal in Imphal East, Manipur in North-Eastern India to determine the nutritional status of the elderly in the area found that almost twenty one percent (21%) of the study participants who were aged between 65 and 75 years old, were malnourished while forty-nine-point two percent (42.9%) were at risk of being malnourished (Joymati et al., 2018).

The Mini nutritional Assessment tool was used to determine prevalence in this study. The study involved 245 elderly persons aged from 60 years and above. The study also established significant association between socio-demographic factors and malnutrition among the participants and similar to the results discussed previously, being female was a significant factor that increased the chances that one would be malnourished. Though the study was focused on individuals from the age of 60 years, it was noted that as much older participants were found to be having poor nutritional status. Meaning this problem became worse as age progressed (Joymati et al., 2018). Living alone and more so being single (never married) which included being widows or widowers were predisposing factors to malnutrition. Finally similar to other studies discussed, having lower educational levels was also a major factor when discussing malnutrition among these group of participants in India.

In another study that was done in India to assess the nutritional status of the elderly in Boko-Bongaon Block, Kamrup District, it was reported that fifteen percent (15%) of the participants were actually malnourished while Fifty five percent (55%) were at risk of becoming malnourished. Some of the factors that were to be associated with these findings were being female, being unable to dependently function and inadequate calorie intake among the elderly (Agarwalla et al., 2015). The mini nutritional assessment (MNA) was adopted in this study. It helped establish epidemiological factors that seem to have an impact on the participants' nutritional status. A twenty -four (24) dietary recall method was also used to assess nutritional status in this study.

A cross-sectional study done in Kenya to determine the nutrition and oral health status of elderly persons in Nairobi reported different results. From the mid upper arm

circumference measurements, it was established that nearly forty one percent (40.9%) of the respondents were malnourished but instead of under nutrition, these participants suffered from obesity (Ngatia et al., 2008).

The study also found that forty-six-point four percent of the study population also had normal nutritional status. It is however important to mention that this study considered people from the age of 45 years. This could have considerably interfered with the results if the study was particularly targeting the elderly considering the fact that some studies have reported that as people become older, the malnutrition also becomes worse. With regards to socio-demographic characteristics that had an impact on the participants' nutritional status; being female was seen as a factor contributing to obesity. Another important factor was the ability to chew or generally the participants' oral health (Ngatia et al., 2008).

According to Khagayi et al. (2020), there is an increased risk of mortality among elderly persons with lower education levels despite the stratification level, whether it is environmental, gender-related, or ethnically-related. Education provides an opportunity for family members to be knowledgeable on the necessary dietary changes to be made and nutritional continuity necessary subsequently, affecting risk-factor levels of the elderly. A good example is an elderly person suffering from a cardiovascular disease; an educated family member will ensure modest reductions in saturated fat and salt intake, which would reduce blood pressure and cholesterol concentrations, consequently, having a significant effect on reducing the burden of cardiovascular disease and mortality rates among the elderly (WHO, 2015).

In Kiambu County the majority of the individuals over 60 years bear little to no education. As an outcome, very few people have access to nutritional information and

knowledge. The impoverished population encounters shortcomings when dealing with nutrition issues due to the lack of sufficient funds to adequately cater to their needs. The implications of this situation are poor health statuses causing malnutrition that could ultimately result in the death of the individuals. Therefore, the hospitalized older people in Kiambu County are more knowledgeable about matters concerning health.

Most importantly, hospitalized individuals have more nutritional knowledge compared to those that are at home (Agbozo et al., 2018). The reason for this is that an individual can acquire relevant information about their health through frequent interactions with medical practitioners and nurses. Through this, an individual can devise the healthiest program to follow concerning their diet to avoid the adverse effects of poor nutrition. Therefore, the hospitalized older people in Kiambu County are more knowledgeable about matters concerning health.

Moreover, HIV and AIDS is another factor that influences the socio-economic status of elderly individuals in Kiambu County. Older persons with the virus encounter various challenges in society that affect their esteem hence their overall health. The stigma placed around the illness leads to individuals having low self-worth and reduced confidence. Subsequently, such individuals are depressed continuously due to the misconceptions that insist on having the virus illustrates death.

An individual engaging in such thoughts is most likely to develop eating disorders that negatively affect their nutrition. Other than that, society displays negative attitudes towards HIV positive persons. As a result, their socio-economic status reduces due to the perception of them as people carrying the AIDS virus. This assumption adversely affects the health outcomes of elderly residing in Kiambu

County. In summary, the county government of Kiambu ought to establish measures to assist the elderly in curbing malnutrition (Nyberg et al., 2018).

To date, information with regard to the nutritional status of the elderly in Kenya remains scarce. Demographic and health surveys, as well as Kenya's National Nutrition Action Plan and strategy, while covering the nutritional health of vulnerable groups, fail to include this parameter for elderly citizens. Kenya has in recent years been faced with drought crisis, which forces communities living in arid areas to move in search for water and food. These movements are impossible for the elderly since they do not have the energy required to get through the scorching sun. Tribal clashes have also left the elderly exposed to malnutrition due to the fact that they cannot flee for safety; hence, they survive on whatever is left behind by the rest of the population upon fleeing (Waudu et al., 2018).

## **2.6 Theoretical Framework**

This study relies on a number of theoretical underpinnings which basically explain the concepts behind behavior and other factors be it individual or external factors, and the impact of these behaviors and factors on malnutrition among the elderly.

### **Social Ecologic Theory**

The social ecological theory basically posits that many factors do interplay when it comes to health issues. It generally suggests that the interaction between these factors result in particular behaviors that either promote well-being or interferes with the well-being of an individual. Therefore, the key tenet of this theory is that not only is behavior affected by a number of factors, but it also affects those said factors. In this

theory five factors are considered, individual or intrapersonal factors, interpersonal, organizational, community and public policy factors (CDC, 2014)

These factors are seen to all influence the behavior of an individual in different aspects. For instance, elderly persons eating habits can be adversely or moderately affected by their knowledge, attitude, beliefs and personality. These factors can have a great impact on an individual's choice of food, pattern of eating or preference. There are considered individual or intrapersonal factors. Interpersonal factors that considerably affect how the elderly person eats or chooses what to eat is the level of dependency the individual has on others especially with regards to food preparation and even procuring the food itself. Therefore, the family, friends and peers can affect an individual's dietary consumption. Clearly an elderly person living with dependable people will more likely be well nourished as opposed to an elderly person who lives with individuals that do not value the importance of having nutritious meals or just do not bother with his dietary/ nutritional needs (Bukania et al., 2014).

Other factors that can really influence the dietary intake of the elderly and mostly in a positive manner are the rules and regulations or policies and other structures whether formal or informal that are adopted in organizations and institutions that's cater or care for the elderly. These institutional factors are normally adhered to because they either give favorable results and hence they promote adequate dietary intake or otherwise. These definitely affect the behavior of the elderly person that is exposed to the factors.

It is a fact that what really makes up a community besides the people that live within it are the norms and values that are adhered to or accepted within these groups of people. This commonality usually fortifies a community. With regards to nutrition,

some social norms and standards can adversely influence the ability of an elderly person to adhere to a particular dietary schedule especially if some of the required meals are either prohibited or are unavailable in the community due to the norms of the said community. Generally, if a dietary plan is not within the expected or accepted standards, this could mean under nutrition for the elderly person (Ranganath et al. 2017).

As mentioned earlier, the World Health Organization has noted the importance of coming up with a definitive quantification of dietary requirement for the elderly to assist with guiding the health practitioner in determining if an elderly person is indeed having issues with his dietary intake and hence could be at risk of under nutrition. Such are policies that influence the dietary intake of the elderly. In essence, public policies factors that are implemented by the state at local and federal levels and even institutional levels do affect nutritional issues in the elderly. For instance, in the United States, there is federal pressures to ensure that there is prevention weight loss among the elderly who are taken care of in nursing home settings and this pressure has increased positive attention to nutritional issues in this setting but in retrospect; it has also led to potentially excessively aggressive interventions (such as enteral nutrition instead of alternative methods such as Percutaneous endoscopic gastrostomy (PEG) tube feeding in residents with advanced illness).

Generally behavioral theories that expound on health promoting or seeking behaviors mainly address the influence that personal or individual factors have on behavior change or they focus on how external (interpersonal) factors also interplay with individual factors to influence these behaviors. This study expounds on the health belief model and the stages of change model.

## **The Health Belief Model**

Modernization has led to improved technology and better health systems. As a consequence, it has been noted that generally older adults have had increased life expectancy but with chronic illnesses. These chronic illnesses more often than not are managed by dietary changes and even more importantly, behavioral changes that lead to health-promoting practices with regards to dietary intake (Carpenter, 2010).

This theory posits that an individual will be pushed towards behavior change once they are made aware of the negative consequences of their own behavior. This negative consequence in this case is a potential health problem that they could suffer from because of their behavior. Hence behavior change will be brought about by determination to avoid the health scare or severe health consequences. Generally, the hypothetical supporting of this model is that people will embrace another wellbeing conduct or change their present wellbeing conduct, when they accept that they can be vulnerable to a specific condition. For instance, it is assumed that an elderly person will adhere to a recommended dietary intake after persistently defaulting once he/she is explained to the correlation between dietary intake and development of serious ailments such as cancer (Agarwalla et al., 2016).

The model's assumption is also that the elderly person has to believe that the consequence of his behavior will have detrimental effects on his well-being to prompt behavior change and also that this behavior change will have an impact with regards to making them less susceptible to the disease or reduce the severity of the disease. The health behavior that is to be adopted should assure the individual that its benefits do outweigh the costs of continuing with behavior. Two factors that are said to effectively help in health behavior change are "cue to action" and "self-efficacy". The



cue to action is usually done by the health care provider where the patient is reminded to start taking action. Self-efficacy generally refers to the ability of the patient himself to perform a health promoting action successfully (Waudu et al., 2018).

### **Stages of Change Model**

Unlike the health belief model which emphasizes on the belief that promotes change in behavior; the stages of change model basically explain the process of that behavior change. The theory suggests that to achieve behavior change and in this case; for an elderly person to change his behavior with regards to dietary intake (poor to healthy and adequate dietary intake); then they go through five phases or stages of change. In the first stage, they go through the Pre-contemplation where they really don't intend to take any action. The individual could malingering in this period for quite a while which also has consequences. They later move to the contemplation phase where they make promises to themselves about doing something about their behavior in the future. The following stage is the readiness stage, where the individual intends to make a move inside the following 30 days and is really making a few strides toward this path. In the activity stage, the individual has effectively changed conduct for a brief timeframe, while in the support stage, the individual has changed conduct for a more extended timeframe or possibly a half year. Fundamentally the wellbeing conviction model works inseparably with the phases of progress model.

### **Social Cognitive Theory**

Basically, this theory posits that an individual will only change their health behavior based on how they view their own self efficacy, what goals they have set and finally the expected outcomes they have based on their change in behavior (Aghdasi et al.,

2021). Social Cognitive Theory is an effective model from which to explore influential constructs of health behavior such as dietary practices among the elderly. In that if the elderly persons could have enough self-confidence, they would therefore change their health behavior regardless of the challenges that they face and the vice versa also applies.

Reciprocal determinism is a key element in social cognitive theory. This basically refers to the interplay between the individual, behavior and the external environment. Another important factor is behavioral capability which refers to the knowledge and skills needed to perform a behavior (.Tougas et al., 2015). A third factor that is very important in social cognitive theory was expectations that the individual has. Others factors are self-efficacy, observational learning and reinforcement that increase or decrease chances of a particular (desired) behavior to be performed. Social cognitive theory also emphasizes the importance of changing the practices of various social systems that are possibly affecting the health; the idea is that this together with individual behavior change can have more positive effect on the health behavior (Shamizadeh et al. 2019).

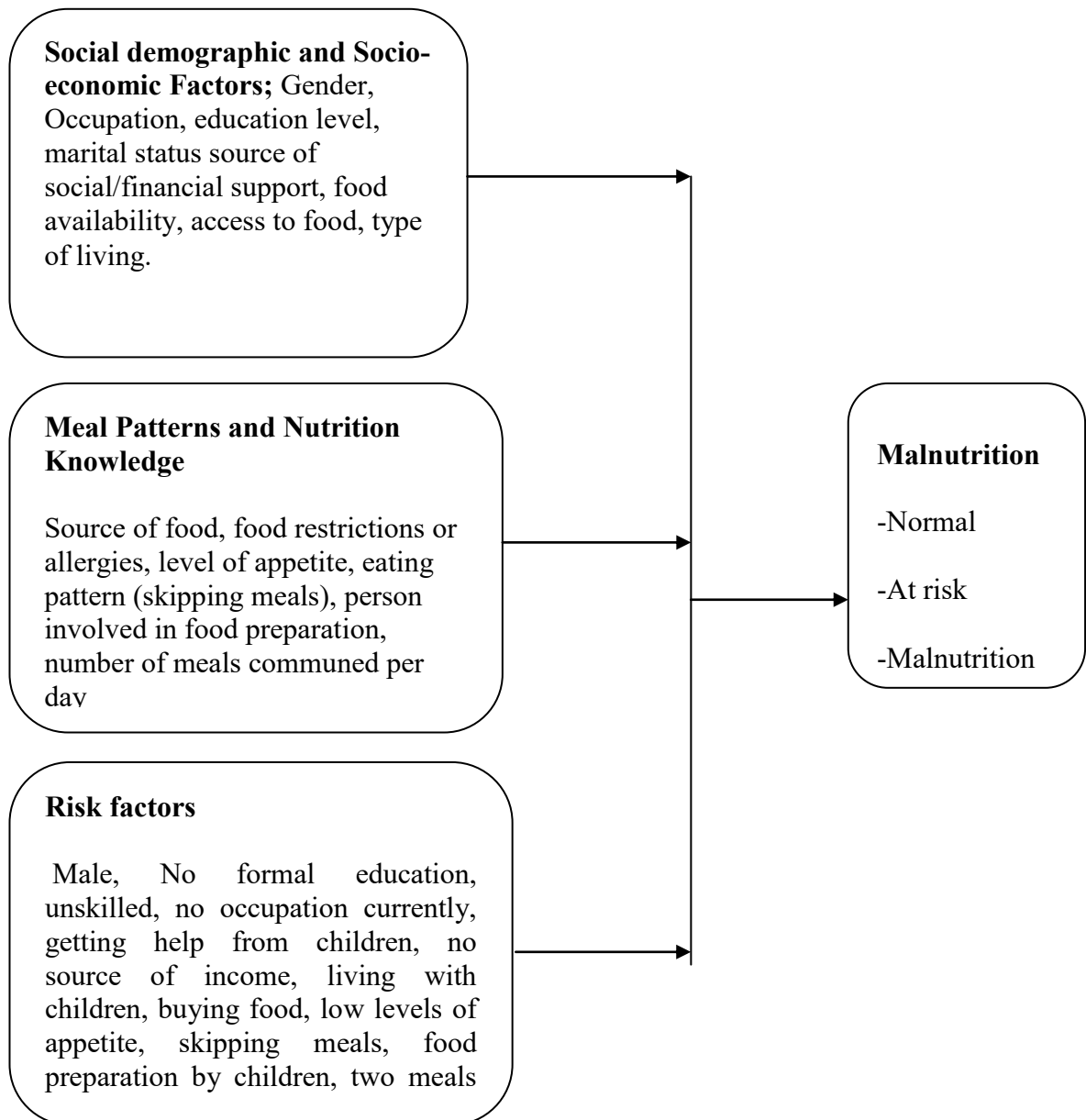
## 2.7 Conceptual Framework

Figure 2.1

### *Conceptual framework*

#### Independent variables

#### Dependent variable



Source: Author (2020)

The conceptual framework above shows the relationship between variables. The three boxes on the left show the independent variables of the study including the socio-demographic and socioeconomic characteristics; in the top most box, nutrition

knowledge and meal patterns; in the bottom most box, and the risk factors; in the middle box. The top and bottom box present the variables in their neutral state while the middle box (risk factors) presents the findings of the study as far as the variables are concerned. On the right is one box with the dependent variable, malnutrition. The arrows show association between the independent variables and the dependent variables with the pointers pointing towards the result.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter entails the study methodology, which entails the study design, target population, sampling procedure, methods of data collection, operation definition and methods of data analysis.

#### **3.2 Study design**

The research design was cross sectional descriptive research design. Cross-sectional study design was appropriate in this study as it allowed for the collection of data at one point. It also allowed the researcher to determine the socio-demographic characteristics at the point of data collection. This allowed for the descriptive characteristics of respondents to be determined. The study involved visiting homes and taking anthropometry measurement of the target group. This research design was cross sectional so as to unveil the relationship between the key variables which are body mass index, feeding habits, socio economic, knowledge and social demographic characteristics.

#### **3.3 Study Area**

The study area was Kiambu county which has a population of 596,268 (Male - 49 %, Female - 51 %). Kiambu County is Located in Central Kenya and Agriculture is the transcendent financial movement that contributes 17.4 percent of the County's populace pay. It is the main sub area as far as work, food security, pay income and generally speaking commitment to the financial prosperity of individuals. Greater part

of individuals in the province relies upon the sub area for their business, with 1.28M straightforwardly or in a roundabout way utilized in the area. The size of arable land in the region is 1,878.4 Km<sup>2</sup>, non-arable land is 649.7 Km<sup>2</sup> and 15.5 Km<sup>2</sup> is submerged mass. The primary food crops filled in the County incorporate maize, beans, Irish potatoes and cabbages. Espresso and tea structure the significant money crops filled particularly in the upper and lower good countries.

### **3.4 Target population**

The target population in this study was the elderly population from the age of 60 years and above. In the year 2009 county residents that were above the age of sixty-five years was estimated to be above fifty-nine thousand (59,057) in the entire county. This represented three-point six four percent (3.64%) of the total population. In the year 2012, this population was estimated at sixty-three thousand, six hundred and fifty-seven (63,657), which indicated that the elderly population had grown by over four thousand people. In 2015, the number had further increased by five thousand people and estimates were at sixty-eight thousand, six hundred and fourteen (68,614) people. The same trend was noted in 2017 with the estimates being at and seventy-two thousand one hundred and thirty-two people (72,132) (County Governement of Kiambu, 2018). (County Governement of Kiambu. (2018, February 18th). Demographic Features. Kiambu County, Central Province, Kenya). Being these estimates were for individuals above the age of sixty-five years, estimated figures that included those that are above sixty years old was ninety-two thousand five hundred and ninety-two persons (92,592).

### **3.5 Study variables**

The following variables were used in the study

#### **Dependent Variables**

The study's dependent variable was malnutrition of the elderly in Kiambu County.

#### **Independent variables**

The independent variables of the study were the risk factors, socio economic factors, feeding habits, social demographic factors, diseases and social support that could possibly lead to malnutrition among the elderly in Kiambu County.

### **3.6 Inclusion and Exclusion Criteria**

Respondents were recruited based on the criteria below:

#### **Inclusion criteria**

The study participants will include the following;

- i) The elderly persons who are above sixty years.
- ii) The elderly persons residing in the Kiambu County.
- iii) The elderly persons who were strong enough to participate in the study.
- iv) Elderly persons who gave consent.

#### **Exclusion criteria**

The persons who were excluded from the study were:

- i) The elderly persons who were too frail or sick to participate in the study.

- ii) The elderly persons who had lived in Kiambu less than one year.
- iii) Elderly person who didn't give consent to participate in the study.

### 3.7 Sample Size and Sampling Procedure

#### Sample Size Determination

The total number of people aged sixty years and above in Kiambu County was estimated to be around ninety-two thousand, five hundred and ninety-two (92,592). To determine the sample population needed to participate in the study and allow proper inference of results to a wider population (among the elderly); Yamane (1967) formula was used.

Yamane Formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where: n= Sample size,

N= Population size

e= Level of Precision (0.05) which is the standard error at 95% level of confidence Interval

$$n = \frac{92,592}{1 + 92592(0.05)^2}$$

$$n = 398.27$$



**n = 398**

Thus, the researcher approached 398 respondents.

### **Sampling Procedure**

This study was a prevalence study and to sufficiently minimize election bias, systematic random sampling technique was used to recruit respondents for the study (Hund et al., 2015). Systematic random sampling which is a probability sampling technique ensured that every elderly person aged above 60 years and residing in Kiambu had an equal opportunity to be selected to participate in the study. Actually, systematic random sampling was done where the 3<sup>rd</sup> (1195/398) elderly person within the study area was approached to participate in the study. The first respondent was identified randomly by lottery method.

## **3.8 Data Collection**

### **Data Collection Instruments**

The study adopted six instruments.

#### **Socio-demographic questionnaire**

The first tool was a researcher- designed questionnaire which was used to determine the respondents' socio-demographic factors such as age, sex, socio-economic status, level of support, and level of education, number of children and income and more importantly source of food among other factors from the respondents. A pre- test of the socio-demographic questionnaire was done to ensure that the tool captured all the data that was needed from the respondent. Therefore, a pilot test was carried out in

Ruiru Sub County just before the main data collection which involved 20 respondents. These elaborate leading a fundamental trial of information assortment devices and methods to distinguish and kill issues. This educated revisions and additionally acclimations to the poll prior to gathering information from the objective populace (Burns et al., 2007).

### **The Mini Nutritional Assessment (MNA)**

This is a validated diet screening and evaluation device that identifies aged human beings who are malnourished or at threat of malnutrition. This device was therefore used to measure their diet popularity of the respondents in Kiambu County. The MNA test is made out of straightforward estimations and brief inquiries that can be finished in around 10 min. Segregate investigation was utilized to contrast the discoveries of the MNA and the healthful status dictated by doctors, utilizing the standard broad wholesome evaluation including total anthropometric, clinical natural chemistry, and dietary boundaries. The MNA, affectability has been accounted for to be around (96%), and its particularity 98% (98 %), while the prescient worth was (97%) (Vellas, et al., 1999).

### **Tapes for Measuring the Mid- Upper Arm Circumference for the elderly**

MUAC is the circuit of the left upper arm and is estimated at the mid-point between the tips of the shoulder and elbow. The estimations were taken by bowing the left arm of the respondents, finding and checking with a pen the olecranon interaction and acromion. The mid-point between these two imprints was then stamped. MUAC is a valuable pointer of hunger that can be utilized in sick patients (normal MUAC >23 cm in males, >22 cm in females).

### **Tapes for measuring Calf Circumference**

An inelastic tape was used to measure the calf circumference (CC). The respondents were informed to be in an upright function with their feet twenty (20) centimeters aside, on the maximum circumference inside the plane perpendicular to the longitudinal line of the calf.

### **Weighing Scale and Tape measure**

A weighing scale became used to degree the load of the respondents at the same time as the tape measure became used to degree the height of the respondents. These two measures were used to further determine the Body mass Index of the respondents.

### **Dietary questionnaire**

The Dietary Questionnaire that was adopted for this study mainly focused on the frequency of meals that the respondents took. It also assessed whether they were allergic to particular foods and their preparation (with regards to who prepared the meals for them). It also looked at whether they were aware the nutritional requirements that they needed in their body.

### **Data Collection Procedure**

Permission was sought from Kenya Methodist University's ethic research committee before starting data collection. Consent from Kiambu county government was also obtained.. This included informing the county ministry of health about the purpose and objectives of the study. Once the consent form were obtained particularly from the county and Kenya Methodist University Ethics Committee, grassroots consent of

the different area chiefs was also important which gave way to data collection done at the convenience of the respondents which in most cases was at their homes.

As mentioned earlier, the researcher/ study only targeted the elderly that were aged from 60 years and older. They had to strictly fit the inclusion criteria mentioned above. The respondents were identified and located through individual house visits which the researcher made in the villages. The researcher was also helped by a county employee who assisted in identifying areas that these respondents could be easily located. Once the respondents were identified and selected, and more so identified to be fitting the inclusion criteria, they were approached and kindly asked to participate. The respondents were explained for the consent form and further told that their choice to participate would be entirely voluntary.

Signing the consent form was meant to reflect this agreement. Prior to the respondents consenting to participating in the study, they were adequately informed about the purpose or aim of the study and the study expectations and their roles as participants. The consent form also had details about the benefits of the study to them as participants which was identifying whether they had issues with their nutrition and hence at risk of malnutrition or if they were suffering from under nutrition. This would allow them to quickly address the issues and seek treatment. The consent form also informed the respondents about the risks that they could be exposed to by participating in the study which was related to psychological distress and for this the researcher promised appropriate referrals.

Once the participants were identified through systematic random sampling, Consent from all participants was obtained at the study site. The consent form which explained what information was being sought and for what purpose the study was being

conducted, was issued to the respondents who agreed to participate in the study. The socio-demographic questionnaire, the dietary questionnaires were then administered and anthropometric measurements taken; including weight and height. Calibration and standardization of the equipment used was duly ensured to assure data quality. After completion of the data collection process which included documentation, the filled in questionnaires were stored in a safe lockable cabinet to protect the data. The questionnaires were later assessed to determine whether information was correctly filled. The information obtained was entered into the Statistical Package for the Social Sciences version 20.0 for analysis.

### **3.9 Data Analysis and Presentation**

Data collected in this study was quantitative. Descriptive statistics namely frequencies and percentages as well as mean and standard deviation were used to organize findings. This was useful in establishing the prevalence of malnutrition among the elderly in Kiambu County. To establish the relationship between socio demographic and socio-economic characteristics and malnutrition and assess the effect of dietary practices on malnutrition, chi-square analysis was conducted. This was conducted with the help of Statistical Package for Social Science (SPSS) version 24 for Windows. Analysis was conducted at 95% confidence interval whereby p values of 0.05 or less were taken to indicate significant associations. Indicators which were significant in the chi-square analysis were further subjected to regression analysis. This was important in determination of the risk factors associated with malnutrition among the elderly in Kiambu County. Results were presented in form of tables and pie charts.

### **3.10 Ethical Consideration**

An Ethical clearance was obtained from Ethical Review Committee (ERC] at KEMU. Permission to collect data was sought from the Kiambu County government. A research permit was obtained from National Commission for Science Technology and Innovation. Participation was voluntary through informed consent after the respondents had been explained to the purpose of the study. An informed written or a thumb print consent was sought from the respondents. The respondents were assured of confidentiality of the information given before carrying out the study in order to enhance the response. Privacy was enhanced by not recording the name of the respondents anywhere. The respondents were made aware that the information given was for study purposes only and confidentiality, privacy, and dignity of the subjects were ensured.

Probability of risk of participating in the study for the respondents was communicated; that they could suffer from distress especially if they discovered they were under nourished and to manage such situations appropriate referrals to the nearest hospital for psychosocial management would be made. The respondents were also made aware of the benefits of the study which was mainly being aware of their nutritional status and being enabled to seek help if they were suffering from malnutrition.

Owing to the fact that participation in the study was entirely voluntary, no monetary compensation was given to the respondents. There was no alteration of data during analysis and after the study. Feedback to the county government for necessary action and possibly policy amendment in nutritional management for the elderly in the county will be given. It was also clearly indicated that the study was purely for

academic purposes but to some extent it may help the government in planning for old people in Kiambu County. The respondents were also made aware about the publication of data.

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

#### **4.1 Introduction**

This chapter entails the analysis of the data collected and discussions of the findings. The results are presented according to the study objectives.

#### **4.2 Response Rate**

The target population for the study was three hundred and ninety-eight (398) respondents as calculated. The response rate was 68.8% representing 274 respondents. In step with Mugenda and Mugenda (2003), a response rate of 50% is adequate for analysis and reporting; a score of 60% is right and a score of 70% and over is the most preferable. The reaction rate accomplished in study therefore meets a high reliability

#### **4.3 Prevalence of Malnutrition among Respondents**

MNA was used to establish the prevalence of malnutrition. The MNA tool (see Appendix III) has a set of standard questions that were developed after thorough research and each option to the said questions assigned a score. The interviewer is supposed to ask these questions to the respondents and for some make informed judgment and record the options down with the corresponding assigned values. The sum of the assigned values is then computed from which the classification is done. The results are shown in Table 4.1.



**Table 4.1**

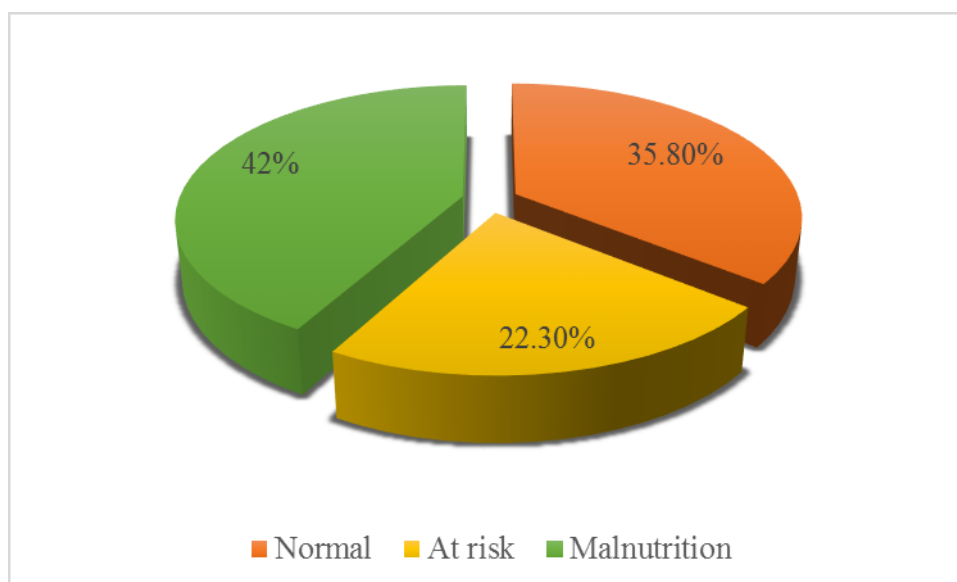
***Mini Nutritional Assessment Scores***

Points	%(n)
0-7	42.0 (115)
8-11	22.3 (61)
12-14	35.8 (98)
Total	100.0 (274)

The sum total of the responses' assigned scores (Table 4.1) is then classified as follows to determine the prevalence of malnutrition: [(12-14 points is classified as having normal nutrition status), (8-11 points is classified as being at risk of malnutrition) and (0-7 points is classified as being malnourished). The prevalence of malnutrition therefore stands at 42% as shown in Figure 4.1.

**Figure 4.1**

***Prevalence of Malnutrition among Respondents***



The prevalence of malnutrition in this study is comparable with those reported in similar studies. An Iranian study that was conducted among elderly persons that were

institutionalized reported near similarly results. The study revealed that it was reported that slightly above (49.1%) of the respondents were malnourished while 38.7% of the study participants were at risk of malnutrition (Nouri et al., 2011). Other studies done on the same have recorded lower percentages of prevalence of malnutrition. For instance, in a study that was done to determine the factors associated with risk of malnutrition amongst elderly women, it was established that 33.8% of women, considered with a malnutrition risk or were malnourished (Virtuoso-Junior et al., 2012). It is however important to note that the study only focused on women.

In another study that was done in Boko-Bongaon Block, Kamrup District, Assam, India, where the MNA tool was used to assess the nutritional status of elderly men and women above sixty years of age, it was determined that out of the total of three hundred and sixty elderly persons, fifteen percent (15%) were found to be malnourished and fifty five percent (55%) were at risk of malnutrition (Agarwalla et al., 2015). The study was a cross-sectional study that involved three hundred and sixty respondents; both male and female. A similar study that was conducted in Okharpauwa, Nepal; which involved one hundred and eleven males and one hundred and thirty-one females, the prevalence of malnutrition was reported at twenty-four (24%) (Ghimire et al., 2017). Finally, another study that was carried out to determine the level of under nutrition among the elderly in North West of Ethiopia determined that nearly twenty two percent (22%) were suffering from under nutrition (Tessfamichael et al., 2014).

#### **4.4 Social Demographic Characteristics of the Respondents**

Table 4.2 shows the socio demographic characteristics of the respondents in this study. The sample size reached was 274 elderly persons above the age of 60 years and

who met the inclusion exclusion criteria. The values are presented as percentages. The proportion of males in this study was higher than that of females (50.4% and 49.6% respectively). 48.5% of the respondents were married while 20.4% had separated. 9.5% had never been married with 15.0% and 6.6% being widows and widowers respectively. 30.7% of the respondents reported to have attained tertiary level of education while 26.6% had never been at school.

**Table 4.2**

*Social Demographic Characteristics of the Respondents*

Characteristic	Category	%(n) [N=274]
Gender	Male	50.4 (138)
	Female	49.6 (136)
Marital Status	Married	48.5 (133)
	Separated	20.4 (56)
	Widowed	15.0 (41)
	Never married	9.5 (26)
	Widower	6.6 (18)
Education Level	No formal schooling	26.6 (73)
	Primary level	14.6 (40)
	Secondary level	28.1 (77)
	Tertiary Level	30.7 (84)

To establish the relationship between socio demographic characteristics and malnutrition among the elderly in Kiambu County, Chi-square tests were conducted between the socio demographic characteristics and the nutrition status of the respondents. The results are displayed in Table 4.3. The results show that gender ( $p=0.001$ ) and education level ( $p=0.035$ ) were significant. Cross tabulation showed that men and those with low education were more likely to be malnourished. In another study done in Yoruba Nigeria, found that most of the affected participants were men (Olayiwola & Ketiku, 2006) but women were more at risk of under nutrition compared to men. Contrary to these findings, in a study that was carried out

in Ethiopia, being female was also found to be a risk factor of suffering from under nutrition (Tessfamichael et al., 2014). The study that was conducted in Columbia also indicated that the level of education was significantly associated with malnutrition and similar to this current study, it concluded that individuals with low levels of education were significantly affected. Similar results have been reported in other studies (Agarwalla et al. 2015; Ghimire et al., 2017 & Tessfamichael et al., 2014).

The findings in Table 4.3 are contrary to a study that was carried out by Virtuoso-Junior et al. (2012) it was indicated that there was a significant association between malnutrition and age particularly the age group ranging from seventy to seventy-nine years of age.

**Table 4.3**

***Relationship between Socio Demographic Characteristics and Malnutrition***

Characteristic	Chi-square value ( $\chi^2$ )	Degrees of freedom (df)	Significance (p)
Gender	110.344	274	0.001
Marital Status	3.121	274	0.373
Education Level	22.187	274	0.035

**4.5 Socio Economic Characteristics of the Respondents**

Table 4.4 presents the socio-economic characteristics of the respondents. In terms their occupation in earlier years, 57.7% were not skilled. With current occupation, 26.6% reported as being business people with 19.3% being farmers. 22.3% are homemakers and 19.7% take care of grandchildren. Those who reported to have no occupation were 12.0%. The main source of income was help from children which

stood at 47.1% with those who obtained their income from business taking up 33.6%. Majority (74.1%) reported as not having any income when it came to the question of income category. 25.5% reported as to be earning more than Kshs.6, 000 in a month. Under the type of living, 38.3% were living with their spouses while 35.0% lived with their children. Those who stayed alone were 8% of the total number of the respondents, 10.9% stayed with in-laws with the remaining 7.7% staying with other parties for example other members of the extended family or with friends. With regards to the source of fuel used in cooking, 36.1% used gas, 31.8% used firewood and 16.8% used paraffin while the remaining 15.3% of the respondents used Charcoal

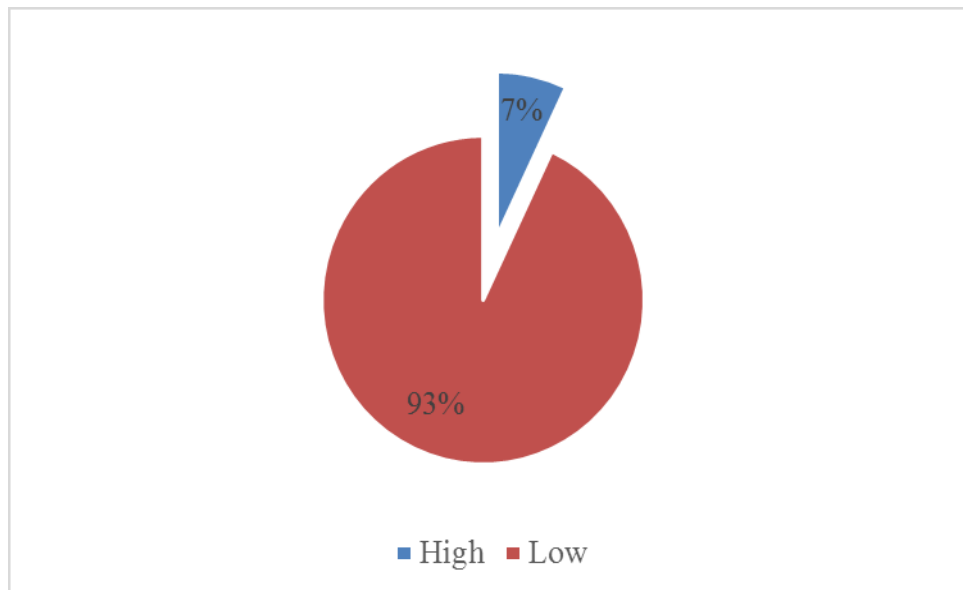
**Table 4.4*****Socio Economic Characteristics of the Respondents***

Characteristic	Category	%(n) [N=274]
Occupation in early years	Skilled	6.9 (19)
	Unskilled	57.7 (158)
	Professional	24.8 (68)
	Others	10.6 (29)
Current occupation	Farmer	19.3 (53)
	Business person	26.6 (73)
	Homemaker	22.3 (61)
	Taking care of grandchildren	19.7 (54)
	None	12.1 (33)
Current sources of income	Retirement Benefits	13.1 (36)
	Business	33.6 (92)
	Sale of personal property	6.2 (17)
	Help from children/dowry	47.1 (129)
Category of income per month (KES)	No income	74.1 (203)
	<3000	7.7 (21)
	3000-4000	5.8 (16)
	4000-5000	11.7 (32)
	5000-6000	0.7 (2)
Type of living	Alone	8.0 (22)
	With In laws	10.9 (30)
	With Spouse	38.3 (105)
	With Children	35.0 (96)
	Others	7.8 (21)
Source of Fuel	Paraffin	16.8 (46)
	Gas	36.1 (99)
	Charcoal	15.3 (42)
	Firewood	31.8 (87)

Socio-economic status (SES) was assessed by the average monthly income of respondents. Respondents earning KES 5,000 were categorized as having low socio-economic status while those earning KES 5,001 and more were categorized as having high socio-economic status. Results in Figure 4.2 show that the vast majority (93%) of respondents in the study had a low socio-economic status.

**Figure 4.2**

*Socio-Economic Status of Respondents*



To establish the relationship between socio economic characteristics and malnutrition among the elderly in Kiambu County, Chi-square tests were conducted between the socio-economic status and the nutrition status of the respondents. Results in Table 4.5 show that there was a significant relationship ( $p=0.000$ ) between socio economic status and the nutrition status of the respondents. Cross tabulation showed that respondents with low socio-economic status were more likely to be malnourished than those with high socio-economic status. Similar results have been reported by other studies, Virtuoso-Junior, et al., (2012), in their study, found that living with other people was highly associated with malnutrition. According to Agarwalla et al. (2015), elderly individuals with dependent financial status- meaning they were being supported by their children- were more likely to malnourished. According to Boulos, et al. (2014) study, they reported that participants who reported lower financial status were more often malnourished or at risk of malnutrition. Similar to the current studies

results, the study clearly implies that low income to no income among the elderly increased the chances of the elderly participants to be malnourished.

**Table 4.5**

*Association of SES and the Nutrition Status*

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	35.213 <sup>a</sup>	274	.000
Likelihood Ratio	35.423	274	.000
Linear-by-Linear Association	10.112	100	.001
N of Valid Cases	274		

**4.6 Dietary Practices of Respondents**

Table 4.6 presents the meal patterns or dietary habits of the respondents. More than half of the respondents (64.2%) obtained food through buying. 29.2% had their main food source being home garden. 6.2% obtained their food from donations while the remaining 4% had other sources including friends or other sources. The question narrowed to the main source of food as some sources overlap for example where one has a home garden and at the same time buys some items, the responses analyzed represent what the respondents considered as their main source. Only 21.2% reported as having some food restrictions or allergies that made them avoid some foods, the remaining 78.8% did not have any restrictions as reported.

More than half of the respondents (55.1%) reported poor levels of appetite. 23.4% and 21.5% had fair and good levels of appetite respectively. The most skipped meal was lunch whereby 25.2% reported skipping. Breakfast was skipped by 8.4% of the respondents while 9.1% skipped supper. 39.8% rarely skipped meals or did not skip



meals at all. The remaining 17.5% reported to have skipped more than one meal in a day. Under meal preparation, 35.8% of the respondents reported as having their children prepare their meals, 23.7% prepared the meals themselves while 13.9% reported their spouses as being the ones involved in the meal's preparation. The rest was shared among friends, in-laws and others at 8.8%, 7.7% and 10.2% respectively. On the number of meals consumed per day; 41.2% consumed two meals per day, 26.6% consumed three meals per day with 17.5% reporting to have been consuming one meal a day. 13.9% consumed four meals; this included the snacks between meals which were treated as meals for purposes of this question. 7% reported consuming more than four meals per day.

The results therefore show poor dietary practices. This is reliable with discoveries of Whitelock and Ensaff (2018) that majority of respondents reported cooking less times and when they cooked, they made easier and simpler meals. This progress in food decision to fuse easier dinners that are not difficult to get ready (counting prepared suppers) is prominent, given the likely ramifications on dietary admission and nourishing danger. The discoveries are anyway rather than discoveries of Winter et al. (2020) who tracked down that the typical dietary example depicted included three dinners each day, with skipping suppers an uncommon event. As essentially all members lived alone, most suppers were eaten alone in their own homes.

**Table 4.6*****Respondents' Dietary Practices***

Characteristic	Category	%(n) [N=274]
Sources of food	Home garden	29.2 (80)
	Buying	64.2 (176)
	Donations	6.2 (17)
	Others	0.4 (1)
Forbidden food/food restrictions	Yes	21.2 (58)
	No	78.8 (216)
Levels of appetite	Poor	55.1 (151)
	Fair	23.4 (64)
	Good	21.5 (59)
Meal skipping	Breakfast	8.4 (23)
	Lunch	25.2 (69)
	Supper	9.1 (25)
	Rarely	39.8 (109)
	More than one	17.5 (48)
	Who prepares the food (meals preparation)	Self
	Children	35.8 (98)
	Friend	8.8 (24)
	Spouse	13.9 (38)
	In-laws	7.7 (21)
	Others	10.0 (28)
Number of meals consumed per day	One	17.5 (48)
	Two	41.2 (113)
	Three	26.6 (73)
	Four	13.9 (38)
	More than four	0.8 (2)

To find out the relationship between dietary practices and malnutrition among the elderly in Kiambu County, Chi-square tests were conducted between the indicators of dietary practices and the nutrition status of the respondents. Results in Table 4.7 show that skipping of meals ( $p=0.003$ ) and number of meals ( $p=0.042$ ) were significant. Cross tabulation showed that respondents who had less than 3 meals and who skipped at least one meal were more likely to be malnourished. This outcome is in consonance with discoveries of Vassilakou et al. (2020) that the everyday number of luxurious dinners devoured was related with ailing health hazard among free-living old locally of a metropolitan region of Attica. These discoveries are like those of Beck and

Ovesen (2004) who set up that member who were skipping dinners had a lower BMI, energy and protein consumption (all  $p < 0.001$ ) and a higher predominance of negative protein balance ( $p < 0.01$ ), than different occupants. This outcome is anyway in conflict with discoveries of Fávaro-Moreira et al. (2016) who set up that helpless craving and requiring help to eat were genuinely critical eating-related danger factors for hunger, while the capacity to eat freely was identified with the improvement of the wholesome status.

**Table 4.7**

*Association of Dietary Practices and Malnutrition*

Characteristic	Chi-square value ( $\chi^2$ )	Degrees of freedom (df)	Asymp. Sig. (p) (2-sided)
Food sources	12.316	4	0.655
Food restrictions	6.942	2	0.074
Appetite	6.215	3	0.102
Meal skipping	13.643	4	0.003
Meals Preparation	8.752	6	0.188
Number of meals	8.187	5	0.042

**4.7 Risk Factors Associated With Malnutrition**

To establish the risk factors associated with malnutrition, regression analysis was conducted. Multiple regression analysis was conducted between significant variables in the chi-square tests and nutrition status of respondents. The regression analyses result in Table 4.8 show that socio-economic status ( $p=0.000$ ) was significant. This shows that socio-economic status was the most important risk factor for malnutrition among the elderly in Kiambu County. The beta value for socio-economic status is

negative indicating that respondents in high socio-economic status were less likely to be malnourished. Damiao et al. (2017) also found that the risk of malnutrition was twice as high in individuals with no family income as compared to those who earned at least three minimum wages. Similar results have been reported by other studies, for instance in a study that was conducted in Brazil to determine the factors associated with risk of malnutrition in the elderly in south eastern Brazil, it was established that the risk of malnutrition was significantly higher in women without formal education, who did not live with a partner. The risk of malnutrition was also noted to be twice as high in individuals with no family income as compared to those who earned at least three minimum wages. Participants suffering from acute illnesses such as kidney, respiratory or heart disease were at higher risk of malnutrition than those with no history of such illnesses (Damiao et al., 2017).

**Table 4.8**

***Regression Analysis of Risk Factors Associated with Malnutrition***

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.701	.404		1.735	.011
Age	.201	.174	.170	1.155	.070
1 Education	-.003	.041	-.004	-.065	.948
SES	-.414	.083	.328	4.970	.000
Meal skipping	-.065	.063	-.057	-1.023	.307
Number of meals	-.017	.029	-.033	-.577	.565

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction

This chapter presents a summary of the findings of the study as well as the conclusions from the findings. This is done in respect to the study objectives. Recommendations for policy and practice as well as suggestions for further studies are also presented.

#### 5.2 Summary of findings

The purpose of this study was to determine the prevalence and risk factors associated with malnutrition in the elderly people living in Kiambu County. Specifically, the study sought to find out the prevalence of malnutrition, establish the relationship between socio demographic and socio-economic characteristics and malnutrition, assess the effect of dietary practices on malnutrition and determine the risk factors associated with malnutrition among the elderly in Kiambu County. Data was collected from a sample of 274 respondents through a questionnaire. Descriptive, chi-square and regression analysis were employed to the data collected.

The study found that prevalence of malnutrition in the sample stands at 42%; 22% were at risk of malnutrition while 36% had normal nutrition status. Among the socio-demographic characteristics, gender ( $p=0.001$ ) and education level ( $p=0.035$ ) were significant. There was a significant relationship ( $p=0.000$ ) between socio economic status and the nutrition status of the respondents. Skipping of meals ( $p=0.003$ ) and number of meals ( $p=0.042$ ) were significant in the dietary practice's domain. Regression analysis showed that socio-economic status ( $p=0.000$ ) was significant.

This shows that socio-economic status was the most important risk factor for malnutrition among the elderly in Kiambu County. The study showed that respondents with low socio-economic status were more likely to be malnourished than those with high socio-economic status.

### **5.3 Conclusion**

The first objective of the study sought to find out the prevalence of malnutrition among the elderly in Kiambu County. This study revealed a 42.0% prevalence of malnutrition in the elderly. This was higher than most of similar studies reviewed and it indicates a public health problem that needs urgent attention.

The study sought to establish the relationship between socio demographic and socio-economic characteristics and malnutrition among the elderly in Kiambu County. Analysis showed that men were at greater risk of malnutrition than women. Among both sexes those with a lower education level were at greater risk of malnutrition. Marital status showed no association with malnutrition among the elderly. Socio-economic status did show a significant association with those of a lower socio-economic standing being at a greater risk.

The study also assessed the effect of dietary practices on malnutrition among the elderly in Kiambu County. Generally, the respondents had poor dietary practices. Although majority of respondents had no food restrictions, majority of them reported low appetite. There was widespread meal skipping and most respondents consumed less than 3 meals per day. Skipping of meals ( $p=0.003$ ) and number of meals ( $p=0.042$ ) were significant. Further analysis showed that respondents who had less than 3 meals and who skipped at least one meal were more likely to be malnourished.

Overall, analysis showed that socio-economic status to be the most important risk factor of malnutrition among the elderly. The lack of adequate income and reduced physical function to pursue employment meant that majority of the respondents were of low socio-economic status. This means that they were unable to access all the necessary foods and healthcare and coupled with a diminished physiological state that led to poor dietary habits which ultimately results in malnutrition. This study contributes to knowledge about nutrition among the elderly living in Kenya in a peri-urban setting.

#### **5.4 Recommendations**

The Ministry of Health should place a greater focus on the elderly as they have done with especially regarding nutrition issues. A multidisciplinary approach should be employed to tackle this issue. There is need for deliberate efforts by policy makers and policy influencers to look into the welfare of the elderly by coming up with policies that facilitate that. One of the best avenues for this is the cash transfer program. Equipping health care providers to effectively and efficiently answer to the welfare of the elderly especially with regards to their nutrition needs should also be a priority area.

The Ministry of Health ought to initiate efforts to help the elderly to adopt healthy life style practices especially with regards to their food intake. Training on nutritional needs of the elderly should be done for the elderly and their care givers to ensure that they are aware of the changing nutrient needs that come as a result of the natural aging process. Training on nutrition needs of the elderly by public health officer should be incorporated in the education curriculum to create awareness on their nutrition needs.

### **5.5 Suggestion for Further Studies**

There is need to conduct a study to establish what is the relationship between; elderly people, staying with their children, and getting help from them and high rates of malnutrition as found from this study. A study into the relationship between skipping lunch meal and an increased risk of malnutrition in the elderly is necessary. In addition, knowledge, attitudes and practices of community health workers or volunteers in regards to the nutritional welfare of the elderly in the community ought to be studied.



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## APPENDICES

### Appendix I: Consent Form

My name is Mary, a master's student at Kenya Methodist University, conducting a study on determination of prevalence and risk factors associated with malnutrition among the elderly in Kiambu. I wish to request for your voluntary and honest opinion in regard to this study topic;

- You are free to choose either to participate or decline to participate.
- There will be no payment for those who choose to participate.
- Information given will be treated with utmost confidentiality and will be used for the purpose of the study only.
- No names will be used to identify you and the information gathered will help enhance better understanding of the study topic.
- You may refuse to answer any question or withdraw from the study at any time.
- Please sign below to show you agree to participate in this study.

Having read and understood the above information and that the study is voluntary, confidentiality and anonymity are guaranteed, I do hereby accept to participate in this research study.

Participant's signature .....	Date .....
Participant's thumb print .....	Date .....
Principal researcher's sign .....	Date .....

## Appendix II: Research Questionnaire

**There no wrong or right answers your cooperation is highly appreciated**

Questionnaire number.....Date.....

**Tick appropriately**

### **Section A: Social demographic characteristics.**

#### **1) Gender**

Male {} Female {}

#### **2) Age of the Respondents**

#### **3) What is your current marital status?**

Married {} Separated {} Widowed {} Never married {} widower {}

#### **4) What is highest level of schooling you completed?**

{ } Primary { } Secondary { } College { } never been to school { }

#### **5) What kind of Occupation did you do in the earlier years?**

Skilled {} Unskilled {} Professional {} others specify .....

#### **6) What is your Current Occupation?**

Farmer {} Business {} Homemaker {} Taking care of grandchildren { }

### **Section B Social Economic status**

#### **1. What are current sources of income?**

Retirement benefits { } Business { } Sale of personal property { } Dowry { }

Help from children { } others specify.....

**2. What category does income fall per month?**

No income {} below 3000sh {} 3000-4000sh {} 4000-5000 {} 5000-6000 {} above 6000sh {}

**3 Whom are you currently living with?**

Alone {} In-laws {} Husband {} Son {} Daughter {} Others  
Specify.....

**4. What is your source fuel for cooking?**

Paraffin {} gas {} charcoal {} firewood {}

**Section C Risk Factors**

**1. What are your sources of your food?**

Home garden {} Buying {} Donations {} Others  
specify.....

**2 Is there food that is forbidden?**

Yes {} No {}

If yes which ones  
.....

Why.....  
.....

**3 How would you describe your appetite?**

Good {} Fair {} Poor {}

**4 How often do you skip any of the following meals?**

Breakfast {} Lunch {} Supper {} None {}

**5 Who normally prepares your meals?**

Yourself {} Daughter /in-law {} Friend {} others specify {}

**6 How many meals do you consume per day?**

One {} Two {} Three {} Four {} others specify.....

**Mini Nutrition Assessment Tool**

A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?

0 = severe decrease in food intake

1 = moderate decrease in food intake

2 = no decrease in food intake

**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

### **F1 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

### **F2 Calf circumference (CC) in cm**

0 = CC less than 31

3 = CC 31 or greater

**Screening score (max. 14 points)**

**12-14 points:** Normal nutritional status

**8-11 points:** At risk of malnutrition

**0-7 points:** Malnourished

**Section C: Anthropometry measurements**

The weighing machine will be calibrated before and after every measurement

Please be with minimal clothing

Measurement	1 reading	2 reading	Average
Weight (nearest 0.1kg)			
MUAC (nearest 0.1cm)			
Calf circumference			

**Instrument for measurement**

Weighing scale with height meter for BMI

Tape measure

Bathroom weighing scale

MUAC tape for the elderly



## Appendix III: Letter of Authorization



### KENYA METHODIST UNIVERSITY

P. O. BOX 267 MERU - 60200, KENYA  
TEL: 254-064-30301/31229/30367/31171

FAX: 254-64-30162  
EMAIL: [INFO@KEMU.AC.KE](mailto:INFO@KEMU.AC.KE)

9<sup>TH</sup> AUGUST, 2016

Kamwana Wambui Mary  
HND-3-4232-3/2014  
Kenya Methodist University

Dear Mary,

**SUBJECT: ETHICAL CLEARANCE OF A MASTERS' RESEARCH PROJECT**

Your request for ethical clearance for your Masters Research project titled "Determination of Prevalence and Risk Factors Associated with Malnutrition among the Elderly in Kiambu County." has been provisionally granted to you in accordance with the content of your project proposal subject to tabling it in the full Board of Scientific and Ethics Review Committee (SERC) for ratification.

As Principal Investigator, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the project.
2. Changes, amendments, and addenda to the protocol or the consent form must be submitted to the SERC for re-review and approval prior to the activation of the changes. The Proposal number assigned to the project should be cited in any correspondence.
3. Adverse events should be reported to the SERC. New information that becomes available which could change the risk: benefit ratio must be submitted promptly for SERC review. The SERC and outside agencies must review the information to determine if the protocol should be modified, discontinued, or continued as originally approved.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by subjects and/or witnesses should be retained on file. The SERC may conduct audits of all study records, and consent documentation may be part of such audits.

**OFFICE OF THE PRESIDENT**  
MINISTRY OF INTERIOR AND CO-ORDINATION OF NATIONAL GOVERNMENT  
**COUNTY COMMISSIONER, KIAMBU**

Telephone: 066-2022709  
Fax: 066-2022644  
E-mail: [countycommkiambu@yahoo.com](mailto:countycommkiambu@yahoo.com)  
When replying please quote



County Commissioner  
Kiambu County  
P.O. Box 32-00900  
**KIAMBU**

Ref.No: **ED.12/1/VOL.IV/163**

**22<sup>nd</sup> November, 2016**

✓ Mary Wambui Kamwana  
Kenya Methodist University  
P.O. Box 267-60200  
**MERU**

**RE: RESEARCH AUTHORIZATION**

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Reference is made to National Commission for Science, Technology and Innovation letter Ref No. **NACOSTI/P/16/52618/13516** dated **12<sup>th</sup> October 2016**.

You have been authorized to conduct research on "**Determination of prevalence and risk factors associated with malnutrition among the elderly in Kiambu County**". The data collection will be carried out in **Kiambu County** for a period ending **12<sup>th</sup> October, 2017**.

You are requested to share your findings with the County Education Office upon completion of your research.

A handwritten signature in blue ink, appearing to read 'J. A. Rateo', written over a horizontal line.

**J. A. RATEMO**  
FOR: COUNTY COMMISSIONER  
**KIAMBU COUNTY**

Cc            County Director of Education  
**KIAMBU COUNTY**

                 County Director of Health Services  
**KIAMBU COUNTY**

                 National Commission for Science, Technology and Innovation  
                 P.O. Box 30623-00100  
**NAIROBI**

                 All Deputy County Commissioners (*For information and record purposes*)  
**KIAMBU COUNTY**

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*"Our Youth our Future. Join us for a Drug and Substance free County".*



**MINISTRY OF EDUCATION**  
**State Department of Education**

Telephone: Kiambu (office) 020-2044686  
FAX NO. 020-2090948  
Email: [directoreducationkiambu@yahoo.com](mailto:directoreducationkiambu@yahoo.com)

COUNTY DIRECTOR OF EDUCATION  
KIAMBU COUNTY  
P. O. Box 2300  
KIAMBU

*When replying please quote*

KBU/CDE/HR/4/VOL.II/ (188)

21<sup>ST</sup> NOVEMBER, 2016.

**Mary Wambui Kamwana**  
Kenya Methodist University  
P.O Box 267-60200  
**MERU**

**RE: RESEARCH AUTHORIZATION**

Reference is made to the National Commission for Science Technology and Innovation letter Ref. No NACOSTI/P/16/52618/13516 dated 12<sup>th</sup> October, 2016

The above named has been authorized to carry out research on "***Determination of prevalence and risk factors associated with malnutrition among the elderly in Kiambu County***" for a period ending 12<sup>th</sup> October, 2017.

Please accord her the necessary assistance.

COUNTY DIRECTOR OF EDUCATION  
KIAMBU COUNTY  
P O BOX 2300-00900 KBU.  
TEL 020-2044686  
FAX 020-2090948

**LEAH ROIKO**  
FOR: COUNTY DIRECTOR OF EDUCATION  
**KIAMBU COUNTY**

## Appendix IV: Research Permit



### NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,  
2241349, 3310571, 2219420  
Fax: +254-20-318245, 318249  
Email: dg@nacosti.go.ke  
Website: www.nacosti.go.ke  
When replying Please quote

9th Floor, Utalii House  
Uhuru Highway  
P. O. Box 30623-00100  
NAIROBI-KENYA

Ref: No.

Date:

**NACOSTI/P/16/52618/13516**

**12<sup>th</sup> October, 2016**

Mary Wambui Kamwana  
Kenya Methodist University  
P.O. Box 267- 60200  
**MERU.**

#### **RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on "*Determination of prevalence and risk factors associated with malnutrition among the elderly in Kiambu County,*" I am pleased to inform you that you have been authorized to undertake research in **Kiambu County** for the period ending **12<sup>th</sup> October, 2017.**

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

  
**BONIFACE WANYAMA**  
**FOR: DIRECTOR-GENERAL/CEO**

Copy to:

The County Commissioner  
Kiambu County.

The County Director of Education  
Kiambu County.

**Appendix V: Kiambu County Map**

