NUTRITIONAL STATUS, FUNCTIONAL CAPACITY AND QUALITY OF LIFE AMONG ELDERLY IN LUGAZI MUNICIPALITY, BUIKWE DISTRICT

BY

BENON ZEBOSI

18/U/GMHN/19553/PD

A RESEARCH DISSERTATION SUBMITTED TO DIRECTOR OF GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS LEADING TO THE AWARD OF THE MASTER OF SCIENCE IN HUMAN NUTRITION OF KYAMBOGO UNIVERSITY

November 2023

DECLARATION

I **ZEBOSI BENON** do hereby declare that this research study report is my original work and that it has never been submitted to any University or any other Higher Institution of learning for any academic award.

Signature: …….. **Date: ……**

Zebosi Benon

18/U/GMHN/19553/PD

APPROVAL

I/We hereby attest that this research dissertation titled "nutritional status and functional capacity of community dwelling elderly persons that was conducted in Lugazi municipality, Buikwe district has been done under our supervision. It has been submitted to graduate school for examination with our approval as the student's supervisors.

Signature …… Date ……

Dr. Nambooze Joweria

Signature …… Date ……

Dr. Evelyne Isingoma Barugahara

DEDICATION

I dedicate this piece of work to my parents Nalongo Sylvia Namugga and Gidudu Francis.

ACKNOWLEDGEMENT

Countless people and institutions supported my effort towards the completion of this research study report through advice and guidance. Dr. Nambooze Joweria, Dr. Isingoma Evelyne and Dr. Mbabazi Muniirah provided invaluable feedback on my initial work at proposal stage up to the final report writing stage. Several other lecturers, Mr. Bari Ndahura Nicholas Dr. Assimwe Jascent, Dr. Muyonga Faith Namayengo gave helpful advice during analysis and interpretation of my results which helped enrich my research report.

The research assistance team led by Mr. Katumba Isaac and Mubiru Derrick performed great work of coordinating field teams during the data collection process which was very much appreciated. Similarly, the data entry team lead by Kassujja Hassan is greatly appreciated for their commitment and endurance during the entire process of data entry and cleaning. Their contributions led to the start of this great result of the study report.

I would like to express my gratefulness to all Lugazi Municipal authorities starting with the town clerk who gave permission for the study to be conducted in his area of governance, division mayors who gave additional permission, senior assistant town clerks, town agents as well as village/cell chairpersons and community mobilizers who helped in identifying households with elderly persons so as to be recruited in the study.

Lastly, I thank my family for the love, patience, support and encouragement during the study and all the moments of life. I will always cherish and love you to the very best of my ability.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

WHO -	Word Health Organization
WHOQOL-BREF –	World health organization quality of life instrument – brief version
QoL –	Quality of life
UBOS -	Uganda Bureau of Statistics
UN -	United Nations
UNPOP –	Uganda National Policy for Older Persons
BMI -	Body Mass Index
MUAC -	Mid Upper Arm Circumference
NIH –	National Institute of Health
UNFPA -	United Nations Population Fund
UNDESA -	United Nations Department of Economic and Social Affairs
UNECA -	United Nations Economic Commission for Africa
HAI -	Help Age International
MoGLSD -	Ministry of Gender, Labour and Social Development
UDHS -	Uganda Demographic and Health Survey
SAGE	Social Assistance Grants for the Elderly

ABSTRACT

Background: Every country in the world is facing a new demographic challenge due to drastic growth of elderly population. Adequate diet, nutritional status and functional capacity are important determinants of health status among this age group. With malnutrition, functional dependence and quality of life becoming serious health burdens among the elderly, there is need for early identification of the factors associated with nutritional status and functional capacity as a way to improve the health status and quality of life of aging individuals.

Objectives: This study aimed at identifying the factors associated with nutritional status and functional capacity among elderly in Lugazi Municipality, Buikwe district.

Methods: This was a community-based cross-sectional study among elderly persons aged 65 – 85 in 50 randomly selected Villages between September and December 2021. Simple random sampling technique was used with a sample size of 353 participants. Nutritional status was assessed by Mini-Nutritional Assessment (MNA), functional capacity was assessed by Lawton – Broody activities of daily living questionnaire. Data was analyzed using descriptive statistics while the associations were determined by logistic regression method.

Results: Among 353 participants, 26.9% (n=95) were found to be with a normal nutritional status, 47.0% (n=166) were at risk of malnutrition and 26.1% (n=92) were malnourished. 14.7% (n=52) were found to be dependent, 79.0% (279) had moderate independence while 6.2% were independent regarding instrumental activities of daily living. The factors associated with nutritional status among elderly after controlling for confounders in multi-variate logistic regression analysis were age 1.5 (1.38-1.59, p<0.001), gender 0.5 (0.36-0.79, p<0.002), level of education 0.8 (0.06-0.50, p=0.001), marital status 1.8 (1.23-2.72, p=0.003) and depression 1.9 (1.32-2.98, p=0.001) while functional capacity was associated with age 0.7 (0.6-0.8, p<0.001), marital status 0.2 (0.1-0.5, p=<0.001) and quality of life 0.1 (0.0-0.4, p<0.001).

Conclusions: The prevalence of malnutrition among the elderly was high. Therefore additional steps to prevent, treat and care for the affected elderly is required. Social protection initiates such as the SCG should be made more nutritional sensitive to improve elderly nutrition directly. Elderly Empowerment Groups should also be formed at community level to engage in nutrition sensitive activities. Malnutrition and functional dependence were prevalent among the elderly and were associated with gender, age, level of education, marital status, quality of life and depression among the elderly persons in Lugazi Municipality.

Keywords: Elderly Persons, Nutritional Status, Functional Capacity, Quality of Life, Depression

CHAPTER ONE: INTRODUCTION

1.1 Background

Ageing is an inevitable part of our human existence (Feng & Qiushi, 2020). The world's population has been growing for centuries but the pace of growth has accelerated (Vanella, Deschermeier, & Wilke, 2020). The global population of people aged 65 or older was estimated at 461 million in 2004, an increase of 10.3 million since just 2003 (Alkema et al., 2015). Projections suggest that the annual net gain will continue to exceed 10 million over the next decades (Buettner, 2022). In 1990, 26 nations had elderly populations of at least 2 million, and by 20000, elderly populations in 31 countries had reached the 2 million mark (Alkema et al., 2015). Projections for 2030 indicate that more than 60 countries will have at least 2 million people aged 65 or older (Hyndman et al., 2021). By 2050, the proportion of the elderly is projected to reach 1500 million worldwide. (Department of Economic and Social Affairs, 2018).

However, under developed nations also have large numbers of elderly persons and their number is increasing rapidly (Pillay et al., 2018). In Africa the elderly population will surpass 225 million while that of the East African region will reach 47.8 million by the year 2050 (World Health Organization, 2015). In most sub-Saharan Africans countries the population of the elderly is growing steadily. In 2006 the region had 35 million people aged 65 and above which increased to 15 million by the year 2015 and is projected to reach 69 million by 2030 (Ratcliffe et al., 2016), In fact the number of people reaching 65 years in sub-Saharan Africa is growing much faster than in many developed countries (Ratcliffe et al., 2016).

Uganda has not been left out either as its elderly population continues to increase drastically from 840,000 in 1991 to 1,090,000 in 2002 and to 1,431,000 in 2014 (UBOS, 2016a). With each passing year and the elderly population is projected to more than triple to 5.5 million by the year 2050 (UBOS, 2016b). Improvements in the health care systems, decreased fertility rates and reduction in child mortality have contributed to this new demographic phenomenon (World Health Organization, 2018).

When people age, they experience physiological changes that lead to a decline in their nutritional status as well as their functional capacity (Tomás et al., 2019; Wong et al., 2018).. This will lead to immense frustrations manifested through depression and poor quality of life (Grover & Malhotra, 2015). Consequently, the elderly persons will lose their autonomy regarding instrumental activities of daily living which are key to survival (Santos et al., 2017). This reduces the elderly to dependents and beggars to both family members and community at large (Devraj & D'mello, 2019; Maniragaba et al., 2018). This in turn creates anxiety, discomfort and tension leading to depression and a poor quality of life among this age group (Güths et al., 2017; Maniragaba et al., 2018).

Literature from developed countries indicates that assessment of these parameters is useful predictor for healthy aging and modest survival among this age group (Cortés-Muñoz et al., 2016; Luger et al., 2016; Oliveira, Anamélia, Nossa, & Mota-Pinto, 2019). Empirical evidence regarding nutritional status and functional capacity among Ugandan elderly and the factors associated with these variables is little and scarce (Kyomuhendo et al., 2020; Maniragaba et al., 2018).

1.2 Statement of the Problem

The rapidly aging population in Uganda is posing one of the greatest challenges to public health (Nzabona et al., 2016; UBOS, 2022). This is due to the numerous physiological changes that happen as people age which could easily lead to death (Department of Economic and Social Affairs, 2018; UBOS, 2016b). Uganda is currently experiencing numerous challenges in the planning, care and support of its bulging elderly population (Maniragaba et al., 2019). This is entirely due to very little available data regarding this age group (Wamara & Carvalho, 2019). Because this is a new demographic phenomenon, pertinent data and scientific Ugandan literature concerning older person's nutritional status, functional capacity together with depression and quality of life remains scanty and not easily accessible while that is accessed is old and outdated (Kikafunda, K, Lukwago, & B, 2005; Nambooze, Fujimura, & Inaoka, 2014b; Nzabona et al., 2016). However, literature from developed countries indicates that periodic assessment data is useful predictor of healthy aging and descent survival which is the ultimate goal for all humans (James, Reneman, & Gross, 2019). With little scientific attention being paid to the elderly persons' day to day well-being, descent survival and proper health care support, this research intends to build on a few earlier studies to help bridge this knowledge gap with hope that the findings will

provide up to date data henceforth help trigger improved planning of social health care and welfare support for the increasing number of elderly persons in Uganda.

1.3 Objectives of the Study

1.3.1 Overall Objective

The overall objective of the study was to assess the nutritional status, functional capacity and quality of life among elderly persons in Lugazi Municipality, Buikwe district.

1.3.2 Specific Objectives of the Study

The specific objectives of the study were to:

i) Assess the nutritional status and associated factors among elderly in Lugazi Municipality, Buikwe district
ii) Assess functional capacity and dependence among elderly in Lugazi Municipality, Buikwe district.
iii) Assess the quality of life and depression levels among elderly in Lugazi Municipality, Buikwe district
iv) Identify the factors that are associated with nutritional status and quality of life among elderly in Lugazi Municipality, Buikwe district.

1.4 Research Questions

i) Does malnutrition influence functional dependence among elderly?
ii) Does depression contribute to malnutrition among elderly?
iii) How does malnutrition influence the quality of life among elderly?
iv) What factors are associated with nutritional status and functional capacity among the elderly?

1.5 Research Indicators

The study was guided by the following research indicators. (Table 1)

Table 1: Research Objectives and Research Indicators

Research Objectives	Research Indicators	Research questions
Assess the nutritional status and associated factors among elderly in Lugazi municipality, Buikwe district.	i) Percentage of elderly at risk of malnutrition (MNA score 17-23.5). ii) Percentage of malnourished elderly (MNA score < 17).	1.i) Does malnutrition influence functional dependence among elderly?
Assess functional capacity and dependence among elderly persons in Lugazi municipality, Buikwe district	i) Percentage of dependent elderly (Score 0 – 3) ii) Percentage of independent elderly (Score 7 – 8)	4.iv) What factors are associated with nutritional status and functional capacity among the elderly?
To assess the quality of life and depression levels among elderly in Lugazi municipality Buikwe district.	i) Percentage of Depressed elderly (Scale Score >5) ii) Percentage of elderly not depressed (Scale score < 5). iii) Percentage of elderly with very good QoL (Score 75 – 100). iv) Percentage of elderly with moderately good QoL (Score 74 – 60) v) Percentage of elderly with moderately poor QoL (Score 59 – 40) vi) Percentage of elderly with very poor QoL (Score < 40)	ii) Does depression contribute to malnutrition among elderly?
Identify factors that are associated with nutritional status and quality of life among elderly in Lugazi municipality.	i) Odds ratios (OR) at 95% CI to predict the factors. ii) Significance (P value of <0.05).	Does malnutrition influence the quality of life among elderly?

1.6 Conceptual Framework

The dependent variables are nutritional status and functional capacity. The independent variables include demographic factors. Socio-economic well-being greatly influences nutritional status because individuals that live under poor housing conditions cannot afford to buy nutritious foods to make up and maintain a balanced diet (Ahlqvist, Nyfors, & Suhonen, 2016). Housing conditions further affect the quality of life of the elderly in that individuals living under poor housing conditions will always lack basic necessities which creates a feeling of anxiety, self-worthlessness and despair (Rahgozar & Mohammadi, 2017).

Socio-demographic factors such as education level influence the nutritional status and functional capacity of the elderly in that educated people tend to earn high incomes hence can afford nutritious foods to provide a balanced diet for their family and themselves as well as understanding the importance of exercise and body work outs to keep strong and healthy (Güths et al., 2017; Nawagi et al., 2018). Depression is also associated with both nutritional status and functional capacity in a way that elderly persons having a poor nutritional status or functional capacity decline is more likely to develop depression symptoms due to constant ill feeling due to reduced body immunity and reduced energy to carry out day to day activities of daily living respectively (Ranganath & Jyothi Jadhav, 2017).

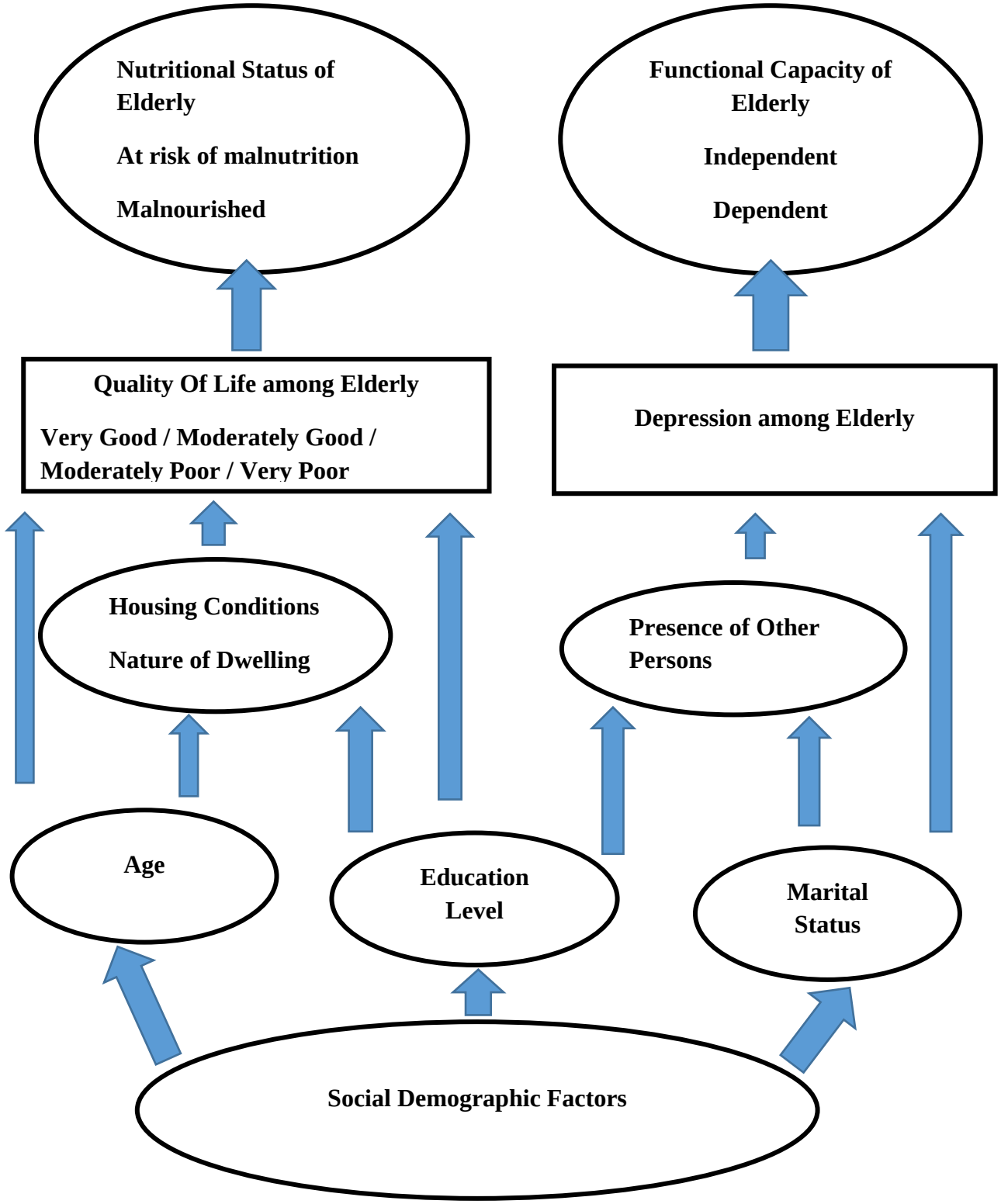


Figure 1. Conceptual framework showing the interaction of nutritional status, functional capacity, quality of life, depression, housing conditions and demographic characteristics.

CHAPTER TWO: LITERATURE REVIEW

2.1 Elderly Population at the Global Level

Ageing, an inevitable process, is commonly measured by chronological age and, as a convention, a person aged 65 years or more is often referred to as 'elderly' (Sabharwal et al., 2015). The health of the elderly persons is an important aspect used to define the health status of a population of any given country (World Health Organization, 2018). According to the World Health Organization, malnutrition, functional dependence and poor quality of life among the elderly are common phenomena (Kanwal, Qidwai, & Nanji, 2018). This is because daily food consumption decreases with increasing old age moreover the food consumed is usually low in calories thus contributing to nutritional deficiencies and consequently malnutrition (Oliveira et al., 2017; Schrader et al., 2014; Vedantam et al., 2016). Multi morbidity associated with increasing age due malnutrition and loss of functional capacity is common and in many cases leads to depression and poor quality of life especially in developing countries for which Uganda is no exception (Karimi & Brazier, 2016; A. Nzabona, Ntozi, & Rutaremwa, 2013; U. D. UBOS, 2016).

Based on the United Nations Department of Economic and Social Affairs' report 'World Population and Ageing' released in 2015, approximately 12.5% of the world population is aged 60 years or over (Department of Economic and Social Affairs, 2018). This number is projected to reach 20% by 2050 and this population will overtake adolescent and youth groups (Department of Economic and Social Affairs, 2018). In sub Saharan Africa, the elderly persons comprise of 5% of the population while in the East African region, the elderly population has been projected to grow from 4.9% to 7.8% in the year 2025 and 2050 respectively (Vera-Sanso et al., 2018; World Health Organization, 2018). In Uganda, the current population of the elderly persons is estimated at 4% of the total population and it is expected to increase to 5.5 million by the year 2050 (Aboderin & Beard, 2015; World Health Organization, 2018). The elderly population in Buikwe district is estimated at 16,712 which make it almost 4% of the total population of the district of which the elderly females constitute 56% while the males are only 44% of the total district population of the elderly (UBOS, 2016b). The aging population poses one of the greatest challenges to public health, mainly in countries where this phenomenon occurs in situations of poverty and great social inequality.

2.2 Aging and Nutritional Outcomes among Elderly Persons

Nutrition plays a significant role among the numerous environmental factors that modulate ageing (Caçador, Teixeira-Lemos, Oliveira, et al., 2021). Nutritional status has been defined as an individual's health condition as it is influenced by the intake and utilization of nutrients (Jeejeebhoy, 2019). While poor nutrition is not a natural affiliate to ageing, older adults are at risk of malnutrition due to physiological, psychological, social, and environmental risk factors (Aboderin & Beard, 2015; Vedantam et al., 2016). Very few studies have reported or even documented information about the elderly persons' nutritional status and functional capacity in Uganda and Africa at large. Among the few studies conducted; Gandhi, Choudary, Kumar and Bhatnagar (2018) reported that 7.3% of the elderly were malnourished. Afolabi, Olayiwola, Sanni, and Oyawoye (2012) found out that 5.7% of the elderly women were underweight while only 2.9% of elderly men were found to be underweight. In Uganda the overall prevalence of under nutrition was reported to be 33.3% based on body mass index (<18.5 kg/m2) and 52% based on mid-upper arm circumference (<24 cm) (Kikafunda & Lukwago, 2005). In the more recent study, Cheserek et al. (2012) reported 29.5% elderly men as significantly more underweight than elderly women who registered 24.2% underweight (Cheserek et al., 2012).

Malnutrition among the elderly has an evident impact on their general health and quality of life (Kshetrimayum et al., 2013). In this age group, malnutrition is common and the risk increases with advancing age (Rasheed & Woods, 2013). The malnourished elderly are more likely to require more hospitalizations, cause burden to caregivers and possess a huge economic cost to society (A. Nzabona et al., 2013). This facilitates the need for early detection of malnourishment among elderly by assessing the nutritional status as a part of geriatric evaluation therefore appropriate measures can be taken to overcome the malnourishment and associated complications of reduced functional capacity status and poor quality of life (Zainudin et al., 2019).

2.2.1 Nutritional Status and Demographic Characteristics of Elderly Persons

Previous studies have reported that socio-demographic characteristics and lifestyle are associated with nutritional status among elderly persons (Krishnamoorthy et al., 2018; Nambooze, Fujimura, & Inaoka, 2014a). The socio-demographic characteristics of concern to this study included gender (male or female), age, educational and literacy level, marital status, presence of other persons in

the household and socio-economic status. Nutritional status has been reported to deteriorate with aging, partly due to the loss of muscle mass and declined food intake (Odwee, 2018). While many elderly persons remain with an adequate nutritional status, those who are at risk or malnourished may experience difficulties in meeting their nutritional needs (Zainudin et al., 2019). Education and literacy levels influence the nutritional status of elderly persons, many studies have reported that illiterates are more prone to malnutrition compared the literates (Ranganath & Jyothi Jadhav, 2017). Living arrangements in terms of whether an individual stay with any other person or alone also has been shown to influence nutritional status of the elderly persons (Cortés-Muñoz et al., 2016). Elderly persons that live with children or other relatives tend to have better nutritional status compared to their counter parts that live alone (Zainudin et al., 2019).

A poor nutritional status is more frequent in developing and low-income countries among their elderly populations (Güths et al., 2017). In these countries, the impact of socio-economic factors may be more pronounced, because of high inequities and limited access to health and social services (Kyomuhendo et al., 2020). Numerous factors can lead to a poor nutritional status among older persons, including physical, medical, psychiatric and social-economic factors. In the majority of cases, these factors are related to each other. The most significant influences of poor nutritional status are poor diet and disease, which are connected to access to food and are influenced by socio-economic status of an individual (Rahgozar & Mohammadi, 2017). Social factors, e.g. lack of social support, having a limited social network or being socially isolated, are also associated with nutritional status in elderly individuals (Hestevik et al., 2019; Rahgozar & Mohammadi, 2017).

2.2.2 Nutritional Status and Quality of Life Among Elderly Persons

Aging is an imperative problem for many countries in this century, and presents several challenges for the maintenance of good nutritional status as well as good quality of life among the rapidly aging population (Maniragaba et al., 2018). Diet and lifestyle, coupled with maintenance of a healthy body weight are important in the maintenance of health for all age groups but are crucial for healthy aging (Maniragaba et al., 2018). Aging is associated with a reduction in appetite due to loss of taste, smell or teeth which in turn reduces food intake for such an individual (Luger et al., 2016). This will in turn affect the nutritional status and consequently lead to a poor quality of life because such people can hardly go shopping or even prepare a meal on their own (Nazari & Ghahremani, 2018; Odwee, 2018). As the aging population continues to escalate, preventing

malnutrition in the elderly has been identified as one of the best strategies for achieving healthy aging by providing healthy environment, proper and timely health care, descent housing, proper transport means and balanced meals (Abye, 2020; Zainudin et al., 2019). Elderly persons are vulnerable to malnutrition and poor quality of life for many reasons, including weight loss, lack of financial as well as support and inability to access food and safe water (Aboderin & Beard, 2015; Krishnamoorthy et al., 2018; Sanya et al., 2017).

The risk of developing nutrition-related disorders is much higher among the elderly population due to their vulnerability, and the fact that daily food consumption decreases with old age (Saghafi-Asl et al., 2018). Malnutrition among the elderly increases the risk of inadequate nutritional status, poor quality of life and also leads to increased mortality by reducing food intake due to appetite loss or lack of money to purchase desired and nutritious foods (Abolghasem Gorji et al., 2017; Ahmed and Haboubi, 2019). As a result of the aging process, elderly persons often experience physiological changes such as changes in the nervous system where by the individual will always require medication for them to be able work or feel better (Amarya et al., 2018). Factors that may contribute to poor quality of life may include; lack of opportunities for desired leisure activities due to lack of energy to perform them for example playing soccer, tennis, being unable to sleep well, being unable to access health services and having negative feelings such as anxiety, blue mood, despair and depression (Caçador, Teixeira-Lemos, Martins, & Ramos, 2021; Panaghi et al., 2018; Yoshimura et al., 2013).

2.2.3 Nutritional Status and Depression among Elderly Persons

Depression can be defined as a multi-dimensional diverse disorder that has a negative influence on the individual's physical health, quality of life and psychosocial functioning which could lead to disability and death (Grover & Malhotra, 2015).Depression is a serious mental disorder among the elderly persons (Keshavarzi, Ahmadi, & Lankarani, 2015). Depressed elderly persons have been reported to have symptoms such as a decrease in self-esteem, hypochondria, alterations in sleep and appetite patterns, feelings of worthlessness, dysphonic moods and a tendency towards recurrent thoughts of suicide (Rahgozar & Mohammadi, 2017).

The difference in the prevalence of depression is caused by regional differences. In high-income countries, the proportion of elderly depression is 6.6% (the United States) (Cui et al., 2022) and

3.7% (Singapore) (Lau et al., 2019). In contrast, the incidence of depression among elderly persons in low-and middle-income countries is higher (Gureje, 2020). For instance, the prevalence of depression among the elderly is 9% (Africa) and 7.8 to 34.8% (Asia) (Chu et al., 2023). The challenge of depression in the elderly in developing countries is even more serious (Reynolds et al., 2019).

Malnutrition and depression are highly prevalent among the elderly and can lead to unfavorable outcomes (Güths et al., 2017). The results of a study by Ssebunnya et al. (2019) revealed a high prevalence of depression and malnutrition among the elderly persons where by depression was associated with the worsening of nutritional status. On the other hand, depressed elderly persons may be at greater risk of malnutrition in later life (Raggi et al., 2016). Some observational studies have reported that depression may deteriorate the risk of malnutrition among the elderly persons by making the feel dissatisfied with their life as a result of dropping many activities of interest (Iwasa et al., 2018). When the nutrient intake does not meet the nutritional needs of the elderly persons, moderate micro nutrient deficiencies may occur, and gradually it may decline into the Protein Calorie Malnutrition (PCM) (Sugiura et al., 2016).

The latter is more common in the institutionalized elderly population whose proportion is between 30 - 50% when compared to home-living elderly persons who only constitute 2-4%, while the prevalence of moderate micro nutrient deficiencies is much more in both cases (Cheserek et al., 2012). Depression is mentioned among other causes of malnutrition among elderly persons aside with chewing or swallowing disorders, loneliness, and social deprivation (Ahmadi et al., 2013).

To date, the causal association linking depression and nutritional status is blurry (Ahmadi et al., 2013). The effect of depression on nutritional status, feeding habits and elderly weight is still controversial. Some studies have reported weight gain and visceral fat accumulation among elderly depressive persons (Raggi et al., 2016), while others report depression as a contributing factor to weight loss in the same group of people (Raggi et al., 2016; Reynolds et al., 2019); Women were more depressed than men 27.9% and 15%, respectively. The elderly persons living in urban areas were more depressed than those living in rural areas 39.5% and 3.8% respectively.

The prevalence of malnutrition and depression among elderly population was much more in free living elderly than family supported elderly persons which reveal the role of family support on

nutritional and mental health status (Rahgozar & Mohammadi, 2017). German L. (2015) and colleagues found that MNA scores were significantly lower among depressed elderly persons as compared with non-depressed elderly, indicating a higher risk for under- nutrition among depressed elderly persons. The consequences of untreated depression are manifold and cause an increased use of health care and medical services (Boström et al., 2014), affect quality of life and well-being negatively and can cause increased mortality.

2.3 Functional Capacity of the Elderly Persons

2.3.1 Functional Capacity and the Aging Process

Functional capacity is considered, as the basis of an efficient geriatric assessment, giving a broad and interdisciplinary approach to health well-being of the this age group (Tomás et al., 2019). Functional capacity is characterized by the ability of individual to conduct, independently, instrumental activities of daily living which include ability regarding phone usage, carrying out shopping of desired items, food preparation, house maintenance, doing laundry, being able to transport oneself, being in position to prepare and take own medication as prescribed by health personnel's and being able to handle and manage own finances such as banking, paying bills, making budgets and many others (Boström et al., 2014; Tomás et al., 2019). Individuals who can independently perform all the activities of daily living are categorized as independent regarding these activities, those that need assistance in either one, two or three of are categorized as moderate independence while those that need assistance in more than three of the activities are categorized as dependent for such activities (James et al., 2019; Oliveira et al., 2019).

Katz first assessed functional capacity and took into account the performance of basic activities of daily living and instrumental activities of daily living (Spector et al., 1987). In many aspects, lacking enough energy to shop, prepare and cook meals is a factor that can result in malnutrition and deserves the attention of professionals as well as family members (Sugiura et al., 2016). The decline in functional capacity can be an indicator of nutritional risk which is particularly associated with less food intake due to lack of energy to go buy the food, prepare and cook it or when the individual lacks financial and social support to purchase enough food and medical supplies to maintain their lives (Sugiura et al., 2016).

Aging is associated with dependency in activities of daily living (Dehghankar et al., 2018). This is largely due to reduced functional and physical capabilities and will eventually affect nutritional outcomes of the elderly (Tomás et al., 2019). As a greater number of people reach older age, there is a tendency of change in the pattern of morbidity and causes of death among this population (Oliveira et al., 2017). So, instead of infectious diseases, chronic degenerative diseases and their complications have become prevalent (Palma et al., 2014; Tomás et al., 2019). The increase in the number of chronic diseases associated with the aging process leads to a higher prevalence of incapacity, both in short and long term for example being confined to bed or wheelchair most of the time due to lack of energy to move (Cortés-Muñoz et al., 2016).

Moreover, with the physiological process of aging, the functional capacity of each system of the human body decreases hence rendering the individual incapacitated (Landi et al., 2010; Tomás et al., 2019). It is a slow process which is undetectable, unavoidable and widespread (Ahlqvist et al., 2016). Therefore functional capacity status evaluation is essential to establish a diagnosis, a prognosis and an appropriate clinical judgment as a basis for decisions on the necessary care to be administered to the elderly persons (Singh et al., 2014). Functional capacity status assessment seeks to verify, in a systematic way, at what level the aging process naturally hinders autonomous and independent performance in instrumental activities of daily living among the elderly which in turn allows for the development of a more appropriate care and proper planning for this age group (Pereira et al., 2017).

2.3.2 Functional Capacity and Demographic Characteristics of Elderly Persons

Functional capacity has been correlated with some socio-demographic factors among the elderly. Aging is a life period surrounded by physical, psychological and social changes that affect each individual in a rather unique way and is associated with socio demographic factors such as gender, education level, socio-economic status among others (Wamara & Carvalho, 2019). Aging is associated with progressive deterioration of physical performance among the elderly persons and this leads to dependency in independent activities of daily living (Abye, 2020). Advancing in age can also cause important physiological changes, such as decreased movement from one place to another, reduced energy to do laundry, go for shopping, prepare meals or even take their own medications (Gravina et al., 2021). These effects hinder the functionality of the elderly, affecting their ability to perform instrumental activities of daily living (Ahlqvist et al., 2016). People who

live longer are more likely to experience functional capacity decline, which can lead to economic and family dependence (Dehghankar et al., 2018). This is because the elderly are normally retired with no daily income, no social security and can hardly do business to earn substantial amounts for survival on their own (Wamara & Carvalho, 2019). When the elderly has some degree of dependence to manage financial resources or purchase basic consumer goods, their autonomy starts to be hampered in terms of shopping (Nogueira et al., 2017). As a result, other people like formal or informal caregivers will manage their lives, make decisions for them, which results in a loss of individuality (Matos et al., 2018).

Functional capacity is characterized by an individual's ability to carry out daily instrumental activities of daily living independently and autonomously, while staying in contact with their home environment (Tomás et al., 2019). Functional capacity status decline makes the elderly persons more vulnerable and dependent, leading to a decrease in their well-being and quality of life (Baptista et al., 2018). To achieve functional independence in the community is one of the challenges in elderly person's care, and for that, we can address the instrumental activities of daily living such as using the phone, means of transport, going for shopping, preparing meals, cleaning up, doing laundry, handling medicine and managing their finances (Spector et al., 1987). Some investigators point out using the telephone, mode of transport and handling money as the activities in which elderly people are more reliant (Graf, 2008), which contribute to the current social representation of aging associated with functional capacity decline (Oliveira et al., 2017).

In another study performed in rural Japan, functional capacity decline was reported to be more advanced in the female gender than in the male gender (Yoshimura et al., 2013). Naturally the female gender ages faster than male gender of the same age and this could be due to physiological factors. Several studies have also reported that individuals that stayed with other persons in the same household were also less likely to have functional capacity decline when compared to those individuals that stayed alone (Gravina et al., 2021; Moreira et al., 2016). Elderly persons that poses some kind of formal education and literacy skills tend to have better functional capacity than their counter parts without education or literacy skills. This could be inclined t the fact that literates tend to live a better social life in terms of exercising their bodies through active leisure such as playing tennis, soccer, swimming, jogging which is not reflected in the illiterates who normally engage in

passive leisure activities such as drinking beer, playing Ludo simply because they are not aware of the health benefits body exercises (Nogueira et al., 2017).

Education also promotes a better quality of life among the elderly as it provides intellectual development and social adaptation to different environments and life challenges (Shivraj et al., 2014). It is assumed that educational programs offered by educational institutions open to senior citizens favor a social support network with family members and friends; motivate the search for information and social interaction; and facilitate intellectual development and a large part of the fundamentals for active and healthy aging (Nazari & Ghahremani, 2018). Such programs are therefore attended by autonomous and independent elderly individuals who differ from the general elderly population in the community in that they represent the concept of active aging as proposed by the world health organization (World Health Organization, 2018).

2.3.3 Functional Capacity and Housing Conditions of the Elderly

An individual's functional capacity reflects the ability to execute a task in a test situation related to a daily physical activity, such housekeeping, ability to make a phone call, mode of transport, handling finances, shopping, meal preparation, laundry and responsibility for own medication (Tomás et al., 2019). Therefore the degree of dependency in these activities is a measure of disability based on the assistance a person receives with these activities and may be more influenced by factors such as housing conditions, number of people in the household, assistance from others and employment (Pereira et al., 2017).

An individual's housing condition relates to many aspects of socio-economic wellbeing including health, social relations as well as income (Zavisca & Gerber, 2016). One aspect of housing quality is the quantity of housing that is available to each member of a household (Fang et al., 2019). For a given household, construction materials of the dwelling unit determine the degree of housing quality experienced by the persons who live there (Zavisca & Gerber, 2016). Elderly persons with social security tend to have better functional capacity due to the fact that they can easily acquire accessories such as wheel chairs to help in mobility from one point to another (Baptista et al., 2018). However, such accessories can best be used under good housing conditions because wheel chairs move best on level grounds and well-built areas which in most cases are available to individuals under good housing conditions (Maniragaba et al., 2018). Presence of electricity in the

house can also help improve an individual's functional capacity in way that laundry will be done with help of washing machines instead of hands, food will also be prepared using electrical devices such as oven, microwave oven, rice cookers, food processors, coffee makers among others hence making meal preparation easier (Ahlqvist et al., 2016).

2.3.4 Functional Capacity in relation to Quality of Life among Elderly Persons

Aging causes many life restricting and physical, mental, social and spiritual consequences which try person's patience and affect everyday living and their quality of life (Yodmai, Somrongthong, & Kumar, 2018). Functional dependence is associated with a poor quality of life due to onset of chronic diseases, taking multiple drugs, poor housing conditions, physical disability, sedentary lifestyle due confinement in wheelchair or bed including depression (Devraj & D'mello, 2019). Functional dependency a serious and common problem among elderly persons and can result in weakened physiological and physical performance which renders victims into poor quality of life due to lack of energy to move or perform day today activities (Oliveira et al., 2019). Lack of functional independence regarding activities of daily living greatly affect quality of life of the elderly of elderly persons due to reduced energy to go shopping for necessities, prepare meals, do laundry or move from one place to another (Uddin et al., 2017).

Some studies have reported that the more independent an elderly is, the better the quality of life of such a person (Baptista et al., 2018). Functional capacity impairment might affect all aspects of elderly person's life (Oliveira et al., 2017). This extends to the family and the care givers consequently leading to high medical cost (Maniragaba et al., 2018). Functional dependence creates great vulnerability for elderly persons, compromising their well-being and quality of life (Hestevik et al., 2019). Functional independence decline due to aging hampers the individual's relationship with the environment and impairs his/her performance in instrumental activities of daily living (Palma et al., 2014). This in turn will cause changes of a psychological and social nature hence affecting the quality of life of the individual elderly (Rahgozar & Mohammadi, 2017).

2.3.5 Functional Capacity and Depression among the Elderly

Some studies have correlated functional capacity and depression in a way that functional capacity decline leads to activity decline and the individual may develop depression symptoms due to loneliness, inability to move to places of their choice or the thought of abandoned by family and

friends (Rahgozar & Mohammadi, 2017). Depression is a mood disorder that causes a persistent feeling of sadness and loss of interest (Grover & Malhotra, 2015). Depression in older persons represents a major issue because of its relevant prevalence and the associated higher risk of adverse health-related events (Khaje-Bishak et al., 2017). Many epidemiologic studies have documented that a high proportion of community-dwelling elderly persons ranging from 12% to 20% suffers from significant depressive symptomatology (Iwasa et al., 2018). Depressive symptoms are associated with several major adverse outcomes, including increased risk of morbidity and mortality, poorer health status, and higher risk of functional capacity status decline (Moreira et al., 2016; Santos et al., 2017). A study conducted among elderly persons in northeastern Brazil found out that an age older than 75 years, illiteracy and dependence for the performance of instrumental activities in daily life were factors associated with the indications of depression symptoms (Danielewicz, Barbosa, & Del Duca, 2014).

Among elderly persons, the incidence and prevalence of depression seem to increase with age (Iwasa et al., 2018; Reynolds et al., 2019). Depression is also more prevalent among elderly persons living in residential care facilities, those with cognitive impairment, and women (Rahgozar & Mohammadi, 2017). Drug treatment for depression seems to have a limited effect among elderly persons and may have no effect in people with reduced functional independence (Gravina et al., 2021). To find alternative ways of treating or preventing depression in older age, increasing our knowledge about factors associated with this condition is very important (Boström et al., 2014).

Depression is a common problem among elderly persons causing emotional suffering and increased mortality as well as an increased risk of physical inactivity and disability (Kagawa & Corrente, 2015). Furthermore, elderly persons with a depressed mood are less likely to receive adequate care of personal health and to follow the treatment schedules prescribed (Boström et al., 2014). Moreover, they are more likely to engage in unhealthy behaviors, such as smoking, alcoholism or unbalanced diet in an effort to find companionship (Baptista et al., 2018). More so, the presence of chronic conditions, such as arthritis or angina, has been indicated as an additional explanation for the increased risk for functional capacity status decline among elderly persons with depression symptoms (Ssebunnya et al., 2019). The prevalence of depression and feeling of loneliness was estimated to be about 22.4% among elderly population of Iran (Panaghi et al., 2018). Depression can lead to adverse outcomes such as relative lower social performance, poorer

health status, and greater medical burden plus reduced functional capacity (de Souza, Papini, & Corrente, 2015; Yoshimura et al., 2013).

In conclusion, to better understand the factors associated with nutritional status and functional capacity, the impact of each individual components of this association between main dependent variables on quality of life and depression must be well explored. Nutritional status could be associated with factors including demographic, quality of life as well as depression and this is one of the main aspects this study seeks to investigate. Functional capacity could also be associated with demographic, quality of life and depression factors; this study seeks to investigate this as well. To the best of my knowledge, no such study has been conducted to date. The main aim of this study was to examine factors associated with nutritional status and functional capacity and the associations between the two main dependent variables. A tertiary aim was to investigate whether gender and housing conditions influenced these associations in any way.

CHAPTER THREE: METHODOLOGY

3.1 Study Area

The study was conducted in Lugazi Municipality, Buikwe district. Buikwe district is located in the Central region of Uganda, sharing borders with the districts of Jinja in the East, Kayunga along river Sezibwa in the North, Mukono in the West, and Buvuma in Lake Victoria and has a total area of about 1,209 Square Kilometers (UBOS, 2014). The GPS coordinates of the district are 0°20'23.40" N 33°01'28.80" E. Buikwe District comprises of three constituencies which include Lugazi Municipality, Njeru Municipality and Buikwe County South.

Lugazi Municipality comprises of three divisions of Kawolo, Najjembe and Lugazi central with a total of 21 parishes and 93 villages. Most of the residents in Lugazi Municipality are average income earners and have attained some level of basic education. Lugazi Municipality is currently experiencing rapid urbanization at 17% (Buikwe local government, 2017); it is located within the central region were 33.6% of the elderly persons aged 60 and above are malnourished with high levels of functional dependence (UBOS, 2016b; Wamara & Carvalho, 2019). Elderly depression is also high and has been reported at 28.6% as well as majority having a poor quality of life (Ndikuno et al., 2016). This trend could be present in Lugazi municipality as it is part of the central region but there is no existing study underpinning it and that is why Lugazi was the study area.

3.2 Study Design

The study used a Cross Sectional study design with quantitative methods.

3.3 Study Population

Community dwelling elderly in Lugazi Municipality, Buikwe district were recruited to participate in this study.

3.3.1 Sample Size Calculation

The sample size was estimated using the Leslie Kish formula as shown below. Based on the study among the elderly nutrition status that reported under nutrition prevalence of 33.3% (Kikafunda et al., 2005), the sample size has been calculated as below using the Leslie Kish formula.

Sample size = $\frac{z^2 * (p)*(1-P)}{d^2}$

Sample size = $\frac{1.96^2 * 0.333* (1-0.333)}{0.05^2}$

Sample size = $\frac{3.84 * 0.333 *0.667}{0.0025}$

Sample size = 341

Minimum sample size was **341** but the study used a sample size of 353. An attrition factor of **10%** was considered to make the total sample size **353**.

Where

Z – Z value equivalent to 1.96

P – Estimated Prevalence of malnutrition among elderly; 33.3 % (Kikafunda et al., 2005)

D - Standard error given by 0.05

3.3.2 Sampling Technique

Simple random sampling technique was used. Buikwe district was selected because it is located within the central region were 33.6% of the elderly persons aged 65 and above are malnourished with high levels of functional dependence (UBOS, 2016b; Wamara & Carvalho, 2019). Lugazi municipality is made up of Kawolo, Central and Najjembe divisions. A list of parishes in each of the three divisions was made with the assistance of assistant town Clarks after which 4 out of 8 parishes were randomly chosen using a raffle draw in Kawolo division. 3 out of 6 parishes as well as 4 out 7 parishes were also randomly chosen using a raffle draw in both Central and Najjembe divisions respectively.

A list of villages under each parish selected was made with assistance of parish chiefs and village chairpersons after which 19 out of 34 villages were randomly chosen using a raffle draw in

Kawolo, 15 out of 25 villages were randomly chosen using a raffle draw in central division and 16 out of 34 villages were randomly chosen using a raffle draw in Najjembe division.

With the help of village mobilizers and village health team members, lists of ten households containing the target group per village were made from which 7 participants were randomly selected using a raffle draw for recruitment to participate in the study.

3.4 Pretesting of the Research Instruments

When the research instruments were designed, 10 people from the target group to pretest it were identified from all the three divisions that make up Lugazi municipality to answer questions in the instruments. The questionnaires were completed the same way that it would be in the actual study. While being taken through the questions, the participants were required to understand the question and answer. The interviewer took notes of everything they said and later identified places where they misunderstood, hesitated or made mistakes. When all the questionnaires had been completed, a review of notes from each session was done.

The research team used the data together with the notes reviewed from the pretesting exercise to improve and fine tune the objectives of the study plus improving the study instruments to address the identified gaps.

The research instruments were checked by research team to see if they covered all the objectives and if all areas of concern had been reflected. Paired sample test was done and in non-normally distributed data; the Wilcoxon Signed Rank test was used. Basing on the results adjustments were made and the tools refined to give consistent values.

Reliability was checked by collecting data from10 respondents and calculating the Intra-Class Correlation Coefficient (ICC) (two-way random, absolute agreement, single measures with a 95 % confidence interval). The cut-off points for reliability assessment of; >0.90 (excellent), 0.75-.90 (good), 0.60-0.75 (moderate), and < 0.60 (low) was used and the results indicated that instrument was good.

3.5 Eligibility Criteria

3.5.1 Inclusion

i) Elderly persons between the ages of 65 to 85.
ii) Being in Position to communicate either in English or Luganda languages.
iii) Elderly persons who were able to stand straight on their own with little or no support.

3.5.2 Exclusion Criteria

i) Elderly persons who never consented for the study.
ii) Elderly persons who were sick at the time of data collection.
iii) Elderly persons who were not available (absent) at the time of data collection.

3.6 Study Variables

The dependent variables for this are nutritional status and functional capacity. The independent variables for this study were socio-demographic characteristics which included age, gender, marital status (staying with a spouse), education level, presence of other persons in the household, housing conditions, plus quality of life and depression.

3.7 Data Collection Methods

3.7.1 Interview Method

Household questionnaire was used to obtain data for the study by reading out each question in turn and waiting for a response from the respondent. Demographic and household data was obtained in this way using the household data questionnaire (Appendix A). In addition, data concerning housing conditions, Quality of Life and Depression was also obtained the same way using household housing conditions questionnaire (Appendix D), quality of life assessment questionnaire (Nejat et al., 2006) (Appendix F) and geriatric depression questionnaire (Yesavage & Sheikh, 1986) (Appendix E) respectively.

Additionally, nutritional status and functional capacity data was obtained using interview method with help of mini nutritional assessment questionnaire (Bruno Vellas et al., 1999) (Appendix B)

and Lawton - Broody activities of daily living questionnaire (Graf, 2008) (Appendix C) respectively.

3.7.2 Anthropometric Measurements

a) Height

Data regarding height measurements was obtained following standard procedures for height measurements (Appendix G) as described by the world health organization.

Height measurements were recorded to the nearest 0.1 cm in the mini nutritional assessment questionnaire (Appendix B).

b) Weight

Data regarding weight measurements of the elderly was obtained following standard procedures for weight measurements (Appendix H) as described by the world health organization. Weight measurements were taken and recorded to the nearest 0.1 kg and recorded in the mini nutritional questionnaire (Appendix B).

3.8 Data Collection Tools

a) Interviewer-Administered Questionnaires

Standard and validated questionnaires were used to collect data from the participants; however slight adjustments were made in order to meet the Ugandan setting. Structured and closed ended questions were used.

b) Mini Nutritional Assessment Questionnaire

This questionnaire was used to assess the Nutritional status of the participants (Bruno Vellas et al., 1999) (Appendix B). The MNA questionnaire is a validated nutrition screening and assessment tool for identifying geriatric patients who are normal, malnourished or at risk of malnutrition (Murphy et al., 2000; B1 Vellas et al., 2006). It includes questions on daily drug prescriptions, mobility, body mass index, meals eaten daily, fluid intake, anthropometry, food preferences and presence or absence of skin ulcers and general mode of feeding.

c) Lawton and Broody Instrumental Activities of Daily Living Questionnaire

This questionnaire was used to assess Functional capacity of the study participants (Graf, 2008) (Appendix C). This is a validated questionnaire recommended by the world health organization for identifying how an individual is functioning at the present time, and to identify improvement or deterioration over given period of time (Lawton, Brody, & Médecin, 1969). There are eight domains of function which include ability to use a phone, ability to do sopping, ability to prepare and cook meals, house maintenance, taking responsibility on own medications, ability to handle his/her finances, doing laundry, mobility, measured with the Lawton and Broody instrumental activities of daily living scale. Participants were scored on all 8 areas of function according to their highest level of functioning in that category. A summary score ranged from 0 (low function, dependent) to 8 (high function)

d) Quality of Life Questionnaire

The World Health Organization Quality of Life - brief (WHOQOL) was adapted to assess the quality of life among the elderly persons (Appendix F). The WHOQOL-BREF contains 2 items from the overall QoL and general health facet and 1 item from each of the remaining 24 facets making a total of 26 question items (Group, 1998). The 24 facets of QoL make up the four domains namely: physical health that comprises 7 items, psychological wellbeing that comprises 6 items, social relationship that comprises 3 items, and environment that comprises 8 items. These two items are examined separately: question 1 asks about an individual's overall perception of quality of life and question 2 asks about an individual's overall perception of their health. The four domain scores denote an individual's perception of quality of life in each particular domain. Domain scores are scaled in a positive direction (i.e. higher scores denote higher quality of life). The mean score of items within each domain is used to calculate the domain score. Mean scores are then multiplied by 4 in order to make domain scores comparable with the scores used in the WHOQOL-100.

Where more than 20% of data is missing from an assessment, the assessment should be discarded were as if an item is missing, the mean of other items in the domain is substituted. Where more than two items are missing from the domain, the domain score should not be calculated (with the exception of domain 3, where the domain should only be calculated if < 1 item is missing).

e) Geriatric Depression scale questionnaire

Presence or absence of Depression symptoms was assessed using the 15-item version of the Geriatric Depression Scale questionnaire (Yesavage & Sheikh, 1986) (Appendix E). The GDS questionnaire was administered using interviews to facilitate completion by people who were malnourished or at risk of malnutrition and those with functional capacity impairment. Items were structured by Yes/No responses with each answer in bold indicating depression symptom counting 1 point and scores ranged from 0 to 15, were by scores greater than 5 were indicative of probable depression among the participants (Vinkers et al., 2015; Yesavage & Sheikh, 1986). The questions were read out and the respondents were asked how they had felt over the past week without further explanation or interpretation to the questions. This questionnaire had shown high sensitivity and specificity in the detection of clinical depression symptoms among people aged ≥65. One missing answer (scored 0) was allowed, but more than one missing answer resulted in the exclusion of a participant's data from the study.

3.9 Data Analysis Method

Immediately after data collection, the questionnaires were presented to the research supervisors for cross checking. Questionnaires with incomplete data were removed while those with complete data were entered into SPSS software version 24 to create a data file for the questionnaires.

3.9.1 Nutritional Status

Data was collected using the Mini Nutritional Assessment questionnaire which comprised of 18 items / questions. The scoring system ranged from 0 to 30 points, and categorized participants according to the total points scored as normal / adequate nutritional status (total score ≥24), at risk of malnutrition (total score 17 to 23.5) and malnourished (total score ≤17).

3.9.2 Functional Capacity

Functional capacity data was collected using the Lawton – Broody activities of daily living questionnaire. This questionnaire comprised of eight domains of human functions measured with the Lawton - Broody IADL scale. Participants were scored according to their highest level of functioning in that category.

A summary score ranged from 0 (low function, dependent) to 8 (high function, independent). Those that scored between 0 – 3 were categorized as low function/dependent while between 4 – 6 were categorized as average where as those that scored between 7 – 8 were categorized as independent/high function.

3.9.3 Housing Conditions

Data concerning the housing conditions of participants was obtained using the housing conditions questionnaire (Appendix D). The questionnaire had questions relating to the conditions of living that included nature of dwelling unit, material of the floor, material of the roof, material of external walls, number of rooms, fuels used, presence or absence of electricity among other questions as seen in questionnaire (Appendix D). The participants were consequently categorized as living under good housing conditions if they scored 27 or above (Score ≥ 27) average housing conditions if they scored between 17 – 26 or poor housing conditions if they scored 16 and below (Score $\leq$ 16).

3.9.4 Quality of Life

This data was obtained with the help of the quality of life questionnaire (Appendix F). The questionnaire contained 2 items from the overall Quality of Life and general health facet and 1 item from each of the remaining 24 facets making a total of 26 question items. The 24 facets of Quality of Life made up the four domains namely: physical health that comprised of 7 items, psychological wellbeing that comprised of 6 items, social relationship that comprised of 3 items, and environment that comprised of 8 items. These two items were examined separately: question 1 asked about an individual's overall perception of quality of life and question 2 asked about an individual's overall perception of their health. The four domain scores denoted an individual's perception of quality of life in each particular domain. Domain scores were scaled in a positive direction (i.e. higher scores denote higher quality of life). The mean score of items within each domain was used to calculate the domain score. Mean scores were then multiplied by 4 in order to make domain scores comparable with the scores used in the WHOQOL-100.

Where more than 20% of data is missing from an assessment, the assessment should be discarded were as if an item is missing, the mean of other items in the domain is substituted. Where more than two items are missing from the domain, the domain score were not be calculated (with the

exception of domain 3, where the domain should only be calculated if < 1 item is missing). Individuals that scored between 75 – 100 points were categorized as having very good quality of life, from 74 – 60 points were categorized as moderately good, between 59 – 40 points were categorized as moderately poor while those that scored below 40 points were categorized as having very poor quality of life.

3.9.5 Depression

Presence or absence of Depression symptoms was assessed using the 15-item version of the Geriatric Depression Scale questionnaire (Appendix E). Items were structured by Yes/No responses with each answer in bold indicating depression symptom counting 1 point and scores ranged from 0 to 15, were by scores greater than 5 were indicative of probable depression among the participants (Vinkers et al., 2015; Yesavage & Sheikh, 1986).

Table 2: Summary of research methods and research tools used

Data Collection Methods	**Data Collection Tools**
Interview Method	• Mini Nutritional Assessment Questionnaire. • Lawton – Broody Instrumental Activities of Daily Living Questionnaire. • Quality of Life Questionnaire • Geriatric Depression Scale questionnaire.
Anthropometric Measurements	• Weight scales • Stadiometer • Height measure wall mount

3.10 Statistical analysis

To test for associations between the different variables of the study, a bi-variate logistic analysis test was used.

To select and include variables to be analyzed at multivariate level through bivariate level, two rules were considered.

i) The p value of the relationship (determined using logistic regression) must be less than or equal to 0.02, all variables whose p values were greater than 0.02 but were found in literature review to be significantly associated with the outcome variable were taken to multivariate level analysis.
ii) All variables that met biological plausibility were also taken to multivariate level.

To conclude significant relationship between independent variable that were selected for multivariate level analysis, a p value less than 0.05 was considered. Furthermore, interaction between variables and the confounding effect was also assessed. A significant confounder was considered if the n% difference between crude and adjusted odds ratio was greater than 10.

3.11 Ethical Consideration

This research study was approved by Kyambogo University, Department of Nutritional science and dietetics (Appendix I). The second approval of the study was by Clarke International University Research Ethics Committee (REC) under approval number CLARKE-2021-88 (Appendix J) While the third approval was given by the Uganda National Council of Science and Technology (UNCST) under research registration UNCST is SS1031ES (Appendix K). Respective Approval letters have been attached.

All respondents were duly informed about the study in a language they understood most and thereafter, they were issued with a consent form at individual basis to read through to verify before appending their signature or thumb print as acceptance to take part in the study voluntarily (Appendix M). All the study assistants were duly trained on social interaction, data collection and entry, interpersonal skills and communication skills.

Privacy and confidentiality were ensured during data collection through utilization of individual questionnaire administration and use of study identification numbers in place of participants' names. Data was entered and password protected in order to limit unauthorized access. Data entered was saved on entry and backed up immediately. Respondents who were found to be malnourished were referred to the nearest health center with a nutrition ward (Kawolo general hospital) for further assessment and better management of the identified health condition. A contact of the close family member was also obtained for purposes of follow up and monitoring of such a participant.

CHAPTER FOUR: RESULTS

4.1 Demographic Characteristics of study Participants

The participants were in the age bracket 65 – 85 years with 85.6% between 65 – 75 year and 14.4% between 76 – 85 years. The median age of participants was 69 years. Of the 353 participants, 55.2% were females, 30.6% had no formal education while 28.3%, 21.3% and 4.3% had completed primary, secondary and tertiary education levels respectively. 30.6% could not read or write in any language while 34.3% could read or write in any language, 15.6% had received adult education. 46.7% were living with their spouses while 95.8% lived with any other person in the household. In addition, about half 50.4% lived under poor housing conditions while 19.6% as well as 30.0% lived under poor and good conditions respectively (Table 3).

Table 3: Demographic Characteristics of Elderly Persons Aged 65 – 85 in Lugazi Municipality

Variable		N	%
Division	Central Division	115	32.6
	Kawolo Division	126	35.7
	Najjembe Division	112	31.7
Gender	Male	158	44.8
	Female	195	55.2
Age	65 – 75	302	85.6
	76 - 85	51	14.4
Education Level	No formal education	108	30.6
	Primary	100	28.3
	Secondary	75	21.3
	Tertiary	15	4.3
	Adult education	55	15.6
Literacy Level	None	108	30.6
	Only read	124	35.1
	Read and write	121	34.3
Marital Status	Staying with spouse	165	46.7
	Staying without a spouse	188	53.3
Presence of other persons			
	Yes	338	95.8
	No	15	4.2
Housing Conditions	Poor	178	50.4
	Average	69	19.6
	Good	106	30.0

4.2 Nutritional Status of Elderly Persons age 65 – 85 in Lugazi Municipality

Nutritional status was assessed using the Mini Nutritional Assessment (MNA) questionnaire (Bruno Vellas et al., 1999). The scoring system ranged from 0 to 30 points and consequently participants were classified as having a normal nutritional status if they scored between 24 - 30 points, at risk of malnutrition if they scored between 17 to 23.5 points and malnourished if they scored less than 17 points (Table 4).

Table 4: Nutritional Status of Elderly Persons Aged 65 – 85 in Lugazi Municipality

Category and Score		**Nutritional Status**	
		N	**%**
Normal	(≥ 24)	95	26.9
At Risk of Malnutrition	(17 to 23.5)	166	47.0
Malnourished	(17 ≤)	92	26.1
Total		353	353

Participants with normal nutritional status were 26.9% (CI; 22.5 - 31.8), at risk of malnutrition among 47.0% (CI; 41.8 - 52.3), and the malnourished were 26.1% (CI; 21.7-30.9). Malnutrition was significantly higher (p=0.002) among males (53.2%) compared to females (42.1%). The higher the education level, the less likely the elderly persons could be malnourished. Those that had attained tertiary education were significantly (p=0.001) less likely to be malnourished (13.3%) compared to their counterpart with lower education levels (46.3%). When marital status was assessed, malnutrition was significantly higher (p=0.003) among those that stayed without a spouse (34.0%) compared to those that stayed with a spouse (17.0%). Presence of other people in the household also significantly reduced (p=0.003) the risk of being malnourished (25.4%) compared to those (40.0%) who stayed alone by themselves. When housing conditions were assessed, living under good housing conditions was slightly associated (p=0.447) with reduced risk of malnutrition (24.5%) when compared to living under poor housing conditions (29.2%) (Table 5).

Table 5: Nutritional Status and Socio-Demographic Characteristics

	Nutritional Status n (%)						
Variable overall	**Normal**	**Cl**	**At risk**	**Cl**	**Malnourished**	**Cl**	**p-value**
	95(26.9)	22.5-31.8	66(47.0)	41.8-52.3	92(26.1)	21.7-30.9	
Gender							
Male	27(17.1)	11.9-23.8	84(53.2)	45.3-60.8	47(29.8)	23.1-37.4	Ref
Female	68(34.9)	28.5-41.9	82(42.1)	35.3-49.1	45(23.1)	17.7-29.5	<0.002
Age							
65-75	66(69.4)	0.9-1.2	70(42.1)	0.2-2.0	74(80.4)	0.2-1.4	<0.001
76-85	29(30.5)	0.2-1.6	96(57.8)	0.6-1.4	18(19.5)	0.1-0.2	
Education Level							
No formal Educ	11(10.2)	5.7-17.5	47(43.5)	34.4-53.1	50(46.3)	37.1-55.8	Ref
Primary	32(32.0)	23.6-41.8	47(47.0)	37.4-56.8	21(21.0)	14.1-30.1	<0.001
Secondary	3(40.0)	29.5-51.5	35(46.7)	35.6-58.0	10(13.3)	7.3-23.2	<0.001
Tertiary	6(40.0)	18.6-66.1	7(46.7)	23.4-71.5	2(13.3)	1.7-41.9	<0.001
Adult education	16(29.1)	18.5-41.5	30(54.6)	41.2-67.3	9(16.4)	8.7-28.7	<0.001
Literacy Level							
None	31(28.7)	20.9-38.0	44(40.7)	31.8-50.3	33(30.6)	22.5-39.9	Ref
Only read	35(28.2)	21.0-36.8	64(51.6)	42.8-60.3	25(20.2)	13.9-28.2	<0.011
Read and write	29(24.0)	17.1-32.4	58(47.9)	39.1-56.9	34(28.1)	2.8-36.8	<0.001
Marital Status							
With Spouse	50(30.0)	23.7-37.9	87(52.70)	45.0-60.3	28(17.0)	11.9-23.5	Ref
No spouse	45(23.9)	18.3-30.6	79(42.0)	35.1-49.2	64(34.0)	27.6-4.1	< 0.003
Presence of Persons							
Yes	91(26.9)	22.4-31.9	161(47.6)	42.3-53.0	86(25.4)	21.1-30.4	Ref
No	4(26.7)	10.0-54.4	5(33)	14.1-60.4	6(40.0)	18.6-66.1	<0.002
Housing Conditions							
Poor	45(25.3)	19.4-32.2	81(45.5)	38.3-52.9	52(29.2)	23.0-36.3	Ref
Average	21(30.4)	20.7-42.3	34(49.3)	37.6-61.0	14(20.3)	12.3-3.5	<0.001
Good	29(27.4)	19.8-36.7	51(48.1)	38.7-57.6	26(24.5)	1.2-33.7	<0.002

4.3 Important Nutritional Outcomes of Elderly Persons

The MNA was further scrutinized to pick out very important elements important for this study. The elements of interest were food intake, weight loss and body mass index of the participants.

4.3.1 Food Intake of Elderly Persons over the Past Three Months

Food intake of the participants, 0.8% reported a severe decrease in food intake, 27.2% reported a moderate decrease in food intake while the majority comprising of 72.0% reported no decrease in food intake over the past three months (Figure 2).

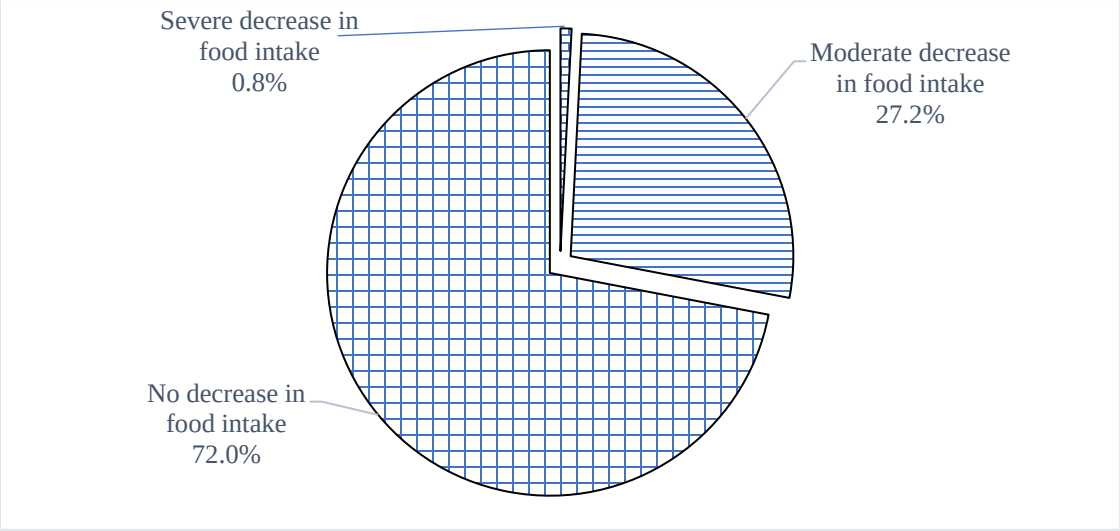


Figure 2: Shows Food intake of the Participants over Past Three Months

4.3.2 Weight Loss during the Past Three Months

Results from the MNA questionnaire further revealed that 2.0% of the participants had suffered weight loss greater than 3 kg, 6.8% did not know, 63.2% had suffered weight loss between 1 and 3 kg while 28.0% had not suffered any weight loss for the same period of time (Figure 3).

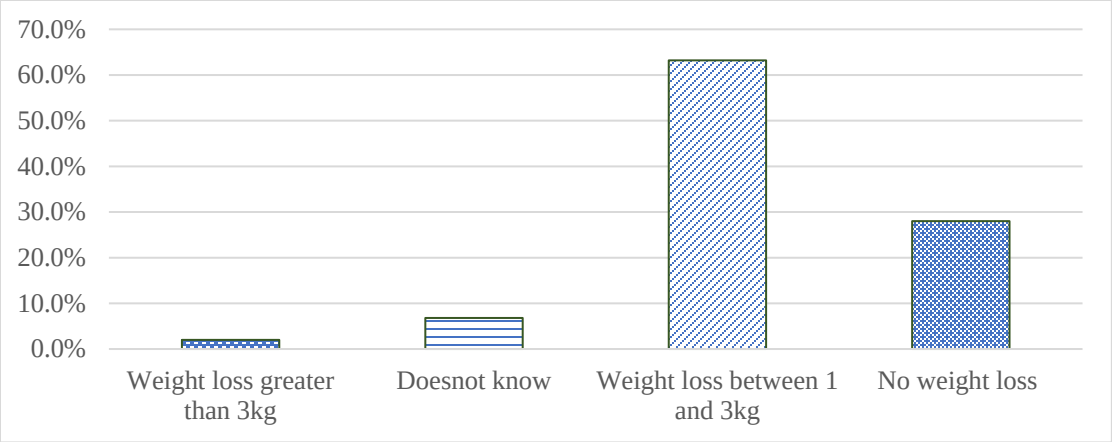


Figure 3: Shows weight loss of the study participants in the past three months

4.3.3 Body Mass Index (BMI) of Study Participants

The body mass index of participants was computed using the formula weight in kg / the square of the height in meters and the results showed that 9.3% had BMI index less than 19, 19.3% had BMI index more than 19 but less than 21, 25.3% had BMI index more than 21 but less than 23 while a whole 46.2% had BMI index greater than 23 (Figure 4).

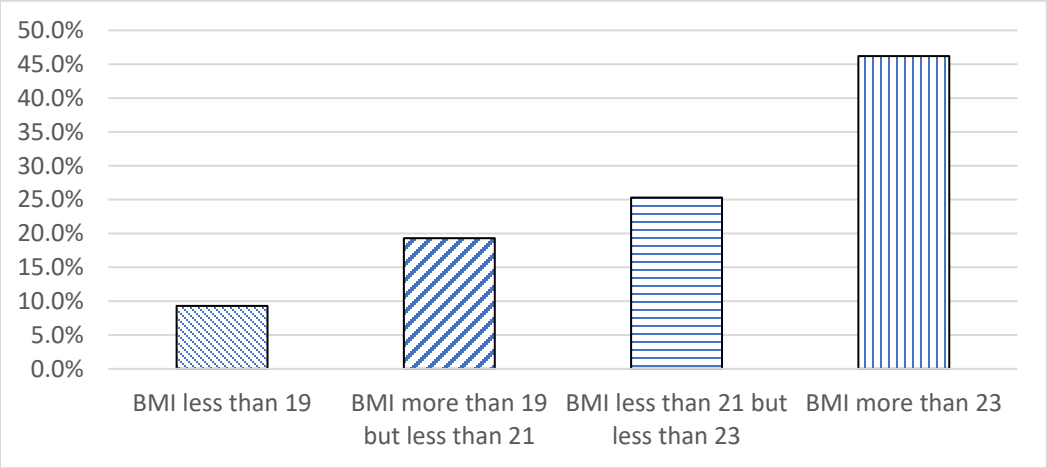


Figure 4: Shows body mass index of elderly persons aged 65 – 85 in Lugazi Municipality

4.4 Functional Capacity of Elderly Persons age 65 – 86 in Lugazi Municipality

The Lawton - Broody Functional capacity assessment questionnaire was used to assess functional capacity of the study participants (Graf, 2009). All participants were interviewed on their ability to conduct these activities which are a key to human survival (Gravina et al., 2021). These activities

of daily living assessed included the ability to use a telephone, shopping, food/meal preparation, housekeeping, laundry, mode of transport, responsibility on own medication and ability to handle finances. A summary score ranged from 0 (dependent) to 8 (independent). Individuals that scored between 0 – 2 were categorized as dependent, those that scored from 3 – 5 were categorized as moderate independent while those that scored 6 – 8 were categorized an independent. Overall, the functional capacity status of the participants was categorized as independent among 6.2% (95% CI; 4.1 - 9.3), moderately independent among 79.0% (95% CI; 74.4 - 83.0), and dependent among 14.7% (95% CI; 11.4 - 18.8) (Table 6).

Table 6: Functional Capacity of elderly persons aged 65 – 85 in Lugazi Municipality

Category and Score		**Functional capacity**	
		N	%
Independent	(7 – 8)	22	6.2
Moderate independence	(4 – 6)	279	79.0
Dependent	(0 – 3)	52	14.7

4.4.1 Functional Capacity and Influence on Demographic Characteristics

Results of the study showed that among the dependent participants, there were significantly (p=0.019) more females compared to the males (53.8%). The median age of those that were dependent was 76 years while the median age for the independent participants was 66 years. There were also more people (p=0.001) with no formal education (64.8%) among those who were dependent compared to those with other education levels (33.3%). More participants 23.9% that did not stay with a spouse were dependent compared to those that stayed with a spouse. For marital status, there were significantly (p=0.001) more people (13%) who were independent and stayed with a spouse compared to those (9.0%) that did not stay with a spouse. There were more people under the good housing conditions 10.4% among the independent category compared to those that lived in the average housing conditions 7.3% and poor housing conditions 3.4% (Table 7).

Table 7: Functional capacity and demographic characteristics of elderly persons

	Functional Capacity n (%)						
Variable	**Dependent**	**CI**	**Moderate**	**CI**	**Independent**	**CI**	**p-value**
Overall	52(14.7)	11.4-18.8	279(79.0)	74.4-83.0	22(6.2)	4.1-9.3	
Gender							
Male	24(15.2)	10.4-21.7	134(84.8)	78.3-89.6	0(0.0)	0.0-0.0	Ref
Female	28(14.4)	10.1-20.0	145(74.3)	67.7-80.0	22(11.3)	7.5-16.6	<0.003
Age							
65-75	42(80.7)	0.49-2.41	240(67.9)	0.33-3.77	22(90.8)	0.13-1.42	Ref
76-85	10(19.3)	1.41-8.73	39(11.0)	1.79-27.21	0(0.0)	0.21-2.34	0.002
Education Level							
No Education	36(33.3)	25.0-42.8	70(64.8)	55.3-73.3	2(1.9)	0.4-7.2	Ref
Primary	5(5.0)	2.1-11.5	92(92.0)	84.7-96.0	3(3.0)	0.9-8.9	<0.001
Secondary	4(5.3)	2.0-13.5	57(76.0)	65.0-84.4	14(18.7)	11.3-29.2	<0.001
Tertiary	1(6.7)	0.8-37.0	13(86.7)	58.1-96.8	1(6.7)	0.9-37.0	<0.002
Adult educ	6(10.9)	4.9-22.4	47(85.5)	73.3-92.6	2(3.6)	0.9-13.6	<0.002
Literacy Level							
None	23(21.3)	14.5-30.1	81(75.0)	65.9-82.3	4(3.7)	1.4-9.5	Ref
Only read	16(12.9)	8.0-20.1	97(78.2)	70.0-84.7	11(8.9)	4.9-15.4	< 0.002
Read and write	13(10.7)	6.3-17.7	101(83.5)	75.7-89.1	7(5.8)	2.7-11.2	<0.003
Marital Status							
With spouse	7(4.2)	2.0-8.7	145(87.9)	81.9-92.1	13(7.9)	4.6-13.1	Ref
No spouse	45(23.9)	18.3-30.6	134(71.3)	64.3-77.3	9(4.8)	2.4-9.0	<0.001
Persons in HH							
Yes	52(15.4)	11.9-19.6	264(78.1)	73.3-82.2	22(6.5)	4.3-9.7	Ref
No	0(0.0)	0.0-0.0	15(100.0)		0(0.0)	0.0-0.0	<0.429
Housing Conditions							
Poor	28(15.7)	11.1-21.9	144(80.9)	74.4-86.0	6(3.4)	1.5-7.3	Ref
Average	9(13.0)	6.9-23.3	55(79.7)	68.5-87.7	5(7.3)	3.0-16.4	<0.001
Good	15(14.1)	8.7-22.2	80(75.5)	66.3-82.8	11(10.4)	5.8-17.8	<0.139

4.4.2 Activities of Daily Living of Great Importance to Elderly in Lugazi Municipality

4.4.3 Shopping

Participants were asked to respondent to questions regarding their ability to carry out shopping in order to obtain necessities for life. 9.2% reported that they could take care of all their shopping needs independently; 86% reported being able to shop for small purchases or needed to be accompanied on any shopping trip while 4.8% reported that they were completely unable to shop on their own.

4.4.4 Food Preparation

Under this section, 6.8% of the participants could plan, prepare and serve adequate meals independently or prepare adequate meals if supplied with ingredients; 76% could heat, serve and prepare meals, but did not maintain adequate diet while 17.2% needed to have meals prepared and served for them.

4.4.5 House Maintenance

As regards housekeeping among the study participants, 12.3% of the participants Maintained house alone or with occasional assistance, 72% Performed light daily tasks such as dish washing, bed making although could not maintain acceptable level of cleanliness while 15.7% needed help with all home maintenance tasks and could not therefore participate in any housekeeping tasks.

4.4.6 Ability to Handle Finances

Seventeen-point four percent (17.4%) of the study participants managed financial matters independently (Budgets, pays rent, bills, goes to bank, deposits or withdraws money on phone) as well as collecting and keeping track of his/her income. 68.2% reported Managing day-to-day purchases but with little assistance with banking and making major purchases while 14.4% reported being unable to handle finances without assistance from other people.

4.5 Housing Conditions of the Elderly Person Aged 65 – 85 in Lugazi Municipality

Housing standards of the elderly was assessed using the housing conditions questionnaire. The questionnaire consisted of parts that sought to determine housing conditions of the participants.

This involved identifying the type of dwelling, tenure status, rooms available in the house, major construction materials of the roof, major construction materials of the external walls, major material of the floor, presence or absence of electricity and the major fuel used for heating purposes. Results revealed that 50.4% lived under poor / inadequate housing conditions, 19.6% live under average housing conditions while 30.0% lived under good housing conditions (Table 8).

Table 8: Housing Conditions of Participants

Category		**Housing Conditions**	
		N	**%**
Poor / Inadequate	(Score 16≤)	178	50.4
Average	(Score 17 – 26)	69	19.6
Good	(Score ≥27)	106	30.0

4.6 Depression among Elderly Persons Aged 65 – 85 in Lugazi Municipality

Presence or absence of depression symptoms among study participants were assessed using the 15-item version of the Geriatric Depression Scale (Yesavage & Sheikh, 1986) (Appendix E). Items were structured by Yes/No responses with each answer in bold indicating depression symptom counts 1 point and scores range from 0 to 15, were by scores greater than 5 are indicative of probable depression among the participant. The results revealed that 61.1% revealed lack of signs relating depression and were categorized as "not being depressed" while 38.9% reported signs relating to depression and were categorized as probably "being depressed" (Table 9).

Table 9: Shows depression among elderly persons aged 65 – 85 in Lugazi Municipality

		Depression	
		N	%
Depressed	**(Score ≥ 5)**	137	38.9
Not Depressed	**(Score < 5)**	216	61.1

4.7 Quality of life among elderly Persons Aged 65 – 85 in Lugazi Municipality

The World Health Organization Quality of Life - brief questionnaire was used to assess the quality of life among the elderly persons (Vahedi, 2010) (Appendix F). The questionnaire contains 24 facets making a total of 26 question items. The 24 facets of QoL made up the four domains namely: physical health that comprised of 7 items, psychological wellbeing that comprised of 6 items, social relationship that comprised of 3 items, and environment that comprised of 8 items. The four domain scores denoted an individual's perception of quality of life in each particular domain. Domain scores were scaled in a positive direction (i.e. higher scores denote higher quality of life). The mean score of items within each domain was used to calculate the domain mean score. Mean scores were then multiplied by 4 in order to make domain scores comparable with the scores used in the WHOQOL-100. The mean domain scores were then used to categorize participants into very good >75 points, moderately good 74 – 65 points, moderately good 64 - 41, very poor <40 points. Concerning quality of life assessment by the WHO QoL brief questionnaire, 28.9% of the participants were classified as having very good QoL, 25.8% were classified as having moderately good QoL, and 21.5% were classified as having moderately poor QoL whereas 23.8% were classified as having very poor Quality of life (Table 10).

Table 10: Quality of Life of elderly persons aged 65 – 85 in Lugazi Municipality

Category		Quality of Life	
		N	%
Very Good	(75 – 100)	102	28.9
Moderately Good	(74 – 60)	91	25.8
Moderately Poor	(59 – 40)	76	21.5
Very Poor	(below 40)	84	23.8

4.8 Factors Associated with Nutritional Status Among Elderly Persons Aged 65 – 85 in Lugazi Municipality

Bivariate Analysis

To determine the factors associated with nutritional status, an independent association between nutritional status and demographic characteristics was carried out using a logistic regression

analysis test with a p-value ≤ 0.05 considered significant. At this level of analysis, all characteristics (level of education, presence of other persons in the household, housing conditions) were significantly associated with nutritional status (P<0.05) except living with another person OR=1.5 (P=0.422, CI 0.55-4.16) and literacy level OR=0.8 (P=0.311, CI 0.48-1.26), OR=1.1 (P=0.823, CI 0.65-1.72) and gender (Table 11).

Table 11: Bivariate analysis of the association between nutritional status and demographic characteristics of elderly persons

Variable	**OR**	**95%CI**	**P-value**
Variable			
Gender			
Male	Ref	Ref	Ref
Female	0.5	0.36-0.79	0.002
Age	1.5	1.38-1.59	<0.001
Education Level			
No formal education	Ref	Ref	Ref
Primary	0.3	0.16-0.46	<0.001
Secondary	0.2	0.09-0.32	<0.001
Tertiary	0.8	0.06-0.50	0.001
Adult education	0.3	0.14-0.49	<0.001
Literacy level			
None	Ref	Ref	Ref
Only read	0.8	0.48-1.26	0.311
Read and write	1.1	0.65-1.72	0.823
Marital status			
Staying with spouse		Ref	Ref
No spouse		1.8	0.003
Presence of other persons in the household	Ref	Ref	Ref
Yes	1.5	0.55-4.16	0.422
No			
Housing Conditions			
Poor	Ref	Ref	Ref
Average	0.7	0.41-1.17	0.175
Good	0.8	0.54-1.32	0.447

To determine all the factors associated with nutritional status at this level, a multivariate analysis logistic regression was used. All variables with an independent significant association with nutritional status were included in the analysis. Those variables that did not have an independent association with nutritional status were removed at various levels when none of them was found to interact or confound with this association. At the end of the analysis, age emerged as the only factor significantly associated with nutritional status (P<0.001) (Table 12).

Table 12: Multivariate analysis results of the factors associated with nutritional status of elderly person in Lugazi Municipality

Variable	OR	95%CI	p-value
Age	1.5	1.38-1.59	<0.001
Gender	0.5	0.36-0.79	<0.002
Education & Literacy 1.1		0.86- 1.13	<0.823
Marital Status	0.6	0.43- 0.78	<0.321
Housing Conditions	0.7	0.57-0.85	<0.175
Depression	0.8	0.75- 0.92	<0.185

4.8.1 Association Between Nutritional Status and Depression Among Elderly Persons Aged 65 – 85 in Lugazi Municipality

The relationship between nutritional status and depression was also investigated using bi-variate analysis. There were more participants 33.3% with depression symptoms who were malnourished compared to those 21.4% without depression symptoms. Additionally, the risk of malnutrition was higher among participants that showed signs of depression 48.6% compared to participants with no depression signs 46%.

When the independent association between nutritional status and depression was determined using the bi-variate logistic regression analysis, there was a statistically significant association between depression and nutrition status of the participants (p=0.001), the depressed participants were 1.98 times more likely to be malnourished (OR, 1.98, p=0.001) than those that were not depressed (Table 13).

Table 13: Association between nutritional status and depression of elderly person

		Depression	
Variable overall		**Normal**	**Depressed**
Nutritional status			
Normal n (%)	95(26.9)	70(32.6)	25(18.1)
At risk n (%)	166(47.0)	99(46.1)	67(48.6)
Malnourished n (%)	92(26.1)	46(21.4)	46(33.3)
OR		Ref	1.98(1.32-2.98)
p-value		Ref	0.001

4.8.2 Association Between Nutritional Status and Quality of Life Among Elderly Persons Aged 65 – 85 in Lugazi Municipality.

Majority of the malnourished participants 47.1% reported a very poor quality of life compared to those that reported very good quality of life 13.6%. Many of the participants 50.0% at risk of malnutrition reported a moderately poor-quality life. Participants that reported a very good and moderately good quality of life had many of the participants being categorized under normal nutritional status than those that reported moderately poor or very poor quality of life.

When the relationship between quality of life and nutritional status was determined, participants that reported a moderately good quality of life were 1.1 times more likely to become malnourished (OR, 1.1, P=0.004), those that reported moderately poor quality of life were 2.3 times more likely to become malnourished (OR, 2.3, P=0.003) while those that reported very poor quality of life were 6.2 times more likely to become malnourished (OR, 6.2, P=<0.001). The results suggested that there was an association between quality of life and nutritional status whereby the being malnourished increased the odds of having a very poor quality of life among the elderly persons (Table 14).

Table 14. Shows the association between nutritional status and Quality of Life among Elderly

		Quality of life n (%)			
Variable overall		Very Good	Moderately Good	Moderately Poor	Very Poor
Nutritional status n (%)					
Normal	95(26.9)	35(39.8)	33(39.3)	22(22.9)	5(5.9)
At risk	166(47.0)	41(46.6)	37(44.1)	48(50.0)	40(47.1)
Malnourished	92(26.1)	12(13.6)	14(16.7)	26(27.1)	40(47.1)
OR		Ref	1.1(0.61-1.92)	2.3(1.32-4.03)	6.2(3.44-11.27)
p-value		Ref	0.004	0.003	<0.001

4.9 Factors Associated with Functional Capacity Among Elderly Persons Aged 65 – 85 in Lugazi Municipality

To determine the independent association between socio-demographic characteristics and functional capacity among the elderly, a p-value ≤ 0.02 was considered significant using when using Bi-variate analysis. At this level of analysis, all characteristics were significantly associated with functional capacity status ($p<0.02$) except living with another person ($P=0.429$). Individuals that were dependent regarding their functional capacity, were 1.65 times more likely to be living alone when compared to those that lived with someone else in the same household (OR:1.65) (Table 15).

Table 15: Association between functional capacity and demographic characteristics of elderly

Variable	OR	95%CI	P-value
Gender			
Male	Ref	Ref	Ref
Female	1.9	1.10-3.15	0.019
Age	0.7	0.60-0.73	<0.001
Education Level	Ref	Ref	Ref
No formal education	5.9	2.78-12.32	<0.001
Primary	18.7	7.51-46.5	<0.001
Secondary	6.8	1.42-33.0	0.017
Tertiary	3.9	1.66-9.12	0.002
Adult education			
Literacy Level			
None	Ref	Ref	Ref
Only read	2.1	1.10-3.91	0.025
Read and write	1.9	1.05-3.72	0.034
Marital Status			
Staying with spouse	Ref	Ref	Ref
No spouse	0.24	0.13-0.44	<0.001
Presence of Other Persons in Household			
Yes	Ref	Ref	Ref
No	1.65	0.47-5.73	0.429
Housing Conditions			
Poor	Ref	Ref	Ref
Average	1.41	0.71-2.81	0.324
Good	1.58	0.86-2.88	0.139

4.9.1 Multivariate Analysis of all Factors Associated with Functional Capacity among Elderly Persons Aged 65 – 85 in Lugazi Municipality

At multivariate analysis for the factors associated with functional capacity, the p value for level of significance was taken to be less than 0.002, all variables with an independent significant association with functional capacity status were included in the analysis. At this point, gender, living with a spouse and quality of life were significant after assessment for interaction and confounding respectively. However, none of the other independent variables was found to either interact or confound the significant variables. Therefore, the only variables considered as significantly associated with functional capacity status. With reference to gender, female elderly persons were 2.6 times more likely to be dependent as regards functional capacity when compared to the male (OR= 2.6, P= 0.006), Age was significant in a way that the increase in the age led to more likely hood of becoming dependent due to the natural physiological process of aging (OR=0.7, P< 0.001) and Quality of life among the elderly deteriorated among those that were dependent regarding functional capacity. Individuals with a very poor quality of life were more likely to be dependent regarding their functional capacity (OR= 0.1, P<0.001,) (Table 16).

Table 16: Multivariate analysis results of the factors associated with functional capacity of elderly person in Lugazi Municipality

Variable	OR	95%CI	p-value
Age	0.7	0.6-0.8	<0.001
Gender			
Male	Ref	Ref	Ref
Female	2.6	1.3-5.1	0.006
Living with Spouse			
Yes	Ref	Ref	Ref
No	0.2	0.1-0.5	<0.001
Quality of Life			
Very good	Ref	Ref	Ref
Moderately good	0.5	0.2-1.4	0.187
Moderately poor	0.8	0.3-2.1	0.654
Very poor	0.1	0.0-0.4	<0.001
Depression			
Depressed	Ref	Ref	Ref
Not depressed	0.5	0.2-0.6	0.001

4.9.2 Association Between Functional Capacity and Depression Among Elderly Persons Aged 65 – 85 in Lugazi Municipality

Generally, the results indicated that the majority of the participants 70.3% showing depressive symptoms were in the moderate category of functional capacity. Also, many participants 24.6% that reported depressive symptoms were among the dependent category of functional capacity.

When the independent association between functional capacity and depression was determined, the results indicated that there was a statistically significant association between functional capacity and depression (P=0.001). Results indicated that depressed participants were more likely to become dependent as per their functional capacity as compared to individuals that were not depressed (OR, 0.35, p=0.001) (Table 17).

Table 17: Association between functional capacity and depression among elderly

		Depression	
Variable overall		**Not depressed**	**Depressed**
Functional capacity			
Dependent n (%)	52(14.7)	18(8.4)	34(24.6)
Cl	11.4-18.8	53.0-12.9	18.1-32.6
Moderate n (%)	279(79.0)	182(84.6)	97(70.3)
Cl	74.4-83.0	79.1-88.9	62.1-77.4
Independent n (%)	22(6.2)	15(7.0)	7(5.0)
Cl	4.1-9.3	4.2-11.3	2.4- 10.3
OR		Ref	0.35(0.20-0.61)
p-value		Ref	<0.001

4.9.3 Association Between Functional Capacity and Quality of Life Among Elderly Persons Aged 65 – 85 in Lugazi Municipality

Majority of the Participants 12.5% with a very good quality of life belonged to the independent category of functional capacity. Additionally, majority of the participants 45.8% who reported

very poor-quality life belonged to the dependent category of functional capacity. This showed that individuals with a very good quality of life were more likely to be independent and vice vasa.

On determining the independent association between quality of life and functional capacity the results showed that there was a statistically significant association between quality of life and functional capacity only for the very poor quality of life (P=0.001). Individuals who reported a very poor quality of life were found to be dependent as regards their functional capacity as compared to those individuals who reported very good quality of life and were independent regarding their functional capacity (Table 18).

Table 18: Association between functional capacity and quality of life of elderly

		Quality of Life n (%)			
Variable	**Overall**	Very Good	Moderately Good	Moderately Poor	Very Poor
Functional Capacity n (%)					
Dependent	52(14.7)	1(1.4)	2(2.4)	10(10.4)	39(45.8)
CL	11.4-18.8	0.1-7.7	0.5-9.1	5.7-18.4	35.5-56.6
Moderate	279(79.0)	76(86.4)	78(92.9)	79(82.3)	46(54.1)
CL	74.4-83.0	77.4-92.1	84.9-96.8	73.2- 88.7	43.4-64.5
Independent	22(6.2)	11(12.5)	4(4.8)	7(7.3)	0(0.0)
CL	4.1-9.3	7.0-21.3	1.8-12.1	3.4-14.6	0.0-0.0
OR	Ref	0.47(0.19-1.16)	0.28(0.11-0.71)		0.026(0.01-0.008)
p-Value			0.102	0.007	<0.001

CHAPTER FIVE: DISCUSSION OF RESULTS

5.1 Nutritional Status and Associated Factors among the Elderly

The main objective of this study was to determine the factors associated with nutritional status and functional capacity among elderly persons. Consequently, the study assessed the nutritional status, functional dependence, quality of life, depression and then analyzed the associations that exist among these variables. More females (55.2%) than males (44.8%) participated in this study. This result suggests that females have higher odds of living longer compared to males in Uganda (Gumikiriza-Onoria et al., 2022) and similar results have been reported by other studies among the elderly which reported more females than male among this age group (Aboderin & Beard, 2015). The result conforms to the fact that life expectancy at birth in Uganda is 63.1 years for males and 70.1 years for females (WHO, 2020).

Results from this study revealed that more elderly persons were at risk of malnutrition 42.7% compared to those that were malnourished 25.4%. This finding has been reported by some studies conducted among community-dwelling elderly in Uganda which reported prevalence of malnutrition of between 24.8% and 33.3% (Cheserek et al., 2012; Wamara & Carvalho, 2019). In other countries however, malnutrition among elderly has been reported between 15.4% and 28.6% (Andre et al., 2013; Cheserek et al., 2012; Krishnamoorthy et al., 2018; Sanya et al., 2017). Malnourished elderly persons tend to have a reduced intake of meals or drinks a day, chewing problems due to poor dentition as a result of teeth loss, suffer weight loss, be of a poor socio-economic status and most likely tend to be depressed. This could be the start of a chain reaction of events that could lead to a poor quality of life, depression and consequently death of such elderly persons.

This study also revealed that 29.6% of the elderly persons had an adequate nutritional status. A similar study pointed out that elderly persons with normal nutritional status tend to have adequate and balanced meals which are a key factor to ensuring a normal nutritional status as well as improving body immunity for the elderly (Haque et al., 2014). Elderly persons with normal nutritional status tend to be of middle income or rich socio-economic status which puts them in a better position to be able to purchase nutritious foods such as animal protein foods such as meat, milk, eggs and poultry. Results of this study showed that elderly persons with adequate nutritional

status enjoyed a very good quality of life whereby they lived in permanent houses (made of sand and burnt bricks), had electricity installed, had cemented or tiled floor. Results of this study showed that elderly persons with adequate nutritional status enjoyed a very good quality of life whereby they lived in permanent houses (made of sand and burnt bricks), had electricity installed, had cemented or tiled floor.

Results from this study revealed that gender was associated with nutritional status among the elderly whereby the prevalence of malnutrition was higher in males 29.8% than females 23.1%. Males were 0.5 times more likely to be malnourished as compared to females (OR, 0.5, CI 0.36 – 0.79, *P*= 0.002). This finding is similar when compared to a study conducted in Malaysia which reported 22.5% prevalence of malnutrition among females with an entire 28.6% among the males (Ahlqvist et al., 2016). This result is also in agreement with a result from another study done around lake Victoria basin which in included areas from Uganda, Kenya and Tanzania that reported that elderly men were 5 times more likely to be underweight compared to the females (Cheserek et al., 2012). Elderly males consume more cigarettes and alcoholic drinks than females counterparts (Asamane, Greig, & Thompson, 2020), these normally interfere with nutrient absorption hence negatively affecting nutritional nutrition status in the long run.

Age was another factor found to be associated with nutritional status among the elderly (OR 1.5, *P*=<0.001). Elderly persons over the age of 75 were more likely to be malnourished or at risk of malnutrition than those below 75 years. This finding is similar to results reported by a study carried out in Malaysia and United Kingdom (Ahlqvist et al., 2016; Baptista et al., 2018). This might be due to the natural ageing process were by it was observed that the elderly persons were less active and often reported reduced appetite hence reduced food and drinks intake with advancing age. It is therefore apparent that increased focus on nutritional status assessment is required as the age of the elderly persons increases.

In this study, older age was also associated with lower MNA scores. This finding has been reported in some previous studies (Cheserek et al., 2012; Moreira et al., 2016) while others have shown that age has no effect on nutritional status (Lahiri et al., 2015; Singh et al., 2014). It was observed that the elderly persons were less active and reported reduced appetite and decreased food intake with affects the muscle mass hence weight of the individual. Previous studies have shown that age is associated with increased anorexia and further development of malnutrition among those elderly

persons aged between 70 – 80 years (Konda & Giri, 2018). In addition, studies have also shown that the prevalence of malnutrition is fairly low among community dwelling elderly but the risk for malnutrition increase substantially with increasing age (Krishnamoorthy et al., 2018).

Educational and literacy levels also showed significant association with nutritional status among the elderly persons studied. Elderly persons who could not read and write were more likely to be malnourished (OR, 1.1, *P*=0.823) while those who could only read were less likely to be malnourished (OR, 0.8, *P*=0.311). This finding is comparable with studies carried out in Iran and Democratic Republic of Cong which reported almost similar results (Ahmadi et al., 2013; Andre et al., 2013). This might be due to the fact that educated people often have good feeding practices and tend to have better social life style compared to their illiterate counterparts (Luger et al., 2016). This could also be explained by the fact that higher education levels can lead to higher income and better lifestyle resulting in a better nutritional status due to consumption of highly nutritious foods such as milk and its products (Krishnamoorthy et al., 2018). Furthermore, educated people are more informed about the importance of food as regards sustaining good health and can easily understand nutrition dynamics in the daily life (Ranganath & Jyothi Jadhav, 2017). Several studies found out that a higher educational level contributes to a better nutritional status (Abye, 2020; Konda & Giri, 2018; Krishnamoorthy et al., 2018). A Higher prevalence of 28.1% malnutrition was observed among those elderly persons who could not read or write with understanding in any language as compared to those who could hence indicating that literacy levels influence the nutritional status of elderly persons. This finding is similar to the study conducted by Shivraj et al. (2014) on elderly nutritional status where among the illiterate elderly, the prevalence of malnutrition was 26.03%.

Staying with a spouse or any other person, nature of the dwelling and presence of electricity were also discovered to be associated with nutritional status among the elderly persons. Adequate levels of nutritional status were noted among those elderly persons living with their spouse or children indicating the importance of the family care in preventing malnutrition among the elderly population. The study also found out that elderly persons who stayed together with their biological children had adequate nutritional status compared to those who were staying alone or with only grandchildren. It could be suggested that spouses and biological children have special attachment and probably empathy which will compel them to respect and provide more for the elderly as

compared to mere grand children or caretakers. This finding is in agreement with results posted by previous studies conducted by Baptista et al. (2018) and Maniragaba et al. (2018).

With regard to housing conditions of the elderly persons, those that lived under the average housing conditions were 0.7 times more likely to be malnourished or being at risk of malnutrition when compared to those that were under the good housing conditions (OR, 0.7, p=0.175) (Table 8). This result is similar to a result obtained from another study carried out in Russia which stated that individuals who lived under good housing conditions had higher Body Mass Index values as compared to those from poor housing conditions (Ranganath & Jyothi Jadhav, 2017). And at the same time elderly persons who were categorized under poor or housing conditions were more likely to be malnourished or be at risk of malnutrition as compared to those from good housing conditions (Ranganath & Jyothi Jadhav, 2017). This might be due to the fact that individuals who live under good housing conditions are rich and tend to have more money that they use to buy enough food to eat and have relatively better quality of life as compared to their poor counterparts who normally have little money to secure their daily food intake and normally have poor life styles depicted from their poor housing conditions (Yodmai et al., 2018).

Results further revealed that presence of depression symptoms, were some of the factors that affected the quality of life among the elderly persons in Lugazi municipality. This finding is consistent with previous studies (Baptista et al., 2018; Karimi & Brazier, 2016; Maniragaba et al., 2018; Raggi et al., 2016; Sováriová Soósová, 2016; Uddin et al., 2017; Yodmai et al., 2018) which reported that the quality of life of older persons is immensely influenced by living in a safe, resource rich and desirable environment. The increase in odds of good quality of life for the elderly persons residing in permanent houses implied that a better standard of living correlated with better quality of life scores. Previous studies (Devraj & D'mello, 2019; Maniragaba et al., 2018) show that elderly persons whose households were of rich socio-economic status are associated with higher odds of quality of life.

In comparison to the adequately nourished elderly persons, those who were malnourished or at risk of malnutrition experienced a significantly lower quality of life scores. The findings further showed that the quality of life among the elderly was significantly reduced in the individuals who were malnourished or at risk of malnutrition. Moreover, the perception of functional capacity and various components of quality of life were low in the respondents with depression symptoms. As

expected, the elderly individuals who reported depression symptoms presented a very poor or poor quality of life compared to those who did not report depression symptoms. Thus, proving the fact that depressed elderly when provided with adequate and consistent care can help reduce suffering due to depression as well as its impacts on the quality of life of an individual.

5.2 Functional Capacity and Functional Dependence among Elderly

This study revealed a gradual decline in functional capacity status among the elderly persons with advancing age. As regards functional dependence, the results of this study revealed that 14.7 % (95 % CI; 11.4 – 18.8) were dependent, 79.0 % (95 % CI; 74.4 – 83.0) were moderately independent while 6.2 % (95 % CI; 4.1 – 9.3) were independent for Lawton and broody instrumental activities of daily living (IADL). These findings are similar to a study carried out in Brazil among elderly persons which revealed that 16% were dependent, 78% were moderately independent while 7.3% were independent for instrumental activities of daily living (Moreira et al., 2016). Another study carried out in Portugal also posted similar results of 18.3% being classified as dependent, 78.6% classified as moderately independent while 9.1% classified as independent for instrumental activities of daily living (Oliveira et al., 2019). Matos and colleagues also conducted a study in Spain with individuals aged 65 years and over and revealed an incidence of functional loss of 11.9% (Matos et al., 2018). The similarity in results could be due to the fact that both studies had the similar category of participants of community dwelling elderly and another reason could be that the studies employed the same study design and methods. Another reason for this similarity could be due to the use of similar participants who were equally in same age bracket.

The study results showed gender was associated with functional capacity in that among those that were dependent, there were more females as compared to the males 53.8% though of all the men sampled; none was completely independent regarding Lawton independent activities of daily living. Singh et al. (2014) revealed similar results in a study carried out in India were by he reported that female elderly persons were more dependent compared to males 52.6% regarding instrumental activities of daily living (Singh et al., 2014). Another study carried out in Colombia reported similar results by stating a finding of 51.8% more dependent females than males (Cortés-Muñoz et al., 2016). These results are similar because of the fact that the human physiological conditions decline with age in both males and females. However, in nature females tend to lose their

physiological wellbeing much faster and earlier than males basically because males have more muscle mass as compared to females with lesser muscle mass. These muscles play a vital role when it comes to activity of an individual hence will directly affect the ability of an individual to perform activities of daily leaving as expected of him or her.

Education was another factor associated with functional capacity as per the study results, there were more people with no formal education among those with dependent functional capacity status 69.2% when compared to those with other education levels. Some studies have reported similar results whereby Maniragaba et al. (2018) reported that 70.4% of the elderly persons with no formal education were more dependent as compared to their counter parts with better educational levels. The similarity in results could be due the fact the studies were carried out in similar geographical areas of rural and peril-urban localities sharing same social economic conditions and social wellbeing which could mean that the influencing factors could be similar.

The study results further revealed that elderly persons living without a spouse or partner had reduced functional capacity when compared to their counterparts with some kind of relationship, married or living with a partner. The odds of being dependent were higher among those that did not have a partner or were not in any kind of intimate relationship (OR; 0.2, p=0.001). There was also a statistical difference in the odds of being dependent among those participants that lived with some other person and those that lived alone by only themselves. Participants that lived alone were 1.65 times more likely to be dependent when compared to their counterparts that lived with any other person in the household (OR; 1.65, p=0.429). Some studies have identified a greater functional capacity decline in single, unmarried and widowed elderly (de Souza et al., 2015; Güths et al., 2017). Elderly persons living without a spouse or partner were 0.2 times at a higher risk of becoming dependent compared to those who were living with a spouse or partner (OR; O.2, p=0.001). This association and result may be related to the care provided by the spouses and partners in the most diverse aspects of life, such as health, food preparation, leisure and occupational activities so that these realms of care can contribute to better functional capacity status, or even contribute to its maintenance over time.

The study results revealed that 30.0% of the participants lived under good housing conditions, 19.6% lived under average housing conditions, while 50.4% lived under poor housing conditions. There were more participants 53.8% under poor housing conditions among dependent elderly

compared to those under average housing conditions 17.3% as well as those under good housing conditions 28.8%. These findings are similar to a study conducted in Uganda where by the results suggested that among the 52.4% elderly persons who lived under poor housing conditions were more dependent compared to those who lived under average housing conditions 16.5% and good housing conditions 27.6% (Wamara & Carvalho, 2019).

Individuals that live under good housing conditions tend to have a good / very good quality of life which translated to good nutritional status as well as good economic wellbeing (Nazari & Ghahremani, 2018). This means that they can take care of their health just the same way they take care of their places of residence (Wong et al., 2018).

The results could be similar due the fact the studies were carried out in similar geographical areas of rural and peril-urban localities sharing same social economic conditions and social wellbeing which could mean that the influence was similar. With regard to housing conditions, elderly persons from average housing conditions were 1.4 times more likely to be dependent as compared to those from good housing conditions. This result could be true become the nature of the housing could be a recipe to injuries as a result of falls resulting from poorly constructed dwellings (Gumikiriza-Onoria et al., 2022).

From the study results, among the dependent elderly only 8.4% reported lack of depression symptoms while majority 24.6% reported having depression symptoms. The elderly with depression symptoms were approximately 0.35 times at higher risk of functional capacity loss when compared to those without such symptoms (OR; 0.35, p=0.001). Similar results were revealed by Tomita and Burns (Tomita & Burns, 2013) with seniors in South Africa. The results are similar because both studies were conducted in Africa whereby so many common aspects come into play such as food intake, health care, modes of transport which could have an influence on functional capacity loss among this age group. Depression symptoms are often accompanied by other symptoms, such as tiredness, physical exhaustion and unwillingness to perform independent activities of daily living (Pereira et al., 2017; Tomita & Burns, 2013), thus directly interfering with functional capacity over time and compromising the effort required to maintain functionality as well as the willingness to perform an activity. Loss of interest or pleasure for most of the independent activities of daily living interferes with the social relationships of the elderly with other people. Thus, social isolation, common in people with depression symptoms, causes the

elderly to participate less in community and religious events, reducing the frequency of making or receiving visits (Maniragaba et al., 2018). Decrease of these social relationships compromises the functional capacity and quality of life among the elderly (Luger et al., 2016).

5.3 Quality Of Life and Depression among the Elderly

The study revealed an association between quality of life and depression among elderly persons below 75 years, but not for those above 75 years of age or for the two groups combined. Multiple studies (Ahmadi et al., 2013; Moreira et al., 2016; Yoshimura et al., 2013) concluded that depression and quality of life were not only related, but depression was also associated with loss of appetite and weight among this age group (Güths et al., 2017; Nawagi et al., 2018). The relationship between depression and loss of appetite may have been the principal reason behind the result obtained in this multivariate analysis which revealed a positive association between quality of life and depression among the elderly. However, the influence of age on the two variables differs. Previous studies have reported that quality of life is an independent predictor of depression even after adjusting for social and educational factors among elderly below 75 year but not those above 75 years (Raggi et al., 2016; Yoshimura et al., 2013).

The current study findings are similar to earlier studies which reported that elderly persons with depression have poor quality of life than their non-depressed peers (Kanwal et al., 2018; Ranganath & Jyothi Jadhav, 2017). A variety of mechanisms have been hypothesized to explain the link between depression and quality of life among the elderly. Specific somatic signs and symptoms of depressed mood, such as exhaustion, fatigue, and pain, may directly influence the quality of life of the elderly. The elderly Persons that were depressed were older than 75 years and were more likely to be female, with less education and poor compared with those without depression (Ssebunnya et al., 2019). Some studies have demonstrated that these characteristics are able to confound the association between depression and poor or very poor quality of life (Gravina et al., 2021; Oliveira et al., 2019).

5.4 Factors Associated with Nutritional Status and Quality of Life

The assessment of quality of life brought forth the findings of 28.9% of the elderly persons as having a very good quality of life, 25.8% had moderately good quality of life, and 21.5% had moderately poor quality of life while 23.8% were classified as having a very poor quality of life.

The findings indicate that a relatively good proportion of the elderly persons enjoy a good quality of life apart from those classified under very poor quality of life. More so functional dependence seemed to affect personal values, interpersonal communication, and emotions of the elderly as well as their nutritional status. Aging was associated with a reduction in appetite due to loss of taste, smell or teeth which in turn reduced food intake for such an individual. This in turn affected the nutritional status and consequently led to a poor quality of life because such people could hardly go for shopping or even prepare a meal on their own. As the aging population continues to escalate, preventing malnutrition in the elderly should be identified as one of the best strategies for achieving healthy aging by providing healthy environment, proper and timely health care, descent housing, proper transport means and balanced meals

5.5 Strength and Limitations of the Study

This study used the Mini Nutritional Assessment (MNA) questionnaire which is the leading and validated screening tool for the elderly to assess Nutritional Status. The MNA is an effective tool to help identify elderly persons who are already malnourished or at risk of malnutrition before severe changes in weight occur. There to a certain degree, the results and estimates of the nutritional status of the elderly obtained have some validity.

The study included a fairly big representative study sample size *(N=353).* The study also had a wide age group (65-85 years) which included both old and older adults. Anthropometric and body composition measurements in this study were repeated and averages obtained to provided fair and consistent estimates of nutritional status of respondents.

However, being a cross-sectional study, it had recall bias since it used questionnaires that required the respondent to remember information from the previous two weeks concerning their health, diet drugs and movements among others. It was also difficult for some factors which the study had no control over other than socio demographic, dietary and physical activity factors which might have influenced nutritional status of the elderly such as Alzheimer's disease.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

In conclusion, the prevalence of malnutrition among the elderly persons was found to be 25.4%, but the proportion of the elderly persons at risk of malnutrition was relatively high at 47.2% while 26.9% of the elderly persons had a normal nutritional status. The factors associated with nutritional status among the elderly persons included; gender, age, educational and literacy levels, marital status, socio-economic well-being and depression. The findings seem to indicate that the elderly with more resources, less stress, and better actual and perceived quality of life were less likely to be malnourished. This is evidenced by the result that using electricity as a fuel for cooking increased the odds of being well-nourished among the study participants. Furthermore, participants that did not experience psychological stress or acute disease had lower odds of being malnourished or at risk of malnutrition compared to those that did, while, having a poor quality of life increased the odds of being malnourished or being at risk of malnutrition. Further research in similar settings is required to establish the impact of the relevant and culturally acceptable interventions that aim to address socio-economic challenges, psychological stress, and the nutritional wellbeing of the elderly.

Functional capacity results of the elderly persons suggested that 14.7% were categorized under complete dependence, those that were categorized as being moderate independence (assisted) were 79.0% while those with complete independence (high function) were 6.2%. These results seem to indicate that the proportion of the elderly person who are dependent and those who are moderately independent is high among this age group. According to the study results the factors that were associated with functional capacity are gender, age, level of education, marital status, socio-economic well-being and depression. The findings also revealed that the high prevalence of elderly persons with reduced functional capacity status was associated with being poor, depressed and having a very poor quality of life. Decreased functional capability caused dependence in ADL and strongly influenced nutritional status of the elderly persons. In this study, there was a significant association between malnutrition and risk of malnutrition with reduced functional capacity and dependency of the elderly persons.

The assessment of quality of life brought forth the findings of 28.9% of the elderly persons as having a very good quality of life, 25.8% had moderately good quality of life, and 21.5% had moderately poor quality of life while 23.8% were classified as having a very poor quality of life. The findings indicate that a relatively good proportion of the elderly persons enjoy a good quality of life apart from those classified under very poor quality of life. More so functional dependence seemed to affect personal values, interpersonal communication, and emotions of the elderly as well as their nutritional status.

For depression the findings suggested that 61.1% lacked signs relating to depression and were therefore categorized as normal (not depressed) while 38.9% reported signs of depression and were therefore categorized and being depressed. Such results clearly denote the need of elderly support from family members or health-care providers. However, this study discovered that there are almost no formal services to take care of the elderly in their daily activities and needs in rural areas and family members are their only source of support.

The factors associated with nutritional status and functional capacity among elderly persons in Lugazi Municipality included age, gender, education level, marital status (staying with or without a partner) housing conditions, depression and quality of life.

6.2 Recommendations

1. Community based support and services should be designed to help community-dwelling elderly remain safely in their homes. Old Age Community Groups (OACG) should be set up by community leaders to work with government and non-government organizations to provide wellness programs, nutritional support, educational programs about health and aging and counselling services for caregivers. Old age community groups should also provide opportunity for community and civic engagement through various volunteer programs to reduce the high prevalence of malnutrition, occurrence of depression and enhance better quality of life among the elderly.
2. There should be community initiatives deliberately formulated by community leaders to provide voluntary service and care to elderly in their respective communities. Community leaders have to organize home visits for the elderly to avoid loneliness which is a major factor that could harm their mental and physical health because they feel neglected and

rejected. There should be deliberate efforts to encourage the elderly attend any social gatherings such as birthdays, graduation parties, wedding receptions and games to reduce social isolation which is common in old age. Leaders of community elderly groups should encourage elderly persons to include manageable physical activities into their everyday lives to help keep them healthy and happy. There should be promotion of mutual support and friendship with other community members such as the youth and children to improve elderly emotional well-being as well as reducing the intergenerational gap.

3. The government of Uganda should lower the enrolment age for beneficiaries under the Senior Citizens Grant (SCG) from 85 to 65 so that more elderly can benefit from this initiative. The amount given should also be raised from 25,000 to a higher figure to suit the current economic situation. This should be effectively implemented at all district levels in order to improve food security and nutrition among this age group and the people they live with such as children and grandchildren. This will help support beneficiary households' basic consumption and assuaging poverty by supplementing their natural coping strategies in the face of shocks.
4. More programming mainly focusing on the elderly should be undertaken by the government at all administrative levels as an effort to scale up livelihoods and create employment opportunities. Design and implementation should be targeted to address particular risks and vulnerabilities faced by the elderly. This can be achieved through formation of elderly empowerment community groups to participate in income generating activities in community markets and engaging in small scale agriculture especially vegetable growing. This will provide income to the elderly which can be used for medication, travel and paying for domestic bills hence improving the quality of life.

6.3 Suggestions for Further Research

It is vital for further inquiry on how other co-morbidity factors such as Alzheimer's disease, diabetes and high blood pressure influence the nutritional status of the elderly persons in Uganda for better understanding of such dynamics for better intervention measures.

More studies of this nature and related longitudinal studies in rapidly urbanizing communities in Uganda should be carried out to best understand the distribution and risk factors of geriatric

malnutrition in these communities in order to establish better strategies to handle such a rapidly increasing group of people in the country.

References

Aboderin, I. A., & Beard, J. R. (2015). Older people's health in sub-Saharan Africa. *The Lancet, 385*(9968), e9-e11.

Abye, N. (2020). *NUTRITIONAL STATUS AND DETERMINANTS AMONG ELDERS OF BOLE SUB CITY, ADDIS ABABA.*

Afolabi, W., Olayiwola, I., Sanni, S., & Oyawoye, O. (2012). Nutrient intake and nutritional status of the aged in low income areas of Southwest, Nigeria. *The Journal of Aging, Research and Clinical Practice*.

Ahlqvist, A., Nyfors, H., & Suhonen, R. (2016). Factors associated with older people's independent living from the viewpoint of health and functional capacity: a register-based study. *Nursing open, 3*(2), 79-89.

Ahmadi, S. M., Mohammadi, M. R., Mostafavi, S.-A., Keshavarzi, S., Kooshesh, S.-M.-A., Joulaei, H., . . . Lankarani, K. B. (2013). Dependence of the geriatric depression on nutritional status and anthropometric indices in elderly population. *Iranian journal of psychiatry, 8*(2), 92.

Alkema, Leontine, Gerland, Patrick, Raftery, Adrian, . . . John. (2015). The United Nations probabilistic population projections: An introduction to demographic forecasting with uncertainty. *Foresight (Colchester, Vt.), 2015*(37), 19.

Andre, M. B., Dumavibhat, N., Ngatu, N. l. R., Eitoku, M., Hirota, R., & Suganuma, N. (2013). Mini Nutritional Assessment and functional capacity in community-dwelling elderly in Rural Luozi, Democratic Republic of Congo. *Geriatrics & gerontology international, 13*(1), 35-42.

Asamane, E. A., Greig, C. A., & Thompson, J. L. (2020). The association between nutrient intake, nutritional status and physical function of community-dwelling ethnically diverse older adults. *BMC Nutrition, 6*(1), 1-15.

Baptista, F. M., Rodrigues, A. M., Gregório, M. J., de Sousa, R., Cruz, E., & Canhão, H. (2018). Functional status and quality of life determinants of a group of elderly people with food insecurity. *Frontiers in nutrition, 5*, 99.

Boström, G., Conradsson, M., Rosendahl, E., Nordström, P., Gustafson, Y., & Littbrand, H. (2014). Functional capacity and dependency in transfer and dressing are associated with depressive symptoms in older people. *Clinical interventions in aging, 9*, 249.

Buettner, T. (2022). Population projections and population policies *International Handbook of Population Policies* (pp. 467-484): Springer.

Caçador, C., Teixeira-Lemos, E., Martins, S. O., & Ramos, F. (2021). The Role of Nutritional Status on Polypharmacy, Cognition, and Functional Capacity of Institutionalized Elderly: A Systematic Review. *Nutrients, 13*(10), 3477.

Caçador, C., Teixeira-Lemos, E., Oliveira, J., Pinheiro, J., Mascarenhas-Melo, F., & Ramos, F. (2021). The Relationship between Nutritional Status and Functional Capacity: A Contribution Study in Institutionalised Portuguese Older Adults. *International Journal of Environmental Research and Public Health, 18*(7), 3789.

Cheserek, M., Tuitoek, P., Waudo, J., Msuya, J., Kikafunda, J., & Wamara, C. K. (2012). Anthropometric characteristics and nutritional status of older adults in the Lake Victoria Basin of East Africa: region, sex, and age differences. *South African Journal of Clinical Nutrition, 25*(2), 67-72.

Chu, W.-M., Tange, C., Nishita, Y., Tomida, M., Shimokata, H., Otsuka, R., . . . Arai, H. (2023). Effect of different types of social support on physical frailty development among community-dwelling older adults in Japan: evidence from a 10-year population-based cohort study. *Archives of gerontology and geriatrics*, 104928.

Cortés-Muñoz, Carolina, Cardona-Arango, Doris, Segura-Cardona, Ángela, . . . O, M. (2016). Demographic, social, physical and mental factors associated with functional capacity in the elderly, Antioquia, Colombia, 2012. *Revista de Salud Pública, 18*(2), 167-178.

Cui, L., Ding, D., Chen, J., Wang, M., He, F., & Yu, S. (2022). Factors affecting the evolution of Chinese elderly depression: a cross-sectional study. *BMC geriatrics, 22*(1), 109.

Danielewicz, A. L., Barbosa, A. R., & Del Duca, G. F. (2014). Nutritional status, physical performance and functional capacity in an elderly population in southern Brazil. *Revista da Associação Médica Brasileira, 60*(3), 242-248.

de Souza, L. B., Papini, S. J., & Corrente, J. E. (2015). Relationship between nutritional status and functional capacity for older people. *Health, 7*(09), 1090.

Dehghankar, Leila, Shahrokhi, Akram, Oveisi, Sonia, . . . Azam. (2018). Impact of Functional Capacity on Nutritional Status of Hospitalized Elderly.

Department of Economic and Social Affairs. (2018). World population projected to reach 9.7 billion by 2050. Report, 29 July 2015, New York.

Devraj, S., & D'mello, M. K. (2019). Determinants of quality of life among the elderly population in urban areas of Mangalore, Karnataka. *Journal of Geriatric Mental Health, 6*(2), 94.

Fang, Mingwang, Mirutse, Gebremeskel, Guo, Ling, . . . Xiao. (2019). Role of socioeconomic status and housing conditions in geriatric depression in rural China: a cross-sectional study. *BMJ open, 9*(5), e024046.

Feng, & Qiushi. (2020). What does successful aging mean? Lay perception of successful aging among elderly Singaporeans. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 72*(2), 204-213.

Graf, C. (2008). The Lawton instrumental activities of daily living (IADL) scale. *Medsurg Nurs, 17*(5), 343-344.

Graf, C. (2009). The Lawton instrumental activities of daily living (IADL) scale. *Medsurg Nurs, 18*(5), 315-316.

Gravina, E. P. L., Pinheiro, B. V., Jesus, L. A. d. S., Barros, F. S., Lucinda, L. M. F., Colugnati, F. A. B., . . . Reboredo, M. M. (2021). Factors Associated with Functional Capacity in CKD Patients. *Clinical Nursing Research, 30*(3), 351-359.

Group, W. (1998). Development of the World Health Organization WHOQOL-BREF quality of life assessment. *Psychological medicine, 28*(3), 551-558.

Grover, S., & Malhotra, N. (2015). Depression in elderly: A review of Indian research. *Journal of Geriatric Mental Health, 2*(1), 4-15.

Gumikiriza-Onoria, J., Odokonyero, R., Giordani, B., Akena, D., Mwesiga, E., Ssuna, B., . . . Nakasujja, N. (2022). An Association of Quality of Life and Ageing Perceptions among Community Dwelling Older Adults in Uganda. *HSOA journal of gerontology & geriatric medicine, 8*(4).

Gureje, O. (2020). Late-life depression in socially and culturally diverse settings. *Epidemiology and Psychiatric Sciences, 29*, e168.

Güths, Silva, J. F. d., Jacob, Metello, M. H. V., Santos, dos, A. M. P. V., . . . Umberto, J. (2017). Sociodemographic profile, family aspects, perception of health, functional capacity and depression in institutionalized elderly persons from the north coastal region of Rio Grande do Sul, Brazil. *Revista Brasileira de Geriatria e Gerontologia, 20*, 175-185.

Haque, M. M., Uddin, A. M., Naser, M. A., Khan, M. Z. H., Roy, S. K., & Arafat, Y. (2014). Health and Nutritional Status of Aged People. *Chattagram Maa-O-Shishu Hospital Medical College Journal, 13*(3), 30-34.

Hestevik, Hillestad, C., Molin, Marianne, Debesay, Jonas, . . . Asta. (2019). Older persons' experiences of adapting to daily life at home after hospital discharge: a qualitative metasummary. *BMC health services research, 19*(1), 1-13.

Hyndman, Rob, J, Zeng, Yijun, Shang, . . . Lin. (2021). Forecasting the old-age dependency ratio to determine a sustainable pension age. *Australian & New Zealand Journal of Statistics, 63*(2), 241-256.

Iwasa, Hajime, Yoshida, Yuko, Kumagai, Shu, . . . Takao. (2018). Depression status as a reliable predictor of functional decline among Japanese community-dwelling older adults: a 12-year population-based prospective cohort study. *International journal of geriatric psychiatry, 24*(11), 1192-1200.

James, C., Reneman, M., & Gross, D. (2019). Functional Capacity Evaluation Research: Report from the Second International Functional Capacity Evaluation Research Meeting. *Journal of occupational rehabilitation, 26*. doi: 10.1007/s10926-015-9589-y

Jeejeebhoy. (2019). Assessment of nutritional status. *Journal of Parenteral and Enteral Nutrition, 14*(5, Supplement).

Kagawa, C. A., & Corrente, J. E. (2015). Analysis of elderly functional capacity in the municipality of Avaré, São Paulo: associated factors. *Revista Brasileira de Geriatria e Gerontologia, 18*, 577-586.

Kanwal, S., Qidwai, W., & Nanji, K. (2018). Relationship of nutritional status and functional capacity in elderly patients visiting outpatient clinics of a tertiary care hospital. *J Coll Phys Surg Pak, 28*(7), 509-513.

Karimi, M., & Brazier, J. (2016). Health, Health-Related Quality of Life, and Quality of Life: What is the Difference? *PharmacoEconomics, 34*. doi: 10.1007/s40273-016-0389-9

Keshavarzi, S., Ahmadi, S. M., & Lankarani, K. B. (2015). The impact of depression and malnutrition on health-related quality of life among the elderly Iranians. *Global journal of health science, 7*(3), 161.

Khaje-Bishak, Yaser, Payahoo, Laleh, Pourghasem, Bahram, . . . Asghari, M. (2017). Assessing the quality of life in elderly people and related factors in tabriz, iran. *Journal of caring sciences, 3*(4), 257.

Kikafunda, K, J., Lukwago, & B, F. (2005). Nutritional status and functional ability of the elderly aged 60 to 90 years in the Mpigi district of central Uganda. *Nutrition, 21*(1), 59-66.

Konda, S., & Giri, P. (2018). Prevalence of malnutrition and its determinants in an elderly people in South India. *International Journal of Community Medicine and Public Health, 5*(8), 3570-3576.

Krishnamoorthy, Yuvaraj, Vijayageetha, M., Kumar, Ganesh, S., Rajaa, . . . Tanveer. (2018). Prevalence of malnutrition and its associated factors among elderly population in rural Puducherry using mini-nutritional assessment questionnaire. *Journal of Family Medicine and Primary Care, 7*(6), 1429.

Kshetrimayum, N., Reddy, C. V. K., Siddhana, S., Manjunath, M., Rudraswamy, S., & Sulavai, S. (2013). Oral health-related quality of life and nutritional status of institutionalized elderly population aged 60 years and above in Mysore City, India. *Gerodontology, 30*(2), 119-125.

Kyomuhendo, Clare, Boateng, Alice, Agyemang, & Akosua, F. (2020). Experiences of elderly women caring for people living with HIV and AIDS in Masindi District, Uganda. *AIDS care*, 1-4.

Lahiri, Surajit, Biswas, Atanu, Santra, Sutanuka, . . . Kumar, S. (2015). Assessment of nutritional status among elderly population in a rural area of West Bengal, India. *Int J Med Sci Public Health, 4*(4), 569-572.

Landi, F., Liperoti, R., Russo, A., Capoluongo, E., Barillaro, C., Pahor, M., . . . Onder, G. (2010). Disability, more than multimorbidity, was predictive of mortality among older persons aged 80 years and older. *Journal of clinical epidemiology, 63*(7), 752-759.

Lau, Y. W., Vaingankar, J. A., Abdin, E., Shafie, S., Jeyagurunathan, A., Zhang, Y., . . . Subramaniam, M. (2019). Social support network typologies and their association with dementia and depression among older adults in Singapore: a cross-sectional analysis. *BMJ open, 9*(5), e025303.

Lawton, M., Brody, E., & Médecin, U. (1969). Instrumental activities of daily living (IADL). *The gerontologist, 9*, 179-186.

Luger, E., Haider, S., Kapan, A., Schindler, K., Lackinger, C., Dorner, T., & Volkert, D. (2016). Association between nutritional status and quality of life in (Pre) frail community-dwelling older persons. *J Frailty Aging*, *5*(3), 141-148.

Maniragaba, Fred, Kwagala, Betty, Bizimungu, Emmanuel, . . . James. (2018). Predictors of quality of life of older persons in rural Uganda: A cross sectional study. *AAS open research*, *1*.

Maniragaba, Fred Nzabona, Abel Asiimwe, John Bosco Bizimungu, Emmanuel Mushomi, John Ntozi, . . . Betty. (2019). Factors associated with older persons' physical health in rural Uganda. *PloS one*, *14*(1), e0209262.

Matos, F. S., Jesus, C. S. d., Carneiro, J. A. O., Coqueiro, R. d. S., Fernandes, M. H., & Brito, T. A. (2018). Reduced functional capacity of community-dwelling elderly: a longitudinal study. *Ciencia & saude coletiva*, *23*, 3393-3401.

Moreira, P. L., Correa, C. R., Corrente, J. E., Martin, L. C., Boas, P. J. F. V., & Ferreira, A. L. A. (2016). Anthropometric, functional capacity, and oxidative stress changes in Brazilian community-living elderly subjects. A longitudinal study. *Archives of gerontology and geriatrics*, *66*, 140-146.

Murphy, C., M., Brooks, N., C., New, A., S., . . . L., M. (2000). The use of the Mini-Nutritional Assessment (MNA) tool in elderly orthopaedic patients. *European Journal of Clinical Nutrition*, *54*(7), 555-562. doi: 10.1038/sj.ejcn.1601055

Nambooze, J., Fujimura, M., & Inaoka, T. (2014a). Nutritional status and functional capacity of community-dwelling elderly in southern Laos. *Environmental health and preventive medicine*, *19*(2), 143-150.

Nambooze, J., Fujimura, M., & Inaoka, T. (2014b). Nutritional status and functional capacity of community-dwelling elderly in southern Laos. *Environmental health and preventive medicine*, *19*, 143-150.

Nawagi, F., Söderberg, M., Berggren, V., Midlöv, P., Ajambo, A., & Nakasujja, N. (2018). Sociodemographic characteristics and health profile of the elderly seeking health care in Kampala, Uganda. *Current gerontology and geriatrics research*, *2018*.

Nazari, M., & Ghahremani, L. (2018). Socio-Demographic Determinants of Quality of Life among Older People, a Population-Based Study. *Elderly Health Journal*, *4*(2), 60-67.

Ndikuno, Cynthia, Namutebi, Mariam, Kuteesa, Job, . . . Connie. (2016). Quality of life of caregivers of patients diagnosed with severe mental illness at the national referral hospitals in Uganda. *BMC psychiatry, 16*(1), 1-9.

Nejat, S, Montazeri, A, Holakouie Naieni, K, . . . S.R. (2006). The World Health Organization quality of Life (WHOQOL-BREF) questionnaire: Translation and validation study of the Iranian version. [Research]. *Journal of School of Public Health and Institute of Public Health Research, 4*(4), 1-12.

Nogueira, P. S. F., Marques, M. B., Coutinho, J. F. V., Maia, J. C., Silva, M. J. d., & Moura, E. R. F. (2017). Factors associated with the functional capacity of older adults with leprosy. *Revista brasileira de enfermagem, 70*(4), 711-718.

Nzabona, Abel, Ntozi, James, Rutaremwa, & Gideon. (2016). Loneliness among older persons in Uganda: examining social, economic and demographic risk factors. *Ageing & Society, 36*(4), 860-888.

Nzabona, A., Ntozi, J., & Rutaremwa, G. (2013). Old is gold. What influences old persons' engagement in income generating activities in Uganda. *Greener Journal of Social Sciences, 3*(8), 383-390.

Odwee, A. (2018). Malnutrition and Its Associated Factors among Adults Attending Anti-Retroviral Therapy at Three Selected Hospitals In Bushenyj District, Uganda.

Oliveira, Anamélia, Nossa, P., & Mota-Pinto, A. (2019). Assessing functional capacity and factors determining functional decline in the elderly: a cross-sectional study. *Acta medica portuguesa, 32*(10), 654-660.

Oliveira, Figueiredo, Danielle, S. T. d., Felisbino, M., Mariana, S., Malta, D. C., & Melendez, G. V. (2017). Prevalence of functional disability in the elderly: analysis of the National Health Survey.

Palma, R., Conti, M. H. S. d., Quintino, N. M., Gatti, M. A. N., Simeão, S. F. A. P., & Vitta, A. d. (2014). Functional capacity and its associated factors in the elderly with low back pain. *Acta ortopedica brasileira, 22*(6), 295-299.

Panaghi, Leili, Abarashi, Zohreh, Mansoori, Nader, . . . Mohsen. (2018). Quality of Life and Related demographic factor of the elderly in Tehran. *Iranian Journal of Ageing, 4*(2), 0-0.

Pereira, L. C., Figueiredo, M. d. L. F., Beleza, C. M. F., Andrade, E. M. L. R., Silva, M. J. d., & Pereira, A. F. M. (2017). Predictors for the functional incapacity of the elderly in primary health care. *Revista brasileira de enfermagem, 70*, 112-118.

Pillay, Gayathri, S, Natashya, Kristanna, Maharaj, & Pranitha. (2018). Population ageing in Africa *Aging and health in Africa* (pp. 11-51): Springer.

Raggi, A., Corso, B., Minicuci, N., Quintas, R., Sattin, D., De Torres, L., . . . Koskinen, S. (2016). Determinants of quality of life in ageing populations: Results from a cross-sectional study in Finland, Poland and Spain. *PloS one, 11*(7), e0159293.

Rahgozar, M., & Mohammadi, M. (2017). Feeling depression, anxiety, and apprehension in elderly population. *Hakim, 2*(2), 103-113.

Ranganath, T., & Jyothi Jadhav, S. N. (2017). To assess the nutritional status among elderly and factors influencing it, in an urban area, Bengaluru-a cross sectional study. *International Journal of Community Medicine and Public Health, 4*(5), 1727.

Rasheed, S., & Woods, R. T. (2013). Malnutrition and quality of life in older people: a systematic review and meta-analysis. *Ageing research reviews, 12*(2), 561-566.

Ratcliffe, Michael, Burd, Charlynn, Holder, Kelly, . . . Alison. (2016). Defining rural at the US Census Bureau. *American community survey and geography brief, 1*(8), 1-8.

Reynolds, Charles F Cuijpers, Pim Patel, Vikram Cohen, Alex, Dias, A., . . . Sati. (2019). Early intervention to reduce the global health and economic burden of major depression in older adults. *Annual review of public health, 33*, 123-135.

Sabharwal, Sanjeeve, Wilson, Helen, Reilly, Peter, . . . M, C. (2015). Heterogeneity of the definition of elderly age in current orthopaedic research. *Springerplus, 4*, 1-7.

Santos, George, Luiz, Alves, Santana, Rosimere, & Ferreira. (2017). Functional capacity of elderly people: implications for instrumental activities of daily living.

Sanya, EO, Kolo, PM, Adekeye, A, . . . TO. (2017). Nutritional status of elderly people managed in a Nigerian tertiary hospital. *Annals of African medicine, 12*(2), 140.

Schrader, E., Baumgartel, C., Gueldenzoph, H., Stehle, P., Uter, W., Sieber, C., & Volkerf, D. (2014). Nutritional status according to Mini Nutritional Assessment is related to functional status in geriatric patients—independent of health status. *The journal of nutrition, health & aging, 18*(3), 257-263.

Shivraj, M., Singh, V., Meena, B., Kusum, S., Neelam, M., Dayal, S., & Sanjay, B. (2014). Study of nutritional status in elderly in Indian population. *International journal of current research, 6*(11), 10253-10257.

Singh, D. K., Manaf, Z. A., Yusoff, N. A. M., Muhammad, N. A., Phan, M. F., & Shahar, S. (2014). Correlation between nutritional status and comprehensive physical performance measures among older adults with undernourishment in residential institutions. *Clinical interventions in aging, 9*, 1415.

Sováriová Soósová, M. (2016). DETERMINANTS OF QUALITY OF LIFE IN ELDERLY. *Central European Journal of Nursing and Midwifery, 7*, 484-493. doi: 10.15452/cejnm.2016.07.0019

Spector, D, W., Katz, Sidney, Murphy, B, J., . . . P, J. (1987). The hierarchical relationship between activities of daily living and instrumental activities of daily living. *Journal of chronic diseases, 40*(6), 481-489.

Ssebunnya, J., Medhin, G., Kangere, S., Kigozi, F., Nakku, J., & Lund, C. (2019). Prevalence, correlates and help-seeking behaviour for depressive symptoms in rural Uganda: A population-based survey. *Global Mental Health, 6*.

Sugiura, Y., Tanimoto, Y., Imbe, A., Inaba, Y., Sakai, S., Shishikura, K., . . . Hanafusa, T. (2016). Association between functional capacity decline and nutritional status based on the nutrition screening initiative checklist: A 2-year cohort study of Japanese Community-Dwelling Elderly. *PloS one, 11*(11), e0166037.

Tomás, Teresa, M., Galán-Mercant, Alejandro, Carnero, Alvarez, E., . . . Beatriz. (2019). Functional Capacity and Levels of Physical Activity in Aging: A 3-Year Follow-up. [Original Research]. *Frontiers in Medicine, 4*(244). doi: 10.3389/fmed.2017.00244

Tomita, A., & Burns, J. K. (2013). A multilevel analysis of association between neighborhood social capital and depression: evidence from the first South African National Income Dynamics Study. *Journal of affective disorders, 144*(1-2), 101-105.

UBOS. (2016a). Uganda Bureau of Statistics. *Energy, 95*(13.6), 14.15.

UBOS. (2016b). Uganda Demographic and Health Survey 2016. *Kampala, Uganda & Calverton, Maryland, USA: UBOS & ICF International Inc*.

UBOS. (2022). Uganda Bureau of Statistics. *Energy, 95*(13.6), 14.15.

UBOS, U. D. (2016). Health Survey 2011. *UBOS and ICF Inc, Editor*.

Uddin, Abbas, M., Soivong, Pratum, Lasuka, Duangruedee, . . . Phanida. (2017). Factors related to quality of life among older adults in Bangladesh: A cross sectional survey. *Nursing & Health Sciences, 19*(4), 518-524.

Vahedi, S. (2010). World Health Organization Quality-of-Life Scale (WHOQOL-BREF): analyses of their item response theory properties based on the graded responses model. *Iranian journal of psychiatry, 5*(4), 140.

Vanella, P., Deschermeier, P., & Wilke, C. B. (2020). An overview of population projections—methodological concepts, international data availability, and use cases. *Forecasting, 2*(3), 346-363.

Vedantam, Aditya, Subramanian, Vijay, Rao, Vijay, N., . . . KR. (2016). Malnutrition in free-living elderly in rural south India: prevalence and risk factors. *Public health nutrition, 15*(10), 1328-1332.

Vellas, B., Guigoz, Y., Garry, P. J., Nourhashemi, F., Bennahum, D., Lauque, S., & Albarede, J.-L. (1999). The Mini Nutritional Assessment (MNA) and its use in grading the nutritional state of elderly patients. *Nutrition, 15*(2), 116-122.

Vellas, B., Villars, H., Abellan, G., Soto, M., Rolland, Y., Guigoz, Y., . . . Rubenstein, L. (2006). Overview of the MNA®-Its history and challenges. *Journal of Nutrition Health and Aging, 10*(6), 456.

Vera-Sanso, Penny, Henry, George, A., Harriss-White, & Barbara. (2018). Ageing, poverty and neoliberalism in urban South India. *The new dynamics of ageing, 1*, 325.

Vinkers, J, D., Gussekloo, Jacobijn, Stek, L, M., . . . C, R. (2015). The 15-item Geriatric Depression Scale (GDS-15) detects changes in depressive symptoms after a major negative life event. The Leiden 85-plus Study. *International journal of geriatric psychiatry, 19*(1), 80-84.

Wamara, C. K., & Carvalho, M. I. (2019). Discrimination and injustice against older people in Uganda: Implications for social work practice. *International Social Work, 1*, 13.

Wong, Y, F., Yang, Lin, Yuen, WM, J., . . . KY, F. (2018). Assessing quality of life using WHOQOL-BREF: A cross-sectional study on the association between quality of life and neighborhood environmental satisfaction, and the mediating effect of health-related behaviors. *BMC public health, 18*(1), 1113.

World Health Organization. (2015). WHO global strategy on people-centred and integrated health services: interim report: World Health Organization.

World Health Organization. (2018). Population dynamics in the post-2015 development agenda: Report of the global thematic consultation on population dynamics. *United Nations. URL http://www. worldwewant2015. org/file/313464/download/340868*.

Yesavage, J. A., & Sheikh, J. I. (1986). 9/Geriatric depression scale (GDS) recent evidence and development of a shorter version. *Clinical gerontologist*, *5*(1-2), 165-173.

Yodmai, K., Somrongthong, R., & Kumar, R. (2018). Determinants of Quality of Life among Rural Elderly Population in Khonkean Province of Thailand. *Journal of Liaquat University of Medical & Health Sciences*, *17*(03), 180-184.

Yoshimura, Kazuya, Yamada, Minoru, Kajiwara, Yuu, . . . Tomoki. (2013). Relationship between depression and risk of malnutrition among community-dwelling young-old and old-old elderly people. *Aging & mental health*, *17*(4), 456-460.

Zainudin, Norain, Hamirudin, Haslinda, A., Rahman, A, N. A., . . . Suriati. (2019). Malnutrition risk and perception on dietary practices among elderly living in agricultural settlements. *Nutrition & Food Science*.

Zavisca, J. R., & Gerber, T. P. (2016). The socioeconomic, demographic, and political effects of housing in comparative perspective. *Annual Review of Sociology*, *42*, 347-367.

APPENDICES

Appendix A: Household Roster

HOUSEHOLD ROSTER

READ ALOUD: To begin, I am going to ask you some questions about who lives in this household. I am interested in hearing about anyone who lives in this house at least half of the time, and who shares food together with the rest of the household.

Q1							
	1a.Name	**1b. Age** Completed years (completed months for children <2) Y=Years M=Months	**1c. Sex** 0=Male 1=Female	**1d. Relationship to the household Head** 01=Mother 02=Spouse/partner 03=Index child 04=Child 05=Sister/ Brother 06=Father/ Mother 07=Father in law/ Mother in law 08=Others (specify)	**HH Members 6yrs and above:** **1e.Currently in school** 0=No 1=Yes	**1g.Highest level of education completed** 0=Never went to school 1=Primary 2=Secondary 3=Tertiary 4=Adult education	**1h.Literacy** *Read & write with understanding in any language.* 0=None 1=Only read 2=Read & write
1							
2							
3							
4							
5							
6							
7							
8							

Appendix B: Mini Nutritional Assessment Questionnaire

Mini Nutritional Assessment
MNA®

Nestlé Nutrition Institute

Last name: First name:

Sex: Age: Weight, kg: Height, cm: Date:

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

Screening

A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?
0 = severe 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 3kg (6.6lbs)
1 = does not know
2 = weight loss between 1 and 3kg (2.2 and 6.6 lbs)
3 = no weight loss

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

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

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

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

Screening score (subtotal max. 14 points)
12-14 points: Normal nutritional status
8-11 points: At risk of malnutrition
0-7 points: Malnourished

For a more in-depth assessment, continue with questions G-R

Assessment

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

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

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

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

K Selected consumption markers for protein intake

- (milk, cheese, yoghurt) per day yes ☐ no ☐
- Two or more servings of legumes no ☐ yes ☐
- Meat, fish or poultry every day no ☐ yes ☐

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

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

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

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

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

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

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

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

Assessment (max. 16 points) ☐☐.☐

Screening score ☐☐.☐

Total Assessment (max. 30 points) ☐☐.☐

References
1. Vellas B, Villars H, Abellan G, *et al.* Overview of the MNA® - Its History and Challenges. *J Nutr Health Aging*. 2006; **10:456**-465.
2. Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. Screening for Undernutrition in Geriatric Practice: Developing the Short-Form Mini Nutritional Assessment (MNA-SF). *J. Geront.* 2001; **56A**: M366-377
3. Guigoz Y. The Mini-Nutritional Assessment (MNA®) Review of the Literature - What does it tell us? *J Nutr Health Aging*. 2006; **10**:466-487.

For more information: www.mna-elderly.com

Appendix C: Lawton - Broody activities of daily living questionnaire

LAWTON BRODY INSTRUMENTAL ACTIVITIES OF DAILY LIVING SCALE (I.A.D.L.)			
Scoring: For each category, circle the item description that most closely resembles the client's highest functional			
A. Ability to Use Telephone		**E. Laundry**	
1. Operates telephone on own initiative-looks up and dials numbers, etc.	1	1. Does personal laundry completely	1
2. Dials a few well-known numbers	1	2. Launders small items-rinses stockings, handkerchiefs, scarfs etc.	1 0
B. Shopping		**F.** Mode of Transportation	
1. Takes care of all shopping needs independently	1	1. Travels independently on public transportation or drives own car	1
2. Shops independently for small purchases	0	2. Arranges own travel via taxi, but does not otherwise use public transportation	1
3. Needs to be accompanied on any shopping trip	0	3. Travels on public transportation when	
C. Food Preparation		**G.** Responsibility for Own Medications	
1. Plans, prepares and serves adequate meals independently	1	1. Is responsible for taking medication in correct dosages at correct time	1
2. Prepares adequate meals if supplied with ingredients	0	2. Takes responsibility if medication is prepared in advance in separate dosage	0
3. Heats, serves and prepares meals, or		3. Is not capable of dispensing own medication	
D. Housekeeping		**H.** Ability to Handle Finances	
1. Maintains house alone or with occasional assistance (e.g. "heavy work domestic help")	1	1. Manages financial matters independently (Budgets, pays rent, bills, goes to bank, deposits or withdraws money on phone), collects and keeps track of his/her income.	1
2. Performs light daily tasks such as dish washing, bed making	1		
3. Performs light daily tasks but cannot	1	2. Manages day-to-day purchases, but needs help with banking, major purchases, etc.	1
Score		**Score**	
		Total score_____	
A summary score ranges from 0 (low function, dependent) to 8 (high function, independent) for women and			

Appendix D: Housing Conditions

Section A: Housing Conditions

Now we would like to ask you about your housing conditions: all the rooms and all separate building used by your household members.

1. What type of dwelling is it?

5 = Flat

4 = Bungalow

3 = Detached

2 = Semi-detached

1 = Cottage

2. What is its tenure status?

5 = Owned

4 = Rented (Normal)

3= Rented (Subsidized)

2 = Rented (Paid by relative)

1 = Supplied free by employer

3. How many rooms does your household occupy?

5 = 5 Rooms

4 = 4 Rooms

3 = 3 Rooms

2 = 2 Rooms

1 = 1 Room

4. What is the major construction material of the roof?

5 = Tiles

4 = Iron sheets

3 = Asbestos

2 = Thaw / Straw

1 = Plastics

5. What is the major construction material of the external wall?

5 = Cement blocks

4 = Burnt Clay bricks

3= Burnt soil bricks

2 = Un-burnt bricks

1 = Mud and poles

6. What is the major material of the floor?

5 = Terrazzo

4 = Tiles

3 = Cement

2 = cow dung

1 = Earth

7. Do you have electricity in your house?

1 = Yes

2 = No

8. Which fuel do you mainly use for heating? (Tick one)

5 = Electricity

4 = LP Gas

3 = Bio gas

2 = kerosene / Oil

1 = Firewood

Appendix E: Geriatric Depression Questionnaire

Geriatric Depression Scale (GDS)

Scoring Instructions

Instructions: Score 1 point for each bolded answer. A score of 5 or more suggests depression.

1.	Are you basically satisfied with your life?	YES NO
2.	Have you dropped many of your activities and interests?	YES NO
3.	Do you feel that your life is empty?	YES NO
4.	Do you often get bored?	YES NO
5.	Are you in good spirits most of the time?	YES NO
6.	Are you afraid that something bad is going to happen to you?	YES NO
7.	Do you feel happy most of the time?	YES NO
8.	Do you often feel helpless?	YES NO
9.	Do you prefer to stay at home, rather than going out and doing things?	YES NO
10.	Do you feel that you have more problems with memory than most?	YES
11.	Do you think it is wonderful to be alive now?	YES NO
12.	Do you feel worthless the way you are now?	YES NO
13.	Do you feel full of energy?	YES NO
14.	Do you feel that your situation is hopeless?	YES NO
15.	Do you think that most people are better off than you are?	YES NO

A score of $\geq$ 5 suggests depression ***Total Score*** _____

Appendix F: Quality of Life Questionnaire

WHOQOL-BREF

The following questions ask how you feel about your quality of life, health, or other areas of your life. I will read out each question to you, along with the response options. **Please choose the answer that appears most appropriate.** If you are unsure about which response to give to a question, the first response you think of is often the best one.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last four weeks.**

		Very poor	Poor	Neither poor nor	Good	Very good
1.	How would you rate your quality of life?	1	2	3	4	5
		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfie	Satisfied	Very satisfied
2.	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last four weeks.

		Not at all	A little	A moderate	Very much	An extreme
3.	To what extent do you feel that physical pain prevents you	5	4	3	2	1
4.	How much do you need any medical treatment to function in your daily life?	5	4	3	2	1
5.	How much do you enjoy life?	1	2	3	4	5

6.	To what extent do you feel your life to be meaningful?	1	2	3	4	5
		Not at all	A little	A moderate	Very much	Extremely
7.	How well are you able to concentrate?	1	2	3	4	5
8.	How safe do you feel in your daily life?	1	2	3	4	5
9.	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about how completely you experience or were able to do certain things in the last four weeks.

		Not at all	A little	Moderately	Mostly	Completely
10.	Do you have enough energy for everyday life?	1	2	3	4	5
11.	Are you able to accept your bodily appearance?	1	2	3	4	5
12.	Have you enough money to meet your needs?	1	2	3	4	5
13.	How available to you is the information that you need in your day-to-day	1	2	3	4	5
14.	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5
		Very poor	Poor	Neither poor nor	Good	Very good
15.	How well are you able to get around?	1	2	3	4	5
		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfie	Satisfied	Very satisfied
16.	How satisfied are you with your sleep?	1	2	3	4	5

17.	How satisfied are you with your ability to perform your daily living	1	2	3	4	5
18.	How satisfied are you with your capacity for	1	2	3	4	5
19.	How satisfied are you with yourself?	1	2	3	4	5
20.	How satisfied are you with your personal relationships?	1	2	3	4	5
21.	How satisfied are you with your sex life?	1	2	3	4	5
22.	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23.	How satisfied are you with the conditions of your living	1	2	3	4	5
24.	How satisfied are you with your access to health services?	1	2	3	4	5
25.	How satisfied are you with your transport?	1	2	3	4	5

The following question refers to how often you have felt or experienced certain things in the last four weeks.

		Never	Seldom	Quite often	Very often	Always
26.	How often do you have negative feelings such as blue mood, despair, anxiety,	5	4	3	2	1

[The following table should be completed after the interview is finished]

		Equations for computing domain scores	Raw score	Transformed scores*	
				4-20	0-100
27.	**Domain 1**	(6-Q3) + (6-Q4) + Q10 + Q15 + Q16 + Q17 + Q18 ✝ + ✝ + ✝ + ✝ + ✝ + ✝ + ✝	a. =	b:	c:

28.	**Domain 2**	Q5 + Q6 + Q7 + Q11 + Q19 + (6-Q26) ✝ + ✝ + ✝ + ✝ + ✝ + ✝	a. =	b:	c:
29.	**Domain 3**	Q20 + Q21 + Q22 ✝ + ✝ + ✝	a. =	b:	c:
30.	**Domain 4**	Q8 + Q9 + Q12 + Q13 + Q14 + Q23 + Q24 + Q25 ✝ + ✝ + ✝ + ✝ + ✝ + ✝ + ✝ + ✝ + ✝	a. =	b:	c:

Appendix G: Standard Procedure for Determining Height of an Individual

MEASURING HEIGHT USING A STADIOMETER

1. Ensure the floor surface is even and firm.

2. Have subject remove shoes and stand up straight with heels together, and with heels, buttocks and shoulders pressed against the stadiometer.

3. Arms should hang freely with palms facing thighs.

4. Take the measurement with the subject standing tall, looking straight ahead with the head upright and not tilted backwards.

5. Make sure the subject's heels stay flat on the floor.

6. Lower the measure on the stadiometer until it makes contact with the top of the head.

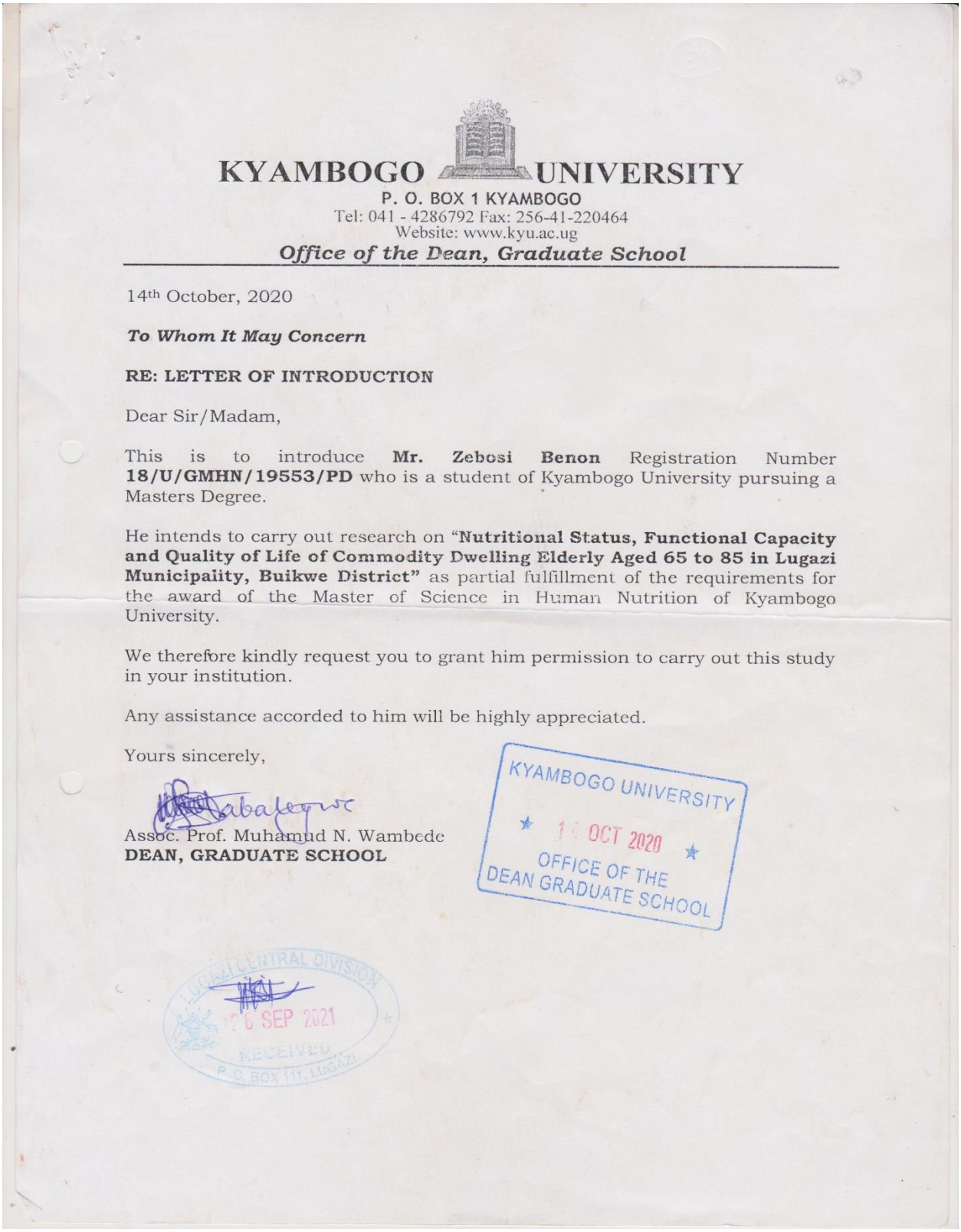
7. Record standing height to the nearest centimeter.

Appendix H: Standard Procedure for Measurement of weight

MEASURING WEIGHT OF ADULT INDIVIDUALS

1. ensure that the scale has been checked and calibrated often following the manufacturer's guidelines.
2. Before taking the weight, make sure the scale is on a levelled surface and displaying 00.0.
3. Ensure shoes and heavy clothing is removed and ask the participant to remove any other heavy objects on them for example, mobile phone, wallet, keys or watches and heavy jewelry.
4. Ask the participant to stand still on the center of the scale with their arms hanging loosely at their sides. Posture is very important because weight of the participant will be evenly distributed for better accurate reading.
5. The display should show fixed result. And the weight should be recorded to the nearest 0.1kg.
6. Repeat the process until the participant has been measured 3 times
7. If these readings are within the 100g of each other, then record these reading as well as the average of the three readings.
8. If you do not have three readings that are within 100g of each other, then continue the process until you do.

Appendix I: Kyambogo University Introductory Letter



KYAMBOGO UNIVERSITY

P. O. BOX 1 KYAMBOGO
Tel: 041 - 4286792 Fax: 256-41-220464
Website: www.kyu.ac.ug

Office of the Dean, Graduate School

14th October, 2020

To Whom It May Concern

RE: LETTER OF INTRODUCTION

Dear Sir/Madam,

This is to introduce **Mr. Zebosi Benon** Registration Number **18/U/GMHN/19553/PD** who is a student of Kyambogo University pursuing a Masters Degree.

He intends to carry out research on **"Nutritional Status, Functional Capacity and Quality of Life of Commodity Dwelling Elderly Aged 65 to 85 in Lugazi Municipality, Buikwe District"** as partial fulfillment of the requirements for the award of the Master of Science in Human Nutrition of Kyambogo University.

We therefore kindly request you to grant him permission to carry out this study in your institution.

Any assistance accorded to him will be highly appreciated.

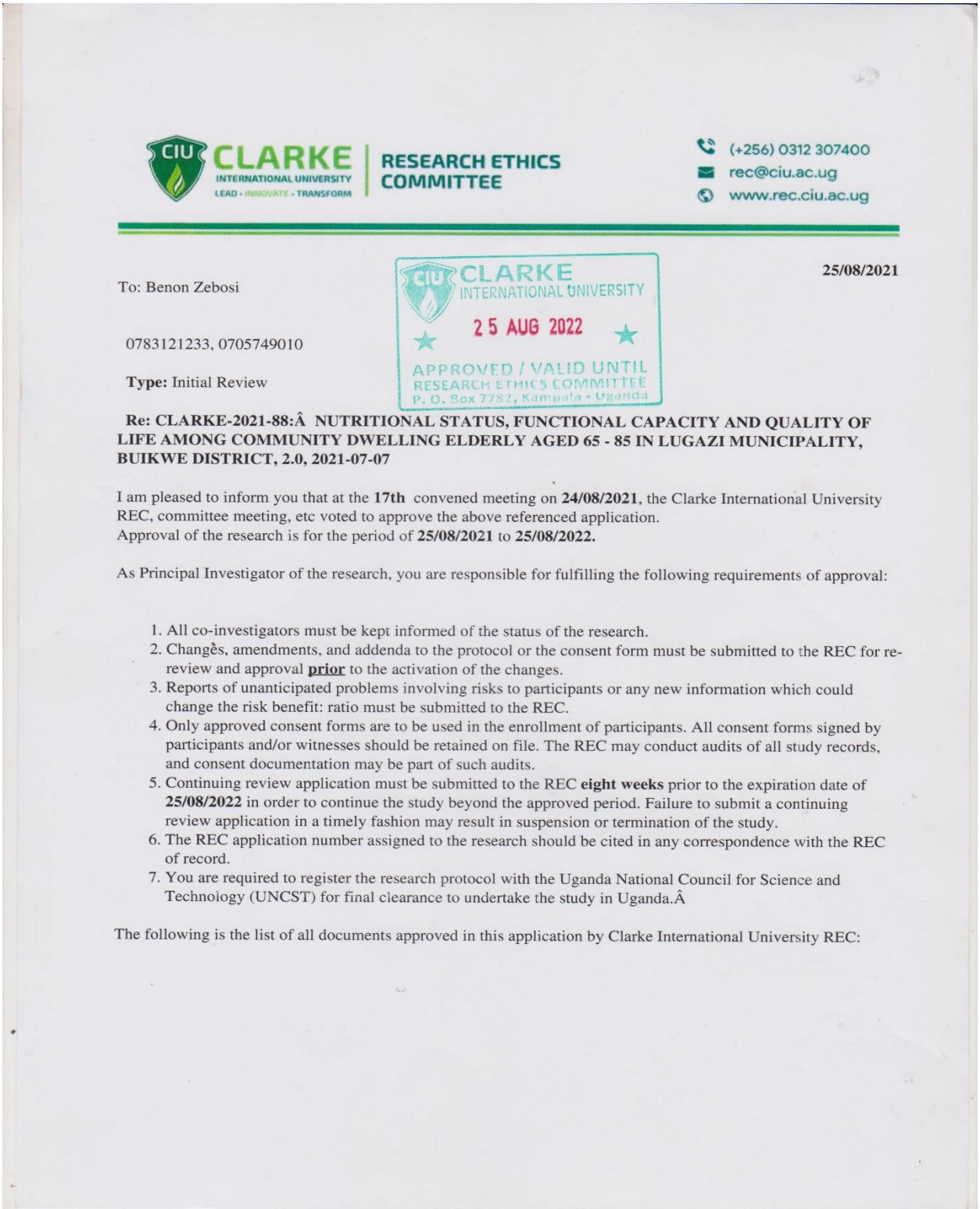
Yours sincerely,

Assoc. Prof. Muhamud N. Wambede
DEAN, GRADUATE SCHOOL

KYAMBOGO UNIVERSITY
14 OCT 2020
OFFICE OF THE
DEAN GRADUATE SCHOOL

LUGAZI CENTRAL DIVISION
16 SEP 2021
RECEIVED
P.O. BOX 111, LUGAZI

Appendix J: REC Approval Letter



CLARKE INTERNATIONAL UNIVERSITY
LEAD · INNOVATE · TRANSFORM

RESEARCH ETHICS COMMITTEE

(+256) 0312 307400
rec@ciu.ac.ug
www.rec.ciu.ac.ug

25/08/2021

To: Benon Zebosi

CLARKE INTERNATIONAL UNIVERSITY
25 AUG 2022
APPROVED / VALID UNTIL
RESEARCH ETHICS COMMITTEE
P. O. Box 7782, Kampala - Uganda

0783121233, 0705749010

Type: Initial Review

Re: CLARKE-2021-88:Â NUTRITIONAL STATUS, FUNCTIONAL CAPACITY AND QUALITY OF LIFE AMONG COMMUNITY DWELLING ELDERLY AGED 65 - 85 IN LUGAZI MUNICIPALITY, BUIKWE DISTRICT, 2.0, 2021-07-07

I am pleased to inform you that at the **17th** convened meeting on **24/08/2021**, the Clarke International University REC, committee meeting, etc voted to approve the above referenced application.
Approval of the research is for the period of **25/08/2021** to **25/08/2022.**

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

1. All co-investigators must be kept informed of the status of the research.
2. Changès, amendments, and addenda to the protocol or the consent form must be submitted to the REC for re-review and approval **prior** to the activation of the changes.
3. Reports of unanticipated problems involving risks to participants or any new information which could change the risk benefit: ratio must be submitted to the REC.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by participants and/or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits.
5. Continuing review application must be submitted to the REC **eight weeks** prior to the expiration date of **25/08/2022** in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record.
7. You are required to register the research protocol with the Uganda National Council for Science and Technology (UNCST) for final clearance to undertake the study in Uganda.Â

The following is the list of all documents approved in this application by Clarke International University REC:

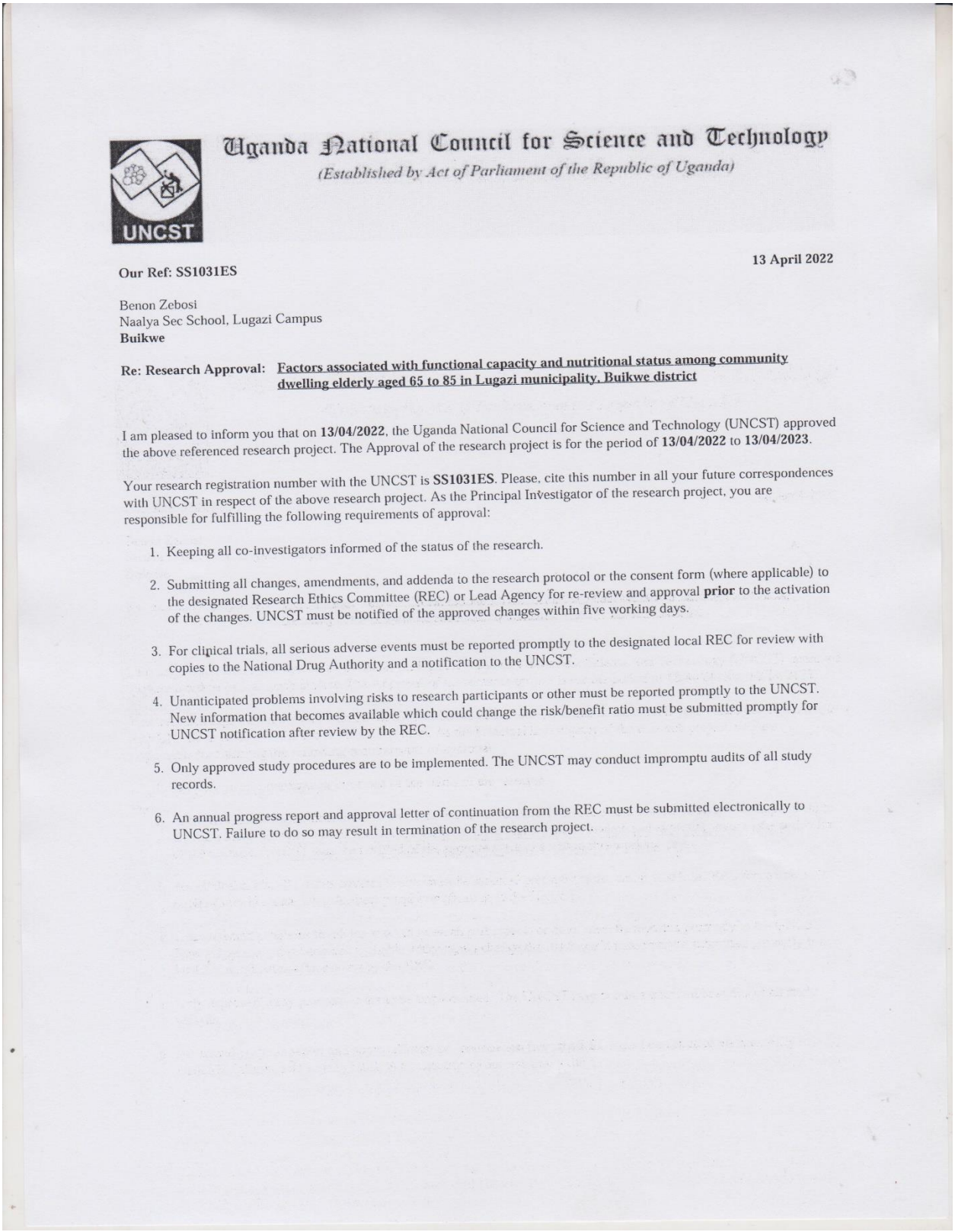
No.	Document Title	Language	Version Number	Version Date
1	translated informed consent form	Luganda	1.0	2021--07
2	Translated data tools	English	1.0	2021-07-07
3	Protocol	English	2.0	2021-07-07
4	Risk management plan	English	1.0	2021-04-26
5	Informed Consent forms	English	1.0	2021-04-26
6	Data collection tools	English	1.0	2021-04-26

Yours Sincerely

Samuel Kabwigu
For: Clarke International University REC

CLARKE INTERNATIONAL UNIVERSITY
25 AUG 2022
APPROVED / VALID UNTIL
RESEARCH ETHICS COMMITTEE
P.O. Box 6782, Kampala - Uganda

Appendix K: UNCST approval letter



Uganda National Council for Science and Technology

(Established by Act of Parliament of the Republic of Uganda)

Our Ref: SS1031ES

13 April 2022

Benon Zebosi
Naalya Sec School, Lugazi Campus
Buikwe

Re: Research Approval: **Factors associated with functional capacity and nutritional status among community dwelling elderly aged 65 to 85 in Lugazi municipality, Buikwe district**

I am pleased to inform you that on **13/04/2022**, the Uganda National Council for Science and Technology (UNCST) approved the above referenced research project. The Approval of the research project is for the period of **13/04/2022** to **13/04/2023**.

Your research registration number with the UNCST is **SS1031ES**. Please, cite this number in all your future correspondences with UNCST in respect of the above research project. As the Principal Investigator of the research project, you are responsible for fulfilling the following requirements of approval:

1. Keeping all co-investigators informed of the status of the research.
2. Submitting all changes, amendments, and addenda to the research protocol or the consent form (where applicable) to the designated Research Ethics Committee (REC) or Lead Agency for re-review and approval **prior** to the activation of the changes. UNCST must be notified of the approved changes within five working days.
3. For clinical trials, all serious adverse events must be reported promptly to the designated local REC for review with copies to the National Drug Authority and a notification to the UNCST.
4. Unanticipated problems involving risks to research participants or other must be reported promptly to the UNCST. New information that becomes available which could change the risk/benefit ratio must be submitted promptly for UNCST notification after review by the REC.
5. Only approved study procedures are to be implemented. The UNCST may conduct impromptu audits of all study records.
6. An annual progress report and approval letter of continuation from the REC must be submitted electronically to UNCST. Failure to do so may result in termination of the research project.

Please note that this approval includes all study related tools submitted as part of the application as shown below:

No.	Document Title	Language	Version Number	Version Date
1	data collection tools	english	1	29 September 2021
2	Project Proposal	English	1	
3	Approval Letter	English		
4	Administrative Clearance	English		
4	Approved COVID 19 mitigation plan	English	3	13 April 2022

Yours sincerely,

Hellen Opolot
For: Executive Secretary
UGANDA NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

LOCATION/CORRESPONDENCE

Plot 6 Kimera Road, Ntinda
P.O. Box 6884
KAMPALA, UGANDA

COMMUNICATION

TEL: (256) 414 705500
FAX: (256) 414-234579
EMAIL: info@uncst.go.ug
WEBSITE: http://www.uncst.go.ug

Appendix L: Lugazi Municipal acceptance letter to conduct research

(39)

LUGAZI MUNICIPAL COUNCIL
P.O. BOX ..1, LUGAZI
28 SEP 2021
RECEIVED

Zebosi Benon
zebosib@mail .com
+256 (0) 783121233
+256 (0) 705749010

28th / September / 2021

To the Town Clerk,

Lugazi Municipality.

(i) No objection.
28/09/21

Dear Sir,

RE: REQUEST TO CONDUCT AN ACADEMIC STUDY IN LUGAZI MUNICIPALITY

I humbly submit my request for the above mentioned issue. I am a Ugandan male aged 30 perusing a Master of Science in Human Nutrition at Kyambogo University. Am undertaking an academic research study project about Factors associated with functional capacity and nutritional status among community dwelling elderly aged 65 to 85 in Lugazi Municipality, Buikwe districtas a partial fulfillment for the requirement leading to the award of Master of Science in Human Nutrition of Kyambogo University.

The study is to be conducted in all the three divisions that make up Lugazi municipality which include Kawolo, Central and Najjembe for a period of two (2) months i.e. October and November. The study shall use the political structural leadership of your municipality including village health team members. Any form of assistance shall be highly appreciated.

I will be glad if my request is honoured.

Thank you.

Yours sincerely,

Zebosi Benon

(ii) Recieved 28/09/2021

Appendix M: Informed Consent Form

INFORMED CONSENT FORM

KYAMBOG UNIVERSITY
DEPARTMENT OF HUMAN NUTRITION AND HOME ECONOMICS

Dear Mr. / Mrs.

Re; Study on Factors Associated with Functional Capacity and Nutritional Status among community dwelling elderly aged 65 to 85 in Lugazi Municipality, Buikwe District.

Hello, my name is Zebosi Benon a student at Kyambogo University undertaking this project as a requirement for the award of a Master of Science degree in Human Nutrition. I would like to invite you to participate in this research study. Before you give your permission, I would like to tell you what will be asked. If you have any questions, feel free to ask.

Purpose of the study:

The number of the persons reaching 60 years and over is rapidly increasing in Uganda and the world at large. Unlike in the industrialized countries, this demographic transition is new to Uganda and many African countries. Consequently the aging of many persons in Uganda turns out to be miserable and undesirable because of the lack of proper health care, social support and lack of proper government policies that outline the well-being of the elderly. This is partly because the data concerning this age group is unavailable and the one available is scanty or very old to be used in the current situation. Therefore this study aims at building on the available little knowledge about the health status of the elderly to help bridge this gap by assessing the nutritional status, functional capacity status, quality of life, economic situation and probable depression among the elderly persons. The data provided will be shared with the authorities and could help to improve the health status of the elderly through provision of better health care and social support such as financial aid and provision of better environments for survival of the elderly.

Procedures:

You are being asked to complete a questionnaire by responding to the questions asked by the interviewer. This interview will take approximately 30 - 35 minutes. There is no right or wrong answers; all we want is to know about you, your health status, experiences and perceptions. The Research assistant will also measure your height using a ketoise / stadiometer, weight using a weighing scale and if required he will also measure your calf or mid upper arm circumference.

Risks and Benefits:

I will conduct the interview in a private and safe place to ensure privacy. The only potential risk in participating in this study is that you may feel uncomfortable answering some of the personal questions however, you may choose not to answer such questions making you uncomfortable.

The information collected may be useful in helping to inform local authorities about the nutritional status, functional capacity and quality of life among the elderly persons which could lead to improved nutritional interventions and social support to improve your quality of life as an elderly person.

More still participants who will be found to be malnourished will be referred to the nearest health center (Kawolo General Hospital) with a nutrition ward for further assessment and better management of the health condition. A contact of the close family member will be obtained for purposes of follow up and monitoring of such a participant.

Confidentiality

All your responses will be confidential. We will assign a unique identification number, so that your name is not linked to the answers you give. The results of the study will be presented in a respectful manner and information that could enable anyone to identify you personally will not be reported.

Compensation

There is no reward or compensation for taking part in this study because this is an academic study involving anthropometric measurements and interview methods. There is no cost for participating in this study.

Questions and contacts

If you happen to have any questions for me about the study or consent document, please ask before signing and I will do my best to answer them. However for additional questions and any aspect of the study project you seem not to understand then you can reach the principal researcher on (0783121233 / 0705749010).

For any other questions regarding your rights as a participant, general questions, or have complaints, concerns or issues you want to discuss with someone outside the research, call the CIUREC-Rec chairperson Dr. Samuel Kabwigu on (0779610100).

What are your rights as a participant?

Your participation will be entirely voluntary. You will receive a copy of the consent form if you like. Refusal to participate in this research study will not in any way result into any form of penalty or offence therefore feel free to or not participate. You are free to stop the interview or opt out of the research study project at any time without giving any reason and there will be no penalty for that.

Nature of compensation for participating in the study

Because this is an academic study and given the fact that the participants will be found at their places of residence (homes), the participants involved in this research study project will only receive a token of appreciation in form of 500g bar soap.

Sponsors of the study

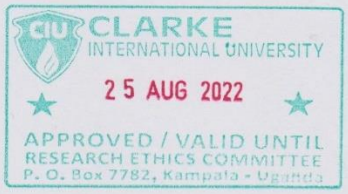
This research study project is entirely self-sponsored and there is no external sponsorship whatsoever from any organization or institution.

Feedback on the findings of the study

After the data collection process, a final report shall be produced and when approved by the academic institution, the findings shall be published in a free access science journal for free access to the community members. More still, a hard copy shall be availed to the respective division offices that make up Lugazi Municipality for community access.

Research approval

This research study project has been duly approved by Clarke International University Research Ethics Committee (CIUREC) and the approval number is CLARKE-2021-88 and the chairperson of the committee can be reached on 0779610100 for any questions.



Statement of Consent

Please tick the box below that best describes your assessment of understanding of the above informed consent document:

☐ I have read the above informed consent document and understand the information provided to me as regarding participation in the study plus benefits and risks. I give consent to take part in the study and will sign on the following page.

☐ I have read the above informed consent document, but still have questions about the study; therefore I don't give my full consent to take part in the study.

Name of the person taking part in the study

.....

Signature of person taking part in the study

.....

Thumb print of the person taking part in the study

.....

Name of Witness to the person taking part in the study

.....

Signature of the witness to the person taking part in the study

.....

Thumb print of the witness to the person taking part in the study

.....

Name of the person obtaining informed consent

.....

Signature of the person obtaining informed consent / Date

.....

CLARKE INTERNATIONAL UNIVERSITY
25 AUG 2022
APPROVED / VALID UNTIL
RESEARCH ETHICS COMMITTEE
P. O. Box 7782, Kampala - Uganda

Appendix N: Covid 19 Mitigation Plan

COVID 19 RISK MITIGATION PLAN FOR THE RESEARCH STUDY

Due to the outbreak of Covid 19 pandemic, numerous measures have been put forward to reduce the transmission from one person to another. As a result, this study will adopt standard operating procedures as per the ministry of health guidelines in the following ways;

1. **Use of Personal Protective Equipment for Corona Virus Disease Prevention**

Personal Protective Equipment will be made available to all members of the research team for use at all times while in the field. The PPE for Coronavirus disease will include gloves, medical/ surgical masks, goggles or face shield, gowns, aprons and medical grade gumboots. The use of PPE in the respective situations or risk categories will be tailored to the current guidelines of Ministry of Health.

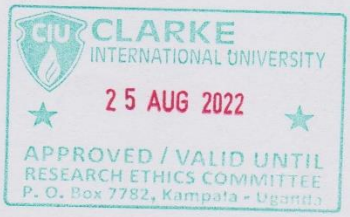
2. **Covid 19 Infection Control Measures at Recruitment stage of participants**

All persons meeting the requirements for recruitment into the study will have to first wash their hands with soap or hand sanitizer before any interaction with the research team.

Research participants and household members available at that time of recruitment and data collection will be screened with an infrared temperature gun in order to detect their body temperature. The main purpose will be to identify persons who fail this screening test and refer them immediately for further assessment at designated centers. The process will includes immediate isolation and referral of suspected cases with Corona Virus infection to prevent further transmission and optimize case management.

During the screening / examining research participants, the person in charge will have appropriate Personal Protective Equipment (PPE) including a medical mask, gloves, gown and eye protection (goggle or face shield) to protect themselves.

Persons identified to have temperature≥37.5 C or respiratory/flu-like symptoms and/ or history to an area with reported community transmission in the last 14 days before the onset of symptoms (suspected/probable case), once identified at the triage area shall be referred to MOH designated centers or District COVID-19 Taskforce teams.



3. **Identification, Isolation and Referral of Suspected Cases of Corona Virus Infection**

All Research team members will undergo a workshop so as to be familiar with the common signs and symptoms of Corona Virus Infection and the immediate precaution to take when a Corona Virus Infection is suspected.

Initial evaluations that will be done will include:

- Temperature screening for fever (Temperature≥37.5 Celsius).
- Additional findings of respiratory symptoms including a dry cough, sore throat, as well as general body symptoms of malaise.
- Any history of recent travel or contact with a person diagnosed with COVID infection or a person who has recent international travel.
- Any history of exposure to a patient with fever, of 37.5 degrees Celsius and above during the time of the COVID -19 outbreak.

4. **Physical Distancing**

A physical distance of a minimum of two (2) meters shall be ensured during research procedures and activities such as consenting, focus Group discussions and training to prevent person- to-person spread of the Corona Virus while conducting research activities. Online discussion will be used whenever possible as a mode of interaction.

No more than ten (10) people shall converge in one place to undertake research procedure. The research team will ensure at least two (2) square meters for each person. Research teams shall avoid hand-shakes and hugging at all times.

5. **Hand washing and Disinfection**

Hand washing is the most important precaution for the prevention of infections. The Research team and participants shall consistently wash their hands with soap and water or use a hand sanitizer throughout the interaction during recruitment and data collection processes.

Compiled the principal investigator of the study.
Zebosi Benon

CIU CLARKE INTERNATIONAL UNIVERSITY
25 AUG 2022
APPROVED / VALID UNTIL
RESEARCH ETHICS COMMITTEE
P. O. Box 7782, Kampala - Uganda

Appendix O: Estimated Study Budget

Activities	**Item description**	**Unit cost**	**Qty**	**Amount**
Travels	Transport costs			650,000
Administrative costs				550,000
Internet	Mobile internet		15 GB	50,000
Ream of ruled	Paper	18,000	06	108,000
Reams of duplicating paper				
Data entry and analysis				0
	Meals	4,000	10	400,000
	Allowances	20,000	10	200,000
Printing	Report compilation			50,000
	Printing			100,000
	Hard cover binding			50,000
Others				0
	Airtime	70,000		70,000
	Transport	300,000		300,000
	Miscellaneous	200,000		200,000
	Allowances for community leaders	500,000		500,000
		Total		**4,590,000**

Appendix P: Study Work Plan

Year	2020				2021								
Time line	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**
Proposal development													
Make correction as advised by the supervisor													
Submit to faculty and then graduate school													
Presentation @ IRB													
Obtain permission from IRB and NCHE													
Data collection tool testing for validity and reliability													
Data collection and entry													
Data analysis, interpretation, & discussion													
Presentation of findings, make corrections													
Second presentation after making corrections.													
Report Writing													
Printing													
Submission													