eHEALTH LITERACY AND NUTRITIONAL STATUS AMONG STUDENTS OF MOUNT KENYA UNIVERSITY IN THIKA, KIAMBU COUNTY, KENYA

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DECLARATION

APPROVAL

DECLARATION

I, Joyner Nanjulula Musombi, hereby declare that this thesis is my original work and has not been presented for award of any degree in any other university but Mount Kenya University.

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APPROVAL

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DEDICATION

I dedicated this body of work to my mother, sister, and the memory of my father. Your support has been the wind beneath my wings.

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LIST OF ABBREVIATIONS AND ACRONYMS

BMI - Body Mass Index

EDNP - Energy-dense nutrient poor

eHEALS - eHealth Literacy Scale

DHL - Digital Health Literacy

MKU - Mount Kenya University

NACOSTI – National Commission for Science Technology and Innovation

SSA – Sub-Saharan Africa

WHO - World Health Organization

ABSTRACT

About 30% of students in higher education institutions are overweight or obese, which raises concerns about the rising frequency of these conditions among young adults worldwide. One important aspect impacting lifestyle decisions, such as eating habits that impact nutritional status, is eHealth literacy. Although earlier study has shown a substantial correlation between eHealth literacy and the lifestyle choices of college students, there is still a dearth of studies in Sub-Saharan Africa, with no evaluations having been carried out in Kenya. The purpose of this study was to examine the association between the nutritional status of university students in Kiambu County, Kenya, their dietary practices, socioeconomic and demographic features, and their level of eHealth literacy. At Mount Kenya University, an institution-based analytical cross-sectional study was carried out. The university was chosen because of its metropolitan location and young adult population. Convenient sampling was used to enroll 423 participants in total. Body Mass Index (BMI) was used to quantify nutritional status, and eHealth literacy was tested using the eHealth Literacy Scale (eHEALS). A questionnaire given by the researcher was used to gather more information on the respondents' demographic and socioeconomic traits. Dietary diversity was examined in accordance with FAO criteria, and nutritional knowledge was evaluated using WHO dietary recommendations for a healthy BMI. To ascertain the connections between the independent variables; eHealth literacy, socioeconomic and demographic traits, dietary practices, and nutritional status data were examined using SPSS 25. Ethical considerations were rigorously observed throughout the study. The study found that most participants were male (57.9%), single (97.8%), and undergraduate students (67.2%) aged 18-22 years (71.8%). The mean eHealth literacy score was 29.12 (±4.121). Approximately 58% of participants demonstrated satisfactory nutrition knowledge. However, only 29.9% were classified as having a high eHealth literacy stage, based on a combination of eHEALS scores and nutrition knowledge assessment results. The mean BMI was 22.15 kg/m², with 73.9% of participants falling within the normal BMI range. The prevalence of underweight, overweight, and obesity was 7.4%, 17.0%, and 1.7%, respectively. Only 20.3% of the study population met the recommended meal frequency i.e., three main meals and two to three snacks daily. In this study, no significant relationship between eHealth literacy and nutritional status was established ($x^2 = 0.021$; CI 95%; $p = 0.885$). The study found that socio-economic and demographic characteristics have an influence on nutritional status as sex was observed in this study to influence the nutritional status of the participants. Male students were more likely than female students to have a normal BMI (Male; OR = 1.47; CI 95% (0.949 – 2.278); $p = 0.085$, AOR = 1.622; CI 95% (1.000 - 2.631); $p = 0.050$). A significant relationship between dietary practices and nutritional status was not found in this study ($x^2 = 0.028$; CI 95%; $p = 0.964$). The findings may be used to guide gender-specific nutrition interventions for university students.

CHAPTER ONE: INTRODUCTION

1.1 Study Background

Health literacy is a crucial health promotion component including the overweight and obesity management which are key indicators of nutritional status (Truman *et al.,* 2019). As the internet is becoming a widely spread media used in communication in healthcare, eHealth literacy has become a key component in health literacy of various populations. A study by Kemp (2022) showed that 92.1% of the 4.95 billion internet users accessed the internet using their mobile phones. In addition to this, Rawal (2021) indicated that the Google search engine queries contributed to 7.0% of the total searches on the web. Health habits including dietary practices are influenced by the health literacy of people and continue into adulthood impacting the nutritional status and productivity of populations (Ayaz-Alkaya & Kulakçı-Altıntaş, 2021).

Nowadays, persons worldwide are increasingly more likely to have poor nutritional status, manifested by high Body Mass Index (BMI) levels, overweight, and obesity. (World Health Organization, 2021). High BMI status, a predictor of chronic diseases like musculoskeletal disorders such as osteoarthritis, cardiovascular diseases, and some cancers, is steadily morphing into a monstrous public health challenge (World Health Organization, 2021). It was reported that by 2016, the global population that was overweight was 39.0% and over 650 million adults i.e., 13.0% were obese (WHO, 2021). Owobi *et al*., (2022) highlighted that by 2016, 429 million adults in Africa were reported to fall into the overweight and obese category. In Kenya, women are more likely than males to have a high BMI status, with 20.5% of adults being overweight and 9.1% being classified as obese as observed by Mkuu *et al.,* (2018).

Young adults have been observed to be getting increasingly overweight over the years. Globally, about 30.0% of the population attending higher education institutions are classified as being overweight or obese (Telleria-Aramburu & Arroyo-Izaga, 2022). In Sub-Sharan Africa, university student population is being observed to be gaining notoriety of obesity rates. For example, the obesity prevalence in this population in Nigeria is approximated at about 10.0%, while in Botswana, it is about 36.8% and about 25.3 -59.4 % in Egypt (Rotich *et al.,* 2023). Rotich *et al.,* (2023) estimated that 19.6% of students attending universities in Kenya are obese with the distribution being heavily

skewed towards female students as compared to their male counterparts. Mbugua *et al*., (2017) research on the elements of metabolic syndrome among college students at a single Kenyan university revealed that some students had unhealthy eating patterns, and a fraction of these were classified as having high BMIs. According to that very investigation, it was brought to light that the probability was higher that female students were overweight or obese when a comparison was drawn with males which aligned with other studies done in Botswana and the United States of America (Tapera *et al.,* 2017; Yang *et al.,* 2019).

Health literacy is a major component in the weight management of individuals with eHealth literacy gaining strides in this aspect of health promotion. Among educated populations, healthier lifestyles are observed in those who have a high levels of digital health literacy in comparison with those who had lower eHealth literacy levels (Suka *et al.,* 2015). The independent food choices which eventually govern nutritional statuses of university students are usually based on factors such as student finances, social influence, and university characteristics. These factors may influence poor dietary or lifestyle choices among students which may consequently result in poor nutritional status indicated by high BMI status (el Ansari *et al.,* 2015). Globally, unhealthy choices seem to characterize the food consumption habits and dietary intake of higher education student populations; a population exposed to a multitude of health interventions across the digital landscape. These choices negatively impact their long-term health if they are not prevented and stopped early in the formative stages of the university student's life. Therefore, this study undertook the exploration of the eHealth literacy and the nutritional status of students attending university in Kenya.

1.2 Problem Statement

The global prevalence of overweight and obesity among university students is rising steadily posing an economical threat to developing countries that are already bearing the burdens of undernutrition as the quality of life of the future workforce is getting compromised. University student life is majorly marked by the transition from dependency on parents and other guardians for decision making including their daily meals to the students having to make independent decisions in an environment where free time is readily available and new community networks. In light of these changes, university students find it more difficult to maintain good lifestyle choices, which is

linked to their deteriorating health. Tsukahara *et al*., (2020) discovered that harmful behaviors that university students are more likely to adopt than those of other age groups typically persist throughout their post-university lives. Improving the nutritional status of the expanding number of adults with tertiary education in SSA requires an understanding of the region's eHealth Literacy level. Health literacy has been shown to be influential on the nutritional status of populations and gaining insight on how this would be in the context of a digitized world has become a necessity as more and more information is being shared on digital platforms and within seconds of a simple click of a button. The widespread reach of internet access has availed plenty of information that was less accessible in the past. Distinctly, there is now more nutrition information available on the web than before. Yang *et al*., (2019) highlight that with health information being easily obtainable on the web, a medium accessed exceedingly by younger populations such as university students, specific skills are needed to search, understand, appraise, and correctly implement the information gathered. eHealth literacy, which is the skill required for the search, appraisal and use of health information, the web has been positively correlated with lifestyle habits of educated populations. However, fewer studies have been done in developing nations and only few have focused on the nutritional status of educated populations despite having reports citing that health literacy does influence health status of individuals (Hashim *et al*., 2020).

While it is assumed that there exists a positive association between health literacy degree and an individual's nutritional status, research on eHealth Literacy and nutritional status have scarcely been conducted in developing nations. Majority of the studies on the correlation between eHealth Literacy and nutritional status have been done among large cohorts that have been situated in developed countries. These studies have presented a case for the need to improve certain facets of eHealth Literacy to improve nutritional status of university students. Furthermore, scant studies on this association have been done in Africa and have been focused on specific groups among university students, for example among students of human sciences or healthcare practitioners. By examining the relationship between eHealth Literacy and the nutritional status of students at Mount Kenya University in Thika, Kiambu County, Kenya, as well as more thoroughly examining other relationships with other important factors, such as socioeconomic and demographic characteristics and dietary practices, this study aims to help close the knowledge gap in Kenya.

1.3 Broad Objective

To establish the eHealth Literacy and nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya.

1.4 Specific Study Objectives

1. To establish the eHealth Literacy associated with the nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya.
2. To assess the nutritional status of students of Mount Kenya University, in Thika, Kiambu County, Kenya.
3. To determine the socio-economic and demographic characteristics associated with the nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya
4. To assess the influence of dietary practices on the nutritional status of Mount Kenya University students in Thika, Kiambu County, Kenya.

1.5 Study Hypotheses

H_{01}: There is no significant association between the eHealth Literacy and nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya.

H_{02}: There is no significant association between the socio-economic and demographic characteristics and the nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya.

H_{03}: There is no significant association between the dietary practices and the nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya.

1.6 Justification

The university student population is showing a trend towards high BMI status globally, regionally, and nationally, an indicator of poor nutritional status. The food environment around university settings in urban and locations adjacent to these urban areas is evolving to make energy-dense nutrient poor foods (EDNP) more available and accessible to young adults joining the university student populations. Most of these students are just beginning to make independent choices regarding their diet, health and lifestyles and are therefore prone to making poor health and lifestyle choices contributing to the prevalence of high BMI status. It is recognized that high BMI status raises the chance of developing

chronic illnesses in individuals whose consequences affect the quality of life, shorten life expectancy, and negatively impacts the productivity of a country's economy.

As health literacy impacts dietary practices, it was imperative to monitor the level at which this factor influences the nutritional status of university students especially, amidst the wealth of health material on internet enabled sources at their disposal which often highlight the positive health outcomes of proper nutrition. There was, therefore, a need to have an initial evaluation of where university students in Kenya rank when eHealth Literacy is concerned and to highlight gaps and opportunities to use technology in solving public health promotion challenges as the internet increasingly becomes a favoured health information source. The study findings provide valuable insights into eHealth literacy, dietary practices, and nutritional status among university students in resource-limited countries. These insights can inform policies and nutrition interventions aimed at promoting healthy lifestyles and improving weight management in the SSA region. By improving well-being, guaranteeing access to wholesome food, lowering healthcare expenses, boosting productivity, and promoting economic prosperity, the study also helps meet Sustainable Development Goals (SDGs) 1 (No Poverty) and 2 (Zero Hunger) (Martin, 2023).

1.7 Significance of Study

The increasing number of students getting into higher education institutions creates an appropriate setting and an opportunity to target and educate young adults on the prevention of poor dietary health-related outcomes in the adult population. The findings of the study are profitable for raising awareness of university students on their nutritional status and the importance of factors influencing their dietary practices. This study also contributed to gaining insight into eHealth Literacy, dietary practices and nutrition knowledge of university students that can be used by university administration and relevant stakeholders in informing interventions for health communication interventions among university student populations. Nutritionists may find information instrumental for use in developing objective behavioural modification targets for clients they serve who fall in this category. Lastly, the results of the study benefit academic and research communities studying the health of educated populations.

1.8 Scope of the Study

A cross-sectional analytical research design with an institutional foundation was used. Study participants were interviewed by the researcher and fieldwork assistants using questionnaires that the researcher had given them. The primary emphasis of this study was on the relationship between the nutritional status of university students at Mount Kenya University in Thika, Kiambu County, Kenya, and their eHealth literacy. The socioeconomic and demographic traits of the students as well as their dietary practices during the research period were also revealed by this investigation. The study, which lasted one month, focused on university students enrolled in Mount Kenya University's Main Campus, located in Kiambu County, Kenya, as the available population.

1.9 Study Limitations

As data on dietary practices and intake was gathered through researcher-administered questionnaires, there was likelihood of the true quality of the results being affected by recall bias . This was mitigated through giving clear instructions to the study participants and having the data collected based on their current environment. Confounding variables such as access to resources and dietary habits might influence study outcomes making it challenging to distinguish generalizable trends.

1.10 Delimitations

In the study we ensured that only study participants who met the criteria of age and health status were selected from the accessible population of students currently attending the main campus of Mount Kenya in Thika, Kiambu County, Kenya. The study focused within the limits specified by objectives assessing the eHealth Literacy, nutritional status, socio-economic and demographic characteristics, and dietary practices of study subjects.

1.11 Assumptions of the Study

1. There were no significant changes in dietary behaviours and practices of the students during the study duration.

1.12 Operational Definition of Key Terms

Dietary practices – Habits observed in university students that cover their meal frequency, food choices and food purchasing habits.

eHealth Literacy – The competence of a person to search, locate, comprehend, and evaluate health content specific to nutrition on the internet, or web, and put into application this gained knowledge to solve nutritional challenge.

Nutritional status – The state of a person's body influenced by their nutritional intake and identified as body mass index.

Nutritional knowledge – Awareness of the notions and actions that are associated with health and nutrition including diet, health and disease, dietary guidance, and dietary recommendations.

Socio-economic and demographic characteristics – Social and economic standing of an individual as characterized by their age, degree, income level, sex, and university major.

CHAPTER TWO: LITERATURE REVIEW

2.1 Overview of Literature Review

Kariba (2021) highlights that nearly 60.0% of Africa's total population constitutes below 25 years of age, with 226 million youth aged 15-24 living in the continent. It has been projected that in Africa, by 2030, the population of youth will have risen by 42.0% with many of them likely to migrate to urban human settlements to find gainful economic ventures (UN DESA, 2015). There is a shift in the food environment and dietary practices of populations in Africa towards unhealthy foods that are highly refined and rich on fat and in sugar because of the rapid urbanization occurring in the continent (Herrick & Reubi (2021), Holdsworth *et al.,* (2020).

Laar, (2021) acknowledged that there is increased availability of unhealthy foods alongside the laxity of African governments to disincentivize unhealthy foods. As a result of this, there is an observed increase in the prevalence of metabolic conditions alongside the bull-headed challenge of undernutrition (Holdsworth & Landais 2019). The transition into young adulthood is correlated with increasing independence and is often a period where unhealthy lifestyle habits are picked by young people who could assume long-lasting dietary behaviour habits. With these developmental changes, the population projections, and the consumption of diets of inferior quality steadily increasing globally in mind, this creates an opportunity to target youth for emerging interventions and policies to influence the improvement of nutritional status through dietary practices which are interlinked with the concept of eHealth Literacy.

2.2 Empirical literature

2.2.1 eHealth Literacy

People with greater levels of eHealth literacy in educated populations tend to lead healthier lifestyles than people with lower levels of eHealth literacy (Suka *et al.,* 2015). People possessing high levels of health literacy are observed to make better food choices, have diets of higher nutrient quality (Cha *et al.,* 2014) and lower consumption of high energy dense foods and sweetened drinks (Zoellner *et al.,* 2011). The internet is fast becoming a source with copious amounts of information on health and healthcare. Consequently, individuals require going beyond being literate in health and further into

having the skillset and the inspiration to locate and evaluate health information that is accessible online.

With health information being increasingly available on the web, a medium accessed exceedingly by younger populations, specific skills are needed to search, understand, appraise, and correctly implement the information gathered (Yang *et al.,* 2019). The internet is steadily turning into the first point of search for health information, it is crucial that if its users are going to have positive health outcomes, that they can sift and filter through the data because it is of varying quality. The ability to do this is referred to as eHealth Literacy. The term was developed from the term "Health Literacy" in 2006 by two scientists Cameron D Norman and Harvey A Skinner (Zrubka *et al*., 2019). According to Britt *et al.,* (2017) the two scientists describe eHealth Literacy as "the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem.". The eHealth Literacy scale (eHEALS), which consists of eight items, was created "to assess the skill of eHealth consumers to find, appraise and use health information from internet sources to answer health related questions." (Norman & Skinner, 2006). The instrument that has been exhibited considerable validity and reliability is used to evaluate six primary skills i.e., "traditional literacy, information literacy, media literacy, computer literacy, health literacy, and scientific literacy." (Norman & Skinner, 2006). Since then, the assessment tool has been translated from English to several languages and modified in different studies and contexts where the researchers have found significantly similar results that the effective utilization of online health material by individuals increases with their eHealth Literacy level (Yang *et al.,* 2019).

Advances in information technologies have had an immense impact of delivery of health care because seeking health information online has increased in popularity. In January 2022, globally, there were a total of 4.95 billion internet users and mobile phones have been utilized by 92.1% of internet users for connecting to the internet (Kemp, 2022). On the prominent internet search engine Google, 7.0% of the searches done are related to health topics (Rawal, 2021). In Kenya, the mobile phone penetration among adults is at 98.0%, with 96.0% of those who use it for the internet, 43.0% doing this on smartphones rather than computers. Social media access is reportedly at 49.0% and most of the users do this on smartphones (Kharono *et al.,* 2022). Nutritional knowledge of university

students will often influence the application of health information accessed and consequently the nutrition outcomes that follow. Researchers have shown that plenty of university students have limited awareness of nutrient requirements and for those with the awareness, factors such as time, convenience and pricing take precedence in food choices that they make (Abraham *et al.,* 2018). An investigation with curiosity can therefore be pursued highlighting the finding that diet quality is not always positively correlated with an elevated level of nutritional understanding. For instance, Abraham *et al.,* (2018) highlights that while students were cognizant of the health threats associated with high consumption of fast meals (89.3%), their consumption was relatively high (65.3%). This trend is seen in similar studies on processed food intake among university students who were aware of the negative outcomes on their health from consuming these foods (M=3.15, SD=0.64) and still consumed these foods at high amounts (M=2.72, SD=0.66) (Abraham *et al.,* 2018). The student compliance to healthy diets such as the Mediterranean diet compliance is low despite them taking courses and receiving lectures on this diet (Antonopoulou *et al.,* 2019).

Research indicates that education status has a pertinent impact on the equity and impact of health interventions with the access and correct utilization of information being key in the success of mhealth interventions in the country (Kharono *et al.,* 2022). While a positive association one's level education and health literacy, investigation aimed to unearth the relationship eHealth Literacy and nutritional status of university students in this part of the world.

2.2.2 Nutritional Status

University students' nutritional state has a significant impact on their ability to maintain mental equilibrium, do well academically, and maintain good health as adults (Antonopoulou *et al.,* 2019). Studies show that often university students have a normal BMI than raised BMI. In a study done in Ghana 54.0% of study participants had normal BMI and 20.4% were overweight (AgyarkwaaOti & Eshun, 2020). The results were comparatively like that was like that done in Nigeria where 70.5% of the students had normal BMI and 14.5% were overweight (Omage & Omuemu, 2018). However, most of these students possess dismal dietary practices including low fruit and vegetable intake (β= -0.160, p=0.003), missing meals (β= -0.294, p=0.001), high intake of energy dense foods (β= 0.445, p=0.000) and carbonated sugary drinks (β= -0.231, p=0.002) which are

significant contributors to high BMI states (AgyarkwaaOti & Eshun, 2020). Time and again, a high intake of EDNP foods and beverages by young adults has been correlated with excess weight gain and obesity. These foods are high in nutritive fats and sugars, are packed in large serving sizes, are low in nutrient quality and are cheaper than healthier foods. This makes the consumption of high-cost energy-foods attractive to university students who are on a tight upkeep-budget because of the subjective cost convenience (Deliens *et al.,* 2014). The overconsumption of these foods contributes to obesity and associated metabolic conditions in the long term because of the reduced productivity attributed with non-communicable diseases which affects the quality of the workforce available thus stunting economic growth (Weiss, 2012).

Research shows that the likelihood of seeking health services is high in those who record high eHealth Literacy perception (Luo *et al.,* 2018) and have healthy dietary behaviours (Huang *et al.,* 2020) which are related to healthy nutritional status. While this is true, little is known about the case in Africa as most of the studies are done in Asian and Western countries. This investigation looked at the relationship between eHealth Literacy and nutritional status of university students attending an institution in Sub-Saharan Africa.

2.2.3 Socio-economic and Demographic Characteristics

2.2.3.1 Socio-economic characteristics

While university students may have newfound freedom and opportunity to exercise their independence, the extent to which they can do this is determined by limited budgets as they are still heavily financially reliant on their parents or donors (Deliens *et al.,* (2014); Manwa, 2013). Evidently, socio-economic characteristics of students have been established to be great determinants of their advantage or otherwise. A study by Lutfiu and Hoxha (2024) established that socio-economic status of students determines their access to resources such as technology and thus students of higher social economic backgrounds tend to have access to comforts or tools that their counterparts may not have. Socio-economic clusters created by students of similar socio-economic backgrounds may also dictate how they share information with each other, this is because similar social classes often associate much closer with each other (Lutfiu & Hoxha, 2024). Students from lower social economic backgrounds may lack the ability to access information from the internet, as data bundles or wifi connectivity is an impossible reach

for them (Dube, 2020). Similarly, the health and nutritional status of students can be determined by their buying power which stems from their socio-economic status (Lutfiu & Hoxha, 2024). Szczuko, M. *et al*. (2014), also denote in their study that economic status of university students affects the frequency of meals as well as the choice of food or options predisposed to them. Social factors such as their ethnic background may also affect their choice of meals as this is often fashioned by dietary habits fashioned at home that eventually become carried along when they go to university. Social and economic factors clearly customize a university students' decisions when it comes to factors such as dietary practices, access to information in relation to what they eat as well as what they can purchase for meals among other factors. These factors vary from one population to the other and are therefore key to investigating.

2.2.3.2 Demographic Characteristics

The female sex, studying non-health related degree major and lower income are some of the factors associated with high BMI statuses. The university major that a student takes looks to be influential in their dietary practices and therefore their nutrition outcomes. Students in health majors have better perceptions and cognitive behaviours related to health behaviours than their counterparts in non-health majors (Hsu *et al.,* 2014). This is corroborated by similar studies in South Korea where university students in the food and nutrition department were most likely to consume low amounts of fatty foods while have a higher inclination towards the consumption of foods from the fruit and vegetable food group in comparison to their counterparts in literature and science departments (el Ansari *et al.,* 2015). In a study by Szczuko, M. *et al*., (2014), According to a study conducted by Szczuko, M. et al. (2014), there is a bias related to gender in the application of nutritional knowledge. It emerged that women were more likely to alter their diets than men who had the same access to nutritional information.

Demographic and socioeconomic traits are significant indicators of eHealth literacy. University students' socioeconomic status and demographic traits have been connected to the prevalence of poor nutritional outcomes. (Zurita-Ortega *et al.,* (2018); Estacio *et al.,* (2017). The research sought to fill in the gaps on how the nuances in the different variables of age, sex, income level and university major are key factors influencing nutritional status of university students in Sub-Saharan Africa.

2.2.4 Dietary practices

Weight gain among university going students can be attributed to poor dietary practices. Their independent food choices are hinged on their nutritional knowledge, financial aspects, social circles, and university eating environment, university characteristics and availability of fast food (el Ansari *et al.,* 2015). It was observed that the likeliness of women adhering to dietary guidelines relating to cold cuts of meat, canned foods and for most food items considered to be healthy ($p \leq 0.01$) is higher in comparison to men. This is also mirrored in a different study that highlighted that most female university students were more likely to attempt to diet or workout to lose weight compared to the male students (Szczuko, M. *et al*., 2014). Yang *et al.,* (2019) highlighted dietary practices as actions taken by individuals that "including consumer health, balanced diet, regular eating habits, and unhealthy food intake, can be viewed as positive or negative actions in relation to maintaining or enhancing health.". Food choice, habits and taste are established at an early age, and this is often governed by the parental and learning environments that those in the youngest age groups belong to (Nicklas *et al.,* 2009). The transition from being under the care of parents to being solely responsible for one's food choices is one that university students have an opportunity to make alongside other lifestyle changes such as the exposure to alcohol (Marquis, 2005). Al-Rethaiaa *et al.,* (2010) emphasize that adolescents who go on to join universities find themselves in a place where they have full freedom to make food choices at a time and in an environment that is recognized to be the point of emergence of unhealthy behaviours. Mbugua *et al.,* (2017) reported that association between dietary practices and metabolic conditions in students is statistically significant i.e., dietary practices predictors of metabolic conditions developing. In the study only 13.3% of the study population had a good nutritional intake and 32.0% of the same population did not have an awareness of their daily caloric consumption. This is in tow with the observation in United States of America where university students had a copious consumption of unhealthy food and low consumption of foods considered to be in the food group fruit and vegetables (Yang *et al.,* 2019). In the study, female students were also observed to have high BMI states in comparison with male student which corroborated similar studies by in Botswana (Tapera *et al.,* 2017).

While it is shown that newfound independence will influence adoption of healthy behaviours, little is highlighted by the current situation concerning university students in

SSA. Therefore, an investigation into what the current dietary practices of university students in this institution are and the impact might have on nutritional status even as studies continue to recommend targeted health education interventions for university students.

2.2.5 Summary and Gaps

Most existing studies on eHealth literacy and nutritional status have been conducted in Western and Asian contexts, leading to a gap in understanding how these factors play out in SSA universities. There is a need for region-specific research to account for cultural, economic, and infrastructural differences that may influence nutrition outcomes and access to digital health information. While studies establish that higher eHealth literacy correlates with better dietary choices, specific evidence from SSA populations is scarce. There is little exploration into how students in SSA universities navigate digital health resources, including challenges such as misinformation, limited internet access, and digital literacy levels. The review discusses SES and gender influences on dietary behaviors but does not deeply examine how these factors impact eHealth literacy and its effectiveness. There is a need to explore whether students experience different challenges in accessing and utilizing online health information.

2.3 Theoretical Framework

The study was founded on two models, i.e., the eHealth Literacy Framework (eHLF) and The Transtheoretical Model.

2.3.1 The eHealth Literacy Framework

Developed by Norgaard *et al*., (2015), this framework conceptualizes eHealth literacy as a multidimensional construct with seven key domains, including knowledge, trust, and motivation in using digital health resources.

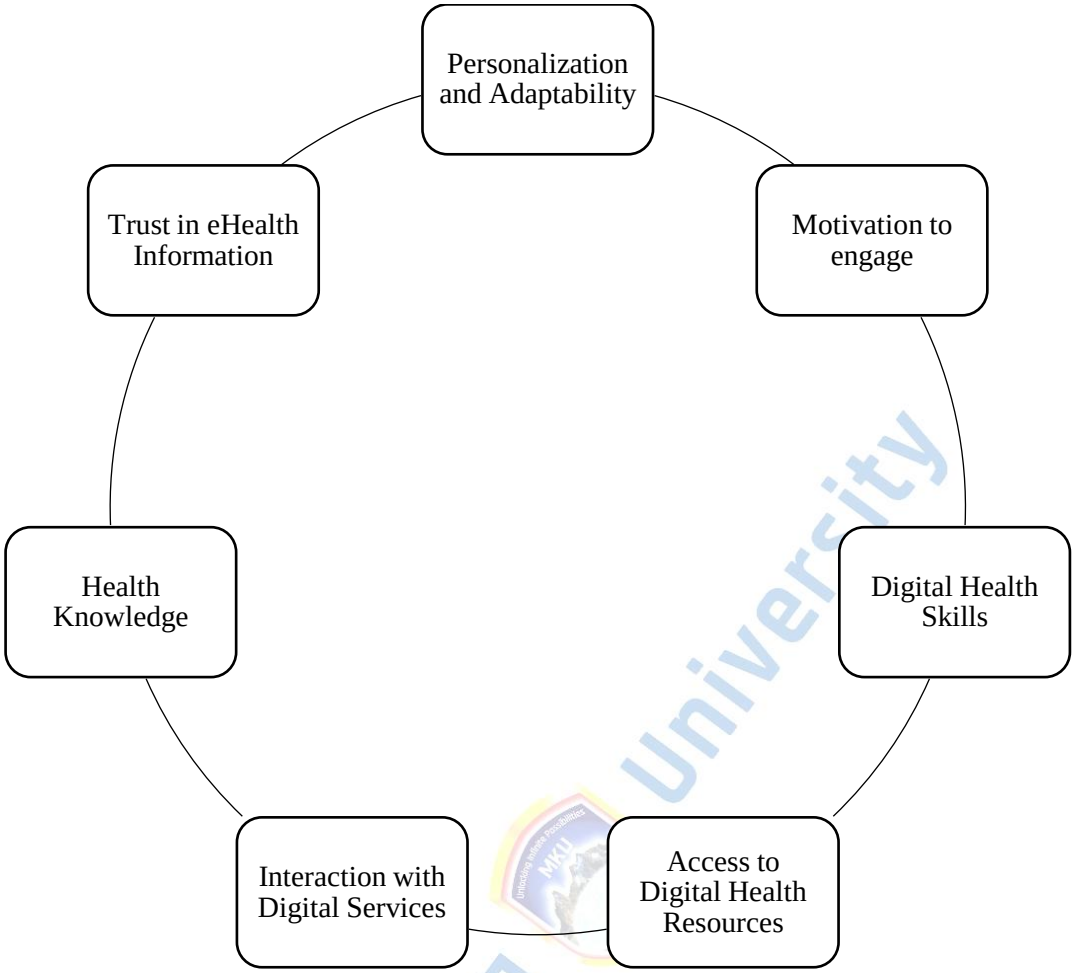

Figure 1. eHealth Literacy Framework Model of eHealth Literacy

This framework assesses students' confidence in using digital health tools (e.g., nutrition apps, websites) and determine whether students can apply what they learn digitally to improve their diet and health. It may also be useful for exploring barriers to accessing and trusting online nutrition information

2.3.2 The Transtheoretical Model

James O. Prochaska and Carlo Di Clemente created the transtheoretical behavioral model in the 1970s while investigating smokers' experiences in order to discover why some quit on their own while others do not (Raihan & Cogburn, 2023). The studies discovered that that people quit smoking were highly dependent on their readiness to make the change. As a result, the Transtheoretical Model (TTM) is a model of deliberate behavioral change that emphasizes individual decision-making on the presumption that the change is habitual (Raihan & Cogburn, 2023). The Transtheoretical Model postulates that change

is a six-stage cyclic process i.e., pre-contemplation, contemplation, determination, action, maintenance, and termination.

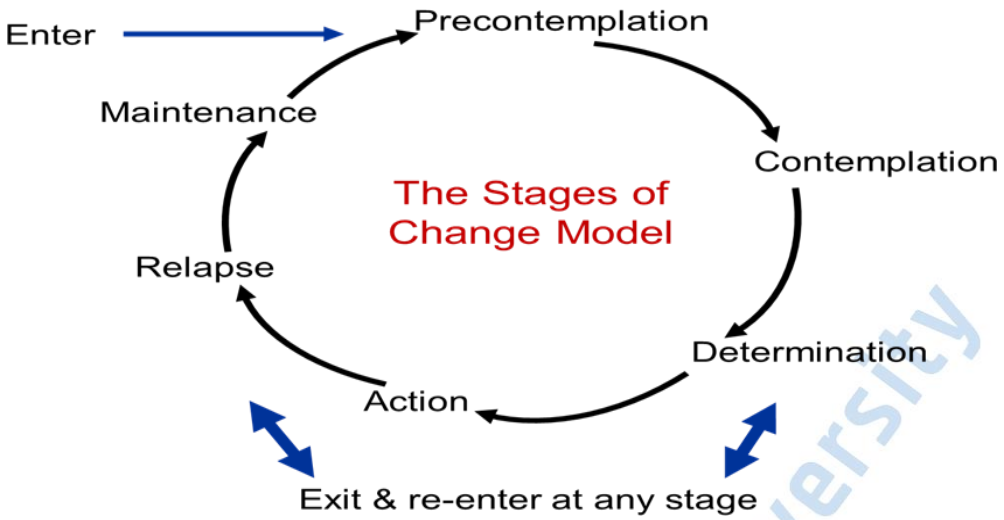

Figure 2. The Transtheoretical Model of Behaviour Change

2.3.3 Integration of eHealth Literacy Framework and The Transtheoretical Model

The eHealth Literacy Framework breaks eHealth literacy into seven dimensions, including knowledge, motivation, access to technology, trust in online information, and ability to apply knowledge in real life. which is useful for the targeting of specific points of the Transtheoretical model where individuals seek nutritional knowledge to understand and improve their dietary practices for better nutritional status. Figure 3 shows the relationship of the two models used in producing the framework for this study. These two models were used to uncover university students' eHealth literacy and to demonstrate how it influences health behaviors that affect the research population's nutritional status.

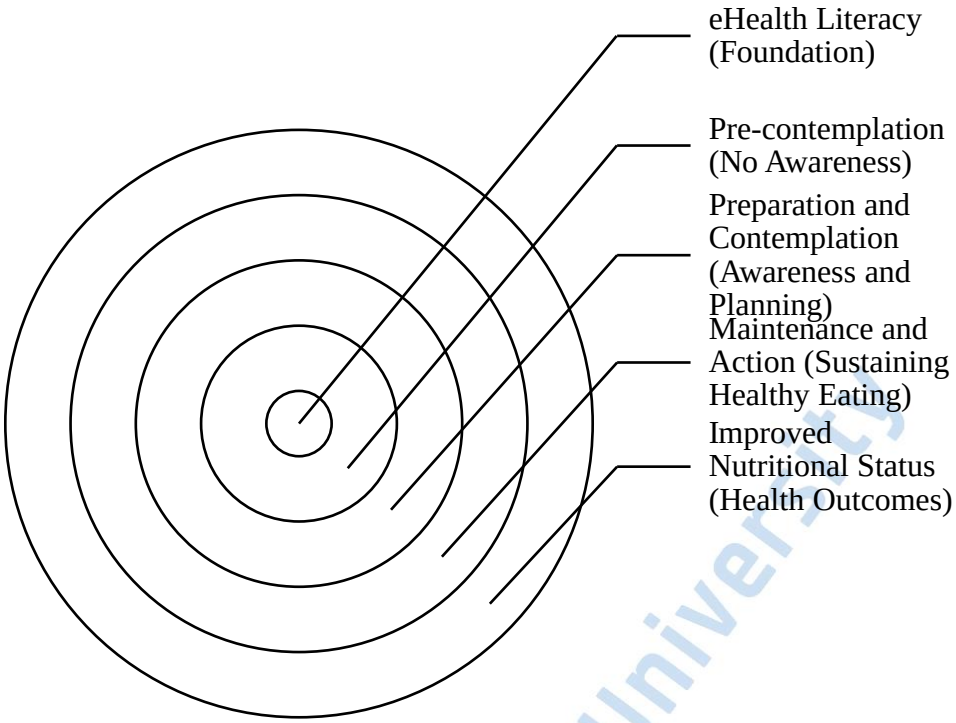

Figure 3. Theoretical Framework

2.4 Conceptual Framework

The study examined the relationship between eHealth Literacy and nutritional status among Mount Kenya University students in Thika, Kiambu County, Kenya, using the eHealth Literacy Framework and the Transtheoretical model. The independent variable was the eHealth Literacy of the university students. The university students' nutritional status was the dependent variable. The intervening variable highlighted the policies governing the execution of healthcare services and the utilization of Information, Communications and Technology in Kenya.

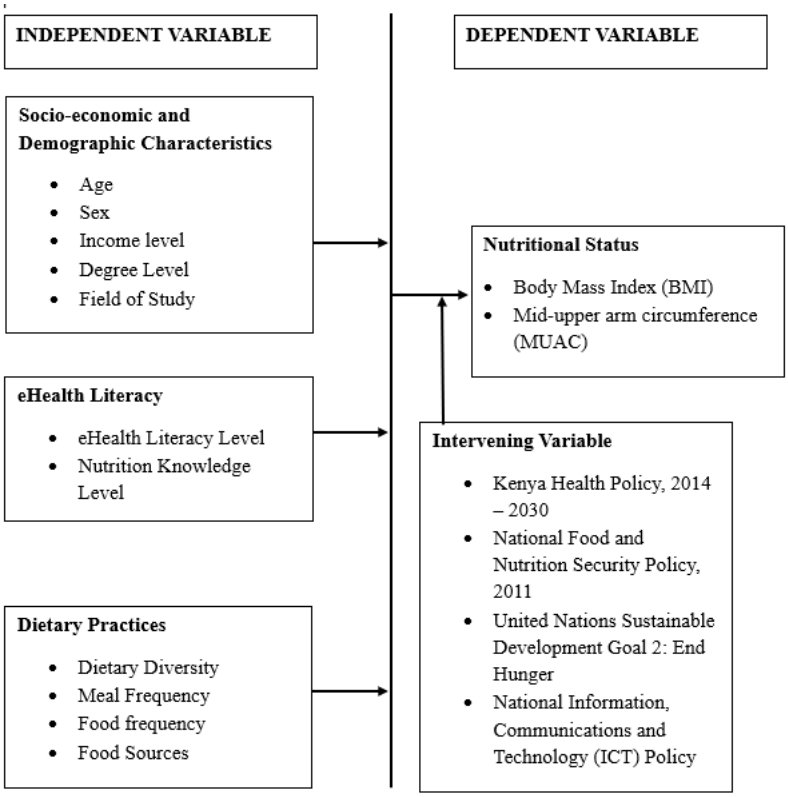

Figure 4. Conceptual Framework

Source: Author, 2024

2.5 Recap of Literature Review

The worldwide trend among university students pertaining to their dietary practices is that they have poor dietary choices putting them at risk of poor nutritional status. Research shows that among adults with high levels of education, individuals with a favorable level of eHealth Literacy are far more inclined to seek healthcare. They also have greater chances to follow appropriate food habits, which are linked to good nutritional status. While this is true, little is known about the case of university students in resource-poor settings in Sub-Saharan Africa. This study sought to explore the association between eHealth Literacy, dietary practices, socio-economic and demographic characteristics, and the nutritional status of university students attending an African country. Consequently, it was imperative to study the association between eHealth literacy and nutritional status to gather insights that would guide the development and roll-out of eHealth promotion interventions targeted to lower the burden of nutrition related chronic diseases in the early stages of adulthood.

CHAPTER THREE: RESEARCH METHODOLOGY

In chapter three we depict methodologies that were utilized in the study to give a framework for the specific relationship among the study variables. It will cover the study population, sampling methodology, data gathering methodologies and data analysis methods.

3.1 Research Design

An institution-based cross-sectional analytical methodology was utilized to investigate eHealth literacy and nutrition status among Mount Kenya University students in Thika, Kiambu County, Kenya. Various diversified approaches of data collecting were used. To gather baseline data, we used the design to examine different variables that influence the relationship between eHealth Literacy and nutritional status among university students. To collect quantitative and qualitative data, research assistants administered semi-structured questionnaires.

3.2 Study Variables

The independent variables were eHealth Literacy, dietary practices and socio-economic and demographic characteristics which included age, school, university level, marital status, school, sex, income, and year of study. eHealth Literacy covered eHealth Literacy level and nutrition knowledge assessment on dietary recommendations to develop eHealth Literacy staging for the study. Dietary practices covered variations in diet, meal frequency, food frequency and source of food. The investigation's dependent variable was the participants' nutritional status, namely their BMI and MUAC status.

3.3 Study Area

Mount Kenya University Main Campus in Kenya (1°02'44.0"S, 37°04'54.0"E) situated along General Kago Road, within the area of Thika Town, in Kiambu County was the study site. Globally, urban settings in the Global South are experiencing shifting food environments with more EDNP foods finding their way into the market. This in addition to more sedentary lifestyles particularly among the youth whom the university students happen to have significantly contributes to a peak in high BMI states in populations found in these settings. Universities are widely perceived and expected to be centres where individuals gain knowledge and skills to improve the society (Pradeilles *et al.,* 2021).

Because of the county being a rapidly developing urban setting that hosts numerous universities, it made it an ideal setting to conduct the study.

Thika town lies on a gentle plain before the climb into the central highlands and is encompassed by two rivers, Chania and Thika, to the north and west which have waterfalls that converge on the northwestern edge of Thika (*See Appendix. III*). As of 2019, Thika town had a population of approximately 280,000 people. Thika town, the administrative centre of Kiambu county, is an industrial town and major commerce hub. The town hosts major companies: Bidco oil refineries which is a leading marketer in East Africa for edible oils, soaps, and detergents. It also hosts Del monte Pineapples, a top producer of prepared fruit and vegetables and products of the same in Africa, Europe, and the Middle East.

Thika hosts nearly twenty tertiary education institutions universities which include but not limited to Mount Kenya University, Umma University, Gretsa University, and NIBS Technical College. Some of the healthcare facilities in Thika include Thika Level 5 Hospital, Avenue Healthcare Hospital, Mount Sinai Private Hospital, Central Memorial Hospital and Bliss Medical Centre to name a few.

Herein lay an opportunity to unearth and understand the factors affecting the eHealth Literacy and nutritional status of a cohort with great digital exposure to digital health material. This was with the intention to develop interventions that will support the health of university students beyond their years in school and further into the communities they serve or will belong to in the future to improve nutrition related health outcomes.

3.4 Study Population

3.4.1 Target Population

Students attending Mount Kenya University in Thika, Kiambu County, Kenya were targeted for this study. The students in this county have characteristics that reflect universities in rapidly growing urban settings with a cosmopolitan mix of students from different countries and socio- economic levels.

3.4.2 Accessible Population

This population for the study was obtained from among students attending classes at the Mount Kenya University campus situated in Thika, Kiambu County, Kenya which is the main campus of this university institution.

3.4.3 Inclusion and Exclusion Criteria

3.4.3.1 Inclusion Criteria

Only university students without underlying health conditions whose age fell between 18 to 35 years who were attending classes at Mount Kenya University, Main Campus, Thika were included.

3.4.3.2. Exclusion Criteria

Those excluded from the students were All university students between the ages of 18-35 years who were;

1. Critically ill.
2. Have family history or have been underlying genetic conditions affecting their weight and height.
3. Eligible and do not consent to participate

3.5 Sampling Techniques

3.5.1 Sample Size Determination

During the research, the respondents were selected from those who are attending classes at Mount Kenya University, Thika prior to our research activities.

The quantitative sample was identified by following the method of Fisher *et al.,* (1998).

$$n = Z^2P(1-P)/d^2$$

Where:

n = sample size (study population greater than 10,000)

Z = standard deviation for normal distribution (95% Confidence, 1.96 standard deviation)

P = proportion of selected population approximated to bear pre-decided characteristics. As this is unknow we set it at 50% = 0.5

d = sampling error (0.05)

Hence

$n = 1.96^2 \times 0.5 \times (1 - 0.5) / (0.05)^2$

The study had a 10% buffer to cover for any respondents that may fall off which was added to give a total sample of 423.

= 10% x 384 = 38.4 384 +38.4 = 422.4 = 423

3.5.2 Sampling Technique

Mount Kenya University was sampled purposely to be the study area as it serves a large population of students from different economic backgrounds. The main campus in a major commerce hub is undergoing rapid changes in its food environment. It is located within the municipality hence its strategic location made it easily accessible to the students from within and from the neighbouring counties.

Participants were chosen from all twelve schools on campus using easy sampling, resulting in a total of 423 interviews. The researcher chose students who were taking classes at Mount Kenya University's main campus. They met the inclusion criteria and agreed to participate in the survey. The researcher approached students in several areas across campus and explained the study. Participants who agreed to participate signed a consent form. Their weight and height measurements were taken, and a short questionnaire on socio-economic and demographic factors, eHealth literacy, nutrition knowledge, individual dietary diversity, and dietary practices, is administered.

3.6 Data Collection Tools

3.6.1 Researcher Administered Questionnaire

Data on the study participants' socioeconomic and demographic variables, nutritional status, eHealth Literacy, nutritional knowledge, and dietary habits were obtained via questionnaires administered by the researchers. The first component of the questionnaire collected information about participants' socioeconomic and demographic traits, as well as anthropometric measures. The study went on to collect data on nutritional knowledge and dietary habits with dietary assessment instruments. The final portion used the eHEALS scale to collect information on eHealth Literacy.

Socio-economic and demographic characteristics were tackled in the first and covered student income source, age, average household income source, student income, sex, education level, marital status, and school.

To obtain data on participants' nutritional condition, anthropometric measurements were performed using a digital scale for weighing and a height meter. The measurements were used to compute the BMI (kg/m^2). The BMI readings were then ranked according to WHO's 2006 BMI cut-off points, which are as follows: underweight: BMI is less than 18.5 kg/m^2, normal weight: 18.5-24.9 kg/m^2, overweight: 25.0-29.9 kg/m^2, and obesity: 30 kg/m^2 or more. Adult MUAC tape was used to measure mid-upper arm circumferences, which were classified as malnourished (<22.0cm) or well-nourished (≥ 22 cm).

Food and Agriculture Organization of the United Nations (FAO, 2013) is a developed dietary diversity score guideline which was adopted to code the data from the 24-hour food recall questionnaire for ranking the participants' dietary diversity. The categorization of the nutrient adequacy was adopted from guidelines based on the FAO, 2013 guideline as shown below;

- Low dietary diversity = ≤ 4
- Moderate dietary diversity ranges from 4 to 5, while high dietary diversity is defined as 6 or higher.

Frequency questionnaires were used to evaluate participants' intake of EDNP foods, food purchasing habits and healthy eating habits.

This final section kicked off by gathering information on overall internet usage by participants i.e., internet use frequency, device used and for what they used the internet. This study made use of eHEALS, which Norman and Skinner developed in 2006. The eHEALS was used to test eHealth Literacy, and all items were rated on a Likert scale i.e., students selected the most appropriate perceived feeling on the Likert scale where "1= Strongly dissent", "2= Dissent", "3= Neutral", "4 = Assent" and "5= Strongly assent" for 10 questions on the standardized 8 question test. The minimum score of the test is eight and the highest is forty. A higher eHEALS score is an indicator of high self-perception

of high eHealth literacy level. The eHealth literacy level was categorized from the mean eHEALS score i.e., a high eHealth Literacy Level was defined as being above or equal to the mean eHEALS score while a low eHealth Literacy Level was defined as being below the mean eHEALS score. Two supplementary questions on views of the web as an appropriate and important source of health resources. For the first question on the web being appropriate in aiding them in making decisions about their health participants asked to select the most correct feeling on the Likert scale i.e. Not Beneficial at all, Not Beneficial, Neutral, Beneficial and Very Beneficial. The students also reported on the importance of them to have the ability to acquire health material on the web when asked to select the most appropriate feeling on the scale of importance i.e. Not important at all, Not important, Important and Very important. Data on nutritional knowledge was collected using a nutrition assessment questionnaire focused on food-based guidelines and overweight and obesity prevention and management. The score grading was classified as poor (below the mean percentage score range), satisfactory (within mean percentage score range) and good above mean percentage score range. The level of nutrition knowledge was ranked as high if the percentage score was above or equal to the mean score and low if it was below the mean score.

3.7 Pretesting Data Collection Tools

The pretesting of the questionnaires and testing of instruments was be done using a group of 39 university students with similar characteristics to those attending classes at the Main campus of Mount Kenya University in Thika, Kiambu County, Kenya but who were not participants in the study for assessment of the tools' validity and reliability.

3.8 Data Collection Tools Validity and Reliability

3.8.1 Validity

Pre-validated questionnaires, i.e., standardized anthropometric measurements, 24-hour food recall, food purchasing habit and meal frequency questionnaires were used. University supervisors used face validity was used to measure the validity of the nutrition knowledge and food frequency questionnaire.

3.8.2 Reliability

The test-retest approach was used to verify the reliability of the questionnaire with thirty-nine students (10%) from Mount Kenya University Main Campus who fit the criteria but

were not going to be study participants. The tests were done within the interval of a week and the alpha value of the results comparison 0.81 indicated an acceptable internal consistency as the Cronbach alpha was 0.7 or higher i.e., $\alpha \geq 0.70$ (Taber, 2017).

3.9 Data Collection Procedures

Data collection was done through questionnaires and the data was entered into Kobo Collect for cleaning before analysis. The forms were filled in with the support and direction from field assistants. Research assistants received training on the data collection method by conducting a half-day workshop where they went through the tools, their use and how they were to conduct themselves in the field.

3.9.1 Socio-economic and Demographic Characteristics

For the data on socio-economic and demographic traits, data on age, school, marital status, university level of education, year of study, income level, income sources, and sex were collected.

3.9.2 eHealth Literacy

The participants were asked 8 questions pertaining to eHealth Literacy derived from the EHEALS scale that are included in the questionnaire and this were graded on the Likert Sale of 1 to 5 where 1 was strongly dissent while 5 was strongly assent. Two supplementary questions on the participant perceptions on the internet usefulness in acquiring health information as well as three general questions on internet use by the participants were asked. The participants answered ten questions in the nutrition assessment tool whose total score was grade on percentage. The eHealth literacy stage was then developed from combination of the eHEALS rank and Nutrition Knowledge rank for appropriate staging i.e., a high eHealth Literacy stage was considered where there is a combination of high eHEALS Score and high nutrition knowledge and a low eHealth Literacy stage if they had a combination where one of eHEALS score or their nutrition knowledge was low or, both scores were low.

3.9.3 Nutritional Status

The BMI of the students was achieved by collecting the weight of the students by use of a digital weighing scale and for height a stadiometer; the average weight was rounded to 0.1kg and the height was rounded to 0.1m. The MUAC was taken with the participants standing and their left arm hanging loosely for us to get to the midpoint between the

shoulder and elbow. For each participant, two readings of the MUAC tape were taken and noted to the closest 0.1cm. The participants were then staged as having a good or poor nutritional status by placing those with normal weight under good nutritional status and those with high or low weight under poor nutritional status.

3.9.4 Dietary practices

Data on the meal frequency using a 24-hr recall was collected from which the study used to find the dietary diversity of participants. Participants were questioned on food frequency by focusing on grouped questions about food groups and their intake of energy dense foods. Responses on meal and snack frequency were recorded between where 0 = never and 3 = at least once a day as per recommended intakes. Food acquisition habits were recorded and the food purchasing habit in the course on 1 week was also documented.

3.10 Data Analysis and Presentation

Kobo collect was used as data entry software after which data was checked, coded, cleaned and transferred into SPSS 25 for analysis. BMI class and MUAC stage that corresponds with the BMI and MUAC measurements respectively were used for nutritional status classification. The distribution of the variables of socio-economic and demographic factors i.e., age, marital status, sex, university education level, year of study, school, income level and income source of the study cohort were analysed. For eHealth Literacy the results from the eHEALS scale were used for analysis of overall eHealth Literacy perception score, the score of knowledge per question and score of knowledge per literacy. Finally, for dietary practices the researcher analyzed the distribution of respondents with healthy eating habits, distribution of their foods and drinks related to weight management and distribution of their food purchasing habits. Under nutrition knowledge, the study analyzed the distribution of the participants' awareness of dietary recommendation guidelines, those who give the correct answers to a question and those who do recognize the proper response to a question. Descriptive summary statistics characterized the socio-economic and demographic characteristics of the study participants. Bivariable analysis was used to test the study hypotheses by using regression analysis and chi square test. Table 1 summarizes the tests conducted per study objective.

Table 1. Data Analysis Matrix

OBJECTIVE	TEST
To establish the eHealth literacy associated with the nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya.	Descriptive summary statistics • Percentages, Median, Standard deviation
To assess the nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya.	Descriptive summary statistics • Frequencies, Percentages, Mean, Median
To determine the socio-economic and demographic characteristics associated with the nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya.	Descriptive summary statistics • Percentages, Median
To assess the influence of dietary practices on the nutritional status of Mount Kenya University students in Thika, Kiambu County, Kenya..	Descriptive summary statistics • Percentages, Mean, Median

3.11 Ethical Consideration

The institutional ethical clearance reference number from Mount Kenya University was MKU/ISERC/3228 whose application approval is 2272. The NACOSTI License number for ethical clearance is NACOSTI/P/23/30508 dated 16/10/2023. This was achieved by ensuring that no personal identification data such as names and national and school identification numbers were collected. The study identity number was randomly assigned after data collection. Confidentiality and privacy were attained by having a single participant per time per research personnel in a space free from interference of others within study vicinity. The participant was made aware of the aim and confidentiality, and explicitly made informed of their right to drop out of the study during research activities. This was done by providing the participants with a documented consent document for them to read and assent to the terms highlighted before proceeding to responding to the question. APA referencing style was be adapted according to the Mount Kenya University Dissertation Handbook to reference the work of others. Mount Kenya University provided field permissions for the study and permission to approach students to participate in the study, which was done at the university's main campus in Thika, Kiambu County, Kenya.

CHAPTER FOUR: FINDINGS AND DISCUSSION

4.1 Introduction

The study was carried out in January 2024 at Mount Kenya University's main campus in Thika, Kiambu County, Kenya. To evaluate the eHealth Literacy and nutritional status of university students in Kenya and contribute to the continent's expanding body of knowledge, the study used a cross-sectional research methodology with a focus on university students in Kiambu County. Data on socioeconomic and demographic variables, eHealth literacy, food habits, and nutritional health. The campus hosts twelve schools that were later grouped into the relevant field of study i.e., health- or non-health related. The eHealth literacy stage was classified based on eHEALS score and nutrition knowledge assessment score. The study's nutritional status was determined by BMI categorization, and the nutritional status ranking was based on WHO cut-offs to designate the students as well-nourished or undernourished. The association between dependent and independent variables was then analyzed, and conclusions were drawn by comparing them to relevant literature.

4.2 Study Response Rate

In this study, 418 of the 423 participants met the criteria for completeness giving the study an overall completeness score of 98.8%.

4.3 Socio-economic and Demographic Characteristics

The majority of participants were male 57.9% (242) and 42.1% (176) were female. Singles accounted for 97.8% (409) of the study population while the remaining were married 2.2% (9). The student's ages ranged between 18 - 32 years and the mean age was 21.36 years (±2.473 SD). The degree level distribution was as follows, in the undergraduate level (7.2%(281), 27.0% (122)in diploma, 3.1%(13) certificate, 2.2%(9) graduate and 0.5%(2) were doing their post-graduate degree. Table 2 shows tabulated results of the distribution of the traits of the participants who were from the twelve schools found in the main campus of MKU in Thika, Kiambu County, Kenya.

Table 2. Socio-demographic Characteristics of the Study Participants

Demographic Characteristics	N	%
Sex		
Male	242	57.9
Female	176	42.1
Age (years)		
18 – 22	300	71.8
23 – 27	108	25.8
28 – 32	10	2.4
Marital Status		
Single	409	97.8
Married	9	2.2
Education Level		
Certificate	13	3.1
Diploma	113	27.0
Undergraduate	281	67.20
Graduate	9	2.20
Post-graduate	2	0.50
Academic Characteristics		
Field of Study		
Non-health Related	313	74.9
Health Related	105	25.1
School		
Pharmacy	18	4.3
Clinical Medicine	21	5.0
Computing and Informatics	89	21.3
Education	84	20.1
Pure and Applied Sciences	8	1.9
Engineering, Energy and Built Environment	13	3.1
Hospitality, Travel and Tourism Management	12	2.9
Medical School	35	8.4
Nursing	17	4.1
Public Health	14	3.3
Business and Economics	57	13.6
Social Sciences	50	12.0

Source: Research Data(2025)

The average household income of the students was Ksh.33,526.20 (± 92165.669 SD) while the mean student's income was Ksh. 87,98.92 (±11626.251 SD). Majority of the students 72% (301) reported that their income was sourced from pocket money only , 15.60% (65) from part-time employment, and 3.10% (13) from bursary. Table 3 highlights the rest of the distribution.

Table 3. Economic Characteristics of the Study Participants

Economic Characteristics	N	%
Average Household Income (Ksh)		
0 - 20,000	294	70.3
20,001 - 40,000	34	8.1
40,001 - 60,000	34	8.1
60,001 - 80,000	16	3.8
80,001 - 100,000	12	2.9
Above 100,000	28	6.7
Student Income (Ksh)		
0 - 10,000	335	80.1
10,001 - 20,000	47	11.2
20,001 - 30,000	13	3.1
30,001 - 40,000	9	2.2
40,001 - 50,000	9	2.2
Above 50,000	5	1.2
Student Income Source		
Bursary	13	3.1
Bursary, Part-time employment	2	0.5
Contract employment	8	1.9
Contract employment, Part-time employment	1	0.2
Full-time employment	4	1
Other	4	1
Part-time employment	65	15.6
Pocket money	301	72
Pocket money, Bursary,	3	0.7
Pocket money, Bursary, Part-time employment	1	0.2
Pocket money, Contract employment	1	0.2
Pocket Money, Part-Time Employment	15	3.6

Source: Research Data(2025)

Most of the students took courses from non-health related courses,74.9% (313, which are the majority of the schools on the campus. The mean income of students was approximately Ksh. 8,800 and was sourced majorly from pocket money received from

parents, guardians, relatives, and friends. This is particularly important as it has been shown in previous studies that having lower income is associated with high BMI values because of EDNP foods being more readily accessible for consumption to such a population (Merhout & Doyle, 2019;Deliens *et al*., (2014); Manwa, (2013)).

4.4 eHealth Literacy

4.4.1 Internet Use

In this study, 87.8% (367) of the students used the internet daily. It was uncovered that 52.6% (220) of the students connect mobile data bundles to get internet connectivity and 92.10% (385) of the participants reported that the smartphone was the device that they used primarily to access the internet. The most frequent use of the internet was the combination of education, entertainment, communication with others and gathering information for personal needs, 23.7% (99). The second most frequent use for the combined use of education, entertainment, communication with others, gathering information for personal needs and shopping, 17.9% (75). Internet bundles were the primary form of access to internet connectivity. Students reported general search engine searches, health websites and apps, social media platforms and AI generated platforms as common sources of health information. Table 4 summarizes the distribution of how participants used the internet.

Table 4. Internet Use by the Study Participants

Internet Use	n	%
Times Students Browse Internet		
Daily	367	87.8
Multiple days a week	4	1.0
Once a week	47	11.2
Internet Connection		
College WIFI connection	75	17.9
Home WIFI connection	123	29.4
Mobile data bundles	220	52.6
Device		
Feature phone	4	1.0
Personal laptop	25	6.0
School lab computer	4	1.0
Smart phone	385	92.0
Internet Uses		
Communication with others	13	3.1
Education	32	7.7
Education, Entertainment	12	2.9
Education, Entertainment, Communication with others	43	10.3
Education, Entertainment, Communication with others, Gathering information for personal needs	99	23.7
Education, Entertainment, Communication with others, Gathering information for personal needs, Shopping	75	17.9
Education, Entertainment, Communication with others, Shopping	16	3.8
Entertainment	33	7.9
Entertainment, Communication with others	10	2.4
Entertainment, Communication with others, Gathering information for personal needs	12	2.9
Gathering information for personal needs	19	4.5

Source: Research Data (2025)

4.4.2 Relevance of Using Internet Sources to Find Health Information

When asked about the appropriateness of internet sources in get health information, 67% (280) of the participants said that they found the internet appropriate in aiding them in making choices about their health and 72.7% (304) of the same total study population reported that it was important for them to have the ability to acquire health material on the web. Majority of the students did not have specific websites where they found health information which was the opposite of a study of medical students in Ethiopia where

87.2% were users of specific health sites (Mengestie *et al.,* 2021). In a similar study done in Ethiopia 59.1% of the students used the internet to gather health information with nearly 70.0% reporting that the internet was beneficial in helping them find health information (Derseh *et al.,* 2022). Common sources where students reported that they found health information included search engines, specific health websites like WHO, Health apps like Flo and Smart meal plan, social media network forums and Artificial Intelligence powered chatbot ChatGPT.

4.4.3. eHealth Literacy Level

The overall mean eHEALS score of the study was 29.12 (±4.121SD). Respectively, high, or low eHealth Literacy was defined as being above or equal to, or below the mean EHEALS score of 29. This study that 59.1% (247) of the students possessed high eHealth Literacy score which was comparable to that of students in Ethiopia participating in a similar study where 60.0% had high eHealth Literacy score on the eHEALS scale (Mengestie *et al.,* 2021). More students in Health-related courses perceived to have higher eHealth Literacy level 70.5% (74) compared to their counterparts from non-health related schools 55.3% (173).

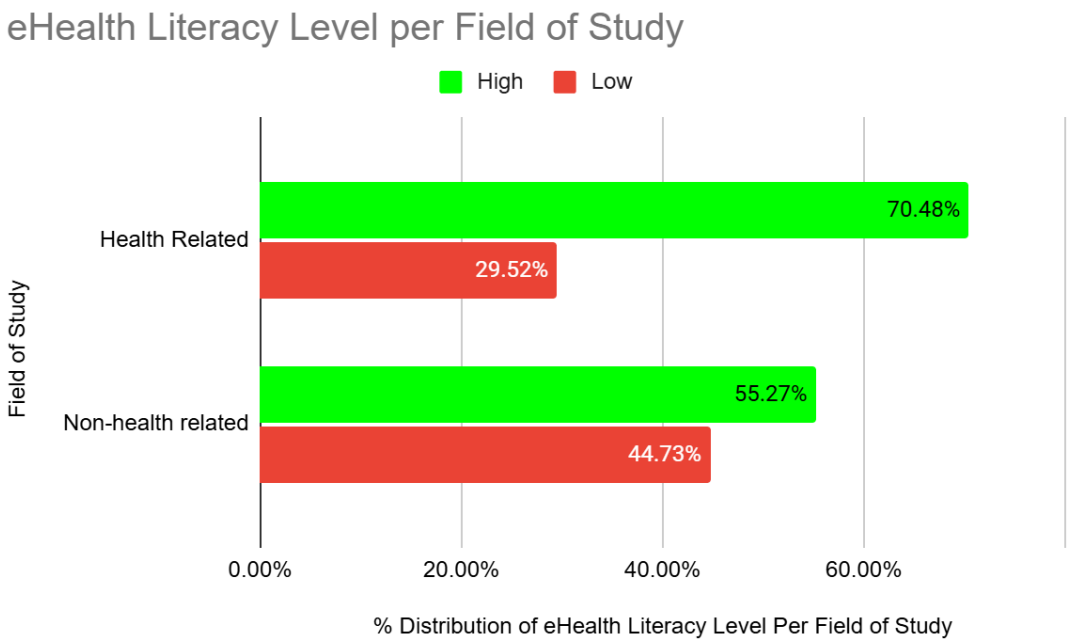

Figure 5. Distribution of eHealth Literacy Perception among the Study Participants

Source: Research Data (2025)

Most male students 61.1% (151) had high perception of their eHealth Literacy compared to their female counterparts 38.4% (96) though the majority within both sexes had a high eHealth Literacy score; male = 62.4% (151), female = 54.6% (96). Similarly, we see in other studies where female students had lower perception of their eHealth Literacy levels compared to the males (Huang *et al.*, 2020).

When asked about their perception of their knowledge on the kind of nutrition material were available on the web 58.1% (243) of the participants positively affirmed this, 63.6% (266) participants were aware of how to locate them and 78.1%) (329) knew how to utilize the internet to locate nutrition material. Close to 69.4% (290) students claimed that they recognized how to implement nutrition information discovered on the web. Only 53.6% (224) of the participants reported that they have the skills to judge nutrition material located on the web with 55.7% (233) asserting that they can distinguish between excellent and poor quality online nutrition resources. In this study it was found that 76.1% (318) of the participants claimed that they are confident that they can make use of the nutritional information that they discover to make decisions about their health. This is summarized in table 5.

Table 5. eHealth Literacy Statement Responses of the Study Participants

eHEALS Scale Statement	Score, n (%) 1	2	3	4	5	Mean Score
Have knowledge of what nutrition materials are acquirable on the web.	11 (2.6)	33 (7.9)	131 (31.3)	213 (51.0)	30 (7.2)	**3.52**
Well nourished	1	10	42	51	6	
Malnourished	10	23	89	162	24	
Can identify where to locate valuable nutrition material on the web.	6 (1.4)	34 (8.1)	112 (26.8)	229 (54.8)	37 (8.9)	**3.61**
Well nourished	1	10	40	51	8	
Malnourished	5	24	72	178	29	
Aware of how to locate valuable nutrition material on the web.	5 (1.2)	32 (7.7)	110 (26.3)	231 (55.3)	40 (9.6)	**3.64**
Well nourished	1	6	38	60	5	
Malnourished	4	26	72	171	35	
Can utilize the internet to answer your queries about nutrition.	5 (1.2)	18 (4.3)	66 (15.8)	251 (60.1)	78 (18.7)	**3.90**
Well nourished	0	2	16	69	23	
Malnourished	5	16	50	182	55	
Recognize how you are using the nutrition information you discover on the web.	4 (1.0)	26 (6.2)	98 (23.4)	253 (60.5)	37 (8.)	**3.70**
Well nourished	1	6	25	72	6	
Malnourished	3	20	73	181	31	
Possess the skills that you need to judge nutrition material you locate on the web.	8 (1.9)	46 (11.0)	140 (33.5)	204 (48.8)	20 (4.8)	**3.44**
Well nourished	1	18	32	52	7	
Malnourished	7	28	108	152	13	
Can tell between high quality and low-quality nutrition material on the web.	7 (1.7)	52 (12.4)	126 (30.1)	202 (48.3)	31 (7.5)	**3.47**
Well nourished	7	19	34	53	4	
Malnourished	0	33	92	149	27	
Confident that you can make use of the nutrition information that you discover on the web to make health decisions	7 (1.7)	16 (3.3)	77 (18.4)	261 (62.4)	57 (13.6)	**3.83**
Well nourished	1	5	22	74	8	
Malnourished	6	11	55	187	49	

Source: Research Data (2025)

4.4.4 Nutrition Knowledge

Mean nutrition knowledge percentage score was 38.1% (±14.804SD). When grouping was done, 23.9% (100) of the participants ha a good score (mean score = 46.9% and above) with males being 53.0% (53) of this number. Close to 58.6% (245) of the students had satisfactory knowledge (mean score = 25% - 46.8%) with more males 60.4% (148) having satisfactory scores compared to their female counterparts 39.6% (97). 17.5% (73) of the study participants were considered to have a poor nutrition knowledge (mean score = 24.9% and below with 56.2% (41) in this category being male and 43.8% (32) being female. While the tool used was not a global gold standard, the results here were here than in studies done in the United states where only 4% of the students had good nutrition knowledge (Niba *et al*., 2017). This could explain the poor dietary habits among university student populations where information about nutrition is limited. On the other hand, high nutrition knowledge does not necessarily indicate adherence to healthy dietary habits. As Mogeni and Ouma (2022) highlight that in both developing and developed countries, while male students had high nutrition knowledge acquisition, female students had higher adherence to healthy dietary patterns.

When considering the field of study, i.e., health or non-health related, students taking health related courses had a higher distribution of good nutrition level as depicted in Figure 6.

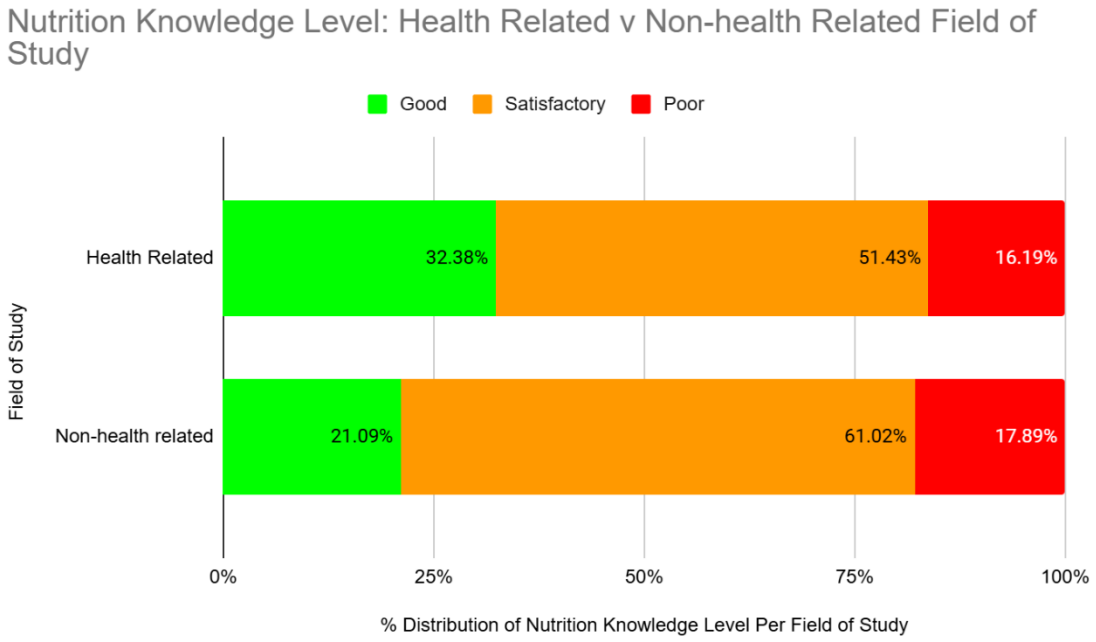

Figure 6. Distribution of Nutrition Knowledge Level of the Study Participants

Source: Research Data (2025)

4.4.5 eHealth Literacy Staging

The eHealth Literacy stage was developed by having a combination of the participants eHealth Literacy perception and nutrition knowledge level. A high eHealth Literacy stage was considered where there is a combination of high eHEALS score rank (eHEALS score ≥ 29) and high nutrition knowledge rank (mean percentage score ≥ 38.05%). In this study only 29.90% (125) of the participants had high eHealth Literacy stage when staging was done. The remaining 70.1% (293) participants were classified under low eHealth Literacy stage. i.e., considered to have a low eHealth Literacy staging if they had a combination where one of eHEALS score (eHEALS score < 29) or their nutrition knowledge (mean percentage score < 38.05%) was low or, both scores were low. In figure 7, we see that when the distribution was investigated according to the field of study, participants undertaking health related courses who fell under the category of high eHealth Literacy were more than those taking non-health related courses. These results correlate with those of studies conducted in Taiwan where students taking courses in medical fields were more concerned about seeking health information and demonstrated high eHealth Literacy (Yang *et al.,* 2017). As students in health related or medical field are exposed to more health-related content, they are placed at an advantage to have high eHealth

Literacy compared to their counterparts in non-medical or non-health related courses(Yang *et al.,* 2017).

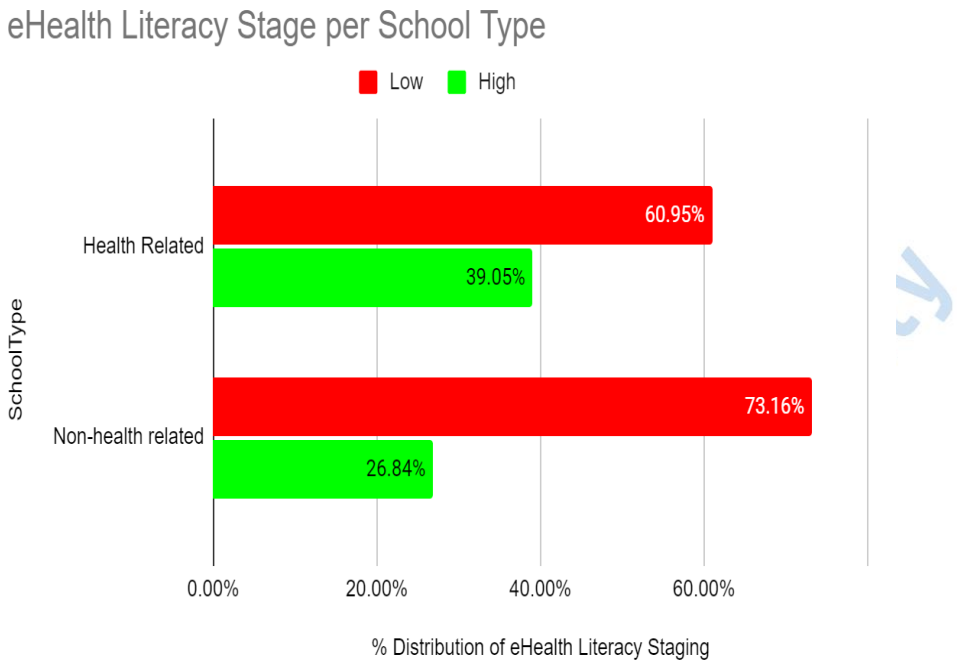

Figure 7. Distribution of eHealth Literacy Stage of the Study Participants

Source: Research Data (2025)

4.5 Nutritional Status

The population's mean BMI (n=418) was 22.15 kg/m^2 (±3.062SD) with the mean BMI of male students being 22.14 kg/m^2 (±2.653 SD) which is considered as normal weight, and the mean BMI of female students was 23.10 kg/m^2 (±3.481SD) which is considered to be normal weight as per WHO cut-offs. In a population of 418 students, 73.9% (309) had normal BMI and 7.4% (31) were underweight. The prevalence of obesity and overweight were 1.70% and 17.0%, respectively. More male students were overweight, 52.1% (37) than females 47.9% (34). Only 7 people were obese, and they were all female. The magnitude of high BMI status lay in the female group as the combined prevalence of overweight and obesity was higher among the female participants 23.3% (41) in comparison with the male participants 15.2% (37). Table 6 represents the nutritional status i.e., BMI status of Students of Mount Kenya University in Thika, Kiambu County, Kenya.

Table 6. Body Mass Index (BMI) Status of Students of the Study Participants

BMI Status	Female		Male		Total	
	n	%	n	%	N	%
Underweight	13	41.94	18	58.06	31	7.4
Normal Weight	122	39.61	187	60.39	309	73.9
Overweight	34	47.89	37	52.11	71	17.0
Obese	7	100	0	0.00	7	1.7
Total	**176**		**242**		**418**	

Source: Research Data (2025)

When investigating the MUAC, out of the 412 students who agreed to have the measurement taken, 97.1% (400) were well nourished i.e., ≥ 22cm while the rest were mal-nourished as shown in Table 7.

Table 7. Mid-Upper Arm Circumference (MUAC) of the Study Participants

MUAC Status	Female	Male	Total	
	N	N	N	%
Well-nourished	168	232	400	97.1
Malnourished	7	5	12	2.9
Total	**175**	**237**	**412**	100

Source: Research Data (2025)

From the study, 73.9% (309) of the population had a normal BMI and the prevalence of overweight was 17.0%. In similar studies done in Sub-Saharan Africa show comparable results. In Ghana 54.0% of study respondents had normal BMI and 20.4% were overweight (AgyarkwaaOti & Eshun, 2020), in Nigeria 70.5% of the students had normal BMI and 14.5% were overweight (Omage & Omuemu, 2018) and in coastal Kenya 69.4% had normal BMI (Mogeni & Ouma, 2022). In this study, 18.7% (78) students were overweight and obese with female students more likely to be obese than their male counterparts. There is a correlates with other studies in Africa that show higher prevalence of high BMI states in women from populations of African origin (Adeboye *et al.,* 2012). Similarly to a study in Tanzania, there was a statistically significant relationship between sex and nutritional status of undergraduate students who were the most populous participants in this study (Msoga & Anasel, 2020). Msoga and Anasel (2020) also showed that age was a significant factor in impacting nutritional status which was the opposite in this study where $p>0.05$.

4.6 Dietary practices

4.6.1 Dietary Diversity Score

After doing the 24-hour food recall, the dietary diversity score (DDS) developed by FAO was used as the indicator for the measurement of the nutrient adequacy of the food intake of participants based on the fourteen food groups of major nutritional value. From the study, the average DDS was 5.93 (±1.311SD) with 61.7% (258) of the study participants having a high DDS, 35.9% (150) having a moderate DDS and 2.4% (10) had a low DDS. The DDS was calculated from the 14 major groups of the 16 item FAO dietary diversity tool (FAO, 2013). The food items were drawn from the participants 24hr food recall.

Table 8. Consumption of Different Food Groups by Study Participants

Food group	Participants (n)	%
Cereals (corn/maize, rice, wheat, sorghum, millet or any other grains or foods made from these (e.g. bread, noodles, porridge or other grain products) + insert local foods e.g. ugali, nshima, porridge or paste)	412	98.6%
White roots and tubers (white potatoes, white yam, white cassava, or other foods made from roots)	102	24.4%
Vitamin A rich vegetables and tubers (pumpkin, carrot, squash, or sweet potato that are orange inside + other locally available vitamin A rich vegetables (e.g. red sweet pepper)	71	17.0%
Dark green leafy vegetables (dark green leafy vegetables, including wild forms + locally available vitamin A rich leaves such as amaranth, cassava leaves, kale, spinach)	159	38.0%
Other vegetables (other vegetables (e.g. tomato, onion, eggplant) + other locally available vegetables)	366	87.6%
Vitamin A rich fruits (ripe mango, cantaloupe, apricot (fresh or dried), ripe papaya, dried peach, and 100% fruit juice made from these + other locally available vitamin A rich fruits)	66	15.8%
Other fruits (other fruits, including wild fruits and 100% fruit juice made from these)	90	21.5%
Organ meat (liver, kidney, heart or other organ meats or blood-based foods)	16	3.8%
Flesh meats (beef, pork, lamb, goat, rabbit, game, chicken, duck, other birds, insects)	156	37.3%
Eggs (eggs from chicken, duck, guinea fowl or any other egg)	76	18.2%
Fish and Seafood (fresh or dried fish or shellfish)	39	9.3%
Legumes, nuts and seeds (dried beans, dried peas, lentils, nuts, seeds or foods made from these (e.g. hummus, peanut butter))	246	58.9%
Milk and milk products (milk, cheese, yogurt or other milk products)	279	66.8%
Oils and fats (oil, fats or butter added to food or used for cooking)	401	95.9%
Sweets (sugar, honey, sweetened soda or sweetened juice drinks, sugary foods such as chocolates, candies, cookies and cakes	352	84.2%
Spices, condiments, beverages (spices (black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, alcoholic beverages)	402	96.2%

Source: Research Data (2025)

The FAO recommends that the adequate dietary score across the fourteen major food groups is six and above. In this study, 5.93 was the mean score for dietary diversity i.e., moderate dietary diversity. More than half of the study population of the participants had a sufficient score for dietary diversification i.e., consumed six and above food groups in their daily diets as drawn from their 24-hour food recall.

Table 9. Dietary Diversity Score Distribution of the Study Participants

	Dietary Diversity Score Ranking		
	Low (< 4 food groups) (n)	**Moderate (4 - 5 food groups) (n)**	**Adequate (≥6 food groups) (n)**
Sex			
Female	6	64	106
Male	4	86	152
School			
Business and Economics	2	15	40
Clinical medicine	0	7	14
Computing and informatics	1	32	56
Education	3	41	40
Engineering, energy and built environment	0	5	8
Hospitality, travel, and tourism management	0	4	8
Medical school	1	12	22
Nursing	0	8	9
Pharmacy	1	4	13
Public health	0	5	9
Pure and applied sciences	1	2	5
Social sciences	1	15	34

Source: Research Data (2025)

More males 58.9% (152)had a high dietary diversity compares to their female counterparts 41.1% (106). A similar study on dietary patterns of university students in Nigeria showed that 49.0% of the participants had a high DDS and male students (51.8%) had a statistically significant ($p<0.004$) higher dietary diversity score than female students (47.0%) (Omage & Omuemu, 2018). The results of these studies viewed by sex were observed to be different in the dietary patterns of university students in Coastal

Kenya where female students had a high dietary diversity score than their male counterparts (Mogeni & Ouma, 2022).

4.6.2 Meal Frequency

The average number of primary meals that participants (N=418) ate in a day was 2.44 (±0.609SD). About 50.0% (209) of the students had three main meals a day, 43.7% (183) had two main meals daily and 6.2% (26) have one meal a day. The mean number of snacks taken by the participants (n=418) was 1.18 (±0.921SD) in a day with the majority taking 1 snack a day, 41.6% (174). Approximately 25.1% (105) had no snacks at all, 23.2% (97) had 2 snacks a day and 10.1% (42) had 3 snacks a day.

The recommended dietary pattern is to have small frequent meals throughout a day with at least three main meals i.e., breakfast, lunch, and supper to meet the daily nutrient and caloric requirements. Meal irregularity in dietary patterns has been observed in both developed and developing countries (Mogeni & Ouma, 2022). Meal irregularity i.e., skipping meals is a contributor of high BMI and risk of eating disorders among university students (Aykut & Bilici, 2021). Poor diet quality is also another challenge posed by dissatisfactory meal patterns which have along tern effect on the health of a person (Zeballos & Todd, 2020). In this study 50.0% (209) of the students had three main meals a day as the recommended dietary patten and only 10.1% (42) had three snacks per day while only 20.3% (85) had the recommended meal frequency of three main meals and two to three snacks per day. Mogeni and Ouma (2022) reported in their study that university students in Coastal Kenya were observed to have a meal pattern irregularity which was aligned with the observation in this study.

4.6.3 Food Frequency

Table 10 shows the median food frequency of foods associated with BMI.

Table 10. Distribution of Food Frequency of Common Foods in the Diets of the Study Participants

Food	Median Times consumed per week
Carbohydrates	
Ugali	3.38
Pasta (spaghetti, macaroni, noodles etc.)	0.94
Rice (plain, fried rice, pilau etc.)	3.03
Chapati	2.12
Pancake	0.60
Porridge	0.89
Githeri or Muthokoi	0.71
Breakfast cereal (Weetabix, cornflakes etc.)	0.49
Bread	0.34
White potatoes (eaten individually, mashed potatoes, mukimo etc.)	3.39
Plantain/Green bananas	1.15
Oats	0.72
Pumpkin	0.31
Roots and tubers (sweet potatoes, cassava, arrow roots etc.)	2.39
Plant proteins	
Pulses (beans, cow peas, kamande, lentils, njahi etc.)	1.90
Nuts and Seeds (groundnuts, simsim etc.)	0.59
High Sugar, Fat, Salty Foods	
Deep fried snacks (mandazi, samosas, KDF, doughnut, kebab etc.)	0.94
Fast foods (chips, bhajia, roasted chicken, deep-fried chicken pizza, burger, hotdogs)	2.14
Fatty condiments (Ghee, butter, cream, mayonnaise, etc.)	1.46
Salty snacks (popcorns, crisps etc.)	1.76
Sweetened beverages (cordials (highlands, treetop etc.)	4.29
Carbonated cold drinks (sodas, energy drinks)	1.77
Sweets (candies, chocolates, lollipops)	2.20
Sweet baked goods (cakes, cookies, pies, biscuits etc.)	1.04
Sugar and honey in beverages (tea, coffee, cocoa, soy)	0.87
Sweetened dairy products (flavoured milk, ice-cream, yoghurt)	0.93

Source: Research Data (2025)

High sugar, fat and salty foods are discouraged by WHO as they not only predispose individuals to obesity but to chronic illnesses like adult onset diabetes, hyperlipidemia, high blood pressure and chronic kidney disease (WHO, 2020).The organization emphasizes a diet rich in fruits, vegetables, healthy fats and high fibre energy sources like whole grains and their less processed products such as whole grain wheat four, brown rice, whole meal maize flour (World Health Organization: WHO, 2020). Participants in the study have higher frequency of intake of high sugar, fat and salty foods compared to whole fibre energy food sources. These findings correlate with studies in both developed

and developing nations globally where students consumed high sugar, fat, and salty foods through items such as fast food, baked goods and sugary drinks (Mogeni & Ouma, 2022).

4.6.5 Food Sources

Majority of the participants 66.5% (278) acquired their food through purchasing from a variety of vendors while 20.6% (86) acquired food through own production. The remaining participants acquired food through different methods such borrowing, food aid and a combination of methods as presented in Table 11.

Table 11. Distribution of Food Purchasing Habits of Students of the Study Participants

Food Sources	Number of students (n)
Borrowed, bartered, exchanged for labour, gifts from friends or relatives	3
Own production (farming), gathering, hunting, fishing	4
Own production (farming), gathering, hunting, fishing Purchased (School cafeteria, Informal vendors (vibanda, food carts), Supermarket, Hotels and restaurants, Food markets (soko), Vegetable stands (mama mboga))	86
Own production (farming), gathering, hunting, fishing Purchased (School cafeteria, Informal vendors (vibanda, food carts), Supermarket, Hotels and restaurants, Food markets (soko), Vegetable stands (mama mboga)) = Borrowed, bartered, exchanged for labour, gift from friends or relatives Food aid	4
Own production (farming), gathering, hunting, fishing Purchased (School cafeteria, Informal vendors (vibanda, food carts), Supermarket, Hotels and restaurants, Food markets (soko), Vegetable stands (mama mboga)) Borrowed, bartered, exchanged for labour, gift from friends or relatives	10
Own production (farming), gathering, hunting, fishing Purchased (School cafeteria, Informal vendors (vibanda, food carts), Supermarket, Hotels and restaurants, Food markets (soko), Vegetable stands (mama mboga)) Borrowed, bartered, exchanged for labour, gift from friends or relatives Food aid Other	1
Own production (farming), gathering, hunting, fishing Purchased (School cafeteria, Informal vendors (vibanda, food carts), Supermarket, Hotels and restaurants, Food markets (soko), Vegetable stands (mama mboga)) Food aid	1
Own production (farming), gathering, hunting, fishing Purchased (School cafeteria, Informal vendors (vibanda, food carts), Supermarket, Hotels and restaurants, Food markets (soko), Vegetable stands (mama mboga)) Food aid Other	1
Own production (farming), gathering, hunting, fishing Food aid Other	1

Source: Research Data (2025)

The food purchasing habit was primarily driven by the access to financial resources available from parents and guardians. 20.6% (86) of the students sourced through own production (mentioned carrying farm produce such as maize and beans from home to their hostels) and purchasing from vendors in their school vicinity. However, the largest population of the students, 66.5% (278), reported that they acquired their food through only purchasing. The school and hostel cafeteria, informal food vendors and shops were some of the common places where they purchased their food as majority do not reside with their parents when the school year is in session. These results were consistent with studies done among university students in Australia (Hutchesson *et al*., 2021). One factor underscoring food purchasing habit is convenience (coast study). Therefore, an opportunity to improve diet quality on-campus is presented by this factor backed by results showing that most students will purchase food when semester is in session. Principally, as most universities in Sub-saharan Africa are part of emerging economies, the price, availability, and time required to acquire nutritious meals need to be considered as seen in similar economies (Pham *et al*., 2018).

4.6.6 Ready-made Meal Purchase

The mean number of times i.e. days, the participants purchased ready-made meals in 7 days was 3.04 (±2.372SD;min = 0 , max =7) Out of the 418 participants 15.1% (63) never purchased ready-made meals while 19.61% (82) did so 7 times in a week. More male participants 57.9 % (242) purchased ready-made meals than the female participants 42.1% (176).

Table 12. Days Ready Made Meals were Consumed by the Study Participants as per Sex

Days Meals Purchased	Female (n)	Male (n)	Total
0	31	32	63
1	32	34	66
2	20	48	68
3	34	53	87
4	13	21	34
5	7	5	12
6	1	5	6
7	38	44	82
Total	**176**	**242**	**418**

Source: Research Data (2025)

High intake of ready-made meals is associated with high energy intake which increases an individual's risk of obesity (Alkerwi *et al*., 2014). As seen in the previous section,

majority of the students acquire food to be eaten in meals through purchase. Upon further inquiry about types of food purchased, 84.9% (355) students reported that they purchase ready-to-eat meals during the week. In the total study population, this purchase was more likely to be done by male students 50.2% (210) than female students 34.7% (145) that was also observed in the research done in universities in Cameroon (Niba *et al*., 2017). In addition to this, 20.8% (87) purchased at least one ready-made meal 3 days a week which was slightly lower as compared to a study among students in Cameroon where 34.9% reported to purchase ready-made meals three times a week. Furthermore, 19.6% (82) of students purchased at least one ready-made meal the entire week i.e., 7 days a week. There was a sexed difference with more males 53.7% (44) purchasing ready-made meals throughout the week compared to their female counterparts 46.3% (38).

4.6.7 Dietary practice Categorization

Dietary practice category was determined by the combination of study participants' DDS and the number of meals consumed per day. A healthy dietary practice was defined as having a dietary diversity score >/= 4 and had the recommended meal pattern of 5 - 6 meals a day i.e., 3 main meals and 2 or 3 snacks per day. Only 20.3% of the students had healthy dietary practice when staged. Mogeni and Ouma (2022) surfaced from the study in Coastal Kenya similar results where meal irregularity and moderate dietary diversity was characteristic of the participants. Similarly, Yun *et al*., (2018) in their study of food habits of college students in Brunei, while majority of the participants had regular meal patterns, they had a low intake of vitamin and mineral rich foods i.e., fruits and vegetables.

4.7 Factors Associated with Nutritional Status of Study Participants

4.7.1 Relationship between eHealth Literacy and nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya

The chi-square test was used to test H_{01} that there is no significant association between the eHealth Literacy and nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya. The dependent variable nutritional status outcomes were regressed on the predicting variable eHealth Literacy staging, high or low eHealth Literacy where high eHealth Literacy was a combination on high eHealth Literacy perception and high nutrition knowledge score. The p-value > 0.05, which indicates that

there is no significant association between the eHealth Literacy and nutrition status of Students of Mount Kenya University in Thika, Kiambu County, Kenya.

Table 13. eHealth Literacy and Nutritional Status of the Study Participants

Hypothesis	Chi-square Variables	Pearson Chi-Square value	df	p-value	Hypothesis Supported
H_{01}	eHealth Literacy staging → Nutritional status outcomes	0.021	1	0.885	Fail to reject

Source: Research Data (2025)

4.7.2 Relationship between socio-economic and demographic characteristic and nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya

The multivariate logistics test was used to test H_{02} that there is no significant association between the socio-economic and demographic characteristics and nutritional status of students at Mount Kenya University in Thika, Kiambu County, Kenya. The dependent variable nutritional status outcomes were regressed on the predicting variable socio-economic and demographic characteristics. At 95% confidence interval, for sex ($p = 0.050$) the odds of male students have a good nutritional status compared to female students was AOR = 1.622 (OR =1.47, $p = 0.085$). Therefore, male students are more likely to have good nutritional status compared to female students thereby indicating a significant association between socio-economic and demographic characteristics and nutritional status of Students of Mount Kenya University in Thika, Kiambu County, Kenya.

Table 14. Socio-economic and demographic Characteristics and Nutritional Status of the Study Participants

	AOR	95% C.I. Lower	Upper	p-value
Sex				
Female	1			
Male	1.622	1.000	2.631	0.050
Age (years)				
28 - 32	1			
18 – 22	0.724	0.115	4.557	0.731
23 – 27	0.445	0.070	2.846	0.392
Marital Status				
Married	1			
Single	0.755	0.135	4.241	0.750
Field of study				
Health related	1			
Non-health Related	1.277	0.763	2.136	0.352
Degree Level				
Post-graduate	1			
Certificate	10.788	0.251	463.744	0.215
Diploma	13.635	0.368	504.840	0.156
Undergraduate	11.647	0.319	425.759	0.181
Graduate	35.089	0.630	1954.939	0.083
Household Income	1	1		0.231
Student Monthly Income				
Above 50,000	1			
0 - 10,000	0.425	0.025	7.241	0.554
10,001 - 20,000	0.546	0.031	9.680	0.680
20,001 - 30,000	3.958	0.127	123.743	0.433
30,001 - 40,000	0.503	0.020	12.642	0.676
40,001 - 50,000	0.706	0.028	17.872	0.832

Base category: Poor Nutritional Status

Source: Research Data (2025)

4.7.3 Relationship between dietary practices and nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya.

Chi-Square test was used to test hypothesis H_{03} that there is no significant association between the dietary practices and nutritional status of Students of Mount Kenya University in Thika, Kiambu County, Kenya. The dependent variable nutritional status i.e., well-nourished (1) or malnourished (0) was regressed on the predicting variable dietary related practice i.e., does the participant have healthy dietary related practice (1) of DDS score of 4 and above, has 3 main meals and has 2 -3 snacks per day or not (0). The p-value > 0.05 for healthy dietary related practice indicates there is no significant association between the dietary practices and nutritional status of Students of Mount Kenya University in Thika, Kiambu County, Kenya.

Table 15. Dietary Related Practice and Nutritional Status of the Study Participants

Hypothesis	Chi-square Variables	Pearson Chi-Square Value	df	p -value	Hypothesis Supported
H_{03}	Dietary related practice staging → Nutritional status outcomes	0.028	1	0.964	Fail to reject

Source: Research Data (2025)

4.7.4 Hypothesis Testing Summary

The H_{01} of the study states that there is no significant association between the eHealth Literacy and nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya. Since the findings of the study indicated no statistically significant relationship between eHealth Literacy and nutritional status, **we fail to reject H_{01}**. The H_{02} of the study states that there is no significant association between the socio-economic and demographic characteristics and nutritional status of Students of Mount Kenya University in Thika, Kiambu County, Kenya. Since a statistically significant relationship between socio-economic and demographic characteristics and nutritional status was indicated in this study, **reject H_{02}.** The **H_{03}** of the study states that there is no significant association between dietary practices and nutritional status of students of Mount Kenya University in Thika, Kiambu County, Kenya. Since the findings of the study indicated that there is no significant relationship between dietary practices and nutritional status, **we fail to reject H_{03}.**

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Findings

Majority of the students in the population that was studied had a normal BMI, and female students had a higher chance of having raised BMI values when compared to male university students.

Less than half the population regarded internet as an appropriate source of health information and the capability to obtain health-related information online is crucial. Male students reported having higher perception of their eHealth Literacy level than their female counterparts. Nearly half of the population feel that they possess the skills to evaluate the quality nutrition material on the web. Most of the students had a satisfactory level of nutrition knowledge. However, eHealth literacy for nutrition knowledge was low. Findings from the study indicated that there is no statistical significance when investigating the null hypothesis that there is no significant association between eHealth Literacy and nutritional status was explored.

Most students were in their undergraduate level of study and majority of them were male, single, undertook studies in non-health related courses and their primary income source was pocket money. Male students tended to have better nutritional status than female students. There was a statistically significant relationship when it came to the socio-economic and demographic characteristics and the nutritional status of the participants.

More than half of the population achieved the FAO dietary diversity recommendation to consume six out of the fourteen major food groups daily (FAO,2013). Half of the population met the recommendation to have three main meals daily while the other half had less than 3 meals a day which is known to have an influence on daily nutrients and energy intake thereby impacting nutritional status and health outcome. Most students had at least one snack a day, however a significant number also reported not having any snack as part of their daily meals. Overall, only a fifth of the study population followed the recommended meal pattern frequency of three main meals and two to three snacks daily. The students primarily purchased food to acquire food and the majority of them purchased ready-made meals at least once a week. EDNP foods feature in most of the weekly meals of the students. There was a statistically significant relationship between

socio-economic and demographic characteristics and nutritional status of study participants. There was no significant relationship between dietary practices and the nutritional status of the participants.

5.2 Conclusion

5.2.1 To establish the eHealth Literacy associated with the nutritional status of university students of Mount Kenya University in Thika, Kiambu County, Kenya.

The students had a comparable eHealth level score when weighed up against the score of students in both developing and developing countries. They had a satisfactory level of nutrition knowledge however a combination to create eHealth literacy stage indicated majority had low eHealth literacy for nutrition information on the internet.

5.2.2 To assess the nutritional status of students of Mount Kenya University, in Thika, Kiambu County, Kenya.

Overall, the university students of Mount Kenya University, Thika, Kiambu County, Kenya had a BMI that fell within the recommendations by WHO 2021 because majority of the students had a normal BMI i.e., 18.5 – 24.99 kg/m^2. The magnitude of high BMI status i.e., overweight, and obese was among female students.

5.2.3 To determine the socio-economic and demographic characteristics associated with the nutritional status of students of Mount Kenya University in Thika, Kiambu County

Majority of the study participants were single and aged between 18 – 22 years. Most of them were at the undergraduate level and their main source of income was from allowance from family and friends. Male students were more likely to have good nutritional status compared to their female counterparts.

5.2.4 To assess the influence of dietary practices on the nutritional status of university students of Mount Kenya University in Thika, Kiambu County, Kenya.

The study population had a moderate diversity score but failed to meet the recommended adequate meal pattern i.e., three main meals and 2 – 3 snacks per day. Additionally, they had an elevated intake of foods rich in fat, sugar, and salts, which featured in their everyday meals.

5.3 Recommendations

5.3.1 Recommendations for Policy

Strategies to promote high eHealth Literacy and heathy eating habits should target all stakeholders in the university. Different departments and schools alongside the student's council need to be involved in development and adoption of interventions that emphasize critical scrutiny of health information sourced online and implementation of actions that promote adequate nutrient and energy intake.

5.3.2 Recommendations for Practice

Gender specific nutrition interventions to should be considered in improving nutrition status of students. Improve the diet quality of the school and hostel cafeterias as well as finding incentives for those running school canteens to provide healthy snacking options as the majority mentioned that they purchase food including ready-made meals.

Specific efforts by the university should be directed to improve the eHealth Literacy skills of university students through targeted intervention including platforms such as My Loft and One health. The ability of populations to tell between low- and high-quality nutrition material is applicable in judging online health material whose importance we saw in the COVID-19 pandemic where misinformation was rampant resulting in unethical use of medications such as that of chloroquine creating shortages that put the health of vulnerable populations taking this medication routinely such as those with Lupus.

5.3.3 Recommendations for Research

The study focused on BMI as the key indicator for nutritional status and dietary diversity as indicator for nutrition intake adequacy. Considering these limitations, we recommend longitudinal studies collecting on central adiposity which is most important in identifying risk of NCDs and portion sizes and caloric intake for dietary intake as quantitative data is beneficial in calibrating future recommendations.

Future research studies should be carried out across multiple sites to increase homogeneity of the participants to the population in the region.

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APPENDICES

APPENDIX I: PARTICIPANT CONSENT FORM

Thank you for showing your interest in participating in this research study on the topic eHealth Literacy and nutritional status among university students in Kiambu County. The principal investigator Nanjulula Joyner Musombi, is undertaking a Master degree from the School of Public Health of Mount Kenya University. The aim of this study is to investigate eHealth Literacy, nutrition status, diet-related practices, nutrition knowledge and the socio-economic and demographic characteristics of university students in Kiambu County. Your participation in the study will contribute to a better understanding of how the pillars of the study interact with each other to influence the health and wellbeing of university students in Kenya. You must be 18 years and older up to 35 years to participate. Should you agree to participate:

- Your anthropometric measurements will be taken.
- You shall respond to questions from our researcher-administered questionnaire that will take approximately 20 minutes.

The questions will cover your eHealth Literacy skills, socio-economic and demographic characteristics, dietary practices, and nutritional knowledge.

Risks

There have been no risks identified for the undertaking of the study

Benefits

The participant will incur no cost for participation as well as they will not benefit directly from the study. Notably, study findings will be used for the improvement of eHealth Literacy as well as the nutritional status of university students in similar settings.

Participant Confidentiality

Research assistants will access study data only during collection while researcher, data analyst and supervisors have additional access during the analysis stage. Your name and phone number will be removed from the final data set used for analysis.

Participation or Withdrawal

Your participation is voluntary. You can turn down responding to questions whenever you are uncomfortable and you also have the right to drop off at any given time during the study activities. Your withdrawal will not negatively impact your relationship with Mount Kenya University, and you may simply ask the researcher to stop the activity when you need to

Contacts

Should you have any questions or need to update information, you may contact the researcher NANJULULA JOYNER MUSOMBI at +25471496760/+254781549161 or send an email to nanjulula@mylife.mku.ac.ke . You may also contact my supervisor, The Dean, School of Public Health, Mount Kenya University, Dr John G Kariuki through publichealth@mku.ac.ke .

Questions and Concerns

Should you need more information or have concerns about how your information will be kept confidential during and after the study, you may through the email address research@mku.ac.ke contact MKU's Institutional, Scientific and Ethical Review Committee.

Participant Statement

I am fully aware of the aim, benefits and risks of this study as explained by the field researchers. I choose to voluntarily participate, and I am cognizant of the fact that I can choose to stop participating at any given point of the study. I have confidence that the information I give is guarded with confidentiality and confirm that concerns and issues raised have been satisfactorily dealt with by the researcher.

Researcher Statement

I affirm that the rights, aim, benefits, and risks of the study have been explained to the participant in a language that they are proficient in.

Participant Signature ..... Date .....

Participant contact……

Researcher Signature……Date…….

APPENDIX II. STUDY QUESTIONNAIRE

Section A. Assessment of socio-economic and demographic characteristics and nutritional status

Here we will collect details on socio-demographic characteristics. We shall also collect anthropometric measurements. Tick most appropriate answer.

A1. Socio-economic and demographic characteristics

Participant ID: .....Age……

Sex

- □ Male
- □ Female

Marital Status

- □ Divorced
- □ Married
- □ Separated
- □ Single
- □ Widowed

Education Level

- □ Certificate
- □ Diploma
- □ Undergraduate
- □ Graduate
- □ Post-graduate

Year of study: ……

School:

- □ Pharmacy
- □ Clinical Medicine
- □ Computing and Informatics
- □ Education

- Pure and Applied Sciences
- Engineering, Energy and Built Environment
- Hospital, Travel and Tourism Management
- Medical School
- Nursing
- Public Health
- Business and Economics
- Social Sciences

Average household monthly income……

Student's income amount per month……..

Student's income source

- Pocket money
- Bursary
- Contract employment
- Part-time employment
- Full-time employment
- Any other……

A2. Nutritional status

Parameters	1	2	3	Average	BMI
Weight (kg)					
Height (cm)					
MUAC (cm)					

Section B. Assessment of nutritional knowledge and dietary practices

The second part of the form we shall collect data on nutritional knowledge and dietary practices using the assessment tools i.e., 24 hr. recall and food frequency questionnaires.

B.1. Nutritional knowledge – (The options provided are for the researcher to mark what corresponds to participants answers)

1. What do you think experts recommend should be part of a healthy diet?

- Protein
- Carbohydrates

- Vegetables
- Fruit
- Fats
- Water
- Salt
- Other…….

2. Which foods do you think provide us with high calories?

- Animal protein
- Plant protein (peas, legumes, lentils, nuts, and nut butters)
- Carbohydrates (cereals and cereal products, wheat)
- Fats (oil, margarine, butter, ghee)
- Leafy vegetables (cabbage, spinach, traditional vegetables, broccoli etc.)
- Starchy vegetables (potatoes, eggplants, baby marrow etc.)
- Fruits
- Other……

3. Which foods do you think provide us with low calories?

- Animal protein
- Plant protein (peas, legumes, lentils, nuts, and nut butters)
- Carbohydrates (cereals and cereal products, wheat)
- Fats (oil, margarine, butter, ghee)
- Leafy vegetables (cabbage, spinach, traditional vegetables, broccoli etc.)
- Starchy vegetables (potatoes, eggplants, baby marrow etc.)
- Fruits
- Other……

4. How many calories do you think men need to eat in a day?

- < 1,800 Kcal
- 1800 – 2,400 Kcal
- 2,400 – 3,000 Kcal
- > 3,000 Kcal

5. How many calories do think women need to eat in a day?

- □ < 1,800 Kcal
- □ 1800 – 2,400 Kcal
- □ 2,400 – 3,000 Kcal
- □ > 3,000 Kcal

6. Honey is a healthier alternative to white sugar

- □ Assent
- □ Dissent
- □ I do not know

7. Peanut butter contains less fat than margarine (blue band, prestige etc.)

- □ Assent
- □ Dissent
- □ I do not know

8. What leads to one being overweight?

- □ High caloric intake and low physical activity
- □ High caloric intake
- □ Physical inactivity

9. What are some of the major health problems and diseases associated with being overweight or obese?

- □ Diabetes
- □ High blood pressure
- □ Some cancers
- □ Heart diseases (including strokes and heart attacks)
- □ Arthritis
- □ Lipid disorders

10. Which eating habits do you think will help prevent being overweight or obese?

- □ Eating high fibre starches (wholemeal bread, sweet potato, cassava, oats)
- □ Having more fruit and vegetables in diet

- Eating more legumes than fatty meat
- Eating less foods with added sugar
- Eating less food high in fat
- Eating healthy snacks like nuts and seeds instead of high salt snacks like popcorns and crisps
- Eating the right portions of protein, starch, and vegetables & fruit during main meals

B.2. Dietary practices

B.2.1 Dietary Diversity Questionnaire (reproduced from FAO, 2013)

Breakfast	Snack	Lunch	Snack	Supper	Snack

Fill in the table below with food groups based on 24-hour recall. Ask participant if a food group that they have not mentioned was consumed in past 24 hours.

Food Group Number	**Food group**	**Examples**	**YES = 1** **NO = 0**
1	Cereals	Corn/maize, rice, wheat, sorghum, millet or any other grains or foods made from these (e.g., Bread, noodles, porridge, or other grain products) + insert local foods e.g., Ugali, nshima, porridge or paste	
2	White roots and tubers	White potatoes, white yam, white cassava, or other foods made from roots	
3	Vitamin a rich vegetables and tubers	Pumpkin, carrot, squash, or sweet potato that are orange inside + other locally available vitamin a rich vegetable (e.g. Red sweet pepper)	
4	Dark green leafy vegetables	Dark green leafy vegetables, including wild forms + locally	

		available vitamin a rich leaves such as amaranth, cassava leaves, kale, spinach	
5	Other vegetables	Other vegetables (e.g., Tomato, onion, eggplant) + other locally available vegetables	
6	Vitamin a rich fruits	Ripe mango, cantaloupe, apricot (fresh or dried), ripe papaya, dried peach, and 100% fruit juice made from these + other locally available vitamin a rich fruits	
7	Other fruits	Other fruits, including wild fruits and 100% fruit juice made from these	
8	Organ meat	Liver, kidney, heart or other organ meats or blood-based foods	
9	Flesh meats	Beef, pork, lamb, goat, rabbit, game, chicken, duck, other birds, insects	
10	Eggs	Eggs from chicken, duck, guinea fowl or any other egg	
11	Fish and seafood	Fresh or dried fish or shellfish	
12	Legumes, nuts, and seeds	Dried beans, dried peas, lentils, nuts, seeds, or foods made from these (e.g., Hummus, peanut butter)	
13	Milk and milk products	Milk, cheese, yogurt, or other milk products	
14	Oils and fats	Oil, fats or butter added to food or used for cooking	
15	Sweets	Sugar, honey, sweetened soda or sweetened juice drinks, sugary foods such as chocolates,	

		candies, cookies, and cakes	
16	Spices, condiments, beverages	Spices (black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, alcoholic beverages	
Individual level	In the past 24 hours have you consumed any food or snack outside of where you live?		

B.2.2 Meal frequency

1. What is the number of main meals you consume in a day?

2. What is the number of snacks you consume in a day?

B.2.3 Food frequency

In the past week, what has been your consumption of the following foods?

Foods	Days consumed
Ugali	
Pasta (spaghetti, macaroni, noodles etc.)	
Rice (plain, fried rice, pilau etc.)	
Chapati	
Pancake	
Porridge	
Githeri or Muthokoi	
Breakfast cereal (Weetabix, cornflakes etc.)	
Oats	
Bread	
White potatoes (eaten individually, mashed potatoes, mukimo etc.)	
Sweet potatoes (ngwaci)	
Yam (nduma)	
Cassava	
Plantain/Green bananas	
Pumpkin	
Deep fried snacks (mandazi, samosas, KDF, doughnut, kebab etc.)	
Fast foods (chips, bhajia, roasted chicken, deep-fried chicken pizza, burger, hotdogs)	

Fatty condiments (Ghee, butter, cream, mayonnaise, etc.)	
Sweetened beverages (cordials (highlands, treetop etc.)	
Carbonated cold drink (sodas, energy drinks)	
Sweets (candies, chocolates, lollipops)	
Sweet baked goods (cakes, cookies, pies, biscuits etc.)	
Sugar and honey in beverages (tea, coffee, cocoa, soy)	
Sweetened dairy products (flavoured milk, ice-cream, yoghurt)	
Pulses (njahi, cow peas, kamande, ndengu, beans etc.)	
Nuts and Seeds (groundnuts, simsim etc.)	
Roots and tubers (sweet potatoes, cassava, arrow roots etc.)	
Salty snacks (popcorns, crisps etc.)	

B.2.4 Assessment of food purchasing habits (adopted from FAO, 2013)

1. From which source do you primarily obtain the foods you eat? Tick all that are applicable.

- 1 = Home produces (farming, gathering, hunting, fishing)
- 2 = Buying (School cafeteria, Informal vendors (vibanda, food carts), Supermarket, Hotels and restaurants, Food markets (soko), Vegetable stands (mama mboga))
- 3 = Bartered, Borrowed, gift from friends or relatives, exchanged for labour
- 4 = Food aid
- 5 = Other

List if others……..

2. How many times in 7 days do you purchase ready-made meals? e.g., once a day, three days a week

Section C. Assessment of eHealth Literacy

C1. eHealth Literacy Scale (adopted from Norman & Skinner, 2006)

The following questions are focused on your outlook and insights when sourcing for nutrition information on the web. Select the most appropriate response to your current opinion and experiences for the following questions and claims.

1. How appropriate do you feel the internet is in aiding you when you want to make health choices?

- Not beneficial at all
- Not beneficial
- Neutral
- Beneficial
- Very beneficial

2. What rating would you give to having the ability to use the internet to acquire health material?

- Not important at all
- Not important
- Neutral
- Important
- Very important

3. Please list the common sources on the web from which you obtain information on nutrition.

……

Please tell us how you feel about the following statements:

4. You have knowledge of what nutrition material are acquirable on the web.

- Strongly dissent
- Dissent
- Neutral
- Assent
- Strongly assent

5. You can identify where to locate valuable nutrition material on the web.

- Strongly dissent
- Dissent
- Neutral
- Assent

- Strongly assent

6. You are aware of how to locate valuable nutrition material on the web.

- Strongly dissent
- Dissent
- Neutral
- Assent
- Strongly assent

7. You can utilize the internet to find answers to your queries on nutrition.

- Strongly dissent
- Dissent
- Neutral
- Assent
- Strongly assent

8. You recognize the way the nutrition information you discover on the web is to be applied.

- Strongly dissent
- Dissent
- Neutral
- Assent
- Strongly assent

9. You possess the skills that I need to judge nutrition material you locate on the web.

- Strongly dissent
- Dissent
- Neutral
- Assent
- Strongly assent

10. You can tell between high quality and low-quality nutrition material on the web.

- Strongly dissent
- Dissent
- Neutral
- Assent
- Strongly assent

11. You feel confident that you can make use of the nutrition information that you discover on the web to make health decisions.

- Strongly dissent
- Dissent
- Undecided
- Assent
- Strongly assent

Thank You For Your Participation!

APPENDIX III. MOUNT KENYA UNIVERSITY MAP

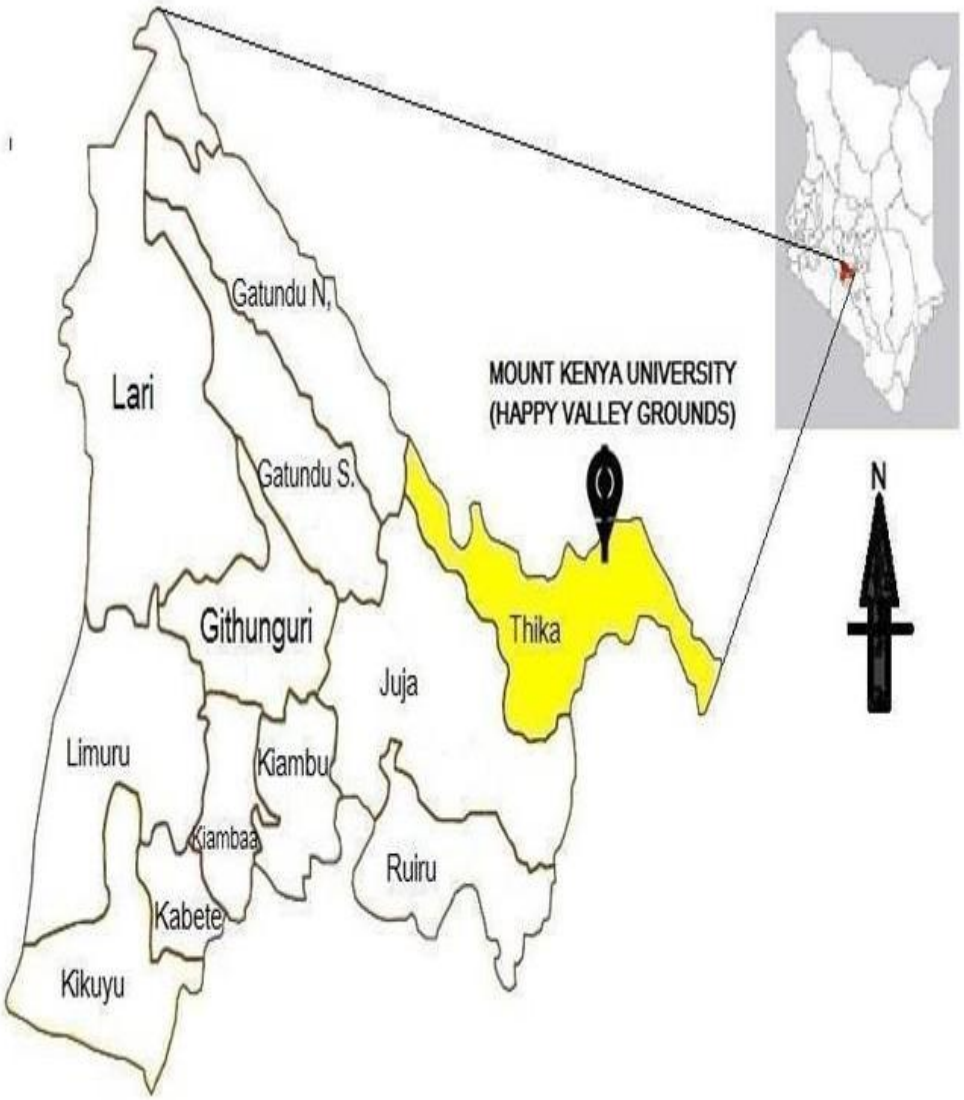
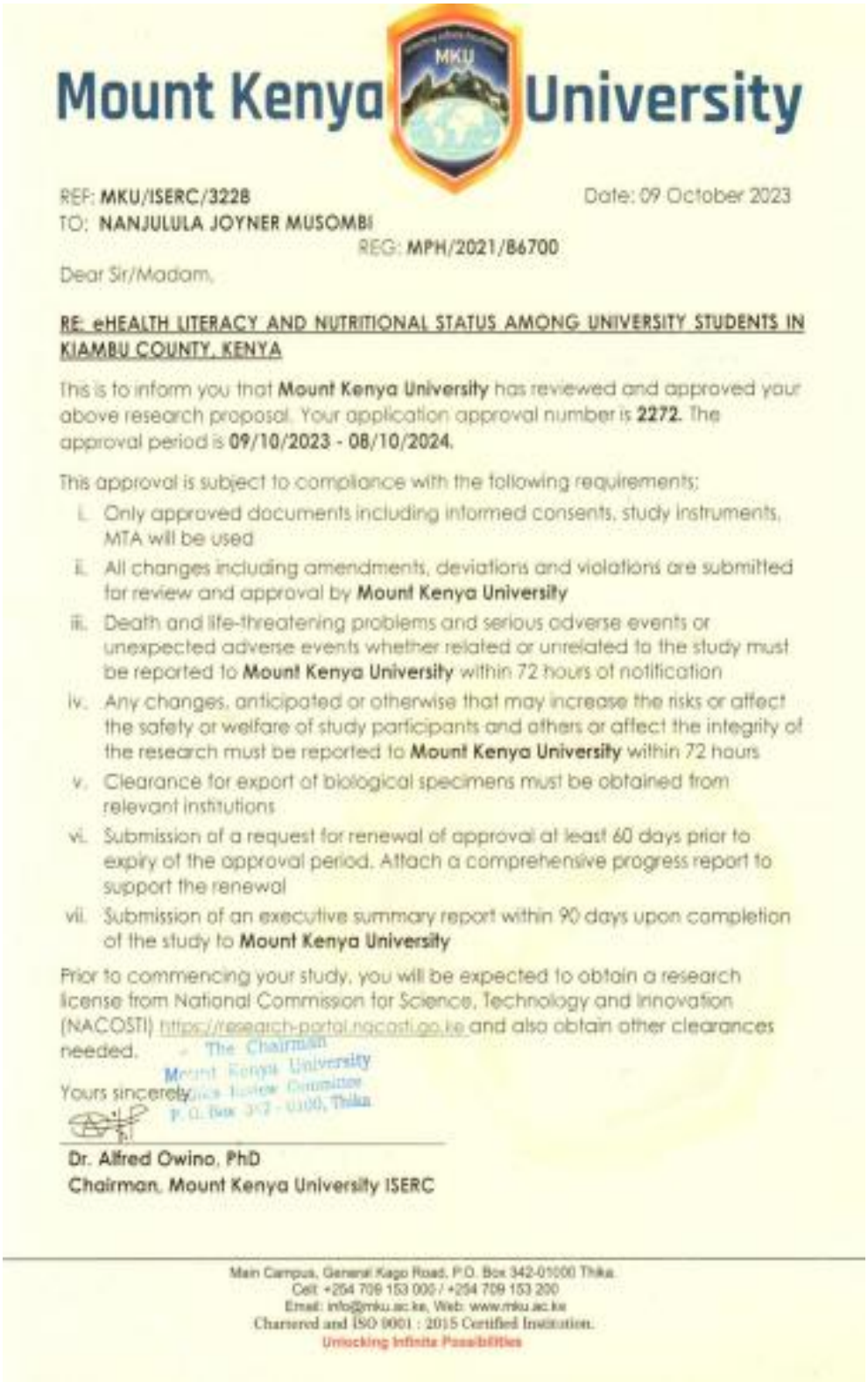


Figure 8. Location of the Study

APPENDIX IV. ETHICAL CLEARANCE



Mount Kenya University

REF: MKU/ISERC/3228 Date: 09 October 2023

TO: NANJULULA JOYNER MUSOMBI

REG: MPH/2021/86700

Dear Sir/Madam,

RE: eHEALTH LITERACY AND NUTRITIONAL STATUS AMONG UNIVERSITY STUDENTS IN KIAMBU COUNTY, KENYA

This is to inform you that **Mount Kenya University** has reviewed and approved your above research proposal. Your application approval number is **2272.** The approval period is **09/10/2023 - 08/10/2024.**

This approval is subject to compliance with the following requirements;

i. Only approved documents including informed consents, study instruments, MTA will be used
ii. All changes including amendments, deviations and violations are submitted for review and approval by **Mount Kenya University**
iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **Mount Kenya University** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to **Mount Kenya University** within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal
vii. Submission of an executive summary report within 90 days upon completion of the study to **Mount Kenya University**

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed.

The Chairman
Mount Kenya University
Ethics Review Committee
P. O. Box 342 - 01000, Thika

Yours sincerely

Dr. Alfred Owino, PhD
Chairman, Mount Kenya University ISERC

Main Campus, General Kago Road, P.O. Box 342-01000 Thika
Cell: +254 709 153 000 / +254 709 153 200
Email: info@mku.ac.ke, Web: www.mku.ac.ke
Chartered and ISO 9001 : 2015 Certified Institution.
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APPENDIX V. RESEARCH PERMIT FROM NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 660467

Date of Issue: 16/October/2023

RESEARCH LICENSE

This is to Certify that Miss.. Joyner Nanjulula Musombi of Mount Kenya University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Kiambu on the topic: eHEALTH LITERACY AND NUTRITIONAL STATUS AMONG UNIVERSETY STUDENTS IN KIAMBU COUNTY, KENYA for the period ending : 16/October/2024.

License No: NACOSTI/P/23/30508

660467

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY &
INNOVATION

Verification QR Code

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Scan the QR Code using QR scanner application.

See overleaf for conditions

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013 (Rev. 2014)
Legal Notice No. 108: The Science, Technology and Innovation (Research Licensing) Regulations, 2014

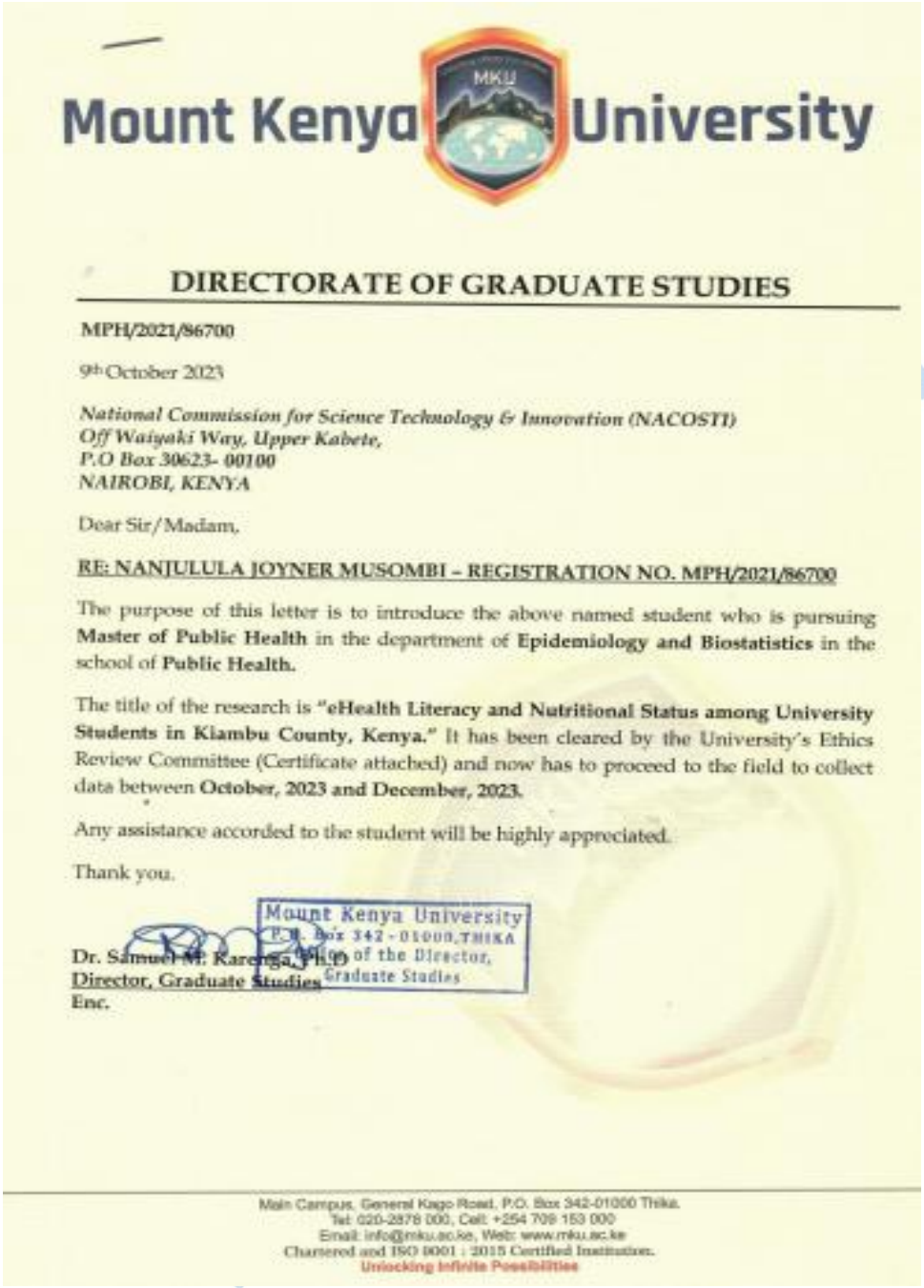
The National Commission for Science, Technology and Innovation, hereafter referred to as the Commission, was the established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

CONDITIONS OF THE RESEARCH LICENSE

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
    i. Endanger national security
    ii. Adversely affect the lives of Kenyans
    iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
    iv. Result in exploitation of intellectual property rights of communities in Kenya
    v. Adversely affect the environment
    vi. Adversely affect the rights of communities
    vii. Endanger public safety and national cohesion
    viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
4. The license any rights thereunder are non-transferable
5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
6. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research.
7. Excavation, filming, movement, and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
8. The License does not give authority to transfer research materials.
9. The Commission may monitor and evaluate the licensed research project for the purpose of assessing and evaluating compliance with the conditions of the License.
10. The Licensee shall submit one hard copy, and upload a soft copy of their final report (thesis) onto a platform designated by the Commission within one year of completion of the research.
11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

National Commission for Science, Technology and Innovation(NACOSTI),
Off Waiyaki Way, Upper Kabete,
P. O. Box 30623 - 00100 Nairobi, KENYA
Telephone: 020-4007000, 0713788787, 0735404245
E-mail: dg@nacosti.go.ke
Website: www.nacosti.go.ke

APPENDIX VI. LETTER OF INTRODUCTION



Mount Kenya University

DIRECTORATE OF GRADUATE STUDIES

MPH/2021/86700

9th October 2023

National Commission for Science Technology & Innovation (NACOSTI)
Off Waiyaki Way, Upper Kabete,
P.O Box 30623- 00100
NAIROBI, KENYA

Dear Sir/Madam,

RE: NANJULULA JOYNER MUSOMBI – REGISTRATION NO. MPH/2021/86700

The purpose of this letter is to introduce the above named student who is pursuing **Master of Public Health** in the department of **Epidemiology and Biostatistics** in the school of **Public Health.**

The title of the research is **"eHealth Literacy and Nutritional Status among University Students in Kiambu County, Kenya."** It has been cleared by the University's Ethics Review Committee (Certificate attached) and now has to proceed to the field to collect data between **October, 2023 and December, 2023.**

Any assistance accorded to the student will be highly appreciated.

Thank you.

Mount Kenya University
P.O. Box 342-01000,THIKA
Office of the Director,
Graduate Studies

Dr. Samuel M. Kareriga, Ph.D
Director, Graduate Studies
Enc.

Main Campus, General Kago Road, P.O. Box 342-01000 Thika.
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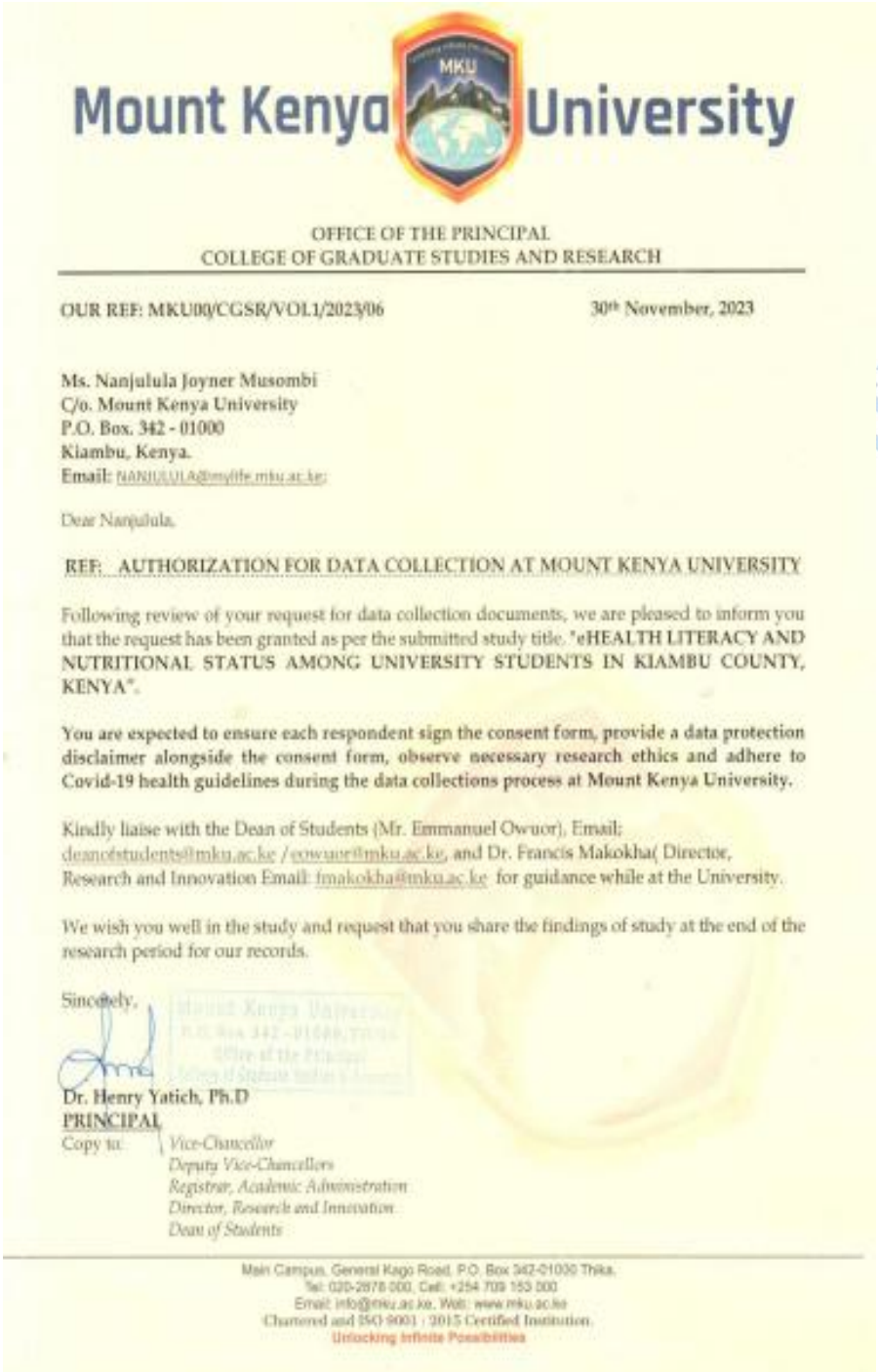
APPENDIX VII. FIELD ENTRY AUTHORIZATION



Mount Kenya University

OFFICE OF THE PRINCIPAL
COLLEGE OF GRADUATE STUDIES AND RESEARCH

OUR REF: MKU00/CGSR/VOL1/2023/06 30th November, 2023

Ms. Nanjulula Joyner Musombi
C/o. Mount Kenya University
P.O. Box. 342 - 01000
Kiambu, Kenya.
Email: NANJULULA@mylife.mku.ac.ke;

Dear Nanjulula,

REF: AUTHORIZATION FOR DATA COLLECTION AT MOUNT KENYA UNIVERSITY

Following review of your request for data collection documents, we are pleased to inform you that the request has been granted as per the submitted study title. "eHEALTH LITERACY AND NUTRITIONAL STATUS AMONG UNIVERSITY STUDENTS IN KIAMBU COUNTY, KENYA".

You are expected to ensure each respondent sign the consent form, provide a data protection disclaimer alongside the consent form, observe necessary research ethics and adhere to Covid-19 health guidelines during the data collections process at Mount Kenya University.

Kindly liaise with the Dean of Students (Mr. Emmanuel Owuor), Email: deanofstudents@mku.ac.ke / eowuor@mku.ac.ke, and Dr. Francis Makokha(Director, Research and Innovation Email: fmakokha@mku.ac.ke for guidance while at the University.

We wish you well in the study and request that you share the findings of study at the end of the research period for our records.

Sincerely,

Dr. Henry Yatich, Ph.D
PRINCIPAL

Copy to: *Vice-Chancellor*
Deputy Vice-Chancellors
Registrar, Academic Administration
Director, Research and Innovation
Dean of Students

Main Campus, General Kago Road, P.O. Box 342-01000 Thika.
Tel: 020-2878 000, Cell: +254 709 153 000
Email: info@mku.ac.ke, Web: www.mku.ac.ke
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APPENDIX VIII. SIMILARITY INDEX REPORT

Nanjulula Musombi

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