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SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

RELATIONSHIP BETWEEN HOME FOOD ENVIRONMENT, DIETARY INTAKE AND HEALTH STATUS OF THE ELDERLY IN LEDZOKUKU KROWOR MUNICIPALITY

BY

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(10704265)

THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PUBLIC HEALTH DEGREE

JULY 2019

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DECLARATION

I, Vincent Mawuli Fedieley, declare that except for the other people's investigations which have been duly acknowledged, this work is the result of my own original research, and that this dissertation, either in whole or in part has not been presented elsewhere for another degree.

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Date: 27-02-2020

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(Supervisor)



Date: 27-02-2020

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DEDICATION

I dedicate this work to my dear wife Deborah Atta Konadu Fedieley of-blessed-memory and our daughter Emmanuella.

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ACKNOWLEDGEMENT

Thanks and praise to the Almighty God who guided and protected me to complete this course.

I also wish to express my sincere gratitude to the following individuals and groups who contributed to the successful completion of this study:

Dr. Gloria Kweiki Folson for the provision of the concept and guidance of this study, as well as her careful review and editing of this dissertation.

The staff of Ghana Health Service, Ledzokuku Krowor Municipality, especially Mrs. Esther Dadebo and Ms. Sanatu Braimah for inspiring and encouraging me to pursue further studies.

I am also grateful to Dr. Isabella Sagoe-Moses, Mrs. Ernestina Agyepong, Pastor Maxwel Hotor and Mr. Samuel Antwi-Atuahene for their numerous contribution toward the completion of the work.

Lastly to my research assistants Naomi Adjartey and Nancy Ashai who assisted me in data collection and to all friends and loved ones who prayed with me.

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ABSTRACT

Background

Population ageing is the success story of the 21st century. As a result of population ageing, the world is facing an unexpected demographic change. Per the 2010 Population and Housing Census, the aged (60+ years) constitute 6.8% of Ghana's population. The home represents the physical environment where the elderly spend majority of their time. The home food environment therefore affects the eating habits of the elderly based on the availability of healthy and unhealthy foods. This study seeks to explore the relationship between home food environment, dietary intake and health status of the aged (60+ years) in Ledzokuku-Krowor Municipality (LEKMA)

Methods

This study was an observational cross-sectional study conducted in Ledzokuku-Krowor Municipality. Three hundred and fifty-five (355) elderly persons aged 60+ were interviewed using a structured questionnaire.

Bivariate and multivariate logistic regression was used to examine factors associated with dietary intake in home environments with health outcome such as obesity and hypertension. Analysis was done using Stata version 15.

Results

Three hundred and fifty-five (355) participants were interviewed for the study. Majority of participants were female 200 (56.4%) female. Healthy foods like fruits and vegetables were consumed 3-4 times in a week. Participants rarely consumed unhealthy foods like pastries and fizzy drinks.

The average frequency of consumption of fruits per week was 10.18 with a minimum of 0 and a maximum of 53 categories of fruits consumed. In addition, the average frequency of consumption of vegetables per week was 32.23 with minimum of 2 and maximum of 94

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categories of vegetables consumed The analysis indicated that 65.1% had normal weight whereas 14.4% were obese. Majority of the elderly who were obese were between the age group 60-60years.

Majority (73%) of respondents perceived their health status as good, only a few (6%) perceived their health status as bad. The results showed that age was positively associated with BMI of respondents. Those who had healthy food environment were 1.97 times more likely to perceive their health as good as compared to those in unhealthy food environment.

Conclusion

The study results revealed that majority of respondents had healthy food environment; a considerable number of the elderly were obese. In addition, BMI of respondents were associated with fats consumption. Majority of the respondents perceived their health as good. In addition, most of the elderly were hypertensive

The study also showed that majority of the respondents had healthy home food environment, and there was a positive association between frequency of intake of healthy food and availability of health foods at home and self-perceived health status of the elderly.

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LIST OF ACRONYMS

BMI	Body Mass Index
GSS	Ghana Statistical Service
IADL	Independent assisted daily living
LEKMA	Ledzokuku Krowor Municipal Assembly
LLIN	Long lasting insecticide-treated net
LMICs	Low-and-middle-income countries
MNA	Mini nutrition assessment tool
NGOs	Non-governmental organisation
PHC	Population and Housing Census
PRB	Population Reference Bureau
UN	United Nations
UNFPA	United Nations Population Fund
US	United States
WHO	World Health Organisation

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CHAPTER ONE

INTRODUCTION

1.1 Background to study

Population ageing has become a milestone considering achievements in the 21st century. Strides in public health interventions, industrialization, disease and injury prevention, improvements in medical technology have resulted in persons living longer and healthier lives throughout the world (Bosu et al, 2019).

As a result of population ageing, the world is facing an unexpected demographic change. It is projected that by 2050, the elderly population aged 60 years and above will increase from 600 million to almost 2 billion. The population of the elderly is expected to double from 10 per cent at the beginning of 2000 to 21 per cent by 2050. This increase will be excessive and fast in developing countries where the older population is expected to quadruple during the same period (Deben et al.,2014). In Ghana life expectancy at birth has increased from 50 years for males in 1984 to 60.2 years in 2000 and from 54 years to 63.4 years for females over the same period (Ghana Statistical Service, 2013).

The diet of many elderly persons does not meet their nutrient requirements (Leslie & Hankey, 2015). They are exposed to changing eating habits as a result of industrialization and westernization of local foods as well as to inadequate nutrition at home because they depend on meals prepared at home (Dake et al, 2016). Inadequate dietary intake in elderly people is often multi-dimensional and may be due to reasons such as unhealthy food environments, poor meal planning, inadequate social support, poor appetite, and dental problems (Anauati et al., 2015).

The term ‘food environment' encompasses geographic access to food in the environment where an individual lives, the place food is purchased for example, food outlets, services

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and infrastructure in institutional settings, or the information available about food (Feng et al., 2018). Food environments are created by the human-built and social environments and can influence individuals' food buying and dietary selections, the quality of their foods, and diet-related health outcomes (Ni Mhurchu et al., 2013). Food environments therefore set the background against which food acquisition occurs by giving several opportunities and restrictions that affect choices of what to eat.

The home food environment is influenced by the presence of healthy and unhealthy foods and how the elderly eats (Kegler et al., 2014). For instance, whether the elderly consume fruits and vegetables or not is related to whether they are present at home (Bloom et al., 2017). It has been suggested that if healthy foods are available and accessible in the home, the elderly are more likely to eat these types of foods (Reitzel et al., 2016)

Obesity in the elderly population is typically a result of an obesogenic environment and increased body fat accumulation during ageing in response to reduced basal metabolism and energy expenditure. It is also a result of unhealthy lifestyles and home food environments (Maters, 2012).

A study by Gorin et al, 2011, revealed that normal weight adults had healthier snacks, fruits and vegetables as compared to their overweight counterparts who had high fats snacks and less fruits and vegetables**.** Also, the elderly are mostly confined to their homes compared to children, adolescents and adults. Averagely, older persons aged 65 years and above spend 80% of their time at home (Baltes, 2005). According to Kegler et al 2014, since greater portion of caloric intake (68%) is from the home food environment, this influences behaviours which affect weight and health status (Kegler et al., 2014).

In Ghana changing food environments in accordance with the nutrition transition and increasingly unhealthy dietary choices are fuelled by the increase in availability of energy-

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dense fast foods, take-away and increasingly unhealthy foods prepared at home. These foods are readily available and accessible, become convenient sources of calories. Overconsumption of these foods lead to obesity and lifestyle diseases like hypertension among the elderly (Gatimu et al, 2016). Most elderly people (60+) are prone to consumption of fatty and sugary foods because they are tasty and the most affordable (Amuta et al., 2015). The consumption of such fatty and sugary foods coupled with the appetite changes as a result of medications during ageing put them at risk of poor nutrient intake which adversely affects their health status (Leslie & Hankey, 2015).

Diet and lifestyle, combined with a steady and healthy body weight are vital in preserving adequate health for all age groups, most importantly for the elderly. This is because the elderly are less mobile and may not exercise as rigorously as the younger population. Ensuring sustainable and optimal nutrition status has great impact on health and wellbeing through delaying and minimizing the threats of disease.

Although nutrition is a key factor for successful ageing, not much information is available on factors that affect nutrition of the elderly in Ghana. A study by Tayie et al. (2004) in Accra, using body mass index (BMI) to assess nutritional status found that 48 per cent of elderly persons were in the undernourished category. Steiner-Asiedu et al., (2010) also found that the elderly form the largest section of the Ghanaian population with issues relating to inadequate nutrition. The study found that about half (3 males and 20 females) reported experiencing hunger and attributed their loss of weight to not having enough to eat and two respondents reported they went a whole day without eating (Steiner-Asiedu et al., 2010). Conversely, a study on over nutrition among adults in Ghana found that overweight and obesity increase the risk for disease conditions, such as diabetes mellitus, hypertension, coronary artery diseases and cancers (Pereko et al., 2013).

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Another study on the diseases of ageing in Ghana, (Ayernor, 2012) found that 45 per cent of elderly persons had oral health problems, 33 per cent were hypertensive, 14 per cent reported having arthritis. In the same study, 7 per cent were diagnosed with diabetes, 6 per cent had a cardiovascular condition (angina) and 4.9 per cent were receiving treatment for stroke or had been diagnosed with stroke. (Ayernor, 2012)

In the Global Ageing and Adult Health study (SAGE), more than half of the respondents (55.3%) who were assessed using BMI had normal nutritional status, 9.8% were obese, 19.8% were overweight and underweight as 15.2%. The proportion of women who were obese was twice that of men, with a significant number in urban areas (17.6%) compared to respondents in rural areas (4.3%) (Biritwum & Mensah, 2014).

It has been estimated that 60% of deaths globally are because of non-communicable diseases like diabetes, cardiovascular disease, chronic respiratory disease and cancers. In 2008 alone it was estimated to cost US$2.35 trillion and is expected to rise in subsequent years (Noble et al., 2012)

The purpose of this study is to assess home food environment, dietary intake and the health status of the elderly in the Ledzokuku Municipality and how these are inter-related.

1.2 Problem statement

Nutrition is essential for development throughout the years of life and for the elderly. Poor nutrition poses a risk for impaired physical and mental functioning among the elderly, risk of obesity, and other non-communicable diseases.

The WHO estimates that 540 million elderly individuals have diet or nutrition-related deteriorating disease such as cardiovascular, cerebrovascular, diabetes, osteoporosis, cancer, Osteoporosis (WHO, 2000).

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Family and home environment play an important role in the nutrition of the elderly because they depend on what is prepared at home for their daily sustenance (Baltes, 2005). The home environment, therefore influences the diet and health status of individuals through the food options available (Kegler et al., 2014).

This suggests that there is a need to address and promote healthy food environments, daily dietary intake and subsequently good health of the elderly (Anauati et al., 2015).

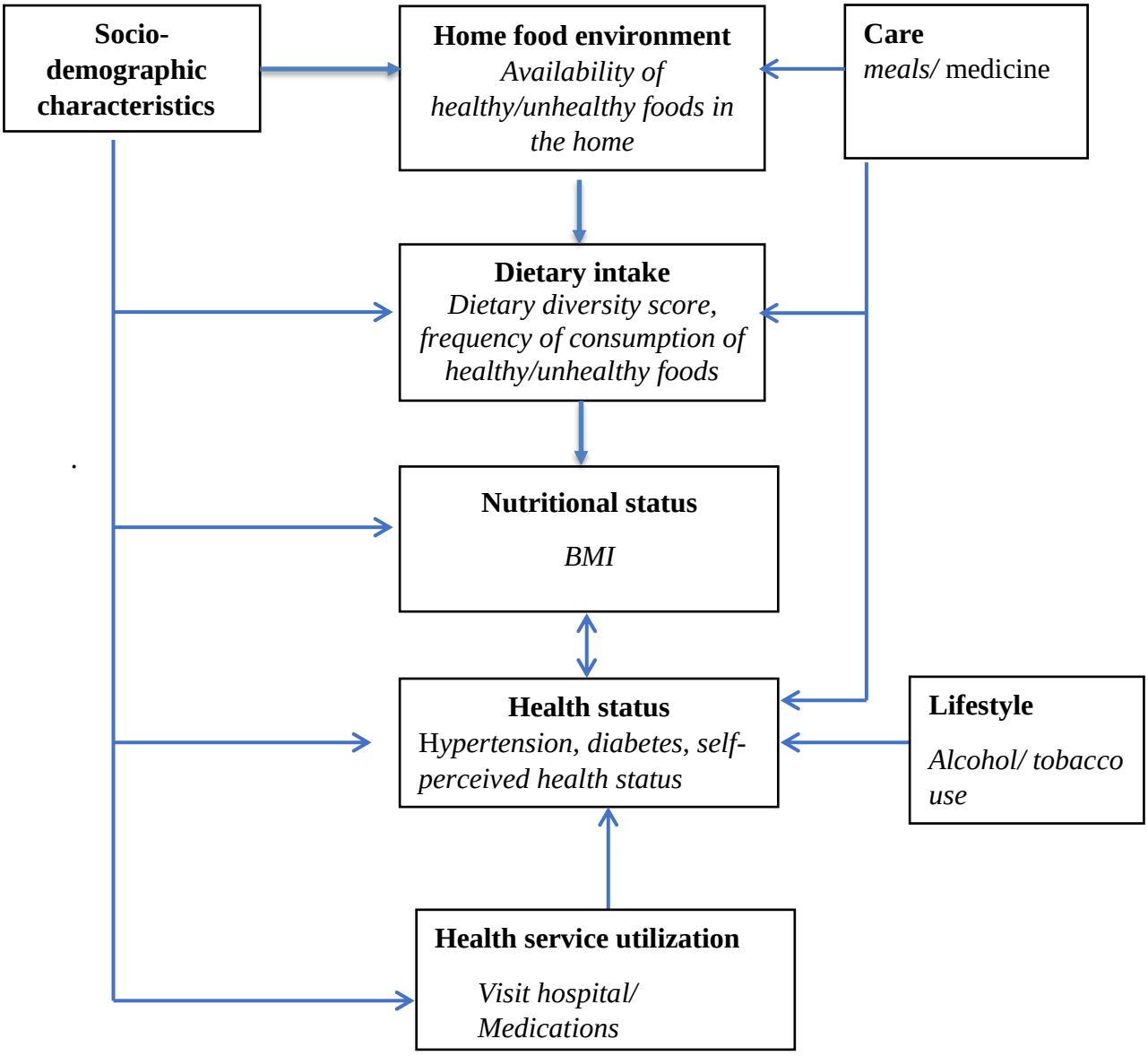
This present study aims to provide answers to the following research questions:

1. What is the home food environment of the elderly in the LEKMA comprised of?
2. What is the influence of the home food environment on the dietary intake of the elderly in the LEKMA?
3. What is the relationship between dietary intake and the health status of the elderly?
4. What is the relationship between home food environment and health of the elderly?

By providing current information on the home food environment, dietary intake and health status of the elderly in Ghana the results of this study will inform policy and intervention to improve the health of the elderly.

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1.3 Conceptual Framework



Source: adapted from (Kegler et al., 2014 and Masters, 2012)

In the framework above, socio-demographic characteristic is an important factor in the assessment of the home food environment of the elderly. Some of the important socio-demographic characteristics which affect the home food environment include marital status, income, educational status and social support the person receives because they are important in food preparation and nutritional status of the elderly (Bradshaw & Bradshaw, 2013).

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Elderly people with low income and family support are likely to consume less fruit vegetables, fiber-rich foods, and dairy product (Masters, 2012)

The home food environment plays an important role in elderly nutrition as it has been found that the elderly consumed about 80% of their regular energy from home food source (Baltes, 2005). Availability of healthy foods such as fruits and vegetables facilitates their consumption by the elderly, likewise the availability of unhealthy foods like pastries and fizzy drinks (Kegler et al., 2014).

Among the elderly, the consumption of whole grain, foods rich in fiber, fruits and vegetables and foods less in fats and sugar is recognized for healthy development. Consumption of unhealthy foods like high fat and protein diets, fizzy drinks and alcoholic beverages exposes the elderly to non-communicable diseases like hypertension, obesity and diabetes (Mercille et al., 2012).

As discussed earlier, choice of food depends on what the elderly has available at home. However, this does not only involve the availability of healthy and unhealthy food at home, but the consumption of these foods to meet the nutrition requirement of the aged. Meeting the nutrition requirements of the elderly at home involves the improvement of dietary and nutrient intake by providing meals with good nutrition composition which is important for maintaining good health, functional abilities and quality of life (Leslie & Hankey, 2015). In a study among the aged, those who consumed fruits and vegetables at least four times a week had the highest score on the healthy ageing index and does not visit the hospital regularly (Shlisky et al., 2017).

Consumption of refined sugars, high fat and salt intake, poor intake of fiber have effects on ageing.

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The home food environment, dietary intake and the nutritional status of the aged influence their health status. Very important outcomes which measure the health status of the elderly are their self-perceived health status and the presence of disease conditions like obesity, diabetes, hypertension, dental problems among others. They become aware of their health status by visiting the hospital regularly, whether they are on medication for a known health condition and addicted to lifestyle behaviours like alcohol and tobacco use. In the SAGE study, the overall self-perceived health status among the aged in Ghana was fair. Some (41%) of the respondents rated their personal health as good or very good; 17% rated their personal health as bad or very bad. Self-perceived health status was poorer among the oldest age groups 70 and above (Biritwum et al., 2014).

1.4 Justification of study

The elderly population spend most of their time at home and therefore are more likely to consume the food most readily accessible to them in that space. Studies about their dietary intake, which affect their health status, are scarce. This study will provide information on home food environment of the elderly. In addition, the study will provide data to fill the gaps in knowledge about the relationship between home food environment, the nutritional status and health of the elderly. This will help plan health services and promotional activities to improve the overall quality of life for the aged.

1.5 Aims and Objectives of study

1.5.1 Aim of the study

To assess the relationships between home food environments, dietary intake and the health status of the elderly in the Ledzokuku Krowor Municipality.

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1.5.2 Objectives of the study

1. To assess home food environment of the elderly in Ledzokuku Krowor Municipality.
2. To assess the dietary intake of the elderly by measuring consumption of some healthy and unhealthy foods over the past week, administering a food frequency questionnaire (FFQ) and conducting 24-hr recall.
3. To assess the nutritional status of the elderly in the LEKMA area using anthropometry.
4. To assess the health status of the elderly using blood pressure (BP) measurement and self-reported disease status and self-perceived overall health status.
5. To assess the associations between home food environment, dietary intake and health status of the aged.

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CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covers, the health challenges of the aged, the role of nutrition and lifestyle in health, and the importance of home food environment to the elderly aged 60 years and above.

2.2 The health challenges of the aged

Health conditions and ageing precipitates the increased risks for several non-communicable diseases for example, cardiovascular disease, diabetes and cancer. Given data from the Centres for Disease Control (CDS/National Centre for Health statistics, 2017) those 65 years and above present more than twice the prevalence of heart disease, diabetes and cancer than those between the age group 45–64 years (Marsman et al., 2018).

2.2.1 Cardiovascular disease

The age-related increase in cardio vascular disease (CVD) morbidity and mortality are due to incidence and prevalence of coronary heart disease (CHD), peripheral arterial disease (PAD), heart failure (HF), valvular heart disease, and stroke. In 2005 CVD was the underlying cause of death in 864,480 of the approximately 2.5million total deaths in the United States, and adults aged 65 years or older accounted for 82% of all deaths attributable to CVD (Yazdanyar et al., 2009).

According to Rodgers et al, 2019, the prevalence of CVD increase with age, in both men and women, leading to the prevalence of atherosclerosis, stroke and, myocardial infarction. Many risk factors have been linked to the development of CVD, such as hypertension, diabetes, and obesity. In the AHA 2019 Heart Disease and Stroke Statistical Update, the incidence of CVD was reported to be 77.2% in males and 78.2% in females, from ages 60–

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79 years. Furthermore, the incidence of CVD was reported to be 89.3% in males, and 91.8% in females, in adults above 80 years of age. With respect to coronary artery disease (CAD), the strongest risk factors are male gender and age (Rodgers et al., 2019). According to the Global Burden of Disease Study, cardiovascular diseases were the leading cause of death in Africa in 2017, being responsible for 1.42 million deaths in that year or 16.4% of the total deaths in all ages compared with 11.3% of total deaths in 1990. The mortality represents a 61.0% increase over the estimated number of cardiovascular deaths in 1990. High systolic blood pressure (SBP) accounted for nearly two-thirds of the cardiovascular deaths in Africa in 2017 (Bosu, et al., 2019)

2.2.2 Hypertension

High systolic blood pressure (SBP) accounted for nearly two-thirds of the cardiovascular deaths in Africa in 2017 resulting in the highest prevalence of raised blood pressure (27%) in the world. The increasing burden is attributed to ageing, increasing population and adoption of unhealthy lifestyles (Bosu et al., 2019)

A work by Biritwum et al., 2014 on the elderly in Ghana indicated that, the proportion of respondents with isolated systolic hypertension was 40.8%, the proportion with isolated diastolic hypertension was 48.5% and with hypertension (elevations of either, or both, systolic and diastolic values) was 54.6%. The proportion of respondents with optimal blood pressure was 19.3%, normal blood pressure was 12.6%, and high normal blood pressure was 13.6%. The proportions of respondents with mild, moderate and severe hypertension were (24.7%, 16.0% and 13.7% respectively) (Biritwum et al., 2014)

In addition, Benetos et al, 2019 that found that majority of the elderly 60 years and above had their SBP increasing with age, whereas DBP concomitantly remains stable or decreases (Benetos et al., 2019).

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A study on the health status of elderly aged 55 years and above in the United States from 2004 to 2007, it was found that close to half of the elderly aged 55 years and above (47.3%) had hypertension and 31.6% (Schoenborn & Heyman, 2009).

2.2.3 Obesity

In a study by Mathus-Vliegen involving 52, 921 subjects aged 65 years and above, 20.3% were in the obese category. Age group 65 to 74 years, representing 25% had a BMI of ≥30 kg/m2 which was significantly more than the 16.6% prevalence in the 75 to 84 year age group and the 9.9% prevalence in the ≥85-year age group (Mathus-Vliegen, 2012). In the same study, prevalence of obesity among the elderly increased with age 60 years and above.

According to Biritwum et al, 2014, obesity is a well-known risk factor for type-2 diabetes mellitus and is associated with some of the major risk factors for cardiovascular disease accounting for 65%-80% new cases of diabetes.

2.2.4 Diabetes

According to Global report on Diabetes, WHO (2016), the prevalence of diabetes and increasing lifespans in many populations with diabetes may be leading to a changing spectrum of the types of morbidity that accompany diabetes. Diabetes has been associated with increased rates of specific cancers, and increased rates of physical and cognitive disability. After the age of 50, middle-income countries have the highest proportion of deaths attributed to high blood glucose, for both men and women. Except for high-income countries, the proportion of deaths attributable to high blood glucose for both men and women are highest in the age group 60–69 years Diabetes can damage the heart, blood vessels, eyes, kidneys and nerves, leading to disability and premature death (WHO, 2016).

In a study by Gatimu et al., 2016 on diabetes among older adults, respondents aged 60 to 69 years were twice likely to have diabetes compared to those aged 50 to 59 years respectively.

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In addition, respondents with university and secondary education were five and two times more likely to have diabetes than those who had never been to school respectively. The prevalence of diabetes among older adults increased with age from 1.13 to 1.57% among 50 to 59 years and 60 to 69 years respectively (Gatimu et al., 2016).

Also, a study by Minicuci et al., 2014 found that stress-related, sedentary, and affluent lifestyle related conditions such as hypertension and diabetes were linked to prevalence of stroke, diabetes, and hypertension among the elderly in urban areas (Minicuci et al., 2014)

2.3 Self-Perceived health status of the elderly

In a study conducted by the Global Study on Ageing (SAGE) group, the overall self-perceived health status was fair. Some (41%) of the respondents rated their personal health as good or very good; 17% rated their personal health as bad or very bad. Self-perceived health status was poorer among the oldest age groups 70 and above (Biritwum & Mensah, 2014).

A study by Fernandez-Martinez et al, (2012) on regional and sociodemographic inequalities among the elderly in Spain found that poorer self-perceived health status was observed in the south and northwest regions. Positive self-perceived health status was more frequently reported by men (62.7%) than women (51.7%) (Fernandez-Martinez et al., 2012).

A study by Vellas et al. (2006) used a five-scale item to assess self-perceived health status compared to peers of the same age. It was found that 24.7 per cent had difficulty rising from a chair, 41.3 percent needed to use the chair arm to rise to a standing position and 34.7 percent have problem with balancing.

A study by Steiner-Asiedu et al., (2010) among the elderly found that less than a quarter self-perceived their health as been in good, while 87.5% self-perceived their health was fair or poor. More females than males reported of being in ‘good health’, while more males than

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females said they were in 'fair health'. Majority of the respondents (71.7%) reported having a chronic disease condition, 73% of whom suffered more than one chronic condition, and this was more prevalent among the females. The most prevalent chronic diseases were arthritis (60%), hypertension (43.5%), and heart disease (24.4%) (Steiner-Asiedu et al., 2010).

2.4 The role of nutrition in ageing

The role of nutrition and lifestyle behaviours have been studied extensively to promote the health status of the elderly. According to Groot et al., (2004), smoking and low quality diet increases mortality among the elderly and women in Europe. The same study realised that the increasing unhealthy lifestyle behaviours such alcohol and tobacco consumption among the elderly was also likened to very high mortality rate. The study results showed that participants who engaged in three (3) healthy lifestyle behaviours had twice the chance of survival than participants with no healthy lifestyle behaviours. A healthy lifestyle was not only related to reduced mortality but a good self-perceived health status and healthy ageing. Smoking and physical inactivity resulted in three (3) time increased risk of a decline in self-perceived health status disability among the elderly (Groot et al., 2004).

A report by British Nutrition Foundation on ageing (2009) revealed the role that nutrition and lifestyle behaviours play in delaying age-related ill health. Its showed that decreasing the intake of fatty acids in the diet by reducing the intake of foods rich in fats and increasing the intake of omega 3 from fish sources reduces the risk of heart diseases.

Obesogenic behaviour, especially excess calorie consumption is common in developing countries due to the nutrition transition (Bawaked et al., 2017) This transformation has brought about nutrition-related chronic diseases associated with the adoption of modern lifestyles. Urbanization in Sub-Saharan Africa is characterized by the consumption of

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Western foods like toffees, carbonated soft drinks and fast foods especially in cities. In the Transition and Health during Urbanization of South Africans (THUSA) study, it was revealed that reduced consumption of carbohydrates and plant-based proteins affects healthy ageing (Vorster & Venter, 2005). While some aspects of urbanization were associated with improved mental and physical health due to the increased consumption of micronutrients, other aspects led to an increase in overweight and obesity with attendant increases in increasing NCDs (Vorster & Venter, 2005). It also found that the increased consumption of energy dense snack-based foods, sweetened carbonated beverages, red meat, fast foods, and take away foods predisposes them to chronic diseases. This has brought about high mortality and non-communicable diseases in Africa (Dake et al., 2016).

A study by Pereko et al (2013) also revealed that obesity increases the risk for many disease conditions, such as diabetes mellitus, hypertension, dyslipidaemia, coronary artery diseases and some cancers (Pereko et al., 2013).

Meeting the nutrition requirements of the elderly at home involves the improvement of dietary and nutrient intake by providing meals with good nutrient composition which is important for sustaining adequate health, physical strength and quality of life (Leslie & Hankey, 2015).

A study by National Academy of Science, Engineering and Medicine, identified that only caloric control during ageing with a good dietary composition promotes healthy ageing and longevity (Marsman et al., 2018). In a study among the aged, those who consumed fruits and vegetables at least four times a week had the highest score on the healthy ageing index and does not visit the hospital regularly (Shlisky et al., 2017).

Consumption of refined sugars, cholesterol and salt intake, poor intake of fibre are risk factors for obesity and hypertension which affects healthy ageing. In the same study, there

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was insufficient consumption of legumes, whole grains, nuts or seeds, fish, lean meat, poultry, and milk and milk products. For healthy ageing there should be less consumption of refined cereals and legumes, processed meats, fried foods, and sugar, preserves and syrups (Shlisky et al., 2017)

Physiological changes coupled with lifestyle behaviours such as smoking, diet related behaviours like large meals, fatty foods, caffeine and medications like anti-inflammatory drugs lead to peptic and gastric cancers in the elderly. These diseases affect food consumption and lead to conditions such as anorexia, weight loss, anaemia, vomiting and dysphagia (difficulty in swallowing). Fruits, vegetables and supplements, however, contain vitamins A and E which contain antioxidants that protect the cells from free radical destruction leading to prolonged life (Mak & Caldeira, 2014).

A study in India, showed that more than 50 per cent of the older population is malnourished and over 90 per cent because the elderly have energy intake below the recommended allowance (Mathew et al, 2015).

Medications used to manage non-communicable diseases can lead to malabsorption of nutrients causing the reduction of micronutrients which are important for healthy ageing (Marsman et al., 2018).

2.5 The influence of home food environment on food intake

Food environments have been reported to be a predictor of food choice and diet quality among individuals in developed countries.

A study of children and adolescents revealed that parents influence their eating behaviours through the foods made available at home, how meal is prepared and practices related to feeding them. The study, which compared adolescents whose parents were unconcerned about dietary intake and the ones whose parents were concerned about their dietary intake.

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It revealed that adolescents of concerned parents did not have cakes/sweet biscuits, potato chips/salty snacks, and chocolates hard candies at home. However, there was no difference between concerned and unconcerned parents in the availability of fruits and vegetables at home. (MacFarlane et al., 2010).

In a similar study of children and adolescents 6-17 years, it was found that the home food environment is an important setting with regard to a child's dietary intake and the development of obesity since 65% to 72% of daily calories are consumed in the home. It has been proposed that homes with normal weight children are more likely to have healthier food options available and limited access to unhealthy foods (Nepper et., 2014).

It was also found among adolescents that the availability of fruits and vegetables at home was positively associated with fruit and vegetable consumption (Masters, 2012). Among adolescents, approximately 60% of meals and snacks are still consumed at home (Masters, 2012).

The family meal forms part of the home environment, which plays an important role in determining the overall health status of the family. In a study in New Zealand they found that adolescents who eat meals with their families eat more fruits and vegetables, and drink fewer sugary drinks, do not skip breakfast, and have better nutritional status, particularly for calcium and saturated fat. The study also revealed associations between income, meal preparation instructions, availability of fruits at home and being Hispanic. The results showed that family meals consumption was not associated with the availability of unhealthy foods like pastries, sweets and fizzy drinks or with fast foods and fried foods, which were consumed in the afternoon as snacks. (Utter et al., 2008).

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In a similar study of adult black American women aged 35-65 years in which household food lists in the past week were taken, women reported an average of 14 types of fruits and vegetables in their home (Kegler et al., 2014).

Among adults, foods rich in fats at home were associated with fat intake. Availability of fruit and vegetable were related to fruit and vegetable consumption and less fat intake (Kegler et al., 2014).

Gorin et al found that overweight adults had less low-fat snacks and fruit and vegetables in the home and more high-fat snacks than did normal-weight adults. Studies have shown that households with overweight individuals consumed foods rich in fat and calories than those with normal-weight adults. It also suggests that frequency with which family meals are obtained from non-home sources, such as sit down restaurants, take away, and delivery, has consequences for weight management and health status of the home food environment (Kegler et al., 2014). Baltes (2005) revealed in a study among the elderly that household and home food environment plays an important role in elderly nutrition as it has been found that the elderly consumed about 80% of their daily energy from home food source (Baltes, 2005).

2.6 The influence of family and caregivers on food consumption

In particular, living alone has been identified as a determinant of poor nutrition (Charlton, 2017). However, studies have reported lack of associations between living alone and nutritional status in some groups. A study conducted in the UK reported some associations between the consumption of fruit and vegetables and marital status and living arrangement. Previous research has found that older men and women who live alone have worse diet quality than those living with a partner. A study of adults aged over 50 years in the EPIC (European Prospective Investigation into Cancer and Nutrition) cohort (UK) found that

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people who were single or widowed had decreased variety of fruit and vegetable intake in comparison to those who were married, in men more than in women (Robinson, 2017).

Living alone is well-documented as a risk factor for nutritional inadequacy during old age. Mourning the loss of a loved one and the effect of depression may also serve to reduce appetite and food intake. For many, eating is regarded as a social activity, and thus an absence of companionship manifests in loss of pleasure normally associated with both cooking and eating. Increased intakes have been observed when in company, dining within relaxed meal environments and when a television or radio is playing to simulate company (Host, et al., 2016).

Home food environment is important for food availability and how meals are prepared at home by families because they strongly influence dietary intake in individuals (Masters, 2012).

The quality of home food sources depends on methods used to prepare food. Whereas some studies have shown that family meals are associated with better diet quality and healthy weight, others report that it is associated with socio-demographic characteristics.The study by Marsman et al (2012) on family meals and the association between weight and eating behaviours of mothers and fathers revealed associations between frequency of family meals per week and fruit and vegetable intake for fathers. Fathers who ate no family meals per week consumed 1.1 fewer servings of fruit and vegetables than fathers who ate seven or more family meals per week. Significantly, decreased fruit and vegetable consumption was also observed for fathers eating less than seven family meals per week relative to fathers eating seven or more meals per week.

A study reported that family meals prepared by caregivers were associated with higher BMI for African American adolescents unless recommended healthy cooking methods are used.

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In the same study, healthier cooking methods was associated with less adolescent obesity. It revealed that women in reproductive age, who used healthier cooking methods in meal preparation like steaming, stir-frying and braising were observed to result in meals with lower caloric content (Kegler et al., 2014).

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CHAPTER THREE

METHODOLOGY

3.1 Study site

Ledzokuku-Krowor Municipality (LEKMA) is one of the newly created districts of the Greater Accra Region that was carved out of Kpeshie sub-metro. It was established on the 1st of November, 2008 and inaugurated on 29th February 2009 under the Legislative Instrument; LI1815.

The Municipality has an estimated projected population of 269,379 (projection from 2010 census). It forms about a fourth of the total population in the region and grows at an estimated 4.0% annual growth rate.

The working-class forms about 43% of the population between the ages of 16 and 45 years.

According to the 2010 Population and Housing Census, the population of the elderly 60 years and above in the Municipality was 11, 547 with a total dependency ratio of 53.2, making it an ideal location for this study since it can provide the needed sample of elderly people.

There are twenty-four electoral areas in Ledzokuku Krowor municipality namely Tsui bleoo central, Tsui bleoo North, Teshie-Nungua North, Sutsuruno, Teshie-Nungua Estates South, Nii Laweh Blekese East, Addo-Gonno, Baatsonaa, Mukwedjor, Blekese West, Nii Odai Ablade, Nkpor, Kliowe Koo Naa, Sookpoti, Okpoi Gonno, Aborlebu, Akror West, Okesekor, Tsui bleoo South, Antsewere Gonno, Akro East, Agblezaa and Nii Ashitey Akomfra.

Six electoral areas were selected randomly for sampling of study participants as follows: Tsuibleoo Central, Tsui bleoo North, Agblezaa, Teshie-Nungua Estates South, Addo Gonno and Okpoi Gonno (GSS, 2014).

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There are three (3) public health facilities in Ledzokuku Krowor namely Lekma Hospital at Teshie, Lekma Polyclinic at Nungua and Teshie Community Clinic, Teshie Maami.

3.2 Study design

This study employed a cross-sectional study design. Primary data comprising the socio-demographic characteristics of the respondents, their food environment, dietary intake, and overall health statuses was collected in June and July 2019. Data was collected from males and females aged 60 years and above in accordance with WHO definition of older persons (WHO, 2001).

3.3 Study population

The study participants were elderly persons of both sexes; aged 60 years and above who lived in the Ledzokuku Krowor Municipality.

3.4 Sample size determination

The sample size estimate was calculated using the Cochran's formula for categorical variables as shown below;

$n= [(Z\alpha/2)^{2*} P (1-P)] /e^2$

Where

n= sample size

Zα/2 = Standard normal variate of α set at 5%, this is 1.96 on the Z table

P =Prevalence of obesity among the elderly

e= Margin of error, set at 5%, therefore;

$n = [(1.96)^2 (0.30) (1-0.30)] / (0.05)^2$

n = 0.8067 / 0.0025

n = 322.69

n=323

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The main assumption for the calculation of the sample size is a prevalence of 30% obesity and 55% hypertension among the elderly in Ghana (Biritwum et al, 2014). The prevalence was taken from this study because the study population was similar to that of this study with outcomes for obesity and hypertension.

The lowest prevalence of 30% for obesity was used. Based on these inputs, the n=323. Working with a 10% of the sample size as non-respondent, the adjusted sample size for the study was

n_1=323+ (323*0.10)

n_1=355.3. which is approximately 355

The sample size of 355 was recruited from the six electoral areas in Ledzokuku Krowor Municipality.

3.5 Inclusion criteria

Males and females aged 60 years and above and who reside within the Ledzokuku-Krowor Municipality.

3.6 Exclusion criteria

People who have disease conditions such as cancer, end-stage renal disease or terminal illness and those receiving artificial enteral or parenteral nutrition and persons below the age of 60 years during the time of study were excluded. Persons who do not reside in the selected township were also excluded in the study.

3.7 Sampling procedure

A cluster sampling technique was used for the study. There are 24 (twenty-four) electoral areas in Ledzokuku Krowor municipality but 6 (six) electoral areas were selected for the study. Each electoral area was designated as a cluster.

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The 6 out of the 24 electoral areas in the municipality were selected using a simple random method. This was done by writing the names of each of the 24 electoral areas on pieces of paper and a research assistant trained in data collection picked 6 of the 24 electoral areas one at a time. Sampling for the study was done in these 6 selected electoral areas.

The researcher then sampled fifty-nine (59) elderly persons from each of the five (5) selected electoral areas and sixty (60) elderly persons from one (1) selected area to make the total sample size of 355 elderly persons needed to participate in the study.

A pen-spin was conducted at the center of each cluster (electoral area). All dwellings from the center to the edge of the cluster in the direction of the tip of the pen were numbered. The first household was randomly selected from these numbered houses. every second household to the left was approached each time and if the elderly was in the household, the elderly was interviewed until the sample size for each electoral area was obtained. The sampling interval of two was arrived at by dividing the estimated population size by the required sample size.

This method was chosen due to logistic constraints involved with random sampling subsequent to enumeration of all households

3.8 Pretesting

A sample of fifteen (15) participants were selected to pre-test research techniques and tools at Tema Manhean Community in the Tema East sub-metropolis to ensure accuracy of the questions and to reveal any problems that will be encountered. Tema Manhean community was chosen because it had similar demographic characteristics as Ledzokuku Krowor Municipality. Identified anomalies in the questionnaire included missing variables and some spelling mistakes, were corrected before final data collected.

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3.9 Variables

The dependent variables were availability of healthy and unhealthy foods in the home as indicators of the home food environment, frequency of consumption of healthy and unhealthy foods, dietary diversity, BMI of respondents, and health status. The independent variables are

1. Socio-demographic characteristics. Example age, sex, educational status, housing, source of income of respondent.
2. Presence of constant companion at home
3. Alcohol use and smoking

3.10 Data collection

Data collection was done using a structured questionnaire. Field staff were recruited and trained on how to administer questionnaire and how to use the instruments and tool that will be used for data collection. The researcher and field staff administered questionnaires to the elderly. In cases where there was more than one elderly person in a household, balloting was done to select the one to be interviewed.

Dietary intake assessment using a 24-hour food recall method was conducted. The respondents were asked to recall the types of food consumed over the previous 24 hours starting with the most recent meal consumed. The 24hr food recall was developed into nine (9) food groups consumed by respondent. The nine (9) food groups were cereals, starchy foods, legumes, vegetables and fruits, sugar, preserves and syrups, meat and fish, milk and milk product, fats and oil and beverages.

A dietary diversity score was determined for each respondents. This was computed by determining each respondent’s consumption from the nine (9) food groups.

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Food environment was assessed based on both healthy and unhealthy foods. Composite scores for healthy food environment were computed as the sum of scores for availability of fruits in the home and scores for availability of vegetables at home. Over the past week, on a scale 1-5, a score of 1 indicated lowest availability and 5 indicated highest availability. The highest composite score for availability of foods was therefore 10 and 2 indicated the lowest composite scores.

Scores for unhealthy food environment computed in the same manner as described above but these were the sum of scores for the availability of pastries and fizzy drinks at home. The maximum score was 10, while 2 was the lowest.

A food frequency questionnaire was developed based on the local food found in the study area and included the most commonly eaten foods such as fruits and vegetables, whole grain and cereals, pastries and confectionary, meat, sugary drinks and alcoholic drinks was used to investigate their frequently consumed food during the last week (7 days preceding interview). See appendix ii pages 79, 80, 81, 82. Frequency was rated as follows (Everyday= 7 days, most days=4-6 days of consumption, sometimes=2-3 days of consumption, rarely=1 day of consumption and Never=0 day of consumption).

Anthropometric measurements were taken and included two variables (body weight, height) in order to determine the body mass index (BMI) of study participants.

Body weight was measured using a Seca scale (Hamburg, Germany) and was taken to the nearest 0.0l kg with subjects in light clothing. Measurements were taken three times and the mean weight determined. Respondents stood erect and were asked to remove shoes, jackets, phones and other objects before standing on the scale.

Height was measured using a Seca stadiometer (Hamburg, Germany) and readings were reported to the nearest 0.1 cm. Respondents stood upright on base plate without shoes with

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their heads in Frankfurt's plane position and back straight, feet together and heels touching the back of the plate. The head plate was lowered to touch the top of the head and height noted.

Body Mass Index (BMI) was computed as a ratio of weight (kg) over height (m) squared (kg/m2). Participants' underweight, normal weight, overweight and obesity were defined as ≤18.5 kg/m2, 18.5–24.9 kg/m2, ≥25.0–29.9 kg/m2 and ≥30 kg/m2 (World Health Organization, 2006; WHO/FAO, 2003).

Blood pressure (BP) of all respondents were measured using sphygmomanometer at least twice at an interval of 10 min and the lower reading was recorded. However, with respondents whose BP was high, their BP was taken three (3) times within a time interval of ten (10) minutes to ascertain their hypertensive status. Respondents were asked to sit down in a relaxed position before the measurement was taken. The measurement was taken at the left upper arm.

For calculation of prevalence the definition of hypertension was systolic BP > 140 mmHg and or diastolic BP > 90 mmHg.

3.11 Data analysis

The data was analyzed using STATA SE version 15. Microsoft Excel 2013 was used to develop graphs. Frequencies and percentages were computed to describe categorical variables such as demographic characteristics, level of availability and consumption of different food groups (food frequency and dietary diversity) and health status (hypertension, diabetes, self-perceived health) of the study participants. Mean and standard deviations were also computed to summarize continuous variables such as age, BMI, systolic and diastolic blood pressure among the aged. The bar chart was used to describe the prevalence of certain

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ailments and number of the different food groups' consumed and the pie chart was used to describe the perceived health status among the aged.

The Pearson's chi-square was used to assess the association of categorical independent variables (age, sex, marital status, level of education and having constant companion) with BMI levels and the perceived health status of the aged. P-value < 0.05 was used to indicate significance.

The perceived health status of the study participants was in three levels ('good', 'moderate' and 'bad') in the Pearson's chi-square test of association. It was re-categorized into a binary variable in the binary logistic regression as 'good' and 'poor' ('moderate' and 'poor' categories combined). Krustal-Wallis test was used to test for difference in food availability and food intake frequency score across demographic characteristics. Linear regression was used to investigate factors associated with food intake frequency for healthy and unhealthy food.

3. 12 Ethical Considerations

The study proposal was submitted to the Noguchi Memorial Institute for Medical Research Institutional Review Board and approval given with approval number NMIMR-IRB CPN 080/18-19, (see appendix). The study was implemented in accordance with provisions of the Helsinki Declaration. Permission was sought from opinion and community leaders and informed consent from the respondents.

Protection of personal information

1. All datasets related to this study was kept confidential and will be used just to serve the purpose of this study.
2. Due care guaranteed the confidentiality and anonymity of participants.
3. No names or any other identifiers were recorded in any of the study instruments.

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4. Unauthorized persons were not allowed to have access to the data collected.
5. Extracted and merged datasets were password protected and accessible only to the researchers at University of Ghana.

Informed consent

Consent of participants was obtained through administration of volunteer agreement forms requiring the participant's signatures or fingerprints. In the case of participants who were not able to read and sign their signatures, the forms were read and or translated to them and fingerprints was required as proof of consent.

Obtaining informed consent involved explaining:

- The purpose of the study
- Expected risks and benefits
- Participation is voluntary and that at any time participants can withdraw without negative repercussions
- Contact name and phone number for further information or to report any problems

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CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter deals with key findings of the study in the selected electoral areas of Ledzokuku Krowor Municipality in the Greater Accra Region. The results include socio-demographic characteristics of respondents, the assessment of availability of healthy and unhealthy foods at home, food intake of study participants, assessment of nutrition status of the elderly, their health status and associations between these different groups of variables.

4.1 Socio-demographic characteristics of study participants

Table 1 shows the socio-demographic characteristics of respondents for the study. 355 participants were interviewed for the study. The mean age for participants was 67.97 years and ranged from 60.46 to 75.42 years. Majority of participants were female 200 (56.4%) female and 155 (43.7%) males.

Most of the respondents 53.8% were currently married and 39.2% were widowed. About 40.3% and 35.5% completed primary education respectively. Most of respondents (67.1%) owned houses and few (15.5%) of the respondents were living in family houses. Only a few (18.3%) had a companion at home.

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Table 1: Socio-demographic characteristics of study participants

Variables	Frequency	Percentage
Age (mean ± SD)	67.91 ± 7.45	
Age group		
60-69	239	67.32
70-79	81	22.82
>79	35	9.86
Sex		
Male	155	43.66
Female	200	56.34
Marital status		
Never married	7	1.97
Currently married	191	53.80
Cohabiting	18	5.07
Widowed	139	39.15
Highest level of education		
No formal education	39	10.99
Primary	126	35.49
Secondary	143	40.28
Higher	47	13.24
Have constant companion		
Yes	65	18.31
No	290	81.69

4.2 Assessment of home food environments (availability of healthy and unhealthy food) of the elderly in Ledzokuku Krowor Municipality

Table 2 reports the availability of healthy and unhealthy food at home. The respondents were asked the number of days on which healthy and unhealthy foods were available over the period of one week preceding the interview.

Frequency was rated as follows (Everyday= 7 days, most days=4-6 days of consumption, sometimes=2-3 days of consumption, rarely=1 day of consumption and Never=0 day of consumption).

When asked about fruits, 41.2% responded they sometimes have fruits. About 42.1% responded they sometimes have vegetables at home. Few (4.8%) of them responded they have fruits at home and 3.1% of them have vegetables at home every day.

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About 46.5% responded they rarely have pastries at home. Only 3.1% responded the have pastries at home most days. Majority (49.6%) responded have fizzy drink s at home.

Table 2: Availability of healthy and unhealthy food at home

	FREQUENCY				
Foods	**Everyday**	**Most days**	**Sometimes**	**Rarely**	**Never**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Healthy foods					
Availability of Fruits	17 (4.8)	53 (14.97)	146 (41.24)	68 (19.21)	70 (19.77)
Availability of vegetables	11 (3.11)	75 (21.19)	149 (42.09)	58 (16.38)	61 (17.23)
Unhealthy foods					
Availability of pastries	1 (0.28)	11 (3.1)	57 (16.06)	165 (46.48)	121 (34.08)
Availability of fizzy drinks	1 (0.28)	11 (3.1)	55 (15.49)	176 (49.58)	112 (31.55)

Table 3 shows association between availability of healthy and unhealthy foods at home and socio-demographic characteristics. Krustal-Wallis test was used to test for differences in scores for availability of healthy and unhealthy foods across demographic characteristics. The mean score for availability of healthy foods at home was highest among the age group 60-69 years (5.43) and lowest in the group 79years and above (5.34). The mean was highest among those who were currently married (5.65) and lowest among those who were who were cohabiting (4.22). Education and marital status were positively and significantly associated with availability of healthy foods at home. Higher education scored highest (5.74) and lowest were those with no formal education (4.85). The mean was lower among those who have constant companion (5.25) at home.

Marital status and companionship were significantly associated with availability of unhealthy foods at home. The mean was highest among age group 60-69 years (3.89) and lowest from 79 years and above (3.31). The mean score was highest among those who never married (4.57) and lowest among those cohabiting (2.72).

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The mean was highest among those with secondary education (3.94) and lowest among those with no formal education (3.67).

Table 3: Associations between availability of healthy and unhealthy foods at home and demographic characteristics

	Healthy			Unhealthy		
Variables	**Mean**	**Standard Deviation**	**p-value**	**Mean**	**Standard Deviation**	**p-value**
Age group			0.978			0.160
60-69	5.43	2.05		3.89	1.57	
70-79	5.38	1.98		3.75	1.31	
>79	5.34	2.30		3.31	1.05	
Sex			0.589			0.535
Male	5.32	2.05		3.73	1.36	
Female	5.48	2.07		3.86	1.57	
Marital status			0.013			0.004
Never married	5.29	2.63		4.57	1.90	
Currently married	5.65	2.05		3.76	1.41	
Cohabiting	4.22	1.70		2.72	0.96	
Widowed	5.23	2.03		3.96	1.55	
Highest level of education			0.024			0.767
No formal education	4.85	1.73		3.67	1.28	
Primary	5.13	2.12		3.71	1.49	
Secondary	5.69	2.05		3.94	1.58	
Higher	5.74	2.02		3.70	1.27	
Have constant companion			0.018			0.018
Yes	5.25	2.05		3.4	1.26	
No	5.44	2.06		3.89	1.51	

4.3 To assess the dietary intake of the elderly using food frequency questionnaire (FFQ) and 24-hr recall.

Table 4 shows the frequency of consumption of food groups obtained from the food frequency questionnaire (FFQ). This was computed as the sum of frequency per week, each food items listed under food groups were consumed by a study participant. The mean and standard deviations were then computed for each food group. The average frequency of consumption of fruits was 10.18 times per week with a minimum of 0 and a maximum of 53 times. The average vegetable consumption was 32 times a week with the minimum being

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2 and the maximum being 94. The frequency of alcohol consumption was 0.6 with a maximum weekly consumption of 12 times for a study participant.

Table 4: Frequency of consumption over a period of one week

Food group	Mean	SD	Minimum	Maximum
Fruits	10.18	7.17	0	53
Vegetables	32.23	15.67	2	94
Cereals	6.56	4.74	0	35
Pastries	3.66	3.08	0	22
All fried food	2.46	3.17	0	24
Meat	3.78	4.09	0	35
Fish	4.7	2.82	0	18
Sugar	2.04	2.35	0	21
Alcohol	0.6	1.52	0	12

Table 5 shows frequency of consumption of healthy and unhealthy food at home. The results show that 48.0% of respondents sometimes eat fruits and 45.5% of them sometimes eat vegetables. 54.4% of respondents rarely eat pastries and 2.0% of them eat pastries most days at home.

50.1% of respondents drink fizzy drinks sometimes and 2.0% drink fizzy drinks most days.

Table 5: Frequency of consumption of healthy and unhealthy food at home

	Frequency				
	Everyday	**Most days**	**Sometimes**	**Rarely**	**Never**
Food	n(%)	n(%)	n(%)	n(%)	n(%)
Healthy food					
Fruits	9 (2.54)	50 (14.12)	170 (48.02)	66 (18.64)	59 (16.67)
Vegetables	7 (1.98)	63 (17.8)	161 (45.48)	67 (18.93)	56 (15.82)
Unhealthy food					
Pastries	0 (0.0)	7 (1.97)	42 (11.83)	193 (54.37)	113 (31.83)
Fizzy drinks	1 (0.28)	7 (1.97)	62 (17.46)	178 (50.14)	107 (30.14)

Table 6 shows mean scores for consumption of healthy and unhealthy food at home. Scores for healthy consumption were computed as the sum of the frequency in consumption of fruits and vegetables at home, on the scale 1-5 with 1 being the least available and 5 being the most available. The resulting scale became 2-10; while 2 was the lowest and 10 being

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the highest. The mean and standard deviation was used to summarize the weekly consumption of healthy and unhealthy food at home. The average consumption of healthy food at home is 5 fruits and vegetable per week among respondents with a minimum being 2 and the maximum being 10.

Unhealthy food intake was also computed as the sum of the frequency in the consumption of pastries and fizzy drinks at home, on the scale 1-5 with 1 being the least available and 5 being the most available. The resulting scale became 2-10; while 2 was the lowest and 10 being the highest.

The average consumption of unhealthy food at home is 4 with a minimum being 2 and a maximum being 9.

Table 6: Consumption of healthy and unhealthy food at home

Food consumption	Mean	SD	Min	Max
Health food intake	3.38	1.9	2	10
Unhealthy food intake	3.76	1.4	2	9

Table 7 shows the association between frequency of intake of healthy and unhealthy food at home and demographic characteristic. The mean was highest among those within the age group 70-79 years (5.48) and lowest from 79 years and above (5.29). The mean was highest among those who never married (4.71) and lowest among those who were cohabiting (2.83). The mean was highest among respondents who had higher education (tertiary and above) 5.66 and lowest among those who did not have formal education (5.00). Among those who have constant companion at home the mean was high among those who did not have companion (3.84) and lowest among those who have companion (3.4)

Consumption of unhealthy food at home was highest within age group 60-69 years (3.86) and lowest from 79 years and above (3.25). Among those who were married, the mean was highest among those who were never

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married (4.71) and lowest among those who were cohabiting (2.83). The mean was highest among those with secondary education (3.91) and lowest among those with no formal education (3.61).

The results show no significant difference in consumption of healthy foods across demographic characteristics. The results show significant difference in food intake frequency for unhealthy food across marital status. They also show significant difference in consumption of unhealthy food between those with and those without a constant companion at home.

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Table 7: Association between frequency of intake of healthy and unhealthy food and demographic characteristics

	Healthy			Unhealthy		
Variables	**Mean**	**Standard Deviation**	**p-value**	**Mean**	**Standard deviation**	**p-value**
Age group			0.610			0.053
60-69	5.34	1.90		3.86	1.47	
70-79	5.48	1.91		3.68	1.19	
>79	5.29	2.23		3.25	0.98	
Sex			0.304			0.922
Male	5.28	1.97		3.75	1.32	
Female	5.44	1.91		3.77	1.43	
Marital status			0.05			0.008
Never married	5.00	2.52		4.71	2.21	
Currently married	5.46	1.90		3.73	1.33	
Cohabiting	4.22	1.70		2.83	0.99	
Widowed	5.41	1.95		3.87	1.39	
Highest level of education			0.072			0.693
No formal education	5.00	1.82		3.61	1.18	
Primary	5.10	1.93		3.67	1.33	
Secondary	5.62	1.92		3.91	1.50	
Higher	5.66	1.96		3.66	1.27	
Have constant companion			0.343			0.030
Yes	5.14	2.05		3.4	1.18	
No	5.42	1.90		3.84	1.41	

Figure 1 represents food groups consumed by the elderly using a 24hr food recall. The food groups of respondents were determined by classifying each food consumed by each respondent into the nine (9) food groups. Majority of the respondents consumed foods in the following food groups; vegetables and fruits (99.7%), starch foods (99.7%), cereals (99.7%), fats and oil (99.4%) and meat fish and egg (97.5%).

The least consumed among the food groups was sugar, preserves and syrups (4.5%)

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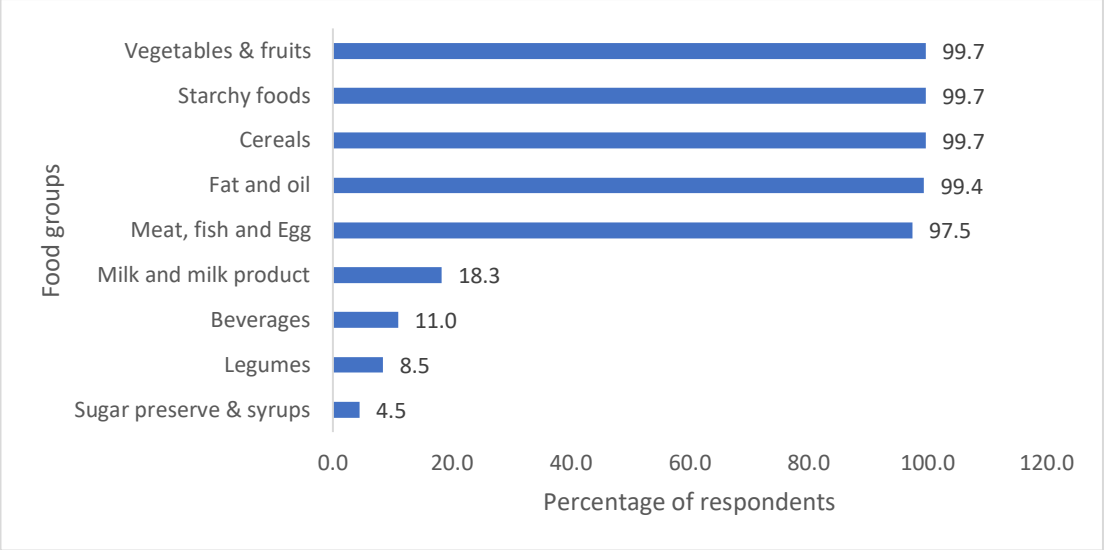


Figure 1: Food groups consumed by the elderly

Table 8 shows the dietary diversity score based on nine (9) food groups. This was computed as each participants' consumption from one (1) to nine (9)-food groups. 252 respondents consumed 5 of the nine food groups, 63 consumed 6 out of the 9 food groups, none consume all 9 food groups. The overall mean dietary diversity score is 5.38. Only one person had a dietary diversity of 1 and 2 respectively. These respondents were fasting during the period of the study.

Table 8: Dietary diversity score for the various food groups for respondent

Dietary diversity score	Frequency of study participants	Percentage
1	1	0.3
2	1	0.3
3	0	0.0
4	0	0.0
5	252	71.0
6	63	17.8
7	34	9.6
8	4	1.1
9	0	0.0

The mean dietary diversity score is 5.38.

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4.4 Anthropometric assessment

Table 9 shows the nutritional status of the respondents based on anthropometric measurement.

Obesity (16.3 %) was prevalent among age group 60-69 years. Majority (62.8%) of respondents were of normal weight.

More females (17.5%) than males (10.3%) were obese

Table 9: Nutritional status (BMI)

		BMI Category n(%)			
Variables	**Mean ± SD**	**<18.5 kgm^{-2}**	**18.5-24.9 kgm^{-2}**	**25.0-29.9 kgm^{-2}**	**>29.9 kgm^{-2}**
Overall	25.11 ± 4.75	5 (1.41)	231 (65.07)	68 (19.15)	51 (14.37)
Age group					
60-69	25.13 ± 4.66	4 (1.67)	150 (62.76)	46 (19.25)	39 (16.32)
70-79	24.96 ± 5.00	0 (0)	63 (77.78)	9 (11.11)	9 (11.11)
>79	25.37 ± 4.88	1 (2.86)	18 (51.43)	13 (37.14)	3 (8.57)
Sex					
Male	24.48 ± 3.82	2 (1.29)	108 (69.68)	29 (18.71)	16 (10.32)
Female	25.60 ± 5.32	3 (1.5)	123 (61.5)	39 (19.5)	35 (17.5)
Marital status					
Never married	23.57 ± 3.81	0 (0)	6 (85.71)	0 (0)	1 (14.29)
Currently married	25.56 ± 4.97	1 (0.52)	113 (59.16)	44 (23.04)	33 (17.28)
Cohabiting	22.61 ± 2.15	2 (11.11)	15 (83.33)	1 (5.56)	0 (0)
Widowed	24.90 ± 4.62	2 (1.44)	97 (69.78)	23 (16.55)	17 (12.23)
Highest educational level					
No formal education	24.00 ± 3.85	2 (5.13)	29 (74.36)	5 (12.82)	3 (7.69)
Primary	25.37 ± 5.38	0 (0)	85 (67.46)	21 (16.67)	20 (15.87)
Secondary	25.20 ± 4.54	2 (1.4)	87 (60.84)	34 (23.78)	20 (13.99)
Higher	25.09 ± 4.22	1 (2.13)	30 (63.83)	8 (17.02)	8 (17.02)
Have constant companion					
Yes	25.27 ± 4.17	1 (1.54)	39 (60)	19 (29.23)	6 (9.23)
No	25.08 ± 4.87	4 (1.38)	192 (66.21)	49 (16.9)	45 (15.52)

Table 10 shows association between BMI of study participants and weekly availability and consumption healthy and unhealthy. BMI was significantly associated with having fruits and vegetables at home as well as consuming fruits and vegetables. A significantly higher proportion of participants who rarely or never had fruits or vegetables at home, or rarely or never consumed fruits or vegetables fell within the normal range for BMI. The results show that majority (77.5%) of the respondent who rarely have fruits at home had BMI within the

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normal range of 18.5-24.9 kg/m2, and among those who eats fruits at home, majority (58.8%) sometimes eats fruits and had BMI of 18.5-24.9 kg/m2 . Among those who sometimes eats fruits at home, majority (58.8%) had BMI of 18.5-24.9 kg/m2.

Majority (80.7%), rarely had fruits at home and had BMI between 18.5-24.9 kgm2, whiles majority (60.8%) who reported eating fruits sometimes at home had a BMI between 18.5-24.9 kg/m2.

The results show no association between having and eating pastries, having and consuming fizzy drinks and BMI of respondents. Nevertheless, the results show positive association between having fruits (chi-square=25.72, p-value<0.001), eating fruits (chi-square=23.93, p-value=0.001), having vegetables (chi-square=20.96, p-value=0.002), eating vegetables (chi-square=24.84, p-value<0.001) and BMI of respondents.

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Table 10: Association between BMI and weekly availability and consumption of foods and

		BMI Category n (%)					
Variables	**Mean ± SD**	**<18.5 kg/m2**	**18.5-24.9 kg/m2**	**25.0-29.9 kg/m2**	**>29.9 kgm2**	**Chi-square**	**P-value**
Availability of fruits						25.72	<0.001***
Every day/Most days	26.96 ± 5.66	1 (1.43)	35 (50)	15 (21.43)	19 (27.14)		
Sometimes	25.04 ± 4.54	3 (2.05)	88 (60.27)	38 (26.03)	17 (11.64)		
Rarely/Never	24.29 ± 4.22	1 (0.72)	107 (77.54)	15 (10.87)	15 (10.87)		
Consumes fruits						23.93	0.001**
Every day/Most days	26.21 ± 5.59	2 (3.39)	33 (55.93)	9 (15.25)	15 (25.42)		
Sometimes	25.32 ± 4.44	2 (1.18)	100 (58.82)	46 (27.06)	22 (12.94)		
Rarely/Never	24.36 ± 4.63	1 (0.8)	97 (77.6)	13 (10.4)	14 (11.2)		
Availability of vegetable						20.96	0.002**
Every day/Most days	26.14 ± 4.72	1 (1.16)	46 (53.49)	22 (25.58)	17 (19.77)		
Sometimes	25.58 ± 5.38	3 (2.01)	88 (59.06)	32 (21.48)	26 (17.45)		
Rarely/Never	23.82 ± 3.52	1 (0.84)	96 (80.67)	14 (11.76)	8 (6.72)		
Consumes vegetables						24.82	0.001***
Every day/Most days	26.59 ± 5.12	1 (1.43)	35 (50)	15 (21.43)	19 (27.14)		
Sometimes	25.19 ± 4.6	3 (1.86)	98 (60.87)	40 (24.84)	20 (12.42)		
Rarely/Never	24.22 ± 4.54	1 (0.81)	97 (78.86)	13 (10.57)	12 (9.76)		
Availability of pastries						9.47	0.149
Every day/Most days	28.24 ± 5	0 (0)	4 (33.33)	3 (25)	5 (41.67)		
Sometimes	25.06 ± 4.49	1 (1.75)	35 (61.4)	12 (21.05)	9 (15.79)		
Rarely/Never	24.99 ± 4.76	4 (1.4)	192 (67.13)	53 (18.53)	37 (12.94)		
Consumes pastries						5.92	0.432
Every day/Most days	26.12 ± 5.97	0 (0)	4 (57.14)	1 (14.29)	2 (28.57)		
Sometimes	24.61 ± 4.1	2 (4.76)	25 (59.52)	10 (23.81)	5 (11.9)		
Rarely/Never	25.16 ± 4.81	3 (0.98)	202 (66.01)	57 (18.63)	44 (14.38)		
Availability of fizzy drinks						11.8	0.067
Every day/Most days	27.54 ± 7.1	0 (0)	5 (41.67)	5 (41.67)	2 (16.67)		
Sometimes	25.46 ± 4.93	2 (3.64)	31 (56.36)	9 (16.36)	13 (23.64)		
Rarely/Never	24.95 ± 4.58	3 (1.04)	195 (67.71)	54 (18.75)	36 (12.5)		
Consumes fizzy drink						3.81	0.702

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Every day/Most days	25.44 ± 5.19	0 (0)	5 (62.5)	1 (12.5)	2 (25)
Sometimes	25.22 ± 5.2	2 (3.23)	39 (62.9)	10 (16.13)	11 (17.74)
Rarely/Never	25.08 ± 4.65	3 (1.05)	187 (65.61)	57 (20)	38 (13.33)

4.5 Health status of the elderly; self-reported disease, self-perceived overall health status and measured blood pressure

Figure 2 shows the self-reported illness of respondents. Respondents were asked whether they have the aforementioned disease conditions. Most of the study participants had hypertension (42.3%) or visual impairment (25.1%). 11.3% reported having diabetes.

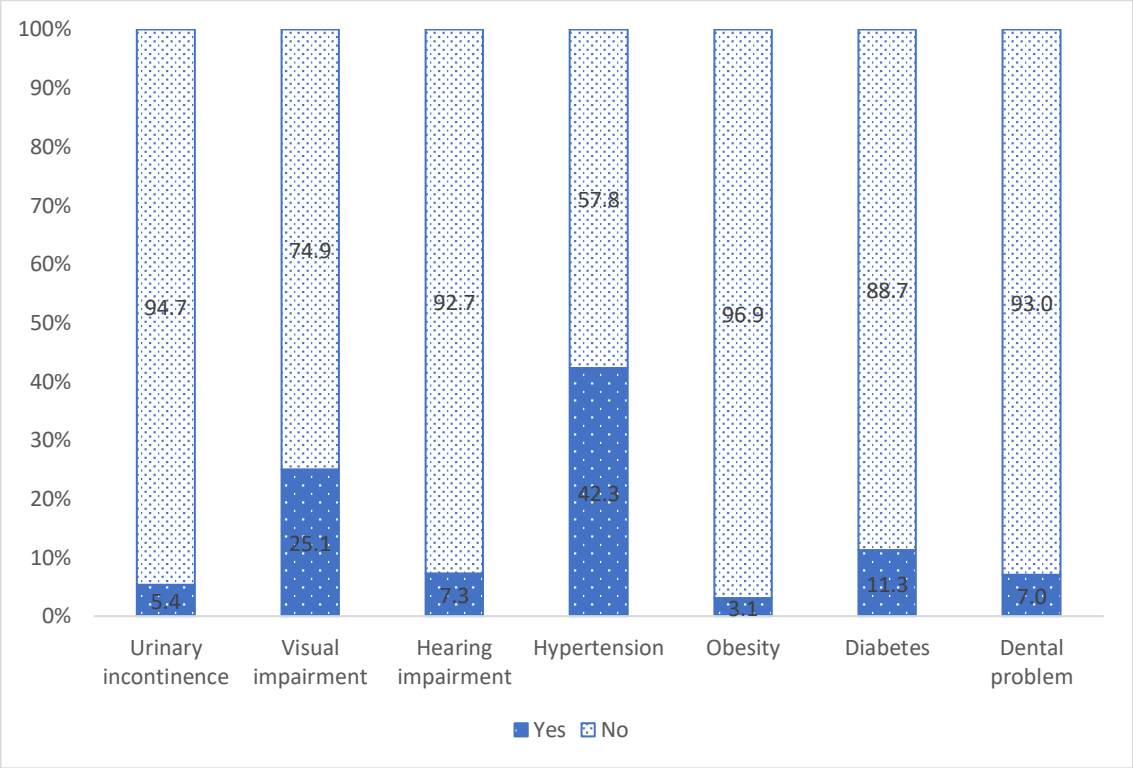


Figure 2: Self-reported illness of respondents

Figure 3 shows self-perceived health status. Majority (73%) of respondents perceived their health status as good, only few (6%) perceived their health status as bad.

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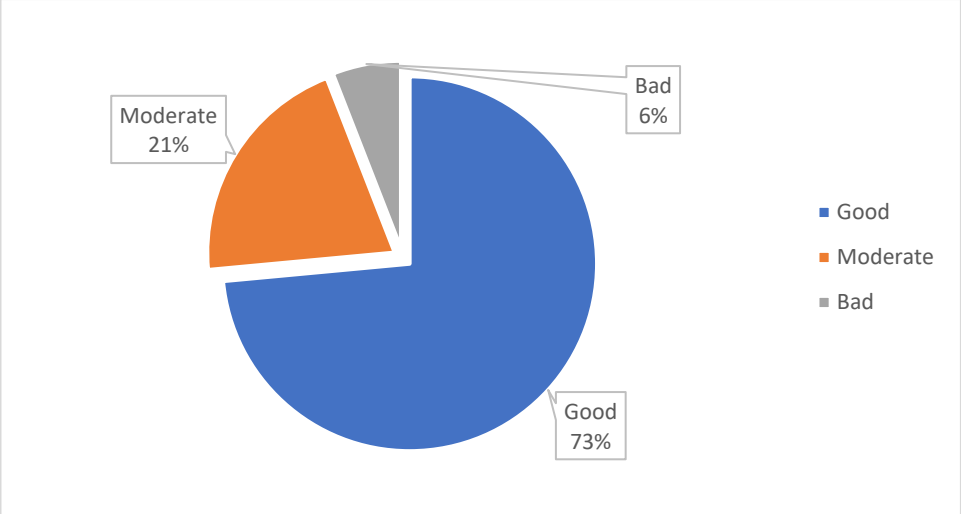


Figure 3: Perceived health status of study participants

Table 11 reports on lifestyle and health related factors of respondents. Most (53.1%) of the respondents were on medication. It was realized that a significant number of respondents 196 (55.2%) had ever consumed alcohol. Very few (1.1%) of respondents were currently smoking as at the time of the study.

Table 11: Lifestyle and health related factors of study participants

Variables (N=355)	Yes (%)	No (%)
Currently on medication	188 (53.11)	166 (46.89)
Type of medication on (N=188)		
*Hypertension	141 (75.00)	47 (25.00)
*Diabetes	42 (22.34)	146 (77.66)
*Pain	45 (23.94)	143 (76.06)
*insomnia	1 (0.53)	187 (99.47)
*Supplements	5 (2.66)	183 (97.34)
*Others (High cholesterol, HIV/AIDs)	8 (4.26)	180 (95.74)
How often medication is taken (N=188)		
Daily	159 (84.57)	
Weekly	21 (11.17)	
Monthly	8 (4.26)	
Ever consumed alcohol	196 (55.21)	159 (44.79)
Currently takes alcohol	64 (18.03)	291 (81.97)
Ever smoked	26 (7.32)	329 (92.68)
Currently smoking	4 (1.13)	351 (98.87)

* : Multiple response

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Table 12 below shows association between demographic characteristics and self-perceived health status using the Pearson's Chi-square test. Majority (75%) of the respondents among age group 60-69 self-perceived their health as good. More males (74.8%) than females (72.5%) self-perceived their health as good. A significant number (28.6%) of the aged from 79 years and above perceived their health status as bad.

There is a significant positive association between self-perceived health status and age group (chi-square=36.68. P-value<0.001), constant companion (chi-square=28.58. P-value<0.001) and using assistive technology (chi-square=71.19, P-value <0.001) and self-perceived health status

Table 12: Association between socio-demographic characteristics and perceived health status

	Perceived health status				
	Good	Moderate	Bad		
Variable	**n (%)**	**n (%)**	**n (%)**	**Chi-square**	**P-value**
Overall??					
Age group				36.68	<0.001***
60-69	179 (74.9)	53 (22.18)	7 (2.93)		
70-79	62 (76.54)	15 (18.52)	4 (4.94)		
>79	20 (57.14)	5 (14.29)	10 (28.57)		
Sex				0.37	0.83
Male	116 (74.84)	31 (20)	8 (5.16)		
Female	145 (72.5)	42 (21)	13 (6.5)		
Marital status				0.92	0.988
Never married	5 (71.43)	2 (28.57)	0 (0)		
Currently married	141 (73.82)	39 (20.42)	11 (5.76)		
Cohabiting	14 (77.78)	3 (16.67)	1 (5.56)		
Widowed	101 (72.66)	29 (20.86)	9 (6.47)		
Highest educational level				8.82	0.184
No formal education	27 (69.23)	11 (28.21)	1 (2.56)		
Primary	85 (67.46)	32 (25.4)	9 (7.14)		
Secondary	112 (78.32)	21 (14.69)	10 (6.99)		
Higher	37 (78.72)	9 (19.15)	1 (2.13)		
Have constant companion				28.58	<0.001***
Yes	42 (64.62)	10 (15.38)	13 (20)		
No	219 (75.52)	63 (21.72)	8 (2.76)		

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Table 13 describes the bivariate analysis of the association between perceived health status and the availability and consumption of foods using the Pearson's chi-square test. It shows that there is a strong association between having fruits at home (chi-square 19.25, p-value=0.001 and eating fruits at home (chi-square=32.4, P-value <0.001) and perceived health status. The same applies to having fruits (chi-square=16.25, P-value=0.003) and eating vegetables (chi-square=22.02, P-value<0.001). This means there is an association between healthy foods and self-perceived health status.

There is no association between unhealthy foods and self-perceived health status of the respondents. Respondents who have 117 (80.14%) and eat fruits 139 (81.76%) sometimes perceived their health as good. Likewise, respondents who have 116 (77.85%) and eat 127 (78.88%) vegetables sometimes perceived their health as good.

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Table 13: Association between perceived health status and Weekly availability and consumption of foods and

	Perceived health status				
Variable	**Good n (%)**	**Moderate n (%)**	**Bad n (%)**	**Chi-square**	**P-value**
Have fruits at home				19.25	0.001**
Every day /Most days	56 (80)	14 (20)	0 (0)		
Sometimes	117 (80.14)	24 (16.44)	5 (3.42)		
Rarely/Never	87 (63.04)	35 (25.36)	16 (11.59)		
Eat fruits				32.4	<0.001***
Every day/Most days	47 (79.66)	12 (20.34)	0 (0)		
Sometimes	139 (81.76)	28 (16.47)	3 (1.76)		
Rarely/Never	74 (59.2)	33 (26.4)	18 (14.4)		
Have vegetables at home				16.25	0.003**
Every day/Most days	67 (77.91)	18 (20.93)	1 (1.16)		
Sometimes	116 (77.85)	28 (18.79)	5 (3.36)		
Rarely/Never	77 (64.71)	27 (22.69)	15 (12.61)		
Eats vegetables				22.02	<0.001***
Every day/Most days	52 (74.29)	17 (24.29)	1 (1.43)		
Sometimes	127 (78.88)	31 (19.25)	3 (1.86)		
Rarely/Never	81 (65.85)	25 (20.33)	17 (13.82)		
Have pastries at home				3.29	0.511
Every day/Most days	9 (75)	3 (25)	0 (0)		
Sometimes	43 (75.44)	13 (22.81)	1 (1.75)		
Rarely/Never	209 (73.08)	57 (19.93)	20 (6.99)		
Eats pastries				3.56	0.468
Every day/Most days	4 (57.14)	3 (42.86)	0 (0)		
Sometimes	32 (76.19)	9 (21.43)	1 (2.38)		
Rarely/Never	225 (73.53)	61 (19.93)	20 (6.54)		
Have fizzy drinks at home				3.2	0.525
Every day/Most days	10 (83.33)	2 (16.67)	0 (0)		
Sometimes	38 (69.09)	15 (27.27)	2 (3.64)		
Rarely/Never	213 (73.96)	56 (19.44)	19 (6.6)		
Take fizzy drinks				2.18	0.703
Every day/Most days	5 (62.5)	3 (37.5)	0 (0)		
Sometimes	45 (72.58)	14 (22.58)	3 (4.84)		
Rarely/Never	211 (74.04)	56 (19.65)	18 (6.32)		

n: frequency. %: row percentage. *: p<0.05. **: p<0.01. ***: p<0.001

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The figure 4 show that majority of the respondents were hypertensive (61%)

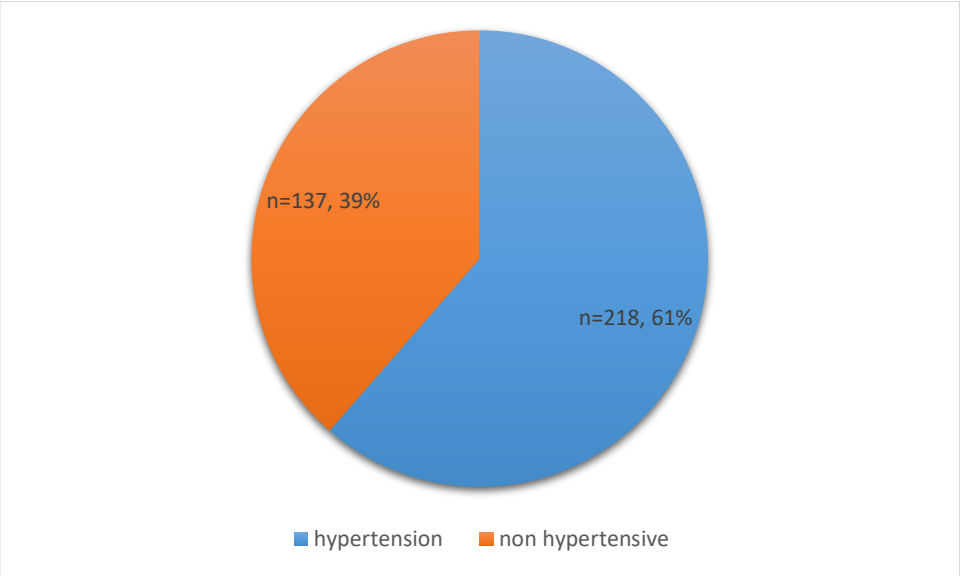


Figure 4: Hypertension status of respondents

Table 14 provides information on the association between hypertension status (measured) and demographic characteristics. Majority (239) of the respondents within the age group 60-69 had a good hypertension status with a mean systolic blood pressure of 143.27 ± 26.07 and mean diastolic blood pressure of 88.15 ± 16.02. Few (35) of the respondents from the age 79 years and above were hypertensive with a mean systolic blood pressure of 151.06 ± 24.92 and a mean diastolic blood pressure of 87.57 ± 14.30. There was no association between hypertension status and demographic characteristics of respondents.

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Table 14: Hypertension status based on measured BP and socio-demographic factors

		Systolic blood pressure			Diastolic blood pressure		
Variables	**N**	**Mean ± SD**	**F**	**P-value**	**Mean ± SD**	**F**	**P-value**
Overall		**144.42 ± 25.29**			**87.42 ± 15.11**		
Age group			1.47	0.23		1.17	0.311
60-69	239	143.27 ± 26.07			88.15 ± 16.02		
70-79	81	144.95 ± 22.83			85.19 ± 12.34		
>79	35	151.06 ± 24.92			87.57 ± 14.30		
Sex			0.00	0.946		1.12	0.292
Male	155	144.32 ± 24.53			86.46 ± 13.15		
Female	200	144.50 ± 25.93			88.17 ± 16.45		
Marital status			2.00	0.114		1.68	0.171
Never married	7	133.29 ± 15.20			78.57 ± 14.42		
Currently married	191	142.93 ± 24.84			86.54 ± 14.77		
Cohabiting	18	137.67 ± 18.08			86.50 ± 12.70		
Widowed	139	147.91 ± 26.72			89.19 ± 15.73		
Highest educational level			0.60	0.615		0.42	0.738
No formal education	39	145.82 ± 25.25			89.26 ± 14.62		
Primary	126	143.05 ± 27.29			88.02 ± 16.36		
Secondary	143	146.20 ± 24.26			86.66 ± 14.34		
Higher	47	141.53 ± 23.05			86.60 ± 14.52		
Have constant companion			2.71	0.101		0.02	0.883
Yes	65	149.08 ± 23.05			87.17 ± 13.67		
No	290	143.38 ± 25.69			87.48 ± 15.43		

SD: standard deviation. **: p-value<0.05

Table 15 shows the association between availability and consumption of foods and hypertensive status (measured). The result shows no association between having and eating fruits, having and eating vegetables, having pastries, having fizzy drinks and hypertensive status. But the result shows association between eating pastries (chi-square=9.07, p-value=0.011), consuming fizzy drinks (chi-square=9.09, p-value=0.001) and hypertensive status

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Table 15: Weekly availability and consumption of foods and hypertensive status (measured)

	Measured hypertensive status			
	Non-hypertensive	Hypertensive		
Variables	**n (%)**	**n (%)**	**Chi-square**	**P-value**
Have fruits			1.28	0.528
Every day/Most days	30 (42.86)	40 (57.14)		
Sometimes	74 (50.68)	72 (49.32)		
Rarely/Never	69 (50)	69 (50)		
Eats fruits			1.36	0.507
Every day/Most days	25 (42.37)	34 (57.63)		
Sometimes	87 (51.18)	83 (48.82)		
Rarely/Never	61 (48.8)	64 (51.2)		
Have vegetables			0.48	0.786
Every day/Most days	40 (46.51)	46 (53.49)		
Sometimes	72 (48.32)	77 (51.68)		
Rarely/Never	61 (51.26)	58 (48.74)		
Eat vegetables			1.51	0.471
Every day/Most days	30 (42.86)	40 (57.14)		
Sometimes	79 (49.07)	82 (50.93)		
Rarely/Never	64 (52.03)	59 (47.97)		
Have pastries			5.67	0.059
Every day/Most days	2 (16.67)	10 (83.33)		
Sometimes	31 (54.39)	26 (45.61)		
Rarely/Never	140 (48.95)	146 (51.05)		
Eat pastries			9.07	0.011*
Every day/Most days	1 (14.29)	6 (85.71)		
Sometimes	28 (66.67)	14 (33.33)		
Rarely/Never	144 (47.06)	162 (52.94)		
Have fizzy drinks			2.01	0.366
Every day/Most days	4 (33.33)	8 (66.67)		
Sometimes	24 (43.64)	31 (56.36)		
Rarely/Never	145 (50.35)	143 (49.65)		
Consumes fizzy drink			9.09	0.011*
Every day/Most days	0 (0)	8 (100)		
Sometimes	35 (56.45)	27 (43.55)		
Rarely/Never	138 (48.42)	147 (51.58)		

Figure 5 shows the diabetic status of respondents. The results show that 11% of respondents self-reported as being diabetic

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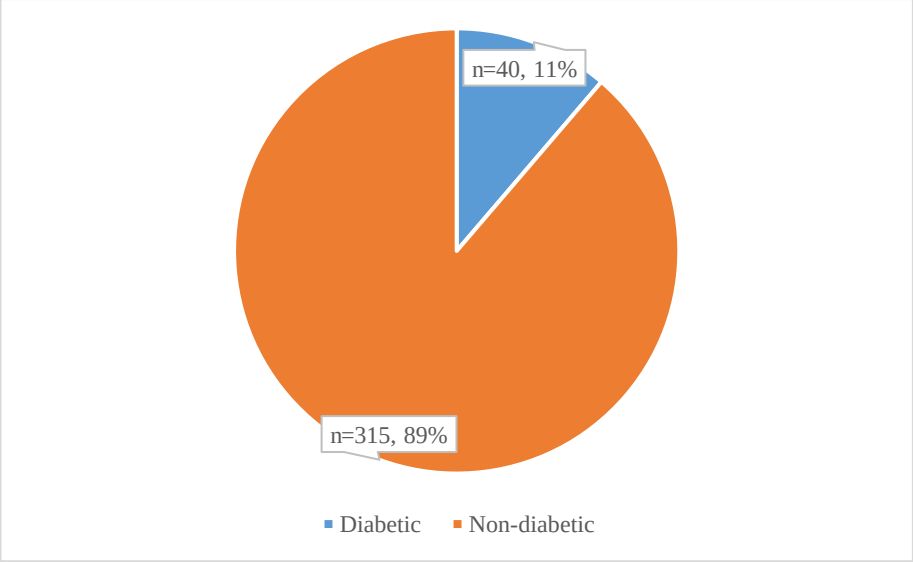


Figure 5: Self-reported diabetic status of respondents

Table 16 shows association between demographic characteristics and diabetic status (self-reported). Majority (91.2%) within the age group 60-69 years self-reported as been diabetic. More males (89%) than females (88.5%) self-reported as been diabetic. Among respondents who were currently married, 85.9% self-reported as diabetic and 14.1% self-reported as non-diabetic. The result shows no association between sex, marital status, education, housing, income and diabetic status. Nevertheless, there was association between age (x_2=6.61, p-value=0.037), constant companion (x_2=14.18, p-value<0.001).

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Table 16: Diabetic status (self-reported) and socio-demographic factors

	Self-reported diabetic status			
Variables	**Non-diabetic n (%)**	**Diabetic n (%)**	**Chi-square**	**P-value**
Age			6.61	0.037*
60-69	21 (8.79)	218 (91.21)		
70-79	11 (13.58)	70 (86.42)		
>79	8 (22.86)	27 (77.14)		
Sex			0.02	0.875
Male	17 (10.97)	138 (89.03)		
Female	23 (11.5)	177 (88.5)		
Marital status			4.01	0.26
Never married	0 (0)	7 (100)		
Currently married	27 (14.14)	164 (85.86)		
Cohabiting	1 (5.56)	17 (94.44)		
Widowed	12 (8.63)	127 (91.37)		
Education			4.89	0.18
No formal education	8 (20.51)	31 (79.49)		
Primary	12 (9.52)	114 (90.48)		
Secondary	17 (11.89)	126 (88.11)		
Higher	3 (6.38)	44 (93.62)		
Constant companion			14.18	<0.001***
Yes	16 (24.62)	49 (75.38)		
No	24 (8.28)	266 (91.72)		

4.6 To assess the associations between home food environment, dietary intake and health status of the aged.

Table 17 shows the home food environment of the elderly. Healthy food environment was computed as the sum of the frequency in availability of fruits and vegetables at home, on the scale 1-5 with 1 being the least available and 5 being the most available. The resulting scale became 2-10, while two was the lowest and 10 being the highest. The mean and standard deviation was used to summarize the weekly availability of healthy and unhealthy food at home. The average availability of healthy food at home is 5 fruits and vegetable per week among respondents with a minimum being 2 and the maximum being 10.

Unhealthy food environment also computed was as the sum of the frequency in the availability of pastries and fizzy drinks at home, on the scale 1-5 with 1 being the least

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available and 5 being the most available. The resulting scale became 2-10, while two was lowest and 10 being the highest.

The average availability of unhealthy food at home is 4 pastries and fizzy drinks with a minimum being 2 and a maximum being 9.

Table 17: The home food environment

Home food environment	Mean	Standard deviation	Min	Max
Healthy food environment	5.42	2.04	2	10
Unhealthy food environment	3.8	1.48	2	9

Factors associated with healthy intakes of foods at home

In table 18, the unadjusted mean difference (unadjusted for unhealthy food availability, BMI, hypertension, diabetic, perceived health status), on the Likert's scale 2-10.

Comparing the mean food intake score, in the availability of heathy at home with unavailability of healthy food at home, food intake increase by 0.85 in respondents with availability of healthy food at home to those with unavailability of healthy food at home. There was positive significant difference in mean associated with availability of healthy food and healthy food intake (UMD [95%C]: 0.85 [0.81, 0.89], p-value<0.001).

Comparing those with BMI >29.9kgm2 to those with BMI 18.5-24.9kgm2 (normal category), the mean food intake score was 1.10 higher in those with BMI>29.9kgm2 as compared to those with BMI 18.5-24.9kgm2. There was positive significant difference in mean associated with BMI of respondents and healthy food intake (UMD [95%C]: 1.10 [0.53, 1.68], p-value<0.001).

Comparing those who were non-hypertensive to those who were hypertensive, the mean food intake score was 0.14 higher in those who were not hypertensive to those who were

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hypertensive. There was no significant difference in mean associated with hypertension status and healthy food intake of respondents (UMD [95%C]: 0.14 [-0.28, 0.55], p-value=0.515)

Comparing those who were not diabetic to those who were diabetic, the mean food intake score was 0.35 lower in those who were not diabetic to those who were diabetic. There was no significant difference in mean with diabetic status of respondents and healthy food intake (UMD [95%C]:-0.35 [-0.67, 0.60], p-value=0.914)

Comparing those who perceived their health status as bad to those who perceived their as good, the mean food intake score among elderly who perceived their health as bad, was 2.49 lower compared to those with good perceived health status. There was significant difference in mean associated with perceived health status and healthy food intake (UMD [95%C]:-2.49 [-3.31, -1.66], p-value<0.001)

For the adjusted mean difference (adjusting for healthy food availability, BMI, hypertension, diabetic and perceived health status), the mean food intake score increase by 0.83 in respondents with availability of healthy food at home compared to those with unavailability of healthy food at home. There was a positive significant difference in mean associated with healthy food availability and food intake (AMD [95%C]: 0.83 [0.78, 0.87], p-value<0.001).

Comparing those with BMI >29.9(obese) to those with normal BMI, the mean food intake score was 0.11 higher in those with BMI>29.9 compared to those in the normal category. There was no significant difference in mean associated with BMI and healthy food intake of respondents (AMD [95%C]: 0.11 [-0.15, 0.26], p-value=0.7863).

Comparing those who were not hypertensive to those who were hypertensive, the mean food intake score was 0.03 higher in those who were not hypertensive compared to those who

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were hypertensive. There was no significant difference in mean with hypertension status and healthy food intake of respondents (AMD [95%C]: 0.03 [-0.15, 0.21], p-value=0.736).

Comparing those who were not diabetic to those who were diabetic, the mean food intake score was 0.07 lower in those who were not diabetic to those who were diabetic. There was no significant difference in mean associated with being diabetic and healthy food intake of respondents (AMD [95%C]: -0.07 [-0.36, 0.21], p-value=0.608).

Comparing those who perceived health status as bad to those who perceived their health status as good, the mean food intake score of respondents with bad perceived health status was 0.67 lower as compared to those with good perceived health status. There was a positive significant difference in mean associated with self-perceived health status and healthy food intake of respondents (AMD [95%C]: --0.67 [-1.09, -0.31], p-value=0.0023).

Table 18: Factors associated with healthy food intake at home

Variables	Unadjusted mean diff (95% CI)	P-value	Adjusted mean diff(95% CI)	P-value
Healthy food availability	0.85 (0.81, 0.89)	<0.001	0.83 (0.78, 0.87)	<0.001
BMI		<0.001		0.7863
<18.5	0.97 (0.71,2.64)		0.13(-0.60,0.85)	
18.5-24.9	**(reference)**			
25-29.9	0.84 (0.34, 1.36)		-0.04 (-0.26, 0.19)	
>29.9	1.10 (0.53,1.68)		0.11 (-0.15,0.26)	
Hypertension		0.515		0.736
Non hypertensive	**Reference**			
Hypertensive	0.14 (-0.28,0.55)		0.03 (-0.15, 0.21)	
Diabetic		0.914		0.608
Yes	**Reference**			
No	-0.35 (-0.67,0.60)		-0.07 (-0.36, 0.21)	
Perceived health status		<0.001		0.0023
Good	**reference**			
Moderate	-0.32 (-0.80,0.16)		-0.02 (-0.24, 0.20)	
bad	-2.49 (-3.31, -1.66)		-0.67 (-1.09, -0.31)	

UMD=unadjusted mean difference **AMD=adjusted mean difference**

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Factors associated with unhealthy food intake at home

From unadjusted, mean difference (unadjusted for unhealthy food availability, BMI, hypertension, diabetic, perceived health status) on the Likert's scale 2-9. Comparing the mean food intake score for unhealthy food for the elderly with availability of unhealthy food with unavailability of unhealthy food, food intake increase by 0.80 in respondents with availability of unhealthy food compared to those with unavailability of unhealthy food at home. There was significant difference in mean of availability of unhealthy food with unhealthy food intake of respondents (UMD [95%C]: 0.80 [0.75, 0.85], P-value<0.001)

Comparing the mean food intake score of those with BMI>29.9kgm2 to 18.5-24.9kgm2 (normal category), unhealthy food intake was 0.59 higher in those with BMI>29.9kgm2 compared to those in the normal category. There was a significant difference in mean of BMI of respondents with unhealthy food intake (UMD [95%C]: 0.59 [0.16, 0.99], P-value=0.015).

Comparing the mean food intake score in those who were not hypertensive to those who were hypertensive, unhealthy food intake was 0.49 higher in those who were non-hypertensive to those who were hypertensive. There was a positive significant difference in mean of those with hypertension status and unhealthy food intake of respondents (UMD [95%C]: 0.49 [0.20, 0.78], p-value=0.001).

Comparing the mean food intake score in those who were not diabetic to those who were diabetic, unhealthy food intake was 0.12 lower in those who were not diabetic to those who were diabetic. There was no significant difference in mean of respondents with diabetes status and unhealthy food intake (UMD [95%C]: -0.12[-0.47, 0.44], P-value=0.944). Comparing the mean food intake score in those who perceived health status as bad to those who perceived their health as good, unhealthy food intake was 1.32 lower in respondents

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with bad perceived health compared to those who perceived their health as good. There was positive significant difference in mean for perceived health status and unhealthy food intake of respondents (UMD [95%C]: -1.32 [-1.91, -0.71], P-value=0.001)

For the adjusted mean difference (adjusted for unhealthy food availability, BMI, hypertension, diabetic, perceived health status). Comparing the mean food intake score for the availability of unhealthy food to unavailability of unhealthy food, unhealthy food intake was 0.80 higher in those with availability of unhealthy food as compared to unavailability of unhealthy food at home. There was positive significant difference in mean for availability of unhealthy food and intake of unhealthy food at home (AMD [95%C]: 0.80 [0.74, 0.85], P-value<0.001).

Comparing the mean food intake score in the availability of unhealthy food in those with BMI >29.9kgm2 to 18.8-24.9kgm2 (normal category), unhealthy food intake was 0.16 lower in those with BMI>29.9kgm2 compared to the normal BMI normal category. There was no significant difference in mean for BMI and unhealthy food intake of respondents (AMD [95%C]:-0.16 [-0.24, 0.20], P-value=0.189).

Comparing the mean food intake score for those who were not hypertensive to those who were hypertensive, unhealthy food intake was 0.05 lower in those who were not hypertensive as compared to those who were hypertensive. There was no significant difference in mean for hypertension status and unhealthy food intake of respondents (AMD [95%C]:0.05 [-0.11, 0.20], P-value=0.572).

Comparing the mean food intake score of those who were not diabetic to those who were diabetic, unhealthy food intake was 0.17 lower in those who were not diabetic to those who were diabetic. There was no significant difference in mean for diabetic status and unhealthy food intake of respondents at home (AMD [95%C]:-0.17[-0.41, 0.08], P-value=0.182).

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Comparing the mean food intake score in those who perceived their health status as bad to those who perceived their health as good, unhealthy food intake was 2.23 lower in those with bad perceived health status as compared to those with good perceived health status. There was no significant difference in mean for perceived health status and unhealthy food intake of respondents (AMD [95%C]:--2.23 [-0.57, 0.11], P-value=0.387).

Table 19: Factors associated with unhealthy food intake at home

Variables	Unadjusted mean diff (95% CI)	P-value	Adjusted mean diff(95% CI)	P-value
Unhealthy food availability	0.80 (0.75, 0.85)	<0.001	0.80 (0.74, 0.85)	<0.001
BMI		0.0155		0.1891
<18.5	0.80 (-0.41, 2.02)		0.30 (-0.33, 0.01)	
18.5-24.9	reference			
25-29.9	0.36 (-0.12, 0.73)		-1.89 (-0.38, 0.07)	
>29.9	0.59 (0.16, 0.99)		-0.16 (-0.24, 0.20)	
Hypertension		0.001		0.572
Non hypertensive	Reference			
Hypertensive	0.49 (0.20, 0.78)		0.05 (-0.11, 0.20)	
Diabetic		0.944		0.182
Yes	Reference			
No	-0.12 (-0.47, 0.44)		-0.17 (-0.41, 0.08)	
Perceived health status		<0.001		0.3870
Good	Reference			
Moderate	-0.00(-0.35, 0.35)		0.01 (-0.18, 0.19)	
bad	-1.32 (-1.91, -0.71)		-2.23 (-0.57, 0.11)	

UMD=unadjusted mean difference **AMD=adjusted mean difference**

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CHAPTER FIVE

DISCUSSION

This chapter discusses the findings of this study under the following areas: Socio-demographic characteristics, home food environment, the nutritional status and health status of the elderly 60 years above. The main enquiry followed by this study were the following:

- What is the home food environment of the elderly in the LEKMA comprised of?
- What is the influence of the home food environment on the dietary intake of the elderly in the LEKMA?
- What is the relationship between dietary intake and the health status of the elderly?

The results of this study show that of the elderly who participated in this study, there were more females (56.34%) than their male counterparts, and typical elderly person in the LEKMA area is aged on average 67.91 years old. This outcome is in line with the outcome of the Ghana Population Census of 2010, which reported more females (almost 60%) than males in the nation. It may also be suggestive of the life expectancy differential between males (62.5 years) and females (64.4 years) in the country according a WHO data (WHO, 2018).

5.1 The Home Food Environment and dietary intake of the elderly

Home food environment are important for food availability and how meals are prepared at the home by families because they strongly influence dietary intake in individuals (Masters, 2012). This study found that majority of the respondents sometimes have fruit and vegetables at home. The least consumed food groups was sugar, preserves and syrups. Masters (2012) in his study confirmed among adolescents that the availability of fruits and vegetables at home is positively associated with fruit and vegetable consumption resulting to positive influence of health. This study reported rare consumption of fizzy drinks and pastries among the elderly. In addition, the average consumption of unhealthy food at home

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was 4 with a minimum of 2 (pastries and fizzy drinks) and maximum of 9 (pastries and fizzy drinks). Consumption of unhealthy food at home was highest among 60-69years and lowest among 79 and above. Utter and colleagues (2008) in a study among New Zealand Adolescents revealed those who ate at home every day with their family were less likely to have unhealthy snack foods at home most days and consume them compared with adolescents who did not eat family meals. Family meals consumption was not associated with the availability of unhealthy foods like pastries, sweets and fizzy drinks or with fast foods and fried foods, which were consumed before and after meal as snacks. (Utter et al., 2008).

Vegetables consumed by the study participants mostly includes onion, tomatoes, ginger and garlic. In a similar study among adult black American women aged 35-65 years, an average of 14 types of fruits and vegetables was recorded. Majority of them had fruits like bananas (64.9%), oranges or tangerines (55.8%), and apples (53.3%) in their fruit list. In terms of vegetables, most of them consumed onions (90.9%) and peas, beans, or green beans (89.0%) (Kegler et al., 2014). In this study. The mean score for availability of healthy foods at home was highest among the age group 60-69 years and lowest in the age group 79 years and above.

Although the study showed the availability and consumption of healthy foods like fruits and vegetables, there were also a significant number of them consuming pastries (chips, cakes) fried foods, meat (cow, chicken and goat), sugars (fizzy drinks), alcohol (both local and foreign) and salted fish and meat (koobi and kako). This agrees with a study by Shlisky and colleagues conducted among the aged, which concluded that there was insufficient consumption of legumes, whole grains, nuts or seeds, fish, lean meat, poultry, and milk and milk products. For healthy ageing there should be less consumption of refined cereals and

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legumes, processed meats, fried foods, and sugar, preserves and syrups (Shlisky et al., 2017).

This study found the majority of the respondents to have consumed food from 5 out of 9 food groups; vegetables and fruits, starchy food, cereals, fats and oil and meat, fish egg product.

5.2 Influence of food consumption on health status of the elderly

Master 2012 found that obesogenic environment increases body fat accumulation during aging in response to reduced basal metabolism and energy expenditure. It is also a result of unhealthy lifestyles and home food environments (Maters, 2012).

This study revealed strong association between the frequency of consumption of unhealthy food at home and availability of unhealthy at home, BMI, hypertension and self-perceived health status of respondents. This is consistent with Mercille et al 2012, which confirms the consumption of unhealthy food like high fat and protein diets, fizzy drinks are associated with BMI and obesity.

A similar study by Kelly and colleagues among children and adolescents 6-17 years, found that the home food environment is an important setting with regard to a child's dietary intake and the development of obesity since 65% to 72% of daily calories are consumed in the home (Nepper, 2014). This study found obesity prevalence similar to previous evidence in Accra. This is consistent with a work by Amoah (2010) in urban and rural Accra, Ghana, which recorded BMI of the elderly as overweight, and obesity with 23.4% and 14.1% respectively. Obesity increases risk for non-communicable disease (NCD) among the elderly (Pereko et al 2013).

The current study showed that majority were hypertensive. However, one risk factor for hypertension is been obese. A study by Pereko et al (2013) revealed obesity increases the

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risk for many disease conditions, such as diabetes mellitus, hypertension, dyslipidaemia, coronary artery diseases and some cancers (Pereko et al., 2013). This study found no association between consumption of healthy food at home and demographics characteristics like age, marital status, level of education and having companion at home

Among many risk factors, alcohol consumption and smoking expose the aged to hypertension and heart disease, this study showed more than half of the aged ever consumed alcohol, but few ever smoked before. The found that unhealthy food intake was lower in those who were hypertensive to those who were not hypertensive. In this study, there was association between eating pastries, consuming of fizzy drinks and hypertension status. A study conducted by Groot and colleagues, confirmed that the increasing unhealthy lifestyle behaviours such alcohol and tobacco consumption among the elderly and its effect on health status of the elderly.

In the current study majority (73%) of the respondents self-perceived their health status as good. There was strong association between having fruits and vegetables at home and self-perceived health status. Respondents who sometimes have and eats fruits and vegetables perceived their health as good. This confirms a study by Biritwum et al 2014, which found majority (41%) of the aged rated their personal health as good or very good. Self-perceived health status was poorer among 70 years and above. The difference in rating perceived health status in both studies may be because the aged are now becoming aware and conscious of their health, as they visit the hospital. This finding is consistent with a study conducted by Obisesan et al (2008) in Washington DC.

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5.3 The influence of home food environment and dietary intake on the health status of the elderly

The study showed the association between multiple aspects of the elderly home food environment and dietary intake.

This study revealed that majority of the respondents have healthy food environment. This means close to 70% of the elderly in Ledzokuku municipal are exposed to healthy food environment. This suggest that, most of this elderly are likely to make healthy food choices since food environment are good predictors of food choices (Groot et al., 2004). Based on this outcome, there was a strong association between frequency of healthy food intake and availability of healthy food, BMI and self-perceive health status (See table 17). This may be attributable to the fact that the respondents reported a relatively positive home food environment in terms of the availability and consumption of vegetables. This may be seen in the results reported in Table 17, where there is a negative association between the frequency of vegetable consumption and hypertensive status. This indicates that making vegetables and other healthy food items available to the aged in their immediate environment could enhance not only their intake but also their overall health status, especially with respect to hypertensive status.

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CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The aim of this study was to assess the influence of home food environment and dietary intake on the health status of the elderly people, using the Ledzokuku-Krowor Municipality as a case study.

The results of this study show that majority of the respondents had healthy food environment. This research demonstrate that home food environment plays an important role in food consumption of the elderly and contribute to the consumption of healthy and unhealthy food with important predictor like the family and hypertensive status. The study revealed that considerable number of elderly were obese. In addition, BMI of respondents were associated with fats consumption. Majority of the respondents perceived their health as good. In addition, most of the elderly were hypertensive and majority were on medication for hypertension. The study revealed that majority of the respondents were having healthy food environment, and there was a positive association between frequency of intake of healthy food and availability of health food at home and self-perceived health status of the elderly.

This study is among few studies that examines the relationship between the home food environment and health outcomes in the Ghanaian context. The results suggest that type of food available and accessible in the local environment contributes to increasing BMI and other health indicators. The findings of this study may be applicable to other similar suburbs in Ghana and even beyond. However, there are a few points to note regarding the validity of the findings of this study. Firstly, this study cannot establish causation due to the use of cross-sectional data. The results thus establish associations rather than causation. Secondly, the selection of the sample was not random, therefore the sample may not be representative

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of the study area or even the nation at large, therefore it may be difficult to draw inferences from the findings of this study. Additionally, the distance from each respondent to various food resource locations could not be determined because their exact location in the study area were not accounted for in this study.

These limitations notwithstanding, the findings from this study provide evidence that characteristics of the food environment are associated with BMI and other health outcomes among the elderly in the Ghanaian context.

6.2 Recommendation

There is an increase in the ageing population across the globe and Ghana is no exception. Therefore, special attention should be given to the elderly from 60 years and above to improve their home food environment with support from government and civil society.

The results of this study demonstrate that individual socio-demographic characteristics influence the health statuses of the elderly in the LEKMA area. The findings of this study affirm the stance that obesity (high BMI) is an outcome of a complex interaction between factors operating at different levels, especially at the individual levels in the case of this study. Given that the average elderly person in this study is obese, research on obesity and interventions aimed at reducing obesity in Ghana, particularly in urban settings like the LEKMA area, needs to focus not only on individual characteristics but also on factors (such as food availability and accessibility) in the community environment that increase the risk of obesity and other health conditions among the elderly. This would go a long way to make life more comfortable for the aged, as well as reduce the burden of non-communicable diseases and the pressure on the National Health Insurance Scheme.

Based on the findings of this study, more aged homes with good food environment and trained caregivers should be provided and made available for the elderly. To ensure this,

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government should mainly provide financial assistance, enforce policies and programs on nutrition support and lastly provide geriatric services at all health care centers for the elderly in society.

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REFERENCES

Anauati, M. V., Galiani, S., & Weinschelbaum, F. (2015). The rise of noncommunicable diseases in Latin America and the Caribbean: challenges for public health policies. *Latin American Economic Review*, *24*(1), 11. https://doi.org/10.1007/s40503-015-0025-7

Amuta, A. O., Jacobs, W., Idoko, E. E., Barry, A. E., & McKyer, E. L. J. (2015). Influence of the home food environment on children's fruit and vegetable consumption: A study of rural low-income families. *Health Promotion Practice*, *16*(5), 689-698. https://doi.org/10.1177/1524839915589733

Ayernor, P. K. (2012). Diseases of ageing in Ghana. *Ghana Medical Journal*, *46*(2), 18-22.

Baltes, P. B., & Baltes, M. M. (1990). Psychological perspectives on successful aging: The model of selective optimization with compensation. *Successful Aging: Perspectives from the Behavioural Sciences*, *1*(1), 1-34.

Baltes, P. B. (2005). A Psychological Model to Age Successfully : Selective Optimization with Compensation. Keynote Lecture, 2005 World Congress of Gerontology, Brazil.

Benetos, A., Petrovic, M., & Strandberg, T. (2019). Hypertension management in older and frail older patients. *Circulation Research*, *124*(7), 1045-1060. https://doi.org/10.1161/CIRCRESAHA.118.313236

Berge, J. M., MacLehose, R. F., Loth, K. A., Eisenberg, M. E., Fulkerson, J. A., & Neumark-Sztainer, D. (2012). Family meals. Associations with weight and eating behaviors among mothers and fathers. *Appetite*, *58*(3), 1128-1135. https://doi.org/10.1016/j.appet.2012.03.008

Biritwum, R., Mensah, G., Yawson, A., & Minicuci, N. (2013). Study on global AGEing and adult health (SAGE), Wave 1: the Ghana national report. *Geneva: World Health Organization*. http://ghanaweb.com/GhanaHomePage/education

Bloom, I., Lawrence, W., Barker, M., Baird, J., Dennison, E., Sayer, A. A., & Robinson, S. (2017). What influences diet quality in older people? A qualitative study among community-dwelling older adults from the Hertfordshire Cohort Study, UK. *Public Health Nutrition*, *20*(15), 2685-2693. https://doi.org/10.1017/S1368980017001203

Bosu, W. K., Aheto, J. M. K., Zucchelli, E., & Reilly, S. T. (2019). Determinants of systemic hypertension in older adults in Africa: a systematic review. *BMC Cardiovascular Disorders*, *19*(1), 173.

Bradshaw, S. (2013). Food Environments: What is the Role of Demographics in Figians' Decision Making Related to Food Choice and Overall Nutrition Behavior.

University of Ghana http://ugspace.ug.edu.gh

Charlton, K. E. (1999). Elderly men living alone: are they at high nutritional risk?. *The Journal of Nutrition, Health & Aging*, *3*(1), 42-47.

Dake, F. A., Thompson, A. L., Ng, S. W., Agyei-Mensah, S., & Codjoe, S. N. (2016). The local food environment and body mass index among the urban poor in Accra, Ghana. *Journal of Urban Health*, *93*(3), 438-455. https://doi.org/10.1007/s11524-016-0044-y

De Groot, L. C., Verheijden, M. W., De Henauw, S., Schroll, M., & Van Staveren, W. A. (2004). Lifestyle, nutritional status, health, and mortality in elderly people across Europe: a review of the longitudinal results of the SENECA study. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, *59*(12), 1277-1284.

Debén, E., Gallego, T., Perez, M., Gomez, M. A., Serra, J. M., Ramirez, E., & Morell, A. (2014). DI-024 Cetuximab in the treatment of advanced metastatic colorectal cancer. *European Journal of Hospital Pharmacy: Science and Practice*, *21*(Suppl 1), A79-A80. https://doi.org/http://dx.doi.org/10.1136/ejhpharm-2013-000436.195

Dong, H. J. (2014). *Health Maintenance in Very Old Age: Medical Conditions, Functional Outcome and Nutritional Status* (Doctoral dissertation, Linköping University Electronic Press).

Feng, X., Astell-Burt, T., Badland, H., Mavoa, S., & Giles-Corti, B. (2018). Modest ratios of fast food outlets to supermarkets and green grocers are associated with higher body mass index: Longitudinal analysis of a sample of 15,229 Australians aged 45 years and older in the Australian National Liveability Study. *Health & Place*, *49*, 101-110. https://doi.org/10.1016/j.healthplace.2017.10.004.

Fernandez-Martinez, B., Prieto-Flores, M. E., Forjaz, M. J., Fernández-Mayoralas, G., Rojo-Pérez, F., & Martínez-Martín, P. (2012). Self-perceived health status in older adults: regional and sociodemographic inequalities in Spain. *Revista de Saúde Pública*, *46*, 310-319.

Gatimu, S. M., Milimo, B. W., & San Sebastian, M. (2016). Prevalence and determinants of diabetes among older adults in Ghana. *BMC Public Health*, *16*(1), 1174.

Ghana Statistical Service (2014). 2010 population census, district analytical report of Ledzokuku Krowor Municipality

Host, A., McMahon, A. T., Walton, K., & Charlton, K. (2016). Factors influencing food choice for independently living older people—a systematic literature review. *Journal of Nutrition in Gerontology and Geriatrics*, *35*(2), 67-94. https://doi.org/10.1080/21551197.2016.1168760

University of Ghana http://ugspace.ug.edu.gh

Kegler, M. C., Alcantara, I., Haardörfer, R., Gazmararian, J. A., Ballard, D., & Sabbs, D. (2014). The influence of home food environments on eating behaviors of overweight and obese women. *Journal of Nutrition Education and Behavior*, *46*(3), 188-196. https://doi.org/10.1016/j.jneb.2014.01.001

Leslie, W., & Hankey, C. (2015, September). Aging, nutritional status and health. In *Healthcare* (Vol. 3, No. 3, pp. 648-658). Multidisciplinary Digital Publishing Institute. https://doi.org/10.3390/healthcare3030648

MacFarlane, A., Crawford, D., & Worsley, A. (2010). Associations between parental concern for adolescent weight and the home food environment and dietary intake. *Journal of Nutrition Education and Behavior*, *42*(3), 152-160. https://doi.org/10.1016/j.jneb.2008.11.004

Marsman, D., Belsky, D. W., Gregori, D., Johnson, M. A., Dog, T. L., Meydani, S., & Griffiths, J. C. (2018). Healthy ageing: the natural consequences of good nutrition—a conference report. *European Journal of Nutrition*, *57*(2), 15-34. https://doi.org/10.1007/s00394-018-1723-0

Masters, M. A. (2012). Impact of the Home Food Environment on Dietary Intake, Obesity and Cardiovascular Health of US Children and Adolescents, Aged 6-19.

Mathus-Vliegen, E. M. (2012). Obesity and the elderly. *Journal of Clinical Gastroenterology*, *46*(7), 533-544.

Mercille, G., Richard, L., Gauvin, L., Kestens, Y., Shatenstein, B., Daniel, M., & Payette, H. (2012). Associations between residential food environment and dietary patterns in urban-dwelling older adults: results from the VoisiNuAge study. *Public Health Nutrition*, *15*(11), 2026-2039.

Minicuci, N., Biritwum, R. B., Mensah, G., Yawson, A. E., Naidoo, N., Chatterji, S., & Kowal, P. (2014). Sociodemographic and socioeconomic patterns of chronic non-communicable disease among the older adult population in Ghana. *Global Health Action*, *7*(1), 21292. https://doi.org/10.3402/gha.v7.21292

Nepal, G. C. (2010). Elderly people (60+) in Nepal on health, nutrition and social status focusing on research needs. *Kathmandu: GCN*.

Nepper, M. J., & Chai, W. (2015). Associations of the home food environment with eating behaviors and weight status among children and adolescents. *Journal of Nutrition & Food Sciences*, (S12), 1.

Ni Mhurchu, C., Vandevijvere, S., Waterlander, W., Thornton, L. E., Kelly, B., Cameron, A. J., & INFORMAS. (2013). Monitoring the availability of healthy and unhealthy foods and non-alcoholic beverages in community and consumer retail food

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environments globally. *Obesity Reviews*, *14*, 108-119. https://doi.org/10.1111/obr.12080

Pereko, K. K., Setorglo, J., Owusu, W. B., Tiweh, J. M., & Achampong, E. K. (2013). Overnutrition and associated factors among adults aged 20 years and above in fishing communities in the urban Cape Coast Metropolis, Ghana. *Public Health Nutrition*, *16*(4), 591-595. https://doi.org/10.1017/S1368980012002698

Reitzel, L. R., Okamoto, H., Hernandez, D. C., Regan, S. D., McNeill, L. H., & Obasi, E. M. (2016). The built food environment and dietary intake among African-American adults. *American Journal of Health Behavior*, *40*(1), 3-11. https://doi.org/10.5993/AJHB.40.1.1

Robinson, S. M. (2018). Improving nutrition to support healthy ageing: what are the opportunities for intervention? *Proceedings of the Nutrition Society*, *77*(3), 257-264. https://doi.org/10.1017/S0029665117004037

Rodgers, J. L., Jones, J., Bolleddu, S. I., Vanthenapalli, S., Rodgers, L. E., Shah, K., & Panguluri, S. K. (2019). Cardiovascular risks associated with gender and aging. *Journal of Cardiovascular Development and Disease*, *6*(2), 19.

Schoenborn, C. A., & Heyman, K. M. (2009). Health characteristics of adults aged 55 years and over: United States, 2004–2007. *Natl Health Stat Report*, *16*, 1-31.

Schröder, H., Bawaked, R. A., Ribas-Barba, L., Izquierdo-Pulido, M., Roman-Viñas, B., Fíto, M., & Serra-Majem, L. (2017). Cumulative effect of obesogenic behaviours on adiposity in spanish children and adolescents. *Obesity Facts*, *10*(6), 584-596.

Shlisky, J., Bloom, D. E., Beaudreault, A. R., Tucker, K. L., Keller, H. H., Freund-Levi, Y., ... & Meydani, S. N. (2017). Nutritional considerations for healthy aging and reduction in age-related chronic disease. *Advances in Nutrition*, *8*(1), 17. https://doi.org/10.3945/an.116.013474.Age

Steiner-Asiedu, M., Pelenah, S. J. M., Bediako-Amoa, B., & Danquah, A. O. (2010). The nutrition situation of the elderly in ghana: a case study. *Asian Journal of Medical Sciences*, *2*(3), 95-103.

Utter, J., Scragg, R., Schaaf, D., & Mhurchu, C. N. (2008). Relationships between frequency of family meals, BMI and nutritional aspects of the home food environment among New Zealand adolescents. *International Journal of Behavioral Nutrition and Physical Activity*, *5*(1), 50. https://doi.org/10.1186/1479-5868-5-50

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

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Vorster, H. H., Venter, C. S., Wissing, M. P., & Margetts, B. M. (2005). The nutrition and health transition in the North West Province of South Africa: a review of the THUSA (Transition and Health during Urbanisation of South Africans) study. *Public Health Nutrition*, *8*(5), 480-490. https://doi.org/10.1079/PHN2005784

World Health Organization. (2018). Global report on diabetes: executive summary. 2016.

World Health Organization. (2000). *Nutrition for health and development: a global agenda for combating malnutrition* (No. WHO/NHD/00.6). Geneva: World Health Organization. Retrieved from http://whqlibdoc.who.int/hq/2000/WHO_NHD_00.6.pdf

Yazdanyar, A., & Newman, A. B. (2009). The burden of cardiovascular disease in the elderly: morbidity, mortality, and costs. *Clinics in Geriatric Medicine*, *25*(4), 563-577.

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APPENDICES

APPENDIX I

NMIMR-IRB CONSENT FORM

Title: **Relationship Home Food Environment, Dietary Intake and Health Status of the Elderly in Ledzokuku Municipality**

Principal Investigator: **Vincent Mawuli Fedieley**

Address:

Population, Family and Reproductive Health

University of Ghana

School of Public Health

P. O Box LG 13Legon, Accra

General Information about Research

This study is being conducted in partial fulfilment for the award of degree of Master of Public Health. It is also to improve the information base on the home food environment of the elderly because we think they tend to spend most of their time at home and eat food that is available at home. The food we eat has a bearing on our health status. The elderly are not exempted from chronic diseases like diabetes and hypertension which are common among all age groups because of the general change in eating habits.

As part of the study we will ask you some questions and also measure your height and weight. Your height will be measured with a height meter and your weight will be measured with a weighing scale. We will also measure your blood pressure. This study is taking place in Ledzokuku Krowor Municipality. It is mainly for academic purposes,

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however, findings will help us understand the issues concerning the elderly population in relation to nutrition and health. The findings of the study may be shared with the Municipal Assembly so that they can be used to improve health service delivery to the elderly.

The duration for answering the questions will be between 10-15 minutes. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask me. You must however note that being part of the study is voluntary.

Potential Risks and Discomforts

There are no potential risks. You may only feel uncomfortable talking about some issues that you consider personal and confidential. You do not have to answer any question or take part in the study if you don't wish to do so. You do not have to give me any reason for not responding to any question, or for refusing to take part in the study

Possible Benefits

The research will help improve the nutrition, health and care of the aged from sixty years (60+ and above) who are a vulnerable group in the society. Data collected and analyze will be use by the Lekma Hospital and other health facilities to help address the nutrition and health needs of the aged. The research would also add to knowledge about the food the elderly normally has and eat at home which can affect the way they eat and their wellbeing.

Confidentiality

What you tell us is confidential. Nothing from this interview will be linked to your personal information. No one will have access to the information you provide except the study team

Sharing the Results

Nothing that you tell me will be shared with anybody outside the study team, and nothing will be attributed to you by name. The knowledge that I will get from this study will be

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shared with the District Director of Health so that they will see what to do to improve nutrition and health of the elderly in your community. I may publish the results so that other interested people may learn from the study.

Compensation.

There will not be any compensation. However, I will refresh you with sugar-free soft drink

Additional Cost

There will be no additional cost for the research

Contacts for Additional Information

If you have any questions at all about this study, please feel free to contact Vincent Mawuli Fedieley, the principal investigator on +233 268894960, you can also contact the Institutional Board of the Noguchi memorial Institute for Medical Research on 0302916438

Your rights as a Participant

This research has been reviewed and approved by the Institutional Review Board of Noguchi Memorial Institute for Medical Research (NMIMR-IRB). If you have any questions about your rights as a research participant you can contact the IRB Office between the hours of 8am-5pm through the landline 0302916438 or email addresses: nirb@noguchi.ug.edu.gh

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VOLUNTEER AGREEMENT

The above document describing the benefits, risks and procedures for the research titled **Relationship between Home Food Environment, Dietary Intake and Health Status of the Elderly in Ledzokuku Krowor Municipality** has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

_____ _____

Date Name and signature or mark of volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the research.

_____ _____

Date Name and signature of witness

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

_____ _____

Date Name Signature of Person Who Obtained Consent

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APPENDIX II: QUESTIONNAIRE

DATE ……./……../2019 **FORM NO……**

This research is to assess home food environment, dietary intake and health status of the elderly in Ledzokuku-Krowor Municipality. It is basically for academic purposes and you have the choice to participate or not to participate. All information provided will be treated confidentially and publication of the research will be based on the permission of the school authority

Telephone number of respondents……..

Telephone number of caregiver ……..

(In case respondents don't have a telephone number) ……

Socio-demographic characteristics

1. How old are you ……
2. What is your sex 1. Male [ ] 2. Female [ ]
3. Marital status
   1. Never married [ ] 2. Currently married [ ] 3. Cohabiting [ ]
   4. Separately/divorced [ ] 4. Widowed [ ]
4. Educational status

   1. No formal education [ ] 2. Less than primary [ ] 3. Primary school completed [ ] 4. Secondary school completed [ ] 5. High school (or equivalent) completed [ ]

   6. College/ University completed [ ] 7. Post graduate degree completed [ ]
5. Housing

   1. Owned [ ] 2 rented [ ] 3. Other (please specify) ……

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6. What is your current source of income? (Multiple response allowed)

   1. Salary [ ] 2. Family [ ] 3. Pension [ ] 4. Government assistance [ ]

   5. Community assistance [ ] 5. Other (please specify) ……

7. Do you have constant companion, helper or caregiver at home? 1. Yes [ ] 2. No [ ]

8. If yes, please what is role of the companion, helper or caregiver at home? (Multiple answers required)

   1. Preparing meals [ ] 2. Running errands [ ] 3. Cleaning the house [ ] 4. Dispensation of medicine [ ] 5. Other (please specify……

9. Do you use any assistive technology? 1. Yes [ ] 2. No. [ ]

10. If yes, (please specify) below.

    1. Wheel chair [ ]

    2. Walker [ ]

    3. Adjusted bed [ ]

    4. Others (please specify) …….

HEALTH STATUS

11. Do you have the National Health Insurance Card? 1. Yes [ ] 2. No [ ]

12. Do you visit the hospital? 1. Yes [ ] 2. No [ ]

13. If yes, how often?

    1. Weekly [ ] 2. Monthly [ ] 3. Every two months [ ]

    4. Every Quarter [ ] 5. Other (please specify)……

14. Are you on any medication? 1. Yes [ ] 2. No [ ]

15. If yes, what are you taking the medication for?

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1. Hypertension [ ] 2. Diabetes [ ] 3. Pain [ ] 4. Insomnia[ ] 4 Supplements [ ]

Other (please specify)……

16. If yes, how often do you take your medicine? 1. Daily [ ] 2. Weekly [ ] 3. Monthly [ ]

17. Have you ever consumed alcohol? 1. Yes [ ] 2. No [ ]

18. Do you currently consume alcohol? 1. Yes [ ] 2. No [ ]

19. Have you ever smoked? 1. Yes [ ] 2. No [ ]

20. Are you currently smoking? 1. Yes [ ] 2 No [ ]

21. Which disease conditions do you have? (Multiple responses allowed)

Urinary incontinence	Yes [ ]	No [ ]
Visual impairment	Yes [ ]	No [ ]
Hearing impairment	Yes [ ]	No [ ]
Depression	Yes [ ]	No [ ]
Hypertension	Yes [ ]	No [ ]
Obesity	Yes [ ]	No [ ]
Diabetes	Yes [ ]	No [ ]
Dental problem	Yes [ ]	No [ ]

Other (Specify) …….

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SELF-REPORTED GENERAL HEALTH STATUS

22. What would you say about your health as compared to that of other people at your age?

1.Very Good [ ] 2. Good [ ] 3.Moderate [ ] 4. Bad [ ] 5. Very Bad [ ]

23. How many times do you eat in a day?

1. Once [ ] 2. 2 times [ ] 3. 3 times [ ] 4. More than 3 times [ ]

24. Do you eat fruits? 1. Yes [ ] 2. No [ ]

25. If yes, how many times a week? _____

26. Do you use food supplements? 1. Yes [ ] 2. No [ ]

27. If yes, how many times a week? _____

28. Mode of feeding.

1. Unable to feed without assistance [ ] 2. Self-fed with some difficulty [ ]

3. Self-fed without any assistance [ ] 4. Other (Specify) ……...

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24hr recall

29. We are interested in all you ate and drank from the time you woke up yesterday morning until you went to bed

Breakfast	Snack	Lunch	Snack	Supper/dinner	Snack

Food intake (Food frequency)

30. In a typical week, how often do you consume the following food items?

Healthy Foods

Fruits and Vegetables

No.	Types of Fruits	Number of times they are consumed	Types of Vegetables	Number times they are consumed
1.	Orange		Kontomire	
2.	Banana		Tomatoes	
3.	Watermelon		Onion	
4.	Pineapple		Cucumber	
5.	Apple		Sweet pepper	
6.	Grapes		Green beans	
7.	Pawpaw		Carrot	

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No.	Types of Fruits	Number of times they are consumed	Types of Vegetables	Number times they are consumed
8.	Tangerines		Lettuce	
9.	Mango		Broccolli	
10.	Avocado Pear		Ginger	
11.	Lime/ lemon		Garlic	
12.	Pumpkin		Beetroot	
13.	Star apple		Cauliflower	
14.	Salsap		Dandelion	
15			Garden egg	
16.			alefu	
17.			Spinach	
18.			Gboma	
19.			Ayoyo	
20.			Okra	
21.			Cabbage	

Whole grains and cereals

No.	Whole grain	Number of times consumed
1.	Millet porridge	
2.	Tom brown	
3.	Maize porridge	
4.	Brown rice	
5.	Oats	
6	Wheat	
7.	Wheat bread	

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Unhealthy Foods

Pastries and Confectionery

No.	Food item	Number of times consumed
1.	**Pastries**	
2.	Meat pie	
3.	Cakes	
4.	Cookies	
5.	Rock buns	
6.	Sugar bread	
7.	Brown bread	
8.	Flour chips	
Fried foods		
1.	Booflot/ dough nuts (bef)	
2.	Fried yam	
3.	Plantain Chips	
4	Fried ripe plantain	
5.	Kelewele	
6.	Koose	
Meat		
1.	Meat (Cow, goat etc.)	
2.	Poultry(chicken, duck, etc.	
3.	Fried meat	
4..	Fried Pork	
5..	Fried chicken	
6	Kebab	
7.	Sausage	
9.	Salted beef (tolo beef)	
Fish		
1.	Fried fish	
2	Canned fish	
13	Salted fish e.g. Kobi, momoni, kako	

No.	Drinks	Number of times consumed
Sugary Drinks		
1.	Carbonated drinks e.g Fanta, coca cola	
2.	Pasteurized Fruit Juices e.g Don Simon, Ceres	

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3.	Sweetened local drinks E.g. Asana, sobolo, Lamogi	
4.	Energy drinks e.g Rush	
Alcoholic drinks		
1.	Local akpeteshie	
2.	Bitters with alcohol e.g Alomo bitters	
3.	Beer e.g. Club	
4.	Local palm wine	
5.	Hard liquor	

HOME FOOD ENVIRONMENT

Consumption and availability healthy food in the home

31. During the past one week, on how many days did your family have fruits at home?

1. Everyday [ ] 2 Most days [ ] 3. Sometimes [ ] 4. Rarely [ ] 5. Never [ ]

32. During the past one week, on how many days did your family have vegetables at home?

1. Everyday [ ] 2.Most days [ ] 3. Sometimes [ ] 4. Rarely [ ] 5. Never [ ]

33. During the past one week, how often did your family eat fruits at home?

1. Every day [ ] 2. Most days [ ] 3. Sometimes [ ] 4. Rarely [ ] 5. Never [ ]

34. During the past one week, how often did your family eat vegetables at home?

1. Every day [ ] 2. Most days [ ] 3. Sometimes [ ] 4. Rarely [ ] 5. Never [ ]

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Consumption and availability of unhealthy food in the home

35. During the past one week, on how many days did your family have pastries, meat pie, anything fried etc. at home?
1. Every day [ ] 2 Most days [ ] 3. Sometimes [ ] 4. Rarely [ ] 5. Never [ ]

36. During the past one week, on how many days did your family have fizzy drinks like coca cola, Fanta etc. at home?

1. Every day [ ] 2 Most days [ ] 3. Sometimes [ ] 4. Rarely [ ] 5. Never [ ]

37. During the past one week, how often did your family eat pastries, meat pie, anything fried etc. at home?
1. Every day [ ] 2 Most days [ ] 3. Sometimes [ ] 4. Rarely [ ] 5. Never [ ]

38. During the past one week, how often did your family drink fizzy drinks like coca cola,

Fanta and etc. at home

1. Everyday [ ] 2 Most days [ ] 3. Sometimes [ ] 4. Rarely [ ] 5. Never [ ]

Food from non-home food sources

39. How often do you obtain food from the following sources outside the home per week?

SOURCE OF MEAL	**Always**	**Most days**	**Sometimes**	**Rarely**	**Never**
Fast Food					
Sit Down Restaurant					
Take Away					
Delivery					

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ANTHROPOMETRIC MEASUREMENTS

(To be taken by researcher)

40. Height?.....

41. Weight?.....

42. BMI …….

43. Please let me check your blood pressure

Systolic ……

Diastolic …….

Thank you