UTILIZATION OF NUTRITION INFORMATION ON FOOD LABELS BY DIABETIC AND HYPERTENSIVE PATIENTS ATTENDING CLINIC AT KAKAMEGA COUNTY TEACHING AND REFERRAL HOSPITAL

Lavender Namuma Mwanzo

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DECLARATION

This thesis is my original work prepared with no other than the indicated sources and support and has not been presented elsewhere for a master's degree or any other award.

Signature_____   Date_____

Lavender Namuma Mwanzo

Reg No: HPN/G/01-53315/2018

CERTIFICATION

The undersigned certify that they have read and hereby recommended for acceptance of Masinde Muliro University of Science and Technology a thesis entitled: '**Utilization of Nutrition information on food labels by patients with Diabetes Mellitus and Hypertension attending clinic at Kakamega County Teaching and Referral Hospital''.**

Dr. Jane Situma (PhD)

Department of Nutritional sciences,

School of Public Health, Biomedical Sciences and Technology,

Masinde Muliro University of Science and Technology.

Signature_____   Date_____

Dr. Lucy Mutuli (PhD)

Department of Nutritional Sciences,

School of Public Health, Biomedical Sciences and Technology,

Masinde Muliro University of Science and Technology.

Signature_____   Date_____

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DEDICATION

This thesis is dedicated to my beloved mother Betty Mwanzo for the support and encouragement, to my son Teijan Zolan and those to come, to all the research assistants and to all people living with Diabetes mellitus and Hypertension across the globe who struggle to live heathy lives free from these conditions.

ABSTRACT

The primary role of food labels is to inform consumers on the composition of food, ingredients and their relative amounts. Diabetes mellitus and hypertension are key public health problems due to lifestyle changes that encompass diet and food choices. Nutrition information conveyed on food labels is important in informing the consumer of the suitability of the food being purchased for their needs and health conditions. However, utilization of this information depends on their understanding of the importance and use of the information. Current global mortality rate from diabetes mellitus and hypertension remains unacceptably high. A major reduction diabetes mellitus and hypertension should come from population-wide interventions including the promotion of a healthy diet through the provision of adequate and appropriate nutrition information on food labels. The main objective of the study was to assess utilization of nutritional information on Food Labels by diabetic mellitus and hypertensive patients and Specific objectives were; to determine the relationship between socio-demographic characteristics and utilization of food labels, to establish factors influencing utilization of Nutrition Information on food labels and to determine whether patients with diabetes mellitus and hypertension utilize food labels. A total of 125 patients were included in the study. The study adopted cross-sectional design with qualitative methods for data collection, analysis and presentation. Systematic random sampling was used to select the study participants. A total of 125 questionnaires were administered and the response rate was 80%. Data was analyzed using SPSS version 25 and presented in the form of graphs, charts and tables. Statistical significance was set at $p<0.05$. The study assessed the socio-demographic characteristics of the respondents such as gender, age, level of education, marital status, occupation and income levels. Among the sociodemographic gender ($p= 0.634$), Marital status ($p=0.077$) and Religion ($p=0.931$) did not influence reading of nutrition information on food labels. However, Age ($p= 0.028$), Education ($p= 0.001$), Job/employment ($p=0.0010$), Monthly income ($p=0.001$) and Monthly household food expenditure ($p=0.007$) did influence utilization of nutrition information on food labels. Majority 64% (n=64) of the participants reported to be knowing what food labels are and only 34% (n=34) reported of not knowing what they are. About 46.8% (n=30) of the participants reported that they read nutrition information every time they purchased the product, 37.5% (n=24) read the information the first time they purchased the product and 15.7% (n=10) reported that they read nutrition information on food labels at other different times. This study also found out that nutrition information on food labels were utilized based on key nutrients and carbohydrate most utilized and dietary fiber least utilized nutrients. Food prices, nutrition information on the food label, health and nutrition status and fat/sodium/sugar content were among the factor that had a high influence on utilization of food labels. From the findings of this study there is need to educate general population on benefits of reading nutrition information on food labels in order to make healthful food choices.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS

DALYs: Disability-adjusted life years

DM: Diabetes mellitus

EUFIC: European Food Information Council

FAO: Food and Agriculture Organization

FDA: Food and Drug Administration

HBM: Health Belief Model

HMIS: Health Management Information Systems

HTN: Hypertension

KCTRH: Kakamega County Teaching and Referral Hospital

KCIDP: Kakamega County integrated development plan

KEBS: Kenya Bureau of Statistics

KHSSP: Kenya Health Sector Strategic Investment Plan

KNNA: Kenya National Nutrition Action

MOH: Ministry of Health

NACOSTI: National Commission for Science, Technology and Innovation

NCDS: Non-communicable diseases

PDV: Percentage Daily Value

SDGs: Sustainable development goals

WHO: World Health Organization

OPERATIONAL DEFINITION OF TERMS

The following terms are operationally defined based on their usage in this study:

Chronic diseases-herein refers to diseases of long duration and require ongoing medical attention   or limited activities in this context they include diabetes mellitus and hypertension.

Disability-adjusted life years (DALYs) - herein refers to is a measure of disease burden, expressed as number of years lost due to ill-health, disability or death**.**

Food- herein refers to any edible substance consisting of nourishing and nutritive components such as carbohydrates, fats, protein, minerals and vitamins.

Food labels- herein refers to any marked/attached /tag/graphic present on a food container for the purpose of informing people the nutritional content in the food product.

Non-communicable diseases-herein refers to conditions that are not transmitted from one person to another and are of long duration and slow progression.

Nutrients-herein refers to organic substances for regulating body functions.

Nutrition information- herein refers to representation that states the nutritional content of food such as proteins, carbohydrates, fats etc.

Nutrition labels-herein refers to the number of calories, carbohydrates, fat, proteins and vitamins per servings, sizes of the food.

Socio-demographic characteristics- herein refers to characteristics of population such as gender, ethnicity, age, marital status, household size, religion, education level, income level and type of employment.

Utilization of nutrition information on food labels- refers to the practice of reading and

using information on the food label to make informed choices.

CHAPTER ONE

INTRODUCTION

1.1 Background Information of the study

Diabetes mellitus and hypertension are two Non-communicable diseases (NCDS) that affect millions of people globally (WHO, 2018). Diabetes is a characterized by high blood glucose/sugar levels as a result of inadequate insulin production or ineffective insulin action in the body (Blonde *et al*., 2022; Petrie *et al.*, 2018). Hypertension is characterized by high blood pressure due to factors such as genetics, sedentary lifestyle, unhealthy dietary/food choices (Chowdhury *et al*., 2021; Ohishi *et al*., 2018). Diabetes mellitus and hypertension both can lead to serious complications such as cardiovascular diseases, kidney damage, blindness, memory loss and amputation (Alloubani *et al*., 2018; Petrie *et al*., 2018; Przezak *et al*., 2022).

The number of people with diabetes mellitus rose from 108 million in 1980 to 422 million in 2014, and the prevalence has been rising rapidly in low- and middle-income countries such as Kenya than in high-income/developed countries (WHO, 2018). Diabetes mellitus was the direct cause of 1.5 million mortalities in 2019 and 48% of all deaths as a result of diabetes mellitus occurred before the age of 70 years (Maciorkowska *et al.*, 2019; Vallée *et al*., 2019). The global incidence, prevalence, mortality, morbidity and disability-adjusted life-years (DALYs) associated with diabetes mellitus was estimated to be 22.9 million, 476.0 million, 1.37 million, and 67.9 million in 2017, respectively, with a projection to increase to 26.6 million, 570.9 million, 1.59 million, and 79.3 million in 2025 (Theo *et al*., and Lim *et al 2019*; Przezak *et al*., 2022).

Hypertension is common and growing public health issue worldwide (Petrie *et al*., 2018 ;Jia & Sowers, 2021). In 2019, an estimated 1.28 billion people had high blood pressure, accounting for 26% of the adult population. Hypertension was responsible for 10.8 million mortalities and 218 million DALYs in 2019 (Bosu *et al*., 2019; Saeedi *et al*., 2019). The global age-standardized prevalence of hypertension was 24% for women and 23% for men in 2019. However, only about half of the people with hypertension were aware that they have the condition, and less than a quarter had their blood pressure checked and managed (Princewel *et al.,* 2019).

In sub-Saharan Africa, diabetes mellitus and hypertension are of great challenge to the health systems and populations at large (Theo *et al.*,2019 and Lim *et al.,* 2019*)*. Sub-Saharan Africa has the highest proportion of undiagnosed diabetes mellitus cases by 60% and the lowest access to insulin injection among low- and middle-income regions such as Kenya (Bigna *et al*.,2019;Theo *et al*.,2019 and Lim *et a*l 2019). The prevalence of Diabetes mellitus in sub-Saharan Africa was estimated to be 4.0% in people aged between 20–79 years in 2019, corresponding to 19 million people living with diabetes mellitus. The prevalence of diabetes mellitus is estimated to increase to 41 million people by 2045. Sub-Saharan Africa has the highest age-standardized death rate due to diabetes mellitus (16 per 1000 population) among all regions (Bigna *et al.,*2019; Diseases & Injuries, 2020). Hypertension is very prevalent in sub-Saharan Africa, affecting about one-third of adults aged 25 years and older. Hypertension causes about half of all mortalities more than stroke and heart disease in the region (Bosu *et al.*, 2019; Princewel *et al.*, 2019). However, the awareness, treatment, and control of hypertension lower in Sub-Saharan Africa than in

developed countries, with only about one-fifth of hypertensive persons receiving antihypertensive.

In Kenya, the prevalence rate of diabetes mellitus among adults aged 18–69 years was 3.3%, with no significant difference between urban and rural areas (Mohamed *et al*., 2018);M. o. H. Kenya, 2021). The study also found that only half of the people with diabetes mellitus are aware of their condition, and only one-third are on treatment. The prevalence rate of hypertension among adults aged 18–69 years was 24.5%, with higher rates in urban areas (27.8%) than in rural areas (23%) (M. o. H. Kenya, 2021). About only one-third of the individuals with hypertension were aware of their condition, and only one-fifth were on either controlling or were on medication. In Kakamega County, the prevalence of DM is at 4.6% while HTN at 29.4% (KNBS, 2019)

 Evaluation on the effect of utilization of nutrition information on the food labels by the United State Department of Agriculture Continuing Survey (DACS, 2014) found out that that reading nutrition information on food labels reduced caloric intake from total fat by 6%, saturated fat by 2.1%, and cholesterol by 67.6 mg and sodium by 29.6 mg. Most consumers in developed countries appreciated the importance of nutrition information on food labels when making purchasing decisions, especially when purchasing food products for the first time (Correa *et al.*, 2022). Individuals who read nutrition information on food labels tend to use them to compare food products and their nutrient content (Vasiljevic *et al*., 2019). Food labels have also been shown to encourage more healthful diets among people who read and utilize the food labels (Buyuktuncer *et al*., 2018; Navarrete-Muñoz *et al*., 2018). The usefulness/ importance of nutrition information on food labels in improving dietary patterns of individuals largely relies on a motivation and education to

the general public to make informed food choices (Oostenbach *et al.*, 2019; Perez-Cueto *et al.*, 2019; Sagaceta-Mejía *et al.*, 2022). The notable increase in NCDs reported, especially Diabetes mellitus, hypertension and Cancer, among others may explain why sodium, cholesterol and fat were the most used food label information (Alessandrini *et al.*, 2019; Champagne *et al.*, 2020). High consumption of cholesterol, sodium and fat is associated with NCDs and various types of cancers (Camila Corvalán, 2018; Oostenbach *et al.,2019,* Champagne *et al.*, 2020).

The nutrition information on food label has emerged as a remarkable policy tool for promoting healthy eating in developed countries (Cowburn & Stockley 2005; Campos-Nonato *et al.*, 2022). The Nutrition Labelling and Education Act of 1990 (NLEA) is a United States Federal Law which gives the Food and Drug Administration (FDA) the authority to require nutrition information on food labels (Campos-Nonato *et al.*, 2022).The NLEA regulations are applicable to Europe, Middle East, Asia and Africa (Campos *et al.*, 2011). The regulations of NLEA were aimed at altering food label information such that their importance to the consumers is increased (Robinson *et al.*, 2019). In the United States, Middle East, Asia and European countries, nutrition information on food label is mandatory, largely because of their populations' change towards healthy foods and also reflects a response to consumer's right to know the nutrient content and nutrition information of the food product (Diaz-Beltran *et al.*, 2023)

In sub-Saharan African countries such as Tanzania, Kenya, Rwanda, among others, nutrition labelling is not mandatory to be included on food products and the country provides procedures to be followed willingly (Hung *et al.*, 2019). The European Food Information Council (EUFIC) identifies the nutrients which should be listed and on what

basis, but nutrition information on the food label is not mandatory for the manufacturers to display unless a health or nutrition claim is made or unless the food is for special dietary uses (EUFIC, 2014). In the East Africa region, the East Africa Standards 38:2000 was developed to provide guidelines of nutrition information labelling besides other labelling requirements (EAC, 2019).

In Kenya, the Kenya Bureau of Standards (KEBS) apply the standards by the East Africa Standards 38:2000. Kenya Bureau of Standards provides, for common and repeated use, production methods, aimed at the achievement of the optimum degree of order in a given context (KEBS, 2022) . It also includes or deals exclusively with terms, symbols, packaging, marking or labelling requirements as applied to the food product, process or production method. Kenya Bureau of Standards, therefore, help to make sure that food products and services are fit for human consumption. The government of Kenya also developed the food and nutrition security policy, an overarching policy that addresses nutrition in the country (M. O.H Kenya, 2021).

1.2 Problem statement of the study

The burden associated with diabetes mellitus and hypertension varies across regions and countries. In general, developing countries have higher prevalence rate and mortality rates than the developed countries (Wood *et al.*, 2021). Africa has the highest prevalence of hypertension (31% for women and 27% for men), followed by Eastern Mediterranean regions (29% for women and 25% for men) and America (26% for women and 24% for men) (Gouda *et al*., 2019). Sub-Saharan Africa has the highest mortality rate due to diabetes mellitus (43 per 100000 population), followed by Middle East and Northern Africa regions (40 per 100000 population) and South Asia (36 per 100000 population).

5

Kenya is one of the countries in sub-Saharan Africa that faces a high burden of diabetes mellitus and hypertension. The prevalence rate of diabetes Mellitus and hypertension among adults aged 18 years and above was 3.3% and 24.5%, respectively according to the national representative survey conducted in 2015 (STEPwise, 2015). The findings of the survey also indicated that only 13.6% of people with diabetes mellitus and 12.7% of people with hypertension were aware of their condition, and only 6.0% of people with diabetes mellitus and 7.2% of people with hypertension had their condition managed. The mortality rate due to diabetes mellitus in Kenya was estimated at 35 per 100000 population in 2017 (STEPwise, 2015). The International Diabetes Federation (IDF) estimates that Kenya has the highest rates of diabetes-related deaths among people aged below 60 years in East Africa, with 88.4%, followed by Uganda (88.0%), and Zimbabwe (86.4%) respectively (IDF, 2017).

Some Studies reported that consumers don't efficiently use the nutrition information on the food labels to make informed purchasing decisions (Herrera *et al*., 2018;Huang *et al*., 2019; Mantilla; Signorell *et al*., 2019; Musicus *et al*., 2022). European consumers are unable to understand and utilize nutrition information on food labels information and thus unable to quantify their nutritional needs due to high level of illiteracy and other factors thus exposing them to risks of Non-Communicable Diseases such as diabetes mellitus and hypertension (Turnwald *et al.,*2018; Camila et al.,2019). In Kenya, NCDs such as diabetes mellitus and hypertension are increasing acting as a hindrance to achieving sustainable development goal 4 (SDGs) on good health and wellbeing of its populations and the Kenya vision 2030 health sector pillar that seek more preventive than curative care because they increase expenditure and lower the productivity level of its people (M. O. H. Kenya, 2021).

NCDs reduce labor force participation by 61% in Kenya (Post *et al*., 2010). Many jobs developing countries such as Kenya require manual labor that is difficult for people with Diabetes Mellitus, Hypertension and those other with chronic diseases (WHO & World Bank, 2011)

An understanding of the relationship between proper utilization of nutrition on food labels and making of quality and healthful food choice are important interventions in managing chronic diseases such as diabetes mellitus and hypertension. This study sought to fill this gap by determining the status of utilization of nutrition information on food labels by patients suffering from diabetes mellitus and hypertension at Kakamega county Teaching and Referral Hospital. This study adds to the pool of literature especially in Sub-Saharan Africa, Kenya and particularly Kakamega County where there is limited literature on the utilization of nutrition information on food labels by patients suffering from diabetes mellitus and hypertension.

1.3 Research Objectives

1.3.1 Broad objective

To assess utilization of nutritional information on food labels by patients with diabetes mellitus and hypertension attending clinic at Kakamega county teaching and referral hospital

1.3.2 Specific objectives

1. To determine the relationship between socio-demographic characteristics of patients with diabetes mellitus and hypertension attending Kakamega county teaching and referral hospital and reading of nutrition information on food labels.

2. To determine whether and how patients with diabetes mellitus and hypertension attending clinic at Kakamega county teaching and referral hospital utilize food labels.

3. To establish factors influencing utilization of Nutrition Information on food labels by patients with diabetes mellitus and hypertension attending clinic at Kakamega county teaching and referral hospital.

1.4 Research Questions

1. **What is the relationship between socio-demographic characteristics of patients with diabetes mellitus and hypertension attending Kakamega county teaching and referral hospital on reading of nutrition information on food labels?**

2. **How do patients with diabetes mellitus and hypertension attending clinic at Kakamega county teaching and referral hospital read nutrition information on food labels?**

3. **What are the factors influencing utilization of Nutrition Information on food labels by patients with diabetes mellitus and hypertension attending clinic at Kakamega county teaching and referral hospital?**

1.4 Justification of the study

Kenya is one of the Sub-Saharan Africa countries facing high burden of diabetes mellitus and hypertension. According to a national representative survey conducted in 2015, the prevalence of diabetes mellitus and hypertension among adults aged 18 years and above was 3.3% and 24.5%, respectively (STEPwise, 2015). The mortality rate due to diabetes mellitus in Kenya was estimated at 35 per 100000 population in 2017 (STEPwise, 2015).

In the recent past, Kenya has increasingly been faced with diet related non- communicable diseases such as diabetes mellitus and hypertension especially in urban areas (KDHS 2022). Therefore, this called for immediate response to help address the burden in terms of morbidities, disabilities and mortalities associated with these conditions and also provide Information on the utilization of nutrition information on food labels by patients with DM and HTN in Kakamega County. This study was aimed at assisting Policy makers in designing nutrition intervention programmes appropriate for patients with diabetes mellitus and hypertension and add knowledge to existing literature on utilization of nutrition information on food labels by patients with diabetes mellitus and hypertension in Kakamega County and in Kenyan context at large.

1.5 Significance of the Study

Findings from this study aimed to enhance/support/promote achievement of the Kakamega County Nutrition action plan 2018-2022 which aims at promoting optimal nutrition for the health and well-being of its population .The study also aimed to enhance the achievement

of The Kenya National Nutrition Action Plan 2012-2017 objective six that aims at improving, prevention, management and control of diet related chronic diseases such as diabetes mellitus and hypertension (Signorell *et al*., 2019).The findings would be significant in implementing the Kenya Health Policy 2012-2030 that aims to attain the highest possible standard of health in a manner responsive to the healthy needs of the population. The study enhanced the achievement of Sustainable Development Goals 3 which aims at achieving good health and well-being of its people. The study is also useful in implementing the Kenya's Vision 2030 social pillar that seeks preventive rather than curative car and the bottom up and economic transformation agenda (BETA) on food and nutrition security pillar that aims to ensure 100% food and nutrition security in Kenya.

Findings were important in planning public health nutrition interventions aimed at improving, preventing and managing diet related chronic diseases especially diabetes mellitus and hypertension. The findings of this will also be useful to the communities, counties and especially to patients suffering from diabetes mellitus and hypertension and also aims at fulfilling Vision 2030 health sector pillar that seeks more preventive and curative care. The findings are significant to stakeholders such as the Ministry of Health (MOH) at both national and county levels in highlighting the importance of utilizing nutrition information on food labels. The findings was useful to Kenya Bureau of Standards (KEBS) in identifying challenges that patients suffering from diabetes mellitus and hypertension face while interpreting nutrition information on food labels and in identifying gaps in the current nutrition labeling situation in the country and the various counties in Kenya in promotion and support of healthy diets. Also, findings from this study added to the body of literature on utilization of nutrition information on food labels by patients with

diabetes mellitus and hypertension, especially in the Kenyan context where there is limited literature.

1.7 Limitation of the Study

This study majorly relied on self-reports and recall, therefore, bias and recalling errors might have occurred during reporting. This was addressed by asking the respondents the questions twice to ensure consistency and clarity in their answers. Another limitation of this study was the inclusion of some people with diabetes mellitus and hypertension, who utilize foods that do not have food labels, such as, maize flour that is locally milled, raw fruits, vegetables, fish, eggs, and some meat products. These foods may have different nutritional values and health effects than the labeled foods, which might have affected the results of the study. Another limitation was that there was limited literature in African settings with relation to the current study. The study reviewed studies on utilization of nutrition information on food labels amongst similar populations in other geographical regions and mostly developed countries to enrich it.

1.8 Delimitation of the Study

The current study was delimited to patients with both diabetes mellitus and hypertension attending clinic at KCTRH aged above 18 years and therefore, findings could only be generalized to populations, geographical regions and counties with similar characteristics to the study population.

1.9 Theoretical Model

Several theories contribute to individuals understanding of health-related behaviors in regard to uptake of health-related services. This study adopted the Health Belief Model (1950) which suggests that people's beliefs about health problems, perceived benefits of

action and barriers to action and self-efficacy explain engagement or lack of engagement in health-promoting behavior. A stimulus or cue to action, must also be present in order to trigger the health-promoting behavior uptake.

Health Belief Model (HBM) predicts that individuals who perceive that they are susceptible to a particular health problem/who are risk of getting a health related problem will engage in behaviors to reduce their risk of developing the health problem; Individuals with low perceived susceptibility may deny that they are at increased risk of contracting a particular disease (Rosenstock 1974). Others may acknowledge the possibility that they could develop the illness, but believe it is unlikely to occur. Individuals who believe that they are at lower risk of developing a disease are more likely to engage in unhealthy or hazardous behaviors. Individuals who perceive a high risk that they will be personally affected by a particular health problem are more likely to engage in behaviors to decrease their risk of developing the health condition. The model has been applied to understand patients' responses to symptoms of disease, compliance with medical regimens, lifestyle behaviors (e.g., food label reading behaviors), and behaviors related to chronic illnesses, which may require long-term behavior maintenance in addition to initiate behavior change. The HBM remains valid today for understanding health related behaviors and utilization of nutrition information on Food labels by patients with diabetes mellitus and hypertension.

1.9.1 Conceptual Framework of the study

The theoretical framework, Figure 1.1 shows how health belief model (HBM) is used to try to forecast health related behaviors based on people's assumptions about health-related problems and their perceived benefits and barriers to action. In this context, socio-

demographic characteristics and factors influencing utilization of nutrition information on food labels are independent variables that may affect how people use food labels to make healthful/ informed food choices. For example, socio-demographic characteristics such as age, gender, education level, and income level may influence how aware, interested, and motivated people are to read, understand and utilize nutrition information on food labels. Factors influencing food labels such as time design, readability, accuracy, and credibility may also affect how people perceive the benefits and barriers of using nutrition information on food labels to prevent or reduce health risks associated with diabetes mellitus and hypertension. Utilization of nutrition information on food labels is the dependent variable that reflects the health behavior of interest. The HBM suggests that people who likely to utilize nutrition information on food labels believe that they are susceptible to health problems that can be prevented or reduced by reading and utilizing nutrition information on food labels, that these health problems are serious and have negative consequences, thus they believe using nutrition information on food labels will benefit them health wise and outweighs any costs or difficulties/problems, and that they have the confidence and ability to use food labels effectively.

Independent variables

Demographic variables such as

Education, age, gender, occupation & income

Factors influencing utilization of food labels such as health/ nutrition status, time, price etc.

Intervening variables

Perceived susceptibility to complications of chronic diseases

Perceived severity of diabetes and hypertension

Perceived barriers of reading food labels

Perceived benefits

Reading of food labels

Action

Reading of food labels

Dependent variables

Utilization of food labels

Outcome

Healthful food choices

Figure 1. 1:Conceptual framework (*adopted and modified from Rosenstock 1974*)

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature in line with the study variables to identify gaps in knowledge. It covers the following areas: socio-demographic characteristics, utilization of nutrition information on food labels, factors influencing utilization of nutrition information on food labels and knowledge, perception and nutrition food label use. It also identified gaps addressed by this study.

2.2 Introduction to Food Labels

Food labels refers to any written, printed, tag or graphic that is present on the food label, that accompanies the food, or is displayed near the food for the purpose of informing the contents of food or for informing consumers on healthful food choices ((WHO 2021). The South African regulations relating to labelling and advertising of foodstuffs also define a label as "any tag, brand, mark, pictorial, graphic or other descriptive matter, which is written, printed, stenciled, marked, embossed, impressed upon, or permanently attached to a container of a foodstuff for the purpose of promoting its sale(Bopape *et al.*, 2021). Food labels are a source of information to the consumers and most often the first means for directly connecting with a consumer however its usefulness is not always well exploited (Jessica *et al.,* 2017; Bryła *et a*l.,2020).

Labels may be an instrument for reinforcing generic claims and for establishing product differentiation, differentiation across food categories and within a specific category (Acton *et al*., 2021). Moreover, food labels provide a source of health-related information for comparing food products and may, occasionally, be the consumer's first exposure to a

health-related issue (Al-Jawaldeh *et al.*, 2020; Packer *et al*., 2021). Nutrition labels are intended to help consumers choose more healthful food product (Kasapila & Shawa, 2011; Kiesel *et al*., 2011). Nutrition or health claims directly linked to economic benefits emerge because truthful and correctly understood claims increase the efficiency of purchase decisions (Grunert & Wills *et al.,* 2007; Anderson *et al*., 2019; Zhang *et al*., 2020). However, providing nutrition information on food labels increases the spur for producers to create more healthful foods and aids consumers in choosing a healthier diet, which leads to reduced costs of diet related illnesses such as diabetes mellitus and hypertension (Fichera *et al*., 2020).

2.3 Nutrition Information on Food Labels

A key difference between countries' approaches to nutrition labeling is the choice of which nutrients are listed on the food label, and how they are presented according to (Grunert, Wills, *et al.*, 2010). The nutritional information may be presented in either numeric or non-numeric formats. Numeric formats present nutrition information quantitatively and non- numeric formats convey information in written form or graphically such as logos, symbols and color coding (Kiesel *et al*., 2011; Wahab *et al*., 2018; Dumoitier *et al*., 2019). The Nutrition Facts Panel (NFP) or Nutrition Information Panel (NIP) gives quantitative data on the nutrient contents of the food in 3 ways: 1) per serving sizes; 2) per 100g (or 100ml if liquid), and as Percentage Daily Value (PDV) and this is usually based on recommendations for an average person requiring 2000 Kcal per day (Wallingford *et al.*,2018; Chavasit *et al*., 2019) .

Processed food products manufacturers must display the following mandatory information on the product packaging or on a label attached to the packaging: the name of the food, the

Quantitative Ingredients Declaration (QUID), a list of ingredients (including allergens), list of preservatives used, the weight or volume of the food (net quantity), a 'best before' or, the name and address of the food business operator (FBO) responsible for the food information (EUFIC 2014). In European Union countries, the format in which nutrition information on the food label is displayed is of great concern. The current presentation of nutrition information on food labels has been reported as being hard for consumers to read, understand and utilize efficiently, this has also been illustrated in the United Kingdom, where 80% of food packages carry food labels, either because a claim has been made, or because the food producers has chosen to do so (Hashem *et al*., 2019).

Nutrition information on processed food products labels must be present if the manufacturer has made a nutritional or health claim on the product (e.g., 'high in fiber' or 'good source of calcium') or vitamins or minerals have been added to the food (EUFIC, 2014). Despite the global support for adequate nutrition information on food labels and its use by dieticians/nutritionists, studies indicate that this goal has not been achieved in developing countries such as Kenya (Campos-Nonato *et al*., 2022). Provision of nutrition information on the label is compulsory in Kenya due to the policies put in place by KEBS and EAS 38: 2000. This gives food producers' freedom over consumer's right to know the nutritional content of the food they are consuming. There are still knowledge gaps in these areas as a result of scanty literature in Kenya and especially Kakamega County on how the nutrition information on food labels should be displayed and simplified to increase utilization by patients with diabetes mellitus and hypertension. This study will therefore, seek to address this gap in Kakamega County and Kenya at large by adding/ contributing to the literature available on food labels.

2.4 Factors Influencing Utilization of Nutrition Information on Food Labels

Sociodemographic factors such as gender, household size, marital status, level of education completed, age, level of income and type of employment have been linked to utilization of nutrition information on the food labels.

2.4.1 Age

There is relationship between age and utilization of nutrition information on food labels (Riccò *et al*., 2022). A study done in France found that middle aged or younger adults were more likely to use nutrition information than aged individuals(Grunert, Fernandez, Celemin, *et al.*, 2010) . This evidence was supported by (Pandav *et al.*, 2021) in a study in South Asia which concluded that aged people perceived nutrition information as difficult to understand and important to them thus opted to read information on the ingredients list only, while younger people were opted to reading both the information on nutrient contents, ingredient lists and other general information on the food label (Park *et al.*, 2014). Majority these studies were conducted in developed countries such as France with varying socio- demographic characteristics with the Kenyan population. This study therefore seeks to establish whether age has the same varying effects with utilization of nutrition information on food labels by patients suffering from diabetes mellitus and hypertension in Kenya and especially Kakamega County.

2.4.2 Gender

There is relationship between gender and utilization of nutrition information on food labels Studies done in Britain and North Carolina found out that women in general are more likely to use nutrition information on food labels than men because they are the ones who are mostly involved in food selection/household shopping and food preparation (Hashem

et al., 2019; Watson *et al*., 2022). A Study by (Butcher *et al*., 2019) also reported that men attach less importance on reading nutrition information food labels provided their households are in good health and have food to eat. Most of these studies were conducted in France and Britain with varying socio- demographic characteristics with Kenyan population. In this study therefore, the researcher seeks to establish whether gender has the same varying effects with utilization of nutrition information on food labels by patients suffering from diabetes mellitus and hypertension in Kenya and especially Kakamega County.

2.4.3 Household composition

Household composition has also been shown to influence utilization of nutrition information on food label in the United States (Sobhani & Babashahi *et al.*,2020). People who are married with children are more likely to search for nutrition information on food label especially since the health of children is a major concern of parents, caregivers and guardians (Xazela *et al.*, 2019). In Britain, it was found out that utilization of nutrition information on food label is lower among individuals who are single/ divorced or married without children, since they have a responsibility only for their well-being and have no any other person to cater for their dietary needs. Household size has also been shown to influence utilization of nutrition information on food label. A study done in South Africa found out that larger households sizes of four or more utilize nutrition information on food labels in making healthful purchasing decisions more compared to smaller households sizes of one or two people (Bopape *et al.,* 2022). Therefore, the researcher seeks to establish whether household size among the study participants influences utilization of

nutrition information on food label by patients with diabetes mellitus and hypertension attending clinic at Kakamega County Teaching and Referral Hospital.

2.4.4 Education level

Literacy level/education level of an individual is an important factor influencing utilization of nutrition information on food labels. (Frank *et al.,* 2021) found out that individuals with higher education are more likely to be aware and use nutrition information on food labels than the lower educated individuals in Europe and South Africa respectively. Similarly, higher education levels may also enhance one's ability to understand and interpret nutrition information on food labels (Post *et al.*, 2010; Adasme-Berríos *et al.*, 2020). Several studies have shown a relationship between the utilization of nutrition information on food labels and consumers education level (Wilson *et al.*, 2018; Jáuregui *et al*., 2020; Hsu *et al.*, 2022). Some studies have also reported a positive association between education level and utilization of nutrition information on food label whereas others have reported a negative association. In New York the main meal planners of higher-educated households are more likely to use nutritional information on food labels, specifically information concerning proteins, carbohydrates, fats sodium, dietary fiber, vitamins and cholesterol content than main meal planners of lower-education level households (Taillie *et al*., 2020; Petimar *et al*., 2021). In Lesotho food label information was a main factor in respondent's food purchasing decisions except for respondents with lower education level and earning a family income of less than 70.2 United State Dollars per month for whom food price was the major determining factor of the foods they purchase and eat (Mahgoub *et al*.,2006). What was not clear is whether education level has the same influence on food label use by

patients with chronic diseases such as diabetes mellitus and hypertension on this study thus necessitating this study.

2.4.5 Occupation

Utilization of nutrition information on food labels can be determined by occupation/type of occupation (Wahab, 2018). High-ranked occupation is directly related to increased levels of nutritional knowledge as indicated in a study by (Al-Shookri, *et al*.,2011) in Asia and (Nishijima *et al*., 2021; Post *et al*., 2010). Further, a study in Britain stated that high ranked occupation is linked to a high income level, which in turn may result in more awareness of the nutrition information on food labels (Hashem *et al.*, 2019). Despite support for adequate nutrition information on food labels and its use, research by EUFIC (2014) indicated that this objective has not been achieved in the developing countries such as Kenya. Several factors have been identified that influence purchasing decisions of consumers and individuals. Some of these factors include; time, health status, price, nutrition knowledge, taste, brand and attitude towards nutrition among others (Darkwa *et al*.,2016; Czine e*t a*l., 2020). Time influence on one's use of nutrition information on food labels was apparent in a study by (Lin *et al* and Lee *et al* 2003; Drichoutis *et al*., 2005) in America, where they reported that reading nutrition information on food labels takes more time than what consumers can spend, and therefore, they are less likely to use nutritional information on food labels. The study therefore seeks to establish whether occupation status has the same effect on food label use by patients suffering from diabetes mellitus and hypertension in Kenya and especially in Kakamega County.

2.4.6 Health status and price

A study by Nayga (2000), found out a positive relationship of health status on search of nutrition information on food labels. He added that consumers with special interest in healthy eating and those with diet related conditions such as diabetes mellitus and hypertension used nutritional information on food labels as a way of managing and controlling these conditions and lead healthier lifestyles. Consumers however, may continue to choose tasty but nutritionally poor foods despite the availability of nutrition information on food labels. Price and search for nutrition information on food labels act competitively. The study has also shown that price-sensitive respondents care less about the nutritional quality of the food they purchase and consume than non-price- sensitive participants (Zhang *et al.,* 2020). Consumers placing importance on price are less likely to read nutritional information on food labels. For instance, Individuals who place a lot of importance on price are less likely to use information on calories, dietary fiber, proteins, fat, sodium and cholesterol contents. Consumers who place a lot of importance on the price actively look for price tag information and this may then be a hindrance from examining food label information (Sonoda *et al.*, 2018). Nutrition information on food labels is influenced by the consumer's perceptions / attitudes they have toward nutrition according to EUFIC report of 2007 which showed that consumers with positive perceptions towards nutrition related issues will utilize nutrition information on food labels more compared to those who have no interest in nutrition related issues (Kiesel *et al.*, 2011;Aryee *et al.*, 2019).

Despite the extensive studies done on factors affecting utilization of nutrition on food labels in developed countries, there is still limited /scanty current information on factors

influencing utilization of nutrition information on food labels by patients with diabetes mellitus and hypertension in sub-Saharan Africa particularly Kenya. Therefore, this study will seek to fill this gap in Kakamega County and Kenya large by providing current information that will aim to reduce the prevalence and incidence of diabetes mellitus and hypertension and provide population wide interventions that are critical to these group of individuals.

2.5 Utilization of nutrition information on food labels by diabetes mellitus and hypertensive patients

Nutrition information on food labels is an essential tool for diabetes mellitus and hypertension meal planning because it helps them compare the nutritional quality of similar products and make healthier choices. However, the use and understanding of food labels among patients with diabetes mellitus and hypertension may vary depending on their level of education, literacy, numeracy, and health literacy. A study by (Zhang *et al*., 2020) found that among 200 patients with diabetes mellitus and hypertension, only 37% reported using food labels frequently, and 22% reported never using them. The study also found that higher education levels, higher income level, female and white race were associated with more frequent use of nutrition information on food labels. Furthermore, the study also found out that diabetic mellitus patients who frequently used food labels had better glycemic control than those who used them rarely or those who have never read the label. Another study by Grunert *et al*.,2010 compared the use and understanding of food labels among 2,837 consumers with diabetes mellitus and hypertension patients from four European countries: Germany, Poland, Spain, and Turkey and found out that patients with diabetes mellitus and hypertension from Germany and Spain used nutrition information on

food labels more often than those from Poland and Turkey, and that patients with diabetes mellitus and hypertension from Germany had the highest level of understanding of food labels. The study also found that consumers who used food labels more often had lower intakes of saturated fat, sodium, and added sugars, and higher intakes of dietary fiber, vitamins, and minerals.

A third study by (Moore *et al*., 2018)evaluated the effect of a nutrition education intervention on the use and understanding of food labels among 538 patients with diabetes mellitus and hypertension from Spain. The intervention study consisted of four group sessions that provided information on how to read and interpret nutrition information on food labels, how to compare food products based on their nutritional content and value, and how to use nutrition information on food labels to make balanced meal items. The study also found out that after the intervention, patients improved their use and understanding of food labels significantly, as well as their dietary quality and blood pressure levels.

These studies suggest that nutrition information on food labels can be a valuable resource for patients with diabetes mellitus and hypertension to improve their dietary choices and health outcomes. However, there are still barriers that limit the utilization of nutrition information on food labels by this target group, such as low education, low literacy, low numeracy, low health literacy, cultural differences, and lack of nutrition education. Therefore, more efforts are needed to increase the awareness, accessibility, readability, and usability of food labels diabetes mellitus and hypertensive patients in Kakamega County and Kenya at large.

2.5.1 Knowledge and use of Nutrition information on food labels

Knowledge refers to concepts and processes related to nutrition and health including knowledge of diet and health, diet and disease, major sources of nutrients, and dietary guidelines and recommendations (McKinnon *et al.*, 2014). Broad definition of nutrition knowledge is needed to capture the complex and wide-ranging nature of the information used to inform dietary choice (Miller & Cassady, 2015). A Study by (Bhawra *et al.,* 2022) found that both subjective and objective measures of nutrition knowledge were significantly associated with self-reported food label use, even after accounting for socio-demographic and health-related variables in a multivariate model. Another study by (Ducrot *et al*., 2022) found that nutrition knowledge was unrelated to self-reported frequency of use that was assessed for specific areas within the nutrition label e.g., serving sizes and nutrient content of the food product.

Indirect effects of nutrition knowledge, showing that knowledge influenced self-reported utilization of nutrition information on food labels through its influence on attitudes and perceptions has been reported (Butcher *et al*., 2019). It could be that measures assessing self-reported frequency of label use are somewhat less able to detect the effects of nutrition knowledge, perhaps because they are assessed more remotely in terms of time, or do not include an indication of how well the information on the food label was understood. In support of this, two of the four studies showing null effects of nutrition knowledge on frequency of use also included nutrition label comprehension measures and in both cases, the associations between knowledge and comprehension were positive (Norazmir *et al*, 2012).

Consistent with the concept that knowledge-is-power, the findings of the various literature reviews suggest that nutrition knowledge supports food label utilization. Although the literature surrounding the use of ingredient lists is limited, evidence from other studies investigating utilization of nutrition information on food labels and claims suggests that these areas of food label use benefit from prior knowledge. Drawing from the cognitive literature, nutrition knowledge likely helps by directing attention to salient information, promoting understanding, allowing more accurate data to be stored in memory and used in decision making situations. Although the review highlights gap in the literature, especially surrounding the role of knowledge among patients with diabetes mellitus and hypertension in Kakamega County and Kenya at large, findings from this study will aim to fill this gap by suggesting that increasing nutrition knowledge levels may improve utilization of nutrition information on food labels

2.5.2 Perception of food label

Perception is defined as the way consumers regard, understand and interpret food labels (Grunert and Wills *et al* 2007; Silva *et al.*, 2022). They distinguished between conscious and subconscious perception; whereby conscious perception is expected to have a stronger influence on food choices than the sub-conscious perception.

Perception depends on personal and other factors. For example, when a product is bought for the first time, perception takes time to build. Time pressure decreases the development of perception as it decreases the likelihood that nutrition information on food label will be read. There is a thin line between perception and understanding and use of nutrition information on food labels. Perception leads to understanding, which is the meaning that consumers attach a lot of importance to what they perceive (Silva *et al.*, 2022). Although

the review highlights gap in the literature, especially surrounding perceptions of patients with diabetes mellitus and hypertension in Kakamega County and Kenya at large regarding utilization of nutrition information on food labels, findings from this study will aim to fill this gap by suggesting that increasing people's perception levels may improve utilization of nutrition information on food labels.

2.6 Summary of Literature Review

It's evidential from the reviewed literature that nutrition information on food label is very critical to persons with diabetes mellitus and hypertension and if the information on food labels is well designed, they potentially have a positive influence on the lives of these people and to the diet of consumers at large, and therefore contribute to the achievement of public health objectives. Although consumers gather information about food from a variety of sources, including their families, education and the media, food labels should be aimed to providing the consumer with valuable information at the point of purchase and to provide healthcare professionals especially hospital based Nutritionist with an opportunity to educate patients on the benefit of utilizing nutrition information on food labels , and how to utilize this information to make healthier food choices in order to manage their conditions.

2.7 Gap in Knowledge

Socio-demographic characteristics such as age, sex, marital status, household size, education, occupation and income of consumers have shown great association/relation with the utilization of nutrition information on food labels with mixed findings of both negative and positive association. Nutrition information on food labels provide consumers with information on the nutritional content on calories, vitamins, proteins, sodium,

cholesterol, fat, sugar etc. though consumers still have challenges reading and utilizing the nutrition on food labels. Factors such as level of illiteracy, time, price, level of knowledge and attitude among others have reported to influence utilization of nutrition information on the food labels as highlighted in the literature above. The prevalence of chronic diseases such as hypertension and diabetes mellitus has increased in the recent past both in the developed and developing countries despite measures put in place.

Majority of studies on the utilization of nutrition information on food labels have been conducted on general and literate populations and have been conducted majorly in developed countries ,leaving behind the illiterate, poor, developing countries and the sick population especially patients with diabetes mellitus and hypertension Thus, there is still important gaps in knowledge and limited literature especially in areas related to utilization of nutrition information on food labels by patients with diabetes mellitus and hypertension in Sub-Saharan Africa and Kenya at large. Despite the extensive work that has been done in developed countries, Policy makers and program managers are still struggling to develop appropriate interventions to curb the high prevalence and incidence of chronic diseases such as diabetes mellitus and hypertension by promoting healthy diets through the provision of adequate nutrition information on food labels. However, in order for this type of intervention to be successful, it is important to have a better understanding of the consumer. Nutrition labels have shown to helpful for chronic diseases i.e., diabetes mellitus and hypertension management as these patients require balanced nutritional intake. Thus, this study aims to address this gap by assessing utilization of Nutrition information on Food labels by persons with diabetes mellitus and hypertension attending clinic at Kakamega County Teaching and Referral Hospital.

SUMMARY OF GAPS IN KNOWLEDGE

1. Majority of the studies conducted on utilization of nutrition on food labels were conducted in developed countries such as Britain and France leaving behind the developing countries such as Kenya thus leading to having scanty information/literature in developing Countries. This study therefore, seeks to fill this gap by contributing to literature in Sub-Saharan African especially Kenya.

2. Main focus of the majority of the studies were done on general public use of nutrition information on food labels while in this study, the researcher's main focus was narrowed down to the ailing population (patients with diabetes mellitus and hypertension)

3. Majority of the studies conducted focused on general components of the food label while this study's main focus was on nutrition component on the food label.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodologies used by the researcher to assess utilization of nutritional information on food labels by patients with diabetes mellitus and Hypertension attending clinic at Kakamega County Teaching and referral Hospital. It discusses the context of the study, the design, the population, sample size determination, sampling technique, data collection, analysis, and presentation, instrument validity and reliability, and ethical considerations.

3.2 Study Area

The study was conducted at Kakamega County Teaching & Referral Hospital (KCTRH). Kakamega County General Teaching & Referral Hospital is a level 5 government health facility which is located not far off the Kisumu-Kakamega Road just before Kakamega Town. The facility is a lifeline for the residents of Western region as it serves as the main Public Referral Hospital for Kakamega County as well as neighboring counties including Vihiga, Bungoma and Busia. Kakamega County Teaching and referral Hospital is located in Kakamega county which is the fourth populous county in Kenya after Nairobi, Kiambu, Nakuru and is cosmopolitan hosting people from the other geographical regions and counties (KPHS, 2019). Diabetes mellitus affects 4.6% people, while hypertension affects 29.4% people in Kakamega County (KNBS, 2019). Kakamega County Teaching and referral Hospital was chosen because it has a comprehensive clinic that is well equipped for patients with both diabetes mellitus and hypertension and also because of increasing cases of diabetes mellitus and hypertension in the county with scanty information on the

use of food labels and no similar studies have been conducted in the County and at the county Referral Hospital at large. Kakamega being the fourth populous County in the country, the trends in terms of utilization of food labels by patients with diabetes mellitus and hypertension are predicted to be the same across all the other counties and its also cosmopolitan county hosting people from other regions and counties.

3.3 Study Design

The study adopted the descriptive cross-sectional study design, the study was done at one point in time and described the characteristics of the study variables at the time the study was done. A descriptive study is a formal, typical structured fact-finding enquiry that encompasses asking questions to the targeted population (Kothari, 2004) to determine the current status of the variables under investigation and to establish factors influencing utilization of nutrition information on food labels. The researcher adopted this study design as it was the most appropriate for this study and the researcher would achieve the study's objectives effectively using this design and therefore, findings could be generalized to population and counties with similar characteristics to the study population.

3.4 Study Population

The study population were patients with both Diabetes mellitus and hypertension aged 18 years and above attending clinic at KCTRH and must have had at least one nutrition counselling session with the hospital-based nutritionist.

3.4.1 Inclusion Criteria

Patients with both diabetes mellitus and hypertension, both male and female aged 18 years and above, attending outpatient clinic at Kakamega County General Teaching and Referral Hospital who gave consent to be included in the study.

3.4.2 Exclusion Criteria

Dissenting patients, patients with only diabetes mellitus or patients with only hypertension and critically ill patients were excluded from the study.

3.5 Study variables

3.5.1 Dependent variable

The dependent variable was utilization of nutrition information on food labels.

3.5.2 Independent variables

The independent variables were:

Socio-demographic characteristics such as level of education, age, income level occupation and gender of patients with diabetes mellitus and hypertension in Kakamega County and Factors influencing utilization of nutrition information on food labels i.e., price, taste, brand of the product, time, health status, nutritional knowledge and nutritional status.

3.6 Sampling Procedure

Kakamega County was purposively chosen because of its high prevalence of diabetes mellitus (4.6%) and hypertension (29.4%) (KNBS, 2019) in comparison to the national prevalence rate where the prevalence of diabetes mellitus is at 3.3% while hypertension is at 24.5%. The Kakamega County Teaching and Referral Hospital was purposively selected because it is the county's only public level 5 health facility and the only teaching and Referral hospital in Kakamega County serving people across all other counties and people within the county with well-established diabetic and hypertensive clinics. The participants/ patients with diabetes mellitus and hypertension were selected from hospital records and registers. A list of patients with diabetes mellitus and hypertension was prepared.

Systematic random sampling was used to select study participants. From the sampled population the sample interval was calculated by dividing the population size by the desired sample size which was 125 which eventually gave the researcher the representative sample of those to participate in answering the questionnaires without having to reach out to each and every one of them. This method ensured that every eligible individual had an equal chance of being included in the study.

Table 3. 1:Summary of the sampling frame

Study population /unit	Total number	Sampling method	Sample size
Geographical region (Kakamega County)	1	Purposive sampling	1
Kakamega County Teaching and Referral Hospital (KCTRH)	1	Purposive sampling	1
Eligible diabetic mellitus and hypertensive patients attending clinic at KCTRH	1000	Systematic random sampling	125

3.7 Sample Size Determination

Fisher's formula of estimating means and proportions was used to calculate the sample size for this study. This formula has been proven effective for cross-sectional studies **(**Fishers *et al.,* 1998). The formula estimates relationship between variables.

$n = Z^2pq/d^2$

Where:

N = wanted example size (when population>10,000)

Z = standard typical go amiss ordinarily at 1.96 which compare to 95%

P = extent in the population assessed to have a characteristic (average of both diabetes mellitus and hypertension) 9 % (Yaya *et al.*, 2021) (0.5) q=1-p

d = level of precision (generally set at 0.05 level)

n = (1.96*1.96) (0.09*0.91)/0.0025

n = 125

3.8 Data collection instruments

Data was collected for a period of one month using a structured questionnaire administered to the study participants by the researcher with assistance from the trained research assistants. The questionnaire used in the collection of data was administered and collected on the same day to ensure a maximum response rate from the study participants.

3.8.1 Semi- structured questionnaire

A structured questionnaire was administered by the research assistants to patients with diabetes mellitus and hypertension. The questionnaire was divided into various sections. Section (1) was used to solicit information on socio-demographic characteristics such as Education level, Age, Income, Occupation and gender of the research participants. Section (II) was used to solicit information on utilization nutrition information on food labels by the research participants and Section (III) was used to solicit information on factors influencing utilization of nutrition information on food labels by the research participants.

3.9 Data Collection Procedure

The study was introduced by the principal researcher to the research participants and sought informed consent from the participants. Questionnaires were distributed to the research participants to fill in. The principal researcher was available to clarify any section to the research participants in case any need arose and to ensure all sections of the questionnaires were completely filled.

3.10. Validity of the instrument

Validity of the research instrument was measured as required. The instrument used for this study was validated by 2 experts i.e. the nutritionist, the principal researcher and was subjected to a pre-test to ensure maximum accuracy and ensured that data obtained in this study represented the study variables. This also ensured important conclusions drawn from such data are more accurate, relevant and meaningful (Kothari, 2008). The researcher used content validity to measure the degree to which data collected using a particular instrument was represented. Construct validity was measured through administering the questionnaire to patients with both diabetes mellitus and hypertension during the pre-test and the results analyzed to check whether the questionnaire measured what it was supposed to measure effectively. A pilot study is important in testing the validity of instruments and clarity of language (Mugenda and Mugenda, 1999).

3.11 Reliability of the instrument

The consistency that instruments show when used in similar settings is referred to as reliability (Bachmann *et al.,* 1991). The test-retest method was used to test for consistency of the questionnaire. The Cronbach alpha coefficient was used to estimate reliability of the instrument. Statistical Package for Social Sciences (SPSS) version 25 was used to establish

the reliability coefficient which was found to be 0.705. A reliability coefficient of 0.70 and above was considered acceptable and in the case of a lesser value, revision of the instrument is to be undertaken (Thomas, Nelson & Silverman, 2015).

3.12 Pre-testing of the questionnaire

The questionnaire pre-testing was done at Malava Sub-County Hospital among 13 (10% of the study sample) research respondents randomly selected with similar characteristics to the study participants. This was done to ensure accuracy of the instrument in collection of relevant data and was used to improve on areas that were not effectively answered. Comprehension of the questionnaire items by the participants and time taken to complete the questionnaire contributed to tailoring the questionnaire to the final one used for this study.

3.13 Training of research assistants

The research team composed of the principal researcher and four research assistants. The research assistants were recruited competitively and trained based on the criteria that they had a minimum of a diploma in nutrition and dietetics/any other health related field, and should have at least experience in data collection from other studies. The selected assistants were trained for three days. The main areas of training were interview skills, research ethics, data handling techniques, data collection tools, communication skills and questionnaire administration techniques. The training was conducted by the principal researcher by use of lectures, role plays, demonstrations and use of charts. During training emphasis was laid on the questionnaire clarity and mastery of the content. On the last day of the training the research assistants were taken for pre-test to ensure that they have mastered the content and understood every instruction given.

3.14 Data management and analysis

The Data collected was entered, coded, cleaned and analyzed. Descriptive statistics and inferential statistics were analyzed using SPSS version 25. Before analysis, data entries that contained wide-ranging missing data were excluded and this arose from where the research participants did not complete the entire questionnaire. Socio- demographic characteristics of patients with both diabetes mellitus and hypertension was analyzed using descriptive statistics such as; means standard deviations, percentages and frequencies for distribution. Chi-square was used to establish significant relationships between utilization of nutrition information on food labels and factors influencing utilization of nutrition on food labels by patients with diabetes mellitus and hypertension. Statistical significance was set at $p < 0.05$. The analyzed data was presented by use of frequency tables, graphs, pie charts for ease of interpretation.

Table 3. 2 Summary of data analysis and presentation

Objective	Method of Data Collection	Method of Data Analysis	Data Presentation
1. To determine the relationship between sociodemographic characteristics of patients with diabetes mellitus and hypertension and reading of food label.	Structured questionnaires	Chi square	Frequency tables
2 To determine whether and how patients with diabetes mellitus and hypertension utilize food labels.	Structured questionnaires	Descriptive statistics such as; means, standard deviations, percentages and frequencies for distribution	Frequency tables
3. To identify factors influencing utilization of Nutrition information on Food Labels by patients with diabetes mellitus and hypertension	Structured questionnaires	descriptive statistics such as; means, standard deviations, percentages and frequencies for distribution	Graphs

3.15 Logistical considerations

Approval was sought from Masinde Muliro University of Science and Technology Directorate of Post graduate studies (DPS) (appendix vii), Institutional Research Ethics Committee (appendix v) and the National Commission for Science, Technology and Innovation (NACOSTI) (appendix iv) and Kakamega County General Teaching and Referral Hospital (appendix vi) to conduct the study. Relevant information on the outcome

of this study was disseminated to the relevant Policy makers, Kakamega County and stakeholders in the Ministry of Health to help in formulating/ designing nutrition intervention programmes appropriate for patients with diabetes mellitus and hypertension attending Kakamega County Teaching and referral Hospital, counties with similar characteristics as the study population and Kenya at large.

3.16 Ethical considerations

3.16.1 Autonomy

The principal researcher explained to the respondents all the details of the study and allowed them to participate willingly by signing the consent forms. The principal researcher ensured that no names of the respondents, their place of residence or next of kin was not recorded on the questionnaire during the data collection process.

3.16.2 Beneficence

The data obtained was used for research and academic purposes only and aimed at informing relevant Policy makers and stakeholders in the Ministry of Health to help in formulating/ designing nutrition intervention programmes appropriate for persons with chronic diseases especially those with diabetes mellitus and hypertension. The benefits from the study were aimed to the community, patients with diabetes mellitus and hypertension, Ministry of Health and other Counties with similar characteristics.

3.16.3 Confidentiality

 The primary researcher assured the respondents on confidentiality of the information obtained from them. To ensure anonymity and confidentiality, respondents' names were kept confidential as no names were written on the questionnaires and only special codes were assigned to each questionnaire to conceal the identity of the respondents. All

questionnaires were safely kept in lockable cupboards and data entered in computer were encrypted with passwords for maximum safety, security and confidentiality.

3.16.4 Informed Consent

The principal researcher introduced herself and clearly explained the objectives of the study to the respondents. Informed consent was sought from the respondents before proceeding with data collection. Written/informed consent were signed by respondents upon agreement to participate in the study/ No respondent was coerced to participate in the study.

3.16.5 Justice

The respondents had equal chances of being selected to participate in the study upon meeting the criteria for selection. During the study, all the respondents were treated equally and fairly throughout the study regardless of their religion, age, their position, social status in the community.

3.16.6 Risks and Benefits

There were no direct benefits linked to the study but the participants benefited from the outcome of the study which aimed to the community, patients with diabetes mellitus and hypertension and other chronic diseases, Ministry of Health and other Counties with similar characteristics. There was no any physical harm done to the respondents as data collection process was non-invasive and those participants who had any discomforts were free to withdraw from the study at any time

Table 3. 3 :Summary of the ethical considerations

Ethical concern	Principle that was likely to be affected	How it was handled
Participant Informed Consent	Voluntarism	Written consent was signed by participants upon agreement to participate in the study/ No participant was coerced to participate in the study
privacy and confidentiality	Autonomy /security of data	Confidentiality was maintained by coding the data/ questionnaires were anonymous /No participants names appeared on the questionnaires
Bias during sampling	Autonomy	Appropriate sampling techniques was used depending on the population to be studied (each participant had equal chances of being selected)
Beneficence	Feedback to respondents	The benefits from the study were aimed to the community, persons with diabetes mellitus and hypertension, Ministry of Health and other Counties with similar characteristics
Non- Malfeasance	Harm to respondents	No harm was done to any participants at any time during the study
Justice/respect of rights	Interviewer/ respondent gender issues	All participants were treated equally and fairly throughout the study

CHAPTER FOUR

RESEARCH FINDINGS

4.1 Introduction

This chapter presents research findings collected on utilization of nutrition information on food labels by patients with diabetes mellitus and hypertension which was carried out at Kakamega County Teaching and Referral Hospital in Kakamega County. Data collected for this study was obtained from structured questionnaires in line with the purpose/objective of the study

4.2 Response Rate

A total of 125 participants consented to participate in the study but only 100 participants completed the questionnaires. The study encountered a loss of 25 participants during the data collection process. The reasons for this loss were as follows; 20 participants withdrew their consent due to personal reasons (such as not having time for the interview despite consenting) and 5 participants became critically ill before the interview. Therefore, our final sample size was 100 participants. The response rate of this study was at 80% and any response rate above 60% is still considered adequate (Fincham 2008).

4.3 Socio-demographic characteristics of the study participants

The study assessed the socio-demographic characteristics of the participants i.e., gender, age, level of education, marital status, occupation and income levels. As per the results are presented on Table 4.1. In terms of the gender, a larger proportion of participants were female 60%, (n=60) compared to males 40%, (n=40). In terms of age, 46% (n=46) were above 60 years of age, 31% (n=31) were between 51-60 years of age, 14% (n =14) were

between 41-50 years of age, 7% (n=7) were between 31-40 years of age, lastly few participants 2% (n=2) were between 18-30 years of age. Majority of participants 73% (n=73) were married, widow and widower were 18% (n=18), divorced/separated were 5% (n=5) and lastly single were 4% (n=4). Regarding religion 94% (n=94) were Christians, Muslims were 4% (n=4), and other religion were 2% (n=2). Regarding the level of education completed a larger proportion 40% (n=40) reported to have completed primary, 35% (n=35) completed secondary school, 21% (n=21) completed tertiary education, only 4% (4) reported to have never gone to school. Regarding monthly income 37% (n=37) of the participants reported to have an income of less than Ksh.5000, 25% (n=25) of the participants reported to be earning above Ksh. 20,000, 22% (n=22) of the participants reported to be earning between Ksh. 5,000-10,000 and 16% (n=16) of the participants reported to be earning between Ksh. 10,000- 20,000. 39 %(n=39) of the participants reported to be self-employed, 23% (n=23) reported to have retired, 20% (n=20) have full time jobs/permanently employed, 10% (n=10) were casual laborers and only 8% (n=8) reported to be doing other unspecified jobs. Regarding household monthly food expenditure, 38% (n=38) of the participants reported to be spending below Ksh. 5,000, 32% (n=32) reported to be spending between Ksh. 5,000-10,000, 16% (n=16) reported to be spending above Ksh. 20, 000 and only 12% (n=14) reported to be spending between Ksh. 10,000-20,000.

Table 4. 1 Socio-demographic characteristics of the study participants.

Sociodemographic	CATEGORY	FREQUENCY	PERCENTAGE
Gender	Female	60	**60**
	Male	40	40
Age (years)	18-30	2	2
	31-40	7	7
	41-50	14	14
	51-60	31	31
	Above 60	46	**46**
Marital status	Single	4	4
	Married	73	**73**
	Divorced/separated	5	5
	Widow/widower	18	18
Religion	Christian	94	**94**
	Muslim	4	4
	Any other	2	2
Level of education completed	Primary	40	**40**
	Secondary	35	35
	Tertiary	21	21
	Never went to school	4	4
Job/employment	Casual laborer	10	10
	Permanent employment	20	20
	Self employed	39	**39**
	Retired	23	23
	Any other	8	8
Monthly income in ksh.	Below 5000	37	**37**
	5000-10000	22	22
	10000-20000	16	16
	Above 20000	25	25
Household monthly food expenditure (in ksh.)	Below 5000	38	**38**
	5000-10000	32	32
	10000-20000	14	14
	ABOVE 20000	16	16

4.4 Relationship between sociodemographic characteristics and use of nutrition information on food labels by the study participants.

The research participants were asked if they were able to read nutrition information on food labels and it was evident that a larger proportion of female 37% (n=37) read the nutrition

information as compared to male at 27% (n=27). The percentage of female who were not able to read nutrition information on food labels were 23% (n =23) and male at 13 %(n=13). As per the results presented on Table 4.2, gender did not significantly influence use of nutrition information on food labels (*p*=0.634). It was also evident from the presented on table 4.2, that the study participants aged above 60 years read the nutrition information on food labels more as compared to those below 60 years of age. Study participants aged between 18-30 years did not read the nutrition information on food labels at all.

As per the results on table 4.2, age influenced reading of nutrition information on food labels (*p*=0.028). In terms of marital status, majority of the participants who were married read the information at 51% (n=51) as compared to the single/ divorced/separated at 3% (n=3). According to Table 4.2, marital status did not significantly influence use of nutrition information on food labels *(p*=0.077). Majority of the study who were participants who were Christians (61%) read the information as compared to Muslims and other religions each at 1%. However, as per the results presented on table 4.2, religion status did not significantly influence reading of nutrition information on food labels *(p* =0.931). In terms of the level of education completed, the results showed that those who had completed secondary school read the nutrition information on food label more at 28% (n=28), followed by those who completed tertiary institutions at 18% (n=18), followed by primary 17% (17) and those who never went to school were the least at 1%. According to table 4.2, the level of education completed significantly influenced the reading of nutrition information on food labels (*p* <0.001). It was evident that those who were self-employed read the information more at 22% (n=22) than those who were permanently employed was

at 19% (n=19), casual laborers at 6% (n=6) and those who had other unspecified jobs rarely read the information at 4 %(n=4).

In reference to table 4.2; Employment significantly influenced the reading of nutrition information on food labels ($p=0.001$). In terms of monthly income, participants who earned a salary above Ksh. 20000 read the information more at 22% (n=22), followed by those who earned a salary between Ksh. 5000-10000 and those who earned below 5000 who were each 15% (n=15) and lastly those earning between 10000 and 20000 were 14% (n=14). According to table 4.2, monthly income influenced the reading of nutrition information on food labels with a p value of 0.001 Lastly those whose monthly household food expenditure was between Ksh. 5000-10000 read the information more at 22% (n=22) as compared to those who spend between 10000- 20000 who were the least at 9% (n=9) as per table 4. 2. In reference to table 4.2, monthly household food expenditure significantly influenced the reading of nutrition information on food labels ($p=0.007$).

Table 4. 2 Sociodemographic characteristics and use of nutrition information on food labels by the participants

Socio-demographic characteristics	Categories	Read nutrition information on food labels		P value
		Yes	No	
Gender	Female	37	23	0.634
	Male	27	13	
Age	18-30	0	2	**0.028**
	31-40	7	0	
	41-50	11	3	
	51-60	19	12	
	above 60	27	23	
Marital status	Single	2	2	0.077
	Married	51	22	
	divorced/separated	3	2	
	widow/widower	8	10	
Religion	Christian	61	33	0.931
	Muslim	1	3	
	any other	1	1	
Level of education completed	Primary	17	23	**<0.001**
	Secondary	28	7	
	Tertiary	18	3	
	never went to school	1	3	
Job/employment	casual laborer	6	4	**0.001**
	permanent employment	19	1	
	self employed	22	17	
	Retired	13	10	
	any other	4	4	
Monthly income	below 5000	15	22	**0.001**
	5000-10000	15	7	
	10000-20000	14	2	
	above 20000	22	3	
Household monthly food expenditure	below 5000	18	20	**0.007**
	5000-10000	22	10	
	10000-20000	9	5	
	above 20000	15	1	

4.5: Utilization of nutrition information on food labels by DM and HTN patients at KCTRH.

4.5.1 Knowledge and use of nutrition information food labels by diabetes mellitus and hypertensive patients at KCTRH.

According to table 4.3. 1 majority 64% (n=64) of the study participants reported to be knowing and using nutrition information on food labels and about 36% (n=36) reported of not knowing what they are. According to figure 2.1, Majority of the participants 64 % (n=64) reported that they always read nutrition information on food labels while 36 %(n=36) reported of not reading the information. According to figure 3.1, 46.8% (n=30) of the participants reported that they read nutrition information on food labels every time they purchased the product, 37.5% (n=24) read the information the first time they purchased the product and 15.7% (n=10) reported that they read nutrition information on food labels different times. Participants were asked how they used the nutrition information on food labels and 35.9% (n=23) reported that they use the information to determine if the product is safe for consumption, =12.5% (n=8) reported that they use to determine serving sizes, 17.2% (n=11) reported that they use for planning their meals, 12.5% (n=8) reported that they use the information to in making food purchasing decisions, 9.4% (n=4) reported that they use the information to balance caloric, fat and sodium intake and only 7% (n=6) of the participants considered all the above when using the information. In regards to utilization of nutrition food labels, participants reported to attach a lot of importance on nutrition and health status 42.2% (n=27), convenience 31.3% (n=20), brand of the product 18.8% (n=12) and lastly taste of the product 7.9% (n=5)

Table 4. 3 Knowledge and use of nutrition information food labels among the respondents

	N	%
Do you know what nutrition food labels are?		
Yes	64	**64**
No	36	36
Do you read nutrition information food label?		
Yes	64	**64**
No	36	36
If yes, when do you read nutrition information on food labels?		
The first time you purchase the product	24	37.5
Every time you purchase the product	30	**46.8**
Other	10	15.7
How do you use the information obtained from food labels?		
Help in making my purchasing choices	8	12.5
Help in determining serving sizes	8	12.5
Determining if the product is safe	23	**35.9**
Planning my meals	11	17.2
Balancing my caloric/fat/sodium content	4	6.3
Purchasing decisions and product safety	4	9.4
All of the above	6	7
In regards to utilization of nutrition food labels, which one of the following do you attach a lot of importance?		
Convenience	20	31.3
Nutrition and health status	27	**42.2**
Taste of the product	5	7.9
Brand of the product	12	18.8
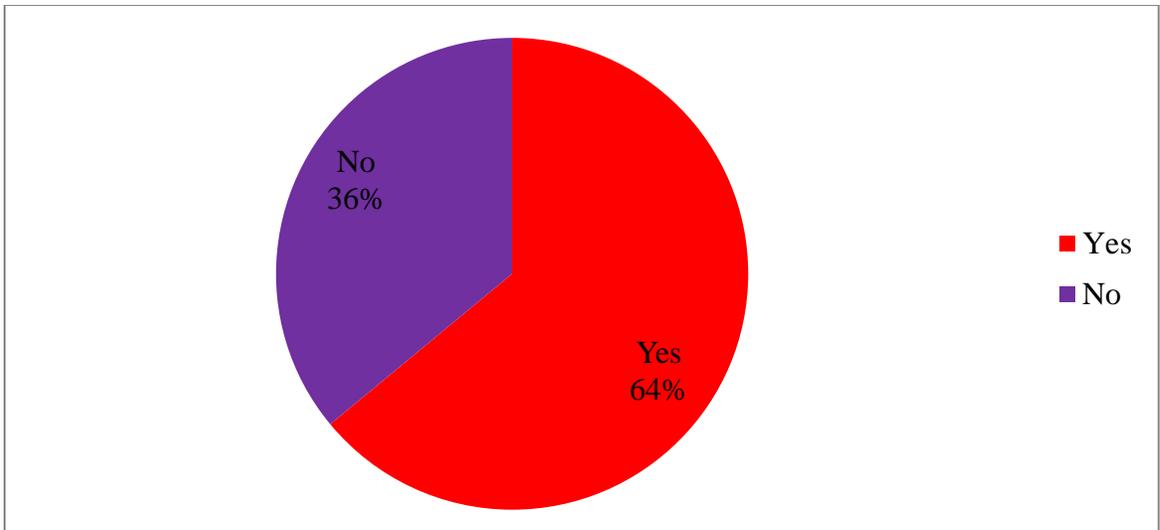
Figure 4. 1 Reading of nutrition information on food labels
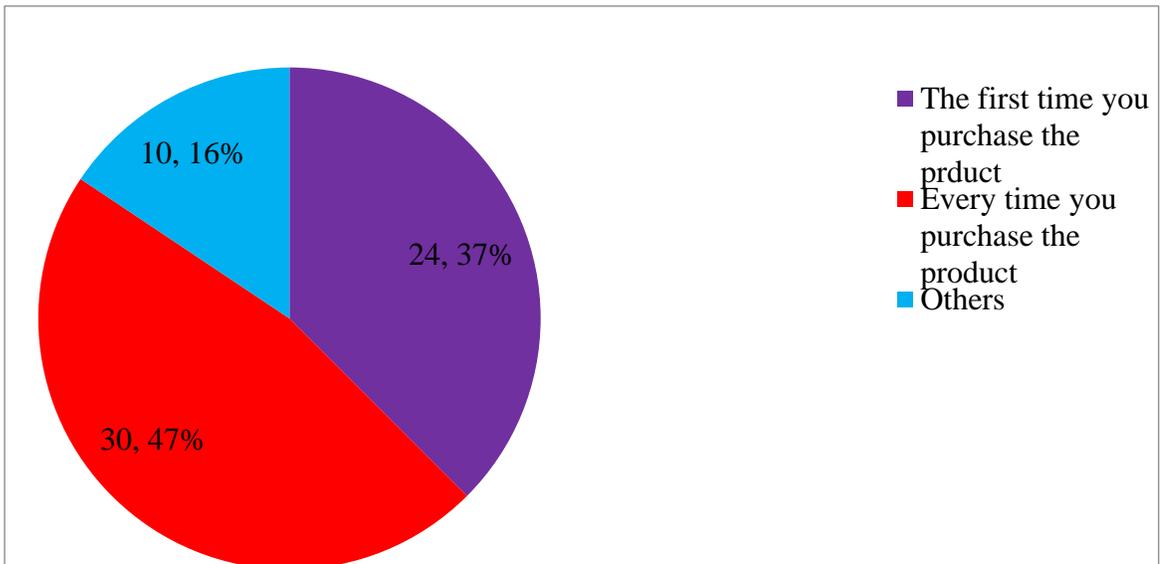
Figure 4. 2 When the respondents use food labels

4.5.2 **Nutrition information on food labels utilization pattern by respondents**

Majority of the participants 25% (n=12) always read information on expiry date. 75% (n=48) always read information on serving sizes. 86% (n=55) always read nutrition information on food labels and lastly 45% (n=29) of the respondents always read information on the brand of the product. 97%(n=62) of the respondents reported to be

reading name and description of the product, 47%(n=30) reported to reading product manufacturer and date of expiry, 9.4%(n=29) reported to reading the net weight and volume of the product, 23.4%(n=6) reported to be reading storage conditions of the products, 64.7%(n=41) reported to reading information on allergen warning, 28.1%(n=18) reported to reading information on the products country of origin and lastly 84.4%(n=54) reported to reading information on ingredients.

Respondents reported to be watching out the following nutrients when reading nutrition information on food label; sodium 95.3% (n=61), saturated fats 54.7 %(n=35), cholesterol 81.3% (n=52), proteins 65.6% (n=42), carbohydrates 100% (n=64), dietary fiber 45.3% (n=29) and lastly other nutrients 97% (n=62).

Table 4. 4 Nutrition information on food labels utilization pattern by DM and HTN patients at KCTRH

	N	%
How do you use nutrition information on food labels as a person with DM & HTN?		
Checking expiry date	12	25.0
Calculating Serving sizes	48	75
Knowing the type of Brand	29	9.4
Nutrition information	55	**86**
Which information do you always read on the food label?		
Name and description of the product	62	**97**
Manufacturers and expiry date	30	47
Net weight/volume	6	9.4
Storage instructions	15	23.4
Allergen warning	41	64.7
Country of origin	18	28.1
Ingredients	54	84.4
What nutrients do you watch out for when reading nutrition information on food label		
Sodium	61	95.3
Saturated fats	35	54.7
Cholesterol	52	81.3
Proteins	42	65.6
Carbohydrates	64	**100**
Dietary fiber	29	45.3
Other nutrients	62	97
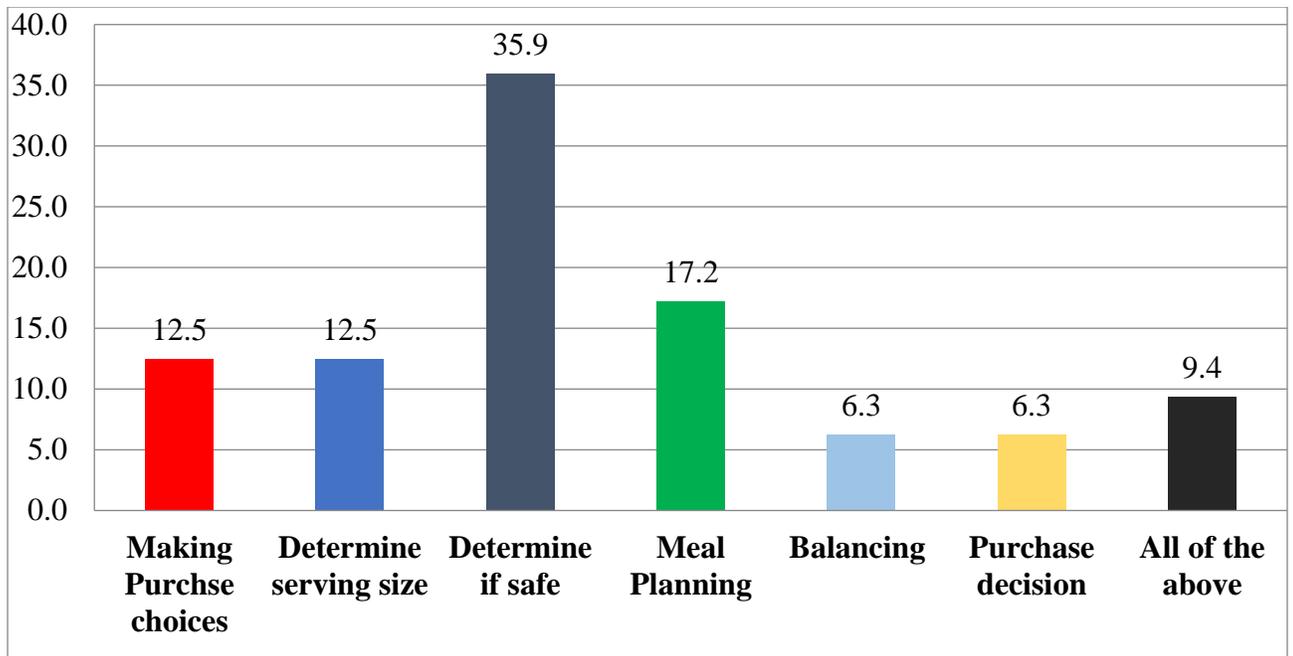
Figure 4. 3: How the participants use the food labels

4.5 Factors influencing utilization of nutrition information on food labels by patients

with DM and HTN at KCTRH.

The participants were asked about factors influencing utilization of nutrition information on food labels. In reference to figure 5.1 majority 62.6% (n=41) indicated that price of the product was very influential when reading nutrition information on food labels, 16.2% (n=10) reported that the price was influential and 21.2% (n=13) reported that the price was not influential at all. In terms of the type of nutrition information on food labels 43.9% (n=28) reported that it is very influential, 21.4% (n=14) reported that its influential and 34.7% (n=22) reported that it isn't influential to them at all. In terms of health and nutrition status, majority of the respondents 48.0% (n=30) reported that health and nutrition status was very influential when reading the nutrition information on the food label, 24.5% (n=16) reported that its influential and 27.6% (n=18) reported that it isn't influential at all. In terms of nutrition knowledge 39.6% (n=25) said its very influential, 28.1% (n=18) said its

influential and 32.3% (n=21) it isn't influential at all. 22.1% (n=14) reported that time was very influential, 21.1% (n=14) reported that time was influential and 56.8% (n=36) reported that time wasn't influential at all. 29.0% (n=19) of the participants reported that the brand of the product was very influential when reading the nutrition information on the food label, 25.8% (n=17) said the brand was influential and the majority at 45.2% (n=28) said that the brand was not influential at all. In terms of the taste of the product 28.0% (n=18) reported that the taste was very influential, 23.7% (n=15) said the taste was influential and 48.4% (n=31) said taste wasn't influential at all. Lastly 41.7% (n=27) of the participants reported that fat/sodium/ sugar content was very influential to them when reading the food label, 25.0% (n=16) said fat/ sodium and sugar content was influential and 33.3% (n=21) said sugar /fat and sodium content wasn't influential to them at all.
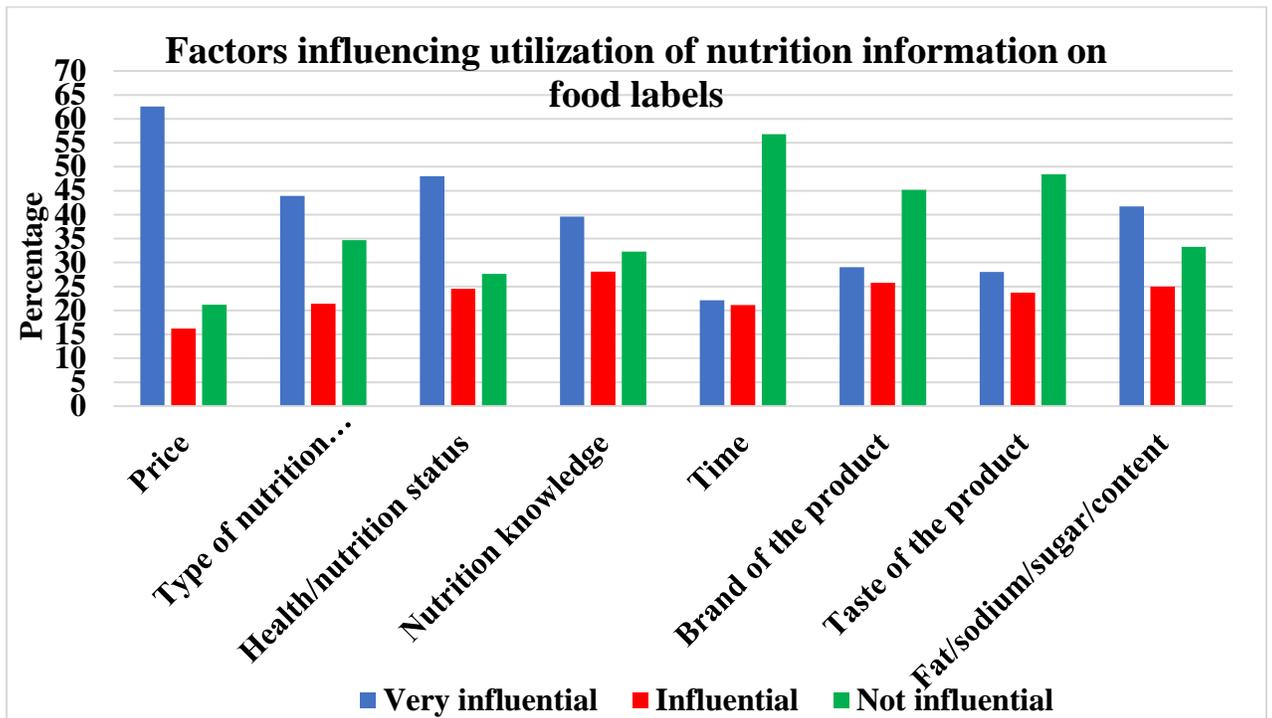
Figure 4. 4: Factors influencing utilization of nutrition information on food labels

CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 Introduction

This chapter evaluates and discusses the study's findings related to literature regarding on the relationship between socio-demographic characteristics of the study participants and reading of nutrition information on food labels, utilization of nutrition information on food labels and factors influencing utilization of nutrition information on food labels. Arguably it provides a comparison between the study findings of other studies and related studies brought out in chapter two.

5.2 Sociodemographic characteristics of the participants

Socio-demographic characteristics form a very basic part in disease prognosis and disease recovery. In the current study majority of the respondent were female. This is bringing very interesting component of the role of gender in food choices. In the African traditional society, the man rarely goes to the market to look or even purchase food (Darkwa *et al.,* 2016). This will therefore, affect the food choices and subsequently the health status of a patient. Education is a very crucial component in the management of chronic diseases such as diabetes mellitus and hypertension (Diseases & Injuries, 2020). This is because it affects decisions in regard to food choices (Sida *et al.,*2016). In this study majority of the respondents had completed primary level of education. Sociodemographic characteristics is a critical factor in disease prognosis, this is because majority of the chronic diseases are multifaceted. Occupation plays a critical role in the choice of food, choices of places to access the type of food to purchase. Occupation also affects key decisions that play a key role in duration of illness and disease prognosis. Occupation together with the level of

income of an individual plays a key role in utilization of nutrition information on food labels. People with low-income levels in many cases tend to buy unlabeled food.

5.3 Sociodemographic characteristics and use of food labels by the study participants

Socio-economic characteristics such as age, sex, marital status, household size, education, occupation and income of consumers have been associated with the utilization of nutrition information with mixed findings of both negative and positive association. Several factors affect the use of nutrition information on food labels. Socio-demographic factors such as gender, age, education level, and income as well as the awareness of the relationship between food and chronic disease, and having nutrition knowledge are well known to affect the use of nutrition information on food labels (Binobead *et al*., 2022; Yun *et al.,* 2020). In the current study, male participants were less likely to read information on nutrition food labels, suggesting that the development of an approach to increase the use of nutrition labels in this male gender is required. This study is consistent with other studies that suggests that males are less likely to use nutrition information on food labels than females (Binobead *et al*., 2022). This may result from the fact that many males do not agree that nutritional information on food label is useful and can also help in healthful food choices, or that health is a matter of importance to them. A study by (Post *et al.,*2020), on patients with hypertension, diabetes mellitus, or hyperlipidemia, contrary to our results showed that those who were advised by a nutritionist/dietitian to reduce intake of calories or fat are 50% more likely to use nutrition information on food labels regardless of gender (*Post et al.,* 2010). The findings of this study are similar to (Julia *et al.,* 2017) who found out that women in general are more likely to read nutrition information on food labels than men. Women generally are the ones who purchase and prepare food in most households.

However, in this study gender did not significantly influence the decision to read or not read nutrition information on food labels but many females read the food label more than males.

In the current study adults aged 51 years and above read nutrition information on food labels more than people aged below 50 years. Age is a critical component between patients with diabetes mellitus and hypertension, this is because these conditions are mostly associated with old age and come with other complications. The findings of this study shows that age influenced the decisions of patients with diabetes mellitus and hypertension to read nutrition information on food labels or not. Similar to this study finding, other studies found out that age plays a critical role in food choices especially in old age (Fuchs *et al*., 2022; Perez-Cueto, 2019). Contrary to the finding of this study, a study by (Van der Waal et al 2022) found out that age did not influence food choices and subsequently reading of nutrition information on food labels (van der Waal e*t al.*, 2022). Age plays a vital role in promoting the use of nutrition information on food labels. Aged people are more likely to search for nutrition information on food labels because of their nutritional knowledge, health problems and because of the continued health education they receive from medical practitioners especially nutritionists (Zhang *et al.*, 2020). The aged prefer the nutrition content on sodium and cholesterol as compared to the adolescents who prefer the information on calories (Lewis e*t al*., 2009).

Previous studies have reported a positive relationship between the level of education and food label use, even though (Nayga *et al.,* 2014) found no evidence supporting this relationship. Studies by (Lewis et al., 2009; Grunert and Wills, *et al*., 2010; Darkwa *et al* .,2016), found out that level of education completed influenced utilization of nutrition

information on food label. Education level facilitate food label use by increasing its perceived benefits or by increasing motivation to seek more healthful information. Other possible barriers to the effective use of food label include negative attitude towards food labels, lack of trust and growing skepticism about food label information, and a low perception of the importance of this information as reported by (Aryee *et al*., 2019). In this study, participants who had received nutrition education were more likely to read nutrition information on food labels than those who have never received nutrition education. Most of the participants in this study had completed primary school and therefore, they could read nutrition information on food labels and were able to make informed decisions on food choices. This study finding is in agreement with (Drichoutis *et al*., 2005) and (Wiles *et al*., 2009) who reported that individuals with higher education levels are more likely to read nutrition information on food labels. The findings of this study shows that level of education influenced whether someone reads or do not read nutrition information on food labels. Therefore, the results indicate that nutrition education is needed so that patients may appreciate the importance of reading and utilizing nutrition information on food labels in making informed purchasing decision and healthful food choices in order to manage and control diabetes mellitus, hypertension and other NCDs.

Religion plays a massive role in our dietary routines with certain cultures or religions come food restrictions as well as customary meals (Goodman *et a*l., 2018). Many of these rules are formed in order to keep people healthy while many others are formed to follow a belief seen as proper or correct. Many religious customs and laws may also be traced to early concerns for health and safety in consuming foods or liquids (Havinga *et al*., 2022). In the past, preservation techniques for food were limited. In this study, the researcher did not

find a significant relationship between religion and utilization of nutrition information on food labels. The researcher measured utilization of nutrition information on food labels by asking the participants how often they read and use nutrition information on food labels when they shop and purchase food. The respondents were also asked about their religious affiliation and from the findings of this study there was no significant difference in the utilization of nutrition information on food labels among people with various religious. Similar to the findings of this study, a study by (Kim *et al.* 2016) found that religion did not influence utilization of nutrition information on food labels. The findings of this are consistent/ similar with a study by (Ollberding *et al.* 2012) who found out found that religion did not affect the use of food labels among US adults.

Contrary to the findings of this study, other studies have found a positive or negative association between religion and food label use. For example, a study by (Teisl *et al.* 2008) found that people who are identified as Catholic or Protestant were more likely to use nutrition information on food labels than those who are identified with other regions/ no religion. A study by (Koenig *et al.* 2014) found that people who were more religious were less likely to use nutrition information on food labels than those who were less religious and as a result, patients highly rely on cheap, highly processed, imitation foods containing little nutritional and religiously correct food (Adasme-Berríos *et al*., 2020; Morales-Avilez *et al.*, 2020).

Level of income has immense contribution to utilization of nutrition information on food labels (Binobead *et al.*, 2022). Literature shows that price is an important aspect in the consumption of expensive sustainable food (Schifferstein & Ophuis *et al*., 1998; Gottschalk & Leistner *et al,* 2013). This could mean that low-income earners lack the

resources to buy labeled foods from food stores. According to a study by (Kim and Lee, 2019), income level influenced how consumers perceived and used the nutrition information on food labels in South Korea. The study found out that consumers with higher income levels were more likely to use the nutrition information on food labels than those with lower income levels. The study also suggested that income level may interact with other factors, such as level of education, health status, and dietary habits, to influence the utilization of nutrition information on food labels.

This finding is consistent with some previous studies that have reported a positive relationship between income level and the use of nutrition information on food labels (Drichoutis *et al*., 2008; Teisl *et al*., 2008; Nayga *et al*., 2009). However, other studies have found no significant effect between level of income and use of nutrition information on food labels (Grunert and Wills, 2007; *Kim et al*., 2009; Saba and Messina, 2013).

5.4 Utilization nutrition information on food labels by patients with DM and HTN attending clinic at KCTRH.

Food Labelling is a very important tool for conveying information on product characteristics to consumers but its potential is not always well exploited. Findings from this study reveal that, despite high consumer interest in the nutritional properties of foods, food labels are not a useful source of nutrition information. These results are consistent with earlier researches on food labels use in Europe (Cowburn and Stockley, 2005; Drichoutis et al., 2006; Grunert and Wills, 2007) that reported food labeling are confusing to consumers, especially due to the use of technical/scientific and numerical information (Kim *et al*., 2022). The findings of this study suggest that consumers' use of nutrition information on food labels varies greatly depending on their motivation, individual

capacity, and shopping habits. How consumers value the information on the food labels directly impact on how they use the food label elements. A specific analysis on food labeling revealed that the majority of respondents only occasionally pay attention to this source of nutrition information on food labels and that only few regularly read the information and recommendations provided on the label (Joo *et al.*, 2020). Similar findings were found in the 38-country AC Nielsen study from 2005, which found that 18% of respondents from Europe said they "always" check the nutrition facts on the package. However, contrary to the findings of this study, other studies, such as those conducted in the UK, Ireland, and Sweden, consumers report checking nutrition information on food labels all the times (Moore e*t al.*, 2018; Robinson *et al.*, 2023). In addition, other comparable studies, European consumers' interest in food labeling was linked to circumstances where a product was purchased for the first time, and where information need was highest. (A.C. Nielsen, 2005; EUFIC, 2005). The findings of this study also show that there are significant differences in how different study participants read and utilized nutrition information on food labels. The findings of this study support the claim that consumers' low tendency to read and use food labels is a result of how they view them. It's also critical to note that a significant portion of consumers think nutrition claims aren't very trustworthy. These findings are consistent with other studies that indicate consumers struggle to comprehend how various nutrients listed on labels fit into their diets (Joo *et al.*, 2020).

5.5 Factors influencing utilization of Nutrition Information on food labels by the participants

In this study, several factors were identified as influencing utilization of nutrition information on food labels. Price was the most influential followed by health/nutrition status, followed by type of nutrition information on the food label and then fat/sodium /sugar content while time, taste and brand of the products were reported to be not influential at all. The findings on time spent on utilization of nutrition information on food labels in this study was in agreement with studies by Lin and Lee (2003) and Drichoutis et al. (2005) who reported that reading and use of nutrition information on food labels takes more time than what consumers can spend, and therefore, less likely to use the nutritional information on the food label. The findings of this study indicate that price was very influential in utilization of nutrition information on food labels. This is in agreement with (Løvhaug et al., 2022) who also found out that price was a very influential factor influencing utilization of nutrition information on food labels. This study was in contrast with findings of (Shahid et al., 2021) who found out that price was not an influential factor influencing utilization of nutrition information on food labels. Type of nutrition information on the food label is an important aspect in food choices and food labeling. In this study type of nutrition information on the food label was very influential and this study finding is similar with a study done by (Melo et al., 2019). The finding of this study shows that health status and nutrition status of an individual were also influential in influencing food label utilization and this finding is consistent with (Ye et al., 2022) who found out that health and nutrition status were influential factors influencing utilization of nutrition information on food labels. Time, taste and brand of the product were not influential

factors influencing utilization of nutrition information on food labels. On the other hand, findings from this study indicate that brand of the product was the least factor influencing food label utilization. This study finding differed/contrary with a study by Batra and Batra (2009) who reported that brand and taste of the product influenced use of nutrition information on food labels. These may be because of the different populations and the place where the study was conducted.

The findings of this study also indicate that price was very influential factor influencing utilization of nutrition information on food label. Drichoutis et al. (2005) reported that consumers who place importance on price were less likely to use nutrition information on food labels in general. This finding was similar with the findings from this study where the study participants reported that price was among the factors that highly influenced utilization of nutrition information on food labels. The findings of this study will contribute to knowledge on the existing gaps on factors influencing utilization of nutrition information on food labels in Kenya.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATION

6.1 Introduction

This chapter outlines a summary of the findings presented in chapter four of this research. The findings are summarized as per the study objective. Recommendations based on the study findings were also suggested in order to support future research endeavors, improve nutrition interventional programs in the community and also the study merits in the policy formulation.

6.2 Summary of key findings

The main objective of this study was to assess the utilization of nutrition information on food labels by patients with diabetes mellitus and hypertension attending Kakamega county teaching and referral hospital.

6.2.1 Relationship between socio-demographic characteristics of the study participants and utilization.

The first specific aim/goal of this study was to determine the relationship between socio-demographic characteristics of the study participants and utilization. The results showed that age, level of education completed, job/ employment, monthly income and monthly household food expenditure had an influence on whether patients read or did not read nutrition information on food labels. However marital status, religion and gender did not have any influence on reading nutrition information on food labels. These findings were consistent with some previous studies although a few studies differed with the study findings as they argued that patients who had been advised by nutritionists/ dieticians to

check their caloric amount were more likely to utilize nutrition information on food labels despite of their sociodemographic characteristics.

6.1.2 Utilization of nutrition food labels among the participants

The second specific aim of this study was to determine whether and how patients with DM and HTN utilize nutrition information on food labels. The finding from this study showed that nutrition information on food labels were utilized based on key nutrients and carbohydrates was the most utilized nutrient followed by sodium, fats, cholesterol, and dietary fiber was the least utilized. The findings were consistent with some previous studies which found out that most patients with NCDs are likely to watch out their carbohydrates, fats and sugar intake as advised by medical practitioners.

6.2.3 Factors influencing utilization of nutrition Information on food labels by the participants.

The third specific aim of this study was to identify factors influencing utilization of nutrition information on food labels. The results showed that food prices, nutrition information on the food label, health and nutrition status were among the factors that highly influenced utilization of nutrition information on food labels by patients with Diabetes mellitus and Hypertension attending clinic at KCTRH. This was similar to some previous studies that found that patients who are aware of their health /nutrition status were likely to use the nutrition information more than those who are not aware of their health and nutrition status. Time, brand and the taste of the product were the least influential factors in utilization of nutrition Information on food labels by patients with DM and HTN attending clinic at KCTRH and this finding was contrary to some previous study findings

that showed that time, brand and taste of the products were very influential factors influencing food label utilization.

6.3 Recommendations of the study

As per the findings of this study the following recommendations were made to different stakeholders interested in diabetes mellitus and hypertension management.

6.3.1 Recommendation for practice

1. There is need for health education to be done on the importance of reading nutrition information on food labels in management of chronic diseases so as the help in accurate decision making on dietary choices. This can be done through advertisement on television, radios and nutrition education in different set ups like schools, chief barazas among others.

6.3.2 Recommendations for future research

1. Further research should be conducted on association between utilization of nutrition information with disease prognosis or complications in Kenya.

2. Further research should be conducted on appropriate methods of improving utilization of nutrition information among people living with other chronic diseases.

3. Further research should be conducted on Challenges people face while reading nutrition information on food labels.

6.3.3 Recommendation for policy

The government through the Ministry of Health should adopt multidisciplinary approach in campaigns on use of food labels. This will help the consumer's access to nutrition health information which will assist them make informed, appropriate and healthful food choices.

The study also recommends that there is need to enhance utilization of nutrition information on the label by people at risk or those with chronic diseases. Key stakeholders like KEBS, Ministry of Health and nutritionists should educate consumers on the importance of reading nutrition information on the labels and how to use this information making healthful food purchasing decisions.

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APPENDIX I: INTRODUCTORY LETTER

Dear Research participant,

My name is Lavender Namuma Mwanzo, a master's student at Masinde Muliro University of Science and Technology taking MSc. Public Health Nutrition. I intend to carry out this research as a partial fulfillment of the university requirement for the award of a Master's degree in Public Health Nutrition. I am undertaking a study on, "**Utilization of nutrition information on food labels by patients with diabetes mellitus and hypertension attending clinic at KCTRH''**

I am kindly asking for your permission to participate in this study to help me realize my objectives and goals.

The information you give is purely academic and will be treated confidentially. You are free to decline your participation in this study and any inquiries may be directed to me at any point during the data collection process.

You are welcome to ask questions before consenting and at any time thereafter. The chief researcher (Lavender Namuma Mwanzo) and the other research team will be available to answer your questions anytime during the data collection. Further queries related to the study, please contact me or the MMUST Ethical Review Secretariat on the contact information given below. Your participation will be highly appreciated.

Lavender Namuma Mwanzo (Principal Researcher)

Masinde Muliro University of Science and Technology

Tel: +254-790780252

APPENDIX II: INFORMED CONSENT FORM

The information you give will be kept privately and confidentially and will be used for academic purposes only. The study's recommendations will be shared with the Ministry of Health in order to inform policies aimed at improving the health of patients with diabetes mellitus and hypertension.

Autonomy

Permission to collect data will be obtained from the respondents to collect data. The researcher will make it clear that no information identifying the respondents' names, addresses, or next of kin will be recorded in the study. To ensure anonymity, each individual's record that met the criteria were coded during data collection and the code was then used for data analysis. These actions aims at protecting respondents by concealing their identities.

Beneficence

The data collected will be used for academic purposes only which aimed at improving eating habits, immune status and nutrition among patients by providing evidence-based information. It will be very helpful to advise respondents about their diet and the foods they eat. Although respondents did not directly benefit from this study, the information collected was helpful in informing decision makers about the best way to plan and improve their quality of life of patients with diabetes mellitus and hypertension.

Confidentiality

The researcher reassured respondents that information obtained from them will be kept confidential. Data relating to the names of respondents and relatives will not be recorded to ensure anonymity and confidentiality, and special code numbers will be provided in

each questionnaire to conceal the identity of the respondent. All questionnaires were stored securely in lockable cabinets, and computerized data was encrypted to ensure the confidentiality of the information.

Consent

Researcher will be present to explain the research objectives to the study participants. Without coercion, respondents were asked for their informed consent prior to the commencement of data collection. Those respondents who chose not to participate in this study decisions were respected. Those who agreed to participate were to show their willingness by signing a consent form.

Justice

Research participants who met the selection criteria were selected for this study, and all data collected was analyzed. Throughout the study, all respondents were treated equally regardless of religion, age, or social status in the community.

Benefits and risks

Apart from the results of the study informing policy makers and patients with diabetes mellitus and hypertension on importance of using nutrition information on food labels there were no any material rewards. Respondents had the option to withdraw from the study at any time willingly. (If the respondent had any concerns or problems, he or she were free to contact the chief researcher or the Nutritional Sciences department at Masinde Muliro University of Science and Technology.

Respondent's consent

I have fully understood the above information as explained to me by the chief researcher, and I willingly consent to participate in this study (Please indicate by signing your willingness to participate in this study)

Yes _____ No _____

Signature _____ Date _____

Investigator's Statement

I, the undersigned, have explained to the research participant in the most understandable manner including the procedures to be followed, risks and benefits involved in this study.

Name of researcher   _____

Researcher's signature _____ Date _____

APPENDIX III: QUESTIONNAIRES

Semi-structured questionnaire

A questionnaire on utilization of nutrition information on food labels by patients with diabetes mellitus and hypertension attending clinic at KCTRH.

INTRODUCTION

My name is lavender Namuma Mwanzo, a student at MMUST, department of Nutritional Sciences taking MSc. Public Health Nutrition.

This questionnaire is designed to obtain information from you regarding utilization of Nutritional information on Food labels. This study also intends to identify socio demographic characteristics, to assess utilization of nutrition information on food labels, and to establish factors influencing utilization of nutrition information on food labels.

The results will be useful in designing appropriate interventions aimed at reducing the prevalence of diabetes mellitus and hypertension in Kakamega and Kenya at large. This information will be handled with confidentiality/privacy and it will not be used for any other purposes rather than those outlined here. Your participation is of great value and I appreciate your cooperation. Thank you

INSTRUCTIONS TO RESPONDENTS

This questionnaire has various sections. Please answer all sections by putting a **TICK** to the response you find most appropriate. Some sections will have their own instructions, please follow carefully.

County_____**Date of interview**_____

Interview code_____

Type of chronic disease

a. Diabetes ( )   b. Hypertension ( )   c. Both Diabetes/Hypertension

( )

What's the Duration of your condition? _____

SECTION 1: QUESTIONNAIRE ON SOCIO-DEMOGRAPHIC

CHARACTERISTICS OF THE RESPONDENTS

1a. Whats your gender?

Female   ( )

Male   ( )

Transgender   ( )

Any other   ( )

1b.Whats your age?

18-30   ( )

31-40   ( )

41-50   ( )

51-60   ( )

Above 60   ( )

1c.What's your marital status?

Single   ( )

Married   ( )

Divorced/separated ( )

Widow/widower   ( )

1d.What's your religion?

Christian   (   )

Muslim   (   )

Hindu   (   )

Any other   (   )

1e. What's your level of education completed?

Primary   (   )

Secondary   (   )

Tertiary   (   )

Never went to school (   )

1f. What's your type of employment?

Casual laborer   (   )

Permanent employed   (   )

Self-employed   (   )

Retired   (   )

Any other   (   )

1g. What's your level of income?

Below kshs 5000 (   )

Kshs 5000- 10000 (   )

Kshs 10000- 20000 (   )

Above kshs. 20000   (   )

1h. What's your household monthly food expenditure?

Below kshs. 5000 (   )

Kshs. 5000-10000 (   )

Kshs. 10000-20000 ( )

Above kshs. 20000 ( )

SECTION 2: QUESTIONNAIRE ON UTILIZATION OF NUTRITION INFORMATION ON FOOD LABELS

Tick the answer(s) that you find most appropriate to you. Additional space is provided for you to write answer(s) that is not given in the list of answers provided. You are allowed to seek clarification for any question that you don't understand.

2a. Do you understand what nutrition food labels are?

　□1. Yes

　□ 2. No

2b. Do you read the nutrition information on food labels?

　□Y

　□
　　e

　　s

　　N

　　o

2c. If yes, when do you read nutrition information on food labels?

　□1. The first time you buy the food product

　□ 2. Every time you buy the food product

　□3. Other (please, specify…………………………………………

2d. If no, state why…………………………………………………………

2e. Do you find the nutrition information on food labels useful to you(s)?

96

☐1

☐
.

Y

e

s

2

.

N

o

2f. If yes, state how……………………………………………………………………………

2g. No, state why…………………………………………………………………………….

2h. which information do you always read on food label? (Tick more than one)

1. Name and description of the product ( )

2. Nutrition information ( )

3. Manufacturers and expiry date ( )

4. Ingredient list ( )

5. Allergen warning ( )

6. Name, contact & address of the manufacturer ( )

7. Country of origin ( )

8. Net weight/ volume ( )

9. Storage instructions ( )

10. Lot or batch number ( )

2i. what nutrients do you look for on food label?

☐ 1. Sodium

☐ 2. Saturated fats

☐ 3. Cholesterol

☐ 4.   Proteins

☐ 5. Total fat

☐ 6. Carbohydrates

☐ 7. Dietary fiber

☐ 8. Others (please specify) …………………………………

2j. How clear is the information on food label?

☐ 1. Very clear

☐ 2. Clear

☐ 3. Somehow clear

☐ 4. Not clear

2k. Does nutrition information on food label has any influence on your buying decisions?

☐ 1. No influence at all

☐ 2. Some little influence

☐ 3. Very great influence

2l. Do you find nutrition information on food label useful?

☐ 1. Very useful

☐ 2. Useful

☐ 3. Not useful

☐ 4. Other (please specify) ………………………

2m. How do you use the information on food labels?

1. help in making buying choices

2. help in determining serving sizes

3. help in determining safety of the product

4. help in planning my meals

5. help in balancing my caloric/ fat/ sodium content /nutrient content

5. Others (please specify) …………………………………

SECTION 3: QUESTIONNAIRE ON FACTORS INFLUENCING UTILIZATION

OF NUTRITION INFORMATION ON FOOD LABELS

Please tick the answer that you find most appropriate to you

Factor influencing utilization of Nutrition information on Food Label	Influential 1.	Very Influential 2.	Not Influential 3.
3a1.Price of food product			
3a2.Type of nutrition information on the label			
3a3.Health/nutrition status			
3a4.Knowledge			
3a5.Time			
3a6.Brand of the product			
3a7.Taste of the product			
3a8.Fat/ sodium/ sugar/ content			

3b. Which one of the following do you attach a lot of importance on?

1. Convenience   ( )

2. Brand of the product   ( )

3. Nutrition/ health status   ( )

4. Taste of the product   ( )

3c. How often do you read nutrition information on food labels?

1. Daily   ( )

2. Weekly   ( )

3. Monthly   ( )

4. Every time I buy the food product   ( )

5. I never read the information at all ( )

4e. What do you think should be done to nutrition information on food labels in order to increase its utilization?

1. Nutrition education   ( )

2. Serving sizes be calculated   ( )

3. Language be simplified   ( )

4. Print size be increased   ( )

5. Terms be simplified   ( )

6. I don't know   ( )

APPENDIX IV: NACOSTI RESEARCH PERMIT

REPUBLIC OF KENYA

**NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY & INNOVATION**

Ref No: **605889**

Date of Issue: **20/November/2021**

RESEARCH LICENSE

This is to Certify that Ms.. LAVENDER NAMUMA MWANZO of Masinde Muliro University of Science and Technology, has been licensed to conduct research in Kakamega on the topic: Utilization of nutrition information on food labels by persons with chronic diseases in Kakamega county , Kenya for the period ending : 20/November/2022.

License No: **NACOSTI/P/21/14425**

605889

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY &
INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document,
Scan the QR Code using QR scanner application.

APPENDIX V: MMUST IERC RESEARCH PERMIT

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

Tel: 056-31375
Fax: 056-30153
E-mail: ierc@mmust.ac.ke
Website: www.mmust.ac.ke

P. O. Box 190,
50100.
Kakamega,
KENYA

Institutional Ethics and Review Committee (IERC)

REF: MMU/COR: 403012 Vol 5 (01)

Date: November 14th, 2021

To: Ms. Lavender Mwanzo

Dear Madam,

RE: UTILIZATION OF NUTRITION INFORMATION ON FOOD LABELS BY PERSONS WITH CHRONIC DISEASES IN KAKAMEGA COUNTY, KENYA

This is to inform you that *Masinde Muliro University of Science and Technology Institutional Ethics and Review Committee (MMUST-IERC)* has reviewed and approved your above research proposal. Your application approval number is **MMUST/IERC/031/2021.**The approval period is *November 14th, 2021-November 14th, 2022.*

This approval is subject to compliance with the following requirements;

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

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

Yours Sincerely,

Prof. Gordon Nguka
Chairperson, Institutional Ethics and Review Committee

Copy to:
- The Secretary, National Bio-Ethics Committee
- Vice Chancellor
- DVC (PR&I)

APPENDIX VI: KCTRH APPROVAL

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF KAKAMEGA
MINISTRY OF HEALTH SERVICES

Telephone: 056-31850/1852/31853
Email: health@kakamega.go.ke
Website: www.kakamega.go.ke

County Director of Health
P.O. Box 36-50100
KAKAMEGA

Ref: No. CGK/MOH/ME/VOL.1/18

Date: 24th March 2022

Lavender Mwanzo,
Principal Investigator,
Department of Nutritional Sciences, MMUST
P.O. Box 190 – 50100
Kakamega - KENYA

Dear Lavender;

RE: REQUEST FOR AUTHORIZATION TO CONDUCT RESEARCH STUDY AT KAKAMEGA COUNTY TEACHING AND REFERRAL HOSPITAL

Pursuant to your request to carry out a research, protocol entitled: *"Utilization of Nutrition Information on Food Labels by Persons with Chronic Diseases in Kakamega County, Kenya"*.

This is to notify you that we have reviewed your study and ascertained that due procedures have been followed prior to the commencement of data collection. You have provided proposal approval for MMUST, the study protocol, Institutional Ethical approval from MMUST *(MMUST/IERC/031/2021)* exp. November 14, 2022, and NACOSTI permit license *(NACOSTI/P/21/14425)* exp. 30th November 2022.

Your request has been granted **approval**; you shall conduct your study at the Kakamega County Teaching and Referral Hospital up to the end of November 2022. You shall work closely with the County Nutritionist and the KCTRH administration during the data collection period. At the end of this study, you shall be required to disseminate your findings to the Hospital Administration, County Health Management Team (CHMT) and the County Director of Health Services.

Best regards

Dr. Linet Elamenya,

Ag. Director, Health Services
Department of Health, Kakamega County

DIRECTOR OF HEALTH SERVICES
KAKAMEGA COUNTY

2 4 MAR 2022

RECEIVED

Copy To; Med-Supt (KCTRH), CHMT

APPENDIX VII: APPROVAL OF PROPOSAL

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

Tel: 056-30870
Fax: 056-30153
E-mail: directordps@mmust.ac.ke
Website: www.mmust.ac.ke

P.O Box 190
Kakamega – 50100
Kenya

Directorate of Postgraduate Studies

Ref: MMU/COR: 509099

26th May, 2021

Lavender Namuma Mwanzo,
HPN/G/01-53315/2018,
P.O. Box 190-50100,
KAKAMEGA.

Dear Ms. Lavender,

RE: APPROVAL OF PROPOSAL

I am pleased to inform you that the Directorate of Postgraduate Studies has considered and approved your Masters Proposal entitled: *"Utilization of Nutrition Information on Food Labels by Persons with Chronic Diseases in Kakamega County, Kenya"* and appointed the following as supervisors:

1. Dr.Jane Situma   -   SPHBST, MMUST
2. Dr. Lucy Mutuli   -   SPHBST, MMUST

You are required to submit through your supervisor(s) progress reports every three months to the Director Postgraduate Studies. Such reports should be copied to the following: Chairman, School of Public Health, Biomedical Sciences and Technology Graduate Studies Committee and Chairman, Nutritional Sciences Department. Kindly adhere to research ethics consideration in conducting research

It is the policy and regulations of the University that you observe a deadline of two years from the date of registration to complete your master's thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.

We wish you the best in your research and hope the study will make original contribution to knowledge.

Yours Sincerely,

Dr. Consolata Ngala
DEPUTY DIRECTOR, DIRECTORATE OF POSTGRADUATE STUDIES
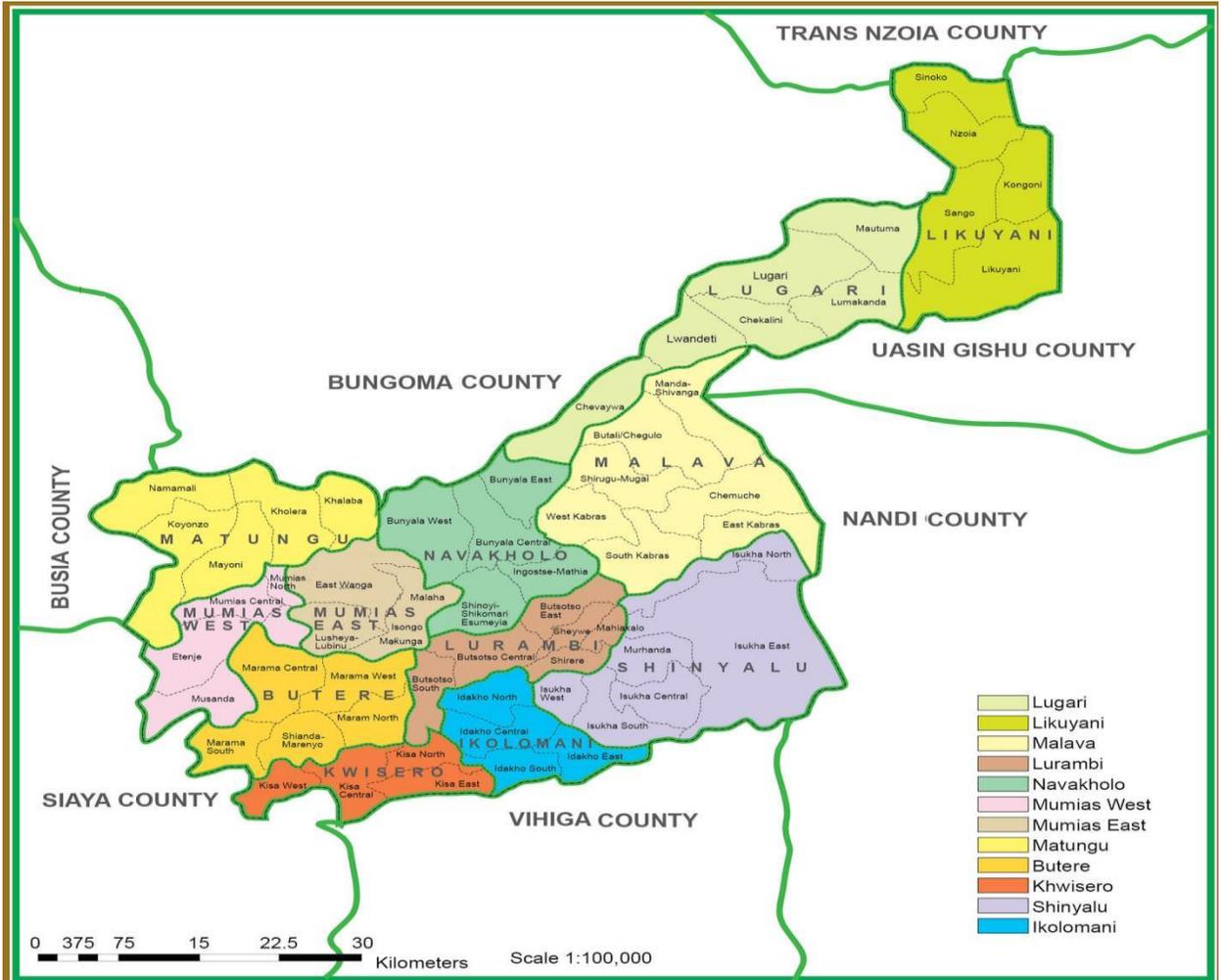
Appendix VIII: Kakamega County Map

Fig 6.1: Source: Kakamega County Government