

**FACTORS CONTRIBUTING TO NON-ADHERENCE TO DIETARY  
RECOMMENDATION AMONG DIABETIC PATIENTS ATTENDING KAPSABET  
COUNTY REFERRAL HOSPITAL, KENYA.**

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THE AWARD OF MASTER OF SCIENCE IN HUMAN NUTRITION DEGREE OF KENYA  
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**SEPTEMBER, 2024.**

## DECLARATION

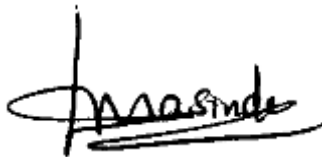
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## **DEDICATIONS**

I would like to dedicate this work to O. Limo thank you for the immense support and encouragement.

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## ABSTRACT

Diabetes mellitus is an endocrine disorder characterized by the pancreas producing little or no insulin, a hormone crucial for the absorption of blood sugar into the blood stream. Diabetes mellitus is an increasing global health problem due to increased illnesses and deaths. Management of diabetes today requires that one follows a prescribed diet plan. Diabetes mellitus care and management is usually costly and worst cases scenario is when there are co-morbidities. Dietary non-adherence has direct implications leading to early onset of diabetes complications. Therefore, the purpose of the study was to find out possible factors contributing to non-adherence to dietary recommendations and to come up with strategies to ease diabetes care and management in Kapsabet County Referral Hospital, Kenya. This was a cross-sectional analytical study which targeted type 2 diabetics attending outpatient clinic at Kapsabet County Referral Hospital. Researchers administered a questionnaire to 138 selected patients for the study. The data was be coded, cleaned and analyzed using SPSS Scientific software. Permission was sought from SERC and NACOSTI, County Commissioner-Nandi and County Director Education. The results from the study indicates that demographic characteristics of the participants played an important role in predicting their adherence to dietary practices ( $B_0=1.634$ ,  $P<0.001$ ). The Adherence to dietary practices was shown to be strongly influenced by age ( $B_1=0.359$ ). Further findings presented a positive association between the level of education and adherence to dietary practices ( $B_3=0.620$ ). More importantly correlation was noted between individual's level of income and their likelihood of adhering to dietary practices ( $B_6=0.611$ ). There was a higher chance for patients with more incomes to consume right diet and adhere to it compared to patients with less incomes. The findings also revealed good knowledge level at 89% whereas non-adherence was at 67%. This indicate that knowledge did not translate directly to adherence to dietary recommendations. The study aim was to look into the dietary adherence and possible factors contributing to non-adherence to recommended dietary practices among diabetic patients attending Kapsabet county hospital and more in depth understanding of the dietary practices and adherence with aim of improving health system strategies for the persons living with type 2 diabetes. The results highlight a range of factors influencing dietary adherence, financial constraints, age, level of education, and social support. In conclusion, healthcare providers should take these factors into consideration when developing interventions to help diabetic patients better manage their condition through diet and achieve glycemic control.

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## **LIST OF ABBREVIATIONS**

|        |                                    |
|--------|------------------------------------|
| ADA    | American Diabetes Association      |
| BMI    | Body Mass Index                    |
| CVD    | Cardiovascular Diseases            |
| DM     | Diabetes Mellitus                  |
| Dx     | Diagnosis                          |
| GAP    | General Attitude and practice      |
| HBA1C  | Glycated Hemoglobin                |
| IDF    | International Diabetes Federation  |
| KCRH   | Kapsabet County Referral Hospital  |
| MTRH   | Moi Teaching and Referral Hospital |
| OGLA'S | Oral Glycemic Lowering Agents      |
| SBGM   | Self blood glucose monitoring      |
| T2DM   | Type 2 Diabetes Mellitus           |
| WHO    | World Health Organization          |
| PUFA   | Poly-unsaturated fatty acids       |

MUFA      Mono-Unsuturated Fatty Acids

FA          Fatty Acids

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background information**

Diabetes mellitus is an increasing global health concern and a leading contributor to the rising burden of chronic disease in low-middle income countries. Diabetes mellitus is defined according to the Kenyan clinical diabetes guideline as a progressive metabolic disorder characterized by continued rise in blood sugar resulting from decreased insulin secretion, action or both' (Ministry of Health [MOH], 2018) The Haruna et al. (2023) categorization of diabetes mellitus has since been reviewed and adopted by the WHO based on cause these are; type 1 diabetes, type 2 diabetes, Gestational diabetes mellitus, and idiopathic diabetes. Globally Type 2 diabetes is the commonest accounting over 90% of cases treated in hospitals.

Diabetes mellitus has increased in terms of morbidities and mortalities being top five causes of death and the increased socio-economic burden. Diabetes mellitus prevalence is on the increase and patients experience greatest challenge of developing complications like foot amputation, heart diseases, cataracts, and neuropathy and kidney failure.

Globally diabetes mellitus is estimated to rise from 425million people in 2017 to 629 million by 2045. According to a report from International Diabetes Federation (IDF, 2019) atlas diabetes is increasing mainly in Low-middle income countries accounting to 74.9%. About 40 years ago diabetes mellitus prevalence globally was 4.7% and has since risen to 8.5% in 2014 (WHO, 2017). According to Stepwise survey of 2015 diabetes prevalence in Kenyan was found to at 5% with distribution at (1.6million) in rural and 10.7% in urban areas while pre-diabetes prevalence is at 8.8% in rural and 14.4% in urban.

Current studies both in urban and rural Kenya have cited a steady rise in diabetes mellitus prevalence from about 3.5 to 5%, with higher percentage in the towns, cities and municipalities. In a study by (

Caleb, 2020) found out that the prevalence rate of diabetes mellitus in Nandi County is about 4.6% a figure close to the Kenyan national prevalence of about 5%. From the findings poor dietary habits and lifestyle was cited as possible cause of diabetes mellitus morbidities and mortalities.

Just like any other chronic diseases diabetes mellitus requires long term care and management which includes dietary management and lifestyle modification. The complication setting in is directly related to diet quality and nutritional management. Effective management of diabetes mellitus according to American Diabetes Association 2019 report requires that patients be given nutrition education, counseling and support needed to make lifestyle changes like individual blood glucose checks, monitoring and observing meal times, diet and engaging in physical exercises, taking medicine, at home and clinic appointments. For excellent dietary adherence and blood sugar control certain measures are to be considered before adopting new lifestyle and behaviors like benefits of controlling sugars and effects of not adhering to prescribed diet plan.

Current clinical guideline on diabetes management 2018, “advocates for longer follow up and behavior change, access to comprehensive care which includes nutrition education and counseling, medications, and education on importance of self -blood sugar monitoring”. Diabetes mellitus treatment usually starts with non-pharmacological therapies like dietary modification and exercise given by a registered nutritionist/dietitian. The American Diabetes Association 2019 report advocates, “that once diagnosed with diabetes mellitus one should receive education on self -blood sugar management and support, which include being trained on diabetes awareness, education and self-care behaviors to support glycemic control”. Medical Nutrition therapy in diabetes is associated with 0.3-2.0% reductions in HBA1C.

Dietary changes is an important goal in management of type 2 diabetes mellitus as per the Kenya National Strategic Plan 2015-2020. “Usually the diet plan for patients with type 2 DM call for knowing what to take, how much to take, and the meal time also avoidance of alcohol and limiting consumption of fast

foods that are high saturated fats, sugars and sodium”, (American Diabetes Association, 2019). Nutrition being key component in diabetes care simply recommends that; diabetic clients eat variety of healthy foods from all food groups in the correct portion size and in the right time and are individualized. Poor dietary choices alone cause morbidities and mortalities. Hence, diabetic patients are counseled and educated, ‘to embrace healthy eating behavior, which requires change in food habits, beliefs and meal pattern for life’ according to (Jing et al, 2008).

Non-adherence is defined as, “deviating from the prescribed plan of treatment”. Failure to follow and observe dietary recommendations increases the risks of hospitalization and poor prognosis leading to deaths and financial burdens. According to WHO, 2003 report non-adherence rates for medications and lifestyle changes in chronic disease management ranges between 50% to 80%.

Despite advances attained so far in disease diagnosis and treatment, comorbidities and death rate continues to increase among diabetic patients. Dietary adherence is a complex behavior that has several influencing factors like continuous care and treatment of diabetes to patients, health systems related. Several studies continue to cite factors contributing non-compliance to recommended diet amongst type 2 Diabetics patients, for instance, socio-economic status, diabetes education, education level, health beliefs and health systems. Poor dietary adherence often leads to poly-pharmacy to manage diabetes comorbidities. Despite the great steps done by the Ministry of Health regarding policy guidelines on dietary choices and guidance in diabetes care non-adherence to dietary recommendations is still high compared to drug adherence. For instance in a study on association of nutrition knowledge and dietary practices in two selected sub-counties in Nandi County it reported poor adherence at 59.6% to diabetes care and called for more research on this area since time was a limiting factor (Caleb, 2020). This therefore calls for an urgent need of a study to look into the dietary adherence and possible factors contributing to non-adherence to recommended dietary practices among diabetic patients attending Kapsabet county hospital and more in depth understanding of the dietary practices and adherence with

aim of getting a clear picture to improving health system strategies for the persons living with type 2 diabetes.

## **1.2 Problem statement**

Patient non adherence is a serious health care concern due to the increasing case of diabetes co-morbidities and mortalities. Diabetes mellitus type 2 is progressive disease which can be managed through proper dietary adherence. Adhering to dietary recommendation among the diabetics patient is key in achieving blood glucose control. Non-adherence increases chances of diabetes related complications and early mortalities.

Several studies found out of non-adherence to dietary recommendation rates at 35-75% among patients with type 2 diabetes. For instance a study done in Ethiopia reported of 55.7% non-adherence to dietary recommendation (Sharew, 2019). In another study in Nakuru County, Kenya found out that 59.6% adhered to the recommended diet (Mugo, 2018). In recent analysis of admissions diabetes accounted to about 4.4% in Kapsabet county referral. From these findings the study seeks to find out factors contributing to non-adherence to recommended dietary practice amongst type 2 diabetic clients attending clinic at Kapsabet county referral as failure leads to complications and frequent hospitalization. There is limited information on dietary non-adherence in Nandi among type 2 diabetics and this will provide a basis to address improvement or continued management in Diabetes care. Hence the question of what is the prevalence of non-adherence to dietary recommendation and what are the possible factors contributing to non-adherence among diabetics in Nandi.

## **1.3 Justification**

Poor dietary practices leads to poor glycemic control resulting in morbidities and mortalities. Many patients are presenting to the hospital with diet related diabetes complications and poor glycemic control. In Kenya, studies done have indicated either non-adherence or partial adherence to recommended diet. According to a study done in Nakuru County a neighboring county (Mugo, 2018) showed that 4.1% did

follow the recommended dietary recommendations. From the findings majority of the patients had a number of reasons of failing to follow the recommended dietary plan and interventions. Another study dietary recommendation and adherence by (Jepkemoi, Gichunge, & Masibo, 2021) in their study at MTRH recommended more studies be done to look into possible barriers to dietary adherence. Currently no study has been done to look into non-adherence to recommended dietary practice in Nandi. Identifying factors that influence dietary non-adherence will help bridge the gap through development of holistic interventions programs to enhance dietary adherence.

## **1.4 Objectives**

### ***1.4.1 Main objective***

To establish factors contributing to non-adherence to dietary recommendations among patients attending Kapsabet Diabetic clinic.

### ***1.4.2 Specific objectives***

- i. To establish socio-demographic factors that hinder adherence to recommended dietary practices
- ii. To determine dietary practices of diabetic clients attending diabetic outpatient clinic at Kapsabet county referral hospital.
- iii. To determine the level of knowledge on recommended dietary practices among diabetic patients attending DOPC at Kapsabet county referral hospital.
- iv. To investigate the level of adherence of diabetic client to recommended dietary practices.

## **1.5 Research questions**

- i. Which are the socio-demographic factors hindering adherence to recommended dietary practices?
- ii. What is the dietary practice of the patients attending diabetic clinic at Kapsabet county referral hospital?

- iii. What is the level of knowledge of the recommended dietary practices for diabetic patients attending diabetic clinic at Kapsabet county referral hospital?
- iv. What is the level of adherence among diabetic patients to recommended dietary practices?

### **1.6 Significance of the study**

Results from the study will help in decision making in developing and improving guidelines on dietary management amongst T2DM and how to implement patient nutrition education at county level. It will act as reference tool for health care providers especially nutritionists to aid in formulating key messages to improve and reinforce health education and dietary practices both at National and County national levels. Also it will serve as reference tool for future studies in Nandi County.

### **1.7 Operational definition of terms**

**Diabetes mellitus:** A condition which happens when the pancreatic cells does not produce enough insulin, or when the body cannot effectively utilize the insulin produced.

**Risk factors:** Is an exposure that increases the likelihood developing a disease, an injury or increases severity of a disease (WHO, 2011).

**Non-Adherence:** Extent to which patients do not adopt the prescribed dietary practices in diabetes mellitus management and care.

**Recommended Dietary Practices:** It's the right meal composition, meal frequency and meal times in the self-care of diabetes mellitus.

**Meal composition:** It refers to the choices of food by groups and also the portion sizes of each food group.

**24 hour Dietary recall:** Is an interview aimed to obtain detailed information on all food items and fluids taken orally in the last 24hrs.

**HBA1C:** It refers to the bound glucose molecule to the red blood cells as a means of determining the average blood sugar concentrations in the last 3 months.

**Glycemic control:** It refers to the average levels of blood glucose in a client living with diabetes Mellitus in whom HBA1C is less than 6.5% in the past three months.

**Glucose:** Form of carbohydrate that serves as a primary source of energy.

**Adherence:** Refers to the level where an individual behavior in (taking medication, following prescribed diet and lifestyle changes) is similar with agreed recommendation from a health care worker (WHO,2003).

**Non-adherence to diet:** Taking > three meals daily and the required in between snacks; taking meals at irregular times and not taking from all the food groups.

**Health systems:** Comprises of all organizations, hospital and resources like human, drugs registers used to deliver treatment and care services to meet the health needs of the people.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Diabetes Mellitus**

Diabetes mellitus is the one of the surging non-communicable disease around the globe. Diabetes mellitus as per the Kenya national Diabetes management guideline is defined as a “chronic metabolic disorder described by hyperglycemia resulting from abnormalities in insulin secretion, action or no insulin production”, (MOH, 2018). Diabetes is a chronic disease that requires lifelong management, including adherence to dietary recommendations. However, studies have shown that many diabetic patients struggle to adhere to these recommendations, leading to poor disease management and increased risk of complications. 48% death due to diabetes occurs before age 70 years. In Low middle income country the mortality rate is at 13% (WHO, 2019).

The type of diabetes mellitus has been researched revised and adopted for use globally by the WHO based on their causes and symptoms these are; type 1 diabetes, type 2 diabetes, Gestational diabetes mellitus, and idiopathic diabetes.

##### **2.1.1. Type 1 Diabetes**

Type 1 diabetes is an autoimmune disease, in which the body's own immune system attacks healthy cells in the pancreas. When many of the cells are destroyed, the body no longer produces insulin for absorption leading blood sugar rise. Type 1 diabetes progress very rapidly leading to increased infections and wasting.

##### **2.1.2. Type 2 Diabetes**

The pancreas produces some insulin, and the cells do not sense its presence and uptake by the cells. Meaning the insulin is not working, and glucose starts to increase in the bloodstream. In type 2 diabetes, symptoms develop progressively, throughout a period of time becoming chronic, symptoms are not

noticed until the disease present with other complications like infections. Some of the risk factors for type 2 diabetes include; family history, age, diet, and lifestyle.

### **2.1.3 Gestational Diabetes**

About 10% of expectant women develop pregnancy induced diabetes, a disorder in which causes blood sugar levels to rise during pregnancy. Gestational diabetes is diagnosed through routine screening at the antenatal clinics. In most instances it is managed through dietary control and some pregnancy friendly exercise, while other women will be started on medications like insulin or other oral glucose lowering agents.

There are other possible causes for pregnancy induced diabetes, which includes overweight and obese mothers, having family history of diabetes, poorly managed pre diabetes, and polycystic ovary syndrome.

While gestational diabetes clears after delivery, it can also lead to increased chances of developing type 2 diabetes later.

## **2.2 Global burden of Diabetes mellitus**

Diabetes mellitus type 2 (T2DM) is the commonest type accounting to about 90% of all cases globally. According to data released in 2014 by WHO, close to 422 million adults (8.5% of the world's population) had been diagnosed with compared to 108 million (4.7%) in early 1980s and it is estimated to continue rising to 642 million by 2040. International Diabetes Federation in 2013 projected that the 381 million person living with diabetes will double by similar margin by 2030, linked with health, social and economic costs. The sharp increase in diabetes prevalence globally is attributed to demographic and societal changes such as westernization, urbanization, geriatrics and unhealthful lifestyle like consumption of highly refined foods and snacks along with sedentary lives. Middle and low income countries are the most affected with rising cases of diabetes mellitus.

In Africa, about 19 million people are living with diabetes with yearly estimates of about 480,900 diabetes related mortalities according to the IDF statistics (International Diabetes Federation, 2019). This figure expected to increase by 143% by 2045 calling for an action. The projection of mortalities as at 2019 was 366,200. Countries with most cases of diabetes according to world diabetes reports in Africa are Nigeria reporting about 3.9 million, South Africa having 2.6 million, Ethiopia reporting of over 1.9 million, and the United Republic of Tanzania having 1.7 million diabetes case reported. Based on prevalence rates statistics by the international federation of Diabetes in 2013 the Island of Reunion is leading at 15.4%, followed by Seychelles at 12.1%, Gabon 10.7% and Zimbabwe at 9.7% (Federation 2013; Hall 2011; Murray, 2012). These figures are based on regional projections and might not be accurate due to under-estimation and many are still undiagnosed.

In Kenya, diabetes prevalence in adults is predicted to be at 5% according to a stepwise survey done in 2015 which accounts to almost 750,000 persons and 20,000 annual deaths. The distributions vary and it is estimated that approximately 10.7% live in urban settings and 2.7% resides in rural settings (International Diabetes Federation, 2019). Diabetes mellitus prevalence is on the increase and patients face greater threats from complication as a result of non-adherence to dietary recommendation.

Kenyan situation is no different, and is now a public health concern since most patients being diagnosed are already presenting with other illnesses people diagnosed to have diabetes usually. Current studies done in Kenya based on population in both urban and rural reported a prevalence rate of between 3.5-5%, from which most cases are found in the urban areas. (Caleb, 2020) In his study in few selected sub-counties showed a prevalence rate of 4.6% in Nandi County a figure almost near the national rates while many are still missed out in diagnosis and treatment.

### **2.3 Diabetes treatment and adherence**

Diabetes mellitus being a chronic disease stipulates that patients be routinely followed up by being given comprehensive care which includes, medications, SBGM, dietary and exercise modification, and regular

screening of the eyes, kidney functionality and feet to allow for early treatment. The American Diabetes Association consensus report of 2019 recommends that those living with type diabetes should receive diabetes nutrition education soon after being diagnosed and support/followed up on how to improve diabetes knowledge on healthy eating patterns and self-care behavior.

Adherence according to World Health Organization is defined as the extent to which a person's behavior conforms to agreed advice from a health care worker. While non-adherence is taking < 80% of the prescribed treatment plan. According to World Health Organization report in the year 2003 non-adherence rates for medications and lifestyle changes was estimated to be between 50% and 80% in chronic disease management. Adherence is very important in the context of chronic diseases requiring long- term therapy.

Treatment adherence is a broad behavioral pattern which is affected by other issues like follow-up, factors relating to the patients, family and treatment supporters, and health systems. Most of these and others factors contributing to failure in adhering to recommended treatment plan among clients with type 2 diabetes mellitus in Kenya. (Masaba et al, 2019) in their study noted that there are many factors related to health systems that contribute to non-adherence citing unaffordable health care, lack of information on diabetes progress, lack of family involvement, poly pharmacy etc. Elsewhere, a study done in rural Kenya by (Musee et al, 2016) noted that income level and routine clinic attendance had some impacts on dietary adherence. (Sabate, 2003) study noted that non-adherence to treatment has direct impacts on treatment outcomes especially in patients on follow-up with chronic diseases like diabetes, epilepsy, AIDS, asthma, TB, Hypertension, and organ transplant. World Health Organization report of 2004 on the other hand found out that diabetes if not well controlled leads to poor prognosis and health outcome including huge financial burden.

A UK based diabetes study group reported that about 45% of type 2 diabetics fail to attain the targeted blood sugar control of HBA1C less than 6.5% and the main contributing factor is failure to follow dietary

and drug prescriptions. Diabetes drugs and dietary management and HBA1C are inversely related. Non-adherence contributes to increased hospitalization, poor health conditions, increased illnesses and deaths, along with increased financial burden through treatments.

For instance, Kenyan studies have noted non-adherence to both drug and dietary management in type 2 diabetics in a study done in rural Kenya (W., 2016). Similarly another study done by (Koech et al., 2019) at MTRH reported that most of the patients about 72% did not take medications as prescribed. Whereas, (Mugo, 2018) in her study in Nakuru county showed 4.1% adherence.

In a similar study in Nairobi, lack of family involvement, drug availability and displeasure with attending health care workers were some factors linked with poor treatment adherence (Waari et al., 2018). In other findings by, Mwaloma, 2016 noted that most patients with low adherence lacked sufficient knowledge to manage themselves and delay the complications. He however noted that adherence can be improved if proper analysis of the different factors both the enablers and barriers are looked into and implemented.

According to American Diabetes Association management of diabetes starts with behavior change like adopting healthy lifestyle regular exercises and good dietary practices in order to attain blood sugar control. Diet management is the main goal in type 2 diabetes and this requires self- discipline in adopting excellent food choices irrespective of social, cultural and psychological factors (American Diabetes Association, 2019).

To manage T2DM and delay diabetes related illnesses, World Health Organization 2013 report advices that clients should have ideal body weights, exercise, take lower glycemic index food, reduce sugars and food high in saturated fats intake and limit use of alcohol or tobacco. Lifestyle changes like diet is an important factor in achieving and controlling T2DM and avoiding its long-term complications.

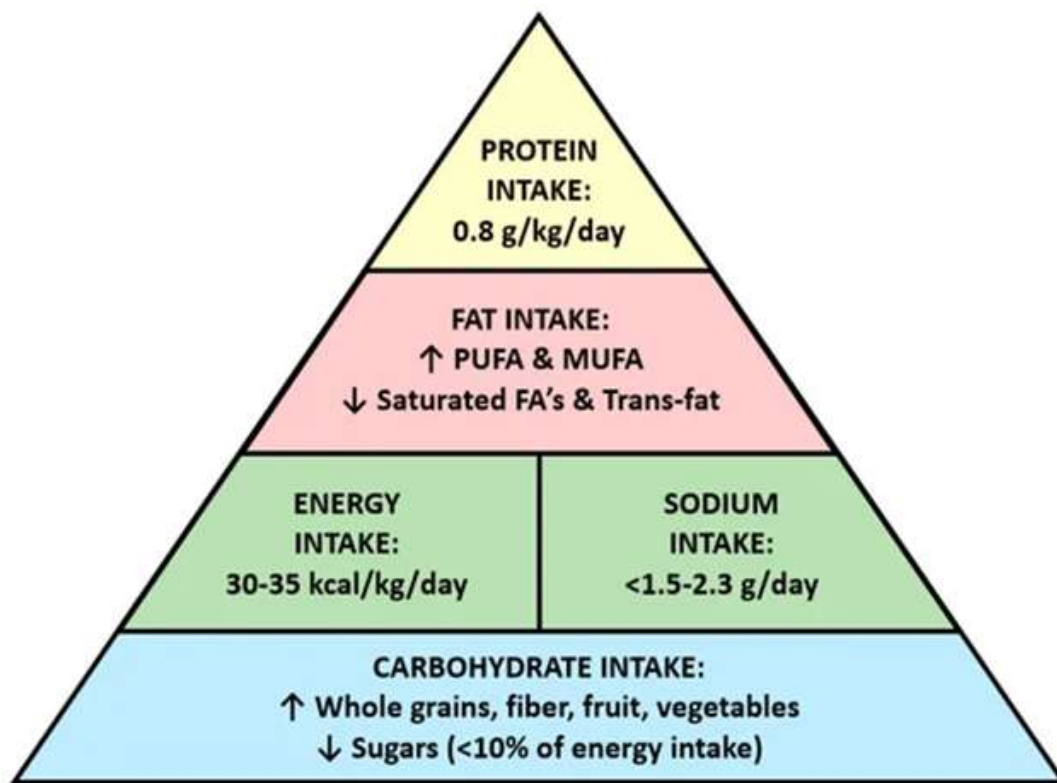
## **2.4 Dietary practice in diabetes and nutritional management.**

### **2.4.1 *Standard recommended dietary practice***

Dietary practice according to (American Diabetes Association, 2019) report refers to clients choice on food consumption based on diabetes education on nutrition that emphasizes on reduction of saturated fats, low sodium foods, omega 3 fatty acids, eating fruits, legumes, whole grains, and vegetables, reducing highly sucrose-containing foods, and increasing fiber-containing foods which is the main goal of medical nutrition therapy of having controlled blood glucose and delay of diabetes complications like neuropathies ,hypertension and kidney failure. Dietary practice assessment in type 2 diabetes involves a thorough evaluation and history taking of the dietary intake ,in terms of quantity of food eaten and fluid intake, meal frequency including snacks intake, total caloric requirement including fats, protein, carbohydrates and vitamin daily consumption. Anthropometric assessment is included, dietary related knowledge, diet history, cooking methods and safety, food aversion and allergies, personal food preferences, household food security, socio-cultural practices, self-monitoring of blood sugars. It's always individualized.

### **Figure 2.1.**

*Food pyramid to summarize on dietary recommendation*



The dietary management of diabetes type 2 mellitus aims at attaining blood sugar control which is the most cost effective ways to reduce incidences of illnesses and deaths; however, glycemic control is still poor mostly in low and middle-income countries. Blood sugar control is attained by acceptance, adopting and maintaining the broad management in self-care behavior's, which include four main domains: medical nutrition therapy, physical activity, drug therapy and foot care along with routine clinic attendance. Proper dietary choices and adherence is the fundamental component which is key practice in type 2 diabetes management as it reduces early onset of diabetes related illnesses and premature deaths by controlling risk factors. Excellent dietary practice adherence will see HBA1C reduce significantly by 1-2 %. When diet and lifestyle behavior is adhered to then normal physiologic and metabolic functionality is attained hence quality of life is achieved.

## **2.5 Demographic factors and diabetes**

The current rapid upsurge in diabetes globally is attributed to both demographic and social interchange like globalization, westernized lifestyles, geriatrics and poor dietary choices and intake of highly refined fast foods, simple sugars coupled with sedentary lifestyles. Socioeconomic factors such as poverty and food insecurity can also contribute to non-adherence to dietary recommendations. Many diabetic patients in Kenya may struggle to afford healthy foods or may live in food deserts where access to fresh produce is limited. This can make it difficult for patients to follow a balanced diet as recommended by healthcare providers. A study by Mutua et al. (2020) found that food insecurity was a major barrier to dietary adherence among diabetic patients in Kenya.

T2DM is considered a predisposing factor for cardiovascular diseases and related complications that leads to other illnesses like kidney failure and heart failure and eventually premature deaths.

## **2.6 Patient's knowledge on recommended dietary practice**

Adherence maybe compromised if a person with type 2 diabetes does not have adequate knowledge on recommended dietary practice. One of the key factors contributing to non-adherence to dietary recommendations among diabetic patients is lack of knowledge and awareness. Many patients may not fully understand the importance of following a specific diet to manage their condition. A study by Mwangi et al. (2019) found that only 30% of diabetic patients in Kenya had adequate knowledge of dietary recommendations for diabetes management. This lack of knowledge can lead to confusion and uncertainty, making it difficult for patients to make informed choices about their diet.

According to a study by Farmer knowing details about the disease diagnosis, effects and control of diabetes and the importance of interventions always influence patient's adherence and attitude towards lifestyle behavior recommendations (farmer, 2005). Persons with T2DM will only attain the goal of following prescribed diet and lifestyle changes only when they receive education on self- management

mainly medical nutrition therapy. The outcome of the education and knowledge received will be seen in how patient's manages their diabetes and having it controlled on daily basis.

In a study by (saleh, 2012) revealed good to average level of knowledge on type 2 DM. The report however, found out that knowledge did not match the nutritional practices and adherence. Results from another study by (wens, 2005) revealed patients lacking diabetes education diabetes; lack of communication skills from healthcare worker treating them; having no multidisciplinary support; and relying so much on latest and traditional medicine; uncertainty of social isolations/stigma; patient looking down on diabetes severity; denials; low self- esteem among patient's are some of the cited barriers to medication complications including therapeutic nutrition and physical activity among diabetics.

Adherence is also affected if diabetic patients do not receive adequate education on lifestyle changes especially regarding excellent dietary choices that influences positively on attaining the right blood sugar control.

## **2.7 THEORIES RELATED TO STUDY**

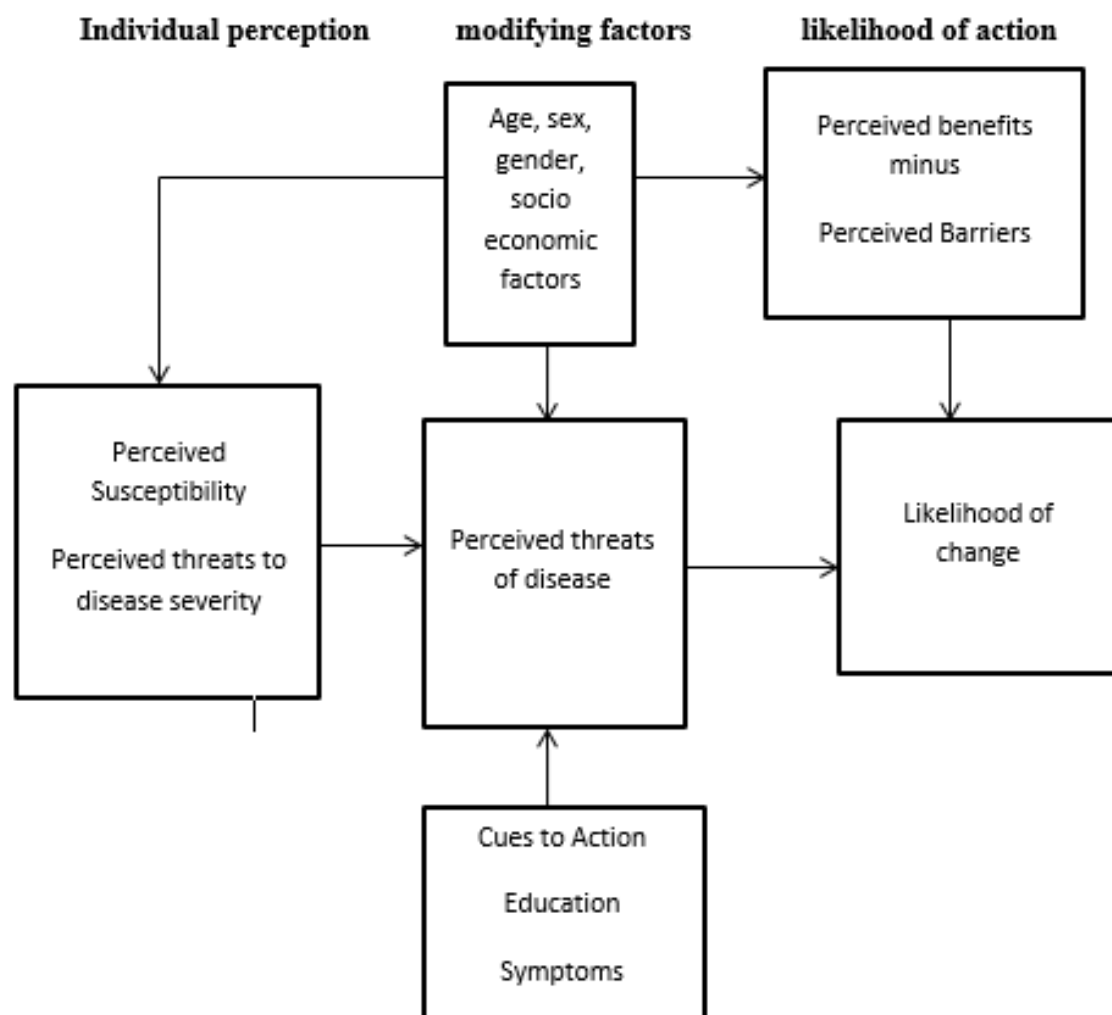
### ***2.7.1 Health Belief Model theory***

Diabetes is now both local and global health challenge. IDF, 2019 projects 51% increase in diabetes cases by the year 2045 globally and this cuts across all regions. Patient education and support in lifestyle change is the cornerstone to assure good glycemic control. Dietary management is now the main therapy according to (American Diabetes Association, 2019) and to achieve treatment goal regarding diet choices and attitude behavior change needs to be adopted. Hence therefore, adopting health belief model will help in identifying possible barriers that hinder adherence to dietary management as it explores on health behaviors of individuals. Patients belief about treatment barriers and benefits will help motivate the patient adopt and adhere to dietary recommendations. Diabetes nutrition education is important in addressing knowledge about diabetes pathogenesis and possible perceived threats in diabetes self-care

management this will call for action on behavior change. Several cross-sectional studies have highlighted that knowledge is not the only factor contributing to non-adherence to dietary plans. Other factors are family support, personal motivation, confidence, health related systems and patient related factors. By looking into these perceived barriers/factors more in depth understanding and plans for action developed to help diabetics attain excellent dietary management and reduced health burden to both the individual and health systems.

**Figure 2.2.**

*Summary of health belief model adopted from (K., B.K., & Lewis, 1984)*



## **2.8 Conceptual framework**

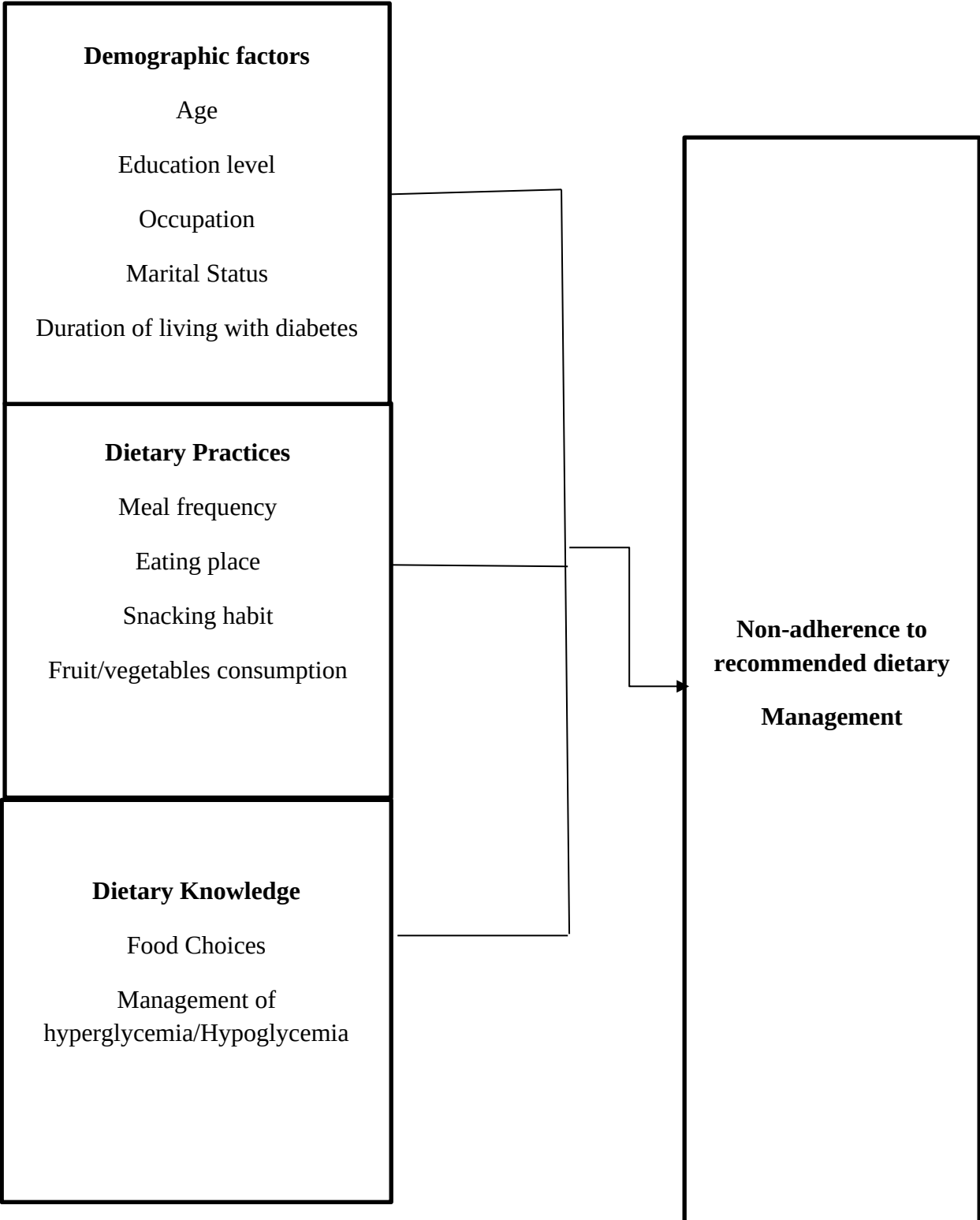
Figure 2.3 is an illustration of factors which relate to non-adherence to recommended dietary practices in the management of T2DM

**Figure 2.3.**

*Conceptual framework*

**INDEPENDENT VARIABLES**

**DEPENDENT VARIABLE**



## **2.9. Summary of literature review**

- Diabetes mellitus is not only national but also a global-health problem that requires well-structured interventional management in order to prolong diabetes morbidities and premature deaths due to diabetes. Proper dietary practices is important in care and treatment of diabetes mellitus. There is scarcity of data on dietary adherence status in Nandi County which necessitated this research. Despite many studies being carried out patients with type 2 diabetes still struggles in adhering to recommended diet.

Study by Misra et al.(2018) showed that healthcare workers passes information on dietary recommendations and practices in the management of diabetes among diabetic clients, however, adherence proves still to be a barrier to clients in attaining blood sugar control. Many research done in Kenya Koech et al. (2019) majorly focused on overall knowledge, attitudes and practices in management of type 2 DM as well medication adherence in diabetes mellitus. However, there is limited literature on non-adherence factors to recommended dietary practices documented in Nandi County. The research study therefore, is to find out non-adherence prevalence to dietary practice and recommendation as well as establish the factors that influence non-adherence among the T2DM on treatment follow up at Kapsabet and come up with strategies to help in care and diabetes management.

## CHAPTER THREE

### METHODOLOGY

#### 3.1 Research design

The study was a descriptive cross-sectional analytical research to find out non-adherence to recommended dietary practices among the type 2 diabetics and find out likely barriers that influence non-adherence. This design was chosen because the study intended to give an analysis of patient's behavior, knowledge and choices made at one particular point in time

#### 3.2 Study variable

The study had both independent and dependent variables. The **independent variables** looked into knowledge on the recommended dietary practices in the treatment of diabetes. This captured in the questionnaire as type of food consumed, quantity, frequency, meal timings and food choices. Other independent variables include socio- demographic characteristics like sex, age occupation marital status etc.

The **dependent variable** is non-adherence to the recommended dietary practices and this will be measured from secondary data like laboratory workups. That is tests done like HBA1C and researcher administered questionnaires.

#### 3.3 Study area and population

Research was conducted at Kapsabet County Referral Hospital in Nandi County. Diabetic patients' attending the clinic having received services like Diabetes health education, nutrition education and counseling. The study site also provides good representation of the people's attitude and behaviors being in a municipality.

The study population was 182 type 2 diabetic patients both male and female attending clinic at Kapsabet County Referral Hospital.

### **3.3.1 Inclusion criteria**

- All Type 2 diabetic patients attending outpatient clinic for a period of over six months at Kapsabet County Referral Hospital
- All patients aged 15 years and willing to consent

### **3.3.2 Exclusion criteria**

- All type 1 diabetes mellitus

### **3.4 Sampling technique**

Purposive stratification sampling was used to select the patients who will have met inclusion criteria by age and have been diagnosed and living with T2DM. The hospital is purposely chosen since it's the only County Referral hospital receiving and attending to all referral cases in the county.

### **3.5 Sample size**

Kapsabet county Referral has 182 active type 2 diabetic patients in the clinic (KCRH Medical Records, 2022). Hence study interviewed 125 patients. The sample size of 125 was arrived at using a formula according to Yamane 1967 and the formula is:

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

Where, n is sample size

N refers to population size

E is the precision level

Hence sample size will be

$$n = 182/1 + 182(0.05)^2$$

$$n = 125$$

10% non-response

$$125 * 10/100 = 12.5$$

n therefore will be  $125 + 13 = 138$

$$n = 138$$

### **3.6 Data collection instrument and analysis**

A structured questionnaire was used to collect data after participants consenting. The questionnaire was coded and cleaned. Data obtained was analyzed using SPSS version 29. Descriptive statistics was used as well to check on the mean, standard deviation, frequencies and percentages. And for statistically significant associations, multivariate regression was done to determine the strength of associations of outcomes by gender, education levels, occupation and perception and family support. Data was represented in form of tables, pie charts, histograms and description presentation.

### **3.7 Ethical consideration**

Approval to carry out the study was sought from Kenya Methodist University post Graduate school. Ethical clearance from Scientific Ethical Research Committee and research permit from National Council of Science and Technology and Innovation (Ref no. NACOSTI/P/23/24350). Approval from relevant ministries in Nandi County that is County Commissioner and County Director of Education.

Written informed consent was obtained and signed by the participants before being interviewed. The respondents were free to leave the study as they felt. The fully filled questionnaires have been kept in lockable drawers only accessed to by the researcher.

## **CHAPTER FOUR**

### **DATA PRESENTATION, ANALYSIS AND INTERPRETATION**

#### **4.1.Introduction**

This chapter presents, analyzes and interprets the research findings. In analyzing the data collected, descriptive and inferential statistics were used. Quantitative data collected was analysed using descriptive statistical techniques, like percentages, frequencies and means. For inferential statistics, Pearson's correlation coefficient and regression analyses were performed using SPSS, version 29. All analyses were conducted at a typical level of  $\alpha = 0.05$ . One set of data was analysed by use of mean. Conclusions were drawn based on the table of means shown below.

**Table 4.1.**

### *Summary Table of Means*

| MEAN VALUE | INTERPRETATION    |
|------------|-------------------|
| 1.00-1.49  | Strongly Disagree |
| 1.50-2.49  | Disagree          |
| 2.50-3.49  | Agree             |
| 3.50-4.00  | Strongly Agree    |

#### **4.2.Response Rate**

The researcher administered the questionnaires in person for the respondents to fill. Where necessary, the researcher provided clarifications on the questions. All the 138 respondents completed and returned the questionnaire administered to them. This represented a response rate of 100%. Therefore, the study's credibility and reliability was significantly high.

#### **4.3.Demographic Characteristics**

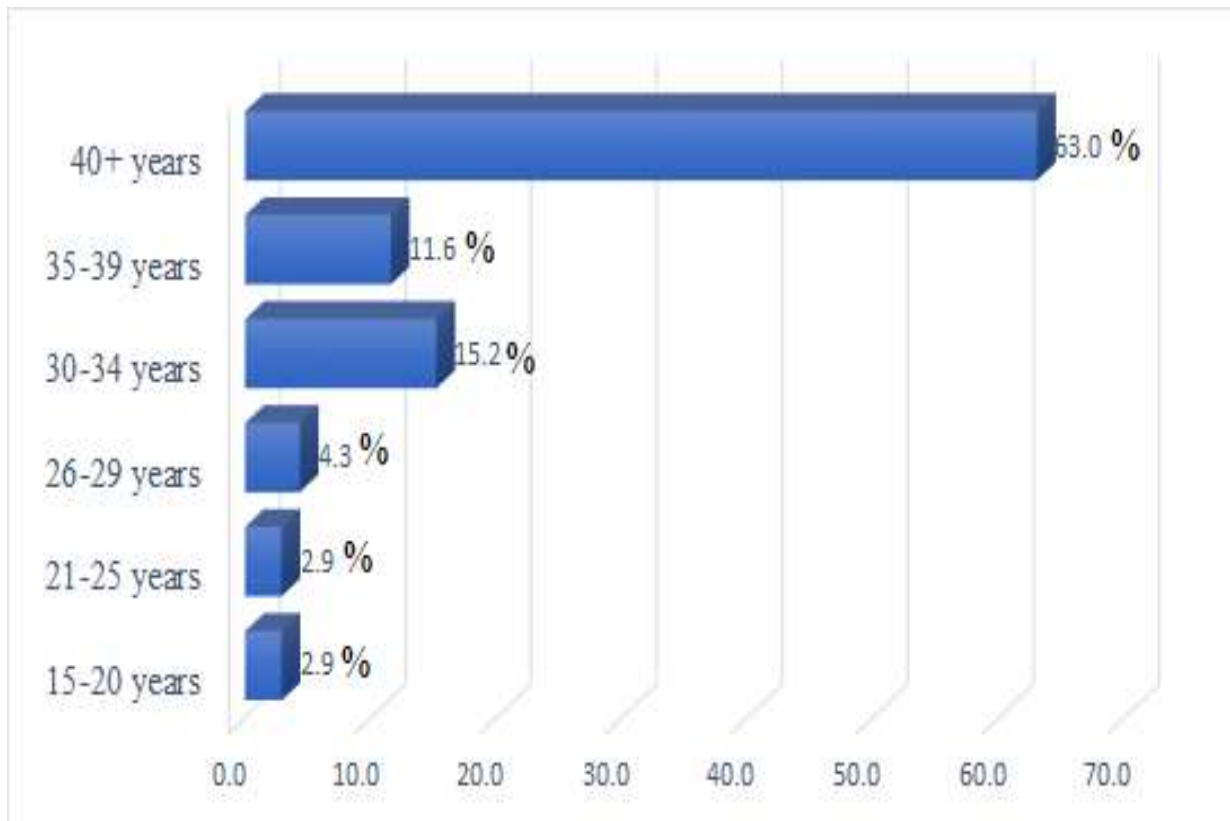
This section discusses the various socio-economic characteristics of the respondents of the study. These characteristics underlined the extent to which the respondents were able to access and adhere to dietary recommendation. It further revealed the characteristics of patients which were likely to influence non-adherence among diabetics in Nandi. The demographic parameters sought were: age, marital status, Level of education, how long one has lived with diabetes, occupation, income, supporter, treatment regimen, HBAIC, and the respondent's preferable area of treatment. The interpretations and presentations are done using tables and charts (graphs and pie charts).

#### 4.3.1. Age of Respondents

The researcher considered the age of the participants to be a significant factor in this study due to its potential influence on diabetes diagnosis. Studies show that the risk of Type 2 diabetes increases with age, especially after age 35. Additionally, studies have shown that Dietary non-adherence decreases with age increase. The findings on the distribution of respondents by age is illustrated in Figure 4.3.1

**Figure 4.1.**

*Age distribution of the respondents*



According to the findings shown on figure 4.1, majority (53%) of the respondents were of age above 40 years. this shows that this is the age group constituting majority of the patients who visit Kapsabet county referral hospital. The second group of respondents consisted of those of age between 30 - 34 years at

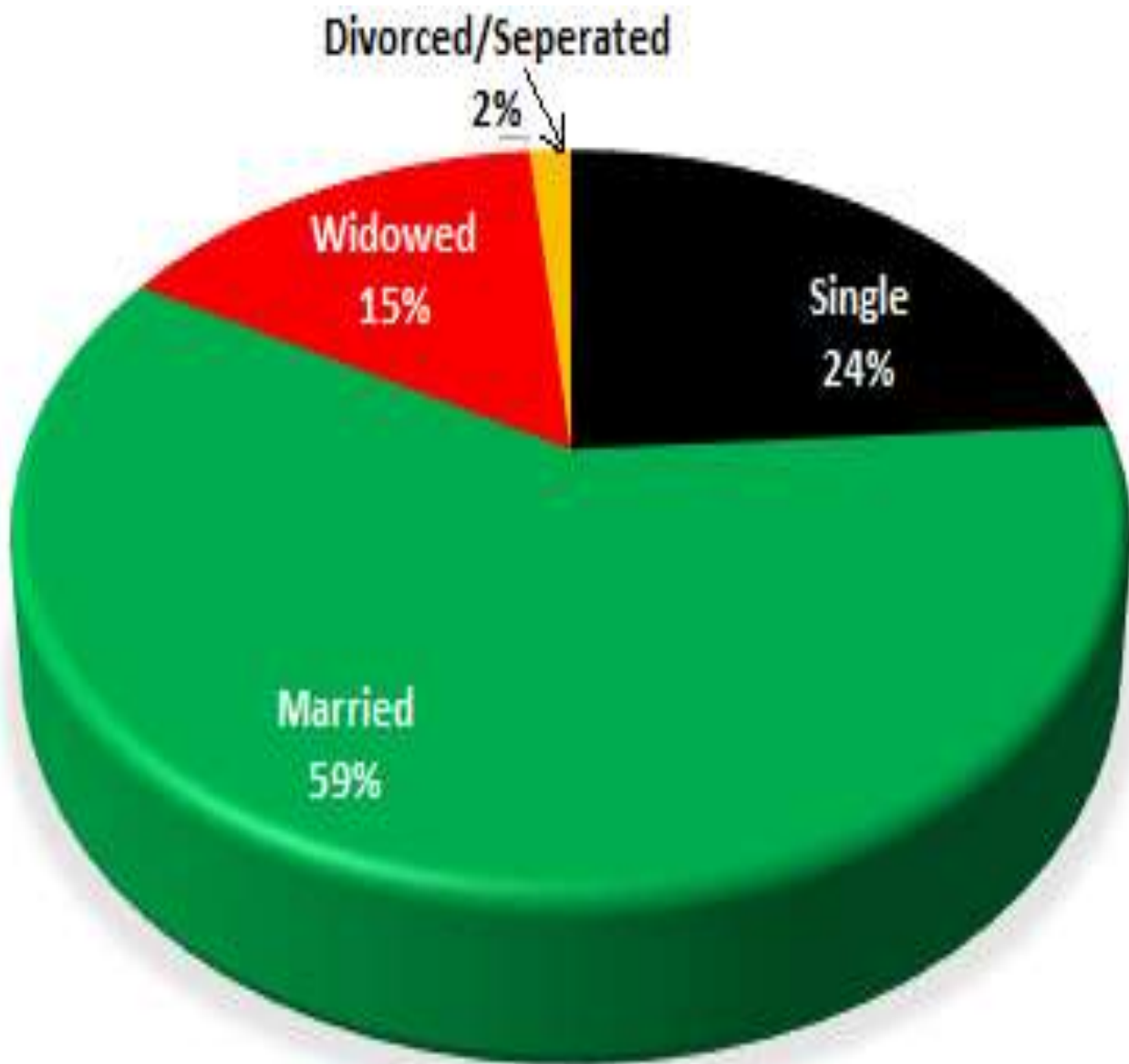
15.2%, followed by the 35 to 39 years age group at 11.6%. 26 - 29 years age group formed 4.3% of the respondents while the least group comprised of 21-25 years and 15 - 20 years at 2.9% only.

#### **4.3.2.      *Marital status of the Respondents***

The researcher considered the marital status of the participants to be a significant factor of non-adherence in this study. This is because the nature of the family one comes from may influence the support one would get, or their treatment supporter. The findings on the distribution of respondents by marital status is shown in Figure 4.2.

#### **Figure 4.3.**

*Marital status*



According to the analysis shown in figure 4.2 above, majority (59%) of the respondents were married, 34% were single followed by 15% who were widowed. Only 2% of the respondents were divorced /separated.

#### **4.3.3. Level of education of the Respondents**

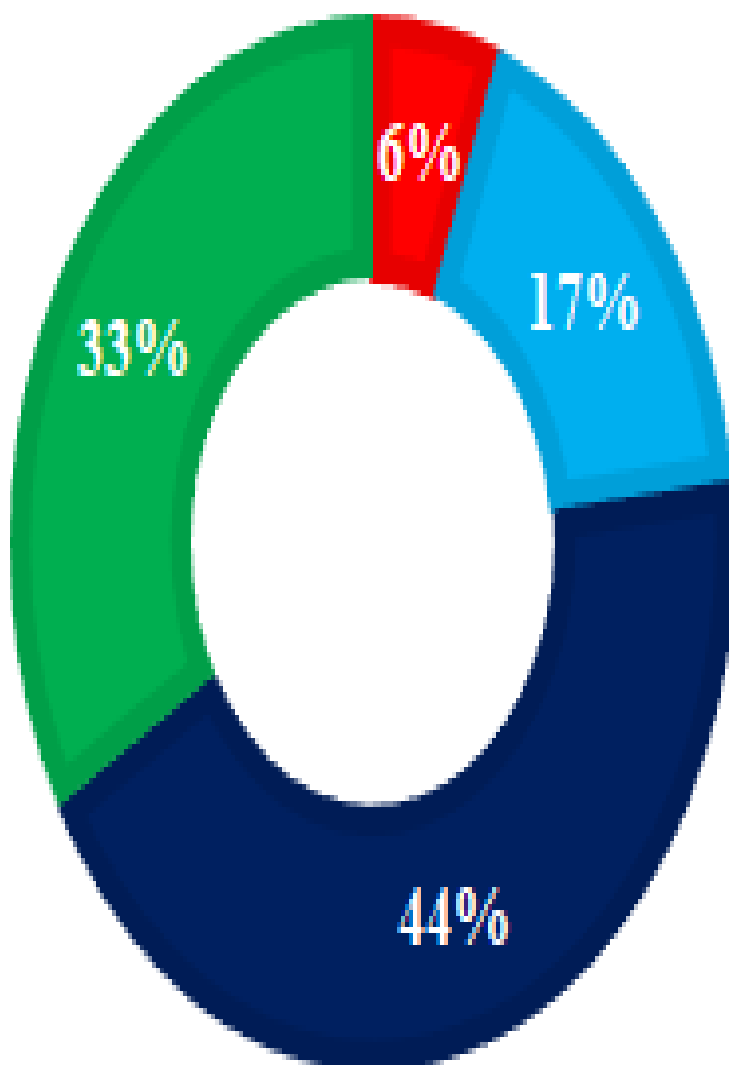
Education is a crucial factor in one's life in terms of healthcare decisions. Some research evidence suggests that education is strongly linked to health outcomes especially in preventative and curative care.

It is for this reason that the study considered education of the participants to be an important demographic factor to look at. The findings on the distribution of the respondents by education levels is illustrated in Figure 4.3.

**Figure 4.3.**

*Level of Education*

■ None ■ Primary ■ Secondary ■ College/university



The results in figure 4.3. show that majority (44%) of the respondents had acquired college or University education, followed by the group that had secondary education at 33%. 17% of the respondents had primary education only, while notably, 6% of the respondents did not have any formal education at all.

#### **4.3.4.      *Duration of living with Diabetes***

The study sort to establish the distribution of the participants depending on length of time one has lived with diabetes. The distribution is as shown in table 4.2 below

**Table 4.1.**

*Duration lived with Diabetes*

| <b>How long have you lived with diabetes?</b> |                  | <b>Frequency</b> | <b>Percent</b> |
|-----------------------------------------------|------------------|------------------|----------------|
| <b>Valid</b>                                  | Less than 1 year | 5                | 3.6            |
|                                               | 1 - 5 years      | 66               | 47.8           |
|                                               | 6 -10 years      | 41               | 29.7           |
|                                               | 11 -20 years     | 14               | 10.1           |
|                                               | >20 years        | 10               | 7.2            |
|                                               | Total            | 136              | 98.6           |
| <b>Missing</b>                                | <b>System</b>    | <b>2</b>         | <b>1.4</b>     |
| <b>Total</b>                                  |                  | <b>138</b>       | <b>100.0</b>   |

The findings in table 4.2 above show 47.8% of the participants have lived with diabetes for one to five years, 29.7% have lived with the condition for 6 to 10 years while 10.1% have lived with it for a period between 11 and 20 years. Only 7.2% and 3.6% of the patients have lived with diabetes for more than 20 years and less than a year respectively. These findings show that majority of the participants had lived with diabetes for more than 6 years, long enough to give accurate information and also to be able to understand the importance of adherence to dietary recommendations.

#### **4.3.5. Occupation**

One's occupation is considered an important aspect in life and by extension the health lifestyle. Studies have shown a significant association between one's occupation and their health care lifestyles. It is for this reason that this study considered the respondents occupations and the results were as shown in table 4.3 below.

**Table 4.2.**

*Respondents Occupation*

| <b>What do you do for a living?</b> | <b>Frequency</b> | <b>Percent</b> |
|-------------------------------------|------------------|----------------|
| Housewife                           | 12               | 8.7            |
| Farmer                              | 44               | 31.9           |
| Teacher                             | 21               | 15.2           |
| Other civil Service                 | 37               | 26.8           |
| Business person                     | 13               | 9.4            |
| Private sector                      | 11               | 8.0            |

|              |            |              |
|--------------|------------|--------------|
| <b>Total</b> | <b>138</b> | <b>100.0</b> |
|--------------|------------|--------------|

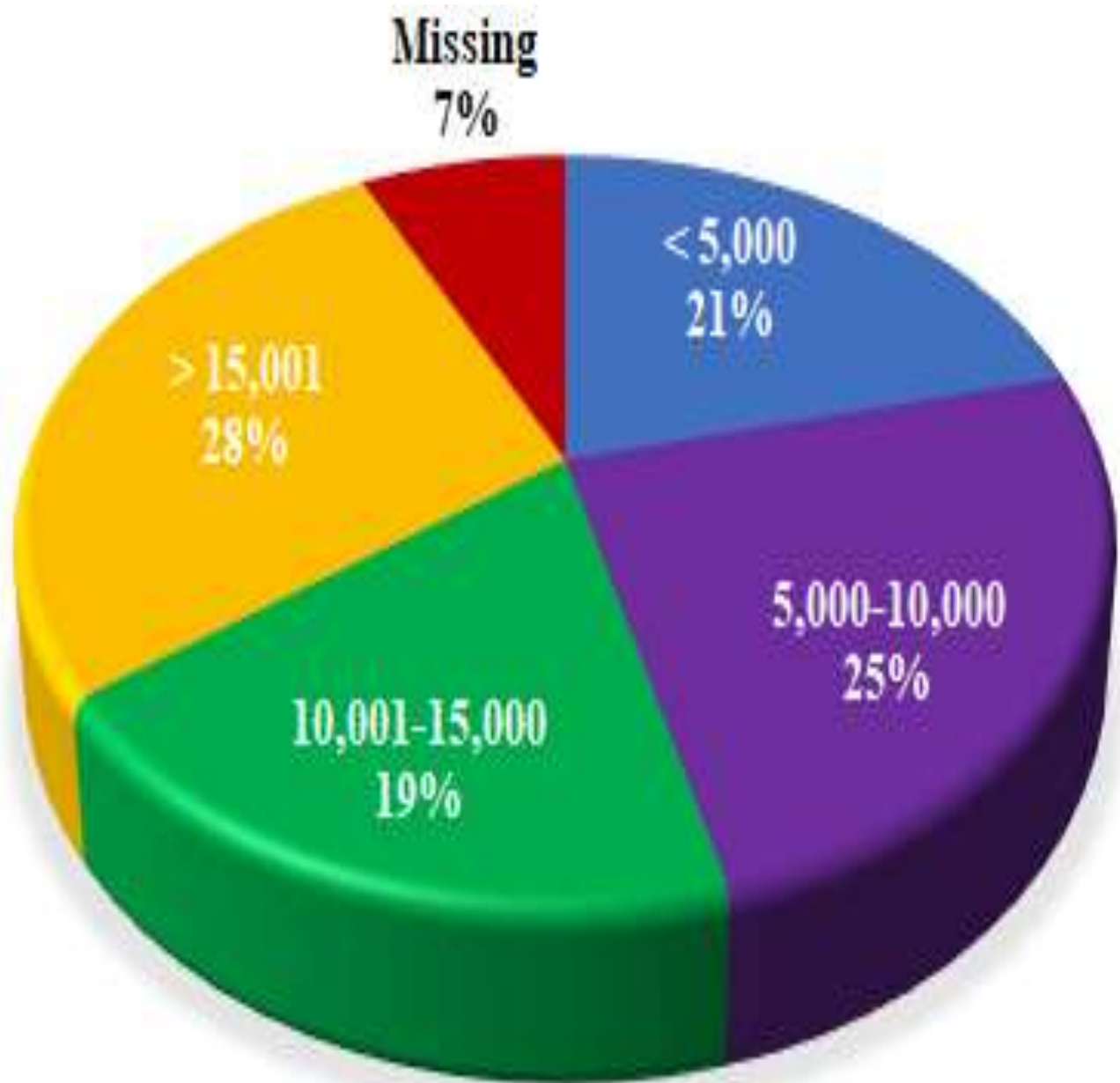
The finding in table 4.3 revealed that most of the participants (31%) were farmers, 26.8% working with civil service while 15.2% of the respondents were teachers by profession. 9.4% of the patients were business people while those who worked with the private sector were 8%. Lastly 8.7% of the respondents were ladies who were simply housewives without being engaged in any occupational income work.

#### **4.3.6.      *Average household income***

Generally, income helps to determine the capability of patients to access to health care services. In this study therefore, the household average income per month was considered and the results were as shown in the figure 4.6 below.

**Figure 4.6.**

*Average income Distribution of households*



According to findings shown in figure 4.6. 28% of the respondents had an average household income of Ksh. 15,000 and more. 25% earned an average income of between ksh. 5,000 to ksh. 10,000 per month while 21 % of the respondents had an average household income of less than ksh. 5,000. Finally, 19 % of respondents had an average household income of between ksh. 10,000 and ksh. 15,000. This shows that most of the respondents had an average household income of above ksh. 10,000. 7% of the respondents chose not to declare the income level.

#### **4.3.7.      *Treatment supporter***

Majority of adults living with diabetes have family and friends who are involved in their treatment care. These family supporters are an invaluable resource who could be used to improve patients' involvement in their self-care and better health care outcomes. A review of studies has shown that there is a positive relationship between social support and self-care behavior. The finding of treatment supporter was as shown in table 4.4 below.

**Table 4.3.**

*Treatment supporter*

| <b>Treatment supporter?</b> | <b>Frequency</b> | <b>Percent</b> |
|-----------------------------|------------------|----------------|
| None                        | 39               | 28.3           |
| Sister/Brother              | 10               | 7.2            |
| Spouse                      | 34               | 24.6           |
| Health care providers       | 16               | 11.6           |
| Parent                      | 28               | 20.3           |

|          |     |       |
|----------|-----|-------|
| Children | 11  | 8.0   |
| Total    | 138 | 100.0 |

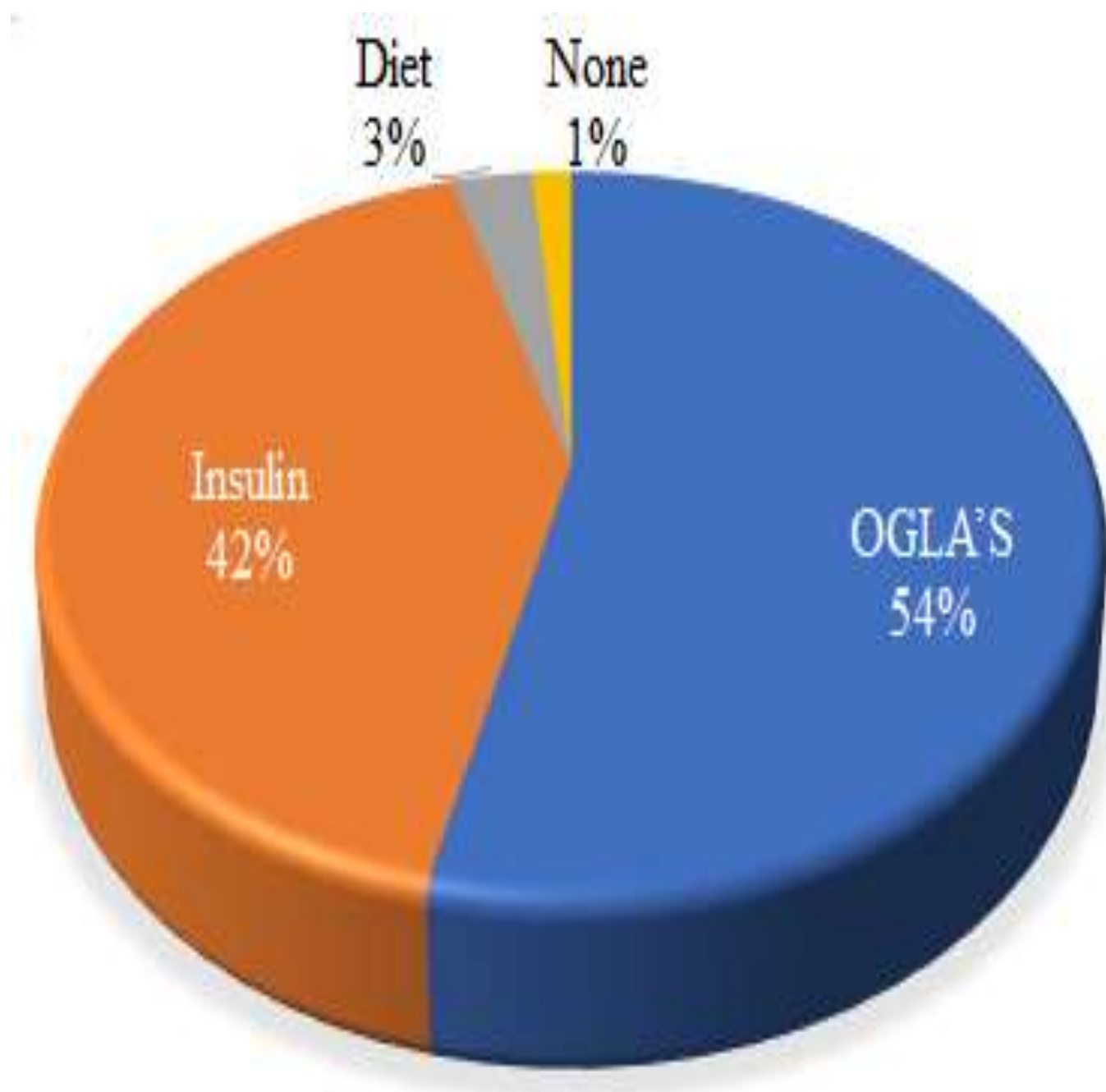
The findings in table 4.4 above show that 28% of the respondents have no treatments supporter. They solely depend on themselves. 24.6% of the patients have their spouses as their treatment supporter while 20.3% are supported by their parents. 11.6% of the respondents had healthcare providers as their treatments supporters. Children support was at 8% while siblings support at 7.2% .The high number of self- caring patients may be an indication of lack of family support in the managements of the disease, and in return this would be an impending factor of dietary adherence. A study by Barasa Masaba B, Mmusi, 2021 cited lack of family support as one of the factors observed to be associated with non-adherence.

#### **4.3.8.      *Treatment Regimen***

The study included a question on the treatment regimen used by the participants, with the aim of examining its potential impact on their adherence or non-adherence due to the fact drugs go hand in hand with diet. The distribution of participants based on the regimen used is presented in figure 4.3.8. Below.

**Figure 4.3.**

*Treatment Regimen*



The findings in figure 4.8 indicate that majority, 54% of the participants were under OGLA'S treatment regimen followed by those using Insulin at 42%. Only 3% of the patients were on dietary managements while 1% of the respondents were not in any treatment regimen at all.

#### 4.3.9. HBA1C Testing

The study sought to know whether the patients had undergone HBA1C testing recently. The findings were as shown in table 4.5. below

**Table 4.4.**

#### *HBA1C testing*

| Done HBA1C recently? |        | Frequency  | Percent      | Valid Percent |
|----------------------|--------|------------|--------------|---------------|
| No                   |        | 65         | 47.1         | 49.2          |
| Yes                  |        | 67         | 48.6         | 50.8          |
| Total                |        | 132        | 95.7         | 100.0         |
| Missing              | System | 6          | 4.3          |               |
| <b>Total</b>         |        | <b>138</b> | <b>100.0</b> |               |

Table 4.5 shows that 48.6% of the respondents had taken the HBA1C test recently. Notably however, almost the same number of the respondents 47.1% had not taken the tests as at the time of this study. 4.3% of the patients did not disclose as to whether they have taken the test or not. This data shows that, many patients have not been able to take a test which is very crucial in monitoring the progress of their glycemic control.

#### 4.3.10. Demographic Characteristics and Adherence to Dietary Practices

Regression analysis was carried out to find out the strength and nature of the relationship between demographic variables and adherence to dietary practices. The findings were as presented in Table 4.6.

**Table 4.6.**

*Relationship between Demographic characteristics and Dietary practices*

| Model |                        | Unstandardized |            | Standardized | Sig.  |
|-------|------------------------|----------------|------------|--------------|-------|
|       |                        | Coefficients   |            | Coefficients |       |
|       |                        | B              | Std. Error | Beta         |       |
| 1     | (Constant)             | 1.634          | .219       |              | <.001 |
|       | Age of Respondents     | .359           | .028       | .133         | .001  |
|       | Marital Status         | -.031          | .061       | -.074        | .147  |
|       | Level of Education     | .620           | .030       | .046         | .001  |
|       | Duration with diabetes | -.342          | .058       | .103         | .016  |
|       | Occupation             | .295           | .021       | .634         | .001  |
|       | Income Level           | .611           | .041       | .534         | .002  |
|       | Treatment supporter    | -.031          | .006       | .056         | .132  |

|                   |       |      |      |      |
|-------------------|-------|------|------|------|
| Treatment Regimen | -.009 | .022 | .089 | .162 |
|-------------------|-------|------|------|------|

The findings in table 4.6 above indicate that the demographic attributes of the participants played a significant role in predicting their adherence to dietary practices ( $B_0=1.634$ ,  $P<0.001$ ). The Adherence to dietary practices was shown to be strongly impacted by age ( $B_1=0.359$ ). There was a higher likelihood of older patients adhering to dietary treatment compared to their younger counterparts. The findings were consistent with previous research that observed a positive correlation between ages and the non - adherence to diabetes dietary recommendation.

According to further findings the data presented a positive association that was seen between the level of education and the adherence to dietary practices ( $B_3=0.620$ ). Furthermore, an important correlation was noted between individual's level of income and their likelihood of adhering to dietary practices ( $B_6=0.611$ ). There was a higher likelihood for patients with higher incomes to pursue accurate dietary information and adhere to it compared to patients with lower incomes. These findings agree with those by the report of WHO (2019) which assert that income and financial status was crucial in matters health. . Many diabetic patients in Kenya may struggle to afford healthy foods or may live in food deserts where access to fresh produce is limited. This can make it difficult for patients to follow a balanced diet as recommended by healthcare providers. Therefore the findings are similar to one by Mutua et al. (2020) which found that food insecurity was a major barrier to dietary adherence among diabetic patients in

Kenya. Studies have shown some significant associations between income, financial stability and better self-rated health. Financial strain was linked with less adherence and lower self-rated health outcome.

The findings of the study indicate an important association between the occupation of the participants and their likelihood of adhering and able to afford food ( $B_5=0.295$ ). There was also shown a significant inverse association between the duration one has lived with diabetes with the adherence to dietary practices. This show that those patients who have lived with diabetes longer, tend to be more adhering than those who had just been diagnosed.

There was also indicate a significant relationship between Dietary practices adherence and treatment regimen ( $B_8=0.319$ ). These findings are in line with that by Barasa Masaba B, Mmusi, (2021) who in their study found that rrespondents' on OGLA's and insulin regimen were less likely to be non-adherent than the clients on single OGLA's and the patients on insulin only were less likely to be non-adherent compared to the patients om single OGLA's.

Nevertheless, the research revealed no significant correlation between the adherence to dietary practices and marital status ( $B_2=-0.03$ ) and Treatment supporter ( $B_7=-0.031$ ).

#### **4.4.Dietary practices**

The second objective of the study was to determine dietary practices of diabetic clients attending diabetic clinic at Kapsabet county referral hospital. The researcher posed seven parameter questions in order to determine the dietary practices of the respondents. These included the number of meals the patient took in a day, how often they took fruits, whether and how often they took vegetables in a day, where they prefer to eat from, how frequent they snacked, and who choose the food they eat daily. The findings were as presented.

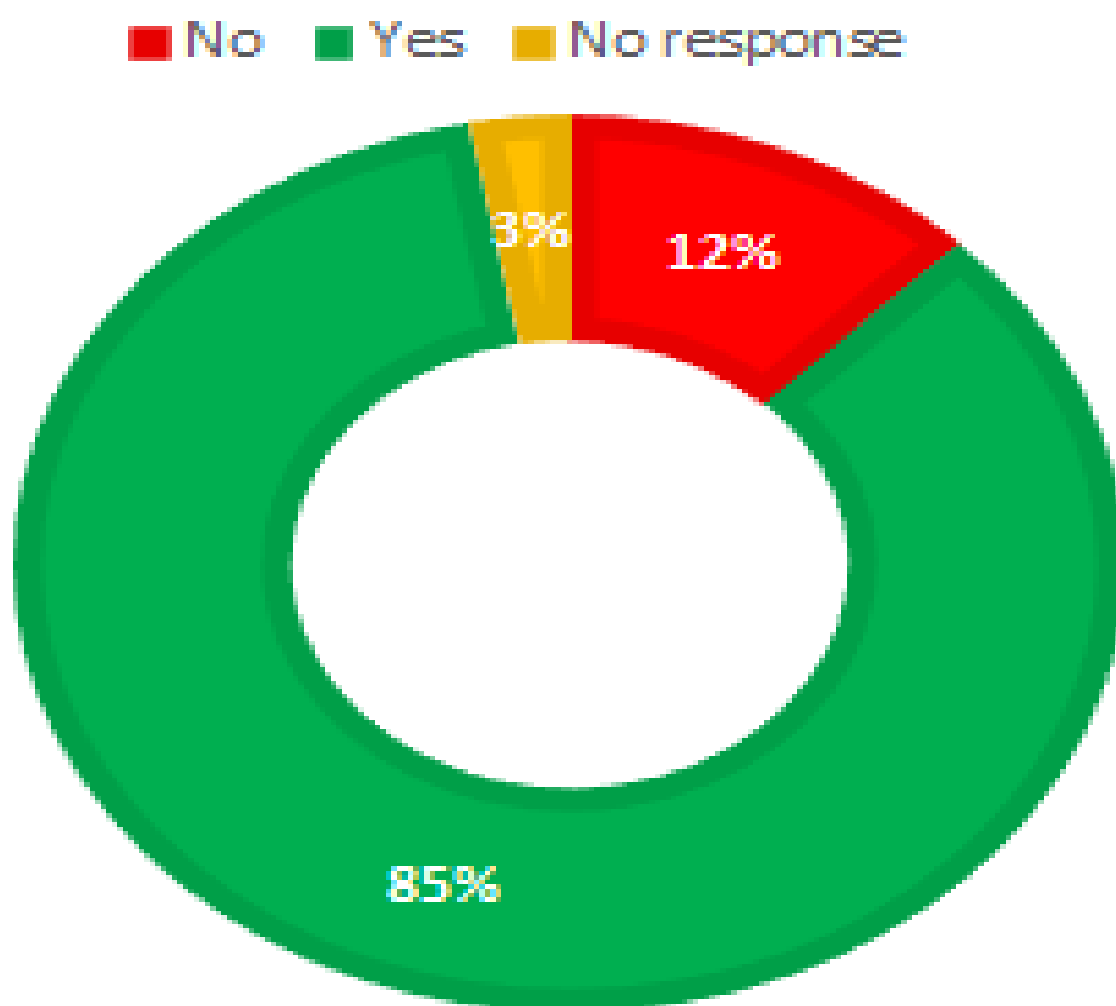
##### **4.4.1. Nutrition Education**

The study wanted to know whether the respondents have been taken through nutrition/diet education.

The findings were as shown in figure 4.4.1 below.

**Figure 4.9.**

*Nutrition and exercise Training*



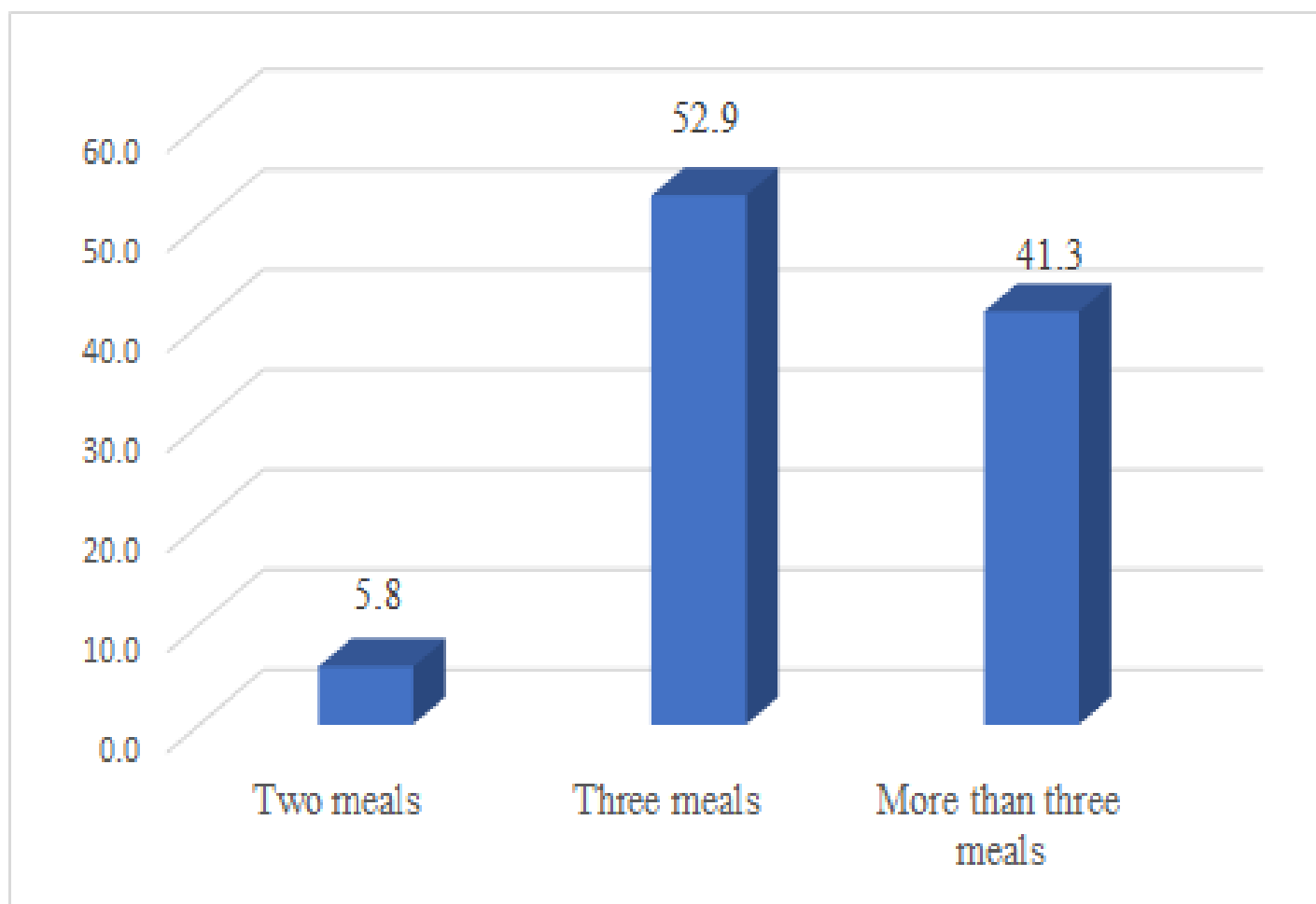
From the findings shown in figure 4.9 above, 85% of the respondents had been taken through nutrition some education regarding diet plan and exercise, while only 12% had not undergone such training. 3% of the respondents did not give their response on this variable. Diet plan and exercise training is very important because it's among the key treatment component in diabetes care.

#### **4.4.2.      *Number of Meals per Day***

One of the important practices for a diabetic patient is their eating behavior. The study wanted to assess the behavior of the patients in terms of the number of meals they took in a day. The results were as shown in figure 4.10 below.

#### **Figure 4.10**

*Daily meals*



The findings in figure 4.10 show that 5.8% of the respondents take only two meals in a day, while 52.9% of the respondent took three meals. 41.3% of the clients took more than three meals in a day. Generally this shows that most of the patients took less number of meals than expected for diabetic patients that is at least 3 main meals and 2 snacks per day.

This implies that dietary intake is still a problem and goes against the recommended standard according to ADA, 2018 guidelines and Kenya national guideline on diabetes management, 2018.

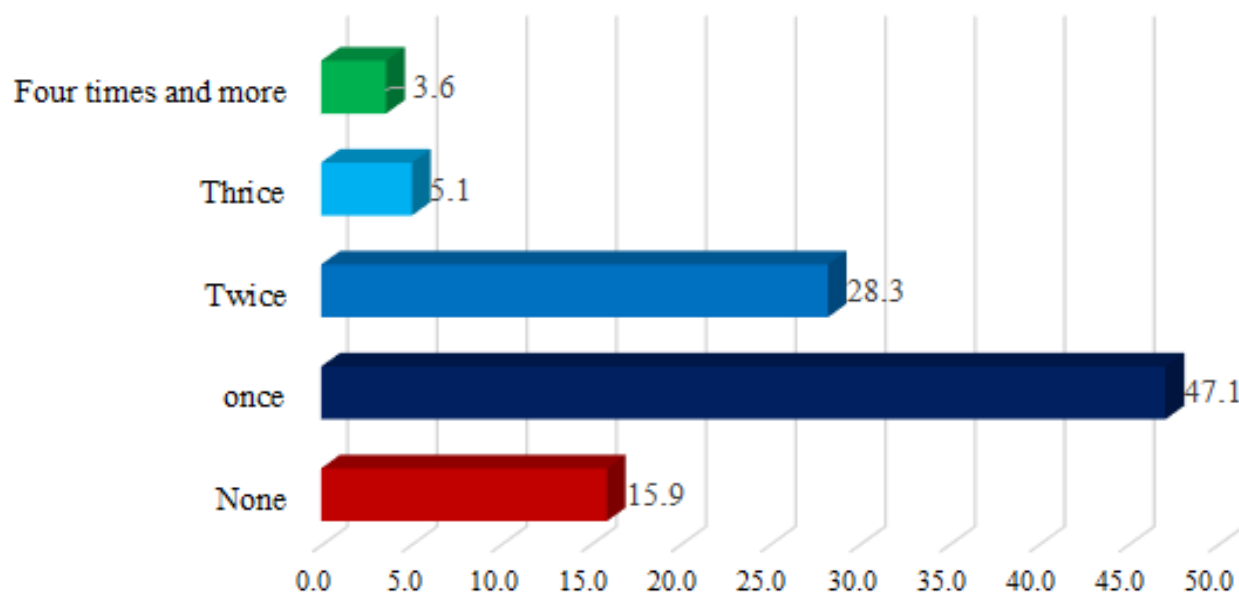
#### **4.4.3. Frequency of taking fruits**

The researcher sought to determine how often the patients ate fruits in a day. The role of fruits and vegetables cannot be overstated. Fruits contain dietary fiber that aids in slow the release of glucose into

the bloodstream, hence helping to keep the blood glucose levels in control. The results are as shown in figure 4.11 below.

**Figure 4.11.**

*Frequency of Taking Fruits*



As shown in the figure 4.11 above, most of the patients do not adhere to eating enough fruits as they should. The findings show that most of the respondents ate fruits only once or twice a day depicted by 47.1% and 28.3% respectively. Only 5.1% of the respondents ate fruits three times while 3.6% ate fruits four times and more in a day. These findings show therefore that majority of the patients took less fruits than required. These findings suggest that uptake of fruits is low as patients cited financial challenges.

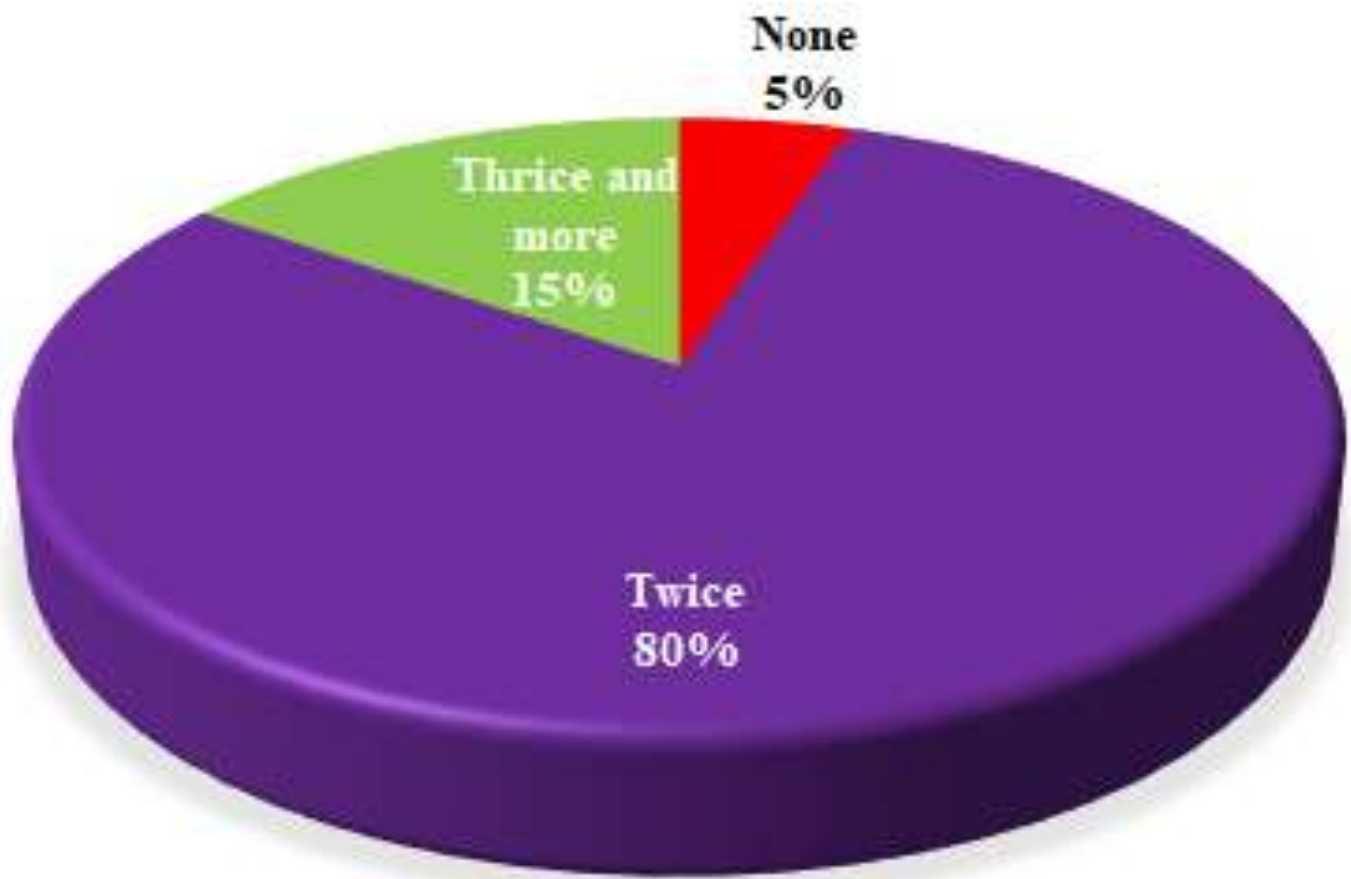
#### **4.4.4.      *Frequency of taking vegetables***

Vegetables intake is an important dietary nutrient for patients with type 2 diabetes. They provide fiber, antioxidants, and other nutrients that help manage inflammation, weight management, and improve overall health. This study wanted to assess the behavior of diabetes patients in terms of how they consumed vegetables.

The results were as shown in figure 4.12 below.

#### **Figure 4.12.**

*Frequency of taking vegetables*



The findings in figure 4.12 above show that majority of the respondents took vegetables only twice a day, while only 15% of the patients took vegetable meals thrice and more. 5% of the respondents reported that they did not take vegetables at all.

Dietary fiber is important because it works in keeping blood glucose levels normal. Dietary fiber is grouped into soluble and insoluble fiber. Soluble fiber delays gastric emptying while slowing the glucose absorption. Insoluble fiber is important too, and health benefits include shortening of the bowel transit time and soften feces.

Eating vegetables with dietary fiber and resistant starch will reduce hunger and appetite and for diabetics it is critical for lowering insulin requirement for starch digestion.

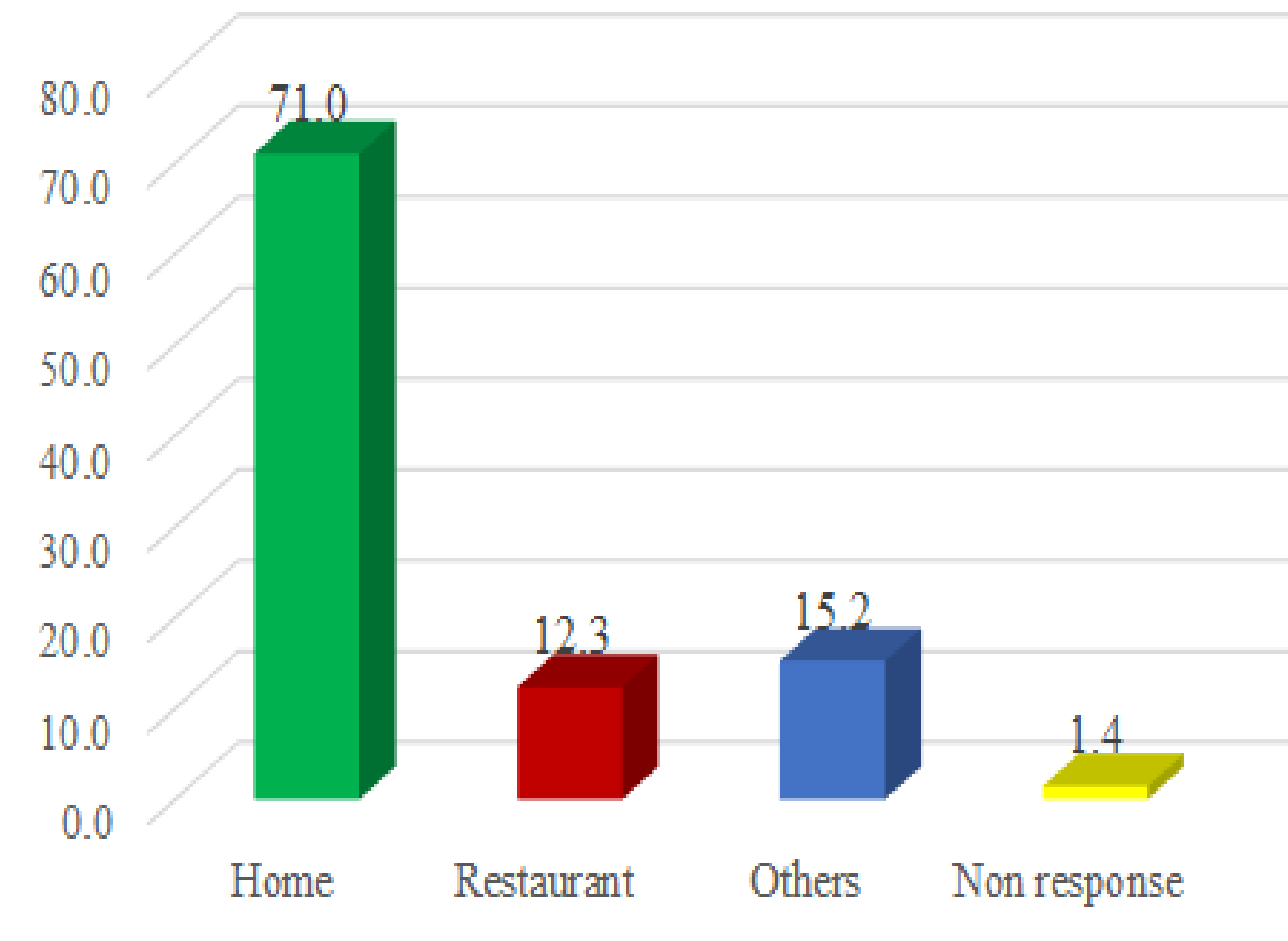
Studies have shown that the vegetable contain bioactive compounds which is linked with the reduction or reversion of diabetes these are dietary fiber, resistant starch, vitamins C and E, carotenoids, flavonoids, thiosulfates', magnesium, selenium, chromium, and zinc.

#### **4.4.5.      *Source of my meals***

Where the patients eat from is a very important factor for diabetic patients. This is because the nature of preparation and the choice of the ingredients matters in especially for foods served from restaurants and hotels. Meals prepared at home or under the monitoring of the patients pose less risk as compared to over that served from elsewhere. For this reason the researcher in a bid to assess the patients eating behavior and to know from where the respondents preferred to eat from, the results were as shown in figure 4.13 below.

**Figure 4.13.**

*Preference Eating Place*



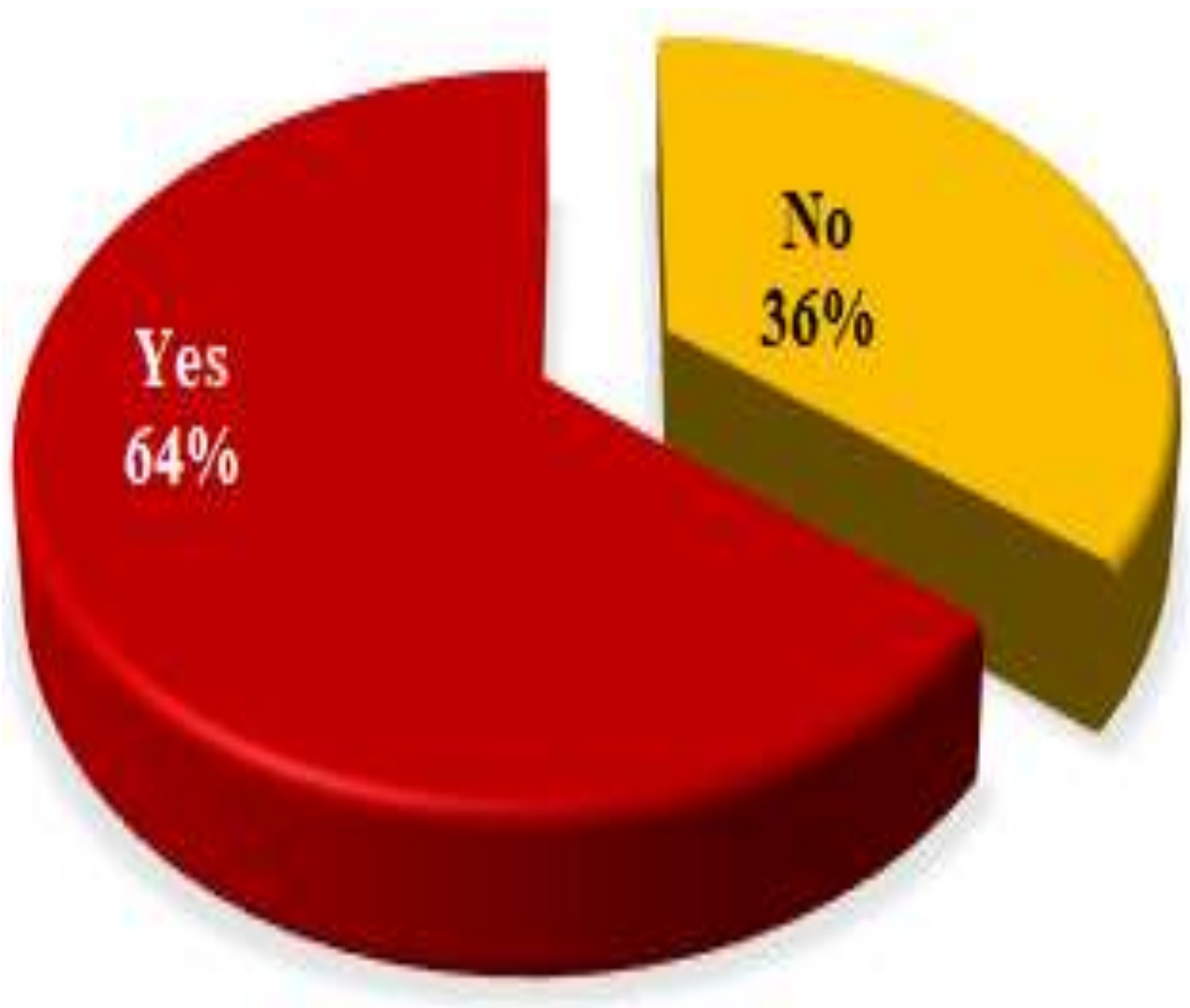
From the findings in figure 4.13, majority, 71% of the respondents prefer eating from home, 12.3% of the respondent prefer eating from Restaurant while 15.2% of the respondents preferred eating from elsewhere, and 1.4% of the respondents also did not disclose their preferred eating place. Patients are encouraged to know the content of their dishes to keep their blood sugars levels monitored. This may be difficult when eating out. This is because, in a restaurant setting, it's easier to eat foods that have high fat content than ones normally chosen, and eating may take place over a longer period of time.

#### 4.4.6. *Choice of meals*

The respondents were asked as to whether they voluntarily choose the food they eat daily. The results were as shown in the figure below.

**Figure 4.14.**

*Choice of Meals by the Respondents*

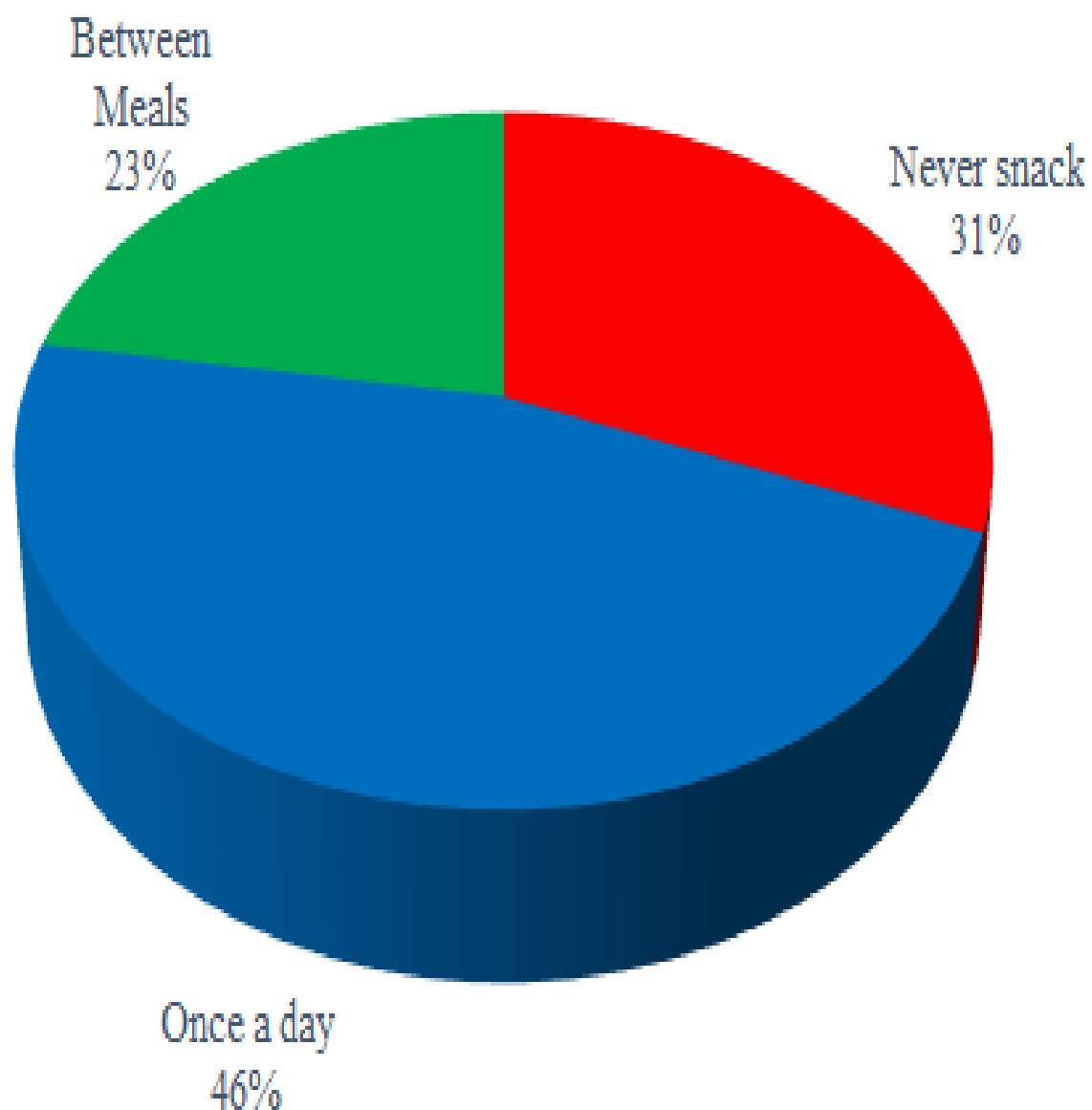


#### **4.4.7.      *Snacking Behavior***

Snacking is very important in the dietary practices of diabetes patients. Patients should snack at least between the meals since they don't consume much for enough calories from the main meals. For this reason the study sought to understand the snacking behavior of the participants and the findings were as shown in figure 4.15 below.

**Figure 4.15.**

*Snacking Pattern of the Respondents*



Results in figure 4.15 show that most of the respondents 46% snacked only once a day. 31% of the patients never snacked at all while only 23% of them snacked between meals. This shows a non-adherence of a very important dietary practice.

#### **4.4.8. Dietary Non-Adherence**

The researcher wanted to gauge in summary, the degree of non-adherence to dietary practices by the patients. The summary findings are as shown in table 4.7 below.

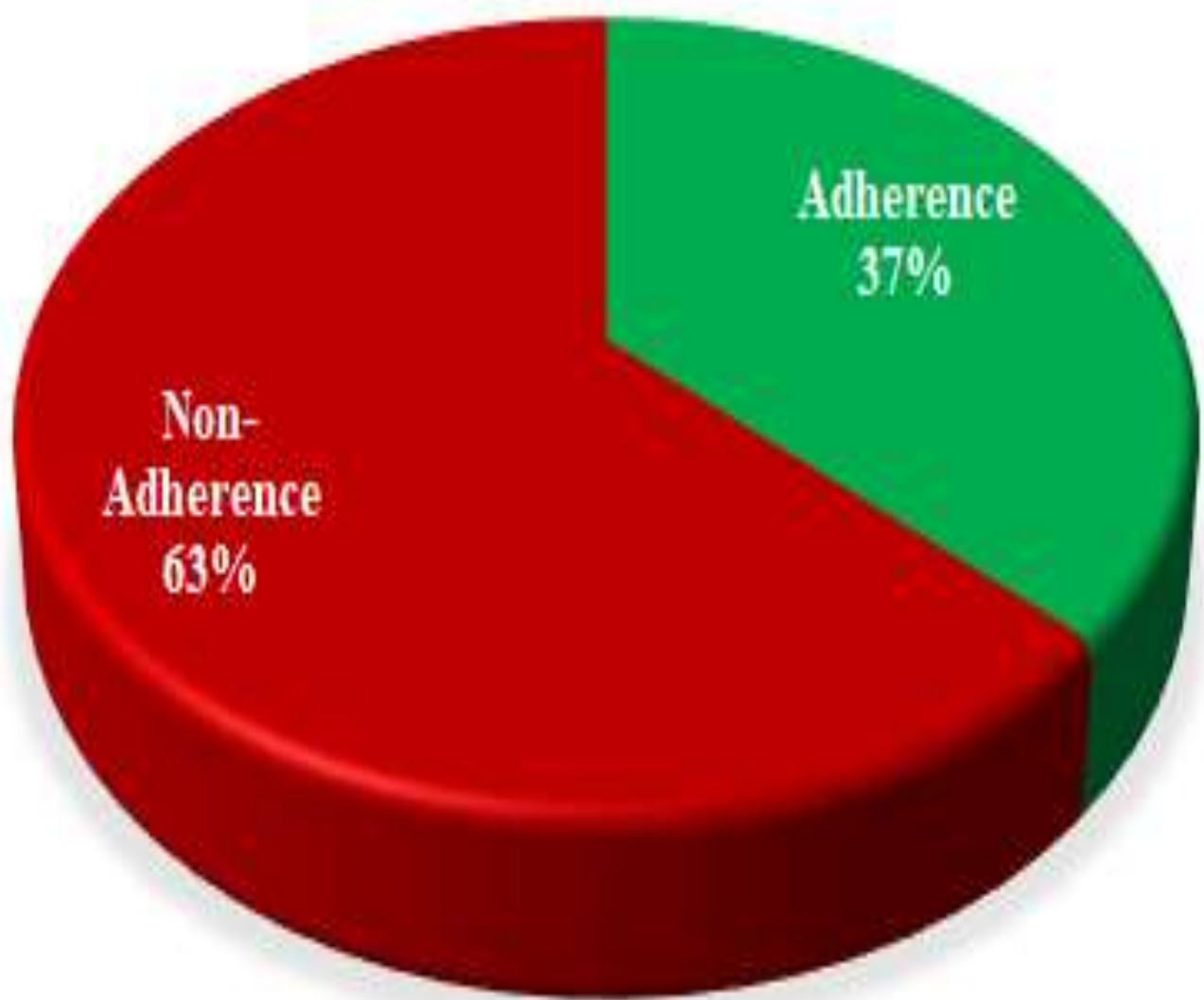
**Table 4.5***Dietary practice Non Adherence*

| <b>Dietary practice</b> | <b>Adherence</b> | <b>Non-Adherence</b> |
|-------------------------|------------------|----------------------|
| Meals per Day           | 41.3             | 58.7                 |
| Taking Fruits           | 8.7              | 91.8                 |
| Taking Vegetables       | 15               | 85                   |
| Eating source           | 71               | 29                   |
| Choice of meals         | 64               | 36                   |
| Snacking behavior       | 23               | 77                   |

The findings in table 4.7 above shows that on Number of meals per day, there is a non -adherence of 58.7% with 41.3% adherence. On Fruit taking behavior, the respondents reported 91.8% non-adherences with only 8.7% adherence. There was reported 85% non -adherence in taking enough vegetable with only 25% adherence. On snacking behavior, there was a 77% non- adherence with only 23% adherence.

In general, the adherence and non-adherence to dietary practices was as shown in figure 4.4.8 below.

**Figure 4.16.***Adherence to Dietary Practices*



The summary figure 4.16 shows that 67% of the respondents did not adhere to dietary practices while only 37% adhered to the dietary practices. The findings on dietary practices are attributable to many factors leading to non-adherence examples is cultural beliefs and practices. In many African communities, food plays a central role in social gatherings and celebrations. Traditional foods are often high in carbohydrates and sugars, which can be harmful for diabetic patients. However, cultural norms and beliefs may make it challenging for patients to resist these foods, leading to non-adherence to dietary recommendations. A study by Oti et al, 2018 found that cultural beliefs and practices were significant barriers to dietary adherence among diabetic patients in Kenya. Furthermore, socioeconomic factors such as poverty and food insecurity can also contribute to non-adherence to dietary recommendations explaining the low uptake of fruits and vegetables. Studies have shown that the vegetable and fruits contain bioactive compounds which is linked with reduction or remission of diabetes. This is a high degree of non-adherence and therefore more routine education needs to be done to improve uptake of nutrients among patients living with diabetes in Nandi County.

#### **4.5.Level of Knowledge on Diabetes and Dietary Practices**

The third objective was to determine the level of knowledge on recommended dietary practices among diabetic patients attending diabetic clinic at Kapsabet county referral hospital. To realize this objective, the researcher posed 15 parameter questions in regard to the level of knowledge of various aspects of diabetes and dietary practices. Two of the questions were open closed type while 13 of them were of likert scale. The interpretation of the likert scale was based on the means as shown on table of interpretation below

**Table 4.6**

*Mean interpretation on level of knowledge*

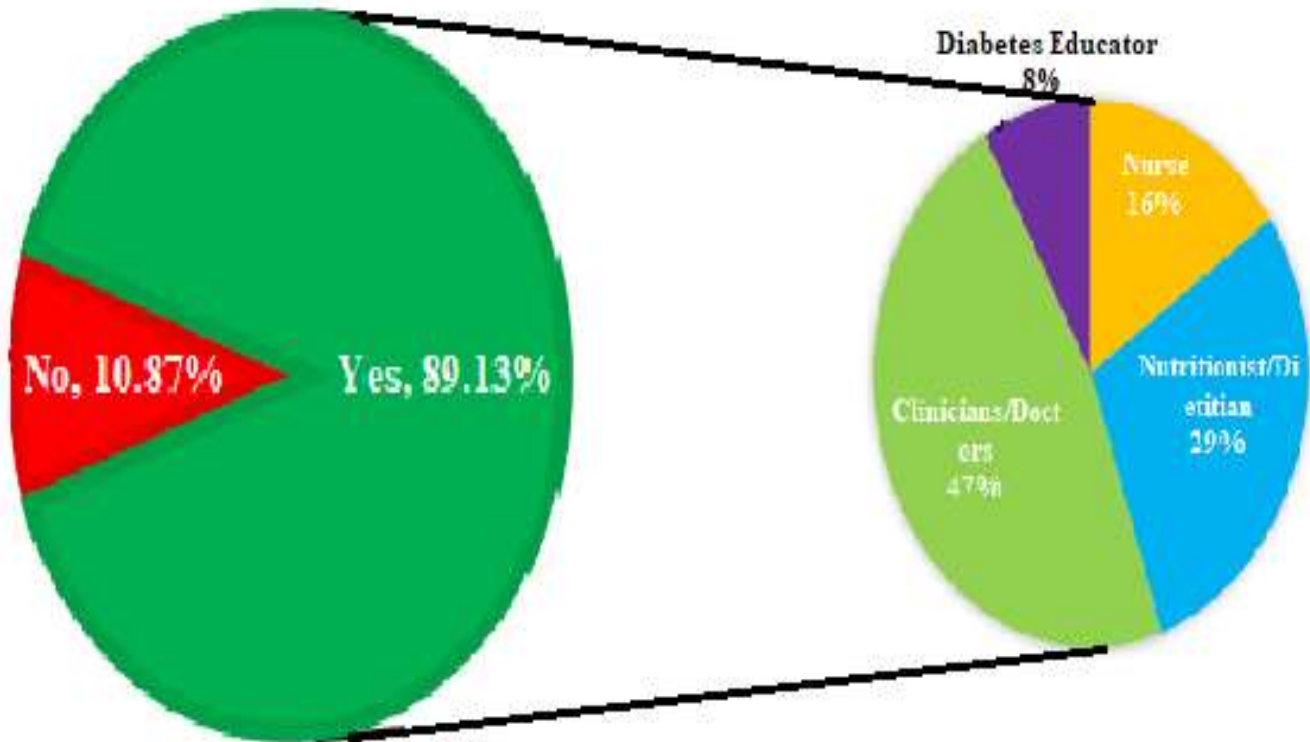
| MEAN VALUE | INTERPRETATION      |
|------------|---------------------|
| 1.00-1.49  | No knowledge        |
| 1.50-2.49  | Average             |
| 2.50-3.49  | Good Knowledge      |
| 3.50-4.00  | Excellent knowledge |

#### **4.5.1. Diabetes Education**

The study sought to know whether the respondents had ever received Diabetes education. Upon diagnosis with diabetes, it is important to learn as much as possible about this disease. Learning about the symptoms of serious complications can help in being proactive about ones' health. Learning how to manage the diet and other daily habits can help one stay healthy. The results for this variable were as shown in the figure 4.17 below.

**Figure 4.17.**

*Diabetes Education and Educators*



From the hierarchy figure 4.17 above, majority of the patients had received diabetes education, while few had not. Upon confirming that the majority of the patients had received education and awareness about the disease, the researcher further sought to establish who the educator was. Educators can be nurses or other health professionals who have specialized expertise in diabetes and lots of experience working with people who have it. Educators must have passed an exam to become a certified diabetes educator, and must renew their credentials every 5 years. This helps make sure that they stay up-to-date on the latest findings and breakthroughs. The findings in figure 4.17 further depicted that of 89.1% of the patients who had received diabetes education, majority of them 47% had received the education from Clinicians and doctors, 29% of them had received their diabetes education from Nutritionists and

dietitians, 16% were educated by Nurses while only 8% of them had received their education from trained diabetes educators.

#### **4.5.2.      *Level of knowledge on Diabetes***

The respondents were asked how they rated their understanding of Diabetes. The findings were as shown in table 4.9 below.

**Table 4.7**

#### *Level of knowledge on Diabetes*

| How would you rate your understanding of Diabetes?          | N   | Mean | Std   |
|-------------------------------------------------------------|-----|------|-------|
| Overall diabetes care                                       | 136 | 2.93 | .826  |
| How to test and interpret the results                       | 136 | 1.21 | 1.043 |
| Prevention and treatment of hyperglycemia                   | 134 | 2.25 | .904  |
| Prevention and treatment of hypoglycemic episodes           | 136 | 2.37 | .797  |
| Diet plan for glycemic control                              | 134 | 1.41 | 1.068 |
| How diet, exercise, and medicines affect blood sugar levels | 136 | 2.91 | 1.921 |
| Current prescribed treatment regimen                        | 136 | 3.11 | .079  |
| Benefits of improving blood sugar control                   | 138 | 2.87 | .868  |
| Prevention of long –term diabetes complication              | 132 | 2.36 | .892  |
| Stress management                                           | 136 | 1.19 | .793  |

|                                                    |            |              |              |
|----------------------------------------------------|------------|--------------|--------------|
| Clinic appointments                                | 136        | 3.43         | .239         |
| Exercise and its importance in diabetes management | 138        | 3.95         | .035         |
| Foot care                                          | 136        | 1.93         | 1.156        |
| Overall                                            | <b>136</b> | <b>2.647</b> | <b>0.817</b> |

From the findings in table 4.9 above, it is depicted that the patients had excellent knowledge on the importance of exercise and its importance in diabetes management (mean=3.95), clinic appointments (mean=3.43), good knowledge on the current prescribed treatment regimen (mean=3.11), overall diabetes care (mean=2.93), how diet, exercise, and medicines affect blood sugar levels (mean=2.91) and benefits of improving blood sugar control (mean=2.87).

On average, the respondents also had awareness on Prevention and treatment of hypoglycemic episodes (mean=2.37), Prevention of long-term diabetes complication (mean=2.36). The patients however had very minimal awareness on how to test and interpret the results (mean=1.21), Diet plan for glycemic control (mean=1.41) and Stress management (mean=1.19). In general, the respondents have good knowledge on diabetes and the dietary practices (mean=2.647). The findings are in line with those by Divas et al (2023) who found diabetic patients well knowledgeable about the disease and its management.

#### **4.5.3.      *Level of knowledge and Adherence to Dietary Practices***

The study sought to determine whether there existed any relationship between level of knowledge the patients have about the disease and the dietary practices and adherence to the dietary practices. Pearson's correlation coefficient was carried out and the results were shown in table 4.10 below.

**Table 4.8**

*Relationship between Level of Knowledge and Adherence to dietary practices*

|                                                              |                 |        | Level of Adherence to<br>knowledge on Dietary<br>diabetes practices |  |
|--------------------------------------------------------------|-----------------|--------|---------------------------------------------------------------------|--|
| Level of knowledge on<br>diabetes                            | Pearson         | 1      | .571**                                                              |  |
|                                                              | Correlation     |        |                                                                     |  |
|                                                              | Sig. (2-tailed) |        | .021                                                                |  |
|                                                              | N               | 136    | 136                                                                 |  |
| Adherence to Dietary<br>practices                            | Pearson         | .571** | 1                                                                   |  |
|                                                              | Correlation     |        |                                                                     |  |
|                                                              | Sig. (2-tailed) | .021   |                                                                     |  |
|                                                              | N               | 136    | 136                                                                 |  |
| **. Correlation is significant at the 0.05 level (2-tailed). |                 |        |                                                                     |  |

The findings show a significant positive relationship between Level of knowledge on diabetes and dietary practices with Adherence to dietary practices (N=136,  $r=.571$ ,  $p=.021$ , 0.05).

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1.Overview**

In this chapter, the summary of the study is presented. This is followed by the summary of findings, conclusions, recommendations and finally the recommendations for further study.

#### **5.2.Summary of the study**

This study entitled Factors Contributing to Non-Adherence to Dietary Recommendation among Diabetic Patients Attending Kapsabet County Referral Hospital, Kenya was conducted in Nandi County, Kenya.

Good nutrition is important in management of diabetes mellitus. Patients get the correct information on the recommended dietary practices from health care workers. Whereas knowledge was high at 89% non-adherence was at 67%.

#### **5.3.Summary of the findings**

The summary of the findings are outline in the order of the study objectives.

- I. The study found that there was a higher likelihood of older patients adhering to dietary treatment compared to their younger counterparts. A significant correlation was observed between Level of education, individuals' level of income, occupation of the patients, treatment regimen and adherence to dietary practices. There was also shown a significant inverse association between the duration one has lived with diabetes with the adherence to dietary practices.
- II. The findings showed that majority of the patients took less meal than expected for diabetic patients that is at least 3 main meals and 2 snacks per day, patients took less fruits than required; majority of the respondents took vegetables only twice a day, while very few patients took

vegetable meals thrice and more. Most patients snacked only once a day with only a small proportion of them snacking between meals

- III. The findings showed a 67% non-adherence with only 37% adherence to the dietary practices.
- IV. Patients had excellent knowledge on the importance of exercise and its importance in diabetes management, clinic appointments, good knowledge on the current prescribed treatment regime, overall diabetes care, how diet, exercise, and medicines affect blood sugar levels and benefits of improving blood sugar control. The findings further shown a significant positive relationship between Level of knowledge on diabetes and dietary practices with Adherence to dietary practice

#### **5.4.Conclusion**

- I. Based on the first objective, the study concludes that, age of the patient, level of education, level of income, occupation of the patients, treatment regimen are the demographic factors that influence adherence to dietary practices
- II. Based on the second objective, the study concludes that, patients did not adhere to recommended dietary practices despite results showing excellent knowledge on diabetes management. Therefore, adherence to recommended dietary practice was not influenced by knowledge level
- III. On level of knowledge, the study concludes that, the patients had sufficient knowledge on diabetes and dietary practices at 89% especially on areas to do with exercise and its importance in diabetes management, clinic appointments, current prescribed treatment regime, diabetes care, diet, exercise, and medicines and their effects blood sugar levels and benefits of improving blood sugar control. The level of education greatly influenced adherence to dietary recommendations with information assimilation. Age was also strongly associated with how much information patient could take and remember those who had lived with diabetes for long adhered to dietary recommendations

- IV. On the level of non- adherence, the study concludes 63% dietary non-adherence that is patients portrayed a high degree level of non -adherence to dietary practices

#### **5.5.Recommendations**

- There is need for comprehensive education at the health facility emphasis being put on meal frequencies, snacking and importance of vegetables.
- There is also a need to review and educate patients on regular basis by a qualified nutritionist in order to reinforce and individualize care to promote adherence.
- To policy makers both at national and county governments to sit and come up with written instructions and IEC materials in local language for ease of knowledge dissemination.

#### **5.6. Recommendations for Further Study**

- Further research is done in order to establish why patients with adequate knowledge on diet still don't adhere. In depth barrier analysis and number of meals patients living with diabetes should consume

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## APPENDICES



**KENYA METHODIST UNIVERSITY**

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January 24, 2023

KeMU/ISERC/HND/01/2023

EILEEN CHERONO  
HND-3-1407-3/2019

Dear Eileen,

**SUBJECT: FACTORS CONTRIBUTING TO NON-ADHERENCE TO DIETARY RECOMMENDATION AMONG DIABETIC PATIENTS ATTENDING KAPSABET REFERRAL HOSPITAL, KENYA**

This is to inform you that Kenya Methodist University Scientific Ethics and Review Committee has reviewed and approved your research proposal. Your application approval number is KeMU/ISERC/HND/01/2023. The approval period is 24<sup>th</sup> January, 2023 – 24<sup>th</sup> January, 2024.

This approval is subject to compliance with the following requirements:-

- I. Only approved documents including (informed consents, study instruments, MTA) will be used.
- II. All changes including (amendments, deviations, and violations) are submitted for review and approval by Kenya Methodist University Scientific Ethics and Review committee.
- 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 KeMU SERC 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 KeMU SERC 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 KeMU SERC.

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

Yours sincerely,  
  
DR. HERBERT KIBETE  
SECRETARY (SERC)

## APPENDIX II

**OFFICE OF THE PRESIDENT  
MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION**

Tel: 053 5252621, 5252003, Kapsabet  
Fax No. 053 - 5252503  
E-mail:  
nandicountycommissioner@gmail.com  
When replying, please quote

Ref. No. NC.EDU/4/3/VOL.III/(22)



County Commissioner's Office,  
Nandi County  
P.O. Box 30,  
KAPSABET.

17<sup>th</sup> May, 2023

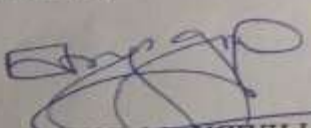
Eileen Cherono  
Kenya Methodist University,  
P.O. Box 267- 60200,  
MERU.

**RE: RESEARCH AUTHORIZATION**

This is in reference to letter No. NACOSTI/P/23/24350 dated 4<sup>th</sup> April, 2023 from the Director General, National Commission for Science, Technology and Innovation on the above subject matter.

You are hereby authorized to conduct a research on **"Factors contributing to non-adherence to dietary recommendation among diabetic patients attending Kapsabet County Referral Hospital, Kenya"** for the period ending **4<sup>th</sup> April, 2024.**

Wishing you all the best.

  
CAROLINE M. NZWILI  
COUNTY COMMISSIONER,  
NANDI.

**THE COUNTY  
COMMISSIONER  
NANDI.**



MINISTRY OF EDUCATION  
STATE DEPARTMENT FOR BASIC EDUCATION

Email: [cdenandicounty@yahoo.com](mailto:cdenandicounty@yahoo.com)

Telephone: 0773044624

When replying please quote

Ref: NDI/CDE/RESEARCH/1/VOL.III/75

Ms. Eileen Cherono  
Kenya Methodist University,  
P.O Box 267-60200  
MERU.

County Director of Education  
NANDI COUNTY,  
P. O. Box 36-30300,  
KAPSABET.

Date: 17<sup>th</sup> May, 2023

**RE: RESEARCH AUTHORIZATION.**

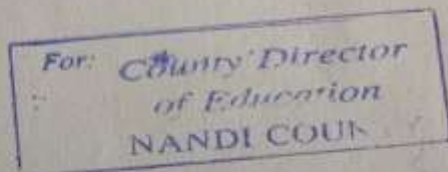
Reference is made to the National Commission for Science,  
Technology and Innovation's letter Ref: No. NACOSTI/P/23/24350  
dated 4<sup>th</sup> April, 2023.

The above named person has been granted permission by the County  
Director of Education to carry out research on *"Factors Contributing to  
Non-adherence to Dietary Recommendation among Diabetic Patients  
Attending Kapsabet County Referral Hospital"*, in Nandi County, Kenya'  
for the period ending 4<sup>th</sup> April, 2024.

Kindly provide her all necessary support she requires.

Mathew Sum

For: County Director of Education,  
NANDI COUNTY.





## **THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013 (Rev. 2014)**

Legal Notice No. 108: The Science, Technology and Innovation (Research Licensing) Regulations, 2014

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

### **CONDITIONS OF THE RESEARCH LICENSE**

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
  - i. Endanger national security
  - ii. Adversely affect the lives of Kenyans

- iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
  - iv. Result in exploitation of intellectual property rights of communities in Kenya
  - v. Adversely affect the environment
  - vi. Adversely affect the rights of communities
  - vii. Endanger public safety and national cohesion
  - viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
  4. The license any rights thereunder are non-transferable
  5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
  6. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research.
  7. Excavation, filming, movement, and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
  8. The License does not give authority to transfer research materials.
  9. The Commission may monitor and evaluate the licensed research project for the purpose of assessing and evaluating compliance with the conditions of the License.

10. The Licensee shall submit one hard copy, and upload a soft copy of their final report (thesis) onto a platform designated by the Commission within one year of completion of the research.
11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

National Commission for Science, Technology and Innovation(NACOSTI),

Off Waiyaki Way, Upper Kabete,

P. O. Box 30623 - 00100 Nairobi, KENYA Telephone: 020 4007000, 0713788787, 0735404245

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#### **APPENDIX IV: INFORMED CONSENT FORM**

**Study Title:** Factors contributing to non-adherence to recommended dietary recommendations of diabetics Type 2 patients at Kapsabet Referral Hospital, Kenya.

**Researcher:** Miss Eileen Cherono (Master of Science, Human Nutrition and Dietetics student) School of Public Health and Nutrition, Kenya Methodist University- Meru.

#### **Purpose of the study**

The study aims to find out factors making dietary adherence difficult and come up with possible strategies that would help in medical nutrition counseling and help DM clients delay the complications associated with diabetes

#### **Procedure and selection of subjects**

The study is a cross-sectional study where the target population are all type 2 diabetic patient, attending Kapsabet County Referral Hospital purposely selected. By consenting the information obtained from you through an interview will only be used for purposes of learning and will take approximately 30-45 minutes.

#### **Benefits**

There will be no direct benefits received by participating in this study. Findings from study will benefit KCRH in improving diabetes nutrition education and counseling.

#### **Risk:**

There is no anticipated risk to the participants in this study.

#### **Confidentiality:**

Information obtained in this study will be treated confidential. All the filled questionnaires and consent form will be locked in lockable cabinets only accessed by the researcher.

**Right of participants:**

Your participation in the study is voluntary. You are free to either refuse to take part or to withdraw at any stage in the course of study.

**Concerns**

In the event of issues arising while taking part in the study please reach out to Miss. Eileen 0729601610

**Signed Consent for Participation**

I agree to participate in this study:

Sign.....Date.....

## APPENDIX V: QUESTIONNAIRES

**NB:** Information obtained here is intended for academic purposes

Any information given will be treated with utmost confidentiality

Questionnaire no:.....

Date filled:.....

### Section 1: Demographic Characteristics

1. What is your current age (respondent)?

15-20( )    21-25 ( )    26-29( )    30-34( )    35-39( )    >40 years ( )

2. What is your marital status

Single ( )    Married ( )    Widowed ( )    Divorced/Separated ( )

3. What is your highest level of education?

None ( )    Primary ( )    Secondary ( )    College/University

4. How long have you lived with diabetes?

< 6months ( )    1-5years ( )    6-10years ( )    11-20years ( )    >21 years ( )

5. What do you do for a living?

Housewife ( )    Farmer ( )    Teacher ( )    Others ( )

Specify.....

6. What is your average household income per month in Kshs?

< 5,000 ( )    5,000-10,000 ( )    10,001-15,000 ( )    > 15,001 ( )

7. Who is your treatment supporter?

None ( )    Sister/Brother ( )    Spouse ( )    Health care providers ( )    others ( )

If your answer is others, specify.....

8. What is your current treatment regimen?

OGLA'S ( )    Insulin ( )    Diet ( )    none ( )

9. Have you done HBA1C recently?

No ( )    Yes ( )

If answer is yes, what is the value in percentage .....

10. Which area of treatment support would you wish to get the most ( tick only one in each line)

|                                       | Strongly<br>Disagree | Somehow<br>Disagree | None | Somehow<br>Agree | Strongly<br>Agree |
|---------------------------------------|----------------------|---------------------|------|------------------|-------------------|
| a. Checking my<br>sugar levels        |                      |                     |      |                  |                   |
| b. Taking<br>medicine                 |                      |                     |      |                  |                   |
| c. Following<br>meal plan/<br>cooking |                      |                     |      |                  |                   |

- d. Doing  
exercises
- e. Foot care
- f. Psychological  
management  
& diabetes  
self-care

## **Section 2: Level of Knowledge/ Dietary practices**

11. Have you ever received Diabetes Education?

No ( )                      Yes ( )

12. Who took you through the Diabetes Education session

Diabetes Educator ( )   Nurse ( )   Nutritionist/Dietitian ( )   Clinicians/Doctors ( )

13. Have you been taken through nutrition educating regarding diet plan and exercise?

No ( )                      Yes ( )

If you answer yes who did the counseling on diet and diabetes plan.....

14. Which of the following statements describes you concerning number of meals in a day?

Two meals ( )                      Three meals ( )                      More than three meals ( )

15. How often do you take fruits?

None ( ) Once ( ) Twice ( ) Thrice ( ) More than four times ( )

16. How many times in a day do you take vegetables?

None ( ) Twice ( ) More than three times ( )

17. Where do you prefer to eat from?

Home ( ) Restaurants/ Hotels ( ) Others ( )

18. Do you voluntary choose the food you eat daily?

Yes ( ) No ( )

19. How often do you snack?

Between meals ( ) Once a day ( ) Never snack ( )

20. How would you rate your understanding of Diabetes? ( only tick the appropriate one for you)

Poor

Average

Good

Excellent

a. Overall

diabetes care

b. How to test

and interpret

the results

c. Prevention

and treatment

of  
hyperglycemia

d. Prevention

and treatment  
of  
hypoglycemic  
episodes

e. Diet plan for

glycemic  
control

f. How diet,

exercise, and  
medicines

affect blood  
sugar levels

g. Maintaining

the

right eating time.

h. Benefits of

improving

blood sugar

control

- i. Prevention of  
long –term  
diabetes  
complication
- j. Stress  
management
- k. Clinic  
appointments
- l. Exercise and  
its importance  
in diabetes  
management
- m. Following a  
prescribed diet  
plan

THANK YOU FOR YOUR TIME.