PERCEIVED CHALLENGES TO DIETARY COMPLIANCE AND GLYCEMIC CONTROL AMONG PATIENTS WITH DIABETES MELLITUS

BY

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IN PARTIAL FULFILMENT OF THE AWARD OF BACHELOR OF NURSING SCIENCES (BNSC) COLLEGE OF MEDICAL SCIENCES, UNIVERSITY OF BENIN, BENIN CITY

OCTOBER, 2025

DECLARATION

This is to declare that this research project titled **Perceived Challenges to Dietary Compliance and Glycemic Control among Patients with Diabetes Mellitus** will be carried out by **NOSAYABA BECKY OSARENOGAE** and is solely the result of my work except where acknowledged as being derived from other person(s) or resources.

MATRICULATION NUMBER: _____

FACULTY/COLLEGE: NURSING SCIENCES, COLLEGE OF MEDICAL SCIENCES, UNIVERSITY OF BENIN, BENIN CITY.

SIGNATURE: _____

DATE:_____

CERTIFICATION

This is to certify that this research project will be carried out by **NOSAYABA BECKY OSARENOGAE** with Matriculation Number BMS1902053 and will be examined and approved for the award of BACHELOR IN NURSING SCIENCES CERTIFICATE.

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Dean of Faculty

ABSTRACT

The purpose of this study is to find out the Perceived challenges to Dietary compliance and glycemic control among patients with diabetes mellitus at the University of Benin Teaching Hospital school facilities. Three research questions are raised and one hypothesis was formulated and tested at 0.05 level of significant. The study will employ a cross-sectional survey design to examine perceived challenges to dietary compliance and glycemic control among diabetes patients at University of Benin Teaching Hospital from February, 2025 to March 2025. This comprises of patients that came to COPD of the UBTH for two months from February 2025 to March 2025. The Taro Yamane method was used in determining the sample size. The sample size was made up of 201. The research instrument was accessed by an expert, my supervisor and two lecturers from the Department of Educational management, Faculty of Education, University of Benin to examine the appropriateness of the research instrument. The instrument to be used for data collection was a questionnaire which is made based on the objectives of the study The obtained data was analyzed to ascertain the perceived challenges of Dietary compliance and glycemic control among patients with diabetes mellitus using descriptive statistics such as frequency, percentage, and mean deviation. The researcher also will use inferential statistics to give answers to the research questions while regression statistics will be used to analyze the stated hypothesis in the study.

KEYWORDS: DIETARY COMPLIANCE, GLYCEMIC CONTROL, DIABETES MELLITUS, PERCEIVED CHALLENGES, PATIENT COMPLIANCE, UNIVERSITY OF BENIN TEACHING HOSPITAL (UBTH).

DEDICATION

This research project work is dedicated to God Almighty for his enabling strength, grace, favour and protection through the period of this research and also to my beloved parents Mr Lucky and Mrs Martha Nosayaba for their love and support throughout this journey.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Diabetes mellitus is a long-term condition where blood sugar levels stay high due to problems with insulin production or function (Yameny, 2024). The number of people affected is rising fast, with about 463 million cases in 2019 and a projected 629 million by 2049 (Ratre et al., 2024; Fauzi et al., 2022). Diabetes is grouped into type 1, type 2, and gestational diabetes, with type 2 being the most common (Yameny, 2024; Fauzi et al., 2022). Risk factors include genetics, obesity, aging, and unhealthy lifestyle habits (Yameny, 2024; Mishra et al., 2024).

Recent studies show that diabetes affects different parts of the world in different ways. High-income countries generally report lower death rates from diabetes, while low-income countries face higher challenges (Xu et al., 2024). In Greece, type 1 diabetes is more common on the islands, while type 2 is more common in the north and east (Faka et al., 2023). In India, southern states show more "hotspots" of diabetes compared to the northern and central parts (Krishnamoorthy et al., 2022). Interestingly, factors like obesity and lack of exercise don't affect all regions equally, which means different populations may have different levels of risk even when exposed to the same conditions (Alkaf et al., 2021).

In Nigeria, diabetes is becoming a major public health issue, with an estimated 4–5% of adults affected (Mugisha, 2024). This number is expected to grow due to increasing urbanization, changes in lifestyle, and economic shifts (Mugisha, 2024; Adeleye, 2021). A study in selected Nigerian states found that more than half of the participants had diabetes or were pre-diabetic, and many of them didn't even know it (Ajayi et al., 2023). Factors like age, gender, education,

job type, and blood pressure were linked to diabetes status (Ajayi et al., 2023). Gestational diabetes is also an issue, with a pooled prevalence of 11% (Azeez et al., 2021). Common risk factors for it include having large babies in the past, being overweight, having a family history of diabetes, past miscarriages, and being of older maternal age (Azeez et al., 2021). There's a strong need for effective prevention and treatment strategies in the country (Adeleye, 2021).

Managing diabetes through diet is very important. Major studies like the Diabetes Control and Complications Trial and the UK Prospective Diabetes Study have shown that keeping blood sugar close to normal helps reduce the risk of complications (Lachin & Nathan, 2021; Holman, 2022). Medical nutrition therapy, which includes custom diet plans, plays a big role in managing diabetes. These plans help control blood sugar, lower the risk of heart problems, and improve quality of life. Current guidelines suggest that diets should be tailored to personal culture, education level, access to food, willingness to change, and any barriers to doing so.

Despite knowing the importance of diet, many people with diabetes don't follow the recommended

eating plans. A review of 23 studies from 12 countries found that only 37% of patients followed dietary advice (Manne-Goehler, 2022). To improve this, health organizations have launched global

programs like the World Health Organization's Global Diabetes Compact, launched in 2021. This initiative focuses on improving prevention, diagnosis, and access to quality care, especially in low- and middle-income countries (Kshirsagar & Mude, 2023).

Many things affect how well people follow their diets. Personal factors like age, gender, and education matter, with higher education usually leading to better compliance (Atosona et al., 2024; Kurnia & Elya, 2023). Income and food availability also play a role (Qureshi & Wassan,

2024; Theofilou, 2023). Cultural and religious beliefs can influence dietary habits, especially when traditional healing practices are involved (Theofilou, 2023). Support from healthcare workers, including education and follow-up, helps improve diet adherence (Kurnia & Elya, 2023; Theofilou, 2023). People's thoughts about their illness and medication also matter, and lifestyle habits like smoking and alcohol use affect compliance too (Kurnia & Elya, 2023; Theofilou, 2023).

In Nigeria, studies highlight serious challenges in managing diabetes. A study in Abeokuta found that lack of money, limited knowledge, and poor blood sugar control were major obstacles to managing type 2 diabetes (Uthman-Akinhanmi et al., 2024). At a hospital in southwestern Nigeria, 40% of patients had poor blood sugar control. This was linked to being older, having low income, obesity, not starting insulin therapy, and not taking medications properly (Ibrahim et al., 2021). The increase in diabetes in Nigeria is largely due to urban growth, changing lifestyles, and economic changes (Mugisha, 2024). But challenges like poor access to healthcare, financial difficulties, and cultural beliefs make diabetes hard to manage. This shows the urgent need for better care and support systems for diabetes in the country.

1.2 Statement of the problem

With diabetes mellitus among the top 10 causes of mortality worldwide and affecting an estimated 537 million adults, it has become one of the most important public health issues of the twenty-first century. Patients' physical, psychological, social, and economic facets of their lives are profoundly disrupted by the condition, which severely lowers quality of life. The International Diabetes Federation estimates that the annual cost of diabetes-related healthcare has reached USD 966 billion. The devastating and far-reaching complications of poorly managed diabetes include cardiovascular disease, nephropathy, retinopathy, neuropathy, and lower-

extremity amputations. More over 20% of individuals with type 1 and type 2 diabetes experience the psychological burden of managing their condition, including diabetic distress, a unique emotional burden related to diabetes treatment (Poole & Hackett, 2024). Patients' capacity to properly manage their disease may be jeopardized by this psychological pressure, which is frequently accompanied by worry and sadness (Asonye & Ojewole, 2023).

Launched in 2021, the World Health Organization's worldwide Diabetes Compact aims to improve prevention, diagnosis, and access to high-quality care in order to combat the rising worldwide diabetes epidemic (Manne-Goehler, 2022; Kshirsagar & Mude, 2023). Recognizing that between 50 and 70 percent of patients globally find it difficult to follow dietary guidelines, despite their shown effectiveness in enhancing glycemic control and lowering complications, this program highlights nutritional management as the cornerstone of effective diabetes care. Similar to this, the UN has identified diabetes as a major barrier to reaching the Sustainable Development Goals, especially goal 3.4, which calls for a one-third reduction in early death from non-communicable illnesses by 2030 (United Nations, 2022).

Notwithstanding the large number of research examining diabetes treatment in Nigeria, little is known about the particular difficulties patients have in maintaining dietary adherence in the nation's distinct sociocultural, economic, and medical setting. Poor glycemic control is common among diabetes patients in sub-Saharan Africa, especially Nigeria, according to recent research. Additionally, most studies have not sufficiently examined the intricate relationship between perceived dietary obstacles and glycemic outcomes, especially in settings with limited resources, even though prior research has revealed general hurdles to diabetes control. The creation of contextually relevant treatments to enhance dietary compliance and, in turn, glycemic management is hampered by this information gap. With the ultimate goal of guiding focused

interventions to enhance patient outcomes, this study intends to fill this important gap in the literature by examining the perceived difficulties with dietary compliance and their effect on glycemic control among patients with diabetes mellitus who visit the Endocrinology Clinic of a tertiary healthcare facility in Nigeria.

1.3 Objectives of the Study

The primary aim of this research is to identify the perceived challenges of Dietary compliance and glycemic control among patients with diabetes mellitus at the University of Benin Teaching Hospital. The specific objectives of the study are to:

1. To assess the level of dietary compliance among patients with diabetes mellitus at the University of Benin Teaching Hospital, Benin City, Edo State.
2. To identify the perceived challenges to dietary compliance among patients with diabetes mellitus at the University of Benin Teaching Hospital, Benin City, Edo State.
3. To determine the coping strategies employed by patients with diabetes mellitus in managing dietary challenges at the University of Benin Teaching Hospital, Benin City, Edo State.

1.4 Research questions

The following research questions were raised to guide the study:

1. What is the level of dietary compliance among patients with diabetes mellitus at the University of Benin Teaching Hospital, Benin City, Edo State?
2. What are the perceived challenges to dietary compliance among patients with diabetes mellitus at the University of Benin Teaching Hospital, Benin City, Edo State?

3. What coping strategies are employed by patients with diabetes mellitus in managing dietary challenges at the University of Benin Teaching Hospital, Benin City, Edo State?

1.5 Research hypothesis

The following hypothesis will be tested in this study:

H_0: Patients with diabetes mellitus at the University of Benin Teaching Hospital do not perceive any significant challenges to dietary compliance.

1.6 Significance of the study

Many stakeholders can benefit greatly from this study on diabetes mellitus patients' perceived difficulties with food compliance and glycemic control at the University of Benin Teaching Hospital in Benin City, Edo State. It will help medical professionals pinpoint the precise obstacles patients have when adhering to dietary guidelines, allowing for more focused and efficient interventions. Clinicians will be better able to identify high-risk patients and put the right support plans in place thanks to the findings.

This study will give policymakers evidence-based knowledge to help them create diabetes management plans and allocate resources effectively. The findings might draw attention to structural adjustments that are required in the way healthcare is delivered, such giving diabetic patients more access to nutritionists or providing them with subsidized healthy food options.

Patients and their families will benefit from validated experiences and practical insights about common barriers and effective coping strategies. Understanding the relationship between dietary compliance and glycemic control may motivate patients to prioritize dietary management despite challenges, improving self-efficacy and disease outcomes. The academic community will gain valuable contributions to the knowledge base on diabetes management in resource-limited

settings, potentially stimulating further research on intervention strategies. The findings may serve as a foundation for similar studies in other regions. At the societal level, this research can inform public health education about diabetes management, potentially reducing stigma associated with dietary restrictions and promoting community support for healthy eating habits.

1.7 Scope of the study

This study is set to evaluate the perceived challenges to dietary compliance and glycemic control among diabetes mellitus patients in a tertiary hospital in Benin City, Nigeria, namely "University of Benin Teaching hospital (UBTH)". It is also restricted to the diabetes mellitus patients, irrespective of their ages, class and educational levels.

1.8 Operational definition of terms

Dietary Compliance: In this study, this refers to the extent to which a patient with diabetes follows the recommended dietary plan prescribed by healthcare professionals, including appropriate food choices, portion control, meal timing, and adherence to specific nutritional guidelines for diabetes management.

Glycemic Control: In this study, this refers to the maintenance of blood glucose levels within the target range recommended for diabetes management, as measured by glycated hemoglobin (HbA1c) levels and/or regular blood glucose monitoring records.

Perceived Challenges: In this study, this refers to the self-reported difficulties, or barriers, that patients with diabetes experience or identify as hindering their ability to adhere to prescribed dietary recommendations.

Diabetes Mellitus: In this study, this refers to a chronic metabolic disorder characterized by elevated blood glucose levels resulting from defects in insulin secretion, insulin action, or both, which requires ongoing medical care and patient self-management to prevent acute complications and reduce the risk of long-term complications.

Patients: In this study, this refers to the persons receiving or registered to receive medical treatment.

CHAPTER TWO

LITERATURE REVIEW

This chapter examines numerous linked literatures on perceived obstacles to dietary compliance and glycemic control in diabetes patients. This is discussed under the following headings: conceptual literature review, theoretical literature review, empirical literature review, and summary.

2.1 Conceptual review

2.1.1 Overview of Diabetes Mellitus

Diabetes mellitus (DM) is a chronic metabolic condition marked by persistent high blood sugar levels due to issues with insulin production, action, or both. This imbalance affects carbohydrate, lipid, and protein metabolism (American Diabetes Association, 2021). According to the World Health Organization (WHO), diabetes is categorized into four main types: type 1 diabetes (T1DM), type 2 diabetes (T2DM), gestational diabetes, and other specific types evolving from different causes (Adler et al., 2021; Elliott & Pfotenhauer, 2022). T1DM arises from the destruction of β-cells, causing insulin deficiency, whereas T2DM is characterized by insulin resistance and defects in insulin secretion (Elliott & Pfotenhauer, 2022). In a 2019 revision, WHO included two hybrid forms: latent autoimmune diabetes in adults (LADA) and ketosis-prone type 2 diabetes (Kaewkrasaesin et al., 2024).

Diagnosing diabetes involves several tests such as fasting plasma glucose, oral glucose tolerance tests, glycated hemoglobin (HbA1C), and random blood glucose levels (Hardianto, 2021). Preventing T1DM remains a challenge due to limited understanding of its development, while T2DM prevention is largely focused on lifestyle modifications and medical interventions

(Hardianto, 2021). Treatment for T1DM is reliant solely on insulin administration, whereas T2DM treatments commonly use medications like metformin to manage blood sugar levels (Hardianto, 2021). Recent insights into hybrid forms like LADA and ketosis-prone diabetes further blur the lines of traditional diabetes classifications (Tuomi et al., 2023).

New research underscores the complexity of diabetes, advocating for an updated classification system that reflects its heterogeneity. The current models, while based on etiology and pathogenesis, are increasingly viewed as inadequate (Sreenivasamurthy, 2021). Personalized care—taking into account biomarkers, genetic information, and clinical characteristics—is gaining support (Redondo & Balasubramanyam, 2021). Innovations such as the palette model, threshold model, and gradient model aim to address this complexity, integrate various diabetes types, and guide the development of new treatments (Leslie et al., 2023). The Precision Medicine in Diabetes Initiative emphasizes understanding the multitude of molecular pathways that lead to diabetes to enhance management strategies and therapeutic advancements

2.1.1.1 Types of Diabetes Mellitus

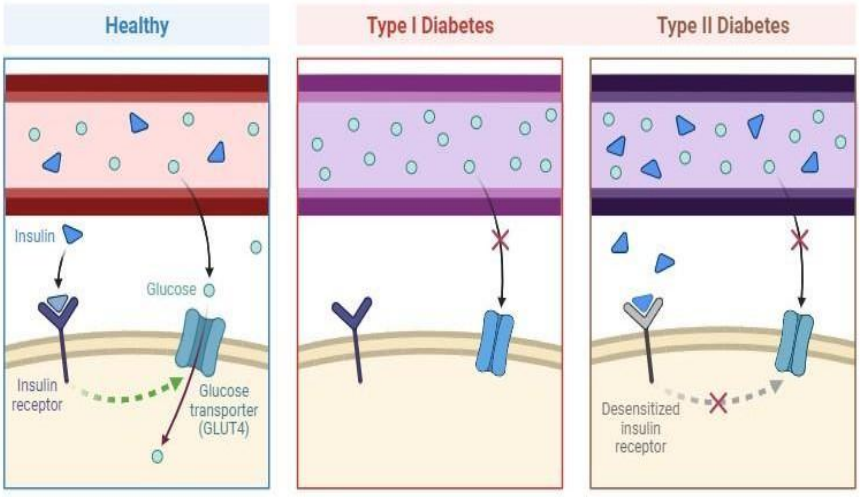

Fig 2.1: Healthy vs Type I Diabetes vs Type II Diabetes

1. Type 1 Diabetes Mellitus (T1DM)

Type 1 diabetes mellitus (T1DM) is a complicated autoimmune illness that destroys insulin-producing pancreatic beta cells. This breakdown causes insulin insufficiency and excessive blood sugar levels, known as hyperglycemia. According to studies by Syed (2022) and Toren et al.

(2021), individuals with multiple autoantibodies, particularly those targeting glutamic acid decarboxylase (GAD), insulin (IAA), and islet antigen-2 (IA-2), tend to experience faster beta cell destruction and an earlier onset of T1DM.

The clinical presentation of T1DM can vary significantly. Redondo et al. (2021) highlight that the disease often presents acutely with ketoacidosis in children, whereas adults may experience a slower progression known as latent autoimmune diabetes in adults (LADA). This variability impacts diagnosis, treatment decisions, and long-term disease management strategies.

Genetic susceptibility is a key factor in T1DM development. Certain alleles like HLA-DR3 and HLA-DR4 significantly increase disease risk, while HLA-DR2 offers protection (source: Medscape, 2024). Approximately 85% of individuals with T1DM possess autoantibodies against GAD or insulinoma-associated antigen-2 (IA-2), which are valuable biomarkers for early detection. The progression of T1DM is heterogeneous, with differences in age of onset, metabolic characteristics, and remaining beta cell function. Research utilizing computed tomography (CT) has found reduced pancreatic volume in both T1DM and type 2 diabetes patients, indicating possible shared mechanisms of exocrine dysfunction (source: Medscape, 2024).

2. Type 2 Diabetes Mellitus (T2DM)

Type 2 diabetes mellitus (T2DM) is primarily defined by insulin resistance and the gradual dysfunction of β-cells. Recent research highlights the roles of inflammation and oxidative stress in β-cell failure, with indicators like C-reactive protein and reactive oxygen species frequently linked to the advancement of T2DM. Advanced techniques, such as single-cell RNA sequencing, have shown that T2DM alters the genetic expression in pancreatic α- and β-cells, particularly affecting crucial redox signaling for insulin production. Environmental influences, such as exposure to bisphenol A (BPA), may also play a role in T2DM development by disrupting glucose balance and β-cell functions through changes in gene expression and mitochondrial structure. Grasping these mechanisms is vital for developing targeted treatments and preventing T2DM, as β-cells can compensate for increased insulin demand for years before failing.

There has been significant progress in understanding the genetic architecture of type 2 diabetes (T2D). A large-scale, multi-ethnic genome-wide association research found 1,289 distinct association signals at 611 loci, including 145 new findings. Three-dimensional chromatin mapping has shown cell-type-specific regulatory structures and found 4,750 possible causal-variant-to-target-gene links among 194 T2D GWAS findings. Multi-ancestry analysis revealed twelve genetic clusters, each with unique cardiometabolic trait associations and varying distributions among ancestry groups. These insights illuminate ancestry-linked differences in T2D

risk profiles. Over 400 genetic risk variants have been associated with T2D across diverse populations, with most showing similar patterns in African Americans. Additionally, ancestry-specific analyses have identified further risk variants and genomic loci, uncovering genetic links between low birth weight and T2D in African Americans.

3. Gestational Diabetes Mellitus (GDM)

Gestational diabetes mellitus (GDM), a major type of diabetes, is distinguished by glucose intolerance that begins during pregnancy. McIntyre et al. (2021) provide a complete overview of the increased hazards associated with GDM for both mothers and children. Mothers are more likely to have cesarean births, preeclampsia, and develop type 2 diabetes later in life. Offspring, on the other hand, are at risk for macrosomia, birth trauma, neonatal hypoglycemia, and long-term problems such as obesity and metabolic disorders. The study emphasizes the vital importance of timely diagnosis and management in order to successfully decrease these risks.

The criteria for diagnosing GDM have changed significantly, affecting prevalence estimates and healthcare resource allocation. Zhang et al. (2022) compared various diagnostic methods and discovered that the International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria, which require only one abnormal result on an oral glucose tolerance test, result in higher diagnosis rates than traditional two-step methods. By implementing these criteria globally, GDM prevalence might climb by 15-20%, emphasizing the necessity of healthcare systems preparing for increasing demand for diagnoses and treatment services.

2.1.1.2 Epidemiology and Global Burden

Diabetes-related healthcare costs were approximately 966 billion USD in 2021, with expectations to escalate to 1,054 billion USD by 2045. Alongside diabetes, cardiovascular diseases (CVDs) and chronic kidney disease (CKD) contribute substantially to global health challenges. There are marked differences in the prevalence and mortality rates of these conditions among various The prevalence of diabetes worldwide has surged significantly, impacting around 537 million adults aged 20-79 as of 2021. This number is anticipated to climb to 783 million by 2045. The increase is primarily due to factors such as aging populations, rapid urbanization, and increasingly sedentary lifestyles. Urban areas show a higher diabetes prevalence rate of 12.1%, compared to 8.3% in rural regions. Furthermore, high-income countries exhibit a prevalence of 11.1%, while low-income countries stand at 5.5%. The most significant rise in diabetes prevalence from 2021 to 2045 is expected to occur in middle-income countries, with a projected increase of 21.1%.

populations. In the United States, mortality rates for diabetes and CKD vary significantly across counties, with the highest rates found in the Deep South and along the Mississippi River.

For individuals managing type 1 diabetes, the presence of cardiovascular disease, albuminuria, and advanced stages of CKD greatly elevates the risk of mortality, especially when these

conditions coexist. Understanding and addressing these risks is crucial for improving health outcomes and reducing the global burden of these diseases.

2.1.1.3 Pathophysiology and Clinical Manifestations

Type 2 diabetes mellitus (T2DM) is a prevalent condition marked by insulin resistance and β-cell dysfunction, resulting from intricate interactions between various tissues. Recent studies highlight that dysfunction in adipose tissue significantly contributes to the onset of hepatic insulin resistance and metabolic dysfunction-associated steatosis liver disease. The underlying pathophysiology includes oxidative stress, mitochondrial dysfunction, endoplasmic reticulum stress, and inflammation, all of which play pivotal roles in insulin resistance and β-cell impairment.

Hyperglycemia, a hallmark of diabetes, activates multiple pathways leading to oxidative stress and vascular complications. Chronic high blood sugar levels facilitate the production of advanced glycation end products (AGEs) through non-enzymatic reactions. These AGEs accumulate in tissues, triggering their receptors (known as RAGE) and generating reactive oxygen species (ROS), which heighten oxidative stress. Hyperglycemia further intensifies glucose metabolism via the protein kinase C, polyol, and hexosamine pathways, escalating ROS production. This episode of oxidative stress disrupts β-cell functionality and insulin signaling, contributing to insulin resistance. Consequently, these processes are linked to both microvascular complications—such as retinopathy, nephropathy, and neuropathy—and macrovascular issues like atherosclerosis.

The interaction between AGEs and their receptors sets off intracellular signaling cascades, altering gene expression and provoking the release of pro-inflammatory molecules, thereby worsening diabetic complications. Understanding these mechanisms offers insight into potential therapeutic targets for mitigating the impact of diabetes.

2.1.2 Dietary Management in Diabetes

Effective dietary management of type 2 diabetes relies on personalized and culturally sensitive approaches, taking into account individual preferences, health literacy, and social determinants (Saenz et al., 2024). Key strategies for managing diabetes through diet include prioritizing minimally processed plant foods, whole grains, and non-tropical vegetable oils while reducing the intake of red meat and refined grains (The Diabetes and Nutrition Study Group of the European Diabetes, 2023). Diet plans like the Mediterranean or plant-based diets, especially when paired with behavioral techniques such as motivational interviewing, can significantly aid in glycemic control (Salvia & Quatromoni, 2023).

Research consistently indicates that personalized nutrition approaches lead to higher diabetes remission rates compared to standard interventions (Arias-Marroquín et al., 2024). Tailored diets are essential for optimizing insulin use and improving glycemic control in diabetic individuals (Ribeiro Gonzaga et al., 2024). The varied responses to dietary changes underscore the importance of moving beyond generic, population-based advice towards individualized nutrition (Merino, 2022).

In terms of protein consumption, a prospective analysis revealed no link between higher protein intake and accelerated kidney function decline in type 2 diabetes patients (Oosterwijk et al., 2021). Some experts suggest a plant-focused, low-protein diet (0.6-0.8 g/kg/day) for those with chronic kidney disease associated with diabetes (Kalantar-Zadeh et al., 2021). However, a systematic review found limited and inconclusive evidence supporting plant-based protein interventions in preserving kidney function and preventing mineral bone disorder complications in these patients (Burstad et al., 2023).

Micronutrients are vital for glucose metabolism and effective diabetes management. Minerals, trace elements, and vitamins impact blood glucose levels and cellular glucose metabolism, potentially affecting type 2 diabetes risk (Barra et al., 2021). Diabetics often exhibit lower levels of antioxidant vitamins A, C, and E, along with reduced thiamine, pyridoxine, and biotin (Younes, 2024). Specifically, zinc plays a crucial role in insulin formation, release, and storage, with adequate zinc levels possibly reducing diabetic complications (Ahmad et al., 2024).

2.1.3 Glycemic Control

Glycemic manage refers to the regulation of blood glucose tiers within a goal vary to stop acute and chronic complications of diabetes mellitus. Scholarly definitions emphasize its function as a metabolic safeguard: Glycemic is defined as the maintenance of blood glucose between 70–180 mg/dL via pharmacological, dietary, and lifestyle interventions, tailor-made to character affected person profiles (American Diabetes Association [ADA], 2025).

The International Diabetes Federation (IDF) characterizes it as a preventive method to mitigate risks of microvascular (e.g., retinopathy) and macrovascular (e.g., stroke) issues by way of minimizing hyperglycemia and hypoglycemia (IDF, 2023). Recent frameworks combine continuous glucose monitoring (CGM), defining control with the aid of metrics like time in vary (TIR), which quantifies the percentage of readings inside 70–180 mg/dL, and time under vary (TBR), a indispensable marker of hypoglycemia chance (Battelino et al., 2022). In hospitalized settings, glycemic manage focuses on keeping glucose stages between 140–180 mg/dL to balance contamination prevention with hypoglycemia avoidance (Umpierrez et al., 2025). Longitudinal research highlight the “legacy effect,” where early intensive manipulate in kind 2 diabetes (T2DM) reduces cardiovascular and renal problems many years later (Holman et al., 2023).

Clinical aims are individualized but usually purpose for an A1C <7% (53 mmol/mol) for nonpregnant adults, adjusted to <8% (64 mmol/mol) in older adults or these with comorbidities (ADA, 2025). CGM-derived goals prioritize TIR >70%, TBR <4% (<70 mg/dL), and TAR <25% (>180 mg/dL), with stricter aims (TIR >80%) for pregnant girls (Seidu et al., 2022). Glycemic variability, measured via a coefficient of variant (CV) ≤36%, is an increasing number of identified as a predictor of complications, impartial of A1C (Monnier et al., 2023). For significantly sick patients, insulin protocols target 140–180 mg/dL to avoid each hyperglycemia-induced immune dysfunction and hypoglycemic episodes (Jacobson et al., 2024).

Assessment strategies vary by means of context. A1C remains the gold preferred for evaluating 3-month glycemic trends, although it may additionally underestimate variability and hypoglycemia (Inzucchi et al., 2023). CGM provides real-time facts on glucose fluctuations, capturing metrics like TIR and nocturnal hypoglycemia, whilst blood glucose monitoring (BGM) remains imperative in resource-limited settings. Inpatient protocols often combine point-of-care checking out with intravenous insulin titration, specifically in ICUs (Dungan et al., 2023). Emerging equipment like the glycemic threat evaluation matrix integrate A1C, CGM data, and hypoglycemia frequency to stratify affected person danger and guide therapy adjustments (Khunti et al., 2024).

The significance of glycemic manipulate in preventing complications is well-established. Tight manipulate (A1C <7%) reduces retinopathy threat by 37% and nephropathy through 33%, with comparable advantages for neuropathy (UK Prospective Diabetes Study Group, 2023). Macrovascular results enhance with a 14% discount in myocardial infarction hazard and a 12% reduce in stroke incidence (Hayward et al., 2022). Hypoglycemia mitigation is equally critical, as

extreme episodes (<54 mg/dL) correlate with cardiovascular events and cognitive decline (McCoy et al., 2023). The legacy impact underscores long-term benefits: early intensive control in T2DM, as shown in the UKPDS trial, lowers mortality prices 20 years' post-diagnosis (Holman et al., 2023). Quality of lifestyles upgrades such as reduced hospitalizations and stronger each day functioning is immediately linked to sustained TIR >70% (Beck et al., 2024).

2.1.4 Dietary Compliance

Dietary compliance, frequently termed diet adherence, is a cornerstone of managing continual stipulations like diabetes mellitus. It encompasses the extent to which people align their ingesting habits with prescribed dietary recommendations, balancing scientific recommendations with personal, cultural, and socioeconomic realities. Scholarly definitions of dietary compliance range however share frequent themes. For instance, it is described as a self-regulated behavioral commitment, involving non-stop engagement with dietary desires mediated with the aid of motivation and social guide (Bandura, 2022). The American Diabetes Association (ADA) views dietary compliance as an individualized dietary strategy, adapting dietary plans to a patient's biochemical parameters, disorder stage, meals accessibility, and non-public preferences (ADA, 2021). Emerging research conceptualize compliance through predictive fitness conduct models, the use of variables like meal timing and social routines to predict adherence (Klein et al., 2023).

2.1.4.1 Factors Influencing Dietary Compliance

Dietary compliance is influenced by way of a number of elements in patients with persistent prerequisites like diabetes and hypertension. Sociodemographic elements such as age, gender, education, income, and occupation play a big position (Jeyalakshmi et al., 2024; Kurnia & Elya, 2023). Family support, knowledge, and dietary counseling are additionally essential

determinants (Fitriana & Salviana, 2021). Health-related elements together with BMI, length of illness, and comorbidities have an effect on adherence (Kurnia & Elya, 2023; Jeyalakshmi et al., 2024). Psychological elements like self-motivation and appreciation make contributions to compliance (Kurnia & Elya, 2023). Mousavi et al. (2022) developed an synthetic neural community mannequin to predict weight loss plan adherence, figuring out elements such as marriage duration, cause for sanatorium referral, weight satisfaction, and meal instances as influential. Exercise compliance is additionally affected by using comparable elements (Jeyalakshmi et al., 2024). Understanding these multifaceted influences can assist healthcare carriers sketch wonderful techniques to enhance dietary compliance amongst sufferers with continual conditions.

Healthcare system limitations significantly impact dietary compliance among patients with prediabetes and type 2 diabetes. Despite guidelines recommending diet and lifestyle support, healthcare providers (HCPs) face constraints in delivering comprehensive nutrition care (Somerville et al., 2021). Nearly 20% of patients report insufficient guidance, with only 19.1% referred to dietitians (Somerville et al., 2021). HCPs and patients often have divergent perceptions of barriers to healthy eating, with providers overestimating patient-related factors and underestimating systemic issues (Bross et al., 2021). The healthcare system could play a crucial role in promoting sustainable diets, but health professionals' potential impact is currently underestimated (Alberdi & Begiristain-Zubillaga, 2021). Successful diet adherence requires motivation, understanding of dietary recommendations, self-efficacy, achievable goals, and social support (Al-Salmi et al., 2021). Improving diet adherence necessitates addressing these factors and enhancing HCP support to help patients implement dietary changes effectively (Al-Salmi et al., 2021).

2.1.4.3 Assessment Tools for Dietary Compliance

Dietary assessment methods are crucial for nutrition research and public health initiatives, encompassing traditional and technology-driven approaches (Bailey, 2021; Esquivel & Lozano, 2024). Common self-reported methods include food frequency questionnaires (FFQs), 24-hour dietary recalls, and food records, each with strengths and limitations (Bailey, 2021; van Rossum et al., 2022). While these methods provide valuable insights, they may be subject to underreporting and recall bias (Esquivel & Lozano, 2024). Recent advancements in technology have introduced novel tools, such as mobile apps and wearable sensors, which offer more efficient data collection but raise concerns about access and privacy (Esquivel & Lozano, 2024; Vadiveloo et al., 2022). Additionally, innovative approaches utilizing big data, food purchasing information, and biomarkers are emerging to complement traditional methods and enhance measurement precision (Vadiveloo et al., 2022). The integration of these diverse assessment tools has the potential to improve dietary surveillance and inform targeted interventions in both population health and precision nutrition contexts (Vadiveloo et al., 2022).

2.1.5 Challenges to Dietary Compliance

Dietary compliance poses significant challenges across various health conditions. In type 2 diabetes, lack of understanding of dietary guidelines is the primary barrier, followed by situational difficulties and insufficient family support (Ahmad, 2024). For low-carbohydrate diets in diabetes management, cultural, religious, and economic factors hinder adherence (Kumar et al., 2022). Dietary clinical trials face limitations due to the complex nature of nutrition interventions, collinearity between diet components, and diverse dietary behaviors (Mirmiran et al., 2021). In pediatric Crohn's disease, adherence to specialized diets is challenging, with only 57% of patients maintaining the diet beyond 12 weeks. Factors affecting compliance include

difficulty following the diet, cost, and poor clinical response (Alsarhan et al., 2023). These studies highlight the need for tailored education, support systems, and consideration of individual and cultural factors to improve dietary adherence across various health conditions.

2.1.6 Coping Strategies for Dietary Management

Dietary management represents a complex interplay of physiological needs, psychological factors, and sociocultural influences that shape an individual's relationship with food. In recent years, researchers have increasingly recognized that successful dietary management extends beyond mere nutritional knowledge and willpower. Rather, it encompasses a range of psychological and behavioral coping strategies that enable individuals to navigate the challenges of maintaining healthy eating patterns in diverse contexts.

2.1.6.1 Psychological Approaches to Dietary Management

1. Mindful Eating Practices

Mindful eating has received sizeable interest as an effective coping method for dietary administration A complete evaluate suggests that multi-component mindfulness-based interventions might also gain disordered consuming and weight management, even though greater lookup is wished to decide their superiority over choice redress (Tapper, 2022). Similarly, Warren et al. (2022) located that mindfulness-based interventions decreased binge ingesting episodes via 62% amongst people with binge ingesting disease over a 12-month follow-up period.

2. Cognitive Behavioral Strategies

Cognitive behavioral approaches address the thoughts, emotions, and behaviors that influence dietary patterns. Metacognitive beliefs, especially negative beliefs about worry and the need to control thoughts, are implicated in eating disorders, with anorexia nervosa patients exhibiting

higher levels compared to other eating disorder diagnoses (Palmieri et al., 2021). Irrational beliefs, particularly awfulizing and negative global evaluations, contribute to both eating disorder-specific and non-specific symptoms, as well as cognitive reappraisal difficulties in patients with eating disorders (Tecuta et al., 2021).

2.1.6.2 Social and Environmental Coping Strategies

1. Social Support Systems

Social support plays a crucial role in dietary management and health behaviors. Online weight-loss communities can enhance dietary self-efficacy through social support, identification with community members, and motivation to comply with group norms (Gallin et al., 2023). Community social networks promote social participation, which in turn facilitates healthier dietary behavior, particularly among older adults living alone (Nishio et al., 2021). For American Indians with type 2 diabetes, social support provides emotional support, fulfills an appraisal function, and enables positive health behaviors (Ishak et al., 2022). During the COVID-19 pandemic, social support emerged as a potential mechanism to promote health behaviors amidst decreases in physical activity and increases in sedentary behavior and social isolation (Weaver et al., 2021).

2. Environmental Restructuring

Recent research highlights the importance of environmental restructuring in promoting healthy dietary behaviors. Systematic reviews have identified several effective strategies, including combining education with environmental changes, incorporating computer-based feedback, involving peers and parents, and increasing the availability of healthy foods (Capper et al., 2022). Consumer-related factors like beliefs, goals, and habits, as well as environment-related forces

such as intervention strategies and retail channels, play dual roles in facilitating or preventing healthy eating (Goukens & Klesse, 2022).

2.1.6.3 Technology-Assisted Coping Strategies

1. Digital Self-Monitoring

Digital self-monitoring tools have shown promise in improving dietary management and weight loss outcomes. Studies have found that consistent use of digital tracking tools for at least 3 months leads to greater improvements in dietary quality and adherence to nutrition goals compared to traditional methods (Carpenter et al., 2022). A meta-analysis revealed that digital self-monitoring of diet and physical activity significantly supports weight loss, increases moderate physical activity, and reduces calorie intake (Berry et al., 2021). Tailored interventions were found to be more effective than non-tailored approaches (Berry et al., 2021). However, adherence to self-monitoring varies by behavioral target, with lower-burden tools showing greater consistency (Carpenter et al., 2022).

2. Virtual Reality Interventions

In recent advancements, innovative virtual reality (VR) techniques are emerging as effective coping strategies for dietary management. In a 2024 study, Rodriguez-Fernandez et al. developed and assessed a VR-based intervention that simulates challenging food environments, enabling participants to practice effective coping strategies. This randomized controlled trial, involving 156 participants, revealed that those who engaged in VR sessions exhibited increased resilience against food temptations in real-world scenarios compared to those who received conventional nutrition education. Integrating VR in dietary management could be a promising approach for enhancing self-control and achieving healthier eating habits.

2.1.6.4 Specialized Dietary Management Strategies

1. Managing Restrictive Diets for Better Health

For those navigating medical conditions necessitating restrictive diets, such as celiac disease or food allergies, effective coping strategies are vital. Research by Kwon and Lebwohl (2021) underscores the importance of preparation strategies, including detailed meal planning, thorough restaurant research, and travel preparation, particularly for individuals with celiac disease. Their qualitative study involving 78 participants revealed that those who implemented comprehensive preparation routines experienced a notable improvement in both qualities of life and adherence to their dietary requirements.

2. Embracing Cultural Influences in Diet Management

Cultural influences play a pivotal role in dietary behaviors, necessitating consideration within coping strategies. A study by Garcia-Martinez and Wong (2022) examined the efficacy of culturally adapted dietary interventions among Hispanic/Latino communities in the U.S. Their community-based research highlighted that approaches incorporating cultural food preferences and respecting cultural values regarding family and meals were far more effective than generic strategies. Similarly, Okafor and colleagues (2024) crafted and assessed tailored dietary strategies for African American communities. Their mixed-method study discovered that interventions focusing on historical food traditions, overcoming structural barriers to healthy eating, and implementing community-based dietary changes led to greater participation and lasting dietary improvements compared to standard methods.

2.2 Theoretical review

The theoretical framework for this study will be based on Health Belief Model.

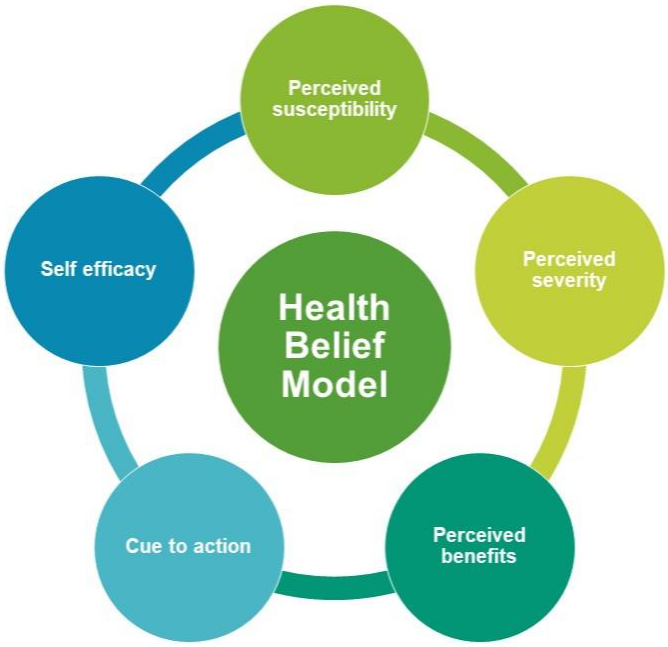

FIG 2.2: HEALTH BELIEF MODEL

The Health Belief Model (HBM) is a leading conceptual framework extensively utilized in health behavior research and practice. Created in the 1950s by social psychologists Irwin Rosenstock, Godfrey Hochbaum, Stephen Kegeles, and Howard Leventhal at the U.S. Public Health Service, the model originally focused on explaining and predicting preventive health behaviors, especially in relation to disease screening initiatives. Over time, HBM has evolved to encompass a wide range of health-related decisions and behaviors, including treatment adherence and the management of chronic conditions such as diabetes. By enhancing our understanding of how individuals perceive health risks and benefits, the Health Belief Model remains crucial for developing effective public health strategies and interventions.

2.2.1 Core Constructs of the Health Belief Model

The HBM posits that health-related behaviors are influenced by six key constructs:

- **Perceived Susceptibility**: This refers to an individual's subjective perception of their risk of developing a health condition. In the context of diabetes management, this represents the patient's belief about their likelihood of experiencing poor glycemic control or developing diabetes-related complications if they do not adhere to dietary recommendations. Patients who perceive themselves as highly susceptible to diabetes complications are more likely to comply with dietary guidelines.
- Perceived Severity: This concept highlights the importance of recognizing the seriousness of a health condition, such as diabetes, and its possible repercussions. For diabetes patients, it involves the awareness of how severe uncontrolled diabetes can become, leading to complications like retinopathy, nephropathy, neuropathy, and cardiovascular disease. When individuals perceive diabetes and its complications as significant threats to their health and quality of life, they are more inclined to follow dietary recommendations closely.
- **Perceived Benefits:** This factor pertains to the belief in the effectiveness of recommended actions to mitigate health risks. In the context of diabetes management, it involves the conviction that adhering to dietary guidelines will lead to improved glycemic control, symptom reduction, complication prevention, and enhanced overall well-being. Patients who see the clear benefits of dietary compliance are more likely to stick to recommended eating patterns.
- **Perceived Barriers:** This construct examines the potential challenges in adopting health-related actions, including physical, psychological, and financial hurdles. For diabetes

patients, common obstacles to following dietary advice include personal food preferences, cultural dietary habits, social pressures, financial limitations, time constraints, and a lack of knowledge about suitable food options. These factors can inhibit dietary compliance, with higher perceived barriers predicting lower adherence.

- **Cues to Action:** These are prompts that spark the readiness to change behavior. For those managing diabetes, cues can come from internal factors like experiencing symptoms of high blood sugar or external influences such as guidance from healthcare providers, insights from diabetes education programs, family encouragement, or awareness raised through media campaigns. These cues act as reminders or motivators to maintain dietary compliance.
- **Self-Efficacy:** Introduced to the model in the 1980s, self-efficacy refers to an individual's confidence in their ability to perform a behavior successfully. In diabetes management, dietary self-efficacy means having confidence in consistently following dietary recommendations, even in challenging situations like social gatherings or periods of stress. Higher self-efficacy is closely linked with better adherence to dietary guidelines.

2.2.2 Application of the Health Belief Model to Dietary Compliance in Diabetes

The HBM provides a valuable framework for understanding the complex factors influencing dietary compliance among diabetes patients:

Perceived Susceptibility and Severity: Diabetes education programs often focus on increasing awareness about the relationship between poor glycemic control and the development of complications. When patients understand that non-compliance with dietary recommendations directly increases their risk of developing serious complications, they may be more motivated to

adhere to dietary guidelines. Healthcare providers can enhance this understanding by discussing individual risk factors and personalizing information about potential complications.

Perceived Benefits: Effective diabetes education emphasizes the specific benefits of dietary compliance, including improved glycemic control, reduced medication requirements, better energy levels, and decreased risk of complications. Feedback mechanisms, such as regular blood glucose monitoring or HbA1c tests, can provide tangible evidence of these benefits, reinforcing patients' belief in the value of dietary adherence.

Perceived Barriers: Identifying and addressing barriers to dietary compliance is crucial for effective diabetes management. This may involve culturally sensitive dietary counseling, providing economical meal planning options, teaching practical skills for healthy food preparation, and developing strategies for managing social situations. Support groups can also help patients overcome psychological barriers by sharing successful coping strategies.

Cues to Action: Healthcare providers can implement various cues to action to promote dietary compliance, including regular follow-up appointments, text message reminders, food diaries, glucose monitoring records, and family involvement in meal planning. These cues can help maintain patients' awareness of the importance of dietary management and provide timely feedback on their progress.

Self-Efficacy: Building patients' confidence in their ability to manage their diet is essential for long-term compliance. This can be achieved through skill-building exercises, setting achievable goals, modeling successful behaviors, and providing positive reinforcement for small successes.

Breaking down complex dietary changes into manageable steps can make the task less overwhelming and increase patients' sense of self-efficacy.

2.2.3 Limitations and Adaptations of the Health Belief Model

While the HBM is widely used in diabetes research and interventions, it has certain limitations:

1. The model primarily focuses on rational decision-making processes and may not fully account for habitual behaviors or emotional factors that influence dietary choices.
2. It may not adequately address the social and cultural contexts that shape food behaviors.
3. The model assumes that health is a highly valued goal for all individuals, which may not always be the case.

2.3 Empirical review of related literature

The level of dietary knowledge

The level of dietary knowledge and practice as well as associated factors among type 2 diabetes mellitus patients in public hospitals of Dire Dawa, Ethiopia, was investigated in a study by Gebeyehu et al. (2022) titled "Dietary knowledge and practice and its associated factors among type 2 diabetes patients on follow-up at public hospitals of Dire Dawa, Eastern Ethiopia." 253 people with type 2 diabetes who went to a public hospital's follow-up clinic for the purpose of a facility-based cross-sectional study were selected through systematic random sampling. Primary data were collected by face-to-face interview and checklist. SPSS version 22 was used to enter the collected data and conduct proportion, percentage, mean, and standard deviation analyses. Bivariate logistic regression analysis was used to identify candidate variables affecting dietary practice. 53.8% of patients with type 2 diabetes mellitus had poor dietary habits, according to the findings. More than half of diabetes patients had poor dietary practice, which is in contrary with international recommendations of diabetic self-care. Patients' knowledge of recommended nutrition was poor, and they had poor habits of eating fruits and vegetables. Therefore, provision

of robust nutritional education and counseling service, a system to strengthen family support as well as psychosocial support, is highly recommended.

A meta-analysis was used to evaluate the Level of dietary adherence and determinants among type 2 diabetes population in another study by Abate et al. (2022), which was titled "Level of dietary adherence and determinants among type 2 diabetes population in Ethiopian." The World Health Organization-Hinari portal (SCOPUS, African Index Medicus, and African Journals Online databases), PubMed, Google Scholar, and EMBASE have all been searched and three reviewers' names extracted. Articles' quality was assessed using the Newcastle-Ottawa Scale by two 1 to March 30, 2020. Patients' medication adherence was assessed using the Medication Adherence Reporting Scale-5 (MARS-5). The data were entered and analyzed using SPSS (Statistical Package for Social Sciences) version 21. It was revealed that the proportion of T2D patients who adhere to medication in the study area was remarkably low. In addition, the study found that good medication adherence was also associated with being married, working for the government, not drinking alcohol, not having any comorbid conditions, and receiving diabetes

independent reviewers, and only studies with low and moderate risk were included in the final analysis. After checking for heterogeneity and publication bias, the review presented the pooled proportion of type 2 diabetics who adhered to their diets and the odds ratios of risk factors that favor dietary adherence. The review has been registered in PROSPERO with protocol number CRD42020149475. The study found that less than half of Ethiopians with type 2 diabetes adhered to their diets overall. Further works would be needed to improve dietary adherence in the type 2 diabetes population. Therefore, the factors that were discovered may assist in revising the nation's plan, and additional research may be required to ensure the adherence of health facilities and provide dietary education in accordance with the diabetes recommended dietary guideline. In their study titled "Factors influencing diabetes self-management in adults,"

Ketia et al. (2021) investigated the factors influencing diabetes self-management. Using an extensive search of 11 bibliographic databases, including gray literature, up to June 2019. The qualitative and quantitative findings were summarized separately and labeled according to their categories (such as demographic and social) and frequency of occurrence, as well as their types (such as facilitator/barrier, strength and direction of association). It was revealed that; the predominant influences were psychological factors and behavioral attributes/skills factors. Motivation to diabetes self-management, a favorable attitude toward diabetes self-management, knowledge of the disease, medications, and behaviors associated with diabetes self-management, skills, and self-efficacy/perceived behavioral control were the most frequently cited facilitators of diabetes self-management. The predominant barriers were the presence of depression, and polypharmacy or drug regimen complexity. It was frequently reported that the demographic factor of female sex had a negative impact on diabetes self-management, whereas older age had a positive impact. The social/cultural and physical environment were the least-studied categories.

Other factors such as social support from family, friends, or networks; interventions led by health professionals; and a strong community environment with good social services favoring diabetes self-management were reported as major facilitators of diabetes self-management.

Another cross-sectional study to evaluate the medical adherence and dietary compliance in type 2 diabetes patients was conducted by Sendekie et al. (2022) and was titled "Medication adherence and its impact on glycemic control in type 2 diabetes mellitus patients with comorbidity." At the selected hospitals in Northwest Ethiopia, a multicenter, institutional-based, cross-sectional study of T2DM patients with comorbidities was carried out. Medication adherence was measured using a structured questionnaire of the General Medication Adherence Scale (GMAS). A logistic regression model was used to identify predictors of the level of medication adherence and glycemic control. At the 95% confidence interval (CI), a significance level of $P > 0.05$ was found. Results The final study included 403 samples in total. The study came to the conclusion that poor glycemic control was significantly correlated with low medication adherence. Medication adherence was found to be linked to a number of medical conditions and medications. Management interventions of T2DM patients with comorbidity should focus on the improvement of medication adherence.

Bross et al. (2021) in their study titled: "Barriers to Healthy Eating and Diabetes Diet Education: Divergent Perspectives of Patients and Their Providers" examined perceived barriers to diet self-management among low-income minority patients with type 2 diabetes and their health care providers within a single ecosystem, to test whether providers understood patient barriers. Using literature-derived barriers, the researchers surveyed 149 members of a safety-net clinic—99 patients and 50 providers. Binomial logistic regression was applied to investigate relationships between barriers and patients' sociodemographic variables and Pearson's $\chi 2$ was used to compare

Perceived Challenges to Dietary Compliance

differences in perceived barriers between patients and providers. The study revealed that providers expressed divergent perceptions of patients' barriers to healthy eating, including more total barriers and little agreement with patients on their relative importance. Largest differences in providers' perceptions of patient barriers included poor motivation, high use of fast food, inadequate family support, and lack of cooking skills—all suggesting patient inadequacy. Patients, on the other hand, demonstrated evidence of high motivation through their desire for diet education and high rate of blood glucose measurement. Patients identified primary care providers as a main source of nutrition education, yet providers indicated lack of time for diet discussion and preferred other staff do the teaching. Conclusion. The findings from this study strongly suggest that health systems need to consider patient, provider, and system barriers when implementing nutrition education and management programs.

40 Suez Canal University Hospital type 2 diabetes mellitus (T2DM) patients' perceived barriers and adherence to dietary guidelines were examined by Abdelsalam et al. (2022). A descriptive study was conducted on 40 diabetic patients in the family practice clinic at Suez Canal University (SCU) hospital. T2DM participants were above 20 years of age. Patients were interviewed using El-Gilany questionnaire to assess socio-demographic characteristics. Using the Perceived Dietary Adherence Questionnaire (PDAQ) and Schlundt's taxonomy of obstacles, the study found that 97.5% of participants had poor adherence to dietary recommendations. Patients showed low adherence to carbohydrate spacing and olive oil use and frequently consumed foods high in sugar and fat. Major barriers included lack of dietary knowledge (84%), financial constraints (61%), and stress (60%). The study concluded that dietary non-adherence is high among T2DM patients and emphasized the need for healthcare providers to address these barriers and support better dietary practices.

Awofala (2024) conducted a qualitative study titled "Diabetes Management in Low-Income Settings: Challenges and Strategies" to explore barriers to effective diabetes management in rural areas of Nigeria and propose solutions. Semi-structured interviews were conducted with 34 patients with diabetes from a safety net primary care practice in Buffalo, New York. Through interviews with patients, thematic analysis identified challenges such as limited access to medications, poor healthcare infrastructure, and low health literacy among patients. Recommendations included community-based education programs and subsidized healthcare services to improve diabetes management outcomes.

Ahmad (2024) conducted a snap chat study on exploring the barriers to dietary compliance in type 2 diabetic patients in Pakistan. The study aimed to explore the key barriers that prevent patients symptom improvement, and personal motivation. Major barriers included the novelty of the study diet, lack of cooking skills, no change in or worsening of symptoms, lack of diet knowledge, and food preferences and temptations.

with type 2 diabetes mellitus (T2DM) from adhering to dietary recommendations. Between March and July 2024, the researchers conducted a cross-sectional study at Ayub Teaching Tertiary Care Hospital in Abbottabad, Pakistan. All 450 T2DM patients, ranging in age from 18 to 80, had been given dietary recommendations prior to the study. A 27-item questionnaire was completed by participants to assess obstacles to dietary adherence. Cronbach's alpha was used to measure reliability, and Stata version 17 was used to analyze the results. Factor analysis helped us identify the major barriers these patients faced. The study revealed that the most prominent barrier was a lack of understanding of dietary guidelines, accounting for 13.5% of the total variance. Other significant barriers included situational difficulties (11.4%), insufficient family support (10.2%), stress-related eating habits (9.0%), dissatisfaction with the diet's monotony (7.8%), concerns over the cost and perceived ineffectiveness of recommended diets (7.1%), work-related challenges (6.0%), and hunger or feelings of weakness (4.9%). Altogether, these barriers explained 69.9% of the variance.

Coping Strategies Are Employed by Patients with Diabetes Mellitus in Managing Dietary Challenges

A study by Sathiyakala (2023) assessed the level of coping strategies among chronic diabetes mellitus patients admitted to specific hospitals. This study used a descriptive research design and a quantitative research approach. The sample consisted of 200 patients with chronic diabetes who were attending the Medical and Surgical OPD as well as the Inpatient department of a particular hospital. The Purposive Sampling method was used to select the study's samples. The study revealed a level of coping158 (79%) of them were belongs to strengthening of coping, 42(21%) of them were belongs to weakening of coping. In addition, the levels of gender-specific coping strategies differed significantly in demographic variables. There was a significant difference

between levels of coping with alternative medicine of clinical variables. The levels of coping with the work's nature and other psychosocial variables varied significantly.

Raji and Okoye (2022) conducted a literature review of the coping strategies utilized by diabetic patients in Ghana. A systematic literature review technique was used for the study, and published articles and theses that addressed physical, social, and psychological coping mechanisms, as well as the financial ramifications of diabetes mellitus in Ghana, were taken into account. The study revealed that the physical coping techniques included lifestyle adjustments, self-care practices, obtaining transportation assistance, collaboration and integration between traditional and orthodox

4 percent of them had incomplete records. Coping styles were measured using the Brief Version of the Coping Orientation to Problems Experienced (Brief COPE), diabetes specific-distress using the Problem Areas in Diabetes, depression using the Major Depression Inventory and self-care using the Diabetes Self-Care scale. According to the data, among Zambian diabetics, adaptive coping strategies such as acceptance and religious coping were the most frequently utilized.

healthcare systems, as well as seeking health care at health centers and health education. Psychologically, patients participate in emotional self-efficacy, preferring to internalize parts of their views rather than communicating emotionally with their support network. Diabetes management was positively influenced by religion, a strong psychological will, and confidence in diabetes control or a cure-all. Diabetic patients can receive social assistance from family and friends, religious organizations, psychologists, patient organizations of general health professionals, and non-governmental organizations.

Aguiar et al. (2021) in their study "Children with type 1 diabetes mellitus: the experience of disease." explored the main challenges faced by children with type 1 diabetes mellitus and describe their coping strategies. Qualitative study conducted with a semi-structured interview with children aged 8 to 11 with type 1 diabetes mellitus diagnosis who received care in the outpatient clinic of a university hospital in the state of Rio de Janeiro, Brazil. The results had been analyzed and categorized as per thematic analysis. The category "Living with diabetes" and its two subcategories, "Challenges to disease coping" and "Family participation and support in the disease process," emerged from the systematization of the qualitative data, which was a process of apprehending meaning from statements made by children and adolescents.

Onyishi et al. (2022) "Potential influences of religiosity and religious coping strategies on people with diabetes." review explored the potential influences of religiosity and religious coping strategies on people with diabetes. Using a literature review, this study looked into how patients' religiosity and religious coping strategies can affect how well they manage their diabetes. The researchers found and cited published papers that were subjected to descriptive-narrative analysis after conducting a literature search. An important goal of the descriptive-narrative analysis was to provide descriptions of the selected literature and take implications from the literature. The

results of studies reviewed show some religious coping strategies for managing chronic diseases such as diabetes. Religious coping strategies may have a positive effect on diabetes management, according to the studies, but they also found some negative effects. The studies did find a connection between religiosity and diabetes management.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

Research methodology is the plan for carrying out the precise procedures of a study. This chapter discusses research designs, research settings, study populations, sample sizes, sampling techniques, data collecting tools, instrument validity and reliability, data gathering and analysis methods, and ethical considerations.

3.1 Research design

This study will use a cross-sectional survey design to examine perceived challenges to dietary compliance and glycemic control among diabetes patients at University of Benin Teaching Hospital from February, 2025 to March 2025. This approach allows for data collection at a single point in time, capturing current level of dietary compliances, perceived challenges and the coping strategies employed by employees. The study will gather information on patients' experiences with dietary guidelines, obstacles to compliance, and coping strategies employed by patients with diabetes mellitus in managing dietary challenges.

3.2 Research Setting

The research will be carried out at the Consultant Outpatient Department (COPD) University of Benin Teaching Hospital. The University of Benin Teaching Hospital, established on May 12, 1973, under the Nigeria National Health Act, is a prominent tertiary healthcare facility. It is the sixth first-generation teaching hospital in Nigeria and was created to complement the University of Benin, offering secondary and tertiary care services. Situated along the Benin-Lagos expressway in Egor Local Government Area of Edo State, the hospital comprises various

departments and units, including the infant welfare clinic, in vitro-fertilization unit, nursing services, pharmaceutical services, radiological services, intensive care unit, and other medical facilities. The radiotherapy/clinical oncology department was established in 2007 as part of the Federal Government of Nigeria/Vamped Engineering Rehabilitation of Teaching Hospitals project during the presidency of Olusegun Obasanjo. This department provides specialized clinical services at the local and national levels, with patient assessments conducted through the Accident and Emergency Unit. Consultant outpatient clinics are held on Mondays from 8:am to 4:00 pm, while the Endocrinology clinic runs on Mondays, and Fridays every week.

3.3 Target Population

This comprises of patients that came to COPD of the UBTH for two months from February 2025 to March 2025.

February 2025							
ENDOCRINOLOGY	**Old**		**New**		**NHIS**		
	M	**F**	**M**	**F**	**M**	**F**	**Total**
	23	48	6	4	15	34	130
	14	52	3	2	6	16	93
	17	24	2	2	7	8	60
	20	26	4	6	3	4	57
Total							340
March 2025							

ENDOCRINOLOGY	Old		New		NHIS		
	M	**F**	**M**	**F**	**M**	**F**	**Total**
	22	57	3	3	14	17	116
	11	25	1	1	5	20	63
	16	25	2	2	5	13	63
	21	32	5	10	1	8	77
Total							319

Table 3.1: Statistics for the month of February 2025 – March 2025 (MOP Clinic UBTH)

The average number of diabetic patients seen for the period of February 2025 to March 2025 was 330.

3.4 Sample Size and Formula

The Taro Yamane method will be used in determining the sample size. This method was formulated in the year 1967.

The formula is given as follows

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

Where

n = Signifies the sample size

N = Signifies the population under study

e = Signifies the margin error it could be 0.10, 0.05 or 0.01)

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

$$n = \frac{330}{1 + 330(0.05)^2}$$

$$n = \frac{330}{1 + (0.0025)}$$

$$n = \frac{330}{(1+0.80)}$$

$$n = \frac{330}{(1.80)}$$

$$n = 183$$

Include 10% of the sample size, which will serve as the attrition rate of the work.

$$\frac{10}{100} \times 183 = \frac{18.3}{1}$$

:. n = 183 +18.3

=201.3 approximately, 201

3.5 Sampling technique

This study will employ systematic random sampling to select participants from among patients with diabetes mellitus attending the University of Benin Teaching Hospital. Systematic random sampling will be chosen because it will provide equal probability of selection for all patients while remaining practically implementable in the clinical setting.

3.6 Instruments for data collection

The instrument that will be used for data collection will be a questionnaire, which will be developed based on the objectives of the study. The questionnaire will be divided into three sections: A, B, and C. Section A will cover demographic data, including the patient's age, marital status, and educational status. Section B will contain the medical history assessment, comprising types of diabetes, duration of diagnosis, family history of diabetes, and other health conditions. Section C will consist of patients' perceived challenges of dietary compliance, the level of dietary compliance, and coping strategies that will be employed by patients with diabetes mellitus in managing dietary challenges.

3.7 Validity of the instruments

Validity refers to the degree to which a research instrument measures what it's intended to measure (Polit and Beck 2008). The face and content validity of the instrument will be ensured by the project supervisor and two other experts in University of Benin, Benin City. Due corrections were made in line with the experts' advice and inputs before it was considered valid

3.8 Reliability of the instruments

Reliability refers to the extent to which an assessment tool produces consistent results. A reliable instrument is one that can yield the same result if the behavior is measured again using the same scale. The instrument and methodology to be used in this study will be considered reliable, as the researcher will not manipulate any information but will use the questionnaire to obtain data. The reliability of the questionnaire will be tested on 10% of the study sample size and will be assessed using Cronbach's alpha, which will indicate the level of internal consistency among the variables. A reliability coefficient of 0.77 was obtained. This statistical tool/procedure was to ensure for instrument's internal consistency.

3.9 Method of data collection

The primary source of information will be obtained from the field using the questionnaire. The questionnaires were distributed to the respondents by the researcher. The participants were properly guided by the researcher regarding how to complete questionnaires. It was explained to the respondents that their responses would remain totally confidential.

3.10 Method of data analysis

The data that will be obtained will be analyzed to ascertain the perceived challenges of dietary compliance and glycemic control among patients with diabetes mellitus using descriptive statistics such as frequency, percentage, and mean deviation. The researcher will also use inferential statistics to answer the research questions, while regression analysis will be employed to test the stated hypothesis in the study. The data will be encoded into the Statistical Package for Social Sciences (SPSS) version 25.0, and the data gathered will be organized, analyzed, and interpreted to give meaning to the research findings.

3.11 Ethical consideration

The researcher will obtain a letter of identification from the Department of Nursing Science to the selected hospital. An application for ethical approval will be submitted along with the research proposal to the Health Research Ethics Committee, University of Benin Teaching Hospital, Benin City, Edo State.

The following ethical considerations will be maintained during the research exercise;

Confidentiality: The information provided by respondents will be treated with the utmost confidentiality; therefore, no names or addresses will be requested on the questionnaire. To maintain this confidentiality, no personal identifiers will be used or indicated on any document or questionnaire.

Anonymity: The principle of anonymity will be maintained throughout the study as it will safeguard the identities of participants, ensuring their personal information remains untraceable throughout the study. This approach will help protect participants' privacy and encourage open and honest participation, as they will be assured that their responses will remain confidential and unlinked to their identities.

Informed consent: Informed consent will be obtained from all participants before they take part in the study. Each participant will be provided with detailed information regarding the purpose of the research, the procedures involved, and any potential risks or benefits. Only those who voluntarily agree to participate, after fully understanding the study details, will be included in the research, ensuring ethical standards are upheld throughout the process.

Voluntary participation: Voluntary participation is a fundamental aspect of this study. Participants will be informed that their involvement in the research is entirely voluntary, and they are free to choose whether or not to take part.

Potential for harm: The potential for harm will be carefully considered in this study, and every effort will be made to minimize any risks to participants. The questions asked will be designed to be respectful and non-invasive, ensuring that no participant will feel uncomfortable or distressed. To further safeguard participants, they will be reminded that they can skip any questions they feel uneasy answering and that they have the right to withdraw from the study at any time without consequence.

All information’s obtained were strictly used for academic purposes. Plagiarism was avoided, all authors used in the study were appropriately cited both in the body of the work and at the reference page.

CHAPTER FOUR

DATA PRESENTATION AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter entails the analysis of the obtained data using frequencies and percentages, mean and standard deviation for the research questions and testing of the stated hypothesis using regression analysis, and provision of answers to the research questions earlier stated.

Demographic information

VARIABLE	CATEGORY	FREQUENCY	PERCENTAGES
Age	18-30	8	3.9%
	31-40	31	15.4%
	41-50	64	31.8%
	51-60	58	28.8%
	Above 60	40	19.9%
Sex	Male	100	39.4%
	Female	101	46.8%
Marital status	Single	20	9.3%
	Married	160	74.1%
	Divorced	11	5.1%
	Widowed	10	4.6%

Educational level	No formal education	6	2.8%
	Primary	6	2.8%
	Secondary	74	34.3%
	Tertiary	84	38.9%
	Postgraduate	31	14.4%

Out of two hundred and one respondents of this study, 64(31.8%) were between the ages of 41–50 years, 58(28.8%) were between the ages of 51–60 years, 40(19.9%) were above 60 years. Only 31(15.4%) was within the age group of 31–40 years, while 8(3.9%) of the respondents fell within the age bracket of 18–30 years. In terms of sex distribution, 101(46.8%) of the respondents were females, while 100(39.4%) were males.

With respect to marital status, a significant majority 160(74.1%) of the respondents were married, 20(9.3%) were single, 11(5.1%) were divorced, and 10(4.6%) were widowed. Regarding educational attainment, 84(38.9%) of the respondents had tertiary education, 74(34.3%) had secondary education, and 31(14.4%) had postgraduate qualifications. Meanwhile, only 6(2.8%) had primary education and another 6(2.8%) had no formal education.

MEDICAL HISTORY ASSESSMENT

VARIABLE	CATEGORY	FREQUENCY	PERCENTAGES
Type of Diabetes	Type 1	34	15.7%
	Type 2	147	68.1%
	Gestational	16	7.4%
	Not sure	4	1.9%

Duration of Diabetes Diagnosis	Less than 1 year	36	16.7%
	1-5 years	94	43.5%
	6-10 years	48	22.2%
	11-15 years	14	6.5%
	More than 15 years	9	4.2%
Family History of Diabetes	Yes	84	38.9
	No	105	48.6
	Not sure	12	5.6
Current Treatment Regimen	Diet only	6	2.8%
	Oral medications	96	44.4%
	Insulin injections	24	11.1%
	Traditional/herbal remedies	6	2.8%
	Other	0	0%
Other Health Conditions	High blood pressure	66	30.6%
	High cholesterol	44	20.4%
	Heart disease	20	9.3%

	Obesity	27	12.5%
	Stroke	4	1.9%
	Kidney disease	23	10.6%
	None	17	7.9%
	Other		

Out of two hundred and one respondents of this study, a significant majority 147(68.1%) were diagnosed with Type 2 diabetes, 34(15.7%) had Type 1 diabetes, while 16(7.4%) had gestational diabetes. Only 4(1.9%) of the respondents were unsure of their type of diabetes. In terms of the duration of diabetes diagnosis, 94(43.5%) of the respondents had lived with diabetes for between 1–5 years, 48(22.2%) had lived with the condition for 6–10 years, and 36(16.7%) had been diagnosed for less than 1 year. A smaller proportion 14(6.5%) had been diagnosed for 11–15 years, while 9(4.2%) had lived with the condition for more than 15 years. With respect to family history of diabetes, 105(48.6%) of the respondents reported no family history, 84(38.9%) indicated a family history of diabetes, while 12(5.6%) were not sure. Regarding current treatment regimen, 96(44.4%) of the respondents were on oral medications, 24(11.1%) were on insulin injections, while 6(2.8%) each relied on diet only and traditional/herbal remedies. None of the respondents reported being on other forms of treatment. In relation to other health conditions, 66(30.6%) of the respondents reported high blood pressure, 44(20.4%) had high cholesterol, 27(12.5%) had obesity, and 23(10.6%) had kidney disease. Additionally, 20(9.3%) of the respondents had heart disease, 4(1.9%) had experienced stroke, while 17(7.9%) had no other health conditions.

Tables 3 to 5 present data that address Research Questions 1 to 4.

Table 3: Research Question (1): What is the level of dietary compliance among patients with diabetes mellitus at the University of Benin Teaching Hospital, Benin City, Edo State?

	Mean ($\bar{X}$)	**S.D**	**Criterion Mean**	**Remark**
Following the dietary plan recommended by healthcare providers occurs regularly.	4.18	.762	2.50	Agreed
Consumption of appropriate portion sizes of food happens as advised.	3.80	.961	2.50	Agreed
Limiting carbohydrate intake as recommended for diabetes management is practiced.	3.99	.967	2.50	Agreed
Regular consumption of fruits and vegetables forms part of the daily diet.	3.82	.928	2.50	Agreed
Avoidance of foods high in sugar and fat as recommended for diabetes management is maintained.	3.57	1.028	2.50	Agreed
Proper spacing of carbohydrate intake throughout the day occurs as advised.	3.81	.811	2.50	Agreed
Adherence to meal timing recommendations (eating at regular intervals) is practiced.	4.07	.758	2.50	Agreed
Monitoring of blood glucose levels takes place to evaluate how diet affects glycemic control.	3.73	1.004	2.50	Agreed
Making conscious food choices when eating outside home helps maintain dietary compliance.	3.99	.967	2.50	Agreed
Use of olive oil or other recommended healthy oils happens during food preparation.	3.75	.999	2.50	Agreed
Grand Mean	**3.87**			

Source: *Field Survey, 2025*

Table 3 provides insights into respondents' perceptions regarding adherence to dietary recommendations for effective diabetes management. All ten items evaluated under this research objective recorded mean scores above the criterion mean of 2.50, indicating overall agreement among respondents that they comply with dietary guidelines recommended by healthcare providers. Specifically, the item *"Following the dietary plan recommended by healthcare providers occurs regularly"* received the highest mean score of 4.18 (S.D = 0.762), suggesting that respondents strongly recognize the importance of adhering to structured dietary plans provided by professionals. Similarly, the statement *"Adherence to meal timing recommendations (eating at regular intervals) is practiced"* recorded a high mean of 4.07 (S.D = 0.758), reinforcing the perception that consistency in meal scheduling is considered essential by respondents in managing their diet. The item *"Limiting carbohydrate intake as recommended for diabetes management is practiced"* and *"Making conscious food choices when eating outside home helps maintain dietary compliance"* both recorded mean scores of 3.99 (S.D = 0.967 each), reflecting that respondents are attentive to portion control and dietary adjustments, even outside the home environment. Additionally, *"Consumption of appropriate portion sizes of food happens as advised"* (Mean = 3.80, S.D = 0.961) and *"Regular consumption of fruits and vegetables forms part of the daily diet"* (Mean = 3.82, S.D = 0.928) emphasize respondents' willingness to incorporate balanced and healthy food options in their daily meals.

Interestingly, the lowest mean score of 3.57 (S.D = 1.028) was observed for the item *"Avoidance of foods high in sugar and fat as recommended for diabetes management is maintained."* Although still above the criterion mean, this relatively lower score suggests that while respondents generally comply with healthy dietary practices, avoiding sugary and fatty foods remains a more challenging aspect of dietary adherence. The grand mean of 3.87 further

confirms that respondents collectively agree with the statements, underscoring a strong overall adherence to dietary recommendations. This finding highlights the importance of continuous education and support from healthcare providers in promoting sustained dietary compliance for effective diabetes management.

Table 4: Research Question (2): What are the perceived challenges to dietary compliance among patients with diabetes mellitus at the University of Benin Teaching Hospital, Benin City, Edo State?

	Mean ($\bar{X}$)	**S.D**	**Criterion Mean**	**Remark**
Understanding the dietary guidelines provided for diabetes management presents difficulties.	3.52	1.175	2.50	Agreed
The financial cost of recommended diabetic foods creates barriers to dietary compliance.	3.75	1.054	2.50	Agreed
Stress and emotional factors negatively impact adherence to the diabetic diet.	4.05	.879	2.50	Agreed
The recommended diabetic diet feels too restrictive.	3.72	1.032	2.50	Agreed
Family gatherings and social events make maintaining dietary compliance difficult.	3.82	.915	2.50	Agreed
Support from family members for adhering to dietary requirements is insufficient.	3.55	1.108	2.50	Agreed
Work schedule/environment creates challenges for following the recommended diet.	3.57	1.028	2.50	Agreed
Feelings of hunger or weakness result from following the recommended diabetic diet.	3.64	.944	2.50	Agreed
Cooking skills needed to prepare appropriate diabetic meals are challenging to acquire.	3.88	.894	2.50	Agreed
Doubts exist about whether the recommended diet effectively controls diabetes.	2.45	.386	2.50	Disagreed
Grand Mean	**3.59**		2.50	

Source: *Field Survey, 2025*

Table 4 provides insights into respondents' perceptions regarding the challenges to dietary compliance among individuals managing diabetes. All ten items recorded mean scores above the criterion mean of 2.50, indicating general agreement among respondents that they encounter various obstacles when attempting to adhere to the recommended diabetic diet. Notably, the item "Stress and emotional factors negatively impact adherence to the diabetic diet" received the highest mean score of 4.05 (S.D = 0.879), highlighting the strong influence of psychological and emotional well-being on dietary practices. Similarly, "Cooking skills needed to prepare appropriate diabetic meals are challenging to acquire" recorded a high mean of 3.88 (S.D = 0.894), suggesting that practical knowledge of food preparation poses a significant barrier to compliance. The influence of social and environmental factors was also evident. The statement "Family gatherings and social events make maintaining dietary compliance difficult" had a mean score of 3.82 (S.D = 0.915), while "The financial cost of recommended diabetic foods creates barriers to dietary compliance" recorded 3.75 (S.D = 1.054). These findings imply that both social engagements and economic considerations present notable difficulties for respondents. Likewise, "The recommended diabetic diet feels too restrictive" (Mean = 3.72, S.D = 1.032) further illustrates respondents' perception that strict dietary rules may limit flexibility in food choices.

Interestingly, the lowest mean score of 2.45 (SD = 0.386) was recorded for the question "Doubts exist about whether the recommended diet effectively controls diabetes." Unlike other items, this is lower than the criteria mean, indicating that respondents usually disagree with the assumption that the suggested diet is ineffective. This suggests faith and confidence in dietary rules as a useful tool for diabetes treatment. The grand mean of 3.59 indicates respondents' general agreement that a variety of factors—psychological, economical, social, and practical—influence their capacity to completely comply with dietary needs. This emphasizes the necessity

for comprehensive support strategies, such as stress management interventions, nutrition education, family involvement, and cost-effective dietary planning, to enhance compliance with diabetes dietary guidelines.

Table 5: Research Question (3). What coping strategies are employed by patients with diabetes mellitus in managing dietary challenges at the University of Benin Teaching Hospital, Benin City, Edo State?

	Mean ($\bar{X}$)	**S.D**	**Criterion Mean**	**Remark**
Seeking emotional support from family and friends helps when facing dietary challenges.	4.18	.799	2.50	Agreed
Using religious practices (prayer, meditation, etc.) assists in coping with dietary management challenges.	3.72	1.031	2.50	Agreed
Actively seeking information improves knowledge about diabetes dietary management.	4.00	1.012	2.50	Agreed
Participating in diabetes support groups provides opportunities to share experiences and coping strategies.	3.94	.849	2.50	Agreed
Planning meals in advance facilitates better adherence to dietary recommendations.	3.72	.965	2.50	Agreed
Developing alternative cooking methods makes diabetic meals more appealing.	4.07	.765	2.50	Agreed
Practicing self-monitoring of blood glucose helps understand how different foods affect blood sugar levels.	3.86	.922	2.50	Agreed
Integrating physical activity into daily routine assists in managing blood glucose levels.	4.01	.916	2.50	Agreed
Using stress management techniques prevents stress-related dietary non-compliance.	3.88	.866	2.50	Agreed
Communicating openly with healthcare providers about dietary challenges results in receiving appropriate support.	3.81	.845	2.50	Agreed
Grand Mean	**3.87**		2.50	

Source: *Field Survey, 2025*

Table 5 presents respondents' perceptions regarding the coping strategies adopted in managing dietary challenges associated with diabetes. All ten items recorded mean scores above the criterion mean of 2.50, indicating general agreement among respondents that they employ various coping mechanisms to sustain dietary adherence. Among the strategies, "Seeking emotional support from family and friends helps when facing dietary challenges" recorded the highest mean score of 4.18 (S.D = 0.799), suggesting that respondents greatly value emotional and social support in overcoming dietary obstacles. Similarly, "Developing alternative cooking methods makes diabetic meals more appealing" (Mean = 4.07, S.D = 0.765) and "Integrating physical activity into daily routine assists in managing blood glucose levels" (Mean = 4.01, S.D = 0.916) highlight the proactive measures respondents take to make dietary management both sustainable and effective.

The items "Actively seeking information improves knowledge about diabetes dietary management" (Mean = 4.00, S.D = 1.012) and *"Participating in diabetes support groups provides opportunities to share experiences and coping strategies"* (Mean = 3.94, S.D = 0.849) also received high ratings, showing that respondents place importance on information sharing and community support in coping with dietary demands. In addition, *"Practicing self-monitoring of blood glucose helps understand how different foods affect blood sugar levels"* recorded a favorable mean of 3.86 (S.D = 0.922), reflecting respondents' awareness of the role of self-assessment in maintaining compliance. On the other hand, the lowest mean scores of 3.72 were observed for both "Using religious practices (prayer, meditation, etc.) assists in coping with dietary management challenges" (S.D = 1.031) and "Planning meals in advance facilitates better adherence to dietary recommendations" (S.D = 0.965). Although still above the criterion mean, these results suggest that while these strategies are practiced, they are not considered as highly effective as others such as social support and meal preparation techniques. The grand mean of

3.87, though lower compared to the previous tables, still affirms that respondents generally adopt coping strategies to overcome dietary challenges. This finding underscores the importance of encouraging multidimensional coping approaches—emotional, social, practical, and lifestyle-based—to enhance dietary adherence among individuals with diabetes.

Hypothesis Testing

Table 6: Patients with diabetes mellitus at the University of Benin Teaching Hospital do not perceive any significant challenges to dietary compliance.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.769[a]	.591	.580	.494	.591	56.296	5	195	.000

The regression analysis yielded an R value of .769**,** indicating a strong positive relationship between the independent variables and patients' perception of challenges to dietary compliance. The R Square value of .591 implies that 59.1% of the variance in perception of dietary compliance challenges can be explained by the predictors in the model. The F-change statistic ($F = 56.296$, $p = .000$) is statistically significant at $p < 0.05$, confirming that the predictors collectively have a significant effect on the dependent variable. Given this result, the null hypothesis — that patients with diabetes mellitus at the University of Benin Teaching Hospital do not perceive any significant challenges to dietary compliance — is rejected. This finding indicates that such patients indeed perceive significant challenges that may hinder their adherence to dietary recommendations.

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.638	5	13.728	56.296	.000[b]
	Residual	47.551	195	.586		
	Total	116.189	200			

The ANOVA table further validates the model's significance, with a Sum of Squares for regression = 68.638 and a Mean Square = 4.181**,** yielding an F-statistic of 5.296 at $p < 0.05$. This demonstrates that the combined effect of the independent variables significantly influences the likelihood of patients regularly following the dietary plan recommended by healthcare providers. Given these results, the null hypothesis — that patients with diabetes mellitus at the University of Benin Teaching Hospital do not perceive any significant challenges to dietary compliance — is rejected. This indicates that the identified challenges play a meaningful role in dietary adherence among this patient group.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter provides the discussion of findings in accordance to the stated objectives and hypothesis, implications for nursing, limitations, summary, conclusion, recommendation and suggestion for further studies.

5.2 Discussion of Findings

level of dietary compliance among patients

The results support the fact that the respondents tend to follow diet prescription as a symptomatic treatment of diabetes with a particular focus on well-structured meal plans, meal timing, portion control, and fruits/vegetables. This is in line with Evert et al. (2020), who clarified that dietary planning - especially the compliance with specific nutrition interventions- has always been one of the key elements of diabetes treatment and can vastly change the glycemic indicators. The strong adherence to the information given by the healthcare professionals found here is indicative of patients accepting the need to use organized meal schedules in order to better manage diabetes.

The adherence to avoiding foods that are high in sugar and fat was relatively lower indicating that lifestyle modification in these areas has not been achieved well. This resounds with the observation of Young et al. (2020), who stated that cultural preferences, environmental factors, and accustomed eating habits frequently act against adhering to dietary restrictions even when the patients know of their health benefits. These results emphasize the importance of culturally conciliatory nutrition training that does not put an excessive amount of wellbeing proposals against life practicalities.

Challenges to Dietary Compliance

The research also indicated that there were prominent issues to dietary compliance. Stress, emotional pressure, shortage of funds, lack of cooking skills, and social engagements were listed as some of the greatest barriers. Such obstacles are concordant with Mphwanthe et al. (2021), who established psychosocial and economic barriers as the key determiner of dietary adherence in diabetes management, especially in low-resource settings. The fact that respondents view dietary requirements as being too rigid speaks to the burden of managing dietary self-management psychologically, whereas the fact that respondents do trust the effectiveness of the professionally intended dietary advice further proves the effectiveness of evidence-based practice. The trust is a favorable aspect because Okemuo et al. (2020) found that trust of dietary guidelines provided in the treatment of chronic illnesses promoted patient adherence over the long-run.

Coping Strategies

The strategies employed by individuals, as far as coping is concerned, can also give great insights. Family and peer support, changes in the character of cooking, physical activity, and attendance at support groups were rated as very important meaning that comprehensive multidimensional coping methods are notable. This correlates with Wang et al. (2022) who showed that social and community support networks improve resilience and adherence to diabetes patients. Although religious activities and meal planning were also reported, they ranked lower, which indicates that they may not be the most effective way of tackling psychosocial and practical barriers that patients experience.

Association between of dietary Challenges and dietary Compliance of patients with diabetes mellitus

The ANOVA and regression analysis results demonstrate that dietary challenges, especially psychosocial, financial, and practical difficulties are important contributors to dietary compliance. The evidence acts in favor of the arguments by Asante et al. (2020), stating that any stakeholder should consider managing diabetes not only with medical advice but also the social and economic situations affecting adherence. These results buttress the idea that dietary compliance is multifactorial and should be addressed using interventions that integrate nutritional counselling with emotional, financial and social support systems.

5.3 Implication to Nursing

The results of this paper can be embodied with a significant implication on nursing practice, nursing education and nursing research especially in the process of managing chronic disorders, in this case diabetes. Nurses are healthcare professionals working at the forefront and are in a position to assist patients in combating the various factors limiting the adherence of dietary treatments and can enforce measures enhancing health outcomes.

Nursing Practice: The implications of this study will provide direct impacts on the nursing practice of diabetes care. Nurses are an important source of education, counseling and empowerment of individuals to follow nutritional advices in the face of psychosocial, financial and cultural constraints. Nurses can improve their practice on the basis of the findings by:

- Delivering personalized nutrition advice focused on cultural differences, financial resources and even preferences of patients to enhance compliance and increase the view that diets are less rigid.

- Incorporating into care the routine inclusion of psychosocial support by assessing stress, emotional pressures, and financial limitations to religiously adherent dietary adherence and connecting patients to the available services.
- Working with multidisciplinary teams, such as dietitians, social workers and psychologists to ensure care provided is all comprehensive including the medical, social and emotional needs of patients.
- Facilitating coping behaviors that include family support, peer support groups (as this study found it to have a positive effect on adherence), and exercise, as coping behaviors found to have a positive effect on adherence in this study. Nurses ought to support and promote these support systems.
- Promoting community-based interventions that render affordable food choices, cookery demonstrations, and effective tools to assist a patient in adopting a healthier eating lifestyle in a limited resource area.

Nursing Education: The study's findings also highlight the importance of nursing education in preparing nurses to effectively address dietary adherence challenges in diabetes care. To strengthen education, the following strategies are recommended:

- Integration of evidence-based nutrition and lifestyle change content into nursing education such as culturally sensitive dietary guidance and education of the patient.
- Provision of continuous external training to nurses, already practising, with the aim of training on advanced communication skills and motivational interviewing concepts and techniques on how to address the psychosocial and financial barriers to dietary adherence.
- Concentrating on patient-centered approach in education, nurses must understand that they must integrate biomedical recommendations and the reality of patients.

- Building advocacy by nurses, so that they can take action to change institutional and community-level policies, to enhance access to healthy, affordable foods and more diabetes-friendly physical and built environments.

Nursing Research: This study contributes valuable insights into the challenges and coping mechanisms associated with dietary adherence in diabetes care. However, further nursing research is needed to strengthen evidence-based practice. Future directions include:

- The longitudinal trials to assess the prolonged effectiveness of the adherence to dietary measures to the glycemic parameters, quality of life, and complications among the population with diabetes.
- Qualitative studies were conducted on lived experiences of patients with dietary restrictions in particular, cultural, emotional, and financial problems in order to use more personalized nursing interventions.
- Two types of intervention studies were conducted to test the effects of nurse led educational programs, community based nutrition interventions and psychosocial support interventions on dietary compliance.
- Cross-sectional research to compare the level of dietary adherence in different socioeconomics and cultural contexts to guide the design of specific/individualized intervention.

5.4 Limitation of Study

i. This was purely a quantitative study with no opportunity for participants to write down comments or fully express other concerns that were not addressed by the questionnaire

ii. This was a cross sectional study which subjects the responses from the respondents to a recall bias

5.5 Summary of Findings

This study explored the perceived challenges to dietary compliance and glycemic control among patients with diabetes mellitus, with a focus on understanding the effect of library computerization on the academic achievement, the level of dietary compliance among patients with diabetes mellitus, perceived challenges to dietary compliance among patients with diabetes mellitus and coping strategies are employed by patients with diabetes mellitus in managing dietary challenges. The study employed a quantitative design using structured questionnaires distributed to 201 respondents. Here are some key findings, which showed that following recommended dietary measures has a positive effect on diabetes management. The respondent concurred that adhering to the diet plans of health care providers, having appropriate meals at appropriate times, carbohydrates reduction and inclusion of fruits and vegetables in their diets help in health outcomes. Compliance with a diet, but not necessarily sugar drawing appeal, was strongly subject to influencing factors like emotional well-being, ability to cook, affordability of diabetic foods, and social pressures (e.g. family get-togethers). Nevertheless, stress, limited options as far as meals are concerned, lack of family support, and work demands undermine proper adherence to the dietary guidelines. Interestingly, the respondents did not differ with the phrase that the recommended diet is ineffective, because they are very much convinced with the role it plays in controlling diabetes. In addition, the subjects listed some of the coping techniques that could be used to maintain compliance including seeking emotional support, physical activity, alternative cooking technique, arranging meals and joining support groups as some of the excellent methods to sustain compliance. These results support the need to implement holistic interventions, such as financial aid, stress solutions, dietetic education, and the significance of relatives to help financial aid, stress solutions, dietetic education, and the significance of relatives to help individuals with diabetes to boost adherence to their diets.

5.6 Conclusion

This study assessed the perceived challenges to dietary compliance and glycemic control among patients with diabetes mellitus, with a focus on adherence levels, challenges to compliance, and coping strategies. The results obtained indicated that the vast majority of the respondents were willing to adhere to suggestions or recommendations of their diet including those related to following the right time of meals, restricting the consumption of carbohydrates, and consuming fruits and vegetables regularly. The practices support the affirmative impact of the adherence to diet to effective control of diabetes. In spite of this, a number of inhibitors were found. Emotional stress, financial burdens of the recommended foods, social events, limited variety of meal options, and inadequate family support were the major factors inhibited consistent compliance to diet. Nevertheless, in general, respondents were sure about the effectiveness of recommended dietary guidelines, and they denied the idea that there is no control over diabetes through such diet. The paper has also shed light on the coping mechanism adopted by people to deal with these issues. Getting the support of family and friends, physical exercise, meal planning, taking part in support groups, and learning alternative cooking techniques were considered practical methods of increasing adherence. These results indicate that social and individual coping mechanisms are essential in maintaining compliance. Finally, the study overall concludes that despite generally positive response to measures on dietary management skills, several barriers still remain in their poll: To counter these challenges, an inclusive system that involves healthcare professionals, relatives, politicians, and the neighborhood should be used. Increased support and measures to alleviate education, counseling, employment, and family support mechanisms and finance in order to access diabetic diets is paramount in improving diet compliance and, in turn, health outcomes in patients with diabetes.

5.7 Recommendation

Based on the finding and conclusion the following recommendations were made:

1. **Strengthen Patient Education and Counseling:** Healthcare providers should intensify nutrition education and continuous counseling sessions for diabetic patients. This will improve their knowledge of dietary guidelines, build self-efficacy, and reduce misconceptions that hinder adherence.
2. **Enhance Family and Community Support Systems:** Since lack of family support and social pressures were identified as major barriers, families should be actively involved in dietary counseling sessions. Community-based support groups should also be encouraged to provide emotional, social, and psychological reinforcement for patients.
3. **Improve Accessibility and Affordability of Healthy Foods:** Policymakers and healthcare institutions should collaborate to subsidize the cost of recommended diabetic foods and promote affordable meal plans. This will help reduce the financial burden, making it easier for patients to comply with dietary recommendations.

5.8 Suggestions for Further Studies

The following topics are suggested for further studies:

1. **Longitudinal Research on Dietary Compliance:** Future studies should adopt a longitudinal design to assess how dietary adherence among diabetic patients changes over time and the long-term effects of consistent compliance on health outcomes.
2. **Comparative Studies Across Demographics:** Researchers could investigate differences in dietary management practices across various socio-economic groups, age categories, or occupational backgrounds to understand how these factors influence adherence levels.

3. **Interventional Studies on Coping Strategies:** Further studies should focus on evaluating the effectiveness of specific coping strategies such as support groups, stress management programs, or nutrition workshops in improving dietary compliance among individuals living with diabetes.

REFERENCES

Adler, A., Bennett, P., Colagiuri, S., Gregg, E., Narayan, K. V., Schmidt, M. I., Sobngwi, E., Tajima, N., Tandon, N., Unwin, N., Wild, S., Yudkin, J., Levitt, N., Mohan, V., Montgomery, S., Nyirenda, M., Tuomilehto, J., den Boon, S., & Hocking, S. (2021). REPRINT OF: Classification of diabetes mellitus. Diabetes Research and Clinical Practice.

Agostoni, C., Boccia, S., Graffigna, G., Slavin, J., Abodi, M., & Szajewska, H. (2024). What should I eat today? Evidence, guidelines, dietary patterns and consumer's behavior. European Journal of Internal Medicine.

Ahmad, R., Shaju, R., Atfi, A., & Razzaque, M. S. (2024). Zinc and diabetes: A connection between micronutrient and metabolism. Cells.

Ahmad, W. (2024). Exploring barriers to dietary compliance in type 2 diabetic patients in Pakistan: A snap chat study. Journal of Population Therapeutics and Clinical Pharmacology.

Alberdi, G., & Begiristain-Zubillaga, M. (2021). The promotion of sustainable diets in the healthcare system and implications for health professionals: A scoping review. Nutrients.

Arias-Marroquín, A. T., Del Razo-Olvera, F. D., Castañeda-Bernal, Z. M., Cruz-Juárez, E., Camacho-Ramírez, M. F., Elías-López, D., Lara-Sánchez, M. A., Chalita-Ramos, L., Rebollar-Fernández, V., & Aguilar-Salinas, C. (2024). Personalized versus non-personalized nutritional recommendations/interventions for type 2 diabetes mellitus remission: A narrative review. Diabetes Therapy.

Atosona, A., Yiadom, L. B., Alhassan, B., Kelli, H., Gaa, P. K., & Kalog, G. L. S. (2024). Dietary compliance and its determinants among type 2 diabetes patients in Tamale Metropolis, Ghana. Journal of Health, Population and Nutrition.

Azeez, Taoreed Adegoke; Abo-Briggs, Tamunosaki1; Adeyanju, Ayodeji Sylvester (2021). A systematic review and meta- analysis of the prevalence and determinants of gestational diabetes mellitus in Nigeria. *Indian Journal of Endocrinology and Metabolism 25(3):p 182-190.*

Bailey, R. (2021). Overview of dietary assessment methods for measuring intakes of foods, beverages, and dietary supplements in research studies. Current Opinion in Biotechnology.

Barra, N. G., Anhê, F. F., Cavallari, J. F., Singh, A. M., Chan, D. Y., & Schertzer, J. (2021). Micronutrients impact the gut microbiota and blood glucose. Journal of Endocrinology.

Bross, R., Genter, P., Lu, Y., Serpas, L., Campa, D., & Ipp, E. (2021). Barriers to healthy eating and diabetes diet education: Divergent perspectives of patients and their providers. Health Education & Behavior.

Dludla, P., Mabhida, S., Ziqubu, K., Nkambule, B., Mazibuko-Mbeje, S., Hanser, S., Basson, A., Pheiffer, C., & Kengne, A. (2023). Pancreatic β-cell dysfunction in type 2 diabetes: Implications of inflammation and oxidative stress. World Journal of Diabetes.

Eliasson, B., Lyngfelt, L., Strömblad, S-O., Franzén, S., & Eeg-Olofsson, K. (2022). The significance of chronic kidney disease, heart failure and cardiovascular disease for mortality in type 1 diabetes: Nationwide observational study. Scientific Reports.

Esquivel, M. K., & Lozano, C. P. (2024). An overview of traditional and novel tools to assess diet. American Journal of Lifestyle Medicine.

Farrugia, F., Aquilina, A., Vassallo, J., & Pace, N. (2021). Bisphenol A and type 2 diabetes mellitus: A review of epidemiologic, functional, and early life factors. International Journal of Environmental Research and Public Health.

Gallin, S., Balbo, L., & Lichtlé, M-C. (2023). Promoting dietary self-efficacy through social support: An application to online weight-loss communities. Recherche et Applications en Marketing (English Edition).

Gardner, C., Vadiveloo, M. K., Petersen, K., Anderson, C., Springfield, S., Van Horn, L., Khera, A., Lamendola, C., Mayo, S., & Joseph, J. J. (2023). Popular dietary patterns: Alignment with American Heart Association 2021 dietary guidance: A scientific statement from the American Heart Association. Circulation.

Gavin, J. R., Rodbard, H., Battelino, T., Brosius, F., Ceriello, A., Cosentino, F., Giorgino, F., Green, J., Ji, L., Kellerer, M., Koob, S., Kosiborod, M. N., Lalic, N., Marx, N., Nedungadi, T. P., Parkin, C. G., Topsever, P., Rydén, L., Sheu, W. H-H., Standl, E., Vandvik, P. O., & Schnell, O. (2024). Disparities in prevalence and treatment of diabetes, cardiovascular and chronic kidney diseases - Recommendations from the taskforce of the guideline workshop. Diabetes Research and Clinical Practice.

Gonzaga, I. R., Pereira, R. J., Welter, Á., & Pereira, A. D. (2024). Nutritional approach in adults with insulin therapy: An integrative review. ARACÊ.

González, P., Lozano, P., Ros, G., & Solano, F. (2023). Hyperglycemia and oxidative stress: An integral, updated and critical overview of their metabolic interconnections. International Journal of Molecular Sciences.

Ishak, I., Walls, M. L., & Aronson, B. (2022). The role of social support in the management of type 2 diabetes mellitus among American Indians: A qualitative study. Monografi: ISSN 1046-7750.

Jeyalakshmi, K., Devi, E., Rao, M., Shashidhara, Y. N., & Thunga, G. (2024). Factors associated with dietary and exercise compliance among elderly with chronic conditions of hypertension and type 2 diabetes mellitus residing in rural areas of coastal Karnataka: A community-based cross-sectional study. Journal of Education and Health Promotion.

Kalantar-Zadeh, K., Rhee, C. M., Joshi, S., Brown-Tortorici, A., & Kramer, H. (2021). Medical nutrition therapy using plant-focused low-protein meal plans for management of chronic kidney disease in diabetes. Current Opinion in Nephrology and Hypertension.

Krishnamoorthy, Y., Rajaa, S., Verma, M., Kakkar, R., & Kalra, S. (2022). Diabetes Therapy.

Kumar, N., Merrill, J., Carlson, S. M., German, J. C., & Yancy, W. S. (2022). Adherence to low-carbohydrate diets in patients with diabetes: A narrative review. Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy.

Kurnia, A. D., & Elya, I. B. A. (2023). Factors related to diet adherence in diabetes mellitus patients: A scoping review. KnE Medicine.

Leslie, R. D., Ma, R. C. W., Franks, P. W., Nadeau, K. J., Pearson, E., & Redondo, M. J. (2023). Understanding diabetes heterogeneity: Key steps towards precision medicine in diabetes. The Lancet Diabetes and Endocrinology.

Li, X. (2025). The research of influence factors and preventive measures that possibly lead to diabetes. Theoretical and Natural Science.

Lima, J. E. B. F., Moreira, N. C., & Sakamoto-Hojo, E. (2022). Mechanisms underlying the pathophysiology of type 2 diabetes: From risk factors to oxidative stress, metabolic dysfunction, and hyperglycemia. Mutation Research. Genetic Toxicology and Environmental Mutagenesis.

Luo, J. (2024). Unveiling the genetic heterogeneity of type 2 diabetes: From multi-ethnic studies to personalized medicine. Biological Evidence.

Mariotti, F., Havard, S., Morise, A., Nadaud, P., Sirot, V., Wetzler, S., & Margaritis, I. (2021). Perspective: Modeling healthy eating patterns for food-based dietary guidelines-scientific concepts, methodological processes, limitations, and lessons. Advances in Nutrition.

Marques, E., Formato, E., Liang, W., Leonard, E. R., & Timme-Laragy, A. (2021). Relationships between type 2 diabetes, cell dysfunction, and redox signaling: A meta-analysis of single-cell gene expression of human pancreatic α- and β-cells. Journal of Diabetes.

Mengstie, M. A., Abebe, E. C., Teklemariam, A. B., Mulu, A. T., Agidew, M. M., Azezew, M. T., Zewde, E., & Teshome, A. A. (2022). Endogenous advanced glycation end products in the pathogenesis of chronic diabetic complications. Frontiers in Molecular Biosciences.

Merino, J. (2022). Precision nutrition in diabetes: When population-based dietary advice gets personal. Diabetologia.

Mirmiran, P., Bahadoran, Z., & Gaeini, Z. (2021). Common limitations and challenges of dietary clinical trials for translation into clinical practices. International Journal of Endocrinology and Metabolism.

Mokdad, A., Dwyer-Lindgren, L., Bertozzi-Villa, A., Stubbs, R. W., Morozoff, C., Shirude, S., Finegold, S., Callender, C., Naghavi, M., & Murray, C. (2022). Trends and patterns of disparities in diabetes and chronic kidney disease mortality among US counties, 1980–2014. Population Health Metrics.

Mousavi, H., Karandish, M., Jamshidnezhad, A., & Hadianfard, A. (2022). Determining the effective factors in predicting diet adherence using an intelligent model. Scientific Reports.

Mugisha, E. K. (2024). The growing diabetes epidemic: A primary health concern for Nigeria's diverse population. Research Invention Journal of Scientific and Experimental Sciences, 4(2), 5-10.

Nishio, M., Takagi, D., Shinozaki, T., & Kondo, N. (2021). Community social networks, individual social participation and dietary behavior among older Japanese adults: Examining mediation using nonlinear structural equation models for three-wave longitudinal data. Preventive Medicine.

Oosterwijk, M., Groothof, D., Navis, G., Bakker, S., & Laverman, G. (2021). High-normal protein intake is not associated with faster renal function deterioration in patients with type 2 diabetes: A prospective analysis in the DIALECT cohort. Diabetes Care.

Patel, J., & null, n. (2023). Diabetes, a global epidemic. John Heinrichs Scholarly & Creative Activities Day.

Qureshi, Q. A., & Wassan, N. A. (2024). Exploring the factors affecting the compliance of treatment among the diabetic patients. Open Access Public Health and Health Administration Review.

Redondo, M., & Balasubramanyam, A. (2021). Towards an improved classification of type 2 diabetes: Lessons from research into the heterogeneity of a complex disease. Journal of Clinical Endocrinology and Metabolism.

Rodríguez-Rodríguez, A. E., Porrini, E., & Torres, A. (2021). Beta-cell dysfunction induced by tacrolimus: A way to explain type 2 diabetes? International Journal of Molecular Sciences.

Ruiz-Narváez, E. (2021). Genetic architecture of type 2 diabetes and its shared genetic component with low birth weight in African Americans. Current Opinion in Clinical Nutrition and Metabolic Care.

Saenz, C., Salinas, M., Rothman, R. L., & White, R. O. (2024). Personalized lifestyle modifications for improved metabolic health: The role of cultural sensitivity and health communication in type 2 diabetes management. Journal of the American Nutrition Association.

Salvia, M., & Quatromoni, P. (2023). Behavioral approaches to nutrition and eating patterns for managing type 2 diabetes: A review. American Journal of Medicine Open.

Sancar, G., & Birkenfeld, A. L. (2024). The role of adipose tissue dysfunction in hepatic insulin resistance and T2D. Journal of Endocrinology.

Singh, A., Kukreti, R., Saso, L., & Kukreti, S. (2022). Mechanistic insight into oxidative stress-triggered signaling pathways and type 2 diabetes. Molecules.

Smith, K., Deutsch, A., McGrail, C., Kim, H., Hsu, S., Mandla, R., Schroeder, P. H., Westerman, K. E., Szczerbinski, L., Majarian, T., Kaur, V., Williamson, A., Claussnitzer, M., Florez, J. C., Manning, A. K., Mercader, J., Gaulton, K., & Udler, M. (2023). Multi-ancestry polygenic mechanisms of type 2 diabetes elucidate disease processes and clinical heterogeneity. medRxiv.

Somerville, M., Chua, D., Johnson, T., Williams, S., Williams, L., & Ball, L. (2021). How do healthcare providers support people with prediabetes to eat well? An in-depth, mixed-methods case study of provider practices. Australian Journal of General Practice.

Sreenivasamurthy, L. (2021). Evolution in diagnosis and classification of diabetes. Journal of Diabetes Mellitus, 11, 200-207.

Su, C., Gao, L., May, C., Pippin, J., Boehm, K., Lee, M. Y. Y., Liu, C., Pahl, M., Golson, M., Naji, A., Grant, S., Wells, A., & Kaestner, K. (2022). 3D chromatin maps of the human pancreas reveal lineage-specific regulatory architecture of T2D risk. Cell Metabolism.

Sun, H., Saeedi, P., Karuranga, S., Pinkepank, M., Ogurtsova, K., Duncan, B., Stein, C., Basit, A., Chan, J., Mbanya, J., Pavkov, M. E., Ramachandaran, A., Wild, S., James, S., Herman, W., Zhang, P., Bommer, C., Kuo, S., Boyko, E., & Magliano, D. (2021). IDF diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. Diabetes Research and Clinical Practice.

The Diabetes and Nutrition Study Group of the European Diabetes. (2023). Evidence-based European recommendations for the dietary management of diabetes. Diabetologia.

Theofilou, P. (2023). Treatment adherence of diabetes mellitus patients: Is it affected by demographic and patient-related factors? A literature review. Academia Medicine.

Uthman-Akinhanmi, Y., Ademiluyi, D., Ibijoke, O., Oyewunmi, B., Ifebajo, A., Olojede, I., & Akinola, O. (2024). Nutritional status and factors influencing blood sugar self-management of patients with type 2 diabetes in government hospital Abeokuta, Nigeria. Egyptian Journal of Nutrition.

Vadiveloo, M. K., Juul, F., Sotos-Prieto, M., & Parekh, N. (2022). Perspective: Novel approaches to evaluate dietary quality: Combining methods to enhance measurement for dietary surveillance and interventions. Advances in Nutrition.

van Rossum, C. V., Ter Borg, S., Nawijn, E. L., Oliveira, A., Carvalho, C., & Ocké, M. (2022). Literature review on methodologies and tools for national dietary surveys; results of ERA EU-menu-project. EFSA Supporting Publications.

Weaver, R., Jackson, A., Lanigan, J. D., Power, T., Anderson, A. J., Cox, A., Eddy, L., Parker, L., Sano, Y., & Weybright, E. H. (2021). Health behaviors at the onset of the COVID-19 pandemic. American Journal of Health Behavior.

Wu, Y., Zhang, Q., & Xiao, X. (2021). The effect and potential mechanism of maternal micronutrient intake on offspring glucose metabolism: An emerging field. Frontiers in Nutrition.

Xourafa, G., Korbmacher, M., & Roden, M. (n.d.). Inter-organ crosstalk during development and progression of type 2 diabetes mellitus. Nature Reviews Endocrinology.

Xu, Z., Feng, J., Xing, S., Liu, Y., Chen, Y., Li, J., & Feng, Y. (2024). Frontiers in Endocrinology.

APPENDIX

QUESTIONNAIRE

DEPARTMENT OF NURSING

FACULTY OF BASIC MEDICAL SCIENCES

UNIVERSITY OF BENIN

BENIN CITY

Dear Respondent

The researcher is a final-year undergraduate student from the above named department, who is currently carrying out a research on: Perceived challenges to Dietary compliance and glycemic control among patients with diabetes mellitus.

Your answer to the questions will be helpful, and the information provided will be treated confidentially and used only for research purposes.

I thank you in anticipation of your assistance.

Yours faithfully,

NOSAYABA Becky Osarenogae

Researcher

SECTION A: DEMOGRAPHICS DATA

Please tick (✓) as appropriate:

1. Age (years): 18-30 ( ) 31-40 ( ) 41-50 ( ) 51-60 ( ) Above 60 ( )

2. Sex: Male ( ) Female ( )

3.Marital Status: Single ( ) Married ( ) Divorced/Separated ( ) Widowed ( )

4. Educational Level: No formal education ( ) Primary ( )Secondary ( )Tertiary ( )

Postgraduate ( )

SECTION B: MEDICAL HISTORY ASSESSMENT

5. Type of Diabetes: Type 1 ( ) Type 2 ( ) Gestational ( ) Not sure ( )

6. Duration of Diabetes Diagnosis: Less than 1 year ( ) 1-5 years ( ) 6-10 years ( ) 11-15 years ( ) More than 15 years ( )

7. Family History of Diabetes: Yes ( ) No ( ) Not sure ( )

8. Current Treatment Regimen: Diet only ( ) Oral medications ( ) Insulin injections ( ) Traditional/herbal remedies ( ) Other (specify) _____

9. Other Health Conditions: High blood pressure ( ) High cholesterol ( ) Heart disease ( ) Obesity ( ) Stroke ( ) Kidney disease ( ) None ( ) Other (specify) _____

SECTION C: PERCEIVED DIETARY ADHERENCE QUESTIONNAIRE

Please complete this section by ticking [✓] the appropriate option in the box provided.

Keys: Strongly Agree (SA) Agree (A) Neutral (N) Disagree (DA) Strongly Disagree (SD)

S/N	ITEMS	SA	A	N	D	SD
	LEVEL OF DIETARY COMPLIANCE AMONG PATIENTS					
10.	Following the dietary plan recommended by healthcare providers occurs regularly.					
11	Consumption of appropriate portion sizes of food happens as advised.					
12.	Limiting carbohydrate intake as recommended for diabetes management is practiced.					
13	Regular consumption of fruits and vegetables forms part of the daily diet.					
14	Avoidance of foods high in sugar and fat as recommended for diabetes management is maintained.					
15	Proper spacing of carbohydrate intake throughout the day occurs as advised.					
16	Adherence to meal timing recommendations (eating at regular intervals) is practiced.					
17	Monitoring of blood glucose levels takes place to evaluate how diet affects glycemic control.					
18	Making conscious food choices when eating outside home helps maintain dietary compliance.					
19	Use of olive oil or other recommended healthy oils happens during food preparation.					
	PERCEIVED CHALLENGES TO DIETARY COMPLIANCE					

20	Understanding the dietary guidelines provided for diabetes management presents difficulties.					
21	The financial cost of recommended diabetic foods creates barriers to dietary compliance.					
22	Stress and emotional factors negatively impact adherence to the diabetic diet.					
23	The recommended diabetic diet feels too restrictive.					
24	Family gatherings and social events make maintaining dietary compliance difficult.					
25	Support from family members for adhering to dietary requirements is insufficient.					
26	Work schedule/environment creates challenges for following the recommended diet.					
27	Feelings of hunger or weakness result from following the recommended diabetic diet.					
28	Cooking skills needed to prepare appropriate diabetic meals are challenging to acquire.					
29	Doubts exist about whether the recommended diet effectively controls diabetes.					
	COPING STRATEGIES FOR MANAGING DIETARY CHALLENGES					
30	Seeking emotional support from family and friends helps when facing dietary challenges.					
31	Using religious practices (prayer, meditation, etc.) assists in coping with dietary management challenges.					
32	Actively seeking information improves knowledge about diabetes dietary management.					
33	Participating in diabetes support groups provides opportunities to share experiences and coping strategies.					

34	Planning meals in advance facilitates better adherence to dietary recommendations.					
35	Developing alternative cooking methods makes diabetic meals more appealing.					
36	Practicing self-monitoring of blood glucose helps understand how different foods affect blood sugar levels.					
37	Integrating physical activity into daily routine assists in managing blood glucose levels.					
38	Using stress management techniques prevents stress-related dietary non-compliance.					
39	Communicating openly with healthcare providers about dietary challenges results in receiving appropriate support.					

APPENDIX II

RELABILITY TEST

Case Processing Summary			
		N	%
Cases	Valid	201	100.0
	Excluded[a]	0	.0
	Total	201	100.0
a. Listwise deletion based on all variables in the procedure.			

Reliability Statistics	
Cronbach's Alpha	N of Items
.77	30

Item total statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Following the dietary plan recommended by healthcare providers occurs regularly.	108.90	160.302	.520	.769
Consumption of appropriate portion sizes of food happens as advised.	109.28	153.410	.691	.763
Limiting carbohydrate intake as recommended for diabetes management is practiced.	109.09	158.620	.482	.769
Regular consumption of fruits and vegetables forms part of the daily diet.	109.26	156.742	.603	.766
Avoidance of foods high in sugar and fat as recommended for diabetes management is maintained.	109.52	163.035	.290	.773
Proper spacing of carbohydrate intake throughout the day occurs as advised.	109.28	167.230	.198	.773
Adherence to meal timing recommendations (eating at regular intervals) is practiced.	109.01	162.440	.445	.770
Monitoring of blood glucose levels takes place to evaluate how diet affects glycemic control.	109.35	152.980	.683	.763
Making conscious food choices when eating outside home helps maintain dietary compliance.	109.10	158.170	.490	.768

Use of olive oil or other recommended healthy oils happens during food preparation.	109.33	157.480	.505	.767
Understanding the dietary guidelines provided for diabetes management presents difficulties.	109.53	165.320	.181	.775
Following the dietary plan recommended by healthcare providers occurs regularly.	110.77	173.110	.069	.778
Stress and emotional factors negatively impact adherence to the diabetic diet.	109.00	162.355	.378	.770
The recommended diabetic diet feels too restrictive.	109.35	155.100	.591	.765
Support from family members for adhering to dietary requirements is insufficient.	109.50	155.885	.501	.767
Work schedule/environment creates challenges for following the recommended diet.	109.49	162.630	.283	.772
Feelings of hunger or weakness result from following the recommended diabetic diet.	109.42	165.770	.196	.773
Cooking skills needed to prepare appropriate diabetic meals are challenging to acquire.	109.20	162.890	.328	.771
Doubts exist about whether the recommended diet effectively controls diabetes.	109.89	155.320	.452	.769
Seeking emotional support from family and friends helps when facing dietary challenges.	108.85	160.020	.500	.768
Using religious practices (prayer, meditation, etc.) assists in coping with dietary management challenges.	109.31	153.250	.647	.764
Actively seeking information improves knowledge about diabetes dietary management.	109.05	156.220	.530	.766
Participating in diabetes support groups provides opportunities to share experiences and coping strategies.	109.12	157.810	.573	.766
Planning meals in advance facilitates better adherence to dietary recommendations.	109.33	166.620	.172	.774
Developing alternative cooking methods makes diabetic meals more appealing.	108.98	165.010	.315	.772
Practicing self-monitoring of blood glucose helps understand how different foods affect blood sugar levels.	109.19	155.910	.646	.765
Integrating physical activity into daily routine assists in managing blood glucose levels.	109.03	158.980	.496	.768
Using stress management techniques prevents stress-related dietary non-compliance.	109.17	157.750	.580	.767
Communicating openly with healthcare providers about dietary challenges results in receiving appropriate support.	109.22	168.420	.118	.774

Scale Statistics

Mean	Variance	Std. Deviation	N of Items

112.37	169.128	13.005	30