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Factors Associated with Low Uptake of Nutritional Diet to Prevent and Control Diabetes Mellitus among Elderly People Visiting Kibagabaga Second-Level Teaching Hospital in Gasabo District, Rwanda

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Abstract: **The prevalence of diabetes mellitus among elderly has increased in Rwanda. Controlling diabetes mellitus primarily focuses on integrating diabetes management into primary healthcare through a national strategy, utilizing home-based care practitioners (HBCPs) to reach patients at the community level, and promoting lifestyle modifications like healthy diet and physical activity. Bur the information in Gasabo hospital remain unknown it was this reason that let to study factors associated with low uptake of the minimum nutritional diet to prevent and control diabetes mellitus among elder people visiting Kibagabaga Second-level teaching Hospital in Gasabo district .Specifically Prevalence of diabetes mellitus management by nutritional diet among elderly people, assess Social economic factors associated with diabetes mellitus management by nutritional diet on the health of elderly people, assess mitigation methods used to prevent diabetes mellitus elderly people from adhering to a nutritional diet tailored for diabetes mellitus prevention and control in Kibagabaga Second-level teaching Hospital in Gasabo District, the study was descriptive cross sectional and cohort, sampling technique was purposive and retrospective using retrospective form , data was management by SPSS version 27 and analyzed by cross tabulation of descriptive and inferential staststics, ethical clearance by MKU school of post graduate and kibagabaga hospital. Results The study shows that many male 119 (66%) participants compared to female gender, 62 (34%), the majority were aged cohort was 41 to 50 77(43%) and least cohort was above 51 years 64, (35.4%). Prevalence of elderly diabetic mellitus in the Gasabo district is only 42% (76), for population health who had chronic conditions and with range of 21 respondents of living with DM for less than 10 years 55 (30%), with RR (0.41, 0.51). OD (0.72), The study associated abundant uptake of heavy sugary foods and limited physical exercise in elderly to be main cause of increased DM with 62 respondents with 34% attack rate. With significant p values of 0.013, 95%CI. The results opined that majority of the respondents 51% (94) received the service from dietary officer and specialist nutrition community health worker to prevent and control DM. while 23% (77), respondents received mitigation service at hospital after visiting o prevent and control type diabetic mellitus in their body. The study recommends need to more physical fitness among the elderly.**

Keywords: **Low uptake of nutritional diet, diabetes mellitus, elders people**.

1. GENERAL INTRODUCTION

The background of the study, the statement of problems, the objectives, the research questions, the study's extent and significance, scope of study and the overall organizational structure make up this research project. For community members, maintaining a healthy lifestyle and a balanced nutritional diet is essential, particularly when employing balanced, healthful meals of various categories that impact various chronic illnesses like diabetes and other related conditions (Schmid, et al.,

2018). The dietary environment is particularly crucial since many people spend a lot of time eating food that is deficient in nutrients, which can lead to decreased productivity and absenteeism, higher health care expenditures, and impairment (Bakris G et al., 2022).

Because type 2 diabetes mellitus and impaired glucose tolerance are becoming more and more common worldwide, countries are focusing more of their attention, resources, and gross domestic product on lowering circulating plasma glucose levels in an effort to prevent the consequences of diabetes mellitus, especially in adults. The bulk of the 422 million individuals with diabetes globally reside in low- and middle-income nations, and the disease is directly responsible for 1.5 million fatalities annually. Over the past few decades, there has been a steady increase in both the prevalence and the number of cases of diabetes (Viikari-Juntura E., 2024).

There are currently 463 million persons with diabetes (1 in 11 people globally, while 1 in 5 are over 65), according to the International Diabetes Federation's 2019 Diabetes Atlas. By 2045, it is anticipated that the total will have increased by an additional 700 million. The direct expenses of treatment and complications, the indirect costs of disability and early mortality, and the intangible costs of a low quality of life all contribute to the significant economic effect (Beck J et al., 2022).

Diabetes, a chronic metabolic condition that over time seriously damages the heart, blood vessels, eyes, kidneys, and nerves, is characterized by elevated blood glucose (or blood sugar) levels. The most common type of diabetes, type 2, usually affects adults. It is caused by the body either growing resistant to insulin or not producing enough of it. Over the past three decades, type 2 diabetes has become much more common in countries of all income levels (Lee, A., 2021). Type 1 diabetes is a chronic condition in which the pancreas is unable to produce a significant amount of insulin on its own. It was formerly known as juvenile diabetes or insulin-dependent diabetes. The life of people with diabetes depends on having access to affordable diabetic treatment, such as insulin (Rutters F et al., 2022).

Glucose metabolism is necessary for normal physiological functions. 90% to 95% of the circulating glucose is supplied by the liver, a crucial metabolic regulating organ, in the post-absorptive state, when the body is no longer absorbing nutrients from the stomach (Maddison R, et al., 2020). About 50% of the glucose is absorbed by the brain during the post-absorptive phase, while only 15% is used by the skeletal muscle. When plasma glucose levels rise, healthy individuals' insulin-sensitive skeletal muscle can absorb up to 85% of the circulating glucose. Because insulin secretion from β cells is tightly linked to glucose availability, blood glucose levels can be adjusted within a normal range (Bauer et al., 2021).

Men and women with diabetes who are 50 years of age or older live an average of 7.5 and 8.2 years less than those without diabetes, according to data from the Framingham Heart Study (Franco O.H, et al., 2017). All of the conventional risk factors for atherosclerosis disease are modulated in part by nutritional variables. In the context of diabetes, making the right dietary adjustments is essential to this subgroup's goal of good aging. According to Safford et al. (2021), diabetes in the elderly raises the risk of poor nutrition, hospital stays, nursing home admissions, and physical disabilities that significantly lower quality of life.

A gradual decline in the pancreatic beta cells' ability to produce insulin could be a predetermined genetic flaw or a normal aspect of aging (Edelman S. V., et al., 2020). Fasting hyperglycemia follows the onset of postprandial hyperglycemia. In addition to improving insulin sensitivity, lifestyle changes that involve weight loss and physical activity can help older persons avoid type 2 diabetes mellitus and glucose intolerance (Iqbal U, et al., 2021). It's interesting to note that new research indicates that an older person's type 2 diabetes may be influenced by how quickly they digest and absorb carbohydrates. The prospective cross-sectional study on health, aging, and body composition examined the dietary glycemic index and glycemic load of 2248 persons between the ages of 70 and 80, together with measurements of body fat distribution and glucose metabolism (Iqbal U, et al., 2021).

In 1994 three million people in Sub-Saharan Africa (SSA) had type 2 diabetes, but that number was projected to increase by two or threefold by 2010. In 2025, it is expected that 18.7 million people will have diabetes in that region 3. Global estimate for types 2 diabetes for adult people between 20-79 years will increase to 35.5% in 2035, and enough number of people with T2D will live in that region. A higher morbidity and mortality rates of type 2 diabetes in SSA countries as well as Rwanda as one of the countries are faced up and also women with Gestational diabetes Mellitus are among the highest risk population to have type 2 diabetes (World Health Organization., 2021). According to the latest data from the WHO, non-communicable conditions account for 36% of deaths in Rwanda, where diabetes counted 1% in 2012. Rwanda registered almost 194,300 cases of adult diagnosed of diabetes and about 5000 diabetic related deaths was found. A study con- ducted in 2014 in three districts shows that 544 patients received treatment for diabetes and the majority of patients had type 2 diabetes (Northern A et al., 2021).

Rwanda is one of the among few countries in SSA that have a strategic plan for NCD integrated into their public health care system Rwanda is included but the management of this chronic disease is still a problem. Generally, the increase of diabetes is due to either modifiable risk factors such as lack of physical activity, the use tobacco, use of alcohol, and unhealthy diets like increased fat and sodium. Some risk factors like both low quantity and quality of fruits and vegetables intake which can be controlled by intervention others are non-modifiable risk factor which are risk factor that cannot be con- trolled by involvement; for example: gender, age, family history, and race or to metabolic risk factors such as raised blood pressure, raised total cholesterol elevated glucose, obesity and overweight. Behaviors or modifiable risk factors can lead to metabolic or physiologic changes (Park CY, 2021).

Type 2 diabetes is caused by modifiable risk factors and is the most common worldwide. One of the highest risk groups for type 2 diabetes is adults with gestational diabetes mellitus, and type 2 diabetes morbidity and death are higher in SSA nations like Rwanda. The study found that the prevalence of diabetes in Rwanda was 7.5% in rural areas and 9.7% in urban areas. It also identified risk factors for hyperglycemia, including obesity, high total cholesterol, hypertension, and increasing age (Mahameed S., 2020). In Rwanda, non-communicable diseases cause 36% of fatalities, with diabetes accounting for 1% in 2012, according to the most recent WHO data (Shumbusho, E. (2016). Nearly 194,300 adult cases of diabetes were detected in Rwanda, and almost 5000 deaths were linked to the disease (Nzabanita, J., et al. 2021). According to a study done in 2014 in three districts, type 2 diabetes accounted for the majority of the 544 patients who underwent diabetes therapy (Alshayban & Joseph, 2020). One of the few SSA nations with an NCD strategy included into their public health care system is Rwanda.

Generally, poor diets with higher fat and sodium content or modifiable risk factors including alcohol consumption, tobacco use, and lack of physical activity are the main causes of the rise in diabetes (Lauer JA, et al., 2018). Numerous physiological changes brought on by aging can significantly impact the nutritional requirements and health of older adults. Making proper dietary advice requires an understanding of these changes. The following section explores age-related physiological changes and how they affect body composition, energy expenditure, and food absorption, metabolism, and utilization (Loayza Villarroel K, et al., 2021).

From the above perspective, this study is going to assess the Factors Associated with Low uptake of Nutritional Diet to prevent and Control Diabetes Mellitus among Elders People Visiting Kibagabaga Second-level teaching Hospital.

Problem Statement

Diabetes is a serious chronic disease that develops when the body cannot effectively use the insulin generated by the pancreas or when there is insufficient production of glucose, the hormone that regulates blood sugar and is one of the major non-communicable diseases (NCDs) is significant public health issue (Bukhman, 2021). According to McLaughlin et al. (2021), the prevalence of diabetes mellitus among adults is rising considerably more quickly in low- and middle-income countries (LMICs) than in high-income countries. It is crucial to keep in mind that adults are most affected by diabetes, which affects nearly 80% of the world's population and resides in LMICs (Agustini et al. 2021).

In elderly adults, malnutrition and glucose intolerance often coexist, but this is often ignored. Frailty, physical disability, and institutionalization that leads to mortality enhance this prevalence (Karuranga et al., 2022). There is no practical way to address the rising prevalence of adult diabetes in Rwanda, where 5.1% of the population was 60 years of age or older in 2020. According to McLaughlin et al. (2023), protein-energy malnutrition is a major contributor to weight loss in older adults and is disproportionate to the burden of disease. It is characterized by a weight loss of more than 5% from baseline, which can be caused by a number of factors, such as protein-energy deficiency, loss of muscle mass and endurance, cognitive impairment, and depression, which primarily affects adults.

Although Rwanda has incorporated a strategic plan for NCDs into its public health care system, diabetes mellitus management remains a challenge (Karuranga S, et al., 2022). According to Ogurtsova et al. (2017), the rise in diabetes is typically caused by either metabolic risk factors like elevated blood pressure, elevated total cholesterol, elevated glucose, obesity, and overweight, or modifiable risk factors like inactivity, tobacco use, alcohol use, and unhealthy diets like increased fat and sodium. Non-modifiable risk factors include gender, age, family history, and race. A related study conducted by Anthony Bazatsinda in 2016, on the prevalence of type 2 diabetes mellitus in patients showed that 22.5% were found with diabetes and all of them were above 40 years. Tracked factors includes socioeconomic issues, including inadequate nutrition, poverty, and a lack of physical activity (Dunachie & Chamnan , 2019).

For the benefit of older people's health, the healthcare system, and society at large, it is imperative that their nutritional demands be met. In older adults, inadequate nutrition can impair immune function, raise the risk of fractures and falls, limit wound healing, cause cognitive decline, and increase the prevalence of chronic diseases. These factors lead to higher

healthcare costs, more hospital stays, and a lower standard of living for senior citizens. Understanding the relevance of traditional risk factors for diabetes in adults is crucial for informing future research and contextualized preventive strategies, as the majority of Rwandan adults have a high risk of developing diabetes mellitus. Factors Associated with Low Adoption of Nutritional Diet to Prevent and Control Diabetes Mellitus Among Elderly Patients at Kibagabaga Second-Level Teaching Hospital will be investigated in this study.

Objectives of the Study

Broad Objective

To determine factors associated with low uptake of the nutritional diet to prevent and control diabetes mellitus among elder people visiting Kibagabaga Second-level teaching Hospital in Gasabo district of Rwanda.

Specific Objectives

i. To determine the prevalence of diabetes mellitus management by nutritional diet among elderly people visiting Kibagabaga Second-level teaching Hospital in Gasabo District;

ii. To assess social economic factors associated with diabetes mellitus management by nutritional diet on the health of elderly people visiting Kibagabaga Second-level teaching Hospital in Gasabo District;

iii. To assess mitigation strategies used to prevent diabetes mellitus elderly people from adhering to a nutritional diet tailored for diabetes mellitus prevention and control in Kibagabaga Second-level teaching Hospital in Gasabo District.

Research Question

i. What is the Prevalence of diabetes mellitus management by a nutritional diet among elderly people visiting Kibagabaga Second-level teaching Hospital in Gasabo District?

ii. What are the Social-economic factors associated with Elderly diabetes mellitus management by nutritional diet on the health of elderly people visiting Kibagabaga Second-level teaching Hospital in Gasabo District;

iii. What are the main mitigation methods used to prevent diabetes mellitus in elderly people in Kibagabaga Second-level teaching Hospital in Gasabo District?

2. THEORETICAL LITERATURE

Prevalence of Diabetes Mellitus Management by Nutritional Diet among Elderly People

Diabetes mellitus, a metabolic disorder with a variety of etiologies, is characterized by persistent hyperglycemia and disturbances in protein, lipid, and carbohydrate homeostasis brought on by deficits in insulin action, secretion, or both (World Health Organization, 2003). While errors in insulin secretion are brought on by malfunctioning pancreatic β cells, abnormalities in insulin action are usually associated with peripheral tissue resistance to insulin. Impaired insulin availability is the ultimate result (Kahn, 2001).

Older persons (defined as those over 65) currently make up about half of all adults with a diabetes mellitus diagnosis due to the strong correlation between T2DM and advancing age. Interestingly, compared to younger adults, older adults have a wider range of physical and cognitive capacities. The complexity of managing disease in older persons is further compounded by the existence of comorbidities, a higher risk of hypoglycemic episodes, the need for individualized care, and a lack of resilience that may raise the risk of frailty. According to Conroy et al. (2011), this review provides up-to-date commentary on the main epidemiological, pathophysiological, and clinical concerns related to type 2 diabetes in older persons.

The balance between higher incidence in this age group and higher mortality among those with T2DM earlier in life is likely reflected in the prevalence of diabetes mellitus leveling off in older persons. In the United States, the prevalence of newly diagnosed diabetes mellitus in older individuals is 21.4%, with an annual rate of approximately 9.4 cases per 1,000 people (Cho, N. H. et al., 2018). When comparing the prevalence of diabetes mellitus by age to World Bank income categories, the highest prevalence is seen in high-income and middle-income nations for adults aged ≥60 years (on average 22% and 19%, respectively). The United States (11.5 million, ~21% of all older adults), India (11.0 million, ~17% of all older adults), Germany (4.9 million, ~27% of all older adults), Brazil (4.3 million, ~22% of all older adults), and China (34.1 million, ~20% of all older adults) currently have the highest numbers of older adults with diabetes mellitus (International Diabetes Federation, 2017).

Due to inadequate care to prevent complications and delayed diagnosis, diabetes mellitus is linked to increased rates of morbidity and mortality in SSA. The burden of endemic infectious illnesses like HIV and TB is expected to rise as a result of this. Because it primarily affects middle-aged people, diabetes mellitus has substantial societal and economic repercussions, particularly in developing nations. Medical bills for those with diabetes are twice as high as those for people without the disease (Nyirenda MJ. et al., 2019). To lower the morbidity and mortality linked to diabetes mellitus, the World Health Organization (WHO) advises making small lifestyle changes (Rutayisire PC, et al., 2020).

Theoretical Framework

Theoretical concerns for diet control of diabetes mellitus are discussed in this section, along with elements that may be especially significant in determining the effectiveness of diet control. In order to maintain long-term compliance with dietary control plans, the patient must assess and reorganize their current eating and exercise habits. This intricate behavioral modification challenge can be comprehended as a result of the interaction of multiple self-regulatory mechanisms when the social action theory is utilized as a conceptual framework.

The theoretical framework of the IFPS is based on the model of dietary behavior developed by Glanz and colleagues (Frank et al., 2005), which highlights the range of interrelated factors that affect food choices. While much research to date has focused on individual-level factors, food choices are heavily influenced by broader environmental factors, including the commercial food system, government policies, and population-level nutrition interventions that shape the food environment and the food supply (ontento IR. Nutrition education, 2005).

Rather, the key to changing dietary behavior is dietary problem-solving activities, which are triggered by information about the disease, the suggested diet, and possible health advantages, as well as other motivated judgment processes. Social interaction processes and individual generating capabilities influence the degree to which knowledge and other motivating variables result in successful issue resolution. A detailed account of the evolution of social action theory can be found elsewhere (Steffen, L.M.; et al., 2022).

Empirical Literature

Prevalence of Diabetes Mellitus Management by Nutritional Diet among Elderly People

The goal of Svendsen et al. (2009)'s study was to ascertain whether LOS among stroke patients was correlated with the quality of healthcare. They conducted a population-based study with 2,636 stroke patients from a Danish stroke hospital between 2003 and 2005. Twelve criteria were utilized to assess the quality of care during this research: "early admission to a stroke unit, early antiplatelet therapy, early anticoagulant therapy, early computed tomography/magnetic resonance imaging scan, early water swallowing test, early mobilization, early intermittent catheterization, early deep venous thromboembolism prophylaxis, early assessment by a physiotherapist and an occupational therapist, and early assessment of nutritional and constipation risk" (Johnsen S. et al., 2009).

Evidence points to a biological connection between T2DM and aging: several human investigations have demonstrated that T2DM causes early cellular senescence and that telomere length is shortened by both diabetes mellitus and aging (Burton, D. G. A. & Faragher, R. G. A., 2018). To determine whether the biological aging processes cause T2DM pathology or whether diabetes accelerates biological aging, more research is necessary to fully understand the nature of this interaction. Through a number of comorbidities that are common in older persons, such as vascular diseases, chronic stress, and poor psychological health, aging can indirectly raise insulin resistance and trigger type 2 diabetes (T2DM) (Lee, P. G. & Halter, J. B., 2017).

Numerous elements that contribute to the development of DM have been examined by researchers. Health researchers believe that lifestyle (Schlesinger et al., 1978), obesity (Lima et al., 2014), demographic variables (Veghari et al., 2010), and hypertension (HTN) are the main causes of diabetes mellitus. HTN and DM evolved together over time (Yildiz et al., 2020). Furthermore, a number of epidemiologic research have shown that the incidence of diabetes mellitus and obesity are rising at the same time. Since both DM and obesity are metabolic disorders marked by abnormalities in insulin action, the word "diabesity" conveys the strong link between the two conditions (Verma and Hussain, 2017).

Furthermore, a study found that DM is significantly correlated with lifestyle choices as physical activity (Simon and Batubara, 2020), sleep quality (Lou et al., 2012), and smoking (Will et al., 2001). According to another study, sociodemographic risk factors, including age (Chan et al., 2009), gender (McCollum et al., 2005), marital status (Ramezankhani et al., 2019), ethnicity (Bancks et al., 2021), and employment status (Islam, 2017), increase the likelihood

of both short- and long-term health complications for individuals with diabetes mellitus (DM) (Powell et al., 2013). Despite the fact that the relevance of these factors in DM is widely acknowledged, few research have examined their precise impact in the Indonesian context.

Social Economic Factors Associated With Diabetes Mellitus Management by Nutritional Diet on the Health of Elderly People

Socioeconomic status (SES), food security, and health and nutrition literacy are examples of individual-level factors that might mediate or moderate the impacts of the food environment on diet quality and behavior. Understanding the effects of health policies on health equity and existing health disparities, as well as the unforeseen consequences of population-level policies on population subgroups that are frequently disregarded in evaluation research, requires a thorough understanding of SES and other individual-level variables.

Low income restricts access to healthier food options, leading to a reliance on cheaper, often less nutritious foods. Education impacts awareness and understanding of the importance of nutrition in managing diabetes. Family and community support can influence dietary adherence; lack of support may reduce the likelihood of a healthier diet. Cultural norms and traditions around food may affect dietary choices, making it challenging to adopt new dietary practices.

The patient must assess and reorganize long-standing eating habits for the dietary adjustment to be successful (Ewart CK, 1989). It is necessary to try new behaviors and incorporate them into a new repertoire if they are successful. In response to changing social (Eckerling L & Kohrs M.B, 1984) and, in the case of diabetes, physiological settings, the new repertoire needs to be performed selectively and kept current (Alpers D.H., et al., 1983). Any dietary recommendation inevitably implies that the person must follow or adhere to certain rules and give up spontaneity and some degree of personal freedom in choosing foods.

Mitigation Methods Used to Prevent Diabetes Mellitus in Elderly People

The goal is to satiate dietary requirements and cravings while adhering to restrictions that promote good health. According to Franz M.J. et al. (1987), the loss of autonomy can lead to disturbances in daily social and familial life as well as in one's self-image and self-esteem. Compared to other aspects of patient adherence, including taking pills or even using insulin, dietary behavior change is more complicated. Medication regimens entail a small number of relatively simple new behavioral acts that can be made routine on a daily basis. By contrast, dietary modification necessitates a number of behavioral adjustments and substitutes (Ewart CK, 1989).

Additionally, dietary adjustments are more complicated than lifestyle modifications like quitting smoking. Although long-standing eating habits may appear to be just as addictive as smoking cigarettes, there are various factors to take into account when trying to break these two kinds of behaviors. As with food, cigarette smoking is not necessary for survival and can be strongly discouraged. It is possible to quit smoking "cold turkey" with the hope that your craving for cigarettes would gradually subside. Maintaining the eating habit and enjoying it while altering the type, amount, and diversity of meals ingested is the difficult part of dietary modification (Harris, P.A., et al., 2019).

Eating heavy in fat, particularly saturated fats, can change the composition of the gut flora. Bacterial diversity may decrease and intestinal permeability may increase as a result. Low-grade systemic inflammation and metabolic endotoxemia are the outcomes of this process, which also increases lipopolysaccharides (LPS) and activates TLR4 (toll-like receptor 4). Fiol et al. (2017) state that this mechanism has an impact on a number of chronic illnesses, including atherosclerosis, diabetes, and obesity. Patients also take trans fatty acids into account. Avoid at all costs foods that contain hydrogenated vegetable oil, or trans fatty acids (Stoody, E.E., et al, 2021). The particular guidelines for people with chronic non-communicable diseases, such type 2 diabetes, are still unknown, despite the Dietary Guidelines for Americans' conclusion that the data did not support the suggestion to cut dietary cholesterol for the general population. According to some research, humans do not need to eat cholesterol because their bodies can create enough of it to suit their structural and physiological needs (Cano, C.; et al., 2020).

Critical Review and Research Gap identification

Ketoacidosis, a non-ketotic hyperosmotic state that can cause stupor, coma, and death, can be brought on by untreated diabetes mellitus. The condition also causes blurred vision, thirst, polyuria, weight loss, and other symptoms. However, these symptoms are typically either very mild or nonexistent. Thus, blood sugar levels may be dangerously high long before the diagnosis is made (Al Rashed, 2011; Conroy et al., 2011). According to media reports, parents give in to their kids'

demands for kid-friendly cookies, box drinks, bullets, and dinners in plastic packaging. This is because ready-to-eat snack packaging is convenient (Lir & Perevalov, 2019). Because they are concerned about health and childhood obesity, which increases with the consumption of bad foods, experts and world leaders have focused on the consumption of nutrient-dense meals.

Micronutrient deficiencies affect about two billion people (Lir & Perevalov, 2019). Patients with type I diabetes mellitus and those who do not respond well to these treatments are treated with insulin-replacement therapy, which entails taking insulin preparations on a daily basis (Nathan et al., 2009). Recently, surgery has been suggested as a diabetes mellitus treatment option to reduce obesity (Valderas et al., 2011). In fact, diabetes mellitus treatment has come a long way since the ancient days, when water and plant extract mixtures were used, and even when olive oil was injected into the rectal cavity (Esmaillzadeh, A., et al., 2016).

Increased intake of whole grains has been associated with a lower risk of heart disease, stroke, cancer, and cardiovascular disease. It has also been linked to a lower risk of mortality from all causes, cardiovascular disease, cancer, respiratory illness, diabetes, and infectious disease, per meta-analyses of prospective cohort studies (Sun, Q., et al., 2016). Although their exact mechanisms of action are unknown, these different phytochemicals have anti-oxidative qualities and regulate lipid metabolism, nuclear transcription factors, and inflammatory mediators.

Conceptual Framework

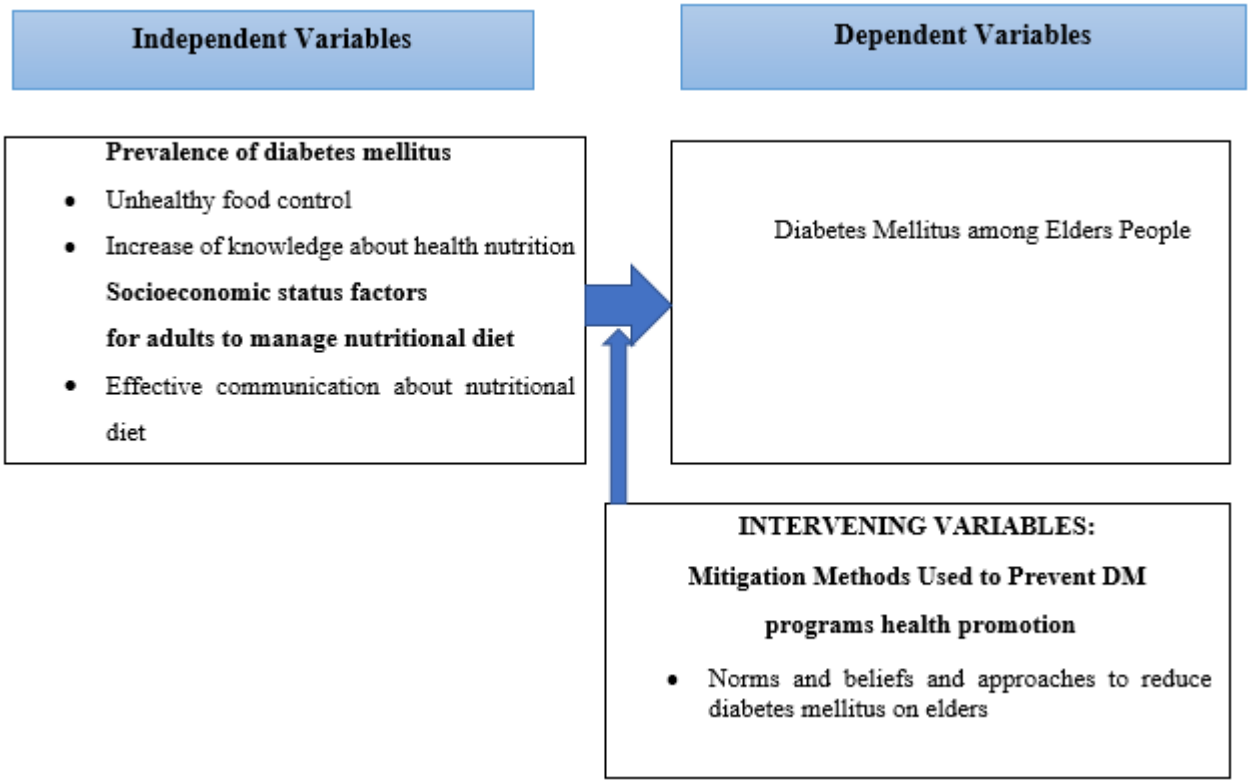

Figure 2.1: Conceptual framework Silali (2023)

3. RESEARCH METHODS

This chapter outlines the strategies, techniques, and different instruments the researcher employed to gather data. The target demographic, sample design, research design, research environment, data collection, data analysis, and ethical considerations were all thoroughly discussed.

Research design

Because case study of Kibagabaga Second-level teaching Hospital regarded as reliable research methods, especially when a comprehensive, in-depth inquiry is needed, the researcher chose to employ one. This is particularly true when dealing with issues that are specific to the community, such poverty and chronic illnesses (Kerzner H., 2008). Because diabetes mellitus is prevalent there and is brought on by a variety of unhealthy eating habits, the researcher used this case study.

Furthermore, a lack of time to prepare a healthy meal was a major issue in Kigali city due to overwork. Numerous diseases are brought on by this, including obesity, which can result in diabetes mellitus.

The purpose of a descriptive research is to outline the traits of a certain person or group of people (Kothari, 2004). Given that the issue examines nutrient-dense foods and their impact on the decline in diabetes mellitus in the Gasabo District, this design technique was suitable. The purpose of descriptive research is to determine and document the current state of the population being studied. It also aids in assessing the population's present condition. The descriptive survey form also raises concerns about the research project's possible cost-effectiveness. The approach is exacting and concentrates on the study's goals (Gay, 2011).

Target population

The target population consists of all the components from which the researcher must choose the sample size. People in the Gasabo district, especially those who previously received care at the Kibagabaga Second-level teaching Hospital, are the study's target group. Hospital employees, Kibagabaga Second-level teaching Hospital patients, and other medical professionals who may have knowledge that could help this study succeed are among those who was consulted.

The Kibagabaga Second-level teaching Hospital in Gasabo was the study site since it was thought to be a trustworthy research location, particularly when a thorough, in-depth inquiry was required to address issues like poverty and chronic illnesses (Kerzner H., 2008).

The sample size was calculated based on the researcher's expectation that 5036 participants would be used. The target population is the entire population from whom a sample could be drawn (Melville & Goddard, 2021). According to Mugenda and Mugenda (2019), sampling is the process used to choose a group of study participants who are representative of the greater community from which they were selected.

Table 1: Target Population

Population understudy	**Respondents' location**	The intended audience
Hospital staff	Kibagabaga Second-level teaching Hospital	45
Clients	Kibagabaga Second-level teaching Hospital	4881
Other stakeholders	Kibagabaga Second-level teaching Hospital	110
Target population		**5036**

The target population of this research was 5036 people who attend Kibagabaga hospital located in Gasabo district, because the District is composed of two hospitals who share to serve people. The target population are categorized in three main categories. Hospital staff, clients, and other stakeholders.

Sample Design

Sample Size

According to Bryman and Bell (2011), a sample size is a subset of the population that is examined during data collection in order to obtain concise information. The sample size is the number of items selected from the population, either intentionally or at random. Of the 5036 people in the population, 181 responded, making up the study's sample size. The sample size was drawn using the Sloven's formula to estimate sampling size, stated as:

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

Whereby: N = the target population

n=the desired sample size

e = margin error of 10%

- The sample size of Kibagabaga hospital staffs $=\frac{45}{1+45*(0.1)^2}=31$
- The sample size of Kibagabaga hospital clients $=\frac{4881}{1+4881*(0.1)^2}=98$
- Sample size of Kibagabaga hospital stakeholders $=\frac{110}{1+110*(0.1)^2}=52$

The research used 31 hospital staffs,98 hospital clients and 52 hospital stakeholders that have any contribution in the implementation of the hospital activities. This means that the total number of sample size of the study was 181 participants and this number provided accurate and updated information.

Sampling Techniques

Since it is impossible to predict in advance how a nitrous diet reduced the incidence of diabetic mellitus, any probability sampling technique was utilized to get data for the study. Therefore, a convenient sampling strategy was employed to obtain responders. The sample methods applied in this study include cluster sampling and purposive sampling.

According to Kidder and Jud (2020), a popular purposive sampling technique is to select examples that are thought to be representative of the population of interest due to their capacity to offer pertinent information on the subject. This indicates that the researcher chose the respondents with a purpose; factors including the frequency of visits to Kibagabaga Second-level teaching Hospital, the hospital's medical staff, and other individuals involved in the disease's information gathering was all taken into account. Hospital respondents are separated into hospital stakeholders in the Gasabo district in the intervention site, hospital clients, hospital employees, and other important stakeholders in compliance with this sample technique. Purposive sampling is a technique for choosing sufficient and high-quality study data that was benefit the research and prevent bias.

4. DATA COLLECTION METHODS

Data collection instruments

Technologies and techniques used to gather data are known as data collection instruments. senco

Normative surveys were the primary use for this data collection tool. This is a methodically created form or document that has a series of questions intended to elicit answers from research informants or respondents in order to gather data or information. It is a form with a series of questions about a subject or set of subjects intended for respondents to respond to. The study's population samples are the responders. The research's data is derived from the respondents' responses (Jaykaran et al., 2011).

The interview process involved talking to a chosen group of people in accordance with a predetermined plan in order to obtain oral information. It is a data collection method that entails presenting spoken and written answers to inquiries. In exceptional circumstances, a "telephone interview" may be employed in place of a face-to-face interview. In addition to the information obtained from the questionnaire, this tool assisted in gathering additional data (Grawitz, M., 2001). Key informants who were purposively selected from among those known to possess information in the field of agricultural production were the subjects of in-person interviews. These include the employees, patients, and other stakeholders of Kibagabaga Hospital.

Procedures of Data Collection

Data collection is the process of gathering and analyzing trustworthy information from a variety of sources in order to address research questions and understand current probabilities. Text, numbers, images, or any other type of media could be used to collect the data. It then passes through processing and structuring to prepare it for decision-making. Understanding and analyzing data can help businesses improve operations, gain a deeper understanding of their clients, and make better decisions. Documentation is a data gathering approach that relies on reading books and other resources, such as reports, to get background information and learn about studies on related issues (Grawitz, M., 2001).

The Reliability and Validity of Study

In order to ensure the validity, the questionnaire guide was pre-tested by conducting a model study to confirm the tools' accuracy and make any necessary modifications. The reliability of the questionnaire used in this study was evaluated using the Cronbach Alpha approach in order to determine how reliable the data is. This data indicates that the survey is reliable. A useful indicator of a latent variable's internal consistency is Cronbach Alpha; acceptable values are usually greater than 0.7, and in this instance, alpha is within the acceptable range.

The accuracy of the data was confirmed before the results are processed. This facilitated the assessment of the reliability of the data collection instruments. This process helped to correct defects and mistakes discovered in the data collection tools, proving their reliability in producing significant field data. Reducing statistical errors was made easy by the reliable data that was obtained. Pearson correlation was conducted through SPSS to test the validity of item questionnaire and it was

done by examining the value of significance for each item. Based on the results obtained; significant value falls between sig (2-tailed) ≤ 0.05, therefore questionnaire is valid. The table demonstrating how the test was conducting is in findings.

Data Analysis

Data analysis includes a number of components and procedures, including diverse approaches that are referred to by different names in several business, scientific, and social science fields (Festing MF & Altman DG, 2002)). While text analytics employs statistical, linguistic, citation, and structural techniques to extract and classify information from textual sources a type of unstructured data predictive analytics concentrates on using statistical models for predictive forecasting or categorization. There are several types of data analysis (Cai & Zeng, 2004). The American Psychological Association (APA) was used in the study to employ established and well-known techniques. The data was analyzed using Statistical Packages for Social Scientists (SPSS), which produces means, frequencies, percentages, correlation, and standard deviation. The researcher needs these statistical tools to interpret the data, and using means and percentages makes it easier to draw conclusions.

Ethical Considerations

To maintain professionalism, respect the confidentiality of the information provided by respondents, and to ensure the ethical conduct of this research, the researcher requested permission to collect data, use questionnaires, and code respondents and institutions rather than naming them. The Kibagabaga Second-Level Teaching Hospital received a formal request to permit the researcher to gather data there. In order to be respected, the respondents wanted to sign the Informed Consent Form, give credit to the study's author, use a standardized tool to reference the results, and present them in a broad manner.

5. RESULTS

Demographic Characteristics of the Respondents

The demographic characteristics of respondents that were assessed included age, gender, residence, university enrollment, occupation, and family history of diabetes mellitus. This provided crucial information by knowing the category of respondents and the strategic ways of discussing with, as well as better way to get real and accurate information. The following tables are composed of different demographic characteristics of respondents including ages, educational level, marital status, employment level, and gender of respondents have been presented to provide more information and increase the understanding of the research study.

Gender of respondents

The study shows that many male 119 (66%) participants compared to female gender, 62 (34%)

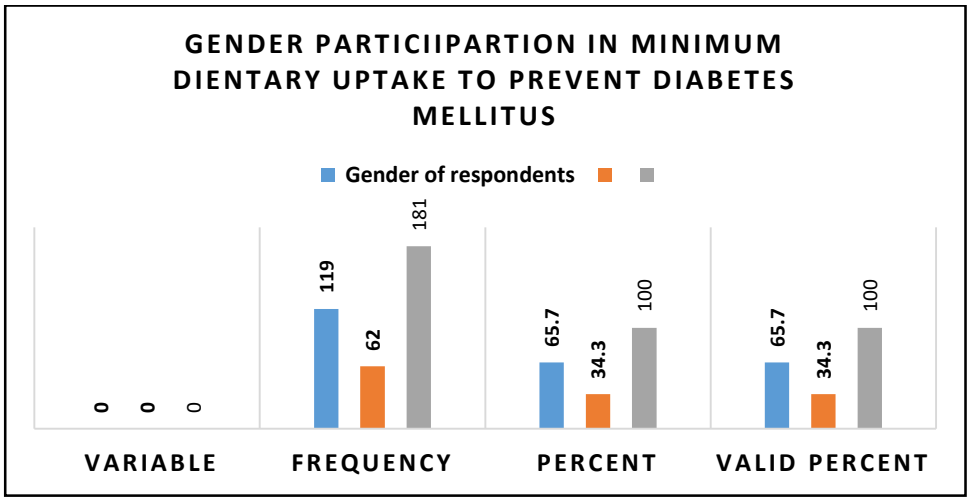

Figure 2: Gender Participation in Minimum Dietary Uptake to Prevent Diabetes Mellitus

The figure above illustrates that men are more at risk of diabetes mellitus than women because the number of respondents who were approached and provided information concerning the research understudy. This also means that men are disposed to the environment where they can easily be affected by the diabetes mellitus.

Ages of respondents

Focused on elderly years as they are mostly attacked by diabetes mellitus, the majority were aged cohort was 41 to 50 77(43%) and least cohort was above 51 years 64, (35.4%).

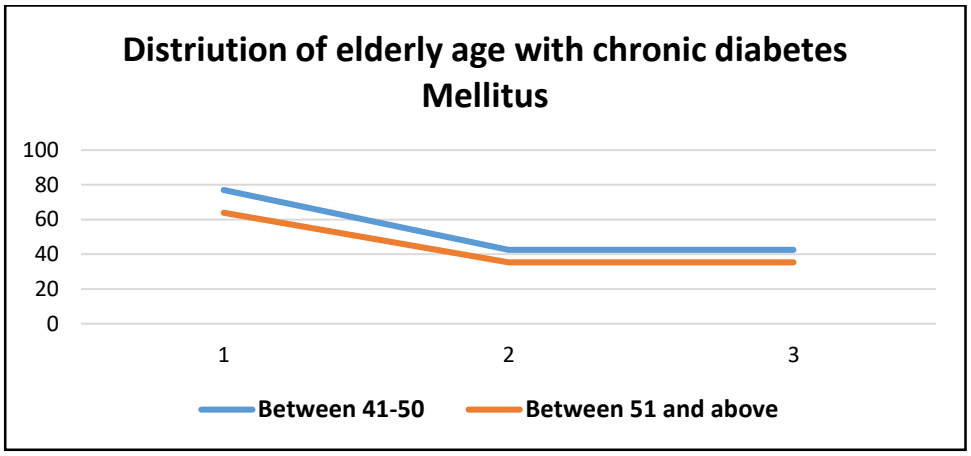

Figure 3: Distributions of elderly age with chronic diabetes Mellitus

The figure above showed that researcher corrected information to different categories of the years, whereby every category of years there are the people with diabetes mellitus diseases. This implies that all people are the candidates of diabetes mellitus if not well managed.

Prevalence of Diabetes Mellitus Management by Nutritional Diet among Elderly People

Prevalence of elderly diabetic mellitus in the Gasabo district is only 42% (76), for population health who had chronic conditions and with range of 21 respondents of living with DM for less than 10 years 55 (30%), with RR (0.41, 0.51). OD (0.72), signifying a positive significant of protective association by the government of the Gazebo district,

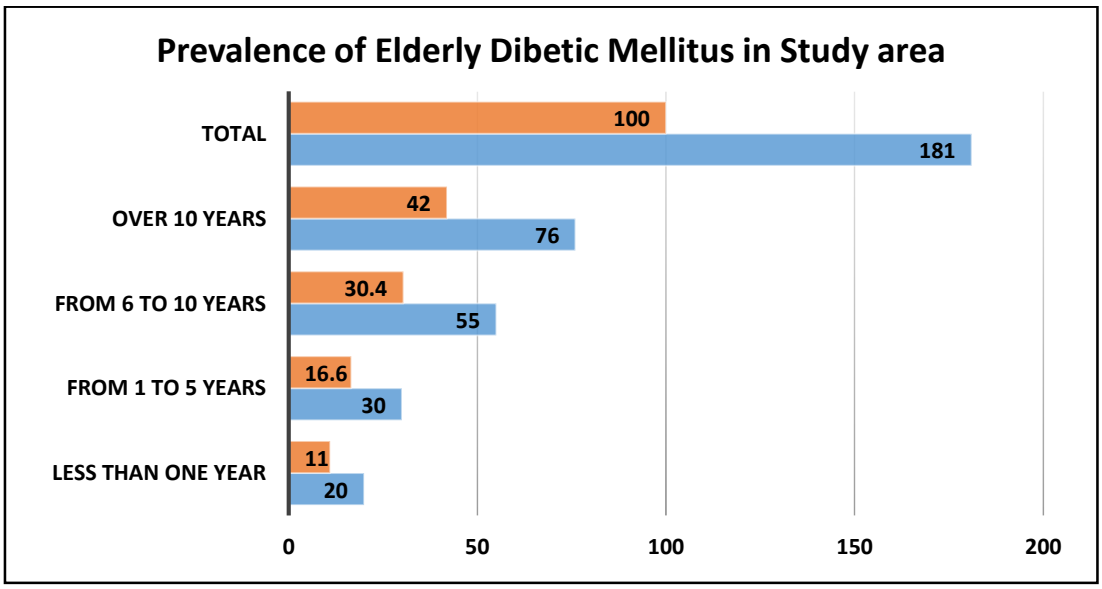

Figure 4: Prevalence of Elderly Diabetic Mellitus in Study

Social Economic Factors Associated with Elderly Diabetes Mellitus Management by Nutritional Diet on Health of Elderly People

These are respondents' views about the affluent styles associated personal increased source of money in pockets and dietary habits and nutritional practices in that elders must use to manage diabetes mellitus. Dietary habits and nutritional practices encompass the patterns and behaviors related to food consumption, including what is eaten, when, how, and why. These habits are shaped by various factors, including culture, socioeconomic status, and individual preferences, and

they significantly impact an individual's health and well-being. The following table provide detailed information about the dietary habits and nutritional practices as stated by respondents.

The study associated abundant uptake of heavy sugary foods and limited physical exercise in elderly to be main cause of increased DM with 62 respondent with 34% attack rate. With significant p values of 0.013 95%CI.

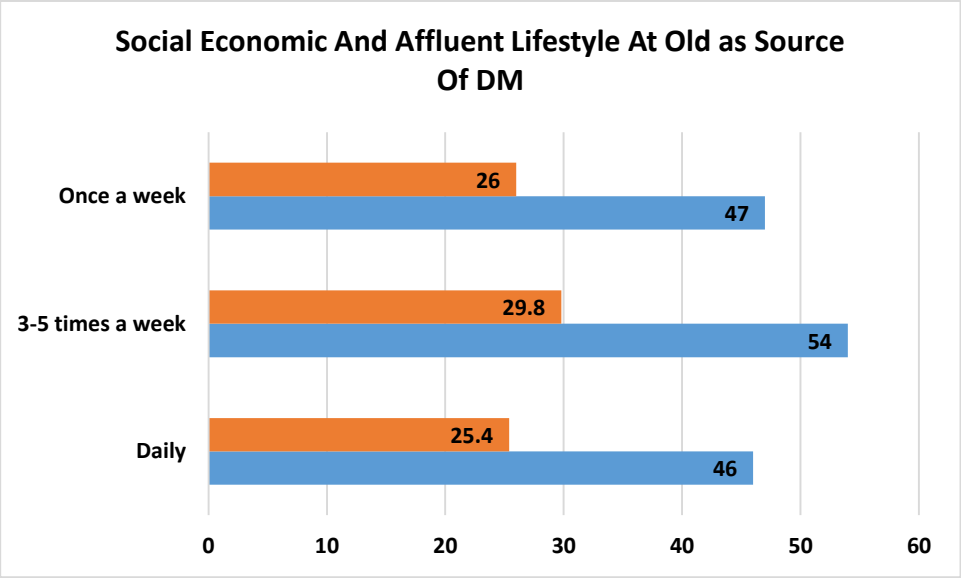

Figure 5: Social Economic and Affluent Lifestyle at Old age as Source of DM

Mitigation Methods Used to Prevent Diabetes Mellitus in Elderly People

Nutritional Counseling and physical fitness Support

These are the views of respondents about the nutritional counselling and physical fitness support provided to the respondents' elders from different sources. The researcher provided this statement to know if the respondents have been given counselling about how to manage diabetes mellitus. Nutritional counseling and support are crucial for effectively managing diabetes mellitus, particularly type 2, as they help individuals control blood sugar levels, manage weight, and reduce the risk of complications.

A registered dietitian or other qualified professional can provide personalized guidance on healthy eating habits, meal planning, and portion control. The results opined that majority of the respondents 51% (94) received the service from dietary officer and specialist nutrition community health worker to prevent and control DM. while 23% (77), respondents received mitigation service service at hospital after visiting o prevent and control type diabetic mellitus in their body.

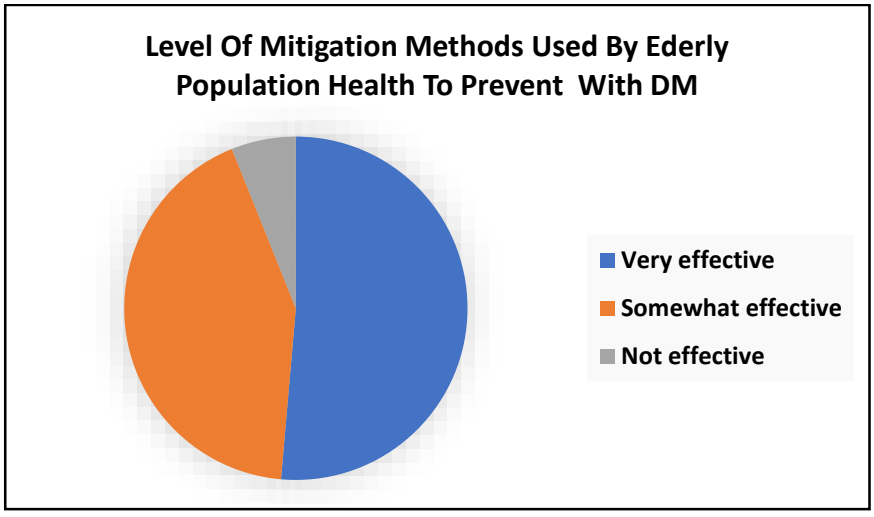

Figure 6: Level of Mitigation Methods Used By the Elderly Population Health to Prevent DM

The chart above illustrates that the mitigation level of respondents has been effective and achieved to the extent level of success, whereby they also provided different methods that should be used to mitigate diabetes mellitus in Rwandan community.

The determinants of diabetes mellitus management by nutritional diet among elderly people

The first research objective was to examine the determinants of diabetes mellitus management by nutritional diet among elderly people visiting Kibagabaga Second-level teaching Hospital in Gasabo District. The researcher sought to establish determinants to manage diabetes mellitus using diet management among the elderly. As indicated in the following tables, a significant number of the respondents provided positive responses in regards to effectiveness of dietary management and diet reduction among elders. Several factors influence the success of diabetes mellitus management through diet among the elderly, including individual health conditions, cognitive ability, physical limitations, social support, and economic factors. Properly managing diabetes in the elderly requires a holistic approach that considers these determinants. The following statements on the tables provide detailed management of diabetes mellitus among elders

Effects of nutritional diet on diabetes management

The table four gave the detailed respondents' views about nutritional diet and diabetes management.

Table 2: Effects of nutritional diet on diabetes management

Statement	Variable	Frequency	Percent	Valid Percent
Nutrition diet has an impacts on diabetes management	Yes	158	87.3	87.3
	No	3	1.7	1.7
	Not sure	20	11.0	11.0
	Total	**181**	**100.0**	**100.0**
Knowledge about a balanced nutritional diet for managing diabetes	Very knowledgeable	70	38.7	38.7
	Somewhat knowledgeable	86	47.5	47.5
	Not knowledgeable at all	25	13.8	13.8
	Total	**181**	**100.0**	**100.0**
Being diagnosed with any other chronic diseases	Hypertension	57	31.5	31.5
	Cardiovascular disease	39	21.5	21.5
	Chronic kidney disease	27	14.9	14.9
	Obesity	43	23.8	23.8
	None	15	8.3	8.3
	Total	**181**	**100.0**	**100.0**

Source: Field research, 2025

Table 4.8, provides general information about nutritional diet and diabetes mellitus management, according to the views from different respondents. According to this statement, whether nutrition diet has an impacts on diabetes mellitus, according to the respondents' views from the table four, 87.3% confirmed that nutrition diet has an impacts on diabetes mellitus; 1.7% of the total respondents stated that nutrition diet does not have an impacts on diabetes mellitus; while 11.0% of the total respondents stated that they were not sure that nutrition diet has an impacts on diabetes mellitus. These are respondents' views concerning the knowledge about a balanced nutritional diet for managing diabetes. Here on 181 respondents in which research was conducted on, 47.5% of the total respondents were somewhat knowledgeable about a balanced nutritional diet for managing diabetes; 38.7% of the total respondents were very knowledgeable, while 13.8%, were not knowledgeable at all about balanced nutritional diet for managing diabetes.

These are respondents' views about if they have been diagnosed any other kind of chronic diseases, the table above showed that 31.5% of the total respondents were diagnosed hypertension; 21.5% were diagnosed cardiovascular disease; 14.9% of

the total respondents were diagnosed chronic kidney disease, 23.8% of the total respondents have been diagnosed obesity, while 8.3% have not been diagnosed any kind of diseases.

Dietary habits and nutritional practices

These are respondents' views about the dietary habits and nutritional practices in that elders must use to manage diabetes mellitus. The following table provide detailed information about the dietary habits and nutritional practices as stated by respondents.

Table 3: Dietary habits and nutritional practices

Statement Variables		Frequency	Percent	Valid Percent
The frequency of respondents to eat foods that include fruits and vegetable	Daily	56	30.9	30.9
	3-5 Times a week	62	34.3	34.3
	Once a week	35	19.3	19.3
	Rarely	28	15.5	15.5
The frequency of respondents to consume high fiber food whole grains	Daily	32	17.7	17.7
	3-5 times a week	68	37.6	37.6
	Once a week	67	37.0	37.0
	Rarely	14	7.7	7.7
The frequency of respondents to consume sugary food and drinks	Daily	46	25.4	25.4
	3-5 times a week	54	29.8	29.8
	Once a week	47	26.0	26.0
	Rarely	34	18.8	18.8
The frequency of respondents to consume foods high in saturated fats	Daily	46	25.4	25.4
	3-5 times a week	48	26.5	26.5
	Once a week	71	39.2	39.2
	Rarely	16	8.8	8.8
The frequency of respondents to skip the meal in week	I don't skip a meal	103	56.9	56.9
	One meal everyday	27	14.9	14.9
	Four time a week	22	12.2	12.2
	Two time a week	16	8.8	8.8
	Others	13	7.2	7.2

Source: Field Research, 2025

The table 4.9, provides the detailed findings about the dietary habits and nutritional practices as they are displayed on the below results. According to the respondents' views about the frequencies of respondents to eat foods that include fruits and vegetable, the table five showed that the majority of respondents which accounted 34.3% of the total respondents stated that the eat foods that include fruits and vegetable, 3-5 times a week; 30.9% of them eat foods that include fruits and vegetable daily; 19.3% of them eat foods that include fruits and vegetable once a week; and 15.5% of the total respondents eat foods that include fruits and vegetable rarely.

On the statement of frequency of respondents to consume high fiber food whole grains showed that among the 181 respondents asked the majority of 37.6% consume high fiber food whole grains 3-5 times a week; 37% of the total respondents consume high fiber food whole grains for once a week; 17.7% of them consume high fiber food whole grains daily, while 7.7% of the total respondents consume high fiber food whole grains rarely. Concerning the frequency of respondents to consume sugary food and drinks, the table above showed that the majority of respondents which was 29.8% of the total respondents stated that they consume sugary food and drinks 3-5 times a week; 26.0% of them consume sugary food and drinks for once a week; 25.4% of the total respondents consume sugary food and drinks daily, while 18.8% of the total respondents rarely consume sugary food and drinks.

The respondents' views about the frequency of respondents to consume foods which is high in saturated fats, 39.2% of them consume foods which is high in saturated fats once a week; 26.5% of respondents consume foods which is high in saturated fats, 3-5 times a week; 25.4% of the total respondents consume foods which is high in saturated fats daily and 8.8% of the

total respondents rarely consume foods which is high in saturated fats. According to the frequency of respondents to skip the meal in week, 56.9% of the total respondents stated that they do not skip a meal; 14.9% of them skip one meal every day; 12.2% skip the meal four times a week; 8.8% of the total respondents skip the meal two time a week, while others skip meal in other period as stated by respondents whereby some skip meal three times a week, and others once a week.

6. DISCUSSIONS OF RESULTS

One of the main non-communicable diseases (NCDs) and a major public health concern, diabetes is a severe chronic illness that arises when the body is unable to use the insulin produced by the pancreas or when there is insufficient production of glucose, the hormone that controls blood sugar (Bukhman, 2021). Compared to high-income countries, the prevalence of adult diabetes mellitus is rising much more quickly in low- and middle-income countries (LMICs) (McLaughlin et al., 2021). It is crucial to keep in mind that adults are primarily impacted by diabetes, with approximately 80% of the world's population living in LMICs (Agustini et al. 2021). Older persons (defined as those over 65) currently make up about half of all adults with a diabetes mellitus diagnosis due to the strong correlation between T2DM and advancing age. Interestingly, compared to younger adults, older adults have a wider range of physical and cognitive capacities. The complexity of managing disease in older persons is further compounded by the existence of comorbidities, a higher risk of hypoglycemic episodes, the need for individualized care, and a lack of resilience that may raise the risk of frailty.

According to the results of the first objective, which was to ascertain the prevalence of diabetes mellitus management by nutritional diet among the elderly who visited Kibagabaga Second-level Teaching Hospital in Gasabo District, the prevalence of elderly diabetes mellitus in the Gasabo district is only 42% (76) of the population with chronic conditions, with a range of 21 respondents having had DM for less than 10 years, 55 (30%), and RR (0.41, 0.51). OD (0.72), indicating that the Gazebo district's leadership has a positive and significant protective association. The balance between higher incidence in this age group and higher mortality among those with T2DM earlier in life is likely reflected in the prevalence of diabetes mellitus leveling off in older persons. In the United States, the prevalence of newly diagnosed diabetes mellitus in older individuals is 21.4%, with an annual rate of approximately 9.4 cases per 1,000 people (Cho, N. H. et al., 2018). When considering changes in the prevalence of diabetes mellitus by age in relation to World Bank income categories, the highest prevalence is seen in high-income and middle-income nations for persons aged 60 and beyond (on average, 22% and 19%, respectively).

Furthermore, dietary habits and nutritional practices encompass the patterns and behaviors related to food consumption, including what is eaten, when, how, and why. This was demonstrated by the second objective, which was to evaluate the socioeconomic factors associated with diabetes mellitus management by nutritional diet on the health of elderly people visiting Kibagabaga Second-level teaching Hospital in Gasabo District. These behaviors significantly affect a person's health and well-being and are influenced by a variety of factors, such as culture, socioeconomic level, and personal preferences. The food habits and nutritional practices as reported by respondents are detailed in the following table.

With 62 responders and a 34% attack rate, the study linked the primary causes of elevated DM in older adults to a high intake of high-sugar foods and a lack of physical activity. has a 95% CI of 0.013 for significant p values. Socioeconomic status (SES), food security, and health and nutrition literacy are examples of individual-level factors that might mediate or mitigate the impacts of the food environment on behavior and diet quality, according to Ewart CK (1989). Understanding the effects of health policies on health equity and existing health disparities, as well as the unforeseen consequences of population-level policies on population subgroups that are frequently disregarded in evaluation research, requires a thorough understanding of SES and other individual-level variables.

In addition to that, the third objective which was to assess mitigation methods used to prevent diabetes mellitus elderly people from adhering to a nutritional diet tailored for diabetes mellitus prevention and control in Kibagabaga Second-level teaching Hospital in Gasabo District, showed that Nutritional counseling and support are crucial for effectively managing diabetes mellitus, particularly type 2, as they help individuals control blood sugar levels, manage weight, and reduce the risk of complications. A registered dietitian or other qualified professional can provide personalized guidance on healthy eating habits, meal planning, and portion control, whereby the results opined that majority of the respondents 51% (94) received the service from dietary officer and specialist nutrition community health worker to prevent and control DM. while 23% (77), respondents received mitigation service at hospital after visiting o prevent and control type diabetic mellitus in their body.

7. SUMMARY OF FINDINGS

The Prevalence of diabetes mellitus management by nutritional diet among elderly people visiting Kibagabaga Second-level teaching Hospital in Gasabo District

The first research objective was to determine the Prevalence of diabetes mellitus management by nutritional diet among elderly people visiting Kibagabaga Second-level teaching Hospital in Gasabo District. The researcher sought to establish determinants of diabetes mellitus management by nutritional diet among elderly people. The focus was on the general knowledge about diabetes mellitus among the respondents.

As stated in the findings from the objective one which was to determine the Prevalence of diabetes mellitus management by nutritional diet among elderly people visiting Kibagabaga Second-level teaching Hospital in Gasabo District showed that the prevalence of elderly diabetic mellitus in the Gasabo district is only 42% (76), for population health who had chronic conditions and with range of 21 respondents of living with DM for less than 10 years 55 (30%), with RR (0.41, 0.51). OD (0.72), signifying a positive significant of protective association by the leadership of the Gazebo district. The balance between higher incidence in this age group and higher mortality among those with T2DM earlier in life is likely reflected in the prevalence of diabetes mellitus leveling off in older persons.

Social Economic Factors Associated with Elderly Diabetes Mellitus Management by Nutritional Diet on Health of Elderly People

The second research objective was to assess the factors associated with diabetes mellitus management by nutritional diet among elderly people visiting Kibagabaga second-level Hospital in Gasabo District. The researcher sought to establish that project planning helped in understanding the expectations of nutritional diet management in the reduction of diabetes mellitus. The researcher wanted to find out first whether the respondents have access to counseling about diabetes mellitus and nutrition. The findings revealed that dietary habits and nutritional practices encompass the patterns and behaviors related to food consumption, including what is eaten, when, how, and why. These habits are shaped by various factors, including culture, socioeconomic status, and individual preferences, and they have a significant impact on an individual's health and well-being. The following table provide detailed information about the dietary habits and nutritional practices as stated by respondents. The study associated abundant uptake of heavy sugary foods and limited physical exercise in elderly to be main cause of increased DM with 62 respondents with 34% attack rate. With significant p values of 0.013 95%CI.

Mitigation Methods Used to Prevent Diabetes Mellitus in Elderly People

The third research objective was to identify potential barriers that prevent elderly people from adhering to a nutritional diet tailored for diabetes mellitus prevention and control in Kibagabaga Second-level teaching Hospital in Gasabo District. The researcher sought to establish the barriers to controlling and preventing diabetes mellitus. The findings showed that Nutritional counseling and support are crucial for effectively managing diabetes mellitus, particularly type 2, as they help individuals control blood sugar levels, manage weight, and reduce the risk of complications. A registered dietitian or other qualified professional can provide personalized guidance on healthy eating habits, meal planning, and portion control, whereby the results opined that majority of the respondents 51% (94) received the service from dietary officer and specialist nutrition community health worker to prevent and control DM. while 23% (77), respondents received mitigation service at hospital after visiting o prevent and control type diabetic mellitus in their body.

8. CONCLUSIONS

The research entitled Determining factors associated with low uptake of nutritional diet to prevent and control diabetes mellitus among elderly people visiting Kibagabaga second-level teaching Hospital in Gasabo district of Rwanda. The first research objective was to determine the determinants of diabetes mellitus management by nutritional diet among elderly people visiting Kibagabaga Second-level teaching Hospital in Gasabo District. Findings from the study deduced that the findings suggested that to effectively manage diabetes mellitus, it was better to ensure that respondents know diabetes mellitus. Here majority of the respondents agreed and strongly agreed that they have such information from different sources, such as media, television, health professionals and from family and friends. The findings also showed that most of them have received counselling on fighting against diabetes mellitus. Moreover, eating food such as to eat foods that include fruits and vegetables, consuming high fiber foods, whole grains, reducing consumption of sugary foods and drinks, and consuming foods high in saturated fats are the main factors for managing diabetes mellitus. The second research objective was to assess associated factors of diabetes mellitus management by nutritional diet among elderly people visiting

Kibagabaga Second-level teaching Hospital in Gasabo District, here the findings focused on the foods that are consumed by elders, the frequency those foods are consumed. The third objective was to identify potential barriers that prevent elderly people from adhering to a nutritional diet tailored for diabetes mellitus prevention and control in Kibagabaga Second-level teaching Hospital in Gasabo District. which includes changes in body or health experienced after improving diet for the elderly**;** changes occurred on weight loss, change of body and health improved blood sugar control; the elderly's body changed on reduced need for medication and change in increasing energy level for the elderly.

9. RECOMMENDATIONS

Referring to the findings of this research from respondents, the recommendations of this study were dedicated to:

It is said that prevention is better than a cure. Therefore, it is recommended that elders and other community members emphasize on adherence to medical treatment, appropriate family member involvement, and pay more attention to the elders' living conditions about diabetes mellitus. For better metabolic control, QOL assessment should be routine as medical checkup.

There is a need to develop and incorporate a culturally-specific food preference tool that accounts for traditional Rwandan dietary patterns among elders. This would help identify which culturally appropriate foods could be effectively integrated into diabetes management plans, increasing the likelihood of adherence. It is also recommended that people need to conduct a wide study on adherence to treatment, risk factors for poor metabolic control in Rwandan elders;

There should be management of family structures, caregiver relationships, and community support that influence elderly patients' dietary management. Consider measuring both practical support (meal preparation, transportation to appointments) and emotional support, as these are likely significant determinants of successful management.

There is a need of different surveys measuring dietary adherence, glycemic control, and socioeconomic factors to explore lived experiences. This approach would provide comprehensive insights into both measurable determinants and the personal barriers/facilitators elderly patients face in maintaining nutritional management.

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