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RESEARCH ARTICLE

Dietary Practices and Nutritional Status of Adults with Type II Diabetes Mellitus Attending Clinic at Nakuru County Referral & Teaching Hospital, Kenya

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ABSTRACT

Type II diabetes mellitus (TIIDM), contributes to morbidity, mortality and financial burden globally. A key non-pharmacological intervention of TIIDM is control of sugar intake. This is largely governed by an individual's dietary practices and by extend, their nutritional status. Evidence of such practices among adults with TIIDM is scanty in Nakuru county. This study assessed dietary practices, nutritional status and glucose levels among adults with TIIDM attending diabetic outpatient clinic at Nakuru County Referral & Teaching Hospital. The study adopted a cross-sectional analytical design and participants were recruited by systematic random sampling . Nakuru County Referral and Teaching Hospital was selected using purposive sampling, considering its well-established diabetic clinic. A structured questionnaire was used to collect data and SPSS Version 23.0 was used for analysis. The respondents' mean age was 54.77 ± 8.82 years. The majority (48.5%) of the respondents were 50-60 years old, of female gender (63.6%), and married (62.6%). Additionally, 33.3% had formal employment while 50.5% had a monthly income ranging from Ksh 20,000- 50,000. Mean energy intake per day was 2376.4 ± 156.2 and 2265.7 ± 134.2 kcal for male and female respectively. Over half (59. 6%) of respondents reported greater frequency of food consumption from five food groups per day. Half of the respondents (59%) were overweight and obese, with 68.7% having central obesity. The results from Pearson correlation coefficients showed that blood glucose levels had a strong positive correlation coefficient with energy intake ($r = 0.72$, $P < 0.0001$), number of meals ($r = 0.55$, $P < 0.0001$), dietary diversity score ($r = 0.52$, $P < 0.0001$), and nutrition status (BMI) ($r = 0.57$, $P < 0.0001$). Respondents with energy intake within recommended levels were 1.4 times more likely to have average blood glucose levels than those with excess (OR = 1.42, P<0.0001). Health facilities should implement wellness programs for diabetic patients, including regular consultations with dieticians for personalized meal plans to manage blood glucose levels and associated complications.

Keywords: Type II Diabetes, Dietary Practices, Nutritional Status, Blood Glucose, Obesity, Nakuru County

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INTRODUCTION

Globally, diabetes mellitus poses a significant public health challenge, contributing to increased morbidity, premature mortality, and economic burdens across both developed and developing nations (World Health Organization, 2020). Among the different types, Type II Diabetes Mellitus (TIIDM) accounts for 90–95% of all diabetes cases and is closely linked to lifestyle factors such as poor dietary habits and physical inactivity (American Diabetes Association[ADA], 2024). The global prevalence of diabetes mellitus is rising at an alarming rate. In 2021, the International Diabetes Federation (IDF) estimated the global prevalence at 10.5%, projected to reach 11.3% by 2030 and 12.2% by 2040. Diabetes affects approximately 530 million adults worldwide, with medical costs for diabetes and its complications accounting for about 12.2% of global health expenditures (IDF, 2021; Williams et al., 2020). From 2007 to 2021, diabetes-related health spending rose by 316%, reflecting the increasing healthcare burden of the disease (WHO, 2021). In low- and middle-income countries, especially in Sub-Saharan Africa, the burden of TIIDM is increasing rapidly due to urbanization, changing lifestyles, and limited healthcare infrastructure (Bhaskaran et al., 2023; WHO, 2020). By 2030, the number of adults with diabetes in this region is expected to surpass 1.3 billion, with a disproportionately high prevalence in populations living on less than $1 a day. In 2014, 76.4% of diabetes-related deaths in Sub-Saharan Africa occurred in individuals under 60 years old (Frota et al., 2021). In Kenya, the prevalence of Type II diabetes is estimated at 6.6% (Maina et al., 2020), with a considerable economic burden for both individuals and the national healthcare system. Patients often face high out-of-pocket costs for medication, regular checkups, and recommended dietary and lifestyle changes (Akpene Amenya et al., 2021). At the national level, diabetes care strains already limited health resources and results in both direct and indirect costs, including lost productivity due to disability or premature death (Malini et al., 2020; Temu et al., 2021).

Poor eating habits, such as high intake of refined carbohydrates, saturated fats, sugary beverages, and low consumption of fruits, vegetables, and whole grains, are strongly linked to increased insulin resistance and obesity, both of which are key risk factors for Type II diabetes mellitus. Over time, these dietary patterns contribute significantly to the rising prevalence of the disease, especially in low- and middle-income countries undergoing rapid urbanization and nutrition transitions (Bhaskaran *et al*., (2023). In contrast, balanced diets rich in fiber, lean proteins, and healthy fats have been shown to improve insulin sensitivity, support healthy weight management, and reduce the risk of diabetes onset (Akpene Amenya et al., 2021). Type II Diabetes Mellitus is associated with serious complications including kidney failure, vision loss, and nerve damage, contributing to higher healthcare costs and reduced quality of life (Magliano, 2021). Suboptimal control of blood glucose and other risk factors remains a major issue in many patients (ADA, 2024). Adherence to clinical guidelines and lifestyle modification, particularly dietary changes, are central to effective disease management (WHO/ADA, 2020). The expected values for average fasting blood glucose concentration are between 70 mg/dL (3.9 mmol/ L) and 100 mg/dL (5.6 mmol/L to 6.9mmol). When fasting blood glucose is between 100 to 125 mg/dL (5.6 to 6.9 mmol/L), changes in lifestyle and monitoring glycemia are recommended. If fasting blood glucose is 126 mg/dL(7 mmol/L) or higher on separate test, diabetes is diagnosed. An individual with low fasting blood glucose concentration (hypoglycemia)- below 70 mg/dL(3.9mmol/L)- will experience dizziness, sweating, palpitations, blurred vision, and other symptoms that must be monitored. Increased fasting blood plasma glucose concentration (hyperglycemia) indicates a higher diabetes risk. An individual's fasting blood plasma glucose (FPG) may be average because of effective treatment with glucose-lowering medication and lifestyle. FPG at the national level is used as a proxy for promoting healthy diets and behaviors and treating type II diabetes.

Efforts to address this burden have included national strategies such as the Kenyan National Strategic Plan for Non-Communicable Diseases (2015–2020), which emphasized public awareness, early screening, and access to essential services. However, challenges like poor resource allocation, lack of trained personnel, and high medication costs continue to impede progress (Ministry of Public Health, 2020; Bhaskaran et al., 2023). The burden is particularly visible in Nakuru County, which is a diverse and rapidly urbanizing region in the Rift Valley. With a population exceeding 2 million and a growth rate of 3.05% (KDHS, 2022), lifestyle-related risk factors such as sedentary behavior and poor diet have contributed to a growing prevalence of TIIDM, estimated at 6 % and higher in urban centers like Nakuru town (Maina et al., 2020). The Nakuru County Referral and Teaching Hospital, which hosts a well-established diabetic clinic serving approximately 400 patients weekly, plays a key role in chronic disease management and diabetes education (Nakuru County Health Report, 2022).

Despite ongoing health education initiatives, data on the dietary practices, nutritional status, and blood glucose control in diabetic adults in this region remains limited. Against this background, this study aimed to assess the dietary habits, nutritional status and blood glucose levels among adults with TIIDM attending outpatient clinic at Nakuru County Referral and Teaching Hospital.

METHODS

Study Design

The study employed a cross-sectional analytical design according to Grimes & Schulz, (2002), that allowed for a snapshot of the target population at a specific point in time. This approach enabled the researcher to assess how adults living with Type II diabetes were managing their blood sugar levels and to explore the relationships between blood glucose control and key factors such as dietary practices and nutritional status.

Study Population

The study was carried out at Nakuru County Referral and Teaching Hospital (NCR&TH), located approximately 160 kilometers northwest of Nairobi. The hospital is situated in Nakuru town, a cosmopolitan area that draws people from a wide range of geographical, cultural, and socio-economic backgrounds. This diversity made the facility an ideal setting for the study. NCR&TH has a diabetes clinic, which operates in two formats: a daily mini-clinic running from 8:00 a.m. to 1:00 p.m., and a main diabetes clinic held every Monday from 8:00 a.m. to 4:00 p.m. On average, the Monday clinic serves between 110 and 140 patients, providing a consistent and accessible point of care for adults managing Type II Diabetes. This setting offered both the volume and variety of patients needed for meaningful data collection.

Study Population

The study targeted approximately 400 adults aged 20 to 70 years living with Type II Diabetes Mellitus and attending diabetic outpatient clinic at Nakuru County Referral and Teaching Hospital (NCR&TH). This age range was selected to capture individuals at varying stages of adulthood where weight gain, hormonal changes, and lifestyle factors significantly influence the risk and progression of TIIDM (Pujiningrum & Rochmah, 2020).

Inclusion Criteria

The study included adults aged 20 to 70 years who had been diagnosed with Type II Diabetes Mellitus (TIIDM) and were receiving care at the Nakuru County Referral and TeachingThe study targeted approximately 400 adults aged 20 to 70 years living with Type II Diabetes Mellitus and attending diabetic outpatient clinic at Nakuru County Referral and Teaching Hospital (NCR&TH). This age range was selected to capture individuals at varying stages of adulthood where weight gain, hormonal changes, and lifestyle factors significantly influence the risk and progression of TIIDM (Pujiningrum & Rochmah, 2020).

Hospital. To be eligible, participants needed to have attended the diabetes clinic for at least one month and be willing to provide informed consent. This age group was chosen to capture a wide range of adults, from young to older individuals, where lifestyle and physiological changes commonly influence diabetes risk and management.

The study excluded individuals who declined to consent, as well as those with Type I Diabetes or Gestational Diabetes Mellitus, since these conditions differ significantly in their causes and treatment. Pregnant women were also excluded due to temporary metabolic changes during pregnancy that could affect glucose regulation. Additionally, people under 20 or over 70 years of age were not included, as the study focused on typical adult-onset Type II diabetes. Lastly, individuals with serious comorbid conditions such as hypertension, dyslipidemia, cardiovascular disease, chronic kidney disease, and diabetes-related complications like neuropathy or retinopathy were excluded to reduce confounding factors and ensure clearer associations between diet, nutritional status, and blood glucose control.

Sample size determination

The sample size was determined using formulae by Fisher et al., 1993, where;

$n = Z_2pq \div d_2$ Where: n= desired sample size of adults 20-70 years and have had TIIDM for one year and above.

Z = Standard deviation at the desired degree of accurancy1.96 at 95% degree of accuracy p= Proportion of target population expected to have features being sedated (Since the prevalence of diabetes mellitus in Nakuru is 6.6 %) (Maina et al., 2020)

Q = Population without features being sedated (1-p) therefore (1-0.066);

P = Type II diabetes Mellitus (KDHS, 2022).

d = Degree necessary for this precision, which is 0.05.

$n = 1.96 \times 1.96 \times 0.066 (1 - 0.066) \div 0.05 \times 0.05 = 94.72 = 95$ respondents

A 10% of 95 (10) was added to take care of non-respondent rates, thus making 105.

Sampling technique

The study employed a systematic random sampling technique as described by Gundersen et al., (1988) to select participants from among Type II diabetic adults attending the Monday clinic at Nakuru County Referral and Teaching Hospital. Out of approximately 400 registered patients, a sample size of 105 was targeted. To determine the sampling interval, the total population was divided by the sample size, yielding an interval of 4. The starting point was selected randomly from the first four patients, and number 3 was chosen, making the third patient on the clinic list the first participant. Every fourth patient thereafter was selected until the sample size was reached. The study focused on Monday clinic attendees, as it is the hospital's main diabetes clinic day, with Thursdays serving as a minor clinic. Data collection occurred over four weeks, during which 99 patients consented to participate and were each interviewed once. The weekly distribution of interviews was as follows: 28 in the first week, 31 in the second, 27 in the third, and 13 in the fourth. Six individuals declined to participate.

Data collection tools

Data were collected using a researcher-administered questionnaire designed to capture comprehensive information relevant to the study objectives. The questionnaire was divided into sections covering socio-demographic and economic details, dietary and lifestyle practices, and awareness of nutritional guidelines. Dietary intake was assessed using both a 24-hour dietary recall and a Food Frequency Questionnaire (FFQ) to capture both short-term and habitual eating patterns. Nutritional status was evaluated using anthropometric measurements, including Body Mass Index (BMI), Waist Circumference (WC), and Waist-to-Hip Ratio (WHR), key indicators of general and central obesity. These tools helped identify associations between diet, body composition, and blood sugar control.

To ensure the accuracy and effectiveness of the tools, content validity was established through expert review and alignment with study objectives. Feedback from supervisors and subject matter experts guided the refinement of the instruments. A pre-test involving 10 respondents (excluded from the main study) helped identify issues before the actual data collection. To assess reliability, a test-retest method was used with a one-week interval, and the responses were compared using Cronbach’s alpha, which yielded a score of 0.81, indicating a high level of internal consistency.

Data Collection Procedures

Research assistants, comprising one nurse and two nutritionists who are well-trained in diabetes care, and the principal investigator delivered the education program, sampling, and data collection. Data collection was based on the study's objectives, ranging from demographic and socio-economic information to dietary practices, nutritional status, and blood glucose data collection. As such, both open- and closed-ended questionnaires, demographic and socio-economic characteristics data collected via the researcher-administered questionnaire dietary assessment (24 Hr recall and 7-day food frequency questionnaire), nutritional status by anthropometric measurements and laboratory tests for fasting blood glucose levels were used in data collection.

Fasting Blood Glucose

A trained and practicing nurse collected samples for fasting blood glucose as a routine procedure for the patients during the clinic day. The patients came early in the morning after fasting for 8 to 12 hours before the test. The nurse poked the patient's finger or used a needle to draw blood from the vein in the arm; the blood was tested, and results were recorded and interpreted using the recommendations by ADA (2024).

Dietary Intake Data

The dietary data were collected by trained interviewers and the researcher using a pretested standard quantitative 24-hour Recall and a 7-day Food Frequency Questionnaire (FFQ). The 24-hour recall was used to estimate the amount of food eaten. Thus, it was appropriate to determine if the respondents consumed the recommended amount of nutrients or more than the recommended intake for those with Type II diabetes. The 24-hour recall dietary intake estimation method helps determine the quantities of nutrients of interest consumed, such as the energy consumption levels, which are critical for those with Type II Diabetes. The 7-day recall frequency provided information on the frequency of consumption of specific food groups and thus was used to appropriate- for those suffering from Type II Diabetes.

Nutritional Status Assessment

Weight measurements were duplicated to the nearest 0.1 kg with a calibrated scale (Seca 761 scale). Height measurement was also duplicated using a standardized stadiometer calibrated in centimeters (Leicester Height measure). Waist circumference was measured around the umbilicus or just above it. Participants were requested to stand with their feet adjacent (about 12–15 cm) with their weight disseminated to each leg. The participants were then asked to breathe routinely, and the reading was taken at the end of gentle exhaling. Hip circumference was measured at its maximal circumference around the buttocks with a measuring tape loose enough to allow the observer to place one finger between the tape and the subject's body and then record the readings.

Data Analysis

Data analysis started with cleaning and checking for completeness and consistency of the data in the research tools, after which coding was done, and data was entered into SPSS version 23. Continuous variables: blood glucose level, dietary practices, and nutrition status were summarized as means, proportions, and median. The blood glucose levels were calculated in percentages and proportions and categorized using the American Diabetes Association 2019 cutoffs. This was to generate the energy and nutrients consumed daily and how often foods in a given food group were consumed weekly. Respondents' average number of meals ranged from 0 to 6 per day. The dietary diversity score was zeroed to 6 food groups. The more foods consumed from varied food groups, the better the distribution of nutrients consumed. The mean daily energy intake was based on the Recommended Dietary Allowance for both males and females. Categorical variables, including socio-demographic and socioeconomic, age, sex education, occupation, income, and marital status, were summarized as means, proportions, and percentages of respondents.

Data on associations were analyzed by Pearson correlation coefficient testing for the relationship between non-categorical variables. These were the number of meals, DDS, income levels, and nutrition status (BMI). The chi-square test tested the association between selected demographic and socioeconomic characteristics like sex, education level, marital status, and nutrition (BMI). Using the odds ratio, Logistic regression was used to measure the association between exposure to various variables and an outcome: nutrition status. Principal Component Analysis (PCA) generated a wealth index and categorized households into low, medium, or high economic status. A P value of less than 0.5 was considered significant.

Ethical Considerations

Kenyatta University Graduate School approved this study. Ethical approval was obtained from the Kenyatta University Ethics Review Committee (PKU/2261/11405) .A research Permit was sought from the National Commission for Science, Technology, and Innovation (NACOSTI/P/24/32/683). Further, administrative authority to carry out the study was sought from the Medical Superintendent of Nakuru County Referral & Teaching Hospital. Informed consent was obtained from each respondent before participating in the study. In addition, respondents' identities remained anonymous throughout the research, and the participants were assured of confidentiality of the information they gave as the data gathered was strictly used for this research. Copies of the filled research instruments were kept in a lockable cabinet, and the researcher-controlled access.

RESULTS

Demographic Characteristics of Adults with Type II Diabetes Mellitus

The results in Table 1 indicate that the respondent's mean age in years was 54.8 ± 8.8 years, the majority of the respondents, 48.5%, were 50-60 years, 13.1 % were ≤ 40 years, 18.2 %were 40-50 years and 20.2 % were 60 years and above. This study, showed that diabetes cuts through all ages but increases with age. After 60 years, the prevalence of diabetes increases with age, with the peak age being 50 years. In addition, the results showed that there were more females with diabetes than males (63.6% vs. 36.4 %). Further, the results indicated that the majority (62.6%) of the respondents were married, (20.2%) were widowed and (13.1%) were single, and those divorced or separated were 4.1%.

Table 1*:*

Demographic Characteristics of Adults with Type II Diabetes Mellitus

Characteristics	Description	N (99)	%	Mean age
Age in years: Mean ± SD				54.77 ± 8.82
	<40	13	13.1	
	40 – 50	18	18.2	
	50 – 60	48	48.5	
	>60	20	20.2	

Gender	Male	**36**	36.4	
	Female	**63**	63.6	
Marital status	Married	62	62.6	
	Widowed	20	20.2	
	Divorced/Separated	4	4.1	
	Single	13	13.1	

Socio-economic Characteristics of Adults with Type II Diabetes Mellitus Attending Diabetic Outpatient Clinic at Nakuru County Referral & Teaching Hospital

The results in Table 2 show that about half (49.5%) of the respondents had tertiary education, (16.2%) had completed primary school, (30.3%) had completed secondary school, and 4.0 % of the respondents had no formal schooling. The study population was primarily in formal employment (33.3%), followed by homemakers (29.3%). Casual laborers and self-employed persons were 21.2% and 16.3%, respectively. The study revealed that slightly above half of the respondents (50.5%) earned income brackets of KShs 20001 - 50000, 5000 -10000 (20%), with the minority (2%) earning KShs < 5000 (Table 2). By focusing on income and property ownership, most respondents were in the low wealth index category (46.4%).

Table 2:

Socio-Economic Characteristics of Adults with Type II Diabetes Mellitus

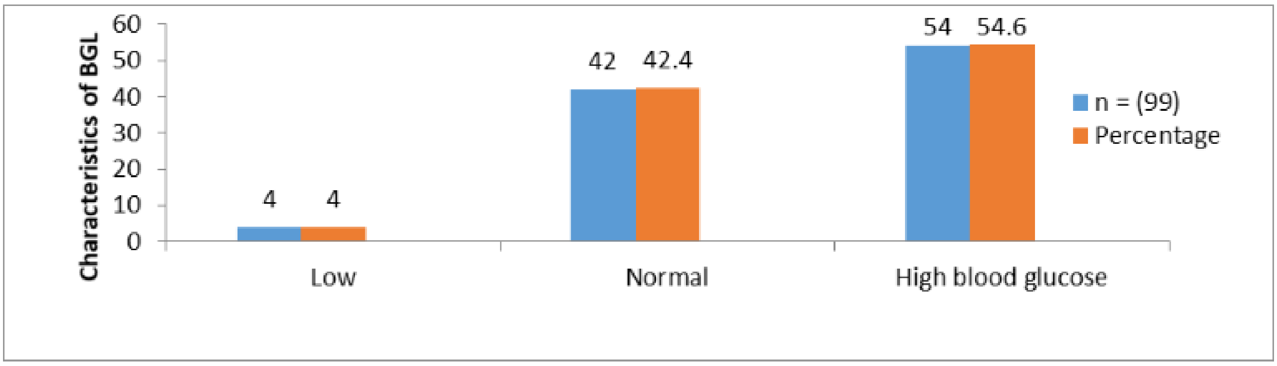
Characteristics	Description	n (99)	%
Education level	No formal education	**4**	4.0
	Primary complete	16	16.2
	Secondary complete	30	30.3
	Tertiary education	49	49.5
Occupation	Casual	21	21.2
	Housewife	29	29.3
	Formal	33	33.3
	Self-employed	16	16.2
Income	<5000	2	2.0
	5000 – 10000	20	20.2
	10000 – 20000	11	11.1
	20000 – 50000	50	50.5
	>50000	16	16.2
Wealth index	Low	46	46.4
	Moderate	37	37.4
	High	16	16.2

Blood Sugar Levels

The results in Figure 1 show that over half (54.6%) of the respondents had high blood glucose levels, (42.4%) and (4%) had average and low blood glucose levels respectively. The expected fasting blood glucose concentration values are between 3.9 – 5.6 mmol.

Figure 1*:*

Blood Glucose Levels



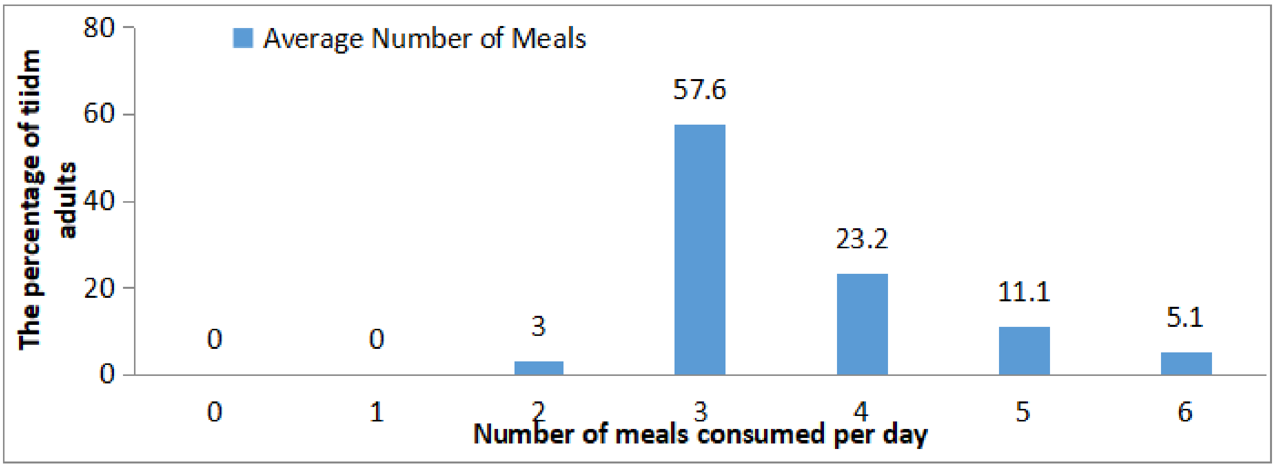
Dietary Practices

The study focused on the daily average number of meals, energy intake, and Dietary Diversity Score. The results for each of these indicators are presented in the subsequent subsections.

Average Number of Meals Consumed Per Day

Figure 2*:*

Average Number of Meals Consumed by adults with Type II Diabetes mellitus



Energy intake of adults with type II diabetes mellitus

The results in Table 3 indicate that the mean energy intake of the respondents was 2376.4 ± 156.2 kcal per day for men and 2265.7± 134.2kcal for females. The respondents' energy intake accounted for (25.2%) and (37.4%) RDA for males and females, respectively. Both females and males had energy consumption slightly higher than recommended.

Table 3*:*

Energy Intake for Type II Diabetic Adults

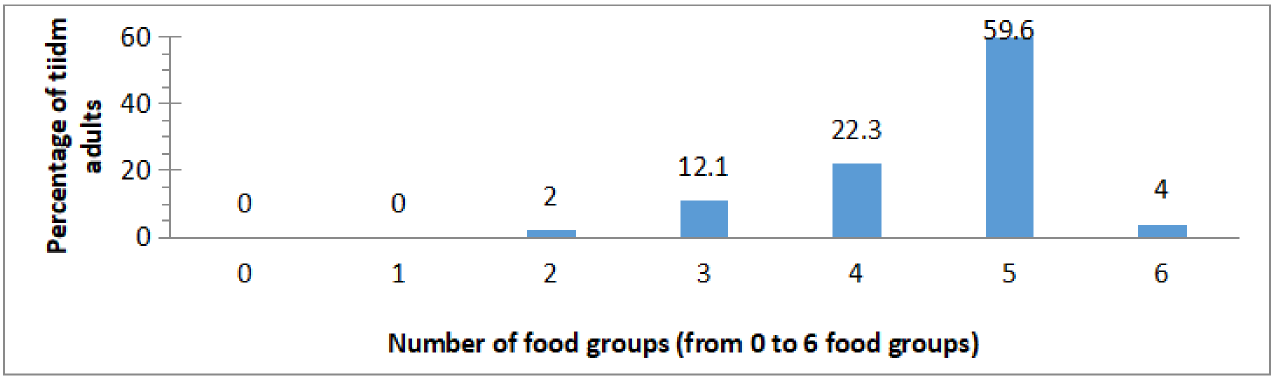
		Proportion consumption adequate (n=99)		
Characteristics	**Description**	**N**	**%**	**Mean± SD**
Male				2376.4 ± 156.2
Energy (kcal)	Below RDA <2200	11	11.1	
RDA=2100	Above RDA >2200	25	25.2	
Female				2265.7 ± 134.2
Energy (kcal)	Below RDA <2100	26	26.3	
RDA=2100	Above RDA >2100	37	37.4	

Dietary Diversity Score

The respondent's mean Dietary Diversity Score (DDS) of the respondents was 5.26 ± 0.61, ranging from 1 to 6. A minority (2%) of the respondents had a low dietary diversity score (≤ 2 food groups), while the majority (59.6%) reported taking five food groups per day. Only 4% of the respondents had a high dietary diversity score (≥ 6 food groups) for men and women.

Figure 3:

Dietary Diversity Score (DDS)



Nutritional Status of adults with Type II Diabetes mellitus

The results in Table 4 show that the mean respondents' BMI was 26.90 ± 4.96. The study findings showed that the majority, 37(37.4%) of the respondents had normal BMI, followed by overweight and obese participants at 35(35.4%) and 24(24.2%), respectively. The findings indicate that 3(3.0 %) of type II diabetic adults were underweight. Concerning the WHR, the mean WHR for the study population was 0.96± 0.14. The majority, 68(68.7%) of the study respondents had central obesity compared to 31(31.3%) who were average.

Table 4:

Nutritional Status of Adults with Type II Diabetes Mellitus

Characteristics	Description	n (99)	%	Mean ± SD
Body Mass Index (BMI)				26.90 ± 4.96
	Underweight	3 (2)	3.0	
	Normal	37 (24)	37.4	
	Overweight	35 (22)	35.4	
	Obese	24 (16)	24.2	
Waist Hip Ratio (WHR)				0.96 ± 0.14
	Normal	31 (20)	31.3	
	Central Obesity	68 (44)	68.7	

Relationship between dietary practices and blood glucose level

A correlational analysis was conducted to test the hypothesis: There is no significant association between the dietary practices of adults with Type II diabetes and their blood glucose levels. The results indicated a strong positive correlation between blood glucose levels and several dietary factors, including energy intake (n = 99, r = 0.73, p ≤ 0.0001), number of meals (n = 99, r = 0.55, p ≤ 0.0001), and Dietary Diversity Score (DDS) (n = 99, r = 0.52, p ≤ 0.0001). The p-value of 0.0001, below the 0.05 significance threshold, confirmed that the correlations were statistically significant; thus, the null hypothesis was not accepted.

Relationship between nutrition status and blood glucose level

A correlational analysis was conducted to evaluate the hypothesis, which stated that there is no significant association between the nutritional status of adults with Type II diabetes and their blood glucose levels. The results revealed a positive correlation coefficient between blood glucose levels and nutritional status (as measured by BMI) (n = 99, r = 0.57, p ≤ 0.0001). The p-value of 0.0001, less than the 0.05 significance threshold, confirmed a statistically significant correlation between the two variables; thus, the null hypothesis was rejected.

DISCUSSION

This study found that the majority of Type II diabetic respondents were aged 50–60 years (48.5%), with a mean age of 54.77 ± 8.82 years, supporting previous research indicating increased diabetes prevalence with age (Jung et al., 2021). This suggests that many affected adults are still in active employment, likely leading to lifestyle patterns influencing disease development. While some studies (Jung et al., 2021) emphasize age as a key predictor of blood glucose levels due to insulin resistance and physical inactivity, contrasting findings in Kenya noted no direct age effect on diabetes occurrence, emphasizing the complexity of diabetes epidemiology (Sarah et al.,2021). Females comprised 63.6% of respondents, consistent with findings that Type II diabetes is more common in women (Yaya et al., 2021). 62.6% of the study participants were married, paralleling findings from Iran and Kenya suggesting marital status impacts diabetes occurrence and management (Jung et al., 2023; Temu et al., 2021). Global data indicate more men than women have diabetes, but women tend to be diagnosed earlier and experience more severe complications, aligning with this study's findings (Mogensen et al., 2022).

Over half (54.6%) of respondents exhibited elevated fasting blood glucose (FBG), signaling poor glycemic control, which is critical for preventing organ damage and complications (IDF, 2022). According to ADA (2024) guidelines, proper management of FBG (80–130 mg/dL) remains elusive for many, highlighting a treatment gap. These findings echo studies reporting that poorly controlled Type II diabetes can lead to severe outcomes such as neuropathy, kidney failure, and cardiovascular events (Mekala & Bertoni, 2020; Ahmadi et al., 2023). The elevated glucose levels underscore the need for improved diabetes management strategies.

Dietary control among respondents showed excessive carbohydrate and caloric intake, with an average of 3.4 meals per day, mostly aligned with recommended meal frequency for diabetes management (Rees et al., 2022). The mean Dietary Diversity Score (DDS) was 5.3 ± 0.8, with most respondents consuming foods from five food groups daily, similar to efforts documented in other populations to reduce carbohydrate intake and improve nutrition quality (Smith et al., 2022). A study on household dietary diversity score, which demonstrated an increase in the number of different food groups consumed, provided a quantitative measure of improved household food access and diet (Kahleova et al., 2022).Mean daily energy intake was high (2376.4 ± 156.2 kcal for men and 2265.7 ± 134.2 kcal for women), with over one-third exceeding recommended caloric intake, consistent with studies suggesting challenges in maintaining energy intake within recommended limits for diabetic individuals (Satija et al., 2022). According to WHO (2020), for RDAs, men's energy is 2200 kcal and 2100 kcal for females. Findings from CDC (2019), showed that people living with diabetes should get about 45% of their total calories each day from carbohydrates. The average allowance for men of reference (77kg) is 2300kcal/day; for women it is 1900kcal/day. A typical variation of ±20 percent is accepted for younger adults (ADA, 2019). Central obesity was prevalent in 68.7% of respondents, with waist circumference thresholds consistent with increased insulin resistance risk (Zhang et al., 2021; Wesling et al., 2022). This aligns with global data showing 80–90% of Type II diabetics are overweight or obese, highlighting obesity as a major risk factor and contributor to morbidity in diabetes (Canadian Diabetes Association; Bailey, 2020). Weight loss targeting abdominal fat remains a key therapeutic goal to improve insulin sensitivity but is difficult to achieve (Kurian et al., 2021; Mogensen et al., 2022).

The study demonstrated significant positive associations between blood glucose levels and energy intake, number of meals, dietary diversity, BMI, and income. Respondents consuming energy within recommended levels were 1.4 times more likely to maintain average blood glucose, reflecting better glycemic control. Similarly, normal BMI was significantly associated with appropriate energy intake and dietary patterns, with adults adhering to recommended energy intake being 1.6 times more likely to have a normal BMI. These findings reject the null hypothesis and emphasize the critical role of diet quality and nutritional status in diabetes management, corroborating previous evidence linking energy balance and diet diversity to glycemic outcomes (Bailey, 2020).

Conclusions

As diabetes continues to be life-threatening patients require reinforcement of TIIDM education, including dietary management, through stakeholders (healthcare providers, health and nutrition facilities, etc.) to encourage them to understand disease management better for more appropriate self-care and a better quality of life. Despite decades of epidemiological studies and randomized trials, several unmet needs still remain. Many type II diabetes respondents did not achieve the recommended glucose level. Education levels, occupation, and income affected the dietary and physical practices, diabetic treatment, and adherence status of the patients. Thus, regular blood glucose levels must be constantly monitored and effectively subdued with proper medication and adapting to a healthy lifestyle. Also an optimal nutritional approach aims to maintain a body weight within the normal range, providing adequate macronutrients and micronutrients to reduce the risk of overweight and obesity.

Recommendations

Based on the study findings above, we recommend as follows:

- Development and implementation of integrated diabetes management programs that combine clinical care with behavioral counseling, nutrition education, and socio-economic support tailored to patients' local contexts.
- Expanded access to affordable self-monitoring tools and strengthen community health systems to provide ongoing education, follow-up, and support for lifestyle modifications in adults living with Type II diabetes.

Conflict of Interest

Authors declare no conflict of interest

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