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A MIXED COHORT STUDY ON DIETARY ADHERENCE, INFECTION PREVENTION, AND GLYCEMIC CONTROL AMONG DIABETIC PATIENTS IN SOUTH KIVU, EASTERN DEMOCRATIC REPUBLIC OF THE CONGO.

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Abstract

Background

Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin or when the body does not use it effectively. A well-adapted diet is essential to stabilize blood glucose levels and prevent complications such as hyperglycaemia and infections. However, adherence to this diet is often compromised by socio-economic factors, limiting access to balanced nutrition and healthcare. This study aims to evaluate the impact of dietary adherence on diabetes management, focusing on infection prevention and glycaemic control.

Materials and Method

A longitudinal study (2020-2024) in South Kivu (Bukavu, Mwenga, Walungu) followed diabetic patients. After informed consent, data was collected through medical records and structured interviews using standardized forms. Statistical analyses, including chi-square tests and logistic regressions, were performed using Jamovi software.

Results

Among 1520 patients, 59.3% of those with stable blood glucose levels adhered to the diet, with an infection rate of 56.8%, compared to 81.9% for non-adherent patients. Among patients with unstable blood glucose levels, 16.5% adhered to the diet, with an infection rate of 27.2%, compared to 98.1% among non-adherent patients. Non-adherence was associated with a higher risk of infection (OR = 7.84), hyperglycaemia (OR: 4.6), hospitalisation (OR = 2.03), and comorbidities (OR = 4.8).

Conclusion

Dietary adherence plays a crucial role in diabetes management by reducing infections and improving glycaemic control.

Recommendations

However, socioeconomic constraints have a significant impact on adherence. Strengthening nutrition education and improving access to healthcare, especially in rural areas, are essential strategies to optimize diabetes management and reduce associated complications.

Key word: *Dietary adherence, infection prevention, glycaemic control, diabetes management, South Kivu.*
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Introduction

Diabetes mellitus is a chronic condition characterized by elevated blood sugar levels, often resulting from insufficient insulin secretion or action. This condition increases the risk of various complications, including infections, due to the negative impact of elevated blood sugar on the immune system, thereby impairing the body's ability to respond effectively to pathogens. (1–3).

In Africa, diabetes poses a substantial public health challenge, as evidenced by data from the International Diabetes Federation (IDF). According to the IDF, the number of adults living with diabetes in 2021 was

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approximately 24 million, with projections indicating a rise to 55 million by 2045, representing a 129% increase. In the Democratic Republic of the Congo (DRC), the prevalence of diabetes among adults is estimated at 4.8%, affecting approximately 1908900 people. (4). This high prevalence within the population underscores the critical importance of effective diabetes management.

Managing diabetes effectively is largely dependent on following a suitable diet. However, non-compliance with dietary recommendations is a common and concerning issue, which can lead to poor blood glucose regulation and an increased risk of complications, including infections (5,6). Several factors have been identified as contributing to non-adherence, such as cultural eating habits, economic constraints, and a lack of information or awareness about the importance of glycaemic control.

Although diabetes is a chronic condition that requires careful management within households, the challenges in the DRC are further exacerbated by limited healthcare infrastructure and restricted access to specialized care. (7,8). However, the importance of nutrition in diabetes management is widely recognized. There is a significant gap in specific data regarding the impact of non-compliance with dietary guidelines on the development of infections in this context.

This study aims to assess the impact of dietary adherence on infection prevention and glycemic control in people with diabetes. It will provide a better understanding of the interactions between different factors and enable us to propose interventions to improve diabetes management.

Materials and method

Study design and period

This longitudinal cohort study, combining retrospective (2020-2021) and prospective (2022-2024) approaches, was conducted from 12 January 2020 to 30 October 2024 in diabetes clubs across South Kivu. The study covered both the urban areas of the city of Bukavu (all its three health zones: Ibanda, Kadutu, and Bagira) and the rural areas of the two health zones of Mubumbano (Walungu territory) and Kitutu (Mwenga territory) in the DRC.

Study population

The study population consisted of people with diabetes who were members of diabetes clubs and had been followed for at least three years. Inclusion criteria included club membership, regular follow-up, informed consent, and participation in clinical assessments. Patients with acute complications or irregular follow-ups were excluded.

Patient selection and classification

Patients were randomly selected from those meeting the inclusion criteria to ensure a balanced representation between urban and rural settings. They were categorized based on education level (low, medium, high), economic status (employed or unemployed), residence (urban or rural), and dietary adherence, defined by specific criteria related to eating habits and dietary recommendations.

Data Collection

Data were collected through medical records and structured interviews. The collected variables included socio-demographic factors (age, gender, education level, employment, residence), clinical data (weight, blood pressure, body mass index: BMI), biological markers (blood glucose), and diabetic complications, particularly infections.

Bias

Bias was minimized through diversified club selection and cross-checked clinical evaluations.

Statistical Analysis

Statistical analysis was performed using Microsoft Excel and Jamovi 2.3.26. Chi-squared tests assessed associations between categorical variables, and logistic regression identified factors influencing dietary non-adherence and complications, adjusted for socio-demographic and clinical variables. A p-value < 0.05 was considered statistically significant.

Ethical considerations

This study was approved by the Kanyamulande Higher Institute of Medical Techniques Ethics Committee on 17 November 2021 under ethical review number 062/CED-ISTM-KNML/PCE/2021. All participants gave informed consent before participation, and all procedures followed ethical guidelines.

Results

1. Distribution of those included and excluded from the study

Of the 3060 patients initially enrolled, 1540 (50.3%) were excluded due to loss to follow-up (234; 15.2%), death (103; 6.7%), or incomplete records (1203; 78.1%). The study included 1520 people with diabetes to assess the effect of adherence on glycaemic stability and infections. Among patients with stable blood glucose levels, 468 (59.3%) adhered to their diet, and 266 (56.8%) developed infections. In contrast, 321 (40.7%) were non-adherent, with an infection rate of 81.9% (263) ($\chi^2 = 15.75$; $p < 0.001$). In patients with unstable blood glucose, only 121 (16.5%) were adherent, with 33 (27.2%) developing infections, whereas 610 (83.5%) were non-adherent, with a significantly higher infection rate of 98.1% (598) ($\chi^2 = 422.16$; $p < 0.001$) (Figure 1).

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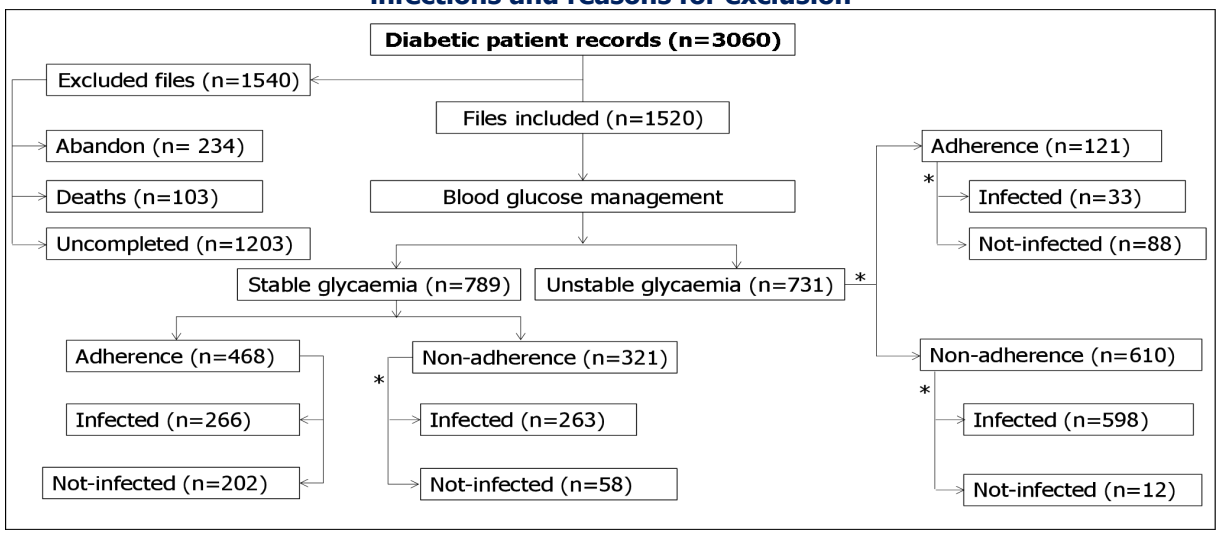
Figure 1: Flowchart of participants included and excluded from the study: Diet, glycaemia, infections and reasons for exclusion



*Note: n: Number of patients, *: Significant p-value <0.05*

2. Socio-demographic, clinical, and biological characteristics of diabetic patients

- **Socio-demographic parameters**

Table 1 shows that most patients are aged between 51 and 70 years (67%). There is a difference in gender distribution, with more males in the 51-60 age group (76.6%) and more females over the age of 61. The study population has a high proportion of patients with a medium level of education (42.9%), while the majority of patients with a low level of education are women (68.9%). Regarding employment, only 31% have a stable job, mostly men (77.1%). The unemployment rate is high (69%), with a relatively balanced gender distribution. The majority of patients (73.5%) live in urban areas, with a slight male predominance.

Table 1: Socio-demographic parameters of diabetic patients

Variable	Patients n (%)	M n (%)	F n (%)
	1520 (100)	**910 (59.8)**	**610 (40.2)**
Age group (years)			
< 40	50 (3.3)	36 (72.0)	14 (28.0)
40-50	320 (21.0)	197 (61.6)	123 (38.4)
51-60	548 (36.0)	420 (76.6)	128 (23.4)
61-70	470 (31.0)	200 (42.5)	270 (57.5)
> 70	132 (8.7)	57 (43.2)	75 (56.8)
Education level			
Low	412 (27.1)	128 (31.1)	284 (68.9)
Medium	652 (42.9)	448 (68.7)	204 (31.3)
High	456 (30.0)	334 (73.2)	122 (26.8)
Economic status			
Stable employment	472 (31.0)	364 (77.1)	108 (22.9)
Unemployed	1048 (69.0)	546 (52.1)	502 (47.9)
Patient's living environment			
Rural setting	402 (26.5)	252 (62.7)	150 (37.3)
Urban environment	1118 (73.5)	658 (58.8)	460 (41.2)

Note: <: Inferior, >: Superior, n: Number, %: Percentage, F: Female, M: Male

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- **Clinical and biological parameters**

The mean systolic blood pressure is 153mmHg, and the mean diastolic blood pressure is 97mmHg, with large variations. The average heart rate is 97 beats per minute, and the body temperature is normal (36.7 degrees Celsius). The body mass index (BMI) distribution shows 60.6% normal weight (18.5-24.9), 17.3% overweight (25-29.9), and 20.4% obese (≥30), with males predominating in the higher BMI categories (in Table 2). Table 2 shows that 39.6% of patients have normal blood glucose levels, while 60.4% have hyperglycaemia. Moderate (13.1%) and severe hyperglycaemia (24.7%) are more common in men. The gender difference in blood glucose levels is statistically significant ($p < 0.05$).

Table 2: Clinical and biological parameters of diabetic patients

Variable	Patients n (%)	M n (%)	F n (%)	p-value	Mean (SD)	Median (Min-Max)
	1520 (100)	**910 (59.8)**	**610 (40.2)**			
Clinical parameters						
Blood Pressure						
Systolic					153 (20)	144 (104-179)
Diastolic					97 (10)	90 (67-110)
Heart rate					97 (20)	90 (66-120)
Breathing rate					23 (4)	20 (18-32)
Temperature					36.7 (0.8)	36.2 (35.1-37.6)
BMI						
< 18.5	26 (1.7)	15 (57.7)	11 (42.3)	0.405	17.2 (1)	17 (15.5-18.4)
18.5-24.9	921 (60.6)	604 (65.6)	317 (34.4)	< 0.001	21.5 (2)	21 (18.6-24.8)
25-29.9	263 (17.3)	124 (47.1)	139 (52.9)	0.222	27.2 (2)	27 (25.2-29.8)
30-34.9	144 (9.5)	96 (66.6)	48 (33.4)	< 0.001	32 (1.5)	32 (30.2-34.8)
35-39.9	120 (7.9)	52 (43.3)	68 (56.7)	0.052	37 (1.5)	37.2 (35.1-39.8)
≥ 40	46 (3)	19 (41.3)	27 (58.7)	0.144	42.5 (3)	41 (40.1-50)
Biological parameters: blood glucose						
Normal blood glucose	602 (39.6)	352 (58.5)	250 (41.5)	< 0.001	102 (11)	110 (93-132)
Mild hyperglycaemia	344 (22.6)	182 (53)	162 (47)	0.147	153 (12)	162 (142-195)
Moderate hyperglycaemia	199 (13.1)	175 (87.9)	24 (12.1)	< 0.001	241 (7)	221 (202-298)
Severe hyperglycaemia	375 (24.7)	201 (53.6)	174 (46.4)	0.058	401 (40)	444 (326-533)

Note: F: Female, M: Male, n: Number of patients, BMI: Body Mass Index, Min: Minimal, Max: Maximum, SD: Standard Deviation, %: Percentage, Significant p-value <0.05.

3. Acute and chronic conditions in diabetes

- **Comorbidities**

As shown in Table 3, almost half of the patients (47.8%) have comorbidities associated with diabetes, with hypertension being the most common (26.4%), followed by cardiovascular disease and nephropathies. However, cardiovascular and renal diseases are significantly more common in women ($p < 0.0001$).

- **Infections**

Infections were observed in 81.7% of people with diabetes. The most common were urinary or genitourinary infections (36.5%), followed by pulmonary infections (25.9%), and gastrointestinal infections (18.9%). Pulmonary infections were more common in men, whereas genitourinary infections were more common in women (Table 3).

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Table 3: Prevalence of comorbidities and infections in people with diabetes mellitus

	Patients	CI 95%	M	F	p-value
	n (%)	%	n (%)	n (%)	
a. Comorbidity (n = 727; 47.8%)					
Diabetes-Hypertension	192 (26.4)	[23.2-29.6]	89 (46.3)	103 (53.7)	0.312
Diabetes and heart disease	69 (9.5)	[7.4-11.6]	11 (16.0)	58 (84.0)	< 0.0001
Diabetes-nephropathy	65 (9.0)	[6.9-11.1]	60 (92.3)	5 (7.7)	< 0.0001
Diabetes-Retinopathy	43 (6.0)	[4.3-7.7]	22 (51.1)	21 (48.9)	0.879
Diabetes-Hypertension-Cardiopathy	114 (15.7)	[13.1-18.3]	66 (57.9)	48 (42.1)	0.092
Diabetes-Hypertension-Retinopathy	25 (3.4)	[2.1-4.7]	15 (60.0)	10 (40.0)	0.317
Diabetes-Hypertension-nephropathy	121 (16.6)	[13.9-19.3]	98 (81.0)	23 (19.0)	< 0.0001
Diabetes-nephropathy-retinopathy	98 (13.4)	[10.9-15.9]	72 (73.4)	26 (26.6)	< 0.0001
Total	**727 (100)**		**433 (59.6)**	**294 (40.4)**	
b. Organ and system infections (n = 1242; 81.7%)					
Urogenital infection	453 (36.5)	[33,5 – 39.5]	193 (42.6)	260 (57.4)	0.002
Lung infection	322 (25.9)	[23 – 28.8]	212 (65.8)	110 (34.1)	< 0.0001
Digestive infection	234 (18.9)	[16 – 21.5]	123 (52.5)	111 (47.5)	0.433
Otorhinolaryngology and other infections	233 (18.7)	[15.9 – 21.3]	104 (44.7)	129 (55.3)	0.077
Total	**1242 (100)**		**632 (50.9)**	**610 (49.1)**	

Note: F: Female, M: Male, n: Number of patients, p-value considered significant at < 0.05, %: percentage, CI: Confidence Interval

4. Impact of non-adherence to diet on diabetes complications: logistic regression analysis

In Table 4, logistic regression analyses show a strong association between non-adherence to dietary recommendations and increased health risks. Non-adherence significantly increases the risk of hyperglycaemia (OR = 4.6) and infections (OR = 7.84), and these associations remain strong after adjustment. In addition, non-adherent patients are twice as likely to require hospitalisation (OR = 2.03).

Women face greater challenges with adherence, with almost three times the risk of men (OR = 2.99 after adjustment). Rural residents are more likely to adhere to the diet than urban residents (OR = 0.18 after adjustment), probably due to differences in food availability and knowledge. Surprisingly, education level has little effect on adherence, with no significant difference observed (adjusted OR = 1.03). Unemployed people appear to be more compliant than those with stable employment (adjusted OR = 0.03), possibly due to differences in dietary habits. These findings highlight the critical role of adherence in preventing infections and hyperglycaemia.

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Table 4: Factors influencing non-adherence: Results from bivariate and multivariate analyses

Factor	Category	Non-adherence % Bivariate	Adherence % Bivariate	OR Bivariate	IC 95% [%] Bivariate	p-value Bivariate	OR Multivariate	IC 95% [%] Multivariate	p-value Multivariate
Gender	Female	77.4	22.6	2.68	[2.13 – 3.38]	< 0.0001	2.99	[2.35 – 3.78]	< 0.0001
	Male	56	44	-	-	-	-	-	-
Location	Rural	33.6	66.4	0.16	[0.13 – 0.21]	< 0.0001	0.18	[0.14 – 0.23]	< 0.0001
	Urban	75.7	24.3	-	-	-	-	-	-
Level of education	Less educated	62.6	37.4	0.89	[0.70 – 1.12]	0.35	1.03	[0.85 – 1.24]	0.75
	Educated	65.4	34.6	-	-	-	-	-	-
Economic status	Unemployed	49.8	50.2	0.026	[0.014 – 0.047]	< 0.0001	0.03	[0.01 – 0.06]	< 0.0001
	Stable employment	97.4	2.6	-	-	-	-	-	-
Comorbidities	Present	82	18	4.8	[3.79 – 6.07]	< 0.0001	4.5	[3.60 – 5.57]	< 0.0001
	Not present	48.7	51.3	-	-	-	-	-	-
Blood glucose	Hyperglycaemia	78.2	8	4.6	[3.67 – 5.75]	< 0.0001	5	[4.10 – 6.07]	< 0.0001
	Normal	43.8	56.2	-	-	-	-	-	-
Infection	Infected	73.2	26.8	7.84	[5.83 – 10.55]	< 0.0001	8.1	[6.50 – 10.20]	< 0.0001
	Not-infected	25.9	74.1	-	-	-	-	-	-
Hospitalization	Hospitalized	69.8	30.2	2.03	[1.62 – 2.53]	< 0.0001	2.1	[1.75 – 2.60]	< 0.0001
	Not hospitalized	53.2	46.8	-	-	-	-	-	-

Note: p-value considered significant at < 0.05; %: Percentage, CI: Confidence Interval

Discussion

This study highlights the critical role of dietary compliance in managing diabetes and preventing complications, particularly infections and hyperglycaemia. The results show that patients who adhere to their diet have a slower progression of hyperglycaemia and a significantly lower rate of infection. Although infections occur in all patients, the increase is less pronounced in the diet adherents, suggesting a protective effect. These results are in line with the findings of Diabetes Québec and Yu et al., who showed that a balanced and adapted diet strengthens the immune response in diabetics and directly reduces the development of infections throughout their lives. (9,10).

The explanation is based on the effect of hyperglycaemia on immune function. Elevated blood glucose levels impair the immune response, making people with diabetes more susceptible to infection. (2,11,12). Three main mechanisms explain this increased susceptibility: firstly, high blood glucose in type 2 diabetes reduces NKG2D+ NK cells, weakening immune defences and increasing susceptibility to infection and sepsis. (13–15)Secondly, prolonged hyperglycaemia causes the blood vessels to constrict, limiting the supply of oxygen, weakening the immune system, and increasing the risk of infection. (13,16). Finally, Hyperglycaemia triggers excessive inflammation, exacerbating cytokine (TNF-α, IL-1β, IL-6, IL-8) storms and increasing the risk of infection. (17,18).

In this study, almost half of the people with diabetes had comorbidities, with hypertension being the most common (26.4%), followed by cardiovascular disease and nephropathies. Other studies report even higher prevalence rates, with diabetic nephropathy reaching 49% and estimates suggesting that 60% to 80% of people with diabetes develop cardiovascular complications, mainly due to hypertension. (19,20). Hypertension, the most common comorbidity, is caused by a diet high in salt and saturated fat and chronic hyperglycaemia, which impairs vascular function and increases blood pressure. Non-adherence to dietary guidelines perpetuates chronic hyperglycaemia, leading to oxidative stress, systemic inflammation,

endothelial dysfunction, and increased risk of hypertension. (21,22). Limited access to healthcare and antihypertensive treatment may also contribute to its prevalence. Similarly, diabetic nephropathy results from prolonged hyperglycaemia that damages renal capillaries, exacerbated by poor diet and frequent urinary tract infections due to glycosuria (23).

In addition to hypertension and nephropathy, other diabetes-related complications are of concern. Diabetic retinopathy, associated with damage to retinal capillaries, is exacerbated by limited access to eye care and a diet low in antioxidants. Cardiovascular disease is also prevalent, with atherosclerosis accelerated by hyperglycaemia, hypertension, and lipid abnormalities, exacerbated by an unbalanced diet and poor glycaemic control. (24,25). Although diabetic neuropathy was not extensively analysed in this study, its association with poor glycaemic control and nutritional deficiencies warrants further investigation. The high prevalence of these comorbidities is largely influenced by diet, glycemic control, and infection, particularly in resource-limited settings. Given the complex interplay of these factors, an integrated and comprehensive approach to diabetes management is essential to reduce complications and improve patients' quality of life.

Women find it more difficult than men to adhere to a diet, probably because of hormonal fluctuations that affect appetite and glycaemic control; they face financial constraints and have limited access to healthcare; and they often prioritise their family's nutritional needs over their own (9,21,22,26) Making dietary adherence more difficult. These inequalities call for tailored strategies to improve their nutritional care and optimise diabetes management.

Socio-economic factors, such as low levels of education and financial difficulties, have a significant impact on adherence to dietary recommendations. Lack of education hinders understanding of dietary guidelines and makes it difficult to distinguish between healthy and unhealthy foods or to plan balanced meals, contributing to poor compliance. (21,22). Geographical factors also play a critical role; in rural areas, local agricultural production provides better access to fibre-rich foods, whereas in urban areas, higher costs and limited availability of nutrient-rich foods negatively affect adherence. In addition, the low stable employment rate (31%) and high unemployment rate (69%) observed in this study further limit access to healthy foods and adequate health care, as highlighted by several international studies. (27–29). Economic constraints, particularly in rural areas, complicate diabetes management by limiting access to care and comprehensive treatment. These findings are consistent with those of Khatun et al., who highlighted disparities in access to care based on socioeconomic and geographic status. (30). Addressing these socioeconomic challenges is essential to improve adherence and disease management, particularly in areas with limited resources and healthcare infrastructure.

In addition to these socio-economic barriers, regular follow-up visits are essential for effective diabetes management. Support from diabetes clubs has been shown to improve adherence to dietary recommendations and reduce complications, including infections. Tang et al. showed that frequent medical visits improved adherence and reduced complication rates. (31). Highlighting the importance of targeted education programmes in rural areas to increase awareness and improve disease management. Ultimately, the results of this study underscore the critical role of adherence in preventing diabetes-related complications, particularly infections and hyperglycaemia, and improving patients' quality of life, even in challenging socioeconomic settings.

Generalizability

Although the sample was limited to patients followed in the clubs, this work largely reflects the diversity of the diabetic population and provides valuable information for the management of diabetic patients. These results can be generalised to diabetic patients regularly followed in the DRC.

Conclusion

This study highlights the critical role of adherence in diabetes management, particularly in reducing infections and improving glycaemic control. Non-adherence emerges as a key factor in worsening complications, while adherence slows their progression. Socio-economic factors, including education levels and access to healthcare, have a significant impact on adherence. Addressing these challenges through targeted education programmes and improved access to healthcare, especially in rural areas, is essential. A comprehensive, patient-centred approach that integrates medical, nutritional, and educational interventions is essential to improve diabetes outcomes, reduce complications, and ultimately improve the quality of life of people with diabetes.

Limitations

This study is limited by the sample of patients followed only in the diabetes clubs due to the ease of follow-up. Among the comorbidities, the limited analysis of diabetic neuropathy does not allow a full assessment of its association with glycaemic control and nutritional deficiencies. Reporting bias may affect the reliability of data on diet and adherence. These limitations highlight the need for larger studies that include a wide range of variables.

Recommendations

It is therefore imperative to adopt multidimensional strategies that include nutrition education, regular follow-up, and management adapted to local socio-economic challenges to improve the quality of life of people with

diabetes and reduce the risks associated with diabetes in a context of limited resources.

List of abbreviations

- BMI: Body Mass Index
- CI: Confidence Interval
- DRC: Democratic Republic of the Congo
- IDF: International Diabetes Federation
- IL: Interleukins
- NGK2D+ NK cells: Natural Killer Group 2D+ Natural Killer cells
- OR: Odds Ratio
- p-value: Probability Value
- SD: Standard Deviation
- TNF-α: Tumor Necrosis Factor Alpha
- WHO: World Health Organization

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This study was funded by the Salama Afia Corporation. Some authors are affiliated with this organization, but the research was conducted independently to ensure objectivity in data analysis and interpretation.

Conflict of interest

We have no conflicts of interest related to this study.

Data availability

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

Author contributions

MML conceived, designed, supervised, and was primarily responsible for drafting the study manuscript; MML, MMM, and BKE collected information from patients and obtained informed consent; MMB coded and analysed the data; CMS and BAC critically analysed the draft; KMB revised the manuscript. All authors read and approved the final version of the manuscript.

Author biographies

Dr Mulakwa Morisho Lambert is a renowned infectious disease specialist, specializing in the diagnosis and management of infectious diseases. Drawing on his experience in tropical medicine, he has contributed to various research projects on infectious diseases in Africa, particularly in the Democratic Republic of Congo (DRC), and is actively involved in the implementation of infection management strategies in resource-limited settings.

Dr Bamavu Amisi Charles is an infectiologist and researcher with expertise in emerging infections and tropical diseases. He has conducted studies on the public health impact of infections, particularly in the DRC, and has participated in several research projects aimed at improving treatment and prevention strategies in high-risk areas.

Dr Chirimwami Muganda Serge is an expert in transfusion medicine, specializing in the management of risks associated with blood transfusion. His research focuses on the prevention of transfusion-transmitted infections and the optimization of transfusion practices, particularly in Africa, where health systems are often fragile.

Bahogwerhe Kashengula Elie is a nurse with expertise in clinical nutrition and the management of malnutrition-related diseases. He has worked on nutrition programs for vulnerable populations, particularly in humanitarian crisis contexts, and is involved in research aimed at improving access to balanced diets in resource-limited settings.

Mwala Morisho Benoit has expertise in data analysis, specializing in statistical methods applied to public health research. He has contributed to several epidemiological studies using advanced data analysis techniques, contributing to the reform of public health policy in the DRC.

Prof. Kipindula Morisho Bertin is a professor of health sociology with a focus on social determinants of health and health inequalities. He has conducted numerous studies on the impact of socio-economic and cultural factors on health behavior in Africa, particularly in the context of the DRC. His research informs public health policy and community engagement strategies for health programs.

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