

Prevalence and Associated Factors of Diabetes Mellitus among Adults in Parakou, Benin, 2025

Adebayo Alassani^{1*}, Lassane Zoungrana², Jules Gninkoun³, Ibrahim Mama Cisse¹, Jemuel Houeto¹, Abdou-Badiou Djibril¹, Armand Wanvoegbe³, Moutawakilou Gomina¹

¹Faculty of Medicine, University of Parakou, Parakou, Benin

²Faculty of Medicine, Joseph KI-ZERBO University, Ouagadougou, Burkina Faso

³Faculty of Health Sciences, University of Abomey-Calavi, Abomey-Calavi, Benin

Email: *adebayoallassani@gmail.com

How to cite this paper: Alassani, A., Zoungrana, L., Gninkoun, J., Cisse, I.M., Houeto, J., Djibril, A.-B., Wanvoegbe, A. and Gomina, M. (2026) Prevalence and Associated Factors of Diabetes Mellitus among Adults in Parakou, Benin, 2025. *Open Journal of Internal Medicine*, **16**, 92-100.

<https://doi.org/10.4236/ojim.2026.161010>

Received: January 26, 2026

Accepted: March 3, 2026

Published: March 6, 2026

Copyright © 2026 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Introduction: Diabetes mellitus is a non-communicable disease whose prevalence is increasing in sub-Saharan Africa, particularly in Benin, where it represents a major public health problem. The main objective of this study was to investigate diabetes mellitus in the general population of Parakou in 2025. **Methods:** This was a descriptive cross-sectional study with an analytical aim conducted from May 1 to July 31, 2025. The study population consisted of individuals aged at least 18 years, residing in Parakou for at least six months, and who provided informed consent to participate in the study. The dependent variable was diabetes mellitus, while the independent variables included sociodemographic, behavioral, and clinical characteristics. Binary logistic regression was used to identify factors associated with diabetes mellitus. A p-value < 0.05 was considered statistically significant. **Results:** A total of 600 individuals were included. The mean age of participants was 33.50 ± 11.30 years, with a male predominance (65.33%). The prevalence of diabetes mellitus was 14.17%. Among individuals with diabetes, 69.41% were unaware of their condition. Factors associated with diabetes mellitus were age ≥ 40 years (OR = 2.44 [1.40 - 4.26], p = 0.002), monthly income $\geq 104,000$ FCFA (OR = 5.72 [1.36 - 24.05], p = 0.017), overweight (OR = 3.43 [1.54 - 7.64], p = 0.001), obesity (OR = 19.12 [8.62 - 42.37], p = 0.001), increased waist circumference (OR = 3.11 [1.85 - 5.28], p = 0.001), and physical inactivity (OR = 2.78 [1.17 - 6.59], p = 0.020). **Conclusion:** Diabetes mellitus is common in the population of Parakou. Most individuals with diabetes were unaware of their condition, highlighting the need for screening, particularly among high-risk groups.

Keywords

Diabetes Mellitus, Prevalence, Associated Factors, Parakou

1. Introduction

Diabetes mellitus, of which type 2 is the most common form, remains a major global public health problem, with prevalence expected to increase from 10.5% in 2021 to 12.2% by 2045 if no preventive measures are implemented [1]. Developing countries, particularly those in Africa, are the most affected, while still facing major challenges related to communicable diseases, such as malaria, tuberculosis, HIV infection, and more recently COVID-19 and viral hemorrhagic fevers [2]. In Africa, a 149% increase in the number of people with diabetes is expected by 2045, rising from 19 million in 2019 to 26 million in 2045 [3]. This exponential increase is mainly explained by rapid urbanization, sedentary lifestyles, and increased consumption of energy-dense foods. Benin is not spared from this global trend, particularly in its northern metropolitan city of Parakou, where diabetes prevalence increased from 4.6% in 2008 to 7.9% in 2015 [4]. Chronic hyperglycemia leads to progressive dysfunction and long-term failure of several organs, including the eyes, kidneys, nerves, heart, and blood vessels, resulting in macrovascular complications (myocardial infarction, transient ischemic attack, stroke, and limb ischemia) and/or microvascular complications (retinopathy, nephropathy, peripheral neuropathy) [5]. These complications develop insidiously, often before the onset of clinical symptoms. Beyond its clinical consequences, diabetes has a substantial economic impact. Each year, more than 727 billion US dollars, approximately 12% of global health expenditure are devoted to diabetes care worldwide [6]. Diabetes is responsible for more than one million deaths annually and ranks among the top ten causes of mortality worldwide [7]. In developing countries, where resources for diabetes management are limited, the disease is often diagnosed late, with 27% of patients presenting with classic symptoms and 61.53% already having complications at diagnosis [8]. This late diagnosis is partly due to the lack of systematic screening, resulting in at least three out of four people with diabetes being unaware of their condition in 2025 [9]. To reduce the negative impact of diabetes on national economic development, preventive actions and early screening are essential. Updating epidemiological data on diabetes is therefore crucial. Since 2015, no population-based data on diabetes have been available in the Borgou Department, particularly in Parakou. This study was initiated to fill this gap by determining the prevalence of diabetes mellitus and identifying associated factors. It also aimed to screen undiagnosed cases to facilitate early management and prevent complications.

2. Study Setting and Methods

Study design

This was a descriptive and analytical cross-sectional study conducted from May 1 to July 31, 2025.

Study population

The study population consisted of individuals aged at least 18 years who had been residing in Parakou for at least six months and who provided informed consent. Individuals unable to answer questions and pregnant women were excluded.

Sampling

A stratified random sampling technique was used. The sample size was calculated using Schwartz's formula. Data collection was conducted in the three districts of Parakou. Sixteen neighborhoods were selected: ten in the first district and three each in the second and third districts. This was done in accordance with the number of neighborhoods in each district: the first district includes 23 neighborhoods, the second 10, and the third 9.

Variables

The dependent variable was diabetes mellitus, defined as fasting blood glucose ≥ 1.26 g/L confirmed the following day, or known diabetes under treatment. Individuals with fasting blood glucose between 1.10 and 1.26 g/L were classified as prediabetic. Independent variables included sociodemographic, behavioral, and clinical characteristics. Monthly income was defined based on the minimum interprofessional guaranteed wage (SMIG), which was 52,000 FCFA in Benin in 2025. Physical inactivity was defined as failure to perform at least 30 minutes of moderate-intensity physical activity at least five times per week. Nighttime sleep duration between 6 and 8 hours was considered normal. Undernutrition was defined as a body mass index < 18.5 kg/m². Overweight was defined as a body mass index ≥ 25 kg/m². Waist circumference ≥ 94 cm in men and ≥ 80 cm in women was considered elevated.

Data analysis

Data were entered using EPIDATA software and analyzed with EPI INFO (version 3.7.2.1). Pearson's chi-square test or Fisher's exact test was used as appropriate to assess associations between the dependent and independent variables. Binary logistic regression was used to identify factors independently associated with diabetes mellitus. A p-value < 0.05 was considered statistically significant.

Ethical considerations

Informed consent and confidentiality were ensured. Authorization was obtained from local administrative authorities. The study was approved by the Local Ethics Committee for Biomedical Research (CLERB) of the University of Parakou (Reference No. 971/2024/CLERB-UP/P/SP/R/SA).

3. Results

General characteristics of the study population

A total of 600 individuals were included. The mean age was 33.50 ± 11.30 years, with a male predominance (65.33%). Monthly income was below two times the SMIG in 89% of participants. Alcohol consumption, tobacco exposure, and physical inactivity were reported by 58.83%, 77.50%, and 90.50% of participants, respectively. Normal nighttime sleep duration was observed in 78%. Overweight and increased waist circumference were present in 45.67% and 29.83%, respectively. The prevalence of hypertension was 31%. Knowledge of diabetes was low in 8.83% of participants (Table 1).

Prevalence of diabetes mellitus

Among all participants, 85 had diabetes mellitus, including 59 newly diagnosed cases, corresponding to a prevalence of 14.17%. Undiagnosed diabetes accounted for 69.41% of cases. Prediabetes was found in 28.17% of participants (**Figure 1**).

Factors associated with diabetes mellitus

In bivariate analysis, factors associated with diabetes mellitus included age ≥ 40 years, monthly income ≥ 2 SMIG, marital status (married), abnormal sleep duration, overweight, abdominal obesity, physical inactivity, and hypertension (**Table 2**). In multivariate analysis, independent factors associated with diabetes mellitus were age ≥ 40 years, monthly income ≥ 2 SMIG, overweight, obesity, increased waist circumference, and physical inactivity (**Table 3**).

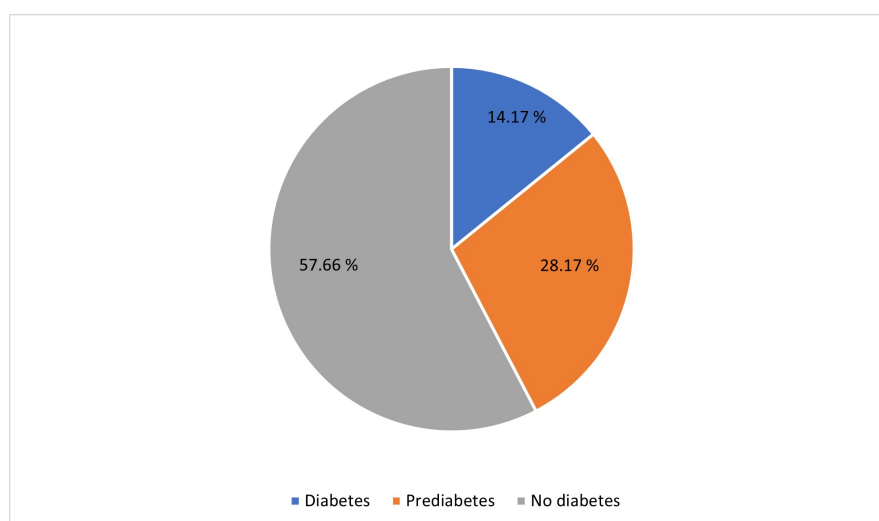


Figure 1. Distribution of participants according to the prevalence of diabetes mellitus, prediabetes, and absence of diabetes mellitus, Parakou, 2025 (N = 600).

Table 1. General characteristics of the study population (n = 600).

	n	%
Age (years)		
< 40	446	74.33
≥ 40	154	25.67
Sex		
Male	392	65.33
Female	208	34.67
Marital status		
Single	386	64.33
Married	214	35.67
Monthly income (FCFA)		
<104,000	534	89.00
$\geq 104,000$	66	11.00
Education level		
None	16	2.67

Continued

Primary	141	23.50
Secondary	340	56.67
Higher	103	17.17
Lifestyle	16	2.67
Alcohol consumption	353	58.83
Tobacco use	465	77.50
Physical inactivity	543	90.50
Nighttime sleep duration		
Normal	468	78.00
Abnormal	132	22.00
Nutritional status		
Undernutrition	15	2,50
Normal	311	51,83
Overweight	79	13,17
Obesity	195	32,50
Waist circumference		
Normal	421	70.17
Elevated	179	29.83
Hypertension		
No	414	69.00
Yes	186	31.00
Knowledge about diabetes		
Low	53	8.83
Medium	318	53.00
High	229	39.17

Table 2. Summary of factors associated with diabetes mellitus (bivariate analysis).

	RP	IC 95 %	p value
Age (ans)			
<40 ans	1		
≥40 ans	2.82	[1.87 - 4.24]	0.001
Monthly income (FCFA)			
<104,000	1		
≥104,000	1.79	[1.06 - 3.02]	0.031
Marital status			
Single	1		
Married	1.94	[1.28 - 2.95]	0.001
Nighttime sleep duration			
Normal	1		

Continued

Abnormal	2.08	[1.21 - 3.60]	0.009
Nutritional status			
Undernutrition	3.76	[0.91 - 15.51]	0.058
Normal	1		
Overweight	3.47	[1.74 - 6.94]	0.001
Obesity	14.31	[7.70 - 26.60]	0.001
Waist circumference			
Normal	1		
Elevated	3.30	[2.17 - 5.02]	0.001
Physical inactivity			
Yes	2.30	[1.40 - 3.77]	0.001
No	1		
Hypertension			
Yes	2.81	[1.59-4.71]	0.001
No	1		

Table 3. Factors associated with diabetes mellitus (multivariate analysis).

	OR	IC 95 %	p-value
Age (ans)			
<40	1		
≥40	2.44	[1.40 - 4.26]	0.002
Monthly income (FCFA)			
<104,000	1		
≥104,000	5.72	[1.36 - 24.05]	0.017
Nutritional status			
Undernutrition	1		
Normal	3.52	[0.65 - 19.13]	0.144
Overweight	3.43	[1.54 - 7.64]	0.001
Obesity	19.12	[8.62 - 42.37]	0.001
Waist circumference			
Normal	1		
Elevated	3.11	[1.85 - 5.28]	0.001
Physical inactivity			
No	1		
Yes	2.78	[1.17 - 6.59]	0.020

4. Discussion

This study, conducted in Parakou, Benin, is the first population-based investiga-

tion of diabetes mellitus in the city since 2015. The prevalence of diabetes mellitus was 14.17%, higher than the 9.7% reported by Djrolo *et al.* in 2015 in the same city [4]. This increase reflects the rapid rise in diabetes prevalence associated with lifestyle changes. Similar prevalences were reported in Guinea (12.5%) [10] and Ethiopia (12.4%) [11]. Higher prevalences have been observed in Saudi Arabia (28%) [12], Thailand (29.6%), and among indigenous populations in French Guiana (40.3%) [13]. Lower prevalences were reported in the Democratic Republic of Congo (6.2%) [14] and Côte d'Ivoire (7%) [15]. A high proportion of individuals with diabetes were unaware of their condition (69.41%), consistent with findings from Bohicon, Benin, where only 3.5% of diabetic workers were aware of their status [16]. Prediabetes affected 20.17% of participants, representing a population at high risk of progression to diabetes if preventive measures are not implemented. The factors independently associated with diabetes mellitus older age, higher socioeconomic status, overweight, obesity, increased waist circumference, and physical inactivity are consistent with findings from other studies. Aging is associated with decreased insulin sensitivity and β -cell dysfunction [17] [18]. Higher socioeconomic status may promote sedentary lifestyles and consumption of refined foods, increasing obesity risk [3]. Visceral adiposity contributes to insulin resistance, a key mechanism in type 2 diabetes [19]. Physical inactivity reduces energy expenditure and promotes fat accumulation and insulin resistance [20]. The use of stratified random sampling and a representative sample size enhanced the validity of the findings. Logistic regression allowed identification of independent associated factors. Although capillary blood glucose is a validated screening method, the inclusion of glycated hemoglobin measurement could have improved diagnostic accuracy. Despite this limitation, the results remain representative of the population of Parakou.

5. Conclusion

The prevalence of diabetes mellitus in Parakou is increasing. Most individuals with diabetes were unaware of their condition, and a substantial proportion of prediabetes was observed. Early screening and management are essential, particularly among high-risk groups. Preventive strategies, including a diet low in sugar, fat, and refined products, as well as regular physical activity, should be promoted among the non-diabetic population.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Al-Shammakh, A.A., Al-Tamimi, A.H.S., Robed, Q.T.Q. and Al-Mojahid, F.Q. (2024) Prevalence and Risk Factors of Poor Glycemic Control and Diabetic Nephropathy among Patients with Type 2 Diabetes Mellitus in Dhamar, Yemen. *International Journal of Diabetes in Developing Countries*, **45**, 364-372. <https://doi.org/10.1007/s13410-024-01356-y>

- [2] Diawara, A., Coulibaly, D.M., Hussain, T.Y.A., Cisse, C., Li, J., Wele, M., et al. (2023) Type 2 Diabetes Prevalence, Awareness, and Risk Factors in Rural Mali: A Cross-Sectional Study. *Scientific Reports*, **13**, Article No. 3718. <https://doi.org/10.1038/s41598-023-29743-1>
- [3] Olamoyegun, M.A., Alare, K., Afolabi, S.A., Aderinto, N. and Adeyemi, T. (2024) A Systematic Review and Meta-Analysis of the Prevalence and Risk Factors of Type 2 Diabetes Mellitus in Nigeria. *Clinical Diabetes and Endocrinology*, **10**, 43-55. <https://doi.org/10.1186/s40842-024-00209-1>
- [4] Djrolo, F., Adoukonou, T., Houehanou, C., Houinato, J.D. and Houinato, D. (2015) Diabetes in Borgou Department in Benin: Prevalence and Associated Factors. *Journal of Diabetes Mellitus*, **5**, 90-96. <https://doi.org/10.4236/jdm.2015.52011>
- [5] Asghar, S., Asghar, S., Mahmood, T., Bukhari, S.M.H., Mumtaz, M.H. and Rasheed, A. (2023) Microalbuminuria as the Tip of Iceberg in Type 2 Diabetes Mellitus: Prevalence, Risk Factors, and Associated Diabetic Complications. *Cureus*, **15**, e43190. <https://doi.org/10.7759/cureus.43190>
- [6] Shrestha, N., Karki, K., Poudyal, A., Aryal, K.K., Mahato, N.K., Gautam, N., et al. (2022) Prevalence of Diabetes Mellitus and Associated Risk Factors in Nepal: Findings from a Nationwide Population-Based Survey. *BMJ Open*, **12**, e060750. <https://doi.org/10.1136/bmjopen-2022-060750>
- [7] Cénat, J., Dromer, E., Beogo, I., Farahi, S., Matsakawo, R. and Mkhatri, J. (2025) Prevalence and Factors Related to Type 2 Diabetes among Black Individuals in Canada: A Systematic Review and Meta-Analysis. *Diabetes and Metabolic Syndrome: Clinical Research and Reviews*, **19**, Article ID: 103269.
- [8] Traoré, S., Dahourou, D.L., Paré, B.C., Sagna, Y., Zemba, D., Somé, D.P., et al. (2024) Prevalence of Undiagnosed Diabetes Mellitus and Its Associated Factors in Urban Burkina Faso. *Journal of Public Health in Africa*, **15**, Article No. 497. <https://doi.org/10.4102/jphia.v15i1.497>
- [9] Kévin, A.J., Lauret, K., Famoussa, K., Emma, A., Hamed, T.K., Salifou, K., et al. (2025) Prevalence, Morbidity and Mortality of Diabetes Mellitus in 9009 Adult Patients over 12 Years in the Internal Medicine Department of the Bouaké University Hospital. *Open Journal of Internal Medicine*, **15**, 312-325. <https://doi.org/10.4236/ojim.2025.154028>
- [10] Diallo, M.D.M., Diallo, M.M., Diallo, M.C., Diallo, M.A., Diallo, A.M., Barry, M.A., et al. (2024) Prevalence of Diabetes and Hypertension on World Diabetes Day 2022 in Guinea. *Open Journal of Endocrine and Metabolic Diseases*, **14**, 1-6. <https://doi.org/10.4236/ojemd.2024.141001>
- [11] Seifu, Y., Tsegaw, D., Haji, Y. and Ejeso, A. (2020) Prevalence and Associated Factors of Diabetes Mellitus among Adult Population in Hawassa Zuria Woreda, Sidama Region, Ethiopia. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*, **13**, 4571-4579. <https://doi.org/10.2147/dms.o.s275230>
- [12] Alwadeai, K.S. and Alhammad, S.A. (2023) Prevalence of Type 2 Diabetes Mellitus and Related Factors among the General Adult Population in Saudi Arabia between 2016-2022: A Systematic Review and Meta-Analysis of the Cross-Sectional Studies. *Medicine*, **102**, e34021. <https://doi.org/10.1097/md.00000000000034021>
- [13] Claussen, C., Papadimos, E., Magliano, D.J., Hotu, C., Monteith, H., Shah, B., et al. (2025) Prevalence of Type 2 Diabetes among Global Indigenous Adult Populations: A Systematic Review. *Diabetologia*, **69**, 582-599. <https://doi.org/10.1007/s00125-025-06624-y>
- [14] Francois, L.M., Victor, B.M., Pange, M.M., Antoine, K.K., Bajo, W., Longembe, E.B.,

- et al. (2025) Prevalence of Diabetes Mellitus (DM) and Prescribed Hygiene and Dietary Measures among Hospitalized Patients in Kisangani, Democratic Republic of the Congo. *Food and Nutrition Sciences*, **16**, 757-770. <https://doi.org/10.4236/fns.2025.167042>
- [15] Amon, R.J.B., Adeh, H., Konan, S., Behibro, N., Koffi, I. and Tiembre, I. (2025) Prevalence of Diabetes among Blood Donors in Côte D'ivoire. *Open Journal of Blood Diseases*, **15**, 1-6. <https://doi.org/10.4236/ojbd.2025.151001>
- [16] Ménéonli, A., Frimège, D., Ibrahim, M.C., Rose, M., Fabien, G., Paul, A., et al. (2024) Prevalence and Factors Associated with Diabetes among City Hall Workers, Bohicon, Benin. *Open Journal of Epidemiology*, **14**, 366-377. <https://doi.org/10.4236/ojepi.2024.142026>
- [17] Baker, F.A., Zeina, A., Natour, R.T., Mouch, S.A., Kopelman, Y., Shibolet, O., et al. (2025) Prevalence and Risk Factors of Type 2 Diabetes Mellitus among Hepatitis B Virus Patients: A Large Retrospective Cohort Study. *International Journal of Medical Sciences*, **22**, 716-722. <https://doi.org/10.7150/ijms.104839>
- [18] Alinga, B.B., Bisuta, S.F., Luvande, R., Mafuta, D.M., Kabengele, B.O., Kashongwe, I.M., et al. (2025) High Prevalence of Diabetes Mellitus and Its Associated Factors in Patients with Tuberculosis Comorbidity: A Cross-Sectional Study in Kinshasa, DRC. *Journal of Tuberculosis Research*, **13**, 159-174. <https://doi.org/10.4236/jtr.2025.134015>
- [19] Chikwati, R.P., Crowther, N.J., Ramsay, M., Micklesfield, L.K., Norris, S.A., Seakamela, K.P., et al. (2025) Incident Type 2 Diabetes and Its Risk Factors in Men and Women Aged 40 - 60 Years from Four Sub-Saharan African Countries: Results from the Awi-Gen Study. *The Lancet Global Health*, **13**, e459-e466. [https://doi.org/10.1016/s2214-109x\(24\)00520-5](https://doi.org/10.1016/s2214-109x(24)00520-5)
- [20] Misra, A., Sattar, N., Ghosh, A., Nassar, M., Jayawardena, R. and Gupta, R. (2025) Type 2 Diabetes in South Asians. *BMJ*, **390**, e079801. <https://doi.org/10.1136/bmj-2024-079801>