

Diabetes Screening, Diagnosis, and Treatment Among Adults in Nigeria: A National Analysis of the 2023–2024 Nigerian Demographic and Health Survey (NDHS)

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Abstract

Background:

Diabetes is a growing noncommunicable disease (NCD) burden in Nigeria, yet population-level screening and diagnosis remain limited. The 2023–24 Nigeria Demographic and Health Survey (NDHS) provides the first nationally representative indicators describing blood sugar screening, diabetes diagnosis, and treatment uptake among adults. We aimed to construct a national diabetes care cascade using NDHS 2023–24 indicators among Nigerian adults aged 15–49, and to compare cascade outcomes across sociodemographic subgroups including sex, age, residence, region, wealth, and education.

Methods:

We conducted a survey-weighted secondary analysis of NDHS 2023–24 individual-level microdata using IBM SPSS Statistics with the Complex Samples module, accounting for the complex sampling design of the NDHS. Key variables included: (1) ever had blood sugar measured, (2) ever diagnosed with diabetes, (3) prescribed medication among those diagnosed in the last year, and (4) currently taking diabetes medication among all diagnosed adults. All proportions are reported with 95% confidence intervals. Sex differences at each cascade step were formally tested using design-based logistic regression.

Results:

Nationally, 18.6% (95% CI 17.8–19.4) of women and 17.6% (95% CI 16.6–18.6) of men had ever had their blood sugar measured ($p = 0.030$). Diagnosis was extremely low (0.9%, 95% CI 0.8–1.1 in women; 1.3%, 95% CI 1.1–1.6 in men; $p < 0.001$). Among diagnosed women, 60.4% (95% CI 53.8–66.9) were prescribed medication and 52.5% (95% CI 45.9–59.1) were currently taking medication. Among diagnosed men, 55.1% (95% CI 46.7–63.6) were prescribed and 39.2% (95% CI 31.9–46.5) were currently taking medication. Sex differences at the treatment stages were not statistically significant ($p = 0.822$ and $p = 0.233$ respectively). Screening and diagnosis were markedly higher in urban areas, southern zones, wealthier households, and among the most educated.

Conclusion:

Nigeria's diabetes screening cascade shows major losses at every stage. Sociodemographic disparities in screening were steep and consistent. These findings highlight the need to expand routine opportunistic screening and strengthen long-term diabetes care within primary healthcare.

INTRODUCTION

Diabetes mellitus is a rapidly growing global health challenge and a major contributor to morbidity and mortality in low- and middle-income countries (LMICs).^{1,2} It is estimated that 588.7 million adults worldwide were living with diabetes in 2024 and Sub-Saharan Africa (SSA) represents the region with the fastest-growing diabetes prevalence^{1,2}, driven by economic, demographic and sociocultural transitions.³ Despite comparatively lower prevalence than other regions, SSA suffers disproportionately from diabetes-related complications, due to late diagnosis and limited access to care.⁴

Nigeria, Africa's most populous country, reflects this concerning trend. National estimates from systematic reviews place diabetes prevalence as 7.0% in adults⁵, with higher prevalence in urban, older, and wealthier populations. However, the burden of undiagnosed diabetes remains extremely high. Earlier systematic reviews reported a pooled prevalence of 5.77%.⁶ This suggests an increase in prevalence. To compound this, available evidence reveals that more than half of adults living with diabetes in Nigeria are unaware of their condition, estimates from community-based studies and international modeling indicates that approximately 50–60% of cases remain undiagnosed.^{2,6} This “silent epidemic” contributes to advanced disease at presentation, high treatment costs, and increased risk of cardiovascular disease, stroke, kidney failure, and lower limb amputations.³

A major determinant of this poor outcome profile is low screening coverage. Early detection of diabetes requires routine blood glucose assessment, yet access to diabetes screening and comprehensive care remains limited across primary healthcare facilities in Nigeria, with studies documenting low availability of trained staff, diagnostic tools, and medication support required for consistent screening and management of diabetes.^{7,8} Screening is further complicated by the fact that more than half of people with type 2 diabetes are asymptomatic during early stages, requiring proactive assessment rather than symptom-driven care.² Thus, national estimates of diabetes screening coverage are essential for planning public health interventions, yet they remain scarce.⁹

The Nigeria Demographic and Health Survey (NDHS) 2023–2024 is therefore a critical milestone.¹⁰ The NDHS collected for the first time in a DHS cycle, nationally representative data on blood sugar screening, diabetes diagnosis, prescription, and current medication use

These indicators provide a rare opportunity to construct a diabetes screening, diagnosis, and treatment cascade at a national scale. Such cascades have been widely used in HIV care and, increasingly, in hypertension research to identify gaps across the care continuum.

The diabetes care cascade is particularly important because diabetes often requires lifelong management, including medication adherence, lifestyle modification, and periodic monitoring. Failure at any cascade stage increases the likelihood of long-term complications. Evidence from SSA suggests profound losses at each stage, from screening to glycaemic control with the greatest losses occurring at the diagnosis stage.⁹

This study is timely and essential. By drawing directly from NDHS 2023–2024, the most comprehensive population health survey in Nigeria, the study provides the clearest national assessment to date of diabetes screening, diagnosis, and treatment uptake.

This paper has two objectives, first is to construct a national diabetes care cascade with 95% confidence intervals using NDHS 2023–24 indicators among Nigerian adults aged 15–49; and secondly to compare cascade outcomes across sociodemographic subgroups (sex, age, residence, region, wealth, and education) and formally testing sex differences at each cascade step.

METHODS

Study Design

This study is a survey-weighted secondary analysis of the 2023–2024 NDHS individual-level microdata. The NDHS 2023–2024 was implemented between December 2023 and May 2024. The survey employed a stratified two-stage cluster sampling design covering all 36 states and the Federal Capital Territory, enabling precise estimates at national, regional, urban-rural, and state levels.

Study Population

The analytic population includes all adults for whom diabetes indicators were measured: 39,050 women aged 15–49 and 10,876 men aged 15–49 years.

Variables and Definitions

Four diabetes-related variables were analyzed: (1) ever had blood sugar measured (screening); (2) ever diagnosed with diabetes by a health worker (diagnosis); (3) prescribed medication among those diagnosed within the past 12 months (treatment initiation); and (4) currently taking diabetes medication among all diagnosed individuals (treatment retention).

Statistical Analysis

All estimates were survey-weighted to account for the complex complex sampling design. Analyses were conducted using IBM SPSS Statistics (Version 30) with the Complex Samples module, which applies appropriate variance estimation for complex survey data. All proportions are reported with 95% confidence intervals. Sex differences at each cascade step were formally assessed using design-based logistic regression, with odds ratios, 95% confidence intervals, and p-values reported. Subgroup analyses by age, residence, region, wealth quintile, and education used the same survey-weighted approach.

Ethical Considerations

The NDHS protocol received ethical approval from the National Health Research Ethics Committee of Nigeria and the ICF Institutional Review Board. This study uses anonymized data and is exempt from additional ethical review. Permission to use the data was obtained from the DHS Program.

RESULTS

National Diabetes Care Cascade

Table 1
National diabetes care cascade with survey-weighted 95% confidence intervals and sex-difference analysis

Indicator	Women % (95% CI)	Men % (95% CI)	OR (95% CI)*	p-value*
Ever had blood sugar measured	18.6 (17.8–19.4)	17.6 (16.6–18.6)	0.93 (0.87–0.99)	0.030
Ever diagnosed with diabetes	0.9 (0.8–1.1)	1.3 (1.1–1.6)	0.58 (0.46–0.73)	< 0.001
Prescribed medication ¹	60.4 (53.8–66.9)	55.1 (46.7–63.6)	0.95 (0.59–1.52)	0.822
Currently taking medication ¹	52.5 (45.9–59.1)	39.2 (31.9–46.5)	1.30 (0.85–2.00)	0.233
<i>*OR and p-value reflect sex differences only (women vs. men, male as reference), derived from design-based logistic regression. ¹Among diagnosed individuals only</i>				

Nationally, diabetes screening coverage was low and broadly similar for both sexes (18.6% women vs. 17.6% men, $p = 0.030$). Diagnosis was extremely low in both sexes. Men had a slightly but significantly higher diagnosis rate than women (1.3% vs. 0.9%, $p < 0.001$). However, both rates were well below 2%, and the absolute difference was less than 0.5 percentage points. The practical implication is that both sexes are equally underserved at diagnosis. Among diagnosed individuals, prescription rates did not differ significantly by sex (60.4% women vs. 55.1% men, $p = 0.822$), nor did treatment retention (52.5% women vs. 39.2% men, $p = 0.233$). The wide confidence intervals at these treatment stages reflect the small number of diagnosed individuals in the sample and should be interpreted with caution.

Screening by Sociodemographic Characteristics

Table 2
Diabetes screening and diagnosis by sociodemographic characteristics

Characteristic	Women screened % (95% CI)	Men screened % (95% CI)	Women diagnosed % (95% CI)	Men diagnosed % (95% CI)
Age group				
15–19	2.9 (2.4–3.3)	4.6 (3.5–5.7)	0.2 (0.1–0.3)	0.2 (0.0–0.5)
20–24	12.0 (10.9–13.1)	9.0 (7.3–10.8)	0.3 (0.2–0.5)	0.8 (0.3–1.2)
25–29	20.1 (18.7–21.4)	13.0 (11.1–14.9)	0.7 (0.5–1.0)	1.0 (0.4–1.6)
30–34	25.1 (23.5–26.6)	21.7 (19.2–24.2)	0.9 (0.6–1.2)	1.6 (0.7–2.5)
35–39	27.8 (26.1–29.6)	24.2 (21.8–26.6)	1.1 (0.7–1.4)	1.7 (1.0–2.4)
40–44	29.3 (27.5–31.2)	27.0 (24.5–29.5)	2.4 (1.7–3.0)	2.0 (1.2–2.9)
45–49	31.4 (29.4–33.5)	33.5 (30.5–36.6)	2.7 (2.0–3.4)	3.2 (2.0–4.3)
Residence				
Urban	26.5 (25.4–27.7)	25.1 (23.4–26.8)	1.2 (1.0–1.4)	1.8 (1.4–2.3)
Rural	11.2 (10.3–12.2)	10.3 (9.2–11.3)	0.7 (0.5–0.8)	0.9 (0.6–1.2)
Region				
North West	9.7 (8.3–11.2)	7.9 (6.6–9.3)	0.6 (0.4–0.8)	0.7 (0.3–1.0)
North East	9.6 (7.9–11.3)	6.1 (4.3–8.0)	1.0 (0.6–1.4)	0.7 (0.2–1.2)
North Central	17.2 (15.5–18.8)	18.8 (16.6–21.0)	1.0 (0.7–1.3)	1.6 (1.1–2.2)
South East	25.6 (23.1–28.1)	27.3 (24.5–30.0)	0.8 (0.6–1.1)	0.9 (0.4–1.4)
South South	32.5 (30.4–34.6)	29.4 (26.8–32.1)	1.5 (1.1–1.9)	2.8 (1.7–3.8)
South West	35.2 (33.3–37.1)	35.2 (31.8–38.6)	1.0 (0.6–1.4)	2.3 (1.3–3.3)
Wealth quintile				
Poorest	4.5 (3.4–5.6)	2.5 (1.6–3.4)	0.4 (0.2–0.6)	0.3 (0.1–0.5)
Poorer	7.5 (6.5–8.6)	6.7 (5.4–8.1)	0.4 (0.2–0.6)	1.0 (0.4–1.5)

Characteristic	Women screened % (95% CI)	Men screened % (95% CI)	Women diagnosed % (95% CI)	Men diagnosed % (95% CI)
Age group				
Middle	14.3 (13.2–15.5)	12.3 (10.5–14.1)	1.0 (0.7–1.2)	1.1 (0.6–1.6)
Richer	22.4 (21.1–23.6)	19.5 (17.6–21.5)	1.0 (0.7–1.2)	1.6 (1.0–2.1)
Richest	39.0 (37.5–40.5)	37.8 (35.2–40.5)	1.7 (1.4–2.1)	2.3 (1.6–3.0)
Education level				
No education	7.1 (6.2–8.0)	4.4 (3.3–5.4)	0.6 (0.4–0.7)	0.7 (0.3–1.1)
Primary	16.4 (14.9–17.9)	11.7 (9.6–13.8)	1.0 (0.7–1.3)	1.1 (0.5–1.8)
Secondary	20.3 (19.4–21.2)	16.3 (15.0–17.6)	0.8 (0.6–0.9)	1.4 (1.0–1.7)
Higher education	44.4 (42.6–46.2)	37.7 (35.3–40.2)	2.3 (1.8–2.8)	2.1 (1.5–2.8)

All values are survey-weighted proportions with 95% confidence intervals. Differences across all five sociodemographic variables were statistically significant for both sexes (all $p < 0.001$).

Age

Screening increased steadily with age in both sexes, from below 5% among those aged 15–19 to over 30% among those aged 45–49. Diagnosis similarly increased with age in both sexes, with rates rising above 2% only among adults aged 40 and older. The age gradient was consistent for both women and men.

Residence

Urban residents were substantially more likely to have been screened than rural residents in both sexes. Among women, 26.5% (95% CI 25.4–27.7) of urban residents had been screened compared to 11.2% (95% CI 10.3–12.2) of rural women. Among men, the pattern was similar with 25.1% (95% CI 23.4–26.8) urban versus 10.3% (95% CI 9.2–11.3) rural. Diagnosis rates also followed the same urban–rural gradient in both sexes.

Wealth Quintile

A steep and consistent socioeconomic gradient was observed. Among women, screening ranged from 4.5% (95% CI 3.4–5.6) in the poorest quintile to 39.0% (95% CI 37.5–40.5) in the richest, nearly a nine-fold difference. Among men, the gradient was even steeper, from 2.5% (95% CI 1.6–3.4) in the poorest to

37.8% (95% CI 35.2–40.5) in the richest, a fifteen-fold difference. Diagnosis rates showed the same gradient in both sexes.

Education

Education showed the strongest gradient of all five sociodemographic variables. Among women, screening ranged from 7.1% (95% CI 6.2–8.0) among those with no formal education to 44.4% (95% CI 42.6–46.2) among those with higher education (a six-fold difference). Among men, the corresponding range was 4.4% (95% CI 3.3–5.4) to 37.7% (95% CI 35.3–40.2) (also a six-fold difference). Non-overlapping confidence intervals at extreme categories confirm these are statistically meaningful disparities for both sexes.

Treatment Initiation and Retention Among Diagnosed Individuals

Table 4
Treatment initiation and current medication use by sex

Indicator	Women % (95% CI)	Men % (95% CI)
Prescribed medication (among recently diagnosed)	60.4 (53.8–66.9)	55.1 (46.7–63.6)
Currently taking diabetes medication (among all diagnosed)	52.5 (45.9–59.1)	39.2 (31.9–46.5)

Among diagnosed individuals, prescription and retention rates were numerically lower in men than women but these differences were not statistically significant (prescription $p = 0.822$; retention $p = 0.233$). The wide confidence intervals at these stages reflect the small number of diagnosed individuals in the survey sample (women $n = 356$, men $n = 146$) and results should be interpreted accordingly. Nonetheless, the data suggest that fewer than two-thirds of diagnosed individuals are prescribed medication, and fewer than half of diagnosed men are currently taking medication, pointing to meaningful gaps in long-term diabetes management for both sexes.

DISCUSSION

This nationally representative analysis of the 2023–24 NDHS reveals profound gaps in Nigeria’s diabetes care continuum. The findings demonstrate significant losses at every stage of the cascade screening, diagnosis, treatment initiation, and long-term treatment retention. With fewer than one in five adults ever screened for diabetes and fewer than 1% diagnosed, the vast majority of diabetes cases in Nigeria remain undetected. Even among those diagnosed, only about half are currently taking diabetes medication among men. These findings underscore the need for urgent expansion of proactive diabetes detection and continuous care within Nigeria’s primary healthcare system.

The most striking finding is the large discrepancy between national diagnosis rates (approximately 1%) and the expected national prevalence 6–7% in Nigeria.^{5,6} This pattern is consistent with earlier studies showing that more than half of Nigerians with diabetes are unaware of their condition. For instance, a study suggested that nearly 60–70% of adults with diabetes in Nigeria were undiagnosed.⁶ Our findings from the NDHS align closely with this, suggesting that the majority of diabetes cases in the country remain silent and unmanaged. This level of underdiagnosis is not unique to Nigeria but reflects a broader regional trend. A multi-country analysis found substantial losses in the diabetes continuum of care across sub-Saharan Africa, with the largest drop occurring between prevalence and diagnosis.⁹ The very low screening coverage observed in Nigeria underscores the fragility of systems for diabetes risk detection. Although men had a marginally higher diagnosis rate than women (1.3% vs. 0.9%, $p < 0.001$), the absolute difference was less than half a percentage point. Both rates are far below the expected national prevalence, underscoring that both sexes are equally underserved at the detection stage.

The 2023–24 NDHS data show strong sociodemographic gradients in diabetes screening and diagnosis coverage. The subgroup analysis demonstrates steep and consistent sociodemographic gradients across all cascade stages, with the non-overlapping confidence intervals confirming statistically meaningful disparities at all levels. Screening rates reported in NDHS are substantially higher in urban areas compared with rural areas, and increase across wealth quintiles and education levels, with the most educated and affluent individuals more likely to report ever having their blood sugar measured. These patterns reflect well-described socioeconomic gradients in access to health services, where financial barriers, geographic distance, and low health literacy constrain uptake of preventive care among disadvantaged groups as poverty and low socioeconomic status have been highlighted as major barriers to accessing diabetes care in Nigeria and West Africa more broadly, including both screening and treatment services.¹¹ At the regional level, the observed north-south divide in screening and diagnosis mirrors broader health system disparities across Nigeria. Primary healthcare services remain under-resourced and unevenly functional nationwide, with only a minority of facilities effectively providing basic preventive and chronic care services.¹² Structural limitations such as shortages of trained staff, essential equipment, and medicines contribute to unequal access to screening and diagnosis across zones. Sex differences in screening and diagnosis are also evident in the NDHS, with women reporting higher rates of both screening and diagnosis than men. This may partly reflect greater contact with health services and primary care physician visits, where opportunistic screening might occur more frequently.^{13,14}

Treatment initiation rates were low for both sexes and the implications of this are significant. Diabetes is a chronic disease requiring continuous treatment and regular monitoring. Interruptions in therapy increase the risk of microvascular and macrovascular complications, including blindness, kidney failure, neuropathy, stroke, and myocardial infarction. Several factors reported in the broader literature help explain these treatment gaps. Diabetes care in Nigeria has been described as poorly coordinated and under-resourced, particularly at primary and secondary levels of the health system, with most patients financing care out-of-pocket and very limited health insurance coverage.¹⁵ Barriers identified in

qualitative studies include organisational constraints (clinic structure and service delivery), personal beliefs and perceptions of disease severity, and socioeconomic challenges that make consistent medication purchase and follow-up difficult.¹⁶ Media reports and expert commentaries further document rising costs of insulin and other essential diabetes medications, with inflation and health system weaknesses forcing some patients to ration or discontinue treatment altogether.¹⁷ Together, this evidence suggests that while some diagnosed individuals in Nigeria initiate pharmacologic diabetes care, retention in long-term treatment is likely constrained by financial, health system, and individual barriers, contributing to ongoing gaps in effective diabetes management.

These findings highlight major deficiencies in the integration of diabetes screening and management within Nigeria's primary healthcare (PHC) system. Although Nigeria has adopted the WHO Package of Essential Noncommunicable Disease Interventions (WHO-PEN), implementation remains uneven, with limited access to diagnostic equipment, financing constraints, and workforce gaps constraining routine diabetes care.^{12,18}

WHO-PEN recommends opportunistic, risk-based screening for diabetes at PHC level, particularly among adults with cardiovascular risk factors, given the asymptomatic nature of early-stage type 2 diabetes. Limited implementation of such screening likely contributes to the high burden of undiagnosed diabetes observed in Nigeria and across sub-Saharan Africa.⁹ Opportunistic screening within existing health-system can also be implemented.¹⁹ Task shifting to nurses and community health extension workers, an approach endorsed by WHO-PEN offers a pragmatic strategy for expanding screening and basic diabetes management in resource-constrained settings.

Sustaining long-term care will also require improved access to essential diabetes medicines. In Nigeria, where diabetes care is largely financed out-of-pocket, medication costs remain a major barrier to treatment continuity.¹⁵ Strengthening medicine availability at PHC facilities, including through insurance coverage or subsidy mechanisms, is essential to reducing treatment attrition.

Together, these findings underscore the need to strengthen PHC-based diabetes care through routine screening, task-shared service delivery, and improved access to essential medicines, in line with WHO-PEN recommendations.

This study has several notable strengths. It uses data from the 2023–24 Nigeria Demographic and Health Survey, the most recent nationally representative survey to include diabetes screening, diagnosis, and treatment indicators. The standardized DHS methodology ensures high data quality and comparability across population subgroups. To our knowledge, this analysis provides the first national description of the diabetes screening, diagnosis, and treatment cascade in Nigeria, highlighting critical gaps and inequities across the continuum of care. Several limitations should be acknowledged. Diabetes diagnosis in the NDHS is based on self-report which likely underestimates true disease prevalence and may introduce bias. The survey did not include fasting glucose or HbA1c testing, precluding direct estimation of undiagnosed diabetes. In addition, the cross-sectional design precludes causal inference,

and treatment initiation was assessed only among individuals diagnosed within the past 12 months, which may not fully reflect long-term treatment patterns. Despite these limitations, the NDHS provides uniquely valuable national insights into gaps in diabetes care in Nigeria.

CONCLUSION

This study provides the first nationally representative assessment of Nigeria's diabetes screening, diagnosis, and treatment cascade using NDHS 2023–24 data. The findings reveal substantial losses at every stage. Sociodemographic disparities in screening were steep and consistent across all subgroups, with wealth and education showing the strongest gradients and non-overlapping confidence intervals across extreme categories. Strengthening Nigeria's diabetes response requires integrating routine opportunistic screening into primary healthcare and targeting the most underserved populations, particularly those in the lowest wealth quintile, those with no formal education, and residents of the North West and North East zones.

Declarations

Conflict of Interest:

The authors declare that they have no conflicts of interest.

Ethical Approval:

Ethical approval was not required for this secondary analysis of anonymized widely available survey. Permission to use the NDHS data was obtained from the DHS program.

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Author Contribution

HN and AN conceptualized and designed the study. HN, FU, and CN were responsible for data curation, data extraction, and formal statistical analysis. HN, AN, MO, DA, AA, DE, OO, OC, FUt, UA, and NA contributed to the interpretation of the data and study findings. HN and AN prepared the original draft of the manuscript. FU, MO, AA, DE, OO, OC, FUt, UA, and NA critically reviewed and revised the manuscript for important intellectual content. OO, FUt, and UA contributed to project administration and study coordination. All authors contributed to manuscript development, reviewed and approved the final version of the manuscript, and agree to be accountable for all aspects of the work.

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Data Availability

The dataset used in this study are available from the DHS Program. Restrictions apply to the availability of these data, which were used under permission for the current study. The datasets are available from the DHS Program upon reasonable request and approval at the DHS website.

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