

Prevalence of undiagnosed diabetes mellitus among people living with diabetes and factors associated with diabetes risks in Uyo, Nigeria

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ABSTRACT

Background: The prevalence of diabetes mellitus (DM) is increasing in Nigeria. The lack of adequate screening services result in limited access, delayed diagnosis, and poorer outcomes for individuals living with diabetes. The prevalence of undiagnosed diabetes in Nigeria has not been extensively studied. Therefore, this study aims to assess the prevalence of undiagnosed diabetes among individuals living with diabetes in Uyo, Akwa Ibom State, Nigeria. **Methods:** A descriptive cross-sectional study was carried out among adults (≥ 18 years) at Akpan Andem market, Uyo Akwa Ibom State. The World Health Organization's stepwise approach for non-communicable diseases surveillance and the Type 2 Finnish Diabetes Risk Assessment Form were adapted to develop a structured questionnaire. Anthropometric data, blood pressure and blood glucose were measured for 281 respondents. Analysis was done using IBM SPSS, version 26. The significance level was set at $p < 0.05$ at a 95% confidence interval. **Result:** Of the 281 respondents, 78% were female, 95.4% lacked health insurance, and 52% had never checked their blood sugar. The prevalence of diabetes was 4.6%, of which 46.2% were previously undiagnosed. Among those previously diagnosed, 43.7% were non-compliant with their medications, with financial constraints being the sole reason for non-compliance. The Finnish risk assessment score indicated that 13.1% had a moderate-to-high 10-year risk of developing diabetes. Significant risk factors included age ($p < 0.001$), sex ($p < 0.001$), marital status ($p < 0.001$), and a family history of hypertension ($p = 0.002$). **Conclusion:** This study revealed a high prevalence of undiagnosed diabetes among those with diabetes in Uyo, alongside poor knowledge of diabetes and limited access to screening services among its residents. These findings emphasize the need for increased awareness and routine diabetes testing, integrated into health service delivery from the primary care level, as well as systematic screening campaigns for diabetes.

Keywords: Diabetes Mellitus, Prevalence, DM risk

KEY MESSAGES

What is already known on this topic:

- Global prevalence of undiagnosed diabetes among those with diabetes was 50.1%

What this study adds:

- The prevalence of undiagnosed diabetes among people with diabetes in Uyo is 46.2%
- 43.7% of those living with diabetes are non-compliant with medication.
- Financial constraint was the sole reason for non-compliance with medication.
- Approximately 13% of the population had a 15-20% risk of developing Diabetes Mellitus over the next 10 years.

How this study might affect research, practice or policy:

- Diabetes care should be included in Universal Health Coverage (UHC) schemes.
- There is need for a population-specific diabetes risk assessment tool for Nigeria.

INTRODUCTION

Diabetes Mellitus (DM) is a chronic metabolic disease characterized by persistently elevated levels of blood glucose (blood sugar) which leads over time to serious complications involving the heart, blood vessels, eyes, kidneys and nerves.¹

Non-communicable diseases (NCDs) including diabetes, cardiovascular disease, cancers, chronic respiratory diseases and mental health account for the greatest burden of deaths globally.² In 2019, diabetes accounted for 1.5 million global deaths.³ The global prevalence of diabetes increased from 108 million in 1980 to 422 million in 2014, with a concomitant increase in premature mortality.³ In Africa, 3.9% of persons aged 20–79 years have diabetes, accounting for 19.4 million people and 366,200 total deaths in the region.¹ Given a 9% prevalence of impaired glucose tolerance, people living with diabetes in Africa could increase exponentially in the next few years.¹ Nigeria has over 3 million people living with diabetes – one of the highest in Sub-Saharan Africa.¹

A significant concern for stakeholders is the lack of awareness among many people living with DM. Type II DM, in particular, may present with no or mild symptoms, leading to delayed diagnosis and treatment.³ Undiagnosed diabetes can result in chronically poor glycaemic control and adverse health outcomes due to the absence of early intervention. The International Diabetes Federation estimates that one-third to half of people with type II DM remain undiagnosed.¹ The prevalence of undiagnosed diabetes in Africa is estimated at 60%, accounting for 11.6 million people, and represents \$9.5 billion in total health expenditure.¹

Undiagnosed DM is associated with worsened health outcomes.⁴ Undiagnosed diabetes and prediabetic dysglycemia were found to be common in patients who have heart failure with reduced ejection fraction (HFrEF). About 20% of patients with undiagnosed diabetes would have developed microvascular complications at diagnosis typically after a decade. Another 5-10% of those with undiagnosed diabetes would have developed diabetic nephropathy at diagnosis.⁵

Several factors including lack of access to healthcare, personal and socio-religious beliefs, poor healthcare system, lack of awareness about disease symptoms, as well as family history of diabetes mellitus have all been found to be associated with an increased

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prevalence of undiagnosed diabetes mellitus in Africa.^{6,7}

The prevalence of undiagnosed diabetes mellitus has been reported in several countries. For instance, the US Center for Disease Control (CDC) reports that 7.3 million adults above 18 years old in the US were not aware that they had diabetes but met the laboratory criteria for diabetes. This represents 2.8 per cent of all adults in the US and 21.4 per cent of all US adults living with diabetes.⁸ Another study reports the 2017 annual cost associated with undiagnosed diabetes mellitus in the US to be \$31.7 billion.⁹

A study in a rural community in Edo State found the incidence of DM to be 23.7 per cent all of which were previously undiagnosed.¹⁰ The South-South geopolitical region in Nigeria has a high prevalence of DM in Nigeria with a prevalence of 9.8%.¹¹ In Uyo, Akwa Ibom State a study carried out over 2 years found a 5.8 percent overall incidence of DM among 3,500 civil servants.¹² Conversely, a study in Eket, Akwa Ibom State found a 13.5% overall prevalence of diabetes, of which 82.2 per cent of those who met diagnostic criteria were previously undiagnosed.¹³

There is however a paucity of data on the prevalence of both diagnosed and undiagnosed diabetes in Nigeria, a testament to the low relevance of diabetes care among the top healthcare needs in the country.¹⁴ An estimation of the prevalence of undiagnosed diabetes among different sub-population groups will assist stakeholders in estimating the burden of the disease, planning and designing interventions and evaluating the impact of previous interventions targeted at the prevention and control of diabetes within Akwa Ibom State. The study aims to assess the prevalence of undiagnosed diabetes mellitus in Uyo, Nigeria; to investigate the factors associated with the prevalence of undiagnosed diabetes mellitus;

to determine the proportion with controlled blood sugar levels among people living with diabetes and to assess the risk of diabetes mellitus in Uyo, Nigeria.

METHODS

Study Design

A descriptive cross-sectional study was adopted to determine the prevalence of undiagnosed diabetes mellitus (DM) among persons with diabetes in Uyo, Akwa Ibom State.

Study Setting and Population

The study was carried out at Akpan Andem market, Uyo, Akwa Ibom State. Akpan Andem market, despite being a relatively small community, serves as a representation of Uyo's urban population. It is centrally located and frequented by individuals from diverse social and economic backgrounds including traders and visitors from the formal and informal sector.

Inclusion and Exclusion Criteria

Traders and visitors were invited to participate in the study if they were above 18 years old during the 2021 World Diabetes Day campaign. Traders and visitors who did not give consent to the study were excluded. All volunteers in the campaign were also excluded from the study.

Sampling Technique and Sample Size

Convenience sampling was used for this study. A sample size of 152 was determined using Cochran's 1977 formula 15 with an 11.1% overall prevalence of undiagnosed DM among persons living with DM,¹⁵ a 95% level of significance and a 5% margin of error. An additional 10% adjustment for non-response yielded a sample size of 168.

Ethical Consideration

Approval for this study was obtained from the University of Uyo Teaching Hospital Research Ethics Committee and permission was sought and granted from Akpan Andem Market Union Authorities. Written informed consent was obtained from all participants.

Data Collection

Data collection was carried out in three phases:

Phase 1 involved the use of a structured questionnaire. The questionnaire consisted of socio-

demographic data, knowledge of diabetes mellitus and assessment of risk for developing diabetes. Risk assessment was done using the adopted Type II Finnish Diabetes Risk Assessment form. This standardized tool evaluated factors such as age, BMI, waist circumference, physical activity, fruit and vegetable intake, blood glucose history, anti-hypertensive treatment, and family history of diabetes. Each factor was weighted, and participants were categorized into risk groups for developing diabetes over the next 10 years.¹⁶ Each participant is classified according to their future risk of developing type 2 diabetes as follows; "low risk" if total score is <7 points, "slightly elevated risk" if total score is 7–14 points, "moderate risk" if total score is 12–14 points, "high risk" if total score is 15–20 points, and "very high risk" if total score is >20 points.¹⁷ Although there is no validated diabetes risk assessment tool for the African population, studies show an increasing popularity of this tool in low-resource settings.^{18,19,17}

Phase 2 consisted of the collection of anthropometric data: height, weight, body mass index and waist circumference. Weight and height were measured using a weight scale and stadiometer. The height was recorded in centimetres with the least count of 0.1 cm. Weight was expressed in kilograms with an accuracy of 100g. Waist circumference was measured using a measuring tape. Abdominal obesity was defined as a waist circumference ≥ 102 cm for men and ≥ 88 cm for women. Blood pressure was measured using a sphygmomanometer. The body mass index was calculated to the nearest 1 decimal point. For body mass index (BMI), study populations were categorized as per the following criteria: underweight (< 18.5 kg/m²), normal (18.5–24.9 kg/m²), overweight (25–29.9 kg/m²) and obese (≥ 30 kg/m²).

Phase 3 was the clinical measurement of random blood sugar using a glucometer (Fine-Test). Participants were classified as either having diagnosed diabetes (if previously diagnosed by a healthcare provider) or undiagnosed diabetes (if they met the diagnostic criteria during the study but had not been previously diagnosed). Undiagnosed diabetes was defined as having symptoms and a random blood glucose level ≥ 11.1 mmol/L.

Statistical analysis

The data collected was coded, validated and analyzed using IBM SPSS, version 26. Descriptive statistics,

including frequencies and percentages, were used to present the data, with graphical representation through plots. Chi-squared test was employed to assess associations between categorical variables, with a significance level set at $p < 0.05$.

RESULTS

As shown in Table 1, a total of 281 respondents were interviewed in the study. More than 50% of total respondents were below 45 years with a median age of 42 years. Female respondents were more than 3 times the number of male respondents at 220 (78.3%) and 61(21.7%) respectively. More than half (52.3%) of respondents had a secondary level of education and 73% were market traders. Half (50.5%) of all respondents earned an estimated monthly income below ₦20,000 (\$40) and almost all (268, 95.4%) respondents did not have any form of medical insurance. More than 75% of respondents had no history of diabetes or hypertension.

From Table 2, 13 (4.6%) of the 281 participants had elevated random blood sugar ≥ 11.1 mmol/L, however, 6 out of these (n=13; 46.2%) were previously undiagnosed. Hence the estimated prevalence of undiagnosed diabetes among those living with diabetes in Uyo, Nigeria is 46.2%

As shown in Table 3, the majority (215; 76.5%) of respondents had heard of diabetes. More than half of the total respondents had not checked their blood sugar levels previously (146; 52.0%). The commonest reasons for not checking blood sugar levels were lack of knowledge about the condition (68; 46.6%) followed by absence of symptoms (41; 28.1%). The majority (265; 94.3%) knew that diabetes was non-communicable, however, more than half of respondents (156; 55.5%) did not know the symptoms of diabetes. Also, all respondents (281; 100%) attributed consuming sweet food as a risk factor for diabetes. The majority (182; 64.8%) agreed that diabetes could be prevented. Also, the majority (202; 71.9%) had no idea of which organs were affected by diabetes, however, among those who knew at least one organ that could be affected by diabetes, the kidney (62; 22.1%) was the commonest organ identified.

Table 1: Sociodemographic characteristics of participants (n = 281)

Variables	Frequency
Age (years)	
<45	151 (53.7%)
45 – 54	66 (23.5%)
55 – 64	37 (13.2%)
>64	27 (9.6%)
Median (IQR)	42 (33.0 – 52.5)
Sex	
Male	61 (21.7%)
Female	220 (78.3%)
Marital Status	
Single	79 (28.1%)
Married	200 (71.2%)
Divorced	2 (0.7%)
Educational Level	
No formal education	11 (3.9%)
Primary	72 (25.6%)
Secondary	147 (52.3%)
Tertiary	51 (18.2%)
Occupation	
Trader	205 (73%)
Artisan	24 (8.5%)
Civil servant	19 (6.8%)
Farmer	11 (3.9%)
Others	22 (7.8%)
Monthly Income (N)	
< 20,000	142 (50.5%)
21,000 – 40,000	99 (35.2%)
41,000 – 60,000	22 (7.8%)
61,000 – 80,000	13 (4.6%)
> 80,000	5 (1.9%)
Health Insurance	
Yes	13 (4.6%)
No	268 (95.4%)
Family History of DM	
Yes	32 (11.4%)
No	249 (88.6%)
Family History of Hypertension	
Yes	69 (24.6%)
No	212 (75.4%)

Table 2: Prevalence of diabetes mellitus

		Previously Diagnosed		Total
		Yes	No	
RBS > 11.1mmol/L	Yes	7	6	13 (4.6%)
	No	9	259	268 (95.4%)
Total		16	265	281 (100%)

Table 3: Knowledge and practice towards Diabetes Mellitus

Question	Frequency (%)
Have you ever heard of diabetes?	
Yes	215 (76.5)
No	66 (23.5)
Have you ever checked your blood sugar levels before?	
Yes	135 (48.0)
No	146 (52.0)
If No, why?	
I don't know about the condition	68 (46.6)
I don't have any symptoms	41 (28.1)
I don't believe I can have this condition	18 (12.3)
I don't think this condition is severe enough to be worried about	12 (8.2)
Others	7 (4.8)
Is diabetes a communicable disease?	
Yes	16 (5.7)
No	265 (94.3)
What are the symptoms of diabetes mellitus?	
Frequent urination & thirst	114 (40.6)
Eating excessively	25 (8.9)
I don't know	156 (55.5)
What are the risk factors for diabetes?	
Consume sweet food	281 (100)
Family history	41 (14.6)
Overweight	41 (14.6)
Physical Inactivity	25 (8.9)
High blood pressure	23 (8.2)
Others	34 (12.1)
I do not know	187 (66.5)
Can diabetes be prevented?	
Yes	182 (64.8)
No	99 (35.2)
What organs are affected by diabetes?	
Kidneys	62 (22.1)
Eyes	30 (10.7)
Heart	29 (10.3)
Leg	25 (8.9)
Brain	10 (3.6)
Lungs	10 (3.6)
I don't know	202 (71.9)

From Table 4. Sixteen (5.7%) respondents had been previously diagnosed with diabetes. Furthermore, only 9 (56.3%) of those previously diagnosed with

diabetes was regular on medication. Financial constraint was the only reason for not being regular on medication (7; 100%)

Table 4: Blood sugar control among people living with diabetes

Question	Frequency (%)
Have you ever been diagnosed with diabetes?	
Yes	16(5.7%)
No	265(94.3%)
If Yes, are you regular on medication?	
Yes	9(56.3%)
No	7(43.7%)
Reason(s) for not being regular on medication	
Financial constraint	7(100%)
I do not believe the diagnosis	0(0%)
I don't believe I can be adversely affected by the condition	0(0%)
Others	0(0%)
RBS among those previously diagnosed of diabetes (n=16)	
>11.1mmol/L	7 (43.7%)
<11.1mmol/L	9(56.3%)

As shown in Fig. 1 and Table 5, the overall median risk score was 7 (IQR: 4–10), with males scoring lower (median 4; IQR: 2–7) than females (median 7.5; IQR: 5–10). Most participants (244; 86.8%) had a low-risk score (≤ 11), indicating a 1–4% 10-year risk of

developing type II DM. Moderate-risk scores (12–14) were seen in 18 (6.4%) participants, correlating to a 17% risk, while high-risk scores (15–20) were observed in 19 (6.7%) participants, corresponding to a 33% risk. No participants had scores over 20.

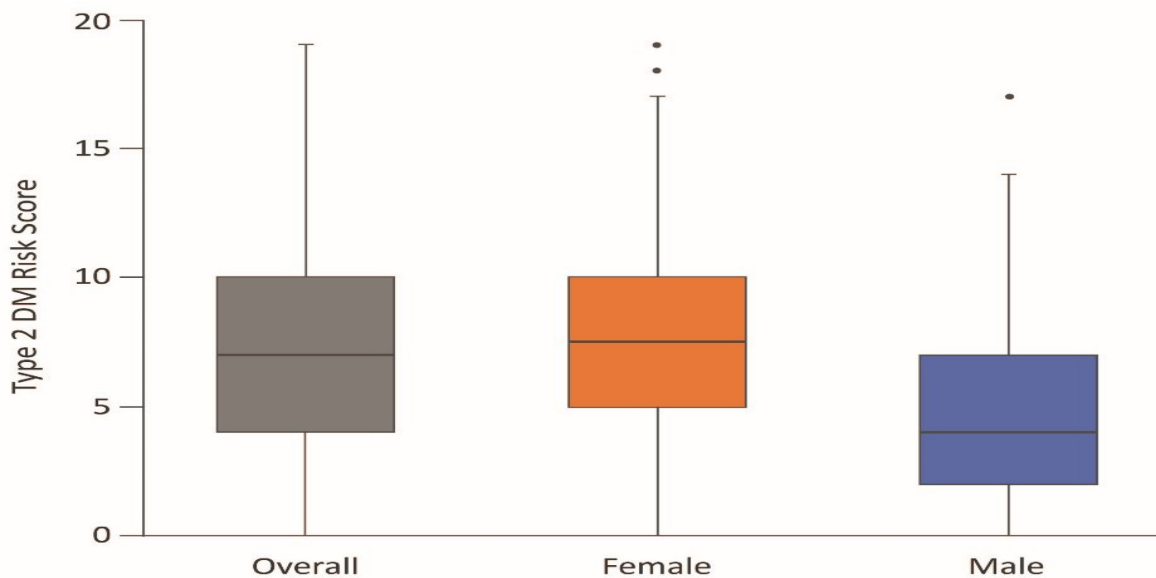


Fig 1. Boxplot of the Finnish Type 2 DM Risk Score of Participants grouped by sex (N=281)

Table 5: Finnish Diabetes Risk Assessment Severity among Participants (N = 281)

Variable	Frequency (%)	Median (IQR)
Risk Scores		Overall median risk score:
Low risk (<7)	137 (48.8)	7 (4 – 10)
Slightly elevated (7 – 11)	107 (38.1)	
Moderate risk (12 – 14)	18 (6.4)	Male: 4 (2 – 7)
High risk (15 – 20)	19 (6.7)	Female: 7.5 (5 – 10)
Very high risk (>20)	0 (0.0)	

As shown in Table 6. above, factors found to be associated with the risks of developing Type II DM included the age of participants ($\chi^2 = 35.0$, $df = 1$, $p < 0.001$), sex ($\chi^2 = 23.9$, $df = 3$, $p < 0.001$), marital status ($\chi^2 = 26.7$, $df = 6$, $p < 0.001$), family history of hypertension ($\chi^2 = 14.9$, $df = 3$, $p = 0.002$), and

whether they had DM or not ($\chi^2 = 9.9$, $df = 3$, $p = 0.011$). Interestingly, there was no significant association between a family history of DM and the risk of developing type 2 DM ($\chi^2 = 5.6$, $df = 3$, $p = 0.110$).

Table 6. Factors associated with the risks of developing type 2 DM (N = 281)

Variable	Diabetes risk category				χ^2 , df, p value
	Low n=137	Slightly Elevated n=107	Moderate n=18	High n=19	
Age					
<45	96(63.6)	49(32.5)	3(2.0)	3(2.0)	$\chi^2 = 35.0$, $df = 1$, $p < 0.001$ §
45 – 54	24(36.4)	32(48.5)	5(7.6)	5(7.6)	
55 – 64	9(24.3)	14(37.8)	5(13.5)	9(24.3)	
>64 years	8(29.6)	12(44.4)	5(18.5)	2(7.4)	
Sex					
Male	45(73.8)	9(14.8)	5(8.2)	2(3.3)	$\chi^2 = 23.9$, $df = 3$, $p < 0.001$ †
Female	92(41.8)	98(44.5)	13(5.9)	17(7.7)	
Marital Status					
Single	57(72.2)	18(22.8)	3(3.8)	1(1.3)	$\chi^2 = 26.7$, $df = 6$, $p < 0.001$ †
Married	79(39.5)	88(44.0)	15(7.5)	18(9.0)	
Divorced	1(50.0)	1(50.0)	0(0.0)	0(0.0)	
Educational level					
No formal education	3(27.3)	5(45.5)	2(18.2)	1(9.1)	$\chi^2 = 1.7$, $df = 1$, $p = 0.197$ §
Primary	27(37.5)	30(41.7)	7(9.7)	8(11.1)	
Secondary	86(58.5)	54(36.7)	2(1.4)	5(3.4)	
Tertiary	21(41.2)	18(35.3)	7(13.7)	5(9.8)	
Income level					
<20,000	68(47.9)	54(38.0)	9(6.3)	11(7.7)	$\chi^2 = 0.7$, $df = 1$, $p = 0.407$ §
21,000 – 40,000	53(53.5)	38(38.4)	3(3.0)	5(5.1)	
41,000 – 60,000	8(36.4)	9(40.9)	5(22.7)	0(0.0)	
61,000 – 80,000	6(46.2)	5(38.5)	1(7.7)	1(7.7)	
>80,000	2(40.0)	1(20.0)	0(0.0)	2(40.0)	
Family history of DM					
Yes	12(37.5)	17(53.1)	0(0.0)	3(9.4)	$\chi^2 = 5.6$, $df = 3$, $p = 0.110$ †
No	125(50.2)	90(36.1)	18(7.2)	16(6.4)	
Family history of Hypertension					
Yes	25(36.2)	26(37.7)	7(10.1)	11(15.9)	$\chi^2 = 14.9$, $df = 3$, $p = 0.002$ †
No	112(52.8)	81(38.2)	11(5.2)	8(3.8)	

† Fisher's exact test, § Linear-by-linear association; level of significance $p < 0.05$

DISCUSSION

This study aimed to assess the prevalence of undiagnosed diabetes among individuals living with diabetes in Uyo, determine the proportion of respondents with uncontrolled blood sugar levels, and assess the risk of diabetes in Uyo, Nigeria. The overall prevalence of DM was 4.6%, with 46.2% of those cases previously undiagnosed. This finding aligns with a 2017 study conducted in Oyo State, Nigeria, where the prevalence of diabetes was also 4.6%. The high prevalence of undiagnosed diabetes is also consistent with regional data from Africa, where 59.7% of diabetes cases remain undiagnosed, potentially contributing to the rising complications associated with diabetes.¹

Although this study did not investigate the specific factors contributing to undiagnosed diabetes, the poor knowledge of DM among the study population likely plays a role. More than half of the study population was unaware of the symptoms of DM, and two-thirds did not know about the risk factors. Similarly, over 70% did not know the organs that could be affected in persons living with diabetes. The study found poor knowledge of diabetes, consistent with a 2021 study in Jos, Plateau State, which reported that 66.9% of residents had limited awareness of the disease. However, 64.8% of the population in this study knew that diabetes could be prevented, indicating some success in public sensitization efforts. This calls for greater efforts by stakeholders within the health sector to re-strategize and increase public enlightenment campaigns and community health education on DM while engaging the community leaders to assist in information dissemination about Diabetes.

The prevalence of undiagnosed DM among persons living with diabetes from this study can also be attributed to the lack of adequate screening services. Only 52% of respondents had previously checked their blood sugar levels. The main reasons for not getting tested in were lack of knowledge about diabetes (46.6%) and absence of symptoms (28.1%). This is consistent with a 2019 community-based study done in Ethiopia where ignorance about the symptoms of diabetes was associated with an increased prevalence of undiagnosed diabetes.²² Only 56.3% of those previously diagnosed were regular on medication, which reflects the poor compliance with treatment among those diagnosed with diabetes. Consequently, just 56.3% of those previously diagnosed with diabetes had their blood sugar levels controlled (RBS <11.1 mmol/L).

Half of the study population earned less than twenty thousand naira (\$40) which is below Nigeria's minimum wage of thirty thousand naira (\$60). Moreover, 95.4% of the respondents lacked health insurance, which may explain the poor diabetes control. Financial constraints, driven by low earning power, were the primary reason for medication non-compliance. These numbers can be reduced if the government and private corporations can develop public-private partnership models to subsidize the cost of screening and medications at health institutions in the country while also ensuring compulsory enrolment in the several available social health insurance programs at all levels. Additionally, tackling unemployment through job creation will empower individuals with the resources to partake in health insurance. Vocational rehabilitation of people living with diabetes would also reduce the financial burden of procuring medication. More importantly, since diabetes requires lifelong care, the approach to diabetes care must include universal health coverage as a pillar, to be used in both diabetes education, counselling and management.

According to the Finnish Diabetes Risk Assessment Score, 86.9% of the population had a score of ≤ 11 , indicating a 1-4% chance of developing diabetes within 10 years. This finding is similar to studies in the Republic of Benin and Asaba, Nigeria, where 83% and 88.4% of participants, respectively, had a diabetes risk score ≤ 11 .^{23,24} The chances of a diabetes epidemic appear low; however, caution is warranted, given the increasing level of undiagnosed diabetes and a lack of existing assessment tools specifically validated for this population. Therefore, existing DM prevention strategies should be intensified at the primordial and primary levels of care.

There was no significant association between a family history of DM and the risk of having diabetes remains which may be due to under-reporting of a positive family history of DM stemming from their limited knowledge of Diabetes occurrence within their families. Only 14% of participants in this study agreed that a family history of DM was a risk factor for having diabetes. This underestimates the true role of family history as a risk factor in the development of diabetes. Additionally, complications such as hypertension, stroke, and cardiac arrest are often seen as more immediate and dramatic than the chronic, asymptomatic course of diabetes, which may contribute to the under-reporting of a family history of the disease.

Strengths and limitations of the study

This community-based study, unlike hospital-based studies, allowed for convenient recruitment of participants without the selection bias typically associated with hospital settings, where undiagnosed individuals often present with complications. Although the Finnish Diabetes Risk Assessment Tool, a widely accepted tool found to be effective in low-resource settings was used, there might have been an under- or over-estimation of the diabetes risk due to the absence of a population-specific tool.

The study was conducted in Akpan Andem market, which represents a wide cross-section of Uyo's urban population, but the use of a single location limits the generalization of the findings to the broader population of Uyo and other urban centers. The gender imbalance, with more females than males, may have also influenced the study's assessment of certain risk factors, such as smoking, which is more prevalent among men. Additionally, certain risk factors like high cholesterol were not measured. Furthermore, the reliance on a single random blood glucose measurement, without HbA1c testing, may have introduced errors due to blood glucose fluctuations. Nevertheless, the comparable prevalence of diabetes with other studies in Nigeria is reassuring.

Despite the limitations, these findings provide a basis for community screening programs. Participants diagnosed with diabetes during the screening were referred to tertiary health facilities for follow-up care and treatment.

CONCLUSION

The study revealed a high prevalence of previously undiagnosed diabetes among individuals living with diabetes in Uyo, highlighting a significant public health concern. Limited screening, poor knowledge of symptoms, risk factors, and complications of diabetes, alongside financial constraints and lack of health insurance, contributed to the problem. While most of the population had a low 10-year risk of developing diabetes, the prevalence of undiagnosed cases poses a threat to long-term health outcomes. These findings call for strengthened public health efforts, including increased access to screening, enhanced public awareness, subsidized healthcare, and policies that support universal health coverage. Public-private partnerships can help lower the costs of testing and medication, while random blood sugar tests should become routine at first contact with healthcare services. Community engagement and

broader communication efforts are essential to improve knowledge and control of diabetes in Uyo.

Authors Contributions

JE, HN, and EU conceptualized, designed the study protocol and wrote the manuscript. VO and UN analyzed the data. VO and EO interpreted the results. EU, PI, and HN wrote the discussion and conclusion. All authors were involved in the implementation and data collection. All authors have agreed and proofread to the published version of the manuscript.

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Institutional Review Board Statement

Ethical clearance was granted by the University of Uyo Teaching Hospital, Uyo Institutional Health Research Ethical Committee (Project Identification code: UUTH/AD/S/96/VOL.XXI/609). The study protocol was implemented in accordance with the guidelines of the Declaration of Helsinki.

Informed Consent/ Transparency Statement

written informed consent was obtained from each participant prior to recruitment into study. The lead investigator affirms that the manuscript is an honest and accurate account of the study. No aspect of the study was omitted or not reported.

Data Availability Statement

Data from this study is available with the lead investigator and will be made available upon reasonable request.

Conflict of Interest

The authors declare no conflict of interest.

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