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Review Article

The Prevalence and Risk Factors of Diabetes Mellitus in Nigeria: A Two-Decade Scoping Review Across Six Geopolitical Zones

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Abstract: Diabetes mellitus (DM) is assuming epidemic proportions worldwide, particularly in developing countries. Identifying the current burden of DM in Nigeria is essential for effective healthcare planning and resource allocation for prevention. This review aimed to determine the current prevalence and risk factors of DM across the six geopolitical zones of Nigeria over the last two decades. Using the preferred reporting items for systematic review and meta-analysis (PRISMA) study design, articles pertinent to the study objective were searched from 2000 to 2024. The quality of the studies included in this review was assessed using the Joanna Briggs Institute (JBI) critical appraisal tool for descriptive studies. Forty-four full-text publications met the eligibility criteria, out of which 23 were excluded because only an abstract was published, and 21 articles were included in the review. The overall pooled prevalence of DM in Nigeria was 6.3%. The prevalence of DM in the six geopolitical zones of Nigeria was 6.2% in the north-west, 6.1% in the north-east, 5.6% in the north-central zone, 5.4% in the south-west, 13.1% in the south-east, and 6.0% in the south-south zone. The prevalence of DM in Nigeria has increased over the last two decades compared to previous reports. Physical inactivity, unhealthy diet, and obesity are important perpetuating factors. A national diabetes care and prevention policy is highly recommended.

Keywords: Diabetes Mellitus, Prevalence, Risk Factors, Nigeria, Scoping Review.

INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder characterized by chronic hyperglycemia with disturbances of carbohydrate, fat, and protein metabolism resulting from defects in insulin secretion, insulin action, or both.(Antar *et al*., 2023) It is classified as type 1 diabetes, type 2 diabetes, and hybrid-form among others.(Antar *et al*., 2023) The global burden of diabetes among adults was estimated at 366 million in 2011, and this is projected to increase to about 552 million by 2030.(King, Aubert, & Herman, 1998) The prevalence of diabetes worldwide was reported to be 8.3% in 2011 and is predicted to be 9.9% by 2030.(King *et al*., 1998) The number of patients with type 2 diabetes is likely to be far higher than the current estimates because a substantial proportion of patients with type 2 diabetes go undetected.(Atlas, 2015) The available data suggest that diabetes is emerging as a major health problem in Africa, including Nigeria.(Organization, 2023) Developing countries in sub-Saharan Africa may experience the largest proportional increase in diabetes.(Ekelund *et al*., 2005) This significant rise in diabetes cases is attributed to population growth, increasing life expectancy, urbanization, and the increasing prevalence of obesity and physical inactivity.(Ekelund *et al*., 2005) There is also a reported increase in DM-related complications alongside the increasing prevalence of the disease.(Atlas, 2015) We now see high rates of DM-related amputations, cerebrovascular disease, heart-related problems, and kidney disease in populations that were not previously known for these challenging health problems.(Antar *et al*., 2023) These alarming figures are much higher than the national prevalence estimates, which appear to underestimate the burden of DM in Nigeria. No recent data have been reported about the national burden of DM in Nigeria as of 2024. Quantifying the prevalence of DM

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and its associated risk factors in Nigeria now is important in rational planning and resource allocation for diabetes prevention.(Atlas, 2015; Commission; Wild, Roglic, Green, Sicree, & King, 2004) This review aimed to determine the current prevalence DM and its associated risk factors across geopolitical zones of Nigeria in the last 2 decades.

MATERIALS AND METHODS

In line with the nature of this study as a scoping review, relevant published articles were sourced from secondary materials and related literature, including hand-searched content via the Google website (www.google.com). The databases consulted for pertinent publications were PubMed, Google Scholar, Web of Science, Scopus, African Journals Online (AJOL), and Dissertations/Theses. The literature search focused on studies conducted in Nigeria and published between 2000 and 2024. Keywords employed during the search included diabetes prevalence, Nigeria, risk factors, morbidity, and mortality, among others.

Study Location:

The studies included in the review were conducted in various states across the six geopolitical zones of Nigeria.

Ethical Consideration

This scoping review was conducted using previously published studies and did not involve any direct participation of humans or animals by the authors.

Eligibility Criteria

Inclusion Criteria

- Studies that reported the prevalence and risk factors of DM.
- Only studies that utilized FPG, OGTT, RBS, or HbA1C as diagnostic criteria for DM were included.
- Studies published in English.
- Studies conducted from 2000 to 2024.
- Studies that used a quantitative, qualitative, or mixed-methods approach.

Exclusion Criteria

- Studies published outside Nigeria.
- Studies conducted in the form of a review, e.g., systematic review.
- Studies that focused on DM without clearly stating its prevalence.
- Published abstract without the complete article.

Sample Size

The review included 21 studies, all of which employed a cross-sectional study design. Sample sizes ranged from 139 to 1,259 per study.

Screening of Research Papers

This was conducted using the preferred reporting items for systematic review and meta-analysis (PRISMA) guideline. The identified articles were screened using the inclusion and exclusion criteria. The search strategy yielded 16,420 articles; after removing duplicates, 2,980 articles were left. The initial screening was carried out by reviewing the titles and abstracts of the articles, subsequently, 1,890 articles were further excluded. The remaining 1,090 articles were screened for the inclusion criteria, and 44 were then subjected to full-text screening. Finally, 21 articles were included in this review. Any discrepancy that arose during the screening process was resolved through discussion and consensus.

Data Extraction

This was carried out using an online pre-designed data extraction form. The form included the following information: Author, year of publication, state, number of patients, prevalence of DM, risk factors, study design, complications, and key findings related to the outcome. See figure 1 below.

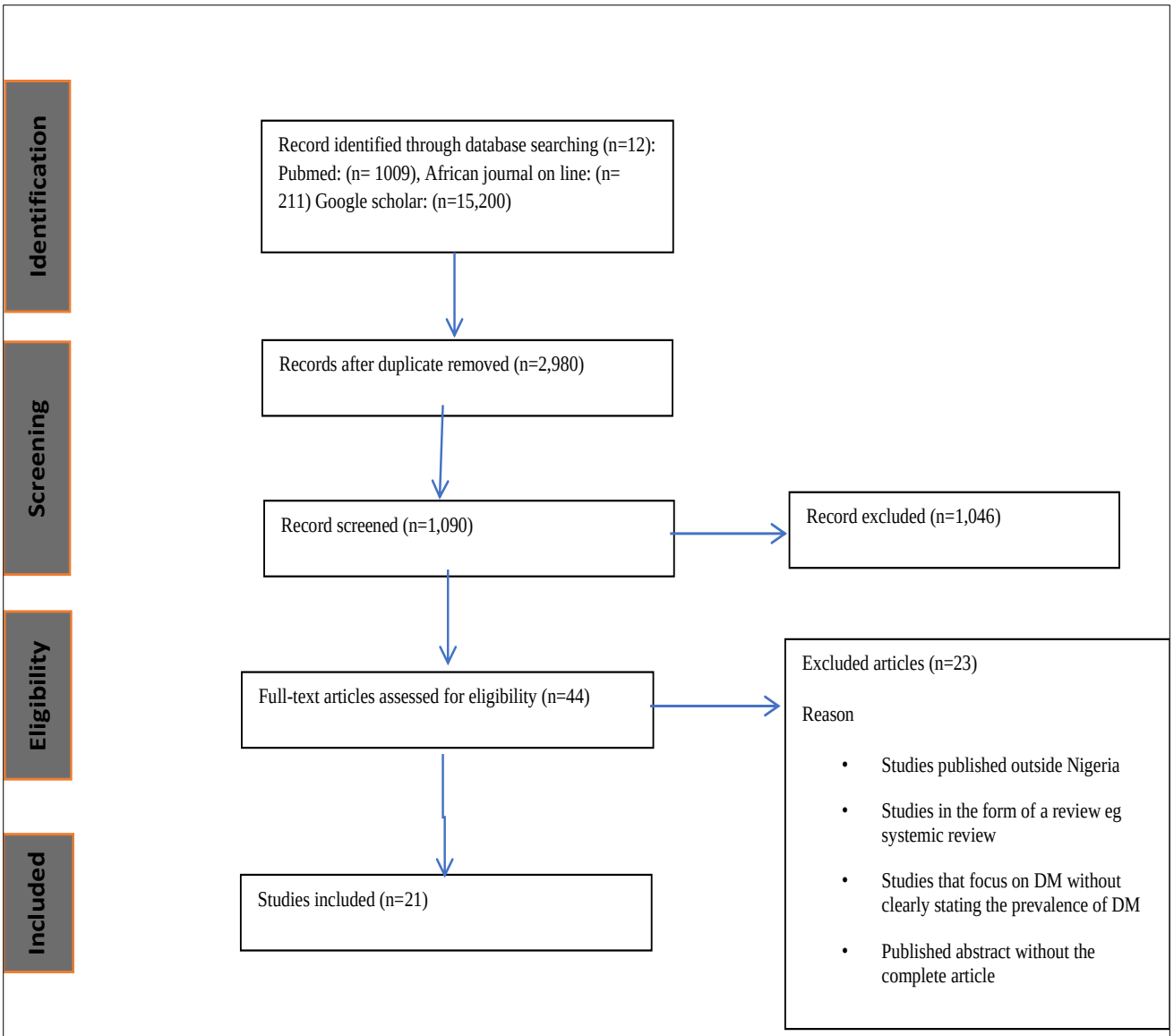

Figure 1: Step-by-step literature search using PRISMA guideline

Assessment of Data Quality

The quality of the studies included in the systematic review was assessed using the Joanna *Briggs Institute (JBI*) critical appraisal tool for cross-sectional studies. The studies were rated based on their sampling strategy, data collection, methods, and analysis of results.

Data Analysis

A complete reading of the included studies was done with the information that meets the aim and objectives of this review. The extracted data were analyzed using a *narrative synthesis approach* which involved summarizing the key findings of each study and identifying common themes and patterns across the studies. The synthesis of the data was guided by the study objective of this review. Preliminary screening of eligible studies revealed considerable heterogeneity in terms of participants, setting, sample size, and outcome measures. Primary analysis of studies was limited to *qualitative synthesis*, allowing a detailed data analysis to be performed. The PRISMA flow diagram was used to present the search and screening process of the articles.

Conceptual Framework of the Study

The rising prevalence of DM and its related death brought about the idea of assessing the current burden of DM in Nigeria, its associated perpetuating factors, and the means of addressing these challenges!

Operational Definition of Terms

Diabetes mellitus was diagnosed based on the following diagnostic criteria.(Antar *et al*., 2023; Association, 2010)

- Fasting plasma glucose of 7.0 mmol/L
- Random plasma glucose of 11.1 mmol/L

- Plasma glucose 2-h post-glucose load (75 g) of 11.1 mmol/L
- HbA1C ≥ 6.5%

Study Period: This scoping review was commenced on August 26th, 2024, and completed on November 18th, 2024.

RESULTS

Table 1: Summary of the articles included in this study

S/no	Author (Reference)	Year	State	Geopolitical zone	Study Design	Prevalence (%)
1.	(Adijat, Folakemi, Adejumo, & Atolagbe, 2021)	2021	Osun	South-west	Retrospective descriptive	2.6
2.	(Gezawa *et al*., 2015)	2015	Maiduguri	North-east	Prospective	7.0
3.	(Ramalan, Habibu, Maiyaki, Uloko, & Muhammad, 2021)	2021	Kano	North-west	Prospective	4.1
4.	(Akinlade, Lasebikan, Satope, & Rahamon, 2017)	2018	Oyo	South-west	Cross-sectional	7.3
5.	(Danjin, Usman, & Adamu, 2016)	2017	Gombe	North-east	Retrospective descriptive	5.2
6.	(Aladeniyi *et al*., 2017)	2017	Oyo	South-west	Cross-sectional	5.3
7.	(Sabir, Isezuo, & Ohwovoriole, 2011)	2011	Sokoto	North-west	Cross-sectional prospective	4.6
8.	(Omorogiuwa *et al*., 2010)	2010	Edo	South-south	Cross-sectional	9.0
9.	(Ekpenyong, Akpan, Ibu, & Nyebuk, 2012)	2012	Akwa Ibom	South-east	Cross-sectional	23.1
10.	(Oyegbade, Abioye-Kuteyi, Kolawole, Ezeoma, & Bello, 2007)	2007	Osun	South-west	Cross-sectional	5.0
11.	(Puepet & Ohwovoriole, 2008)	2008	Plateau	North-central	Cross-sectional prospective	4.0
12.	(Nyenwe, Odia, Ihekwaba, Ojule, & Babatunde, 2003)	2003	Port Harcourt	South-south	Cross-sectional prospective	6.8
13.	(Anzaku & Musa, 2013)	2012	Plateau	North-central	Cross-sectional prospective	8.3
14.	(Adeniyi, Uloko, & Musa, 2010)	2010	Kano	North-west	Cross-sectional	2.0
15.	(Etukumana, Puepet, & Obadofin, 2013)	2014	Plateau	North-central	Cross-sectional prospective	4.1
16.	(Nwafor & Owhoji, 2001)	2001	Port harcourt	South-south	Cross-sectional preospective	2.3
17.	(Ejike, Uka, & Nwachukwu, 2015)	2015	Abia	South-east	Cross-sectional	3.0
18.	(Isara & Okundia, 2015)	2015	Edo	South-south	Cross-sectional	5.0
19.	(Enang *et al*., 2014)	2014	Cross River	South-south	Cross-sectional	7.0
20.	(MA., 2016.)	2016	Kano	North-west	Prospective	10
21.	(Olamoyegun, Iwuala, Olamoyegun, Olaniregun, & Kolawole, 2015)	2014	Oyo	South-west	Prospective	7.0

The geo-political zones of Nigeria included in this study were: North-west, North-east, North-central, South-west, Southsouth, and Southeast.(Idike & Eme, 2015) The study involves all categories of individuals aged 18 years and above.(Idike & Eme, 2015) The total number of participants recruited in all the reported studies was 63259. The prevalence ranges from 2.0% in Kano to 23.1% in Akwa Ibom, with a mean prevalence of 6.3%. The prevalence of DM in each geopolitical zone is shown in Figure 2 below. Southeast has the highest prevalence of DM (13.1%) while Southwest has the lowest prevalence of DM (5.4%).

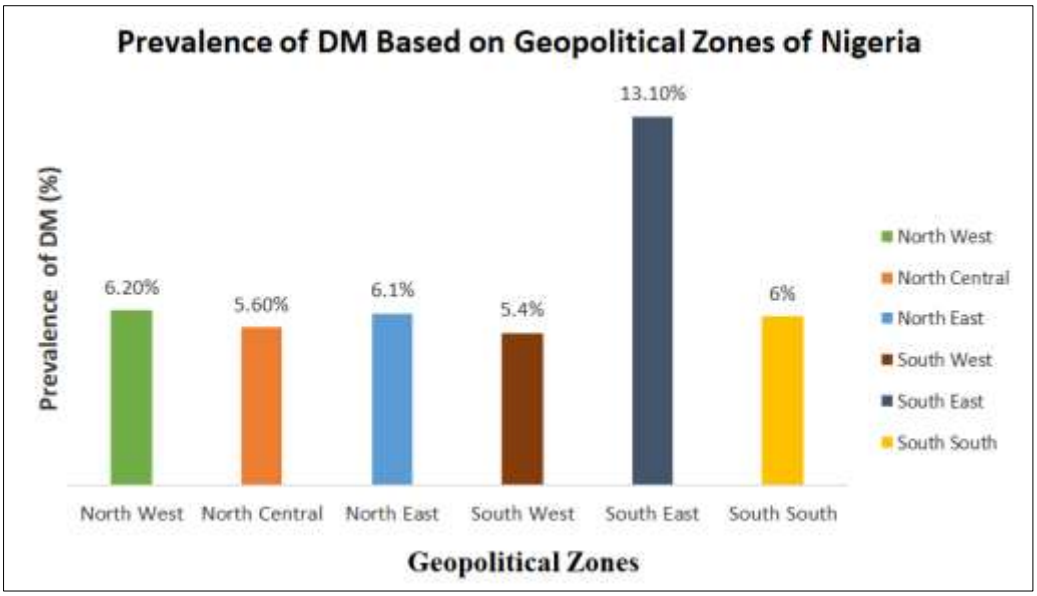

Figure 2: Prevalence of DM across geopolitical zones of Nigeria

DISCUSSION

This study assessed the national and regional prevalence of diabetes mellitus (DM) in Nigeria and revealed a considerable burden across the country's six geopolitical zones. The overall national pooled prevalence of DM was found to be 6.3%, indicating a significant public health concern. This finding aligns closely with the study reported by.(Uloko *et al*., 2018) In contrast, an earlier study by Akinkugbe *et al.*, reported a much lower national prevalence of 2.2%.(Akinkugbe & Akinyanju, 1997) The upward trend in DM prevalence over the years may be attributed to factors such as population growth, increasing urbanization, sedentary lifestyles, and dietary changes associated with modernization.. Regional variations in DM prevalence were also observed. The Southeast recorded the highest prevalence of DM, followed by the Northeast and Northwest, indicating a worrying trend in these areas. Conversely, the Southwest showed the lowest prevalence among all the regions. The regional disparities in DM prevalence also appear to parallel trends in obesity, a key risk factor for type 2 diabetes.(Gerich, 2003) For example, the high DM prevalence in the Southeast aligns with earlier reports of elevated obesity rates in the same zone.(Opeodu & Adeyemi, 2013) On the other hand, the relatively lower DM prevalence in the Southwest may be due to better public health awareness, healthier lifestyle practices, or more effective interventions in that region. Based on the United Nations' 2017 population estimate of 193.3 million for Nigeria, applying the pooled DM prevalence rate suggests that approximately 11.2 million Nigerians—about 1 in every 17 adults—are currently living with diabetes. This projection underscores the growing burden of diabetes and its implications for the country's healthcare system. Importantly, the national prevalence reported in this review closely matches the 2013 International Diabetes Federation (IDF) estimate, which was based on extrapolations from populations with similar sociodemographic characteristics. (32) This consistency lends credibility to the findings and highlights the urgency of developing effective, evidence-based strategies for diabetes prevention and management in Nigeria.

CONCLUSION

There has been a significant increase in the prevalence of DM in Nigeria in the past two decades compared to previous reports, affecting all regions of the country. The prevalence of DM obtained in this scoping review suggests a 2.9-fold increase over the past two decades. Physical inactivity, unhealthy diet, and obesity are the leading risk factors for DM among Nigerians. A national diabetes care and prevention policy is highly recommended.

Limitations of the Study

1. Secondary data was used for this study, which may be prone to some errors.
2. Inability to have access to complete articles of some of the eligible studies may affect the outcome.

Authors' Contributions Statement:

- Umar Musa and Zainab Zubairu conceived and designed the study.
- Abdullahi Faruk conducted the literature search.
- Jimoh Kolawale and Kabir Sada conducted the data collection.
- Umar Hayatu analysed the data.
- Umar Musa drafted and revised the manuscript.
- Maiyaki Abubakar proofread the manuscript.
- Sabir Anas read and approved the final version of the manuscript.

Conflicts of Interest: There were no conflicts of interest to declare by the authors.

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