

Prevalence of Non-Communicable Diseases in Nigeria; a Nine Year Systematic Review

Abdulshahid Sarki¹, Hamza Bello², Oluwatomi V. Adara³, Opeyemi Abolarin⁴, Kallah Patience Asa⁵, Alabi Taofiqat Ikeoluwa⁶, Babangida Fatima Mana⁷, Izu Edesiri Godswill⁸, Tessy Theodore⁹, Samaila Muhammad¹⁰.

ABSTRACT

Introduction: Globally, Non-Communicable Diseases are responsible for 41 million Deaths each year, which contribute to 74% of all death. Furthermore, 17 million people die before they reach age 70, and 86% of these premature deaths occurs in low to middle income countries like Nigeria. This Systematic review aimed at studying the status of Non-communicable disease in Nigeria, a nine year review, from January 2015 to December 2024.

Materials and Methods: A relevant studies via systematic searched of PubMed and Google scholar using the terms prevalence, non-communicable diseases and Nigeria. The search was limited to studies published between January 1st, 2015 and December 1st, 2024.

Results: The total sample size of all studies included in the meta-analysis was 138,818 subjects. The overall prevalence of non-communicable disease in the Nigeria was estimated to be 12.9 % (95 % CI: 9.3 % - 17.6 %). The subgroup analysis illustrated that the highest prevalence rate of non-communicable disease in Nigeria was related to the south-south zone with 19.3 % (95% CI: 1.0 – 33.9%), followed by south west 18.3% (95% CI: 1.22 – 26.7%) , north west 11.0%(95% CI: 5.4 – 21.1%), south east 8.4% (95% CI: 3.3 – 19.9%), north central 4.5% (95% CI: 1.9 – 10.2%) and north east 1.1% (95% CI: 1.0 – 1.3%).

Conclusion: The pooled prevalence of Non-communicable disease in our study was found to be 12.9%, with South-south having the highest prevalence of 19.3% and while the North-east having the least prevalence of 1.1%, which underscores the surge of Non-communicable diseases in Nigeria.

1.Department Of Internal Medicine, National Hospital Abuja.

2.Department of Obstetrics and Gynecology, University of Maiduguri Teaching Hospital.

3.Department of Public Health, Ahmadu Bello University.

4.Geospatial Analytics Technology, Abuja.

5.Department of Family Medicine, Federal Medical Center Jalingo.

6.Department of Ophthalmology, Ahmadu Bello University Teaching Hospital, Zaria.

7.Department of Hospital Services, Federal Ministry of Health and Social Welfare, Abuja.

8.Department of Public Health, Federal Ministry of Health and Social Welfare.

9.KNCV Foundation, Nigeria.

10.Department of Nursing services, Usman Danfodiyo University Teaching Hospital.

Corresponding author: Abdulshahid Sarki, Department of Internal Medicine , National Hospital Abuja. Email: sarki442@yahoo.com,

INTRODUCTION

Non-Communicable Diseases are increasingly becoming major causes of morbidity and mortality in Nigeria. Based on the 1990-1992 national survey, the prevalence of hypertension was 11.2% (4.3 million Nigerians aged 15 years

and above) while that of diabetes mellitus was 2.7% (1.05 million Nigerian 15 years and above). However, with the shift in paradigm using a cut-off point of 140/90 mmHg in 1999 by World Health Organization and International Society for Hypertension, the prevalence of hypertension

now exceed 20%.¹

Non-communicable disease include hypertension, diabetes mellitus, cardiovascular diseases, mental illness, chronic respiratory diseases, chronic kidney diseases, cancers. Globally, NCD are responsible for 41 million Deaths each year, which contribute to 74% of all death. Furthermore, 17 million people die before they reach age 70, and 86% of these premature deaths occurs in low to middle income countries like Nigeria.²

Non-communicable diseases pose a threat towards the 2030 Agenda for Sustainable Development, which include targets of reducing probability of death from any of the NCDs between ages 30 and 70 years by one-third by 2030.³ In low to lower-middle income countries where most of the payment of healthcare is out-of-pocket or by donors.⁴ Healthcare cost of Non-communicable disease easily deplete household resources with deleterious consequences. The exorbitant cost of managing NCDs plunge millions of people into poverty.⁵

In Nigeria, NCDs have taken a bigger share of diseases due to numerous reasons including Globalization, urbanization, life style, and socio-economic issues. Nigeria is among the countries that are expected to have a surge of this NCDs as a percentage of disease burden, but they spend less than expected even after including aid from external donors.⁶ In Nigeria about 30% of all death are due to NCDs.⁷ The risk of premature death from NCDs is quite substantial to 22%.⁸ They accounted for 567 deaths/100,000 (age standardized) in 2019⁸, overtaking the previous predominant causes: communicable, maternal, neonatal and nutritional. Specifically, CVD as a group account for 10% of death and 3.8% of disability-

adjusted life years (DALYs).⁹ The DALYs loss to NCDs in general increases tremendously by approximately 21.3% from 24,987 in 2010 to 30,306 in 2019 compared to 6.5% DALYs lost to infectious disease over the same period.¹⁰ This scenario presents an opportunity for intervention at many levels, from the primary healthcare level up to the tertiary centers in the country, with adequate training of healthcare staff the surge of NCDs can be mitigated and its financial burden to the individual and country can be reduce significantly.¹¹

Nigeria is undergoing epidemiological transition, with emergences of NCDs, adding to the burden of diseases in the country, people due to urbanization often engage in sedentary life style, consumption of unhealthy diet, use of tobacco products. These risk factors as well as rapidly growing and aging population are increasing the speed of the change from communicable diseases, maternal, neonatal and nutritional diseases to Non-communicable diseases.¹²

The major risk factors of CVDs include physical inactivity, hypertension, obesity, tobacco use, diabetes mellitus, and hyperlipidemia. Hypertension provide unique opportunity for intervention, because of its ease of diagnosis, but yet it prevalence in Nigeria is as high as 30.6% with only 29.0% being aware of their hypertension, 12.0% receiving treatment, and 2.8% at-goal blood pressure in 2020.¹³ Nigeria contributed 15% to the estimated 681,000 new cases of cancer that occurred in Africa in 2008.¹⁴ Diabetes has an estimated prevalence of 5.8% in Nigeria.¹⁵ Nigeria has the highest prevalence of asthma in Africa with an estimated 13 million Nigerians suffer from clinical asthma with age adjusted death rate of about 10 per 100,000 population.¹⁶ Chronic kidney disease has as high as 15% prevalence in Nigeria.¹⁷ The pooled crude prevalence of dementia in Nigeria 4.9% in 2019.¹⁸

Schizophrenias, Manic illness and organic psychosis affect about 1% of the population.¹⁹ Depression, Anxieties and Somatoform disorders are far more prevalent. At least 10% of the population will be suffering from those poorly identifiable disorders. These conditions run a chronic course and are responsible for more morbidity. There is evidence that depression is particularly common among Nigerian elderly, with over 7% reporting major depressive disorder in a 12-month period and over 25% reporting same in the course of a lifetime.²⁰

Globalization and urbanization has tremendously affect the life style of Nigerians predisposing them to risk of developing NCDs, the prevalence is soaring and the surge need to be mitigated to prevent premature deaths in Nigeria.

MATERIALS AND METHODS

Formulating a Research Question

The group of reviewers (10 participants) had a group discussion to arrive at a research question as the pooled prevalence of Non-Communicable Diseases (NCDs) in Nigeria reported from clearly defined studies where both the numerator and the denominator for computing the prevalence were discernible.

Study Design

This was systematic review that was conducted following the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocol (PRISMA-P 2015).²¹

Study Protocol and Registration

The study was registered with the Pan African Clinical Trials Registry (PACTR).^{22,23}

Search Strategy

We retrieved potentially relevant studies via systematic search of PubMed and Google scholar using the terms 'prevalence, non-communicable diseases and Nigeria' as well as 'hypertension, diabetes, chronic kidney disease, cardiovascular disease, chronic respiratory disease (asthma and chronic obstructive pulmonary disease), neurological disease, cancers, obesity, dementia, depression, schizophrenia, epilepsy, and learning disorders'. Boolean operators 'and' 'or' and 'not' were used to join and construct various search terms. Further review was made from the reference list of the identified articles and related articles from the search results. The review was carried out by nine of the participants to avoid having a tie vote. The search was limited to studies published between Jan 1st, 2015 and December 1st, 2024.

Effort was made to identify not only complete articles but also published abstracts that contained the ingredient data required to compute pooled prevalence of NCDs in Nigeria. However, ongoing studies and studies awaiting publication or studies that do not contained the ingredients data were excluded. Among the studies retrieved in the search, the reviewers remove duplicate studies using Endnote, select studies that meet the inclusion criteria based on the abstracts and then make the final selection of studies based on their full text. In order to maintain transparency and objectivity throughout this process, study selection is conducted independently by at least two investigators. Disagreement was resolved via voting by nine of the reviewers and simple majority was used. The group leader was excluded from voting. For all studies that were excluded, the reason for exclusion were given in the PRISMA-P flow chart. A total of eighty two abstract were identified, only fifty two abstract were included.

Study Selection and Eligibility Criteria

Studies of any design that reported the prevalence of any NCD in Nigerian population published in English language were included. Studies must have clear number of cases included, number analyzed, as well as the denominator used for computing the prevalence were included. We excluded letters to the editor, narrative reviews, systematic reviews as well as studies not published in or studies reporting secondary data.

Assessment of Quality of Publication

The quality of the included studies was assessed using the Joanna Briggs Institute (JBI) critical assessment checklist for prevalence data.⁶⁵ This checklist assesses nine items: (1) appropriate sampling frame, (2) proper sampling techniques, (3) adequate sample size, (4) study subject and setting description, (5) sufficient data analysis (6) use of valid methods for the identified conditions, (7) valid measurement for all participants, (8) using appropriate statistical analysis and (9) adequate response rate. Yes, no, unclear, or not applicable is assigned to each item. The 'yes' response received a 1 score, whereas the 'no' and 'unclear' responses received 0 scores. Finally, the average score for the studies was determined. The quality of studies with scores below and above the average was then classified as bad and good, respectively.²³

Data Extraction

Using a standard pro-forma, one reviewer extracted relevant data from each of the included articles and an independent reviewer for each subheading verify all the data. Discrepancies were discussed and solved by consensus or voting by simple majority in similar manner as above.

We extracted the following data from individual

studies: general information about the paper authors, journal and year of publication, type of NCD reported, the prevalence, the numerator and denominator used as well as the 95% confidence interval of each of the prevalence. Region of Nigeria where the study was done and state was also extracted.

Data Analysis

The summary of the quality of all the studies included in the review was reported. Data was entered into SPSS version 26. Forest plot was used to determine the pooled prevalence of NCDs in Nigeria while I² static was used to report the level of heterogeneity of the included studies. P-values of less than 0.05 was considered statistically significant.

RESULTS

Data Review

The total sample size of all studies included in the meta-analysis was 138,818 subjects. The maximum and minimum sample size were related to the study of amanc et al, 2023. With 21,369 subjects and the study of Maarten C et al, 2021. With 40 subjects, respectively. The oldest study was done in 2015 and the most recent study in 2024. A large number of studies were conducted in the south west with twenty six (26) articles. Below table indicates the characteristics and data of studies included in the systematic review and meta-analysis (table 1).

Statistical analysis and result presentations

The present study estimated the prevalence rate of non-communicable disease in the Nigeria and the prevalence rate or relative frequency of non-communicable disease in each study was employed to combine the results of different studies. Heterogeneity among studies was checked using I^2 index and considering the high heterogeneity between the results of the studies

included in the meta-analysis ($I^2 > 75\%$), the random effects model was used, which calculates the parameter changes between studies. Therefore, the results of random effects model in heterogeneous conditions are more generalizable than those of fixed effect model. Funnel plot were used to assess the publication bias. Further, the meta-regression was applied to examine the relationship between the prevalence rate of stroke in the elderly and sample size, year of publication, and mean age of elderly. The subgroup analysis was performed based on the different political zones in Nigeria (North Central, North East, North West, South-South, South East, South West). The comprehensive meta-analysis software (version 4) was used for meta-analysis and P-value <0.05 was considered as statistically significant.

Meta-analysis of the overall prevalence rate of non-communicable disease in Nigeria

Considering that the result of I^2 test for the overall prevalence of non-communicable disease in the Nigeria demonstrated a significant heterogeneity among studies ($I^2 = 99.73$), the data were analyzed using a random effects model (table 2). The results of Egger's

regression intercept revealed no publication bias in the studies at the level of 0.1 ($P = 0.000$). After combining the all results of studies included in the meta-analysis, the overall prevalence of non-communicable disease in the Nigeria was estimated to be 12.9 % (95 % CI: 9.3 % - 17.6 %) based on the random effects model. The black square illustrates the prevalence rate, the length of the line segment displays the 95 % CI in each study (table 3 &4). The results of sensitivity analysis demonstrated that the pooled estimation did not change significantly by eliminating each of the studies.

Subgrouped analysis

Given the high heterogeneity among the studies ($I^2 = 99.73$), subgroup analysis was reported based on the different in to six geopolitical zones (north central, north east, north west, south-south, south east, south west) . The results of the subgroup analysis illustrated that the highest prevalence rate of non-communicable disease in Nigeria was related to the south-south zone with 19.3 % (95% CI: 1.0 – 33.9%), followed by south west 18.3% (95% CI: 1.22 – 26.7%) , north west 11.0%(95% CI: 5.4 – 21.1%), south east 8.4% (95% CI: 3.3 – 19.9%), north central 4.5% (95% CI: 1.9 – 10.2%) and north east 1.1% (95% CI: 1.0 – 1.3%). Respectively (table 5)

Table 1: Distribution of characteristics of the data studies included in the Systematic review and meta-analysis on Non-communicable disease

Author and Year	Political zone	Sample size (n)	Prevalence (%)	NCD types
fasanmade et al, 2015	SW	416	21.4	Obesity
Adetola et al, 2021	SW	1059	58.9	Obesity
Boma oyan et al, 2023	SS	204	36.6	Obesity
Nkenditin et al, 2021	SE	450	38.9	Obesity
fasanmade et al, 2021	SW	1059	37.4	HTN
Njideku et al, 2019	SW	5365	55.0	HTN
Ajayi et al, 2016	SW	806	33.1	HTN
A.Uowolabi et al, 2015	SW	324	20.1	HTN
Njideku et al, 2021	SW	1059	18.9	DM
AA sabir et al, 2017	NW	280	4.3	DM
BO bello ovosi et al, 2018	NW	181	23.3	DM
Ezeani et al, 2020	SE	1680	3.3	DM
CO. Eze et al, 2024	SW	172	15.2	Stroke
Akin O et al, 2020	SW	150	52.0	Stroke
C.Eze et al, 2019	SW	983	20.0	Stroke
G.O osagbowo et al, 2015	NC	2398	4.3	Stroke
amanc et al, 2023	SW	21369	1.6	CAD
O samuel et al,2023	SW	567	30.8	CAD
Victor M et al, 2016	SW	211	1.9	CAD
Dike Ojji et al, 2015	NC	2398	0.3	CAD
amanc et al, 2023	SW	21369	36.2	HF
Dike Ojji et al, 2015	NC	2398	22.6	HF
O Adebayo et al, 2023	SW	160	83.8	HF
Oloseyi et al, 2018	SW	90	54.4	HF
Dike Ojji et al,2015	NC	2398	1.1	CKD
T.Olusegun et al, 2020	NC	1353	12.0	CKD
I. Ijezie et al, 2019	SW	165	7.5	CKD
Okwuonu et al,2017	SE	328	7.8	CKD
Boni M et al,2022	SS	4234	9.2	COPD
OB Ojuawo et al,2022	NC	338	24.3	COPD

Akinrami et al, 2015	SW	211	4.7	COPD
Adeniyi B et al, 2016	SW	914	9.0	COPD
O Deselu et al, 2020	NC	870	2.1	Asthma
O Ozoh et al, 2019	SW	20063	8.0	Asthma
O Ozoh et al, 2019	NC	20063	1.1	Asthma
A Oyemomi et al, 2023	SW	124	4.8	Asthma
Maarten C et al, 2021	SW	40	8.8	Cancers
CC Nwafor et al, 2018	SS	1186	11.1	Cancers
yusuf et al, 2017	NW	6548	10.9	Cancers
Onwusah DO et al, 2017	SS	782	26.3	Cancers
B Adikaibe et al, 2016	SE	8228	6.0	Epilepsy
West BA et al, 2019	SS	298	51.0	Epilepsy
P Obemeke et al, 2019	SE	1802	5.2	Epilepsy
C donald et al, 2019	SS	2283	6.5	Epilepsy
A Ogunniyi et al, 2016	SW	613	2.9	Dementia
Akin O et al, 2021	SW	150	6.2	Dementia
Abolagade et al, 2020	SW	532	25.4	Dementia
JO yaria et al, 2016	SW	142	22.1	Dementia

Note: SW= south west, SE= south East, SS=South South, NC= North Central, NE= North East, NW= North West, CKD= Chronic Kidney Disease, HTN= Hypertension, DM= Diabetes Mellitus, COPD= Chronic Obstructive Pulmonary Disease, HF= Heart Failure.

Table 2: the result of fixed and random effect model on meta-analysis of prevalence of Non-Communicable disease

Model effect	Number Studies	Point estimate	Lower limit	Upper limit	Tau	Tau ²	Q-value	df (Q)	P-value	I ² (%)
Fixed	48	0.224	0.221	0.227	1.286	1.654	17728.08	47	0.000	99.73488
Random	48	0.129	0.093	0.176						

Figure 1: funnel plot of the result of the overall estimate of the prevalence rate of non-communicable disease in Nigeria

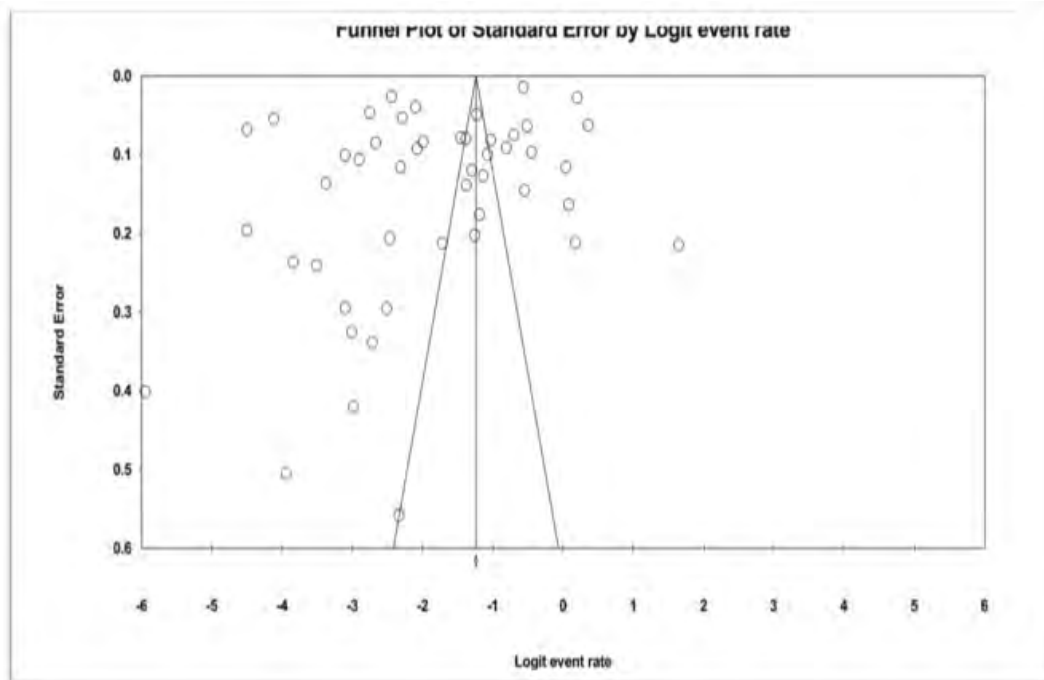


Table 3: Distribution of the overall estimate of the prevalence rate of Non-communicable disease in Nigeria

Study name	Statistics for each study			
	95% Confidence interval			P-Value
	Rate	Lower limit	Upper limit	
fasanmade et al, 2015	0.214	0.177	0.256	0.000
Adetola et al, 2021	0.589	0.559	0.618	0.000
Boma oyan et al, 2023	0.366	0.303	0.434	0.000
Nkenditin et al, 2021	0.389	0.345	0.435	0.000
fasanmade et al, 2021	0.374	0.345	0.404	0.000
Njideku et al, 2019	0.550	0.537	0.563	0.000
Ajayi et al, 2016	0.331	0.299	0.364	0.000
A.U.owolabi et al, 2015	0.201	0.161	0.248	0.000
Njideku et al, 2021	0.189	0.167	0.214	0.000
AA sabir et al, 2017	0.043	0.025	0.074	0.000
BO bello ovosi et al, 2018	0.233	0.177	0.300	0.000
Ezeani et al, 2020	0.033	0.025	0.043	0.000
CO. Eze et al, 2024	0.152	0.106	0.214	0.000
Akin O et al, 2020	0.520	0.440	0.599	0.000
C.Eze et al, 2019	0.200	0.176	0.226	0.000
G.O osagbowo et al, 2015	0.043	0.036	0.052	0.000
amanc et al, 2023	0.016	0.014	0.018	0.000
O samuel et al,2023	0.308	0.271	0.347	0.000
Victor M et al, 2016	0.019	0.007	0.049	0.000
Dike Ojji et al, 2015	0.003	0.001	0.006	0.000
amanc et al, 2023	0.362	0.356	0.368	0.000
Dike Ojji et al, 2015	0.226	0.210	0.243	0.000
O Adebayo et al, 2023	0.838	0.773	0.887	0.000
Oloseyi et al, 2018	0.544	0.441	0.644	0.000
Dike Ojji et al,2015	0.011	0.008	0.016	0.000

T.Olusegun et al, 2020	0.120	0.104	0.138	0.000
I. Ijezie et al, 2019	0.075	0.043	0.126	0.000
Okwuonu et al,2017	0.078	0.053	0.112	0.000
Boni M et al,2022	0.092	0.084	0.101	0.000
OB Ojuawo et al,2022	0.243	0.200	0.292	0.000
Akinrami et al, 2015	0.047	0.025	0.085	0.000
Adeniyi B et al,2016	0.090	0.073	0.110	0.000
O Deselu et al, 2020	0.021	0.013	0.033	0.000
O Ozoh et al, 2019	0.080	0.076	0.084	0.000
O Ozoh et al, 2019	0.011	0.010	0.013	0.000
A Oyemomi et al, 2023	0.048	0.022	0.103	0.000
Maarten C et al, 2021	0.088	0.031	0.224	0.000
CC Nwafor et al, 2018	0.111	0.094	0.130	0.000
yusuf et al, 2017	0.109	0.102	0.117	0.000
Onwusah DO et al,2017	0.263	0.233	0.295	0.000
B Adikaibe et al, 2016	0.060	0.055	0.065	0.000
West BA et al, 2019	0.510	0.453	0.566	0.000
P Obemeke et al, 2019	0.052	0.043	0.063	0.000
C donald et al, 2019	0.065	0.056	0.076	0.000
A Ogunniyi et al, 2016	0.029	0.018	0.046	0.000
Akin O et al, 2021	0.062	0.033	0.114	0.000
Abolagade et al, 2020	0.254	0.219	0.293	0.000
JO yaria et al, 2016	0.221	0.160	0.297	0.000
Overall prevalence	0.129	0.093	0.176	0.000

Table 4: Distribution of the overall estimate of the prevalence rate of Non-communicable disease in Nigeria based on the random effects model

Study name	Statistics for each study			
	95% Confidence interval			P-Value
	Point	Lower limit	Upper limit	
fasanmade et al, 2015	0.127	0.091	0.175	0.000
Adetola et al, 2021	0.123	0.088	0.169	0.000
Boma oyan et al, 2023	0.125	0.090	0.172	0.000
Nkenditin et al, 2021	0.125	0.090	0.172	0.000
fasanmade et al, 2021	0.125	0.089	0.172	0.000
Njideku et al, 2019	0.124	0.089	0.169	0.000
Ajayi et al, 2016	0.126	0.090	0.173	0.000
A.U.owolabi et al, 2015	0.127	0.091	0.175	0.000
Njideku et al, 2021	0.127	0.091	0.175	0.000
AA sabir et al, 2017	0.131	0.094	0.180	0.000
BO bello ovosi et al, 2018	0.127	0.091	0.174	0.000
Ezeani et al, 2020	0.132	0.095	0.181	0.000
CO. Eze et al, 2024	0.128	0.092	0.176	0.000
Akin O et al, 2020	0.124	0.089	0.170	0.000
C.Eze et al, 2019	0.127	0.091	0.175	0.000
G.O osagbowo et al, 2015	0.132	0.095	0.180	0.000
amanc et al, 2023	0.134	0.099	0.180	0.000
O samuel et al,2023	0.126	0.090	0.173	0.000
Victor M et al, 2016	0.133	0.096	0.182	0.000
Dike Ojji et al, 2015	0.138	0.099	0.188	0.000
amanc et al, 2023	0.125	0.088	0.176	0.000
Dike Ojji et al, 2015	0.127	0.090	0.175	0.000
O Adebayo et al, 2023	0.120	0.086	0.165	0.000
Oloseyi et al, 2018	0.124	0.089	0.170	0.000
Dike Ojji et al,2015	0.135	0.097	0.184	0.000
T.Olusegun et al, 2020	0.129	0.092	0.177	0.000

I. Ijezie et al, 2019	0.130	0.093	0.178	0.000
Okwuonu et al,2017	0.130	0.093	0.178	0.000
Boni M et al,2022	0.129	0.093	0.178	0.000
OB Ojuawo et al,2022	0.127	0.091	0.174	0.000
Akinrami et al, 2015	0.131	0.094	0.180	0.000
Adeniyi B et al,2016	0.130	0.093	0.178	0.000
O Deselu et al, 2020	0.133	0.096	0.182	0.000
O Ozoh et al, 2019	0.130	0.093	0.178	0.000
O Ozoh et al, 2019	0.135	0.099	0.182	0.000
A Oyemomi et al, 2023	0.131	0.094	0.179	0.000
Maarten C et al, 2021	0.129	0.093	0.177	0.000
CC Nwafor et al, 2018	0.129	0.092	0.177	0.000
yusuf et al, 2017	0.129	0.092	0.178	0.000
Onwusah DO et al,2017	0.126	0.090	0.174	0.000
B Adikaibe et al, 2016	0.131	0.094	0.179	0.000
West BA et al, 2019	0.124	0.089	0.170	0.000
P Obemeke et al, 2019	0.131	0.094	0.179	0.000
C donald et al, 2019	0.130	0.094	0.179	0.000
A Ogunniyi et al, 2016	0.132	0.095	0.181	0.000
Akin O et al, 2021	0.130	0.094	0.179	0.000
Abolagade et al, 2020	0.127	0.091	0.174	0.000
JO yaria et al, 2016	0.127	0.091	0.174	0.000
Pooled prevalence rate	0.129	0.093	0.176	0.000

Table 5: The subgroup analysis of estimating the prevalence rate of non-communicable disease in Nigerian by political zones.

Model	Number Studies	Point estimate	Lower limit	Upper limit	Tau	Tau ²	Q-value	df (Q)	P-value	I ² (%)
North Central	7	0.045	0.019	0.102	1.184	1.401	707.480	6	0.000	99.152
North East	1	0.011	0.010	0.013	0.000	0.000	0.000	0	1.000	0.000
North West	3	0.110	0.054	0.211	0.657	0.431	37.849	2	0.000	94.716
South East	5	0.084	0.033	0.199	1.131	1.279	533.377	4	0.000	99.250
South South	6	0.193	0.100	0.339	0.954	0.910	613.769	5	0.000	99.185
South West	26	0.183	0.122	0.267	1.241	1.539	10374.135	25	0.000	99.759

DISCUSSION

The present study aimed at estimating the prevalence of Non-communicable disease in Nigeria using systematic review and meta-analysis. After combining the data collected from 48 articles included in the meta-analysis with a sample size of less than one million people, the overall prevalence of Non-communicable disease in Nigerian was estimated to be 12.9%.

The prevalence of Non-communicable disease was found to be higher in south-south zone of the country and lowest in the North-east with prevalence of 19.3% and 1.1% respectively, this might be attributed to paucity of data, and where the data analyzed from North-east was only one, while the one from south-south six publications were used.

CONCLUSION

The pooled prevalence of Non-communicable disease in our study was found to be 12.9%, with South-south having the highest prevalence of 19.3% and while the North-east having the least prevalence of 1.1%, which underscores the surge of Non-communicable diseases in Nigeria

and also provide room for necessary interventions especially where the prevalence was high to mitigate the soaring prevalence of Non-communicable disease in Nigeria.

Limitations of the Study

- There was a paucity of prevalence studies in some part of the country.
- There is paucity of recent studies for Non-communicable diseases in Nigeria.

REFERENCES

1. Federal Ministry of Health. National Demographic and Health Survey Final Report. Abuja: Federal Ministry of Health; 2008.
2. World Health Organization. Non-communicable diseases. WHO. 2017. Available from: <https://www.who.int/mediacentre/factsheets/fs355/en/>
3. Global Burden of Disease Health Financing Collaborator Network. Evolution and patterns of global health financing 1995-2014: development assistance for health, and government, prepaid private, and out-of-pocket health spending in 184 countries. Lancet. 2017;389(10083):1981-2004.

4. Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2019 (GBD 2019) Results. Seattle: Institute for Health Metrics and Evaluation; 2020. Available from: <https://vizhub.healthdata.org/gbd-results/>
5. Gomez-Gonzalez JE, Reyes NR. Pattern of global health financing and potential future spending on health. *Lancet*. 2017; 389 (10083):1955-1956.
6. World Health Organization. Non-communicable diseases country profiles 2018. Geneva: World Health Organization; 2018.
7. GBD 2019 Risk Factors Collaborators. Global burden of 87 risk factors in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020; 396:1223-1249.
8. World Health Organization. Global health estimates: Leading causes of DALYs. WHO. 2022. Available from: <https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/global-health-estimates-leading-causes-of-dalys>
9. GBD 2015 Mortality and Causes of Death Collaborators. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2016;388(10053):1459-1544.
10. Ogah OS, Stewart S, Falase AO, Akinyemi JO, Adegbite GD, Alabi AA, et al. Contemporary profile of acute heart failure in southern Nigeria: data from Abeokuta Heart Failure Clinical Registry. *JACC Heart Fail*. 2014;2:250-259.
11. Kankeu HT, Saksena P, Xu K, Evans DB. The Financial burden from Non-communicable diseases in low-and middle-income countries: a literature review. *Health Res Policy Syst*. 2013;11:31.
12. Skirbekk V, Loichinger E, Weber D. Variation in cognitive functioning as a refined approach to comparing aging across countries. *Proc Natl Acad Sci US A*. 2012;109(3):770-774.
13. World Economic Forum. From burden to "best buys": reducing the economic impact of non-communicable diseases in low-and middle income countries. Geneva: The Forum; 2011.
14. Uloko AE, Musa BM, Ramalan MA, Gezawa ID, Puepet FH, Uloko AT, et al. Prevalence and risk factors for diabetes mellitus in Nigeria: a systematic review and meta-analysis. *Diabetes Ther*. 2018;9(3):1307-1316.
15. Ozoh OB, Adebisi SA, Ayuk AC, Desalu OO, Oridota OE, Olufemi O, et al. The prevalence of asthma and allergic rhinitis in Nigeria: A nationwide survey among children, adolescents and adults. *PLoS One*. 2019;14(9):e0222281.
16. Kadir S, Odubanjo MO, Oluwasola AO. The epidemiology of end-stage renal disease in Nigeria: the way forward. *Int Urol Nephrol*. 2011;43:785-792.
17. Omoleke SA. Chronic non-communicable disease as a new epidemic in Africa: focus on the Gambia. *Pan Afr Med J*. 2013;14:87.
18. Gureje O, Lasebikan VO. Lifetime and 12-month Prevalence of Mental Disorders In the Nigerian Survey of Mental Health and Well-being. *Br J Psychiatry*. 2006;188:465-471.
19. Miranda JJ, Patel V. Achieving the MDGs: Does Mental Health Play a Role? *PLoS Med*. 2005;2(10):e291.
20. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev*. 2015;4:1.
21. Ndwandwe DE, Runeyi S, Pienaar E,

- Mathebula L, Hohlfeld A, Wiysonge CS. Practices and trends in clinical trial registration in the Pan African Clinical Trials Registry (PACTR): a descriptive analysis of registration data. *BMJ Open*. 2022;12(1):e057474.
22. Booth A, Clarke M, Dooley G, Ghera D, Moher D, Petticrew M, et al. The nuts and bolts of PROSPERO: An international prospective register of systematic reviews. *Syst Rev*. 2012;1:2.
 23. Raimi TH, Odusan O, Fasanmade O. High prevalence of central obesity in rural South-Western Nigeria: Need for targeted prevention. *J Diabetes Endocrinol*. 2015;6(3):12-18.
 24. Adetola AB, Ani I, Matthew JE, Abodunde GB. Prevalence of obesity, hypertension, and diabetes among patients attending outpatient clinic at a tertiary health institution in Southwestern Nigeria. *Niger J Cardiol*. 2021;18(2):51-56.
 25. Oyan B, Ndu-Akinla C. Sociodemographic determinants of overweight and obesity in adults attending a tertiary hospital in Rivers State, Nigeria. *Niger J Med*. 2023;32(3):280-287.
 26. Nkemdilim IU, Ezeala-Adikaibe BA, Donatus OO, Innocent O, Ernest N, Nkeiruka M, et al. Obesity in Patients with Hypertension Attending a Medical Outpatient Clinic in a Tertiary Health Facility in Enugu, Southeast Nigeria. *Ann Afr Med*. 2021;20(2):84-91.
 27. Njideka U, Ogah O, Adebayo R, et al. Prevalence of hypertension and blood pressure profile among urban-dwelling adults in Nigeria: a comparative analysis based on recent guideline recommendation. *Cardiovasc J Afr*. 2019;25(7).
 28. Ajayi I, Dada A, Adebayo A. Prevalence of hypertension and associated factors among residents of Ibadan-North local government area of Nigeria. *Niger J Clin Immunol*. 2016;3(1):67-75.
 29. Owolabi AO, Owolabi MO, OlaOlorun AD, Amole IO. Hypertension prevalence and awareness during health workforce in Nigeria. *Internet J Med Update*. 2015;10(2):10-19.
 30. Sabir AA, Isezuo SA, Fasanmade OA, et al. Prevalence of diabetes mellitus and its risk factors among the Sub-urban population of Northwest Nigeria. *Ann Afr Med*. 2017;16(4):165-171.
 31. Bello-ovosi BJ. Prevalence and correlates of hypertension and diabetes mellitus in urban community in North-western Nigeria. *Sahel Med J*. 2018;21(3):125-130.
 32. Ezeani I, Onyemelukwe G, Oli J. Prevalence and risk factors for Diabetes mellitus in a state in south-east Nigeria: results of population based house to house survey. *West Afr J Med*. 2020;16(2):181-187.
 33. Eze CO, Ozigboegwu O, Ezeala-Adikaibe B. The Prevalence and pattern of admission mortality among acute stroke patients managed at a tertiary hospital in Abaliki, Nigeria. *Ann Med Health Sci Res*. 2024;14(1):45-52.
 34. Akin O, Owolabi M, Ogunniyi A. Prevalence, predictors and prognosis of post-stroke neuropsychiatric symptoms at 3 month post-stroke. *J Neurol Sci*. 2020;418:117073.
 35. Chukwemeka Eze C, Ezeala-Adikaibe B, Ozigboegwu O. Stroke in the young adults: experience at Abakaliki south-east Nigeria. *Niger J Clin Pract*. 2019;22(8):1075-1080.
 36. Amanc B, Sani M, Tijani B, et al. Trends and outcome of cardiovascular disease admission in Lagos Nigeria: a 16 year review. *West Afr J Med*. 2023;40(7):678-685.
 37. Okechukwu S, Okoye I, Akpa M, et al. Cardiovascular disease in Nigeria: current status, threats and opportunities. *Glob Heart*. 2023;18(1):62.

38. Victor M, Ogedengbe O, Adebayo R. Association between metabolic syndrome and 10 year risk of developing cardiovascular disease in a Nigerian population. *Afr Health Sci.* 2016;8:354-359.
39. Dike B, Isezuo S, Chijioke A, et al. Risk Factors profile and comorbidities in 2398 patients with newly diagnosed hypertension from the Abuja Heart study. *J Clin Hypertens.* 2015;17(9):691-697.
40. Adebayo O, Ogah O, Oladapo O, et al. Clinical characteristics, management and six-month outcomes after discharge of patients admitted for acute heart failure in Ibadan, Nigeria. *West Afr J Med.* 2023;40(5):421-428.
41. Oloseyi A, Adewole O, Akinyemi O. Prevalence and pattern of cardiovascular related causes of out-of-hospital death in Lagos, Nigeria. *BMC Public Health.* 2018;18:1245.
42. Timothy O, Chijioke A, Isezuo S, et al. Prevalence of chronic kidney disease and risk factors in North Central Nigeria: a Population base study. *Niger J Clin Pract.* 2020;23(10):1385-1392.
43. Innocent I, Arogundade F, Sanusi A, et al. Prevalence and predictors of chronic kidney disease in a semi-urban community in Lagos. *Pan Afr Med J.* 2019;32:45.
44. Okwuonu C, Ojimaodu N, Oche M. Prevalence of chronic kidney disease and its risk factors among adults in a semi-urban community of south-east Nigeria. *Niger Postgrad Med J.* 2017;24(2):81-87.
45. Boni M, Desalu O, Onyedum C, et al. Estimating the prevalence of chronic obstructive pulmonary disease in an African country: evidence from southern Nigeria. *Int J Tuberc Lung Dis.* 2022;26(4):312-318.
46. Ojuawo OB, Desalu O, Salami A, et al. Out-patient burden of adult respiratory disease in university of Ilorin Teaching Hospital, Nigeria. *Afr J Respir Med.* 2022;18(1):12-18.
47. Akinremi AA, Desalu O, Onyedum C. Prevalence of Lung function impairment among a Nigerian Undergraduate Population. *Niger J Physiol Sci.* 2015;30(1-2):45-49.
48. Adeniyi A, Desalu O, Adeoti A, et al. Pattern of respiratory diseases among patient seen at the emergency unit of tertiary health facility in south-west Nigeria. *West Afr J Med.* 2016;35(3):201-206.
49. Desalu O, Bello K, Salami A, et al. Prevalence of Asthma and respiratory symptoms during pregnancy in the middle belt of Nigeria. *J Obstet Gynaecol.* 2020;40(5):645-649.
50. Obianju O, Erhabor G, Adewole O, et al. The prevalence of Asthma and allergic rhinitis in Nigeria: A nationwide survey among adults. *Allergol Immunopathol.* 2019;47(3):224-231.
51. Azeez O, Desalu O, Opeyemi C, et al. Acute severe asthma and its predictors of mortality in rural south-western Nigeria: a five year retrospective observational study. *J Asthma.* 2023;60(5):912-918.
52. Maarten C, Aisuodionoe-Shadrach O, Ogunbiyi J. Prevalence of prostate cancer at autopsy in Nigeria- A preliminary report. *Prostate Cancer Prostatic Dis.* 2021; 24(2):456-461.
53. Nwafor CC, Ugboko H, Oluwasola O. The pattern and distribution of cancers in Akwa Ibom state, Nigeria. *Niger J Clin Pract.* 2018;21(5):612-617.
54. Yusuf I, Atanda A, Umar A. Cancer in Kano, northwestern Nigeria. A 10 year update of the Kano Cancer Registry. *Niger J Surg Res.* 2017;8(2):87-93.
55. Onwusah DO, Ekanem I, Udoh E. Prevalence of cancer in a tertiary Health Facility in south-south Nigeria. *Int J Cancer Res.* 2017;13(3):145-150.
56. Adikaibe B, Onwuekwe I, Ezeala-Adikaibe B. Prevalence of active convulsive epilepsy in

- urban slum in Enugu south-east Nigeria. *Seizure*. 2016;39:45-49.
57. West BA, Opara P, Eneh A. Pattern and impact of childhood seizure disorders in port Harcourt, Nigeria. *Niger J Clin Pract*. 2019;22(4):512-517.
 58. Paul O, Ogunniyi A, Baiyewu O. Epidemiology of acute symptomatic seizures among adult medical admissions. *Afr J Neurol Sci*. 2016;35(2):23-28.
 59. Chidozie D, Ani C, Nwosu M. Seizure disorders at Madonna University Teaching Hospital prevalence, pattern and co-morbidities. A seven year review. *Niger J Med*. 2019;28(3):189-194.
 60. Ogunniyi A, Baiyewu O, Gureje O, et al. Prevalence estimates of Major neurocognitive disorder in a rural Nigeria community. *Dement Geriatr Cogn Disord*. 2016;42(3-4):198-205.
 61. Akin O, Owolabi M, Arulogun O, et al. Pre-stroke cognitive decline in Africans: Prevalence, predictors and association with post-stroke dementia. *Stroke*. 2021;52(8): 2567-2574.
 62. Amao A, Adebayo R, Oshodi Y, et al. Prevalence and pattern of psychiatric morbidity among community dwelling elderly population in Abeokuta, Nigeria. *Afr J Psychiatry*. 2020;23(4):145-150.
 63. Yaria JO, Ojagbemi A, Akinyemi R, et al. Neurocognitive impairment in Nigerian community: Pattern of cognitive dysfunction and risk factors. *Int J Geriatr Psychiatry*. 2016;31(12):1345-1352.
 64. Munn Z, Barker TH, Moola S, Tufanaru C, Stern C, McArthur A, Stephenson M, Aromataris E. Methodological quality of case series studies: an introduction to the JBI critical appraisal tool. *JBI evidence synthesis*. 2020;18(10):2127-2133.

Abdulshahid S, Hamza B, Oluwatomi VA, Opeyemi A, Kallah PA, Alabi TI, Babangida FM, Izu G, Theodore T, Samaila M. Prevalence of noncommunicable diseases in Nigeria; a Nine year systematic review. *Afr. J. Trop. Med. & Biomed. Res*. 2026; 9(1) 131-147
<https://dx.doi.org/10.4314/ajtmbr.v9i1.8>