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Economic Burden AND Patterns of Noncommunicable Diseases in Rural Nigeria: A Cross-Sectional Study in Esan Central LGA, Edo State

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ABSTRACT

Background: Noncommunicable diseases (NCDs) are a growing global health crisis, accounting for nearly three-quarters of all deaths worldwide. In Nigeria, the burden of hypertension, diabetes, and other chronic conditions is rising rapidly, exacerbated by limited health insurance coverage, fragmented healthcare infrastructure, and high out-of-pocket costs. This study assessed the economic burden and healthcare utilisation patterns related to NCDs in a rural Nigerian setting.

Methods: A descriptive cross-sectional study was conducted among 206 adults in Esan Central LGA, Edo State. Multistage sampling was used to select participants. Data on sociodemographics, NCD diagnoses, and direct healthcare costs were collected via structured questionnaires. Out-of-pocket expenses for consultations, medications, investigations, transportation, and hospital admissions were documented. Associations between age and NCD prevalence were tested using chi-square analysis.

Results: Nearly one-third of respondents reported an NCD diagnosis, with hypertension and diabetes being the most prevalent. Age was significantly associated with a higher incidence of NCDs. Affected individuals faced multiple financial burdens across care categories, with medications and hospital admissions being the most expensive. Over 75% relied on personal funds for treatment, with minimal support from insurance or family.

Conclusion: The study highlights the cumulative economic strain of NCD management in resource-limited settings, emphasising the urgent need for financial protection mechanisms. Policies expanding insurance coverage, subsidising essential care, and decentralising NCD services to primary care levels are crucial to reduce this burden and improve health equity in Nigeria.

Chronic disease management

Economic burden

Healthcare costs

Nigeria

Noncommunicable diseases

Noncommunicable diseases have emerged as one of the most pressing global health challenges of our time, accounting for an estimated 43 million deaths annually, approximately 75% of all mortality worldwide, according to World Health Organisation data.¹ The cardiovascular disease epidemic alone claims 17.9 million lives each year, with hypertension affecting about 1.28 billion adults globally, including over 550 million people who remain unaware of their condition.² This silent pandemic disproportionately burdens low- and middle-income countries, where health systems already strained by infectious diseases must now contend with the rising tide of chronic conditions.¹ Across Africa, noncommunicable diseases contribute to approximately 2.1 million deaths annually (37% of total mortality), with projections suggesting this figure will surpass communicable diseases by 2030.^{3,4} The continent's 257 million hypertensive patients face particularly acute challenges, including limited healthcare infrastructure and medication shortages, with barely 5% to 10% of hypertensive individuals achieving blood pressure control.^{5,6}

Nigeria, Africa's most populous nation with over 218 million people, mirrors this troubling trajectory. Recent epidemiological studies indicate that 30% of Nigerian adults - approximately 65.4 million people - live with hypertension, while diabetes prevalence has risen sharply to affect between 3-7% of the population (7-15 million individuals).^{7,8} The economic consequences are severe, with many households spending over 30% of their income on chronic disease management, often resorting to catastrophic health expenditures that push families into poverty, further compounded by Nigeria's fragmented health system, where less than 5% of the population (about 11 million people) has meaningful health insurance coverage and essential medicines remain out of reach for most citizens.^{9,10}

The growing crisis demands urgent attention as the human and economic costs mount, and the convergence of communicable and noncommunicable diseases threatens to overwhelm the nation's healthcare infrastructure unless immediate, coordinated action is taken to strengthen prevention, diagnosis and treatment capabilities at all levels of care.

This study aims to comprehensively assess the economic burden and healthcare utilisation patterns of noncommunicable diseases in Nigeria, with a particular focus on the management of hypertension and diabetes. By analysing treatment costs, access barriers, and socioeconomic impacts at both household and health system levels, we seek to identify key gaps in service delivery and financing mechanisms. Our findings will provide critical evidence to inform policy decisions aimed at strengthening primary care capacity, expanding financial protection schemes, and developing targeted interventions to reduce the growing burden of NCDs in resource-limited settings.

Materials and Methods

Study Area

This study was conducted in Esan Central Local Government Area (ECLGA) of Edo State, Nigeria, which has a population of 105,313

and comprises 10 political wards. The area hosts various health facilities, including the Irrua Specialist Teaching Hospital and multiple primary health centres. The study took place over five months, from October 2023 to February 2024.

Study Population

The study population included adults aged 18 years and above who had resided in ECLGA for at least one year and had accessed healthcare services at least once. Individuals who declined participation, were under 18, or were not residents were excluded.

Sampling Technique

A descriptive cross-sectional study design was adopted. A multistage sampling technique was used. Two wards (Otoruwo II and Ugbeun) were selected by simple random sampling. From each ward, one community and two quarters were randomly chosen. Cluster sampling was then used to select households. The sample size of 206 was determined using the Leslie Kish formula, based on a hypertension prevalence of 14.2%, with a 10% adjustment for non-response.

Data Collection and Analysis

Data were collected using a pretested, structured, interviewer-administered questionnaire divided into four sections: sociodemographics, awareness of non-communicable diseases (NCDs), direct healthcare costs, and cost patterns. The researcher and a trained assistant collected data. Entries were managed and analysed using SPSS version 20. Descriptive statistics (frequencies, percentages) were used to summarise variables. Associations between variables were tested at a 5% significance level. Out-of-pocket expenses were defined as direct payments for consultations, medications, investigations, and transportation.

Ethical Consideration

Ethical approval was obtained from the Irrua Specialist Teaching Hospital Ethics Committee. Participation was voluntary, and informed consent was obtained after explaining the study's purpose, risks, and benefits. Anonymity was maintained by coding responses to prevent identification. Institutional approval was also granted by the Department of Community Medicine, Ambrose Alli University, Ekpoma.

RESULTS

Sociodemographic Characteristics of Respondents (Table 1)

The majority of respondents were younger than 40 years (132; 64.1%), while only 6 (2.9%) were aged 65 years or older. Females accounted for 118 (57.3%) of the participants, slightly exceeding the number of males. Most respondents were married (129; 62.6%), and a vast majority identified as Christians (179; 86.9%).

Regarding education, secondary schooling was the most commonly attained level (100; 48.5%), while 65 (31.6%) had no formal education. Monthly income was below ₦30,000 for over half the participants, with 45 (21.8%) earning less than ₦10,000. The predominant household size was 1–4 members (116; 56.3%), with only 9.7% living in households of more than 8 members.

Table 1: Sociodemographic Characteristics of Respondents.		
Variable	Frequency (n=206)	Percentage (%)
Age Group (years)		
< 40	132	64.1
40–64	68	33.0
≥ 65	6	2.9
Sex		
Male	88	42.7
Female	118	57.3
Marital Status		
Single	49	23.8
Married	129	62.6
Divorced	26	12.6
Widowed	2	1.0
Religion		
Christianity	179	86.9
Islam	19	9.2
Others	8	3.9
Level of Education		
No formal education	65	31.6
Primary	16	7.8
Secondary	100	48.5
Tertiary	25	12.1
Monthly Income (₦)		
< 10,000	45	21.8
10,001–30,000	78	37.9
30,001–50,000	31	15.0
> 50,000	31	15.0
Household Size		
1–4	116	56.3
5–8	70	34.0
>8	20	9.7

Diagnosis of Non-Communicable Diseases Among Respondents (Figure 1)

Among the respondents, hypertension was the most commonly reported condition, with 29 (14.1%) individuals confirming a diagnosis. Diabetes mellitus followed closely, affecting 27 (13.1%) of

participants, while arthritis was reported by 26 (12.6%). Fewer cases were noted for asthma (12; 5.8%) and cancer (7; 3.4%).

Mental health and neurological conditions were far less prevalent: only 3 respondents each (1.5%) reported being diagnosed with depression or osteoporosis, and single cases were recorded for epilepsy (0.5%), Alzheimer's disease (0.5%), and schizophrenia (0.5%).

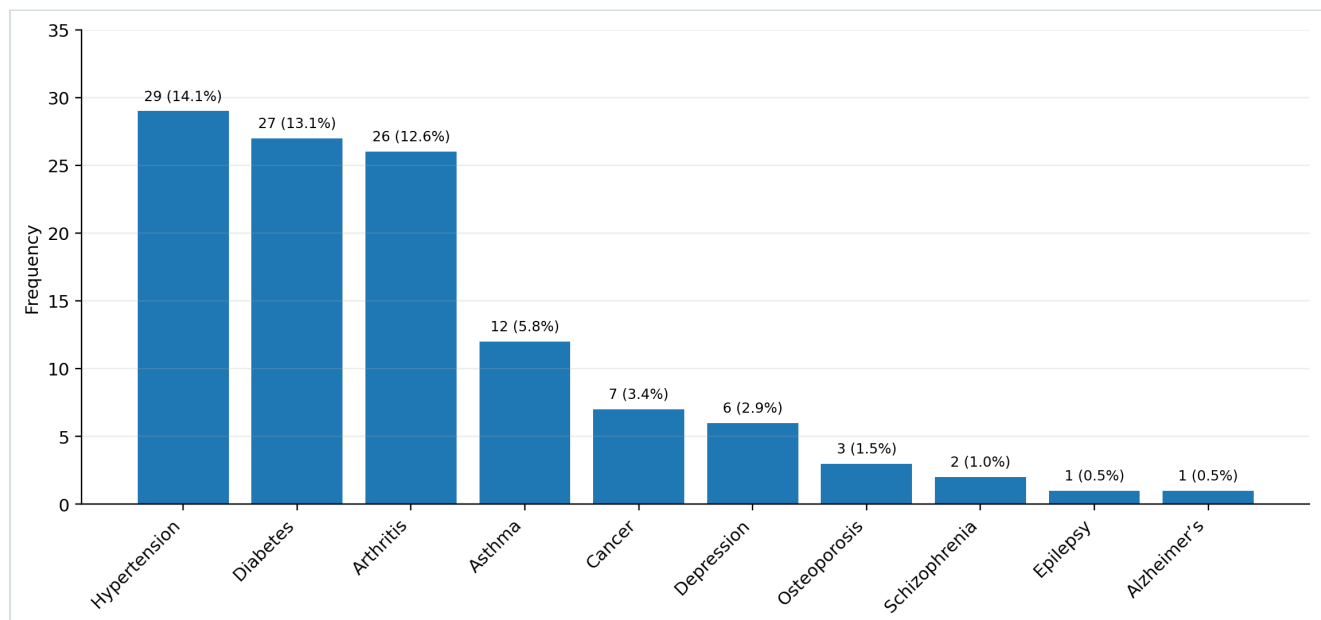


Figure 1: Diagnoses of non-communicable diseases among respondents

Pattern of Direct Costs Among Respondents with Non-Communicable Diseases (Table 2)

Out of 206 respondents, 61 (29.6%) reported being diagnosed with a non-communicable disease. Among these, the majority spent less than ₦10,000 (\$13) on consultation (46; 75.4%), while hospital admission costs were more varied, with 24 (39.3%) spending

between ₦10,000 and ₦19,999 (\$13 - \$26), and 19 (31.2%) paying between ₦20,000 and ₦29,999 (\$26 - \$39).

Over half of the participants (32; 52.4%) spent less than ₦10,000 (\$13) on laboratory investigations, though a similar portion (41.0%) fell into the ₦10,000–₦19,999 (\$13 - \$26) range. For medication, 25 (41.0%) reported costs between ₦10,000 and ₦19,999 (\$13 - \$26), while another 17 (27.9%) spent between ₦20,000 and ₦29,999 (\$26

- \$39). Transportation costs were low for most respondents, with 44 (72.1%) spending under ₦10,000 (\$13).

In terms of financing, 60 (77.9%) of the individuals with NCDs paid for their care out-of-pocket. Only a small fraction received financial support from family (15; 19.5%) or relatives (2; 2.6%), suggesting a significant economic burden borne by affected individuals.

Table 2: Pattern of Direct Costs Among Respondents with Non-Communicable Diseases		
Variable	Frequency (n = 61)	Percentage (%)
Diagnosed with NCD (n=206)		
Yes	61	29.6
No	145	70.4
Consultation Cost (₦)		
< 10,000 (\$13)	46	75.4
10,000–19,999 (\$13 – \$26)	13	21.4
20,000–29,999 (\$26 - \$39)	1	1.6
≥ 30,000 (\$39)	1	1.6
Hospital Admission (₦)		
< 10,000 (\$13)	18	29.5
10,000–19,999 (\$13 - \$26)	24	39.3
20,000–29,999 (\$26 - \$39)	19	31.2
≥ 30,000 (\$39)	0	0.0
Laboratory Investigation (₦)		
< 10,000 (\$13)	32	52.4
10,000–19,999 (\$13 - \$26)	25	41.0
20,000–29,999 (\$26 - \$39)	2	3.3
≥ 30,000 (\$39)	2	3.3
Medication (₦)		
< 10,000 (\$13)	16	26.2
10,000–19,999 (\$13 - \$26)	25	41.0
20,000–29,999 (\$26 - \$39)	17	27.9
≥ 30,000 (\$39)	3	4.9
Transportation (₦)		
< 10,000 (\$13)	44	72.1
10,000–19,999 (\$13 - \$26)	12	19.7
20,000–29,999 (\$26 - \$39)	4	6.6
≥ 30,000 (\$39)	1	1.6
Source of financing		
Self	60	77.9
Family	15	19.5
Relatives	2	2.6

Association Between Age Group and Non-Communicable Diseases Among Respondents (Table 3)

There was a statistically significant association between age group and diabetes mellitus ($\chi^2 = 41.896$; $p < 0.001$), with prevalence highest among those aged 40–64 years (37.3%). Hypertension also increased with age and showed a significant association ($\chi^2 =$

16.144; $p < 0.001$), affecting 29.9% of those aged 40–64 years and 28.6% of those ≥65 years.

For asthma, although prevalence was slightly higher among older respondents, the association with age was not statistically significant ($\chi^2 = 4.711$; $p = 0.095$). Conversely, arthritis showed a strong age-related trend, with 31.3% of respondents aged 40–64 years affected, and a significant association observed ($\chi^2 = 25.364$; $p < 0.001$).

Table 3: Association Between Age Group and Selected NCDs Among Respondents (n = 206).			
Disease	Age (years)	Yes (%)	No (%)
Diabetes Mellitus	< 40	4 (3.0%)	128 (97.0%)
	40–64	25 (37.3%)	42 (62.7%)
	≥ 65	2 (28.6%)	5 (71.4%)
		$\chi^2 = 41.896$; df = 2	
Hypertension	< 40	11 (8.3%)	121 (91.7%)
	40–64	20 (29.9%)	47 (70.1%)
	≥ 65	2 (28.6%)	5 (71.4%)
		$\chi^2 = 16.144$; df = 2	
Asthma	< 40	7 (5.3%)	125 (94.7%)
	40–64	9 (13.4%)	58 (86.6%)
	≥ 65	0 (0.0%)	7 (100.0%)
		$\chi^2 = 4.711$; df = 2	
Arthritis	< 40	7 (5.3%)	125 (94.7%)
	40–64	21 (31.3%)	46 (68.7%)
	≥ 65	2 (28.6%)	5 (71.4%)
		$\chi^2 = 25.364$; df = 2	

DISCUSSION

Nearly one in three respondents reported a confirmed diagnosis of an NCD, with hypertension and diabetes being the most common. This trend mirrors national patterns, where hypertension affects approximately 38% of adults and diabetes prevalence continues to

rise.^{11,12} A similar burden has been reported in other low- and middle-income countries (LMICs), including a recent study in Ghana, which found NCD prevalence rates exceeding 25% among adults.¹³ The prevalence of diabetes mellitus and hypertension was highest in the middle age group in this study. This may reflect the growing

adoption of Westernised diets and sedentary lifestyles, combined with inadequate preventive healthcare systems.^{11,12} This trajectory, if unaddressed, could lead to a sustained rise in NCD-related morbidity and healthcare expenditure.

Our observation in this study reflected that age was a significant determinant of disease distribution in this population, with respondents aged 40 and above bearing the greatest burden of diabetes, hypertension, and arthritis. This age-dependent pattern is consistent with findings from studies in Kenya and India, where older adults were disproportionately affected by NCDs.^{14,15} One possible explanation is the cumulative exposure to predisposing factors such as poor dietary habits, physical inactivity, and untreated elevated blood pressure over time. However, the higher prevalence of NCDs in the middle-aged group in our study and earlier studies suggests that predisposing factors may be taking hold earlier in life, possibly due to changing social and environmental determinants. Predisposing factors to NCDs are usually already established for some years before the clinical occurrence of NCDs. This observation makes it necessary to integrate routine screening for NCDs into primary care, particularly for adults well before the age of 40 years, to facilitate early diagnosis and intervention.

The financial toll of NCD care was evident in the multiple categories of out-of-pocket spending reported by affected individuals. Respondents consistently paid for consultation fees, medications, diagnostic investigations, transportation, and, in some cases, hospital admissions, each contributing cumulatively to a significant economic strain. Particularly concerning is the disproportionately high cost of medications and hospital admissions, with many respondents spending over ₦20,000 (\$26) per service. When combined with other routine expenses such as transportation and laboratory testing, the total cost of managing a chronic condition becomes unsustainable for low-income households. This layered pattern of expenditure accentuates the absence of financial protection mechanisms and highlights the vulnerability of patients who must navigate an underfunded health system while simultaneously shouldering the burden of lifelong treatment. Comprehensive reforms aimed at reducing or subsidising these cumulative costs, through expanded insurance coverage, community drug schemes, and investment in local diagnostic capacity, are critical to improving NCD outcomes and preventing catastrophic health expenditure.

The heavy reliance on personal funds to finance healthcare, reported by over three-quarters of respondents with NCDs, further illustrates

the absence of institutional safety nets. This is consistent with findings from other Nigerian studies where over 90% of patients paid for healthcare out-of-pocket.^{10,16} The near-complete absence of formal health insurance in this cohort is alarming and reflects the broader national reality, where less than 5% of the population is enrolled in any health insurance scheme. The public health implications of such an arrangement are profound: individuals with chronic illnesses may delay or abandon care altogether due to cost, leading to avoidable complications, hospitalisations, and loss of productivity. Policy reforms are urgently needed to improve enrollment in the National Health Insurance Scheme (NHIS), expand benefit packages to cover NCDs, and subsidise essential medicines for chronic diseases.

Transportation costs were an overlooked but significant component of total healthcare expenditure, with most respondents spending out-of-pocket for travel to health facilities. In rural areas like Esan Central, where primary healthcare infrastructure is limited, patients often travel long distances to obtain care. This barrier has been documented in other sub-Saharan African contexts, where transportation costs are a key determinant of healthcare-seeking behaviour.^{17,18} The cumulative cost of accessing decentralised services, especially for conditions requiring regular follow-up such as diabetes and hypertension, may discourage adherence to treatment regimens. There is therefore a critical need to strengthen community-level care through mobile outreach clinics and decentralisation of essential NCD services to primary health centres.

Limitations of this study include recall bias, which may have influenced responses, especially regarding healthcare expenditures. To reduce this, questions were restricted to events occurring within the past 6 to 24 months. Additionally, self-reported data may have introduced subjective errors.

Conclusion

This study underscores the urgent need for a systems-based response to the growing burden of non-communicable diseases in Nigeria. Beyond individual healthcare costs, the wider societal impacts, such as loss of productivity and increased health system strain, demand coordinated, multisectoral action. Strengthening early detection, reducing out-of-pocket treatment costs, and expanding access through universal health coverage are critical steps. Without sustained investment in NCD prevention and care, communities like Esan Central risk remaining locked in cycles of illness and economic hardship.

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HOW TO CITE

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