



Impact of mandatory health insurance on out-of-pocket healthcare spending in Nigeria

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Abstract

Out-of-pocket (OOP) healthcare expenditure remains a major barrier to equitable healthcare access and financial protection in Nigeria. The enactment of the National Health Insurance Authority (NHIA) Act 2022 introduced mandatory health insurance as a major policy strategy for advancing universal health coverage and reducing households' exposure to catastrophic healthcare expenditure. This study examined the relationship between health insurance coverage and out-of-pocket healthcare spending among healthcare users in Nigeria. A cross-sectional household survey design was adopted. The original dataset contained 236 respondents drawn from Lagos State, Kano State, Enugu State, Rivers State, and the Federal Capital Territory who had accessed healthcare services within the preceding six months. Following application of the stipulated adult eligibility criterion, 11 respondents younger than 18 years were excluded, yielding a final analytical sample of 225 adults. Health insurance status, duration of enrolment, healthcare-seeking behaviour, total healthcare bill, OOP payment, catastrophic health expenditure, cost-related delay in seeking care, satisfaction with healthcare services, and knowledge of the NHIA were assessed. Descriptive and inferential statistical procedures were employed to compare insured and uninsured respondents. Of the 225 eligible respondents, 142 (63.1%) were insured and 83 (36.9%) were uninsured. Mean OOP expenditure was approximately ₦7,038.03 among insured respondents compared with ₦17,875.90 among uninsured respondents, representing a 60.6% lower mean OOP payment among the insured ($p < .001$). Catastrophic OOP expenditure and cost-related delayed care were strongly associated with insurance status (Fisher's exact $p < .001$), while insured respondents reported substantially higher satisfaction ($M = 4.17$) than uninsured respondents ($M = 1.81$; $p < .001$). The study concludes that health insurance coverage is strongly associated with improved financial protection among recent healthcare users. Expansion of effective mandatory coverage, adequate benefit packages, protection of vulnerable populations, improved service quality, and systematic monitoring of financial-protection outcomes are recommended.

Keywords: Mandatory health insurance; national health insurance authority, NHIA act 2022, out-of-pocket expenditure, catastrophic health expenditure, financial risk protection, universal health coverage, Nigeria

Introduction

Universal health coverage (UHC) has become a central objective of contemporary health-system reform because access to healthcare cannot be considered equitable when the use of essential services exposes individuals and households to severe financial hardship. UHC requires that all people obtain the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, without suffering financial hardship from paying for those services. Consequently, financial protection is not merely an ancillary component of UHC but one of its defining dimensions. The World Health Organization (WHO, 2025a) ^[9] emphasizes that health financing arrangements determine the extent to which resources can be raised, pooled and strategically used to ensure access to services while protecting households from financial risk. Globally, however, direct out-of-pocket (OOP) expenditure continues to undermine this objective. The 2025 global monitoring report on UHC estimated that approximately 2.1 billion people experienced financial hardship arising from OOP healthcare expenditure in 2022, demonstrating that financial protection remains an unfinished component of the global UHC agenda (World Health Organization & World Bank, 2025) ^[16].

Out-of-pocket health expenditure refers broadly to payments made directly by individuals or households to healthcare providers at the point of receiving healthcare services,

without full reimbursement through an insurance or other third-party financing arrangement. These payments may include consultation fees, medicines, diagnostic investigations, hospital charges, medical procedures and other healthcare-related expenses. Although some degree of cost sharing exists in many health systems, excessive dependence on OOP financing can create substantial barriers to healthcare utilization. When individuals must finance treatment directly from current income, savings, borrowing or asset sales, healthcare expenditure can compete with basic household needs such as food, housing and education. WHO (2026a) describes financial hardship as occurring when OOP health expenditure reduces people's capacity to satisfy basic needs or afford other necessary goods and services. The consequences extend beyond financial loss because high user payments may cause patients to delay treatment, discontinue care, resort to self-medication or forgo necessary healthcare altogether (WHO, 2026b).

The global magnitude of this problem remains substantial despite improvements in health service coverage. According to WHO and the World Bank (2025) ^[16], approximately 4.6 billion people were not fully covered by essential health services in 2023, while billions continued to experience financial hardship associated with direct healthcare payments. WHO's updated financial protection estimates indicate that financial hardship arising from OOP spending

remains disproportionately concentrated among economically vulnerable populations. In 2022, approximately 1.6 billion people were pushed or further pushed into poverty by direct healthcare costs, while financial hardship was substantially more prevalent among the poorest than the wealthiest populations (WHO, 2026b) ^[1]. These inequalities demonstrate why financial protection policies must extend beyond increasing healthcare utilization to address the way healthcare services are financed.

The situation is particularly important in sub-Saharan Africa, where fragmented risk pools, limited fiscal capacity, large informal sectors and high reliance on direct household payments continue to constrain progress towards UHC. The WHO Regional Office for Africa (2024) ^[14] reported that OOP healthcare expenditure places a financial burden on more than 200 million people in the African Region and has pushed more than 150 million people into, or further into, poverty based on the latest regional estimates. Such evidence highlights the close relationship between health financing, poverty and socioeconomic development. Illness can produce a dual economic shock: households may simultaneously experience loss of income because of inability to work and increased expenditure because treatment must be purchased. Without effective prepayment and risk-pooling arrangements, poor and near-poor households are especially vulnerable to this combination of reduced income and increased expenditure (WHO Regional Office for Africa, 2024) ^[14].

Nigeria provides an especially important context for examining these relationships. As Africa's most populous country and a lower-middle-income economy, Nigeria operates a pluralistic health system involving federal, state and local governments alongside private-for-profit, faith-based and other non-state healthcare providers. Financing comes from government revenue, household expenditure, health insurance, development assistance and other private sources. Nevertheless, the system continues to depend heavily on direct household payments. Recent WHO evidence indicates that household OOP expenditure represented approximately 72% of Nigeria's current health expenditure in 2023 (WHO Regional Office for Africa, 2026) ^[15]. This high level of direct household financing indicates that illness continues to impose considerable financial risk on Nigerian households.

High OOP expenditure has implications for both healthcare access and household welfare. For affluent households, an unexpected medical bill may be manageable from disposable income or savings; for poor households, even relatively modest healthcare costs can represent a significant proportion of available resources. Households may therefore respond to illness by postponing treatment, seeking cheaper but potentially less appropriate providers, purchasing medicines without professional consultation, borrowing money, selling productive assets or reducing expenditure on food and education. Catastrophic health expenditure (CHE) captures this financial burden by identifying situations in which healthcare spending exceeds a specified proportion of household resources. Although thresholds differ across studies and policy frameworks, the underlying concept concerns the extent to which healthcare payments threaten normal household consumption and living standards.

Empirical evidence from Nigeria confirms that catastrophic expenditure is not evenly distributed across the population.

Aniebo *et al.* (2026) ^[1], analysing nationally representative post-pandemic data from the Nigeria General Household Survey 2023/2024, identified substantial socioeconomic inequalities in catastrophic OOP health expenditure. Such inequalities are particularly relevant because financial hardship may be determined not only by the absolute amount spent on healthcare but also by household income, socioeconomic position, illness severity, healthcare provider selected and insurance coverage. Recent Nigerian evidence therefore reinforces the need for financing mechanisms capable of redistributing health risks across population groups rather than requiring households to bear the financial consequences of illness individually.

Health insurance constitutes one of the principal mechanisms for addressing these problems through prepayment and risk pooling. Rather than requiring individuals to finance the entire cost of treatment when illness occurs, insurance collects contributions in advance and pools resources across members. This allows healthcare costs to be distributed between healthy and sick individuals and, depending on the financing design, across different income groups. From a health-financing perspective, compulsory prepayment and sufficiently large risk pools are generally more conducive to financial protection than fragmented voluntary arrangements. Importantly, insurance enrolment alone does not automatically ensure financial protection; benefit-package design, co-payments, provider availability, reimbursement mechanisms and service quality determine whether insured individuals continue to incur substantial OOP costs (WHO, 2026b).

Nigeria's health insurance architecture has evolved considerably in response to longstanding deficiencies in coverage. Earlier arrangements under the National Health Insurance Scheme were largely associated with formal-sector workers and did not achieve population-wide risk pooling. The National Health Insurance Authority Act 2022 ^[3] represented a major policy transition by replacing the previous institutional framework with the National Health Insurance Authority and providing a stronger statutory foundation for expanding health insurance coverage (Federal Republic of Nigeria, 2022) ^[2]. The reform therefore seeks to move Nigeria away from predominantly voluntary and fragmented insurance coverage towards a system in which health insurance becomes an integral component of national healthcare financing.

The significance of the NHIA Act extends beyond changing institutional nomenclature. Mandatory insurance potentially addresses adverse selection and narrow risk pools associated with voluntary enrolment by incorporating a broader population into prepaid financing arrangements. It also provides a policy platform for integrating federal arrangements with State Health Insurance Schemes (SHIS), private Health Maintenance Organisations (HMOs) and mechanisms intended to support vulnerable populations. In September 2025, implementation received further policy reinforcement through a presidential directive requiring federal Ministries, Extra-Ministerial Departments and Agencies to implement mandatory health insurance provisions (National Health Insurance Authority, 2025) ^[6].

Nevertheless, the existence of mandatory insurance legislation does not necessarily imply that financial protection has been achieved in practice. The coexistence of a mandatory statutory framework with persistent high OOP financing creates an important implementation and research

question: to what extent does actual insurance coverage protect healthcare users from direct healthcare expenditure and its associated consequences? Existing Nigerian studies provide reasons to expect a protective effect but also demonstrate the importance of empirical evaluation. Okunogbe *et al.* (2022)^[8], for example, found evidence that insurance could reduce catastrophic health expenditure in Kwara State, although the magnitude and sustainability of financial protection depended on programme implementation and the period over which effects were assessed.

Furthermore, evaluating health insurance solely in terms of enrolment rates may obscure important dimensions of its effectiveness. A meaningful assessment of financial protection should consider the actual amount households pay when they use services, the proportion experiencing catastrophic expenditure, and whether costs cause individuals to postpone necessary healthcare. Satisfaction is also relevant because financial protection accompanied by poor service quality, restricted provider choice, unavailable medicines or administrative difficulties may weaken confidence in insurance and discourage sustained participation.

Knowledge of the NHIA framework may similarly influence enrolment and utilisation. Mandatory health insurance reforms can achieve their intended objectives only when eligible populations understand available schemes, enrolment procedures, benefit packages and their rights and obligations. This issue is particularly important in Nigeria because a large proportion of the workforce operates within the informal economy, where automatic payroll-based insurance enrolment is more difficult to implement than in formal employment. State insurance agencies, community-based mechanisms and targeted subsidies consequently have an important role in extending financial protection to populations that may otherwise remain outside conventional contributory systems.

The urgency of strengthening these mechanisms has increased as Nigeria approaches the 2030 deadline for achieving the Sustainable Development Goals. SDG Target 3.8 calls for UHC, including financial risk protection, access to quality essential healthcare services and access to safe, effective, quality and affordable medicines and vaccines. International policy has increasingly emphasized compulsory prepaid financing and pooling as instruments for reducing OOP expenditure. In 2025, the World Health Assembly urged Member States, according to their national contexts, to strengthen policies that reduce direct payments and prioritize pooling of government revenue and mandatory insurance contributions as part of improving financial protection (World Health Assembly, 2025)^[9].

Despite this policy momentum, there remains a need for empirical evidence on whether insured Nigerians actually experience lower OOP expenditure and better financial-protection outcomes than their uninsured counterparts under the evolving mandatory insurance environment. Evidence is particularly needed across heterogeneous settings because Nigeria's states differ substantially in economic conditions, health-system capacity, insurance implementation and patterns of healthcare utilization. Examining respondents across Lagos, Kano, Enugu and Rivers States and the Federal Capital Territory provides an opportunity to capture experiences across geographically and socioeconomically diverse Nigerian settings.

Against this background, the present study examines the impact of mandatory health insurance on out-of-pocket healthcare spending in Nigeria, focusing on adults who accessed healthcare within the preceding six months. Specifically, the study investigates differences in OOP payments between insured and uninsured healthcare users and examines the relationship between insurance coverage and catastrophic OOP expenditure, cost-related delays in seeking healthcare, and satisfaction with healthcare services. It further considers insurance type and duration of enrolment alongside relevant demographic, socioeconomic and healthcare-utilisation characteristics. Because the design is cross-sectional, observed differences are interpreted primarily as associations rather than definitive causal effects.

Review of Related Literature

1. Concept of Health Insurance

Health insurance is a health-financing mechanism through which individuals, employers, governments, or other financing agents make advance contributions to a pooled fund from which the healthcare expenses of enrolled persons are subsequently paid. The fundamental principles underlying health insurance are prepayment, risk pooling, cross-subsidization, and protection against unpredictable healthcare expenditure. Instead of requiring patients to bear the full financial cost of illness at the point of service utilization, insurance distributes health risks across a larger population and across time.

From a universal health coverage perspective, insurance is valuable to the extent that it removes financial barriers to healthcare and protects people against impoverishment. WHO (2026) emphasizes that financial protection depends on reducing reliance on payments made directly at the point of care and strengthening prepaid and pooled financing mechanisms. However, participation in an insurance scheme does not automatically guarantee financial protection. The extent of protection depends on the comprehensiveness of the benefit package, medicines covered, copayment arrangements, availability of contracted providers, reimbursement mechanisms and the ability of insured persons to obtain required services without additional payments.

2. Mandatory Health Insurance in Nigeria

Nigeria's contemporary health insurance framework is rooted in the National Health Insurance Authority Act 2022^[3], which replaced the previous National Health Insurance Scheme framework. The legislation represented an important policy shift from a predominantly limited formal-sector insurance arrangement towards the objective of mandatory health insurance for Nigerians and legal residents. The policy seeks to mobilize prepaid resources, strengthen pooling, improve access to healthcare and reduce the dominance of out-of-pocket financing.

The introduction of mandatory insurance reflects the recognition that Nigeria cannot sustainably achieve UHC through a financing system dominated by households paying directly whenever illness occurs. Nevertheless, mandatory insurance as a legal principle should be distinguished from universal effective coverage. Coverage depends on actual enrolment, payment of contributions or subsidies, awareness, availability of accredited providers, scope of benefits and utilization of services.

3. Out-of-Pocket Healthcare Expenditure

Out-of-pocket expenditure represents direct payments made by households to healthcare providers for healthcare goods and services at the time they are used, excluding amounts subsequently reimbursed by a third party. OOP expenditures may include consultation fees, diagnostic tests, medicines, hospital admissions, surgical procedures and other treatment-related expenses. WHO (2026) identifies OOP expenditure as a critical health-financing indicator because excessive reliance on it links healthcare utilization directly to an individual's ability to pay.

Globally, the scale of the problem remains substantial. WHO and the World Bank (2025) ^[16] reported that approximately 2.1 billion people experienced financial hardship attributable to OOP healthcare expenditure in 2022. Nigeria continues to experience high reliance on OOP financing, making financial risk protection a central health-system concern.

4. Catastrophic Health Expenditure

Catastrophic health expenditure occurs when healthcare spending consumes such a substantial share of household resources that the household's ability to maintain its normal living standard is seriously compromised. Historically, studies have commonly classified expenditure as catastrophic when OOP payments exceed 10% of total household expenditure or income, or 40% of non-food expenditure or household capacity to pay. The present study operationalizes catastrophic OOP burden as OOP expenditure exceeding 10% of monthly income.

International evidence demonstrates that catastrophic expenditure is influenced by socioeconomic position, demographic characteristics, health needs, healthcare utilization and contextual characteristics of health systems (Mohsin *et al.*, 2024) ^[4]. Nigerian evidence similarly shows persistent socioeconomic inequalities. Edeh (2022) ^[2] reported that catastrophic expenditure was disproportionately concentrated among poorer households, while Aniebo *et al.* (2026) ^[1] documented substantial catastrophic OOP expenditure and socioeconomic inequality in post-pandemic Nigeria.

5. Health Insurance and Out-of-Pocket Expenditure

The central expectation underlying health insurance is that insured individuals should face lower payments at the point of healthcare consumption than equivalent uninsured individuals. The relationship operates because part or all of covered medical expenditure is financed from pooled prepaid resources rather than from household income at the moment illness occurs. Insurance may not completely eliminate OOP expenditure because copayments, deductibles, uncovered services, unavailable medicines and services obtained from non-accredited facilities may continue to generate direct expenditure.

Nigerian evidence generally supports a protective relationship between insurance and direct expenditure. Previous studies have shown lower OOP expenditure among insured patients and reductions in healthcare spending following insurance enrolment. These findings support the hypothesis that insurance coverage is inversely associated

with OOP expenditure, although the magnitude of protection varies with scheme design and benefit coverage.

6. Health Insurance and Catastrophic Healthcare Spending

Insurance should reduce catastrophic healthcare expenditure by replacing large unpredictable individual expenditure with smaller predictable prepayments or publicly financed coverage. Okunogbe *et al.* (2022) ^[8], using longitudinal evidence from Kwara State, found significant short-term reductions in catastrophic expenditure associated with insurance exposure, with particularly important benefits among poorer households and households containing chronically ill members.

The Kwara findings also showed that protective effects may weaken over time, emphasizing the need for sustainable financing, adequate benefit packages and effective programme management. More broadly, Nigerian evidence indicates that income, education, occupation and insurance enrolment are important correlates of catastrophic expenditure.

7. Health Insurance and Delayed Healthcare Seeking

The financial consequences of OOP payment may occur even before expenditure takes place. Individuals who anticipate that healthcare will be unaffordable may delay consultation or avoid healthcare completely. Cost-related delayed care therefore represents an important dimension of inadequate financial protection. Insurance lowers the effective price of care at the point of service and may reduce such delays. WHO's financial-protection framework recognizes that expenditure measures alone may miss individuals who spend little because they cannot afford to obtain needed healthcare.

8. Health Insurance and Patient Satisfaction

Patient satisfaction represents an important indicator of perceived healthcare quality and can influence healthcare utilization, continuity of insurance enrolment and public confidence in mandatory schemes. Satisfaction reflects waiting time, provider communication, medicine availability, provider choice, interpersonal treatment, facility conditions, administrative processes and the amount paid for care. Insurance can enhance satisfaction when it makes services more affordable and predictable, although insured patients may remain dissatisfied where service quality is poor or additional payments remain substantial.

9. Knowledge and Awareness of Health Insurance

Awareness constitutes an important precondition for effective participation in health insurance. Individuals must understand the existence of insurance schemes, eligibility conditions, contribution requirements, benefit packages and procedures for accessing healthcare if coverage is to translate into service utilization. The relationship between awareness and enrolment is especially important in Nigeria's large informal sector, where participation may require active registration rather than automatic payroll enrolment.

10. Healthcare-Seeking Behaviour and Financial Protection

Healthcare-seeking behaviour refers to decisions concerning whether, when and where healthcare is obtained. Provider type can affect both the total healthcare bill and OOP payment. Insurance coverage can also influence provider choice because enrollees may be restricted to accredited providers or encouraged to enter the system through primary-care gatekeeping. Variation in OOP spending between insured and uninsured respondents should therefore be interpreted alongside healthcare-seeking patterns.

11. Socioeconomic Determinants of Out-of-Pocket Spending

Insurance status operates within a wider set of demographic and socioeconomic determinants. Income is particularly important because the same absolute OOP expenditure has different welfare consequences at different income levels. Education may influence health literacy, awareness of insurance and ability to navigate healthcare systems, while employment status may shape access to contributory insurance. Age and sex may also influence health needs and utilization. Mohsin *et al.* (2024), Edeh (2022), and Aniebo *et al.* (2026)^[1, 2, 4] collectively demonstrate the importance of socioeconomic position in explaining financial hardship from healthcare expenditure.

12. Theoretical Review

The principal theoretical foundation of the study is risk-pooling theory. Risk pooling aggregates prepaid financial resources so that the uncertain cost of illness is shared across members rather than borne entirely by the person who becomes ill. Mandatory insurance can broaden the contribution base, reduce adverse selection and strengthen redistribution from healthy to sick and, depending on financing design, from higher-income to lower-income groups.

Grossman's health demand model provides a complementary explanation by conceptualizing healthcare as an investment in health capital. High OOP prices can suppress healthcare demand and encourage delayed treatment, while insurance reduces the effective price faced at the point of service. Andersen's Behavioral Model of Health Service Use further identifies insurance as an enabling resource operating alongside predisposing factors such as age, sex and education and other enabling resources such as income.

13. Empirical Review

Empirical studies in Nigeria generally support the financial-protection role of insurance. Okunogbe *et al.* (2022)^[8] found significant short-term reductions in catastrophic healthcare expenditure associated with insurance in Kwara State. Edeh (2022)^[2] documented persistent socioeconomic inequalities in catastrophic expenditure and recommended deeper insurance coverage. Aniebo *et al.* (2026)^[1], using nationally representative post-pandemic data, similarly documented substantial socioeconomic inequality in catastrophic OOP expenditure. Together, these studies indicate that insurance can improve financial protection but that effects depend on programme design, household circumstances and health-system implementation.

14. Identified Gap in the Literature

Although considerable research has examined healthcare financing and catastrophic expenditure in Nigeria, much of the available evidence predates full implementation of the National Health Insurance Authority Act 2022^[3] or focuses on individual states, facilities or disease populations. Fewer studies simultaneously examine actual OOP payment, catastrophic burden, cost-related delayed care and patient satisfaction within the contemporary mandatory insurance environment.

The present study addresses these gaps by examining recent healthcare users across Lagos, Kano, Enugu and Rivers States and the Federal Capital Territory and distinguishing NHIA formal-sector insurance, State Health Insurance Schemes and private HMO coverage. It therefore provides contemporary evidence on whether insurance status is associated with lower OOP expenditure, reduced catastrophic spending, fewer cost-related delays and greater satisfaction.

Methodology

1. Research Design

The study adopted a cross-sectional household survey design to examine the relationship between mandatory health insurance and out-of-pocket healthcare spending among healthcare users in Nigeria. Data on insurance status, healthcare utilisation, expenditure, financial burden, delayed care, satisfaction and NHIA awareness were collected at a single point in time. Because the design is observational and cross-sectional, the analysis estimates associations rather than definitive causal effects.

2. Study Area

The study covered Lagos State, Kano State, Enugu State, Rivers State, and the Federal Capital Territory (FCT), Abuja. These locations were selected to provide geographical and socioeconomic diversity and to capture variation in health insurance implementation, health service availability, employment structure, household income and healthcare-seeking behaviour.

3. Study Population

The target population comprised adults aged 18 years and above residing in the selected locations who had utilised healthcare services during the six months preceding the survey. Healthcare utilisation included attendance at primary healthcare centres, general hospitals, tertiary health facilities, private healthcare facilities and pharmacies.

4. Eligibility Criteria

Respondents were eligible if they were aged 18 years or older, resided in one of the selected study locations, had accessed healthcare during the preceding six months, could provide information concerning their most recent healthcare expenditure, and consented to participate. Eleven observations below age 18 were excluded during data cleaning.

5. Sample Size

The original dataset comprised 236 respondents. After exclusion of 11 respondents younger than 18 years, the final analytical sample consisted of 225 eligible adults.

6. Sampling Procedure

A multistage sampling approach was conceptualised for the study. The five study locations were selected to reflect geographical and socioeconomic diversity; eligible recent healthcare users were then identified within selected household or community clusters. The approach was designed to capture both insured and uninsured respondents across socioeconomic and healthcare-utilisation categories.

7. Instrument for Data Collection

Data were collected using a structured questionnaire covering demographic and socioeconomic characteristics, insurance status, duration of enrolment, healthcare-seeking behaviour, total healthcare bill, OOP payment, catastrophic expenditure, delayed care attributable to cost, satisfaction with healthcare services and knowledge of the NHIA.

8. Measurement of Variables

The principal independent variable was health insurance status, coded 0 = uninsured, 1 = NHIA formal sector, 2 = State Health Insurance Scheme, and 3 = private HMO. For binary comparisons, categories 1-3 were combined as insured. Enrolment duration was coded 0 = none, 1 = less than 6 months, 2 = 6-12 months, and 3 = more than 12 months. OOP payment was measured in Nigerian naira. Catastrophic OOP burden was coded 1 where the supplied study classification indicated OOP expenditure exceeded 10% of monthly income and 0 otherwise. Delayed care was coded 1 = yes and 0 = no. Satisfaction was measured on a five-point Likert scale. Control variables included state, age, sex, education, employment, income, healthcare-seeking location and NHIA awareness.

9. Validity and Reliability

The questionnaire was structured to reflect the study objectives and key health-financing constructs. Most study variables were objective or single-item measures rather than multi-item psychometric scales; consequently, internal consistency measures such as Cronbach's alpha were not applicable to most variables. Data-quality checks focused on coding ranges, logical consistency, completeness and eligibility.

10. Data Collection Procedure

Eligible respondents were informed about the purpose of the research and voluntarily provided information about their most recent healthcare encounter during the preceding six months. Completed questionnaires were reviewed for completeness and entered into an electronic database for analysis.

11. Data Management and Cleaning

The dataset was screened for duplicate records, missing values, coding errors, out-of-range values and inconsistencies. Eleven respondents younger than 18 years were excluded to preserve the stated adult eligibility criterion. The final analytical sample was therefore N = 225.

12. Method of Data Analysis

Frequencies and percentages were used for categorical variables, while means and standard deviations summarized continuous variables. Insured and uninsured groups were compared using Welch independent-samples t-tests for continuous outcomes and Fisher's exact tests for binary

outcomes where complete separation or sparse cells occurred. Mann-Whitney U tests were considered as robustness checks for skewed expenditure data. Statistical significance was set at $p < .05$. Because catastrophic OOP burden and delayed care showed complete separation by insurance status, conventional maximum-likelihood logistic regression was not considered appropriate for these outcomes; Firth penalized logistic regression would be preferable if adjusted modelling were required.

13. Ethical Considerations

The study was conducted in accordance with standard ethical principles governing human-participant research. Participation was voluntary, informed consent was obtained, identifying information was excluded from the analytical dataset, and data were treated confidentially. The name and approval number of the relevant ethics committee should be inserted in the final manuscript where applicable.

14. Methodological Limitation

The cross-sectional design limits causal inference and cannot fully eliminate selection effects or unmeasured confounding. Healthcare expenditure was based on respondents' reports concerning a recent healthcare encounter and may therefore be subject to recall error. In addition, the study's catastrophic expenditure indicator was supplied as a binary variable while monthly income was recorded categorically, limiting independent reconstruction of the threshold from exact income values.

Results and Discussion

1. Data Cleaning and Final Analytical Sample

The original dataset contained 236 observations. Application of the stipulated eligibility criterion identified 11 respondents below 18 years (IDs 126, 146, 161, 166, 181, 186, 201, 206, 218, 221 and 226). These observations were excluded. The final analytical sample therefore consisted of 225 adults aged 18-65 years, with a mean age of 41.24 years (SD = 12.37). Of these respondents, 142 (63.1%) were insured and 83 (36.9%) were uninsured.

2. Distribution of Respondents by Insurance Status

Insurance status	Frequency	Percentage
Uninsured	83	36.9
NHIA Formal Sector	82	36.4
State Health Insurance Scheme	47	20.9
Private HMO	13	5.8
Total	225	100.0

Almost two-thirds of the analytical sample had some form of health insurance coverage. NHIA formal-sector insurance represented the largest single insured category, followed by State Health Insurance Schemes and private HMOs. Because the study sampled recent healthcare users rather than a nationally representative population, these percentages should not be interpreted as national insurance coverage estimates.

3. Health Insurance and Out-of-Pocket Healthcare Expenditure

Insurance status	n	Mean OOP payment (₦)	SD (₦)
Uninsured	83	17,875.90	10,085.93
Insured	142	7,038.03	5,031.64

Uninsured respondents paid an average of approximately ₦17,875.90 directly for their most recent healthcare encounter compared with ₦7,038.03 among insured respondents. The absolute mean difference was approximately ₦10,837.87, equivalent to a 60.6% lower mean OOP payment among insured respondents. A Welch independent-samples t-test showed a statistically significant difference, $t(106.28) = -9.15$, $p < .001$. A supplementary Mann-Whitney comparison similarly indicated a significant difference ($U = 2,101.5$, $p < .001$).

4. Discussion of Health Insurance and OOP Spending

The substantial difference in expenditure provides strong evidence of a financial-protection association in the study population. The finding is consistent with risk-pooling theory and the policy rationale of the NHIA Act 2022 [3]; prepaid and pooled financing reduces the proportion of healthcare costs borne directly by patients. Given Nigeria's continuing high dependence on household OOP financing, wider effective insurance coverage could materially reduce direct household exposure to healthcare costs.

5. OOP Expenditure According to Type of Insurance

Insurance arrangement	n	Mean OOP payment (₦)	SD (₦)	Mean satisfaction
Uninsured	83	17,875.90	10,085.93	1.81
NHIA Formal Sector	82	9,442.68	3,411.89	4.56
State Health Insurance Scheme	47	1,289.36	1,595.54	3.51
Private HMO	13	12,653.85	2,455.81	4.08

The lowest mean OOP payment was observed among respondents enrolled in State Health Insurance Schemes, followed by NHIA formal-sector enrollees and private HMO participants. This pattern suggests that the depth of financial protection varied across insurance arrangements. However, differences in benefit packages, healthcare provider use, illness severity and socioeconomic characteristics prevent a causal interpretation of these scheme-level differences.

6. Insurance Status and Catastrophic OOP Expenditure

Insurance status	Catastrophic OOP: Yes	Catastrophic OOP: No	Total
Uninsured	83 (100.0%)	0 (0.0%)	83
Insured	0 (0.0%)	142 (100.0%)	142
Total	83	142	225

All 83 uninsured respondents were classified as experiencing catastrophic OOP expenditure, whereas none of the 142 insured respondents were classified as experiencing catastrophic expenditure. Fisher's exact test indicated a statistically significant association, $p < .001$. The complete separation is unusually absolute for observational data and should therefore be interpreted as a very strong sample-specific association rather than evidence that insurance universally eliminates catastrophic expenditure.

7. Health Insurance and Cost-Related Delayed Care

Insurance status	Delayed care: Yes	Delayed care: No	Total
Uninsured	83 (100.0%)	0 (0.0%)	83
Insured	0 (0.0%)	142 (100.0%)	142
Total	83	142	225

Every uninsured respondent reported delaying healthcare because of cost, whereas none of the insured respondents reported cost-related delay. Fisher's exact test showed a statistically significant relationship, $p < .001$. The result suggests that insurance may reduce not only the amount paid at the point of care but also financial barriers to timely healthcare utilisation. As with catastrophic expenditure, the complete separation warrants cautious generalisation.

8. Health Insurance and Patient Satisfaction

Insurance status	n	Mean	SD
Uninsured	83	1.81	0.40
Insured	142	4.17	0.68

Insured respondents reported a mean satisfaction score of 4.17 compared with 1.81 among uninsured respondents. The mean difference of approximately 2.36 points was statistically significant, $t(223.00) = 32.78$, $p < .001$. Higher satisfaction among insured respondents may partly reflect reduced financial pressure, although satisfaction also depends on service quality, waiting time, provider responsiveness, medicine availability and other dimensions of care.

9. Summary of Major Comparative Findings

Outcome	Insured (n=142)	Uninsured (n=83)	Statistical result
Mean OOP payment	₦7,038.03	₦17,875.90	$t = -9.15$, $p < .001$
OOP reduction	60.6% lower	Reference	-
Catastrophic OOP	0.0%	100.0%	Fisher's exact $p < .001$
Delayed care due to cost	0.0%	100.0%	Fisher's exact $p < .001$
Mean satisfaction	4.17	1.81	$t = 32.78$, $p < .001$

The combined findings consistently demonstrate substantially better financial and healthcare-experience outcomes among insured respondents. Nevertheless, because insurance enrolment is related to socioeconomic and employment characteristics and the study is cross-sectional, these results are most appropriately described as strong associations consistent with a financial-protection effect.

10. Statistical Limitation: Complete Separation

Both catastrophic OOP burden and delayed care exhibited complete separation by insurance status: all uninsured respondents had an outcome value of 1 and all insured respondents had an outcome value of 0. Conventional binary

logistic regression would therefore yield unstable or infinite maximum-likelihood estimates. Cross-tabulations and Fisher's exact tests are consequently reported. If adjusted modelling is required, Firth penalized logistic regression or another separation-robust method should be used.

11. Overall Discussion

Taken together, the findings indicate a substantial relationship between health insurance coverage and financial protection among recent healthcare users in the selected Nigerian settings. Insurance coverage was associated with significantly lower OOP expenditure, absence of catastrophic expenditure as defined in the supplied dataset, absence of reported cost-related treatment delay, and substantially higher satisfaction. The approximately 60.6% lower mean OOP expenditure is particularly important because it demonstrates the practical economic relevance of risk pooling. These findings are consistent with Nigerian evidence from Okunogbe *et al.* (2022), Edeh (2022), and Aniebo *et al.* (2026)^[1, 2, 8], as well as the broader WHO emphasis on prepaid and pooled financing as a mechanism for reducing financial hardship. The policy implication is that mandatory insurance should be judged not merely by enrolment but by whether it reduces direct payments, catastrophic financial burden and barriers to timely care.

Conclusion and Recommendations

1. Conclusion

This study examined mandatory health insurance and out-of-pocket healthcare spending in Nigeria within the policy framework established by the National Health Insurance Authority Act 2022^[3]. Following application of the adult eligibility criterion, the final analytical sample comprised 225 respondents, of whom 142 (63.1%) were insured and 83 (36.9%) were uninsured.

The findings provide strong evidence that health insurance coverage was associated with greater financial protection. Mean OOP expenditure among insured respondents was ₦7,038.03 compared with ₦17,875.90 among uninsured respondents, representing a 60.6% lower mean OOP payment among the insured ($p < .001$). Catastrophic OOP expenditure and cost-related delayed care were both strongly associated with insurance status (Fisher's exact $p < .001$), while insured respondents reported significantly higher satisfaction ($M = 4.17$) than uninsured respondents ($M = 1.81$; $p < .001$).

Analysis by insurance type further suggested variation in the depth of financial protection across schemes. State Health Insurance Scheme participants recorded the lowest mean OOP expenditure, while NHIA formal-sector participants reported the highest mean satisfaction. This demonstrates that financial protection and patient experience, although related, are distinct dimensions of health-system performance.

The findings should be interpreted within the limitations of the cross-sectional design and the complete separation observed for catastrophic expenditure and delayed care. The study therefore concludes that health insurance coverage is strongly associated with lower OOP expenditure, reduced financial hardship, improved timely access to healthcare and greater patient satisfaction among the healthcare users studied, rather than claiming definitive causal effects.

Nigeria's mandatory health insurance policy consequently represents an important potential instrument for advancing universal health coverage when legal entitlement is translated into effective and comprehensive coverage.

2. Recommendations

1. Strengthen coordinated implementation of mandatory health insurance. The Federal Government, NHIA, state governments, State Health Insurance Agencies and private HMOs should coordinate implementation of the NHIA Act 2022^[3], with priority given to expanding enrolment among informal-sector workers and underserved populations, strengthening risk pooling, harmonising minimum benefit standards, improving provider networks and ensuring effective regulation.
2. Guarantee financial protection for poor and vulnerable populations. Government-funded subsidies and appropriate equity mechanisms should ensure that low-income households, unemployed persons, older people without adequate income, persons with disabilities and other vulnerable groups are not excluded because of inability to pay contributions.
3. Improve benefit coverage and minimise residual OOP expenditure. Insurance schemes should provide adequate coverage for essential medicines, diagnostics, emergency services, maternal and child healthcare, surgery and chronic disease management. Provider reimbursement should be timely and adequate, while unauthorised copayments and informal charges should be actively monitored and controlled.
4. Improve healthcare quality and patient experience. Financial protection should be accompanied by improvements in medicine availability, waiting times, provider responsiveness, facility standards and continuity of care. Routine patient satisfaction assessment should be incorporated into provider accreditation and insurance programme performance monitoring.
5. Strengthen public awareness and simplify enrolment. Sustained public education should communicate the benefits, obligations and procedures associated with mandatory health insurance. Community organisations, workplaces, professional and trade associations, religious institutions and digital platforms should be used to facilitate enrolment, particularly among informal-sector populations.
6. Institutionalise financial-protection monitoring and further research. The NHIA and State Health Insurance Agencies should routinely assess OOP expenditure, catastrophic health expenditure, cost-related delays in accessing care and patient satisfaction rather than evaluating programme success solely through enrolment figures. Future research should employ nationally representative and longitudinal designs to determine longer-term effects.

3. Policy Implication

The principal policy implication is that mandatory health insurance should be implemented as a financial-protection strategy rather than merely an enrolment programme.

Success should be reflected in declining OOP payments, lower catastrophic healthcare expenditure, fewer people delaying necessary treatment because of cost, and improved patient experience. Within the limitations of the present cross-sectional study, the evidence supports expansion of the breadth, depth and quality of health insurance coverage as a central component of Nigeria's strategy for reducing dependence on out-of-pocket healthcare financing and advancing universal health coverage.

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