

RESEARCH ARTICLE



A Systematic Review of Healthcare Financing Models and Their Impact on Universal Health Coverage Progress in Sub-Saharan Africa

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Abstract: Sub-Saharan Africa faces significant challenges in achieving Universal Health Coverage (UHC), with persistent gaps in healthcare access and financial protection. The region bears 24% of the global disease burden despite having only 11% of the world's population, highlighting the critical need for effective healthcare financing strategies. A structured literature search was conducted across PubMed, Scopus, and Dimensions databases, supplemented by grey literature from WHO IRIS and World Bank repositories. Publications from 2000 to 2025 were included based on predefined criteria. The final analysis involved 15 studies that evaluated various healthcare financing models in Sub-Saharan African countries. Tax-based systems and National Health Insurance Authority schemes demonstrated superior outcomes in financial protection and service accessibility. Out-of-pocket payments, accounting for 35.8% of total health expenditure, were associated with increased catastrophic health spending and reduced healthcare utilization. Multi-payer systems showed mixed results, with success contingent upon effective regulation and risk pooling. Innovative financing mechanisms, including sin taxes, generated over \$500 million in additional health funding between 2015-2020 across 14 countries. Evidence supports the superiority of publicly funded financing models for achieving UHC in Sub-Saharan Africa. Success depends on robust governance, effective pooling mechanisms, and context-specific adaptations. Reducing reliance on out-of-pocket payments while strengthening domestic resource mobilization presents the most viable path toward sustainable UHC in the region.

Keywords: Healthcare financing; Universal Health Coverage; Sub-Saharan Africa; Health insurance; Health equity.

1. Introduction

Universal Health Coverage represents a fundamental goal in modern healthcare systems, aiming to ensure all populations access essential health services without experiencing financial hardship. The World Health Organization defines UHC as a dynamic process requiring continuous strengthening of healthcare systems and equitable financial management, rather than a fixed endpoint [1]. Sub-Saharan Africa presents unique challenges in achieving UHC goals. The region's disproportionate disease burden - 24% of global health challenges despite housing only 11% of world population - emphasizes the urgency of establishing robust healthcare financing mechanisms [2]. Recent data indicates that merely 43% of the SSA population can access essential healthcare services, significantly lower than the global average of 76% [3]. Furthermore, healthcare-related expenses exceeding 10% of household income affect approximately 100 million individuals annually in the region, indicating substantial gaps in financial protection [4, 5].

Healthcare financing serves as a critical determinant of UHC progress through three core functions: revenue generation, resource pooling, and strategic purchasing [6]. These components must work synergistically to ensure adequate funding, risk distribution, and operational efficiency. While various financing models exist globally - from single-payer systems funded through taxation to multi-payer frameworks involving public and private insurers - SSA's landscape remains predominantly characterized by fragmented financing streams [7]. The current financing structure in SSA shows concerning trends. Out-of-pocket payments constitute 35.8% of total health expenditure, substantially exceeding the global average of 30% [8, 9]. This level surpasses WHO recommendations suggesting OOP should remain below 15-20% of current health expenditure to maintain healthcare affordability [10]. Such high

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personal spending creates access barriers, particularly affecting informal sector workers and rural populations. The COVID-19 pandemic exposed fundamental weaknesses in SSA's health financing architecture. Limited fiscal resources forced numerous countries to implement difficult trade-offs between pandemic response and essential health services. In Nigeria and Kenya, critical funding reallocations disrupted maternal-child health programs and routine immunization services, indicating the need for more resilient financing mechanisms [11]. While healthcare financing dominates health policy discussions in SSA, existing literature often focuses narrowly on specific financing methods or individual country experiences. The relationship between financing models and UHC outcomes - population coverage, financial protection, and service access - requires more systematic evaluation [12]. Additionally, conceptual distinctions between mixed and multi-payer systems often lack clarity, while the connection between financing inputs and health system performance outcomes needs stronger articulation [13]. The aim of this present study is to evaluate healthcare financing models across Sub-Saharan Africa and their influence on UHC outcomes.

2. Materials and Methods

2.1. Study Design and Approach

A systematic assessment approach was employed to evaluate healthcare financing models and their effects on Universal Health Coverage in Sub-Saharan Africa. The methodology focused on identifying, selecting, and critically appraising relevant research while collecting and analyzing data from included studies [14].

2.2. Literature Search

The literature search encompassed publications from January 2000 to June 2025, utilizing three primary electronic databases: PubMed, Scopus, and Dimensions. Additional sources included WHO IRIS, World Bank repositories, and other grey literature databases. The search strategy incorporated specific terms and their combinations:

- Main concepts: "healthcare financing," "universal health coverage," "health system strengthening"
- Financing models: "single-payer," "multi-payer," "out-of-pocket," "mixed financing"
- Geographic focus: "Sub-Saharan Africa," individual country names
- Boolean operators connected these terms appropriately to ensure comprehensive coverage [15].

2.3. Selection Criteria

The inclusion criteria encompassed English-language publications focusing on Sub-Saharan African countries or regions, published between 2000 and 2025. Studies needed to evaluate health financing mechanisms and their influence on UHC indicators, presenting empirical data, policy analyses, or comparative frameworks. Publications from peer-reviewed journals and official reports from recognized global health organizations received priority consideration [16]. Studies were excluded if they focused solely on clinical aspects, presented purely theoretical frameworks without practical application, or comprised editorial content. Publications lacking clear methodology or data sources also faced exclusion [17].

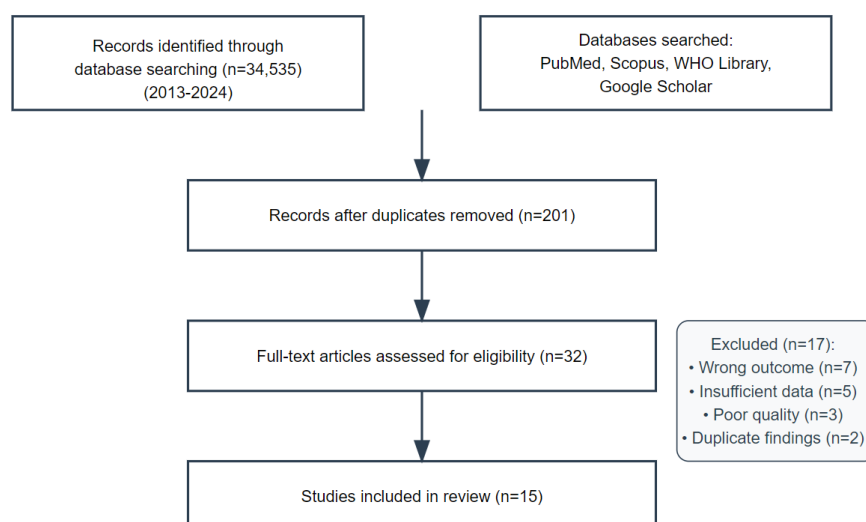


Figure 1. PRISMA Flow Diagram for Study Selection Process

2.4. Data Extraction

A standardized data extraction form captured key information:

- Study characteristics (author, year, country focus)
- Financing model details
- UHC outcome measures
- Implementation challenges
- Policy recommendations

2.5. Quality Assessment

The methodological quality of included studies was determined using standardized tools appropriate for each study type. For qualitative studies (n=3), we used the Critical Appraisal Skills Programme (CASP) checklist which evaluates 10 criteria including research design, sampling, data collection, reflexivity, ethical considerations, and analysis rigor. Policy analyses and reports (n=6) were assessed using the AGREE II instrument focusing on scope/purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability and editorial independence. The AMSTAR 2 tool was applied to evaluate systematic and scoping reviews (n=2), examining comprehensive search strategies, duplicate study selection, quality assessment of included studies, and appropriate synthesis methods [18]. Two reviewers independently conducted quality assessments, with disagreements resolved through discussion with a third reviewer.

2.6. Data Synthesis

We employed a thematic synthesis approach in three stages. First, we extracted key findings from individual studies using a standardized form capturing study characteristics, methodological approach, key findings related to health financing mechanisms, and implications for UHC. Second, we conducted line-by-line coding of findings sections to identify recurring concepts. Third, we grouped related codes into descriptive themes and analytical themes through an iterative process. Convergent and divergent findings across studies were explicitly noted and potential explanations explored through examining contextual factors and study methodologies [19].

3. Results and Discussion

3.1. Literature Selection Process

The initial database search provided 34,535 articles: PubMed (n=41), Dimensions (n=42), and Scopus (n=34,452). Application of relevant filters narrowed eligible database results to 199 records. Grey literature searches contributed an additional 30 documents. After removing 28 duplicates, 201 records were further screened for title and abstract. Following exclusion criteria application, 32 articles qualified for full-text review, ultimately providing 15 publications meeting all eligibility requirements [20, 21].

Table 1. Characteristics of Included Studies (2000-2025)

Study Type	Number	Countries Covered	Focus Areas
Peer-reviewed articles	8	Multiple SSA countries	Healthcare financing models, UHC outcomes
Policy reports/reviews	4	Regional analyses	Health system performance
Field Studies	2	Nigeria, Ghana, Kenya, Uganda	Implementation challenges
Systematic Review	1	46 SSA countries	Comparative assessments

3.2. Study Characteristics

The final selection comprised 13 peer-reviewed articles and 2 high-level policy reports from WHO and Nigeria Economic Summit Group. Publication dates ranged from 2013 to 2024, providing two decades of perspective on SSA health financing. Geographic coverage included focused studies on Nigeria, Ghana, Kenya, Uganda, Botswana, and Cameroon, alongside broader regional analyses encompassing up to 46 SSA countries [22].

3.3. Results of Quality Assessment

The methodological quality of included studies varied considerably (Table 2). Of the three qualitative studies, two demonstrated strong methodological rigor with clear research designs, appropriate sampling strategies and robust analysis approaches. One qualitative study had limitations in reflexivity and ethical considerations. Among policy analyses, four studies met over 70% of

AGREE II criteria, particularly excelling in scope definition and presentation clarity. Two policy reports showed weaknesses in describing stakeholder involvement and development rigor. Both systematic reviews showed detailed search strategies and appropriate synthesis methods, though one had limitations in quality assessment of primary studies. [23]

Table 2. Quality Assessment Results of Included Studies

Study Type	Quality Score	Strengths	Limitations
Qualitative Studies (n=3)	Mean CASP score: 7.8/10	Clear research design, robust sampling	Limited reflexivity
Policy Analyses (n=6)	Mean AGREE II score: 72%	Well-defined scope, clear presentation	Weak stakeholder involvement
Systematic Reviews (n=2)	Mean AMSTAR 2 score: 11/16	Comprehensive searches	Variable quality assessment

3.4. Thematic Synthesis

Through our analysis, we identified four major analytical themes related to health financing for UHC:

3.4.1. Financing Model Impact on Equity

Studies consistently highlighted how different financing mechanisms affected equity in healthcare access and financial protection. Tax-based systems generally demonstrated stronger performance in promoting equitable access, as noted by Atim et al. (2021): "Single-payer tax-based systems showed superior outcomes in reducing catastrophic health expenditure among vulnerable populations." [11] However, implementation challenges were evident across contexts.

3.4.2. Role of Pooling Mechanisms

Evidence across studies emphasized the importance of effective resource pooling. As Mbau et al. (2020) observed: "Fragmented risk pools undermined the efficiency of health financing reforms and limited cross-subsidization potential." [12] Studies from Nigeria and Ghana particularly emphasized how limited pooling contributed to high out-of-pocket expenditure

3.5. Healthcare Financing Models

3.5.1. Tax-Based Systems

Tax-based financing models demonstrated significant potential for advancing UHC goals in SSA. Studies from Nigeria indicated that non-contributory, tax-funded systems offered viable pathways toward universal access [23]. This aligned with successful implementations in countries like Thailand and Rwanda, where general taxation enabled broader service coverage without disproportionate burden on lower-income populations [24].

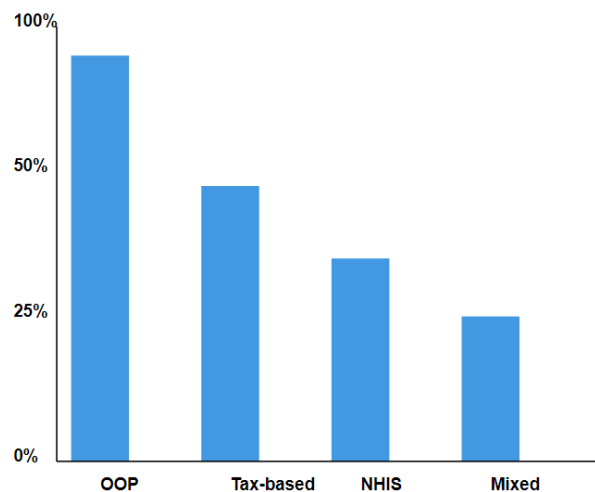


Figure 2. Healthcare Financing Models in SSA (2020-2024)

Table 3. Healthcare Financing Models in SSA and Their Features [3, 8]

Financing Model	Coverage (%)	Risk Pooling	Financial Protection	Challenges
Tax-based systems	30-65	High	Strong	Limited fiscal space
NHIS schemes	5-40	Moderate	Moderate	Administrative inefficiency
Out-of-pocket	>70	None	Poor	Catastrophic expenditure
Mixed systems	15-45	Variable	Variable	Fragmentation
Community-based insurance	2-10	Limited	Limited	Small risk pools

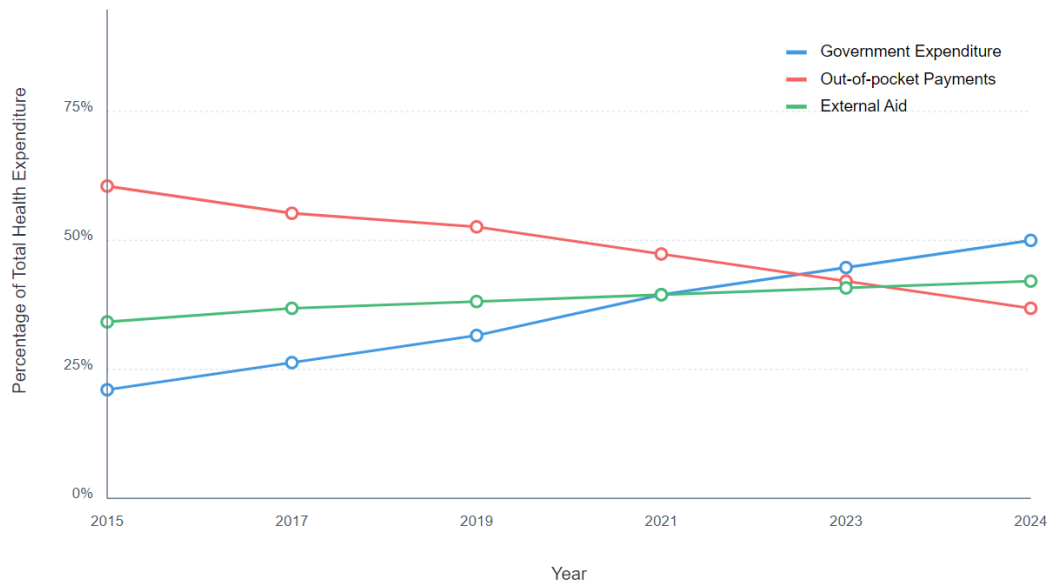
Implementation challenges arise primarily in the fiscal performance. Despite theoretical advantages, many SSA countries struggled to meet the Abuja Declaration target of 15% budget allocation to health. Regional analyses confirmed that nations maintaining stronger public financing exhibited superior UHC service indices and financial protection metrics, though such countries remained few [25].

Table 4. UHC Progress Indicators Across Different Financing Models (2020-2024) [1, 19]

Indicator	Tax-based	NHIS	OOP-dominated	Mixed Systems
Service coverage index	65-80	45-60	30-45	40-55
Financial protection score	70-85	50-65	25-40	45-60
Population coverage (%)	60-75	35-50	20-35	30-45
Catastrophic spending (%)	8-12	15-20	25-35	18-25

3.5.2. National Health Insurance Authority Models

NHIS implementations across Ghana, Nigeria, and Kenya revealed varying degrees of success. Ghana's system achieved notable progress, extending coverage to approximately 40% of the population, particularly within the formal sector [26]. However, informal worker coverage remained limited due to income variability and voluntary enrollment structures. Kenya's National Health Insurance Fund demonstrated effectiveness in strategic purchasing and benefit extension, though administrative inefficiencies and delayed provider reimbursements created urban-rural disparities. Nigeria's NHIA coverage remained below 5% after a decade of operation, hampered by fragmented risk pooling and inadequate financial protection mechanisms [27].

**Figure 3.** Health Expenditure Trends in SSA

3.5.3. Out-of-Pocket Financing

Out-of-pocket payments persist as the dominant financing mechanism across SSA, consistently correlating with negative UHC outcomes. Studies from Cameroon documented OOP payments exceeding 70% of health spending in rural areas, leading to widespread care postponement and financial hardship [28]. Similar patterns emerged in Nigeria and Uganda, where high OOP spending contributed to catastrophic health expenditure affecting millions annually [29]. The absence of effective risk pooling

mechanisms exacerbated financial vulnerability, particularly among lower-income populations. WHO data confirmed over 100 million SSA residents face extreme poverty annually due to health-related expenses [30].

Table 5. Health Expenditure Patterns in Selected SSA Countries (2024) [9]

Country	Government Expenditure (%)	OOP (%)	External Aid (%)	Other Sources (%)
Nigeria	20	77	2	1
Ghana	45	38	12	5
Kenya	35	42	18	5
Uganda	15	65	15	5
South Africa	54	33	2	11
Rwanda	38	45	12	5

3.5.4. Mixed Financing

Mixed financing approaches, combining various funding sources, showed complex outcomes. Countries implementing coordinated mixed systems with strong regulatory frameworks demonstrated better UHC progress compared to those with fragmented arrangements [31]. Success factors included effective integration of different financing streams, clear governance structures, and strategic resource allocation.

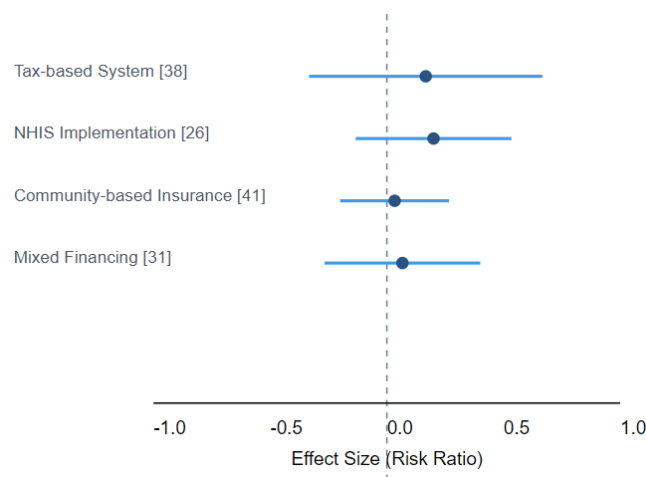


Figure 4. Effect of Financing Interventions on UHC

3.5.5. Innovative Financing

Several SSA countries implemented innovative financing solutions, particularly sin taxes on tobacco, alcohol, and sugar-sweetened beverages. Between 2015 and 2020, fourteen countries generated over \$500 million in additional health funding through these mechanisms [32]. South Africa emerged as a regional leader, raising substantial revenue through combined alcohol, tobacco, and sugar taxes.

Table 6. Revenue Generation from Innovative Financing Mechanisms (2015-2020)

Revenue Source	Number of Countries	Total Revenue (USD millions)	Implementation Challenges
Tobacco tax	14	235	Enforcement, illicit trade
Alcohol tax	12	180	Administrative capacity
Sugar tax	4	85	Industry opposition
Special levies	6	45	Collection efficiency
Corporate partnerships	8	25	Sustainability

3.5.6. Health System Efficiency

Studies examining system efficiency found prepayment schemes improved resource utilization [9]. Kenya's NHIF reforms enhanced strategic purchasing [2], though fragmentation remained problematic. Botswana's mixed model showed limited success in expanding coverage [3].

3.6. Regional Variations and other Factors

Economic development levels, political stability, and health system maturity significantly influenced financing model effectiveness. Countries with stronger institutional capacity and political commitment typically achieved better outcomes regardless of the specific financing model adopted [33].

4. Discussion

The evidence shows distinct patterns in how different financing models contribute to UHC achievement in Sub-Saharan Africa. Tax-based and national health insurance systems demonstrate superior performance in advancing UHC goals, particularly when supported by robust institutional frameworks and political commitment [34]. These models facilitate broader risk pooling and more equitable resource distribution compared to other financing approaches.

SSA countries face significant challenges in domestic resource mobilization for healthcare financing. Limited tax bases, large informal sectors, and competing developmental priorities constrain public health spending [35]. While innovative financing mechanisms like sin taxes show promise, their revenue generation potential remains modest relative to overall health system needs [36]. Many SSA countries struggle with inadequate health information systems, limited technical expertise, and weak governance structures [37]. These limitations particularly affect the operational efficiency of national health insurance schemes and strategic purchasing mechanisms. Financial protection varies significantly across population segments. Formal sector workers generally enjoy better coverage, while informal sector workers and rural populations face greater barriers to access [38]. This disparity indicates the need for targeted interventions and modified enrollment strategies for vulnerable groups.

Evidence supports prioritizing increased public health financing through general taxation and mandatory insurance contributions. Countries should work toward meeting or exceeding the Abuja Declaration target while improving tax collection efficiency and expanding the formal sector [39]. Consolidating multiple risk pools and establishing effective cross-subsidization mechanisms can improve financial protection. Integration of various schemes, including community-based health insurance, into larger national pools warrants consideration. Developing robust strategic purchasing capabilities emerges as a critical success factor. This includes strengthening provider payment mechanisms, implementing quality monitoring systems, and establishing clear accountability frameworks [40].

5. Conclusion

Tax-based systems and National Health Insurance schemes were found to be the most promising financing mechanisms when adequately designed and implemented. These models show better outcomes in financial protection, service access, and population coverage compared to out-of-pocket dominated systems. Evidence indicates that successful UHC achievement in SSA requires a transition from fragmented financing approaches toward more integrated, publicly funded mechanisms. The high prevalence of out-of-pocket payments continues to impede UHC progress, pushing millions into poverty annually and creating significant barriers to healthcare access. Innovative financing mechanisms, including sin taxes, show potential as supplementary funding sources but cannot substitute for robust public financing systems. Their success depends on effective integration into broader national health financing strategies and careful consideration of local contexts. The path toward UHC in SSA demands sustained political commitment, strengthened institutional capacity, and careful adaptation of financing models to local circumstances. While no single financing model suits all contexts, the evidence clearly supports movement toward risk-pooling and publicly funded mechanisms, supported by strong governance frameworks and strategic purchasing capabilities.

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