

Innovative Health Education Strategies for Addressing Economic Barriers to Non-Communicable Disease Control in Rural North Central Nigeria

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Abstract

This paper examines the economic, behavioural, and health-system barriers to non-communicable disease (NCD) prevention and control in rural North Central Nigeria, where hypertension and diabetes are increasingly prevalent. High out-of-pocket payments, poverty, travel costs, productivity losses, weak insurance coverage, limited diagnostics, and medicine stock-outs expose households to catastrophic expenditure and delay screening, treatment, and adherence. Low health literacy, cultural misconceptions, geographic isolation, and under-supported primary healthcare further reinforce reliance on costly late-stage care. Drawing on evidence from Nigeria and sub-Saharan Africa, the paper applies the Health Belief Model, Social Cognitive Theory, and Freire's Pedagogy of the Oppressed to propose a community-centred prevention package. The package combines trained Community Health Extension Workers and peer educators; culturally and linguistically tailored radio campaigns reinforced through listening groups; and multisectoral initiatives including screening days, savings or micro-insurance schemes, school clubs, community gardens, physical-activity groups, and SMS follow-up. These strategies aim to improve risk awareness, self-efficacy, early detection, medication adherence, affordable lifestyle practices, and ownership. The paper recognises that effectiveness is context-dependent and requires sustained financing, supplies, supervision, incentives, coordination, culturally responsive participation, and public-private partnerships. It recommends institutionalising them in primary healthcare structures, alongside monitoring of equity, coverage, behaviours, catastrophic spending, and cost-effectiveness to support scale-up.

Keywords: Non-communicable diseases, Economic barriers, Health education, Innovative strategies, Rural Nigeria

Background

Non-communicable diseases (NCDs), particularly hypertension, diabetes mellitus, cancers, and chronic respiratory diseases, have emerged as a major public health threat in low- and middle-income countries (LMICs). Globally, NCDs account for approximately 74-75% of all deaths, with 18 million premature deaths (before age 70) recorded in 2021, 82% of which occurred in LMICs (World Health Organization [WHO], 2023). Nigeria exemplifies this epidemiological transition, experiencing a double burden in which NCDs coexist with persistent communicable diseases. NCDs now contribute to 27-30% of total national mortality, with significant increases in disability-adjusted life years driven by urbanisation, dietary shifts toward processed foods high in salt, sugar, and unhealthy fats, widespread physical inactivity, tobacco and alcohol use, and population ageing (WHO, 2023).

This rising national burden is felt with particular intensity in rural communities across the North Central geo-political zone of Nigeria. The zone comprises Benue, Kogi, Kwara, Nasarawa, Niger, Plateau, and the Federal Capital Territory (FCT). Community-based studies and national pooled estimates indicate hypertension prevalence ranging from 26% to 38% in parts of the region, while national figures stand at 32-34% (Adeloye et al., 2021). Diabetes prevalence is estimated at 5.7-7% nationally, though rural detection remains critically low due to limited screening services (Olamoyegun et al., 2024; Uloko et al., 2018). Awareness, treatment, and control rates are alarmingly poor often below 30%, 12%, and 3% respectively indicating that prevalence statistics alone mask a deeper public health emergency (Adeloye et al., 2021; WHO, 2023). Comorbidities are common and drive high rates of preventable complications such as stroke, chronic kidney disease, and cardiovascular events.

The health burden is severely amplified by profound economic barriers. Out-of-pocket (OOP) payments dominate Nigeria's health financing, constituting over 70% of total health expenditure. Odunyemi et al. (2023) reported that households affected by NCDs spend an average of ₦122,313 annually on care approximately 24% of household food expenditure with medications as the primary cost driver. Consequently, about 30% of NCD-affected households experience catastrophic health expenditure (CHE) at the 40% non-food threshold, with rural households facing even higher risks (up to 35%). Additional indirect costs, including transportation to distant facilities, lost agricultural productivity, and private pharmacy purchases due to frequent stock-outs, further escalate financial strain (Odunyemi, 2024; Odunyemi et al., 2023).

These economic pressures create a vicious, self-reinforcing cycle: poverty restricts access to nutritious foods, regular screening, and consistent treatment, while unmanaged NCDs accelerate complications, deepen impoverishment, and erode household resilience. The National Health Insurance Scheme offers limited protection in rural areas, where enrolment remains below 5% due to awareness gaps, administrative barriers, and unaffordable contributions. Indirect productivity losses estimated at ₦36,150 per individual annually are particularly devastating in agrarian economies where daily manual labour sustains livelihoods. Without effective financial risk protection, NCDs continue to transmit poverty across generations and undermine national development goals.

Compounding these economic challenges are significant gaps in health literacy, behaviour, and health systems. Many rural residents demonstrate low health literacy and hold cultural misconceptions, such as viewing hypertension as a spiritual affliction rather than a lifestyle-related condition (Fenta et al., 2024). This results in delayed care-seeking, poor understanding of modifiable risk factors (high-salt diets, sedentary behaviour, tobacco use), and preference for traditional healing practices. Existing health education programmes are largely urban-biased, short-term, and donor-driven, with minimal integration into community structures such as farmers' cooperatives, women's groups, or religious institutions. Geographic isolation, poor infrastructure, and linguistic diversity further hinder effective message dissemination (Chiweta-Oduah, 2025).

Systemic weaknesses further exacerbate these problems. Nigeria's National Multi-Sectoral Action Plan for NCDs (2019-2025) emphasises prevention and task-shifting, yet implementation in rural areas remains weak. The key systemic issues include chronic underfunding of primary healthcare, frequent medicine stock-outs, shortages of trained staff, inadequate diagnostic tools, fragmented referral systems, and weak supportive supervision of community-level workers. Behavioural gaps including low consumption of fruits and vegetables, high sedentary behaviour even among rural populations, and poor medication adherence persist. Low health literacy reduces perceived susceptibility, severity, and self-efficacy, while negative experiences with the health system erode trust and utilisation (Fenta et al., 2024).

Critically, the NCD crisis in rural North Central Nigeria reflects not only rising prevalence but a systemic failure to translate available knowledge into equitable, sustainable action. Lifestyle transitions from labour-intensive subsistence farming to more sedentary trading are occurring without corresponding preventive infrastructure or support. Conventional facility-based, curative-oriented models have proven financially unsustainable and poorly adapted to rural realities. While some

community health worker interventions have shown short-term promise, many fail due to inadequate supervision, resource constraints, and lack of community ownership (Okoroafor et al., 2023).

In this context, innovative health education refers to low-cost, theory-driven, community-centred approaches that move beyond traditional facility-based health talks. Such approaches leverage existing social structures, local communication channels, and participatory methods to build knowledge, self-efficacy, and collective action around affordable NCD prevention. They prioritise early detection, lifestyle modification using locally available resources, and reduced reliance on expensive curative care. Against this background, the present paper critically examines the complex interplay of economic, behavioural, and structural barriers to NCD control in rural North Central Nigeria. It then proposes a package of innovative, low-cost health education strategies centred on community peer educators, radio-based mass media campaigns, and integrated multi-sectorial initiatives designed to shift the paradigm from expensive curative care toward empowered, sustainable prevention. Grounded in the Health Belief Model, Social Cognitive Theory, and Freire's Pedagogy of the Oppressed, these strategies aim to enhance perceived benefits and self-efficacy, promote affordable preventive behaviours, foster critical consciousness, and reduce household economic vulnerability.

Theoretical Framework

This paper is anchored on a multi-theoretical framework that integrates the Health Belief Model (HBM), Social Cognitive Theory (SCT), and Paulo Freire's Pedagogy of the Oppressed. These complementary theories provide a robust lens for understanding and addressing economic barriers to non-communicable disease (NCD) prevention and control in rural North Central Nigeria.

The Health Belief Model (Rosenstock, 1974), one of the most widely applied theories in health education and promotion, posits that individuals are more likely to engage in health-promoting behaviours when they perceive themselves as susceptible to a condition (perceived susceptibility), believe the condition has serious consequences (perceived severity), recognise the benefits of taking action (perceived benefits), and perceive fewer barriers to action than benefits (Rosenstock, 1974; Champion & Skinner, 2008). In the context of rural North Central Nigeria, economic barriers such as high out-of-pocket costs for medications, transport, and lost productivity significantly heighten perceived barriers, while low health literacy reduces perceived susceptibility and benefits of preventive actions like dietary modification or regular screening. Cues to action (e.g., radio messages or peer

educator visits) and self-efficacy (confidence in performing behaviours despite resource constraints) are critical constructs that the proposed strategies aim to strengthen (Hareru et al., 2024; Wang et al., 2022).

Complementing the HBM is Bandura's Social Cognitive Theory (1986), which emphasises the reciprocal interaction between personal factors, behaviour, and the environment. Key constructs include observational learning, self-efficacy, outcome expectations, and social support. Peer educators and community health extension workers (CHEWs) serve as credible role models, enabling observational learning of affordable preventive behaviours such as home gardening, walking groups, or salt reduction using local ingredients. SCT is particularly relevant in collectivist rural settings where community norms and social modelling strongly influence individual behaviour change (Sebastian et al., 2021; Thojampa, 2019). By building self-efficacy through skill-building and small successes, the model helps overcome economic barriers by demonstrating that low-cost, locally feasible actions can yield significant health gains.

The third pillar draws from Paulo Freire's Pedagogy of the Oppressed (1970/2000), which advocates for critical consciousness, dialogue, and participatory education. Rather than adopting a "banking model" of top-down information transfer, Freirean approaches position community members as active subjects who critically reflect on their realities including poverty-driven barriers to NCD care and collectively develop solutions. This is highly suitable for rural North Central Nigeria, where participatory methods involving farmers' groups, women's cooperatives, and religious gatherings can foster ownership and sustainability of health initiatives (Brouse, n.d.; Chávez, 2006).

Together, these frameworks support community-led strategies that reduce perceived economic barriers through empowerment, build self-efficacy via peer modelling and practical skills, and promote critical awareness of structural determinants of health. They align with Nigeria's National Multi-Sectorial Action Plan for NCDs, which emphasises community participation and task-shifting, and with WHO "best buys" that prioritise low-cost, high-impact interventions such as health education and mass media campaigns (WHO, 2023).

Innovative Health Education Strategies for Addressing Economic Barriers to NCD Control

Building on the documented high burden of NCDs, severe economic barriers causing catastrophic health expenditure, and critical health literacy gaps in rural North Central Nigeria, this section proposes a theory-driven package of innovative, low-cost health education strategies. Grounded in the Health Belief Model, Social Cognitive Theory, and Freire's Pedagogy of the Oppressed, these community-

centred interventions seek to enhance self-efficacy, promote affordable preventive behaviours, and shift households from reactive, impoverishing curative care to proactive, sustainable prevention.

Community Peer Education and Task-Sharing Programmes

Community Health Extension Workers (CHEWs) and trained peer educators (youth, farmers, women leaders, and respected elders) constitute the cornerstone of a scalable, culturally appropriate, and cost-effective workforce for NCD prevention and control in rural North Central Nigeria. Already embedded in primary healthcare structures, these lay and mid-level workers can be empowered to deliver targeted health education, basic screening (blood pressure and glucose), and behaviour-change support, thereby reducing reliance on expensive facility-based services (Ajisegiri et al., 2023; Oseni, 2024).

A focused 5-7-day initial training curriculum, supplemented by quarterly refreshers, should equip them with essential knowledge on NCD epidemiology, modifiable risk factors, affordable preventive practices (such as home gardening, walking groups, and local salt reduction), basic screening skills, medication adherence counselling, and referral pathways. Training should utilise pictorial aids, role-playing, and local languages (Hausa, Gbagyi, Nupe, and others as appropriate) to ensure cultural relevance and accessibility.

Peer educators should be assigned 2-4 per political ward and seamlessly integrated into existing primary healthcare and agricultural extension services. Their core activities include household visits, market outreaches, and group sessions in cooperatives, mosques, and churches, with follow-up support for patients on treatment. Sustainability is enhanced through monthly supervision, modest performance incentives, and linkage with community savings groups to establish micro-health funds for medicines and transport (Ajisegiri et al., 2023; Yenit et al., 2023).

Empirical evidence from Nigeria and sub-Saharan Africa supports this approach. Peer-led interventions have significantly improved knowledge, screening uptake, treatment adherence, and clinical outcomes for hypertension and diabetes at relatively low cost (Ajisegiri et al., 2023; Jeet et al., 2017). In rural settings, the trust and reliability of peer educators particularly amplify effectiveness. However, success critically depends on consistent supervision, supplies, and incentives; poorly resourced programmes often suffer from high attrition and limited long-term impact. When well-supported, this strategy directly mitigates economic barriers by promoting early detection and affordable lifestyle changes that prevent costly complications.

Radio-Based Mass Media and Complementary Communication Campaigns

Radio remains one of the most penetrating and cost-effective channels for health education in rural North Central Nigeria, where battery- and solar-powered radios enjoy widespread ownership and listenership across diverse linguistic and socioeconomic groups. Sustained, culturally tailored mass media campaigns can raise perceived susceptibility and severity (Health Belief Model), model positive behaviours (Social Cognitive Theory), and stimulate community dialogue (Freirean approach), thereby addressing widespread myths and low health literacy (Obada et al., 2024; WHO, 2023).

Key components include strategic partnerships with local radio stations in Minna, Lokoja, Jos, and other zonal hubs for the development and broadcast of serial family dramas depicting relatable stories of NCD management through lifestyle changes; short jingles and expert talk shows on affordable diets (millet, sorghum, vegetables, and legumes), physical activity integrated into daily farming life, danger signs, and timely care-seeking; and interactive phone-in segments for listener questions. Campaigns should span 12–24 months with daily or high-frequency slots, reinforced by community listening groups co-facilitated by peer educators to deepen engagement and behavioural reinforcement. Evaluation should combine pre- and post-intervention listener surveys, call-in analytics, and qualitative focus group discussions (Obada et al., 2024).

The World Health Organization identifies mass media campaigns as a core “best buy” for NCD prevention due to their broad reach and favourable cost-effectiveness. Similar initiatives across Africa have successfully reduced risk factors and improved health-seeking behaviours, particularly when combined with community-level follow-up (National Multi-Sectorial Action Plan for NCDs, 2019; Obada et al., 2024). In rural North Central Nigeria, this strategy directly counters economic barriers by reaching remote populations without requiring expensive travel or facility visits, while normalising preventive behaviours that reduce long-term household expenditure.

Integrated Multi-Sectorial Community Initiatives for Sustainability

To maximise synergy and long-term viability, peer education and radio campaigns should be embedded within broader integrated initiatives. These include quarterly community-based screening and health promotion days led by CHEWs and peer educators; promotion of village health savings schemes and cooperative micro-insurance models to buffer against catastrophic costs; integration of NCD education into secondary school curricula through peer-to-peer clubs and whole-school approaches; and lifestyle support programmes such as community gardens and exercise groups linked with agricultural extension

services to promote local production and consumption of nutritious crops. Where network coverage permits, supplementary SMS reminders via telecom partnerships can support medication adherence and follow-up appointments.

These integrated mechanisms reduce reliance on curative hospital care by fostering community ownership, generating local resources, and creating supportive environments for sustained behaviour change. They align with Nigeria's decentralised health system and multi-sectorial NCD policy frameworks, leveraging existing structures in health, agriculture, education, and community development for cost-efficiency and scalability.

Discussion

The innovative health education strategies proposed in this paper community peer education, radio-based campaigns, and integrated multi-sectorial initiatives collectively represent a necessary paradigm shift from Nigeria's predominantly facility-based, curative-oriented approach to a proactive, community-driven prevention model. By directly addressing the economic barriers of high out-of-pocket expenditures, catastrophic health spending, and productivity losses documented earlier, these interventions seek to lower perceived barriers (Health Belief Model), enhance self-efficacy through modelling and skill-building (Social Cognitive Theory), and foster critical consciousness regarding structural determinants of health (Freire's Pedagogy of the Oppressed). In theory, they should yield higher early detection rates, improved adherence to low-cost lifestyle modifications, fewer expensive complications, and reduced household impoverishment, thereby advancing health equity and supporting Sustainable Development Goals 3 and 10.

However, a critical examination of evidence from Nigeria and sub-Saharan Africa reveals a more nuanced picture. While many community health worker (CHW) and peer-led interventions have demonstrated success in improving knowledge, screening uptake, and short-term clinical outcomes for hypertension and diabetes (Ajisegiri et al., 2023; Jeet et al., 2017), results are not uniformly positive. Some studies report no significant blood pressure reductions or effects limited to specific subgroups (e.g., younger adults), while others highlight risks of variable care quality when CHWs operate beyond formal scopes due to systemic gaps (Ajisegiri et al., 2023). Success has often depended on intensive supervision, consistent supplies, and performance incentives elements frequently absent in underfunded rural programmes. Failures commonly stem from inadequate training, equipment shortages, weak

supervision, and overburdening of already stretched CHWs, leading to burnout and diminished effectiveness (Mhlanga et al., 2025; Okoroafor et al., 2023).

Similarly, radio-based mass media campaigns have shown promise in raising awareness and influencing behaviours when culturally tailored and sustained, yet their impact is frequently limited by one-way communication, competing messages in saturated media environments, and poor translation into sustained behaviour change without complementary community reinforcement (Obada et al., 2024). In some Nigerian contexts, radio messages have had minimal influence on preventive practices due to low audience engagement, power supply issues, and cultural resistance. Integrated multi-sectoral models face additional challenges, including inter-cadre rivalry, political interference, and difficulties sustaining public–private partnerships beyond donor funding cycles.

These contradictions underscore that intervention success is highly context-dependent. Programmes that succeeded typically featured strong community ownership, continuous supportive supervision, integration into existing structures, and adaptive management. Conversely, top-down or poorly resourced initiatives often failed to achieve lasting impact. This paper’s proposed model attempts to mitigate these pitfalls through explicit emphasis on supervision, train-the-trainer approaches, micro-health funds, and multi-stakeholder coordination. Nevertheless, without addressing deeper systemic issues such as chronic underfunding, weak governance, and gender/power dynamics in community participation, the strategies risk replicating documented shortcomings.

Implementation Considerations, Monitoring, Evaluation, Challenges, and Mitigation

Successful implementation demands more than technical design; it requires deliberate attention to political economy, health system readiness, and adaptive management. Strong coordination among Local Government Areas, Primary Healthcare Boards, traditional/religious leaders, NGOs, and academic institutions (e.g., Federal University of Education, Kontagora) is essential. Monitoring and evaluation should extend beyond basic tools such as knowledge-attitude-practice (KAP) surveys, screening coverage, self-reported behaviours, and catastrophic health expenditure incidence. Rigorous, embedded designs—including quasi-experimental, stepped-wedge, or hybrid effectiveness-implementation studies conducted in partnership with universities will be critical for generating credible evidence on cost-effectiveness, equity impacts, and scalability in North Central contexts.

Key challenges include funding volatility, cultural and religious sensitivities, low literacy, remote logistics, task-shifting resistance, and potential overburdening of CHWs. Evidence from similar African

programmes shows that inadequate supervision and supplies often lead to inconsistent quality and eventual programme fatigue (Ajisegiri et al., 2023; Mhlanga et al., 2025). Mitigation strategies should therefore be proactive: sustained advocacy for ring-fenced budgetary lines, formal integration of peer educators into the health workforce with commensurate incentives, active engagement of traditional and religious leaders as co-owners rather than mere champions, and development of contextually adapted materials. Public–private partnerships must be carefully structured with clear accountability mechanisms to avoid dependency and ensure alignment with public health goals. Train-the-trainer models can aid multiplication of capacity, but only if accompanied by quality assurance systems.

Ultimately, while the proposed strategies hold considerable promise, their effectiveness will hinge on addressing implementation science gaps. Policymakers must move beyond pilot enthusiasm toward institutionalised, adequately resourced, and continuously evaluated programmes. Only through such rigorous, adaptive approaches can these interventions deliver meaningful, sustainable reductions in the economic and health burdens of NCDs in rural North Central Nigeria.

Conclusion

In conclusion, the escalating burden of non-communicable diseases and severe economic barriers in rural North Central Nigeria underscore the urgent need for innovative, low-cost interventions. High out-of-pocket expenditures, catastrophic health spending, and low health literacy form a self-reinforcing cycle that deepens household impoverishment. Grounded in relevant health promotion theories and supported by evidence from peer-led and mass-media interventions in Nigeria and similar settings, the proposed community peer education programmes, radio-based campaigns, and integrated multi-sectoral initiatives offer a coherent package of solutions. By promoting early detection, affordable lifestyle modifications, medication adherence, and community ownership, these strategies can reduce the incidence of costly complications, lower the frequency of impoverishing health expenditures, and decrease dependence on expensive curative care. In this way, innovative health education does not eliminate catastrophic health spending overnight, but it can substantially mitigate it over time by shifting the balance from late-stage treatment toward prevention and early, low-cost management. When adequately resourced, supervised, and integrated into existing community and primary healthcare structures, such approaches hold strong potential to improve NCD outcomes and advance health equity in resource-constrained rural settings.

Recommendations

Based on the analysis presented in this paper, the following recommendations are proposed:

1. **Policy and Funding Support:** Federal and state governments, particularly those covering Benue, Kogi, Kwara, Nasarawa, Niger, Plateau, and the FCT, should prioritise dedicated budgetary allocations for NCD prevention within the National Multi-Sectoral Action Plan. This includes sustained funding for community peer educator programmes and radio-based mass media campaigns. Policymakers should also integrate NCD health education into existing primary healthcare, agricultural extension, and community development policies to ensure mainstreaming and sustainability.
2. **Strengthening Community Peer Education Programmes:** Local Government Areas and Primary Healthcare Boards should recruit, train, and deploy Community Health Extension Workers (CHEWs) and peer educators (youth, women, and farmers) as the frontline workforce. A standardised 5–10-day training curriculum focusing on NCD risk factors, affordable prevention, basic screening, and behaviour-change communication should be institutionalised, with quarterly refresher training and performance-based incentives. Peer educators should be integrated into ward-level health teams and linked with community savings groups to establish micro-health funds.
3. **Mass Media and Communication Strategies:** The Federal Ministry of Health and state ministries should partner with local radio stations in Minna, Jos, Lokoja, and other hubs to implement sustained, culturally tailored NCD awareness campaigns in Hausa, Gbagyi, Nupe, and other local languages. These campaigns should run for a minimum of 12-24 months and be reinforced through community listening groups facilitated by peer educators.
4. **Integrated Community Initiatives:** Stakeholders should promote quarterly community screening days, school-based NCD peer education clubs, community gardens, and physical activity groups linked with agricultural programmes. Village health savings schemes and cooperative models should be encouraged to reduce catastrophic health expenditure and improve access to essential medicines.
5. **Public-Private Partnerships and Sustainability:** Governments should actively forge partnerships with telecommunications companies, NGOs, pharmaceutical firms, and academic institutions (such as the Federal University of Education, Kontagora) to provide subsidies, airtime, essential drugs, and technical support. Train-the-trainer models and community ownership mechanisms should be adopted to ensure long-term programme sustainability.

6. Monitoring, Evaluation, and Research: Robust monitoring frameworks using simple indicators such as knowledge-attitude-practice scores, screening coverage, medication adherence, and household catastrophic health expenditure should be established. Collaboration with universities and research institutions is recommended to conduct rigorous quasi-experimental and cost-effectiveness studies on integrated peer-radio-community models in rural North Central Nigeria.
7. Community Engagement and Equity: Traditional rulers, religious leaders, and women's groups should be actively involved as co-owners and champions to enhance cultural acceptability and participation. Special attention should be given to vulnerable groups, including the elderly, women, and low-income households, to promote health equity.

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