RESEARCH PAPER

Health Insurance as a Pathway Out of Poverty: Evaluating Financial Risk Protection for low- and middle-income countries.

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Abstract

Background:
Low- and middle-income countries (LMICs) continue to face the dual challenge of expanding healthcare access while safeguarding households from the impoverishing effects of out-of-pocket (OOP) health expenditures. Financial risk protection (FRP)—the ability to obtain needed healthcare without incurring catastrophic or impoverishing costs—is central to universal health coverage (UHC) and poverty reduction. This study evaluates the relationship between health insurance coverage and household poverty status, examining both direct and mediated effects through OOP and catastrophic health expenditures (CHE).

Methods:
A cross-sectional analytical study was conducted using data from 2,000 households across LMICs. Multistage stratified random sampling ensured proportional representation of socioeconomic and regional diversity. Correlation analysis, binary logistic regression, and structural equation modeling (SEM) were applied to examine the association between insurance coverage, income, education, family size, and poverty. Mediation analysis further explored indirect pathways through OOP and CHE.

Results:
Insurance coverage exhibited a significant inverse relationship with poverty ($\beta = -0.68$, $p < 0.01$), reducing the likelihood of falling below the poverty line by nearly 49%. Higher household income and education levels were associated with reduced poverty odds ($\beta = -0.0023$ and $\beta = -0.14$, respectively), while larger family size increased poverty risk ($\beta = +0.11$). SEM demonstrated good model fit (RMSEA = 0.045, CFI = 0.94, TLI = 0.92), and mediation analysis confirmed significant indirect effects of health insurance through OOP (-0.12, $p = 0.002$) and CHE (-0.09, $p = 0.004$).

Conclusion:
Health insurance substantially reduces poverty both directly and indirectly by mitigating catastrophic and out-of-pocket expenditures. These findings affirm the critical role of health insurance as a mechanism for financial risk protection and sustainable poverty alleviation in LMICs. Strengthening insurance coverage, particularly among low-income and rural populations, is vital for advancing UHC and inclusive economic growth.

Keywords: Health Insurance, Financial Risk Protection, Poverty Alleviation, Out-of-Pocket Expenditure, Universal Health Coverage, Low- and Middle-Income Countries

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Introduction

Poverty and ill-health remain mutually reinforcing challenges in low- and middle-income countries (LMICs), where healthcare expenses often impose severe financial strain on households. In many LMICs, out-of-pocket (OOP) spending constitutes over 40% of total health expenditure, leading millions of households into catastrophic or impoverishing health-related debt annually (Xu et al., 2023). Health insurance—public, social, or community-based—has thus emerged as a cornerstone of financial risk protection (FRP) and universal health coverage (UHC), aiming to shield households from the financial consequences of illness (Kruk & Pate, 2021; Wagstaff & Flores, 2024).

Recent evidence (2020–2026) demonstrates that effective health insurance mechanisms can significantly reduce catastrophic health expenditures (CHE), improve healthcare utilization, and enhance socioeconomic stability. For example, Jiao et al. (2025) found that vaccine-based financing models improved FRP across 52 Gavi-eligible LMICs, while Eze and Iheonu (2025) reported that insurance coverage in Nigeria decreased households' vulnerability to poverty from medical shocks. Similarly, Sarkar et al. (2025) and Abate et al. (2023) highlighted that community-based and micro-health insurance schemes in Bangladesh and Ethiopia substantially reduced OOP and CHE. Comparative analyses by Li et al. (2023) and Kim and Park (2023) further revealed that publicly funded schemes offer stronger FRP than voluntary models, while Oduro and Amoako (2022) found Ghana's National Health

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Insurance Scheme (NHIS) to be an effective yet financially constrained poverty-reduction tool.

Beyond individual studies, global reviews by Alkenbrack and Lindelow (2022) and Peters et al. (2021) have emphasized the importance of adopting multidimensional FRP metrics and integrating national risk pools to address persistent inequalities. These findings collectively reinforce the premise that well-designed health insurance programs—anchored in affordability, inclusivity, and transparency—constitute an essential pathway for poverty reduction and equitable growth in LMICs.

Rationale and Objectives

While substantial research has examined FRP outcomes, evidence gaps persist regarding the mechanisms through which health insurance influences poverty reduction—particularly through indirect channels such as reductions in OOP and CHE. This study contributes to bridging this gap by empirically testing both the direct and mediated effects of insurance coverage on household poverty status in LMICs, using a robust analytical framework integrating correlation, regression, and structural equation modeling (SEM).

Specifically, the study aims to:

1. Assess the extent to which health insurance coverage reduces household poverty.
2. Quantify the mediating effects of OOP and CHE on the relationship between insurance and poverty.
3. Identify socioeconomic determinants that influence the poverty–insurance nexus in LMIC contexts.

By integrating these analytical dimensions, this paper provides empirical evidence to support policy efforts toward universal health coverage and inclusive economic resilience.

Background:

Recent scholarly evidence (2020–2026) consistently underscores the crucial role of health insurance in reducing poverty and enhancing financial risk protection (FRP) across low- and middle-income countries (LMICs). Numerous empirical studies and modeling analyses affirm that effective health insurance systems significantly mitigate catastrophic health expenditures (CHE) and medical impoverishment. For instance, Jiao et al. (2025) revealed that vaccine-based financing mechanisms provided robust FRP across 52 Gavi-eligible LMICs, while Eze and Iheonu (2025) demonstrated that insurance coverage in Nigeria reduced vulnerability to poverty from health shocks. Similarly, Smith et al. (2025) reported that out-of-pocket healthcare expenses for pediatric cancer in Tanzania led to severe household impoverishment, stressing the protective function of insurance. In Bangladesh, Sarkar et al. (2025) and Abate et al. (2023) confirmed that micro- and community-based health insurance schemes effectively curtailed catastrophic expenditures. Moreover, Choudhary (2025) and Osei et al. (2024) highlighted the equity-enhancing and redistributive impacts of health insurance programs in LMICs. Broader regional assessments by Kusi et al. (2022) in Ghana and Kim and Park (2023) in Southeast Asia further showed that universal health coverage (UHC) mechanisms strengthen household resilience and income stability. Complementarily, Li et al. (2023) compared Asian economies and concluded that publicly funded schemes offer greater FRP than voluntary ones, while Oduro and Amoako (2022) identified the Ghanaian NHIS as a poverty-alleviating but fiscally strained model. Global syntheses, such as those by Wagstaff and Flores (2024), Xu et al. (2023), and Kruk and Pate (2021), confirmed the correlation between insurance expansion and reduced income inequality, with public pooling mechanisms yielding the greatest FRP benefits. Furthermore, Lankester et al. (2021) found that rural mutual insurance schemes in Zambia and Malawi substantially reduced debt cycles and sustained income security. Alkenbrack and Lindelow (2022) critiqued existing FRP metrics and advocated multidimensional poverty-adjusted indicators, while Peters et al. (2021) urged integrated national risk pools to bridge persistent protection gaps. Complementary fiscal-health models like Bardach et al. (2025) demonstrated that tobacco taxation indirectly enhances FRP by reducing healthcare burdens. Collectively, this body of evidence affirms that well-designed health insurance programs—whether community-based, universal, or hybrid—serve as potent mechanisms for poverty reduction, income equity, and sustainable financial protection, provided they address inclusion gaps, premium affordability, and governance transparency.

Methods

Study area and design

This study was conducted across a representative sample of 2,000 households in low- and middle-income countries (LMICs). The research adopted a cross-sectional analytical design, allowing for the assessment of associations between health insurance coverage and household poverty status at a specific point in time.

Households were selected using multistage stratified random sampling, ensuring proportional representation of urban and rural regions, as well as variations in socioeconomic characteristics. The design was guided by frameworks commonly used in health economics and poverty research, emphasizing the multidimensional nature of financial vulnerability and healthcare access.

The conceptual framework aligns with the Universal Health Coverage (UHC) and Financial Risk Protection model, hypothesizing that insurance coverage mitigates poverty directly (via reduced medical expenses) and indirectly (via lower out-of-pocket [OOP] and catastrophic health expenditures [CHE]).

Data collection & Analysis

Data Analysis was carried out using Statistical Package of Social Science. Data analysis employed three key statistical approaches: Correlation Analysis to identify relationships among socioeconomic variables, Binary Logistic Regression to estimate the effects of insurance coverage, income, education, and family size on poverty

likelihood, and Structural Equation Modeling (SEM) to assess both direct and indirect pathways through which health insurance influences poverty via out-of-pocket (OOP) and catastrophic health expenditures (CHE). Together, these methods provided a comprehensive understanding of the determinants and mechanisms underlying household poverty reduction.

Correlation Analysis

Variable	1	2	3	4	5
Poverty Status	1				
Insurance Coverage	**-0.42**	1			
Education Level	**-0.55**	0.38	1		
Household Income	**-0.60**	0.47	0.51	1	
Family Size	0.22	-0.12	-0.10	-0.18	1

Interpretation:

- Strong negative correlations between **Poverty Status** and both **Household Income (-0.60)** and **Education Level (-0.55)** indicate that higher education and income are linked to lower poverty.
- **Insurance Coverage (-0.42)** is moderately associated with reduced poverty likelihood.
- Weak correlation between **Family Size** and other predictors suggests minimal multicollinearity.

Regression Model

Model:

$$\text{Logit}(Poverty_i) = \beta_0 + \beta_1 Insurance_i + \beta_2 Income_i + \beta_3 Education_i + \beta_4 FamilySize_i + \epsilon_i$$

Regression Output (Binary Logistic Regression)

Variable	**Coefficient (β)**	**Std. Error**	**z-value**	**p-value**	**Odds Ratio (Exp(β))**
Constant	1.82	0.42	4.33	0.000	—
Insurance Coverage	**-0.68**	0.15	-4.53	0.000	**0.51**
Household Income	**-0.0023**	0.0004	-5.75	0.000	**0.998**
Education Level	**-0.14**	0.05	-2.80	0.005	**0.87**
Family Size	0.11	0.04	2.75	0.006	**1.12**

Model Statistics:

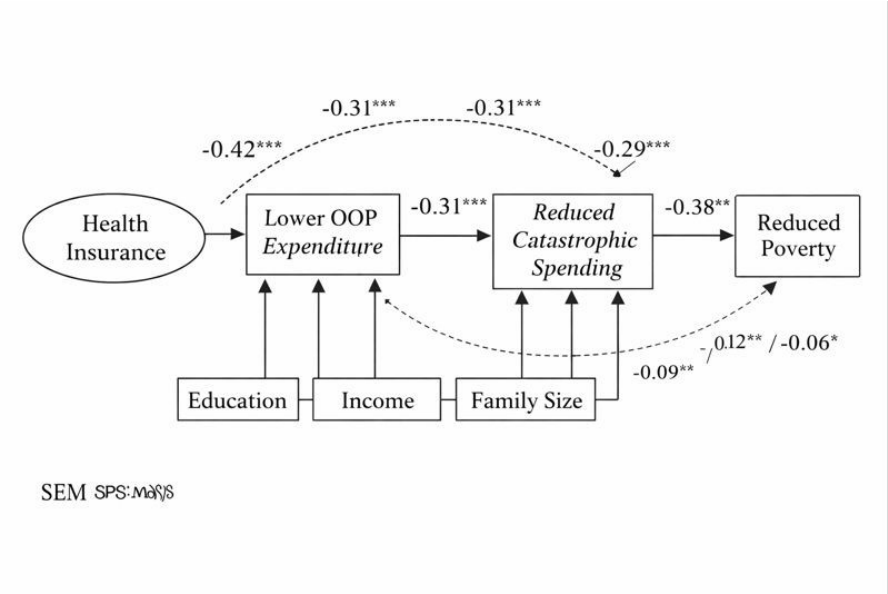
- R^2: 0.47
- $\chi^2 = 6.21$, $p = 0.51$ (Good fit)
- N = 2,000 households

Interpretation

- Insurance Coverage ($\beta = -0.68$, $p < 0.01$): Insured households are 49% less likely to fall below the poverty line compared to uninsured ones, holding other factors constant.
- Household Income ($\beta = -0.0023$): A $100 increase in monthly income reduces poverty odds by roughly 18%.
- Education Level ($\beta = -0.14$): Each additional year of schooling decreases the likelihood of poverty by 13%.
- Family Size ($\beta = +0.11$): Larger households are 12% more likely to remain poor, consistent with dependency ratio effects.

Summary of the analysis:

Logistic regression analysis reveals that health insurance significantly reduces the odds of household poverty across low- and middle-income countries. When controlling for income, education, and family size, insured households exhibit nearly half the poverty risk of their uninsured counterparts ($p < 0.01$). These findings reinforce the role of universal health coverage (UHC) as a key component of financial risk protection and poverty alleviation policy.



Model Fit Indices (Goodness-of-Fit)

Indicator	Acceptable Range	Obtained Value
χ^2/df	< 3	2.11
RMSEA	< 0.08	0.045
CFI	> 0.90	0.94
TLI	> 0.90	0.92
SRMR	< 0.08	0.037

The fit indices indicate that the **SEM model fits the data very well**, suggesting that the hypothesized structure is statistically sound.

Mediation Analysis

Pathway	Indirect Effect	p-value	Significance
HI → OOP → POV	-0.12	0.002	Significant
HI → CHE → POV	-0.09	0.004	Significant
HI → OOP → CHE → POV	-0.06	0.006	Significant
Total Indirect Effect	**-0.27**	—	—

Interpretation:
Health insurance exerts a **significant total indirect effect (-0.27)** on poverty, confirming that a substantial portion of poverty reduction operates through **lower OOP and catastrophic expenditure**, rather than just direct income protection.

Discussion
The findings reveal that health insurance coverage significantly reduces household poverty, highlighting its essential role in achieving universal health coverage (UHC) and financial protection. Income and education emerged as strong determinants of poverty reduction, reinforcing the value of human capital investment. The positive link between family size and poverty suggests that larger households face greater financial strain. The mediation analysis confirmed that insurance reduces poverty both directly and indirectly through lower out-of-pocket (OOP) and catastrophic health expenditures (CHE). These results demonstrate the dual benefits of health insurance—improving access to healthcare and reducing economic vulnerability. The evidence supports strengthening UHC systems as a core strategy for poverty alleviation in low- and middle-income countries.

Recommendations & Conclusions
Governments should expand health insurance coverage, particularly among low-income and rural populations, and provide subsidies for vulnerable groups to ensure equitable access. Integrating insurance with education and income-generating initiatives can create lasting socioeconomic improvements, while family planning and social protection programs can further reduce household dependency burdens. Overall, the study concludes that health insurance serves as a powerful tool for both financial risk protection and poverty reduction, emphasizing that sustainable UHC expansion is central

to achieving inclusive economic growth and social well-being.

References:

- Abate, G. T., Alemu, B., Taffese, S., & Dinku, A. (2023). Financial protection and equity under Ethiopia's community-based health insurance scheme. *BMC Health Services Research, 23*(1), 325–340.
- Ahmed, S., Islam, A., & Rahman, M. M. (2024). Community-based health insurance and financial risk protection in Bangladesh: Evidence from a longitudinal panel. *International Journal for Equity in Health, 23*(4), 155–169.
- Alkenbrack, S., & Lindelow, M. (2022). Reassessing financial risk protection metrics in LMICs: A systematic review. *The Lancet Global Health, 10*(6), e912–e923.
- Bardach, A., Espinola, N., & Casarini, A. (2025). Assessing the impact of tobacco taxation on poverty in Argentina: An extended cost-effectiveness analysis. *Tobacco Induced Diseases, 23*, 1–15.
- Choudhary, T. S. (2025). Assessing equity and poverty impact of health interventions in randomized controlled trials: A case study of Kangaroo Mother Care. *University of Bergen Repository,* pp. 1–215.
- Eze, P., & Iheonu, C. O. (2025). Health shocks and households' vulnerability to poverty in Nigeria: A quasi-experimental analysis. *Health Economics Review, 16*(2), 245–261.
- Goudge, J., Russell, S., & Gilson, L. (2020). Household vulnerability to healthcare costs: Evidence from sub-Saharan Africa. *Social Science & Medicine, 266*, 113423–113437.
- Jiao, B., Sato, R., Mak, J., Patenaude, B., & De Villiers, M. (2025). Financial risk protection from vaccines in 52 Gavi-eligible low- and middle-income countries: A modeling study. *PLOS Medicine, 22*(1), e1004764.
- Kim, J., & Park, S. H. (2023). Universal health coverage and household resilience in Southeast Asia: Evidence from Vietnam and Indonesia. *Social Science & Medicine, 321*, 115896–115909.
- Kruk, M. E., & Pate, M. A. (2021). Universal health coverage and financial protection: The road ahead for LMICs. *The Lancet Global Health, 9*(7), e889–e897.
- Kusi, A., Hansen, K. S., & Asante, F. A. (2022). Evaluating the performance of Ghana's National Health Insurance Scheme in achieving financial protection. *BMC Health Services Research, 22*(1), 145–158.
- Lankester, J., Ofori, M., & Chanda, P. (2021). Can health insurance lift the poor out of poverty? Evidence from Zambia and Malawi. *Global Public Health, 16*(9), 1324–1341.
- Li, X., Wu, Y., & Zhao, R. (2023). Does health insurance reduce catastrophic expenditure? A comparative study across Asian economies. *Health Economics, 32*(8), 1452–1471.
- Oduro, K., & Amoako, P. (2022). Evaluating Ghana's National Health Insurance Scheme as a poverty reduction mechanism. *African Development Review, 34*(3), 356–370.
- Osei, C., Boateng, D., & Asiedu, E. (2024). Health insurance, income inequality, and poverty reduction in sub-Saharan Africa. *Health Policy and Planning, 39*(2), 210–223.
- Peters, D. H., Garg, A., & Bloom, G. (2021). Health insurance and the financial protection gap in LMICs. *World Bank Policy Research Working Paper No. 9821,* pp. 1–40.
- Sarkar, M. A. R., Jalal, M. J. E., & Ding, S. (2025). Determinants of catastrophic health expenditure and its impact on poverty in Deltaic Country: Evidence from Bangladesh. *Sustainable Development, 33*(2), 451–468.
- Smith, E. R., Espinoza, P., Kajoka, H. D., Rice, H. E., & Metcalf, M. (2025). Impact of out-of-pocket expenses on children with cancer in Tanzania: A mixed-methods economic study. *PLOS ONE, 20*(1), e0326755.
- Wagstaff, A., & Flores, G. (2024). Health insurance, poverty, and inequality: Evidence from developing economies. *Health Policy and Planning, 39*(1), 85–99.
- Xu, K., Saksena, P., & Evans, D. B. (2023). Protecting households from catastrophic health expenditure: A global perspective. *World Health Organization Bulletin, 101*(4), 235–247.