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Research Paper

Bridging the Health Insurance Gap in Akwa Ibom: A Data-Driven Tableau Assessment of Healthcare Financing Among Informal Sector Households

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Abstract

This study examines the relationship between income, medical expenses, and borrowing for medical care among Akwa Ibom's informal households and how it affects their participation in health insurance. The results show a high dependence on out-of-pocket expenses, little insurance coverage, and frequent financial vulnerability using survey data and visual analysis with Tableau software. A third of households must borrow money to pay for medical expenses, while the majority spend modest amounts on healthcare. Affordability is further hampered by income differences between spouses and breadwinners. The results underscore the urgent need for inclusive financing strategies, such as community-based insurance, to reduce catastrophic spending and advance Universal Health Coverage for the informal sector households in Akwa Ibom, Nigeria.

Keywords: Catastrophic Health Spending; Income Disparity; Informal Sector; National Health Insurance Scheme; Out-of-pocket Expenditure.

1. Introduction

Universal Health Coverage (UHC) stands as a fundamental global objective, aiming to ensure that all individuals can access necessary healthcare services without enduring financial hardship [1]. Financial risk protection (FRP) is a key part of reaching UHC since it protects people who use healthcare from the high expenses of getting sick [1]. In numerous low- and middle-income countries (LMICs), such as Nigeria, dependence on direct out-of-pocket (OOP) payments at the point of service delivery continues to be the primary healthcare financing method [2]. This strong reliance on out-of-pocket payments, which can make as more than 60% of all health spending in Nigeria, makes it hard for everyone to get the care they need and protects their finances [3].

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The consequences of this system are severe: households frequently face catastrophic health expenditure (CHE), defined as health spending exceeding a certain percentage of income or capacity to pay [4]. These kinds of costs can make households poor or make them even poorer [4]. Many families have to skip necessary medical care when expenses are high, which makes their health worse [5]. Health insurance plans, especially social health insurance (SHI) and community-based health insurance (CBHI), are often advertised as good ways to share risks and turn uncertain out-of-pocket costs into predictable prepayments [2]. The National Health Insurance Scheme (NHIS) was set up in Nigeria in 2005 to cover more people, although only about 3–5% of the population is really insured [3]. Coverage is especially low in rural areas and in the huge informal sectors [1].

To make a lot of progress toward UHC in Nigeria, we need to remove the hurdles that keep people from getting health insurance, especially in rural areas where people are more likely to be financially affected by disease [3]. Comprehending the determinants that affect households' ability and readiness to engage in health insurance is essential for formulating effective and enduring programs [1].

This research concentrates on households within the informal sector in Southern Nigeria [6]. Prior studies demonstrate that awareness and enrollment in health insurance are significantly deficient among residents of this state [18]. Although there is a broad inclination to participate in projects [6], the practical practicality of involvement is significantly affected by socio-economic considerations. A household's income level, the extent of their regular and unforeseen health expenditures, and their reliance on borrowing to finance treatment are pivotal factors influencing their capacity to afford and prioritize health insurance premiums [6].

Consequently, this article seeks to investigate the correlation between income level, health expenditures, and borrowing behavior among informal households in Akwa Ibom State, as well as the consequences for their participation in health insurance schemes. The study aims to analyze these characteristics to furnish knowledge that informs policy formulation and implementation methods aimed at enhancing financial protection and expediting the progression towards Universal Health Coverage (UHC) for informal sector populations in Nigeria.

2. Literature Review

2.1 Health Insurance in Nigeria: SHI, NHIS, and Structural Challenges

Efforts to expand health coverage through the National Health Insurance Scheme (NHIS) have encountered several persistent barriers. The NHIS, originally intended to reduce out-of-pocket (OOP) expenses, has not adequately reached informal and rural populations [12]. Structural inefficiencies, poor coordination between government bodies, and minimal community-level engagement have constrained implementation.

Similar challenges are documented in studies focusing on scaling social health insurance (SHI) coverage. Constraints such as limited enrollment among informal sector workers and weak provider payment systems are common [11]. These barriers affect both uptake and sustainability.

In addition, trust and affordability remain significant concerns. Evidence suggests that even when insurance programs exist, financial barriers and lack of awareness prevent many from enrolling [1]. Without targeted policy adjustments, health insurance expansion will continue to bypass vulnerable groups.

2.2 Community-Based Health Insurance (CBHI) and Local Models

CBHI schemes are increasingly promoted as alternatives for populations excluded from formal coverage. A recent survey in Akwa Ibom found that rural residents showed high interest in joining CBHI programs, provided the schemes were transparent, community-led, and affordable [6]. Local involvement was identified as critical for uptake.

Another study further supports the viability of CBHI for the rural poor, noting that respondents' place of residence and socioeconomic status significantly influenced their participation [8]. These schemes are seen as more approachable and trustworthy than centralized models.

On a broader scale, evidence from cross-sectional studies in similar contexts shows that willingness and ability to pay vary based on perceived service quality and household income [7]. This reinforces the importance of tailoring CBHI models to local realities and emphasizing community participation in scheme design.

2.3 Willingness to Pay (WTP): Income, Trust, and Education

Multiple determinants affect whether households are willing to pay for or join CBHI schemes. For instance, income level, household size, and prior exposure to health-related financial shocks all impact decision-making [10]. Higher income generally increases the capacity to contribute, while larger families may face financial strain.

Further, civil servant studies suggest that education and trust in the health system are positively associated with WTP [9]. This is relevant for understanding how messaging and program design can influence uptake among rural populations with limited formal education.

The prevalence of catastrophic health spending among low-income households further strengthens the argument for expanding CBHI [13]. Many rural families continue to rely on OOP spending even in the face of extreme financial burden, highlighting the urgency of alternative financing mechanisms.

2.4 Gaps in Research and the Akwa Ibom Context

While Nigeria's health financing literature is expanding, rural-focused studies remain limited. Notably, the COVID-19 pandemic exposed deeper weaknesses in the system. A recent analysis showed that income shocks and rising medical costs have led to increased borrowing and avoidance of care [5]. Such patterns emphasize the need for adaptive, context-aware schemes that can respond to crisis-driven vulnerabilities.

Moreover, a lack of monitoring mechanisms for rural healthcare financing was identified as a barrier to achieving universal health coverage [1]. Studies advocate for integrating local data systems and feedback loops into CBHI structures to ensure sustained community trust and evidence-based adjustments.

In summary, CBHI schemes hold promises for Akwa Ibom if tailored to reflect community needs, supported by policy reform, and informed by localized evidence. The reviewed studies provide a foundation for structuring health financing models that are equitable, scalable, and sustainable in Nigeria's informal sector health landscape.

3. Methodology

This is a descriptive study that uses primary data collected in Akwa Ibom, Nigeria, to explore the relationship between income levels, healthcare expenditures, and financial vulnerability in rural households considered as working in the informal sector. The data was collected from 466 respondants as part of a health systems research initiative focused on understanding willingness to pay (WTP) for social health insurance [18]. It includes information on household income, treatment-seeking behavior, healthcare costs, and reliance on borrowing or out-of-pocket payment methods. Table 1 below highlights the genders of the respondents.

Respondents included household heads or spouses who provided information on demographic characteristics, monthly income, treatment behavior when sick, monthly medical expenses, and willingness to contribute to health cooperatives or insurance schemes.

Table 1. Gender of Participants

Gender	n	%
Female	174	37%
Male	292	63%
Grand Total	466	100%

The following variables were selected for analysis based on their relevance to financial vulnerability:

- Monthly income of breadwinner and spouse (grouped into income brackets)
- Average monthly household medical spending
- Reported a need to borrow money for treatment
- Primary method of treatment payment (e.g., out-of-pocket, insurance, family support)
- Membership in or willingness to join a health insurance scheme

These variables were used to identify patterns in household healthcare financing and to evaluate the role of income level in determining financial stress related to treatment costs. Descriptive statistics were generated using Tableau to show the distribution of income levels, health expenditures, and borrowing behavior across the sample. Charts and graphs were used to highlight:

- The percentage of households in different income bands
- The proportion of participants who needed to borrow money for medical care
- The dominant methods of payment for treatment

In addition, subgroup comparisons (e.g., by income level or family size) were made to visually assess the relationship between economic standing and treatment-related financial behavior.

4. Analysis and Discussions

The graph above illustrates the relationship between the monthly income levels of spouses and household breadwinners among informal sector households in Akwa Ibom as shown in Figure 1. The highest level of income alignment is observed when both the spouse and the breadwinner earn more than ₦100,000, with 62.5% of such households falling into the same income category. This suggests a relatively small but economically stable subset where both partners contribute significantly to household finances. In contrast, the greatest disparity appears in households where spouses earn between ₦21,000–₦40,000, but breadwinners earn either significantly less or more, pointing to uneven earning dynamics across gender and role lines.

Households where spouses earn ₦21,000–₦40,000 show a diverse spread of breadwinner income brackets, with 46.95% of breadwinners earning the same, 24.39% earning ₦41,000–₦60,000, and 18.29% earning ₦61,000–₦80,000. This trend suggests that while this range is the most common for spouses, breadwinner income often exceeds it, reinforcing the notion of income concentration within male-headed financial structures in rural Nigerian households [14].

Interestingly, the largest discrepancy is seen in households where breadwinners earn ₦81,000–₦100,000, yet the spouse earns significantly less. Specifically, only 1.21% of these spouses earn more than ₦100,000, indicating a potential gender gap in income capacity and employment opportunities in rural Akwa Ibom [14]. The heatmap also reveals that in households where the breadwinner earns less than ₦20,000, a sizable 28.48% of spouses also earn less than ₦20,000, reinforcing a cycle of mutual financial vulnerability.

These findings support evidence from prior literature that ties high out-of-pocket healthcare spending with low dual-income households [15], indicating that these income dynamics have direct implications on health affordability and borrowing behavior.

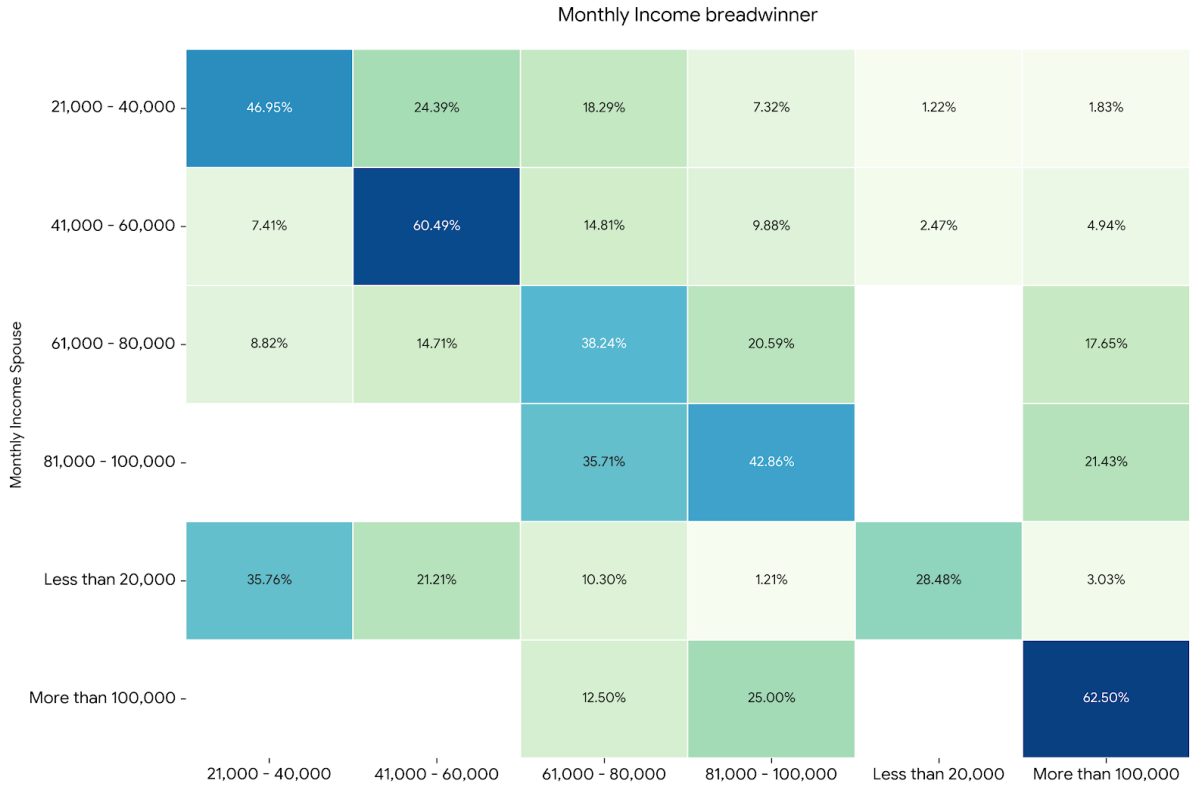

Figure 1. Summary of the Monthly Income Breadwinner

Figure 2 illustrates the distribution of average monthly medical expenses incurred by rural households in Akwa Ibom. The most frequently reported expense range is between ₦1,000 and ₦4,999, accounting for 32.62% of respondents. This indicates that although medical spending is present, it often remains relatively modest, potentially reflective of limited disposable income, lower healthcare access, or restricted treatment options within rural environments. However, the fact that almost one-third of households are incurring this level of out-of-pocket expense on a monthly basis signals a persistent burden in the absence of universal prepayment schemes [16].

The next most prominent category is labeled "Null," capturing 28.97% of respondents. This could represent either households with zero spending due to lack of healthcare access or households that did not disclose expense data. In either case, it raises significant concerns about either unmet health needs or reporting barriers both of which contribute to Nigeria's poor health outcomes and reinforce inequality in health system utilization [17].

Expenditures of ₦5,000–₦9,999 were reported by 16.52% of households, while those below ₦1,000 represented 16.09%. These middle and low-spend categories demonstrate a widespread reliance on out-of-pocket payments, confirming prior findings that OOP expenses remain the dominant healthcare financing method in Nigeria's rural areas [14].

Notably, only 3.65% of households report spending between ₦10,000–₦14,999, and less than 1% (0.64%) spend above ₦15,000 per month. These very low frequencies for higher expense brackets imply that very few rural

households can afford comprehensive or specialized care, leading to underutilization or delayed care. This support concerns that financial insecurity pushes families to avoid or ration care, often until the condition worsens [15].

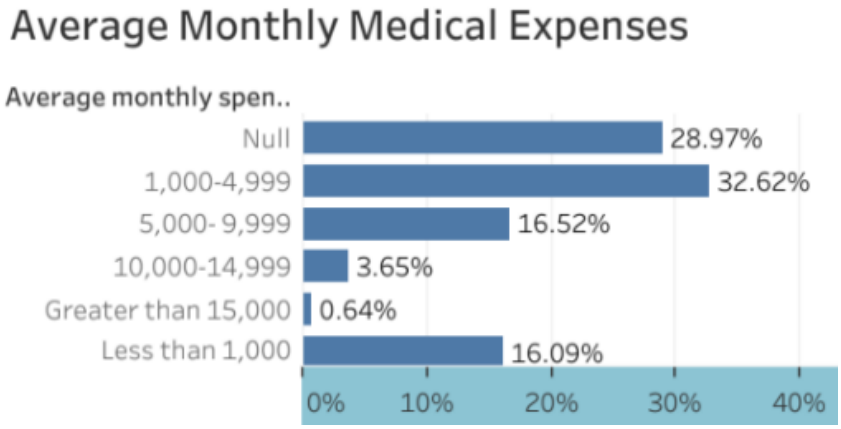

Figure 2. Summary of the Average Monthly Medical Expenses

The figure 3 above illustrates the self-reported need to borrow money for medical or household-related expenses among households in Akwa Ibom. A significant majority, 68.28%, indicated that they never needed to borrow. While this may initially suggest financial self-sufficiency, it could also reflect a deeper issue of unmet healthcare needs due to an inability or unwillingness to seek care at all, a pattern consistent with prior research linking zero borrowing to avoidance of care rather than financial comfort [14]. In low-resource settings like Akwa Ibom, families frequently forget formal medical treatment when costs exceed their earning power, especially in the absence of health insurance systems [16].

18.43% of respondents reported rarely needing to borrow, and 11.78% stated they sometimes had to do so. This combined 30% indicates that nearly one in three households occasionally face financial shocks significant enough to require debt. These findings align with reports that Nigerian households regularly engage in borrowing or asset sales to cover health costs, particularly when treatment is sudden or emergent [15].

Although only 1.51% reported they often needed to borrow, this small segment represents the most financially vulnerable group. These households are likely trapped in a recurring cycle of debt driven by either chronic illness, lack of income, or complete absence of social protection mechanisms [17]. Persistent borrowing for health-related needs is a red flag for catastrophic health expenditure, particularly in the absence of functioning risk-pooling mechanisms such as community-based health insurance or government-funded subsidies [14].

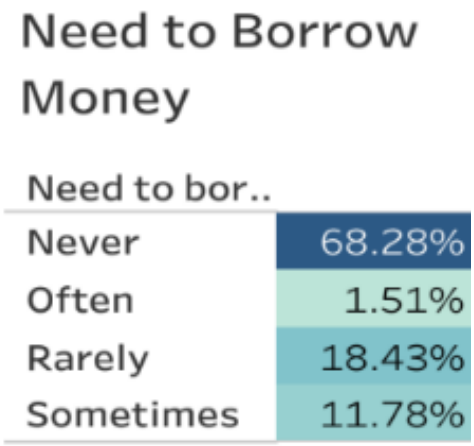

Figure 3. Summary of the Participants need to borrow money

The graph in figure 4 presents the distribution of primary payment sources for medical treatment among rural households in Akwa Ibom. An overwhelming 94.80% of respondents reported paying out-of-pocket, confirming the dominance of this financing mechanism in Nigeria's healthcare landscape. This reflects the broader national pattern where direct payments at the point of care are the norm, rather than the exception a structure that leaves households highly vulnerable to financial shocks and reduces access to essential services [14].

The data further highlights the limited role of health insurance, which accounts for just 1.22% of treatment payments. Despite the formal establishment of the National Health Insurance Scheme (NHIS) over two decades ago, its impact remains marginal in rural settings. This supports findings that the NHIS has struggled with both coverage and inclusivity, often benefiting formal sector workers while excluding the informal and rural workforce [18].

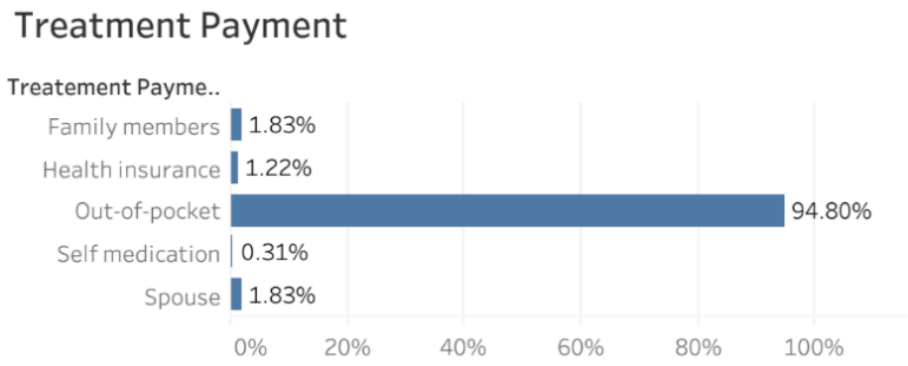

Figure 4. Summary of the Treatment Payment

Interestingly, only 1.83% of respondents indicated that their treatment was paid for by family members, and an equal percentage reported spousal support. These figures suggest that intra-household and extended family financial support systems, often relied upon in rural African settings, are not the primary fallback for health expenses in this region. Instead, financial independence or more accurately, the lack of viable alternatives pushes individuals to bear the cost themselves [16].

Finally, self-medication was reported by just 0.31% of respondents. This low figure may reflect underreporting or a preference for formal care despite cost barriers. Still, it is notable given the extensive literature that links high out-of-pocket costs with increased informal care-seeking behaviors in underserved areas [17].

To synthesize the insights drawn from the income, expenditure, borrowing, and payment behavior analyses, Table 2 above summarizes key findings and their implications for informal sector healthcare financing in Akwa Ibom. The study also highlights the limited financial buffers for the households. Although 68.28% reported never having borrowed for healthcare, approximately one-third admitted borrowing at least sometimes. These borrowing behaviors suggest that a majority of households have insufficient savings or insurance to buffer them from unexpected healthcare costs. When illness strikes, they have no alternative but to employ informal borrowing or asset depletion, both of which reinforce long-term financial insecurity and entrench poverty traps.

Further compounding these challenges is household income alignment, particularly that of spouses and single breadwinners. Despite the highest income alignment being observed when both spouses earn at least ₦100,000, most spouses earn significantly lower. This gendered earning disparity undermines the household's ability at joint planning or saving towards health needs in the future, rendering insurance uptake less feasible. In patriarchal societies where the male breadwinner usually controls financial decision-making, limited female earnings restrict both autonomy and resilience in financing health spending.

5. Conclusion and Future Work

This study highlights the complex and largely vulnerable landscape of health financing across Akwa Ibom informal sector households in Nigeria, a state that is representative of the majority of low-resource contexts in the country. Despite the presence of national health insurance schemes, household survey data and self-reported data cumulatively evidence the prevalence of out-of-pocket (OOP) payments, as 94.8% of the respondents utilized this channel towards financing access to care. This tendency is not simply a matter of choice or convenience but, more basically, a reflection of the absence of useful financial protection mechanisms, which expose households to financial disaster when illness strikes. While OOP spending might be assumed to indicate some financial independence, more detailed analysis reveals otherwise. Nearly 29% of households incurred no medical spending, which could reflect unmet needs for care as much as good health. This finding, coupled with the minimal health insurance uptake (a mere 1.22%), points to a pattern of underutilization of services more likely to be driven by affordability concerns than by a lack of need. These figures reveal that the healthcare cost has created a stealth population of people who forego treatment altogether, especially women and poorer people, simply because the danger of financial devastation outweighs the perceived benefit of care. The data on borrowing behavior adds another facet to this financial vulnerability. While 68.28% of respondents indicated that they had never borrowed money to pay for medical or household costs, this is not in itself a measure of financial resilience. In low-income contexts like Akwa Ibom, such a response often masks an inability to access care more than the capacity to pay. This description is supported by the literature that explains non-borrowing behavior as due to healthcare avoidance rather than convenience. A total of 30% of households (rarely + sometimes borrowing) actually do borrow when they face health issues, which points to a systemic deficit in financial preparedness. While only a meagre 1.51% of the households report regular borrowing, this small fraction is the most vulnerable financially, most likely beset by chronic illness, irregular income, and a complete absence of safety nets.

Moreover, the comparatively small role played by support systems habitually relied upon in rural African settings is noteworthy. Spousal or familial support for treatment was mentioned by a mere 1.83% of all respondents. Such rates belie conventional presumptions of strong intra-family economic safety nets and suggest a growing individualization of financial risk, with households being left on their own when faced with rising healthcare

spending. Taken together, these findings underscore a broader structural failure in the design and accessibility of Nigeria's health insurance systems. Although the National Health Insurance Scheme (NHIS) has been operational for more than two decades, its impact in rural and informal sector communities remains negligible. The scheme's urban and formal-sector bias excludes the very populations most in need of protection. This mismatch between policy creation and local-level realities reinforces financial hardship, discourages care-seeking, and hinders movement toward Universal Health Coverage (UHC). Addressing these challenges, a multi-pronged strategy is required with urgency. Prioritizing community-based health insurance schemes, subsidized premiums for indigent households, and the formal insurance inclusion of informal sector employees is required. At the same time, mass awareness campaigns are required to raise awareness about the benefits of prepayment and risk pooling. Gender-sensitive policies providing spouses, especially women, financial autonomy could also close the income alignment gap and improve health outcomes. Our study calls for urgent inclusive and context-tailored policy interventions to increase health insurance enrollment. First, subsidized premiums for low-income earners, particularly women, would eliminate the gender disparity in health financing and improve enrollment in insurance schemes. Second, risk-pooling arrangements at the community level would establish more accessible and culturally appropriate pathways to coverage, especially in rural areas where there is a lack of formal insurance infrastructure. Third, public information campaigns that demystify insurance benefits and dispel misconceptions can be used to establish trust and increase voluntary take-up of health plans.

Finally, making insurance coverage a real choice for residents of low-income rural areas involves more than making policies available, it requires structural changes that render health insurance both affordable and socially acceptable. The present arrangement, premised largely on out-of-pocket expenditures and informal loans, is unsustainable and unfair. To progress towards Universal Health Coverage (UHC) in Nigeria, policymakers will need to give priority to risk protection for the most vulnerable by transforming the health financing system to become more inclusive, equitable, and resilient. The evidence of this study provides a compelling case for doing so, rooted in the daily lives of rural households living with illness without formal support.

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