

**Environmental Health Treatment in Nepal: A Study of Money Borrowing and Asset Sales for Individual Households ---- by Shrestha J., Adhikari G. M. & Adhikari S**

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**Abstract**

*When people get sick from environmental problems, they need money for treatment. This creates big challenges for families. This study examined how 9,600 people from across Nepal pay for health care when they have environmental health problems. The research used data from a national survey to analyze what families do when they need money for medical care. The study found that most families (85%) use their savings to pay for health care. Only 11% borrow money and 1% sell things they own. Surprisingly, poor families rely more on savings (86.6%) than rich families (82.9%). Rich families are more likely to borrow money because they have better access*

*to loans. Environmental health problems make families use different ways to get money compared to other health issues. Chronic diseases require more complex ways of paying than simple illnesses. Families who own land are 50% more likely to borrow money rather than sell their land. These findings show that Nepal needs better health financing policies. Poor families need more help getting loans. The government should create special insurance for environmental health problems. Since environmental health issues will increase due to climate change, Nepal needs better systems to help families pay for treatment.*

**Keywords:** Health financing, Environmental health, Borrowing money, Selling assets, Poverty, Health insurance

## **Introduction**

Paying for health care is a big problem in developing countries like Nepal. When people get sick, families often struggle to find money for treatment. This problem becomes worse when families face environmental health issues like dirty water diseases or air pollution problems. Many studies show that health expenses create major financial problems for families. The World Health Organization estimates that annually 150 million people experience severe financial difficulties as a result of healthcare payments (Eze et al., 2022). Research in India has shown that tobacco and alcohol use is associated with increased risk of impoverishment through borrowing and distress selling of assets to meet hospitalization costs, with an adjusted population-attributable risk proportion of 16% (Bonu et al., 2005). In sub-Saharan Africa, research shows that about 23% of households face catastrophic health expenditure at the 10% threshold of household income (Njagi et al., 2018). Studies in Asia have found similar patterns where environmental health conditions create significant financial burdens for households (van Doorslaer et al., 2007).

A landmark multi-country analysis using household survey data from 59 countries found that the proportion of households facing catastrophic payments from out-of-pocket health expenses varied widely between countries, with the highest rates in countries in transition and certain Latin American countries (Xu et al., 2003). This research established the foundation for understanding catastrophic health expenditure globally and demonstrated that financial protection policies are essential for health system development. More recent analysis of 133 countries has shown that progress on catastrophic health spending has been uneven, with many countries still experiencing high rates of financial hardship due to healthcare costs (Wagstaff et al., 2018).

Environmental health problems are different from other health issues. They often affect many family members at the same time. They may need special treatments. They can happen again and again. Unlike other health problems that families can plan for, environmental health issues often surprise families. This forces them to find money quickly. Research shows that households with chronic conditions or environmental health problems often face higher rates of catastrophic spending compared to those with acute conditions (Eze et al., 2022). Studies have documented that the economic consequences for households of illness in low- and middle-income countries can be severe and long-lasting (McIntyre et al., 2006). Global research has shown that non-communicable diseases impose particularly substantial financial burdens on households, often leading to impoverishment (Jaspers et al., 2015).

The way families choose to pay for health care matters a lot. Some choices like using savings might not hurt the family much. But other choices like borrowing money at high interest rates or selling important things can trap families in poverty for years. Research across multiple developing countries has shown that households using asset sales for health financing often experience reduced income-generating capacity for years following the health emergency (Wagstaff & van Doorslaer, 2003). Studies have documented that the economic consequences for households of illness in low- and middle-income countries can be severe and long-lasting (McIntyre et al., 2006). Global research has shown that non-communicable diseases impose particularly substantial financial burdens on households, often leading to impoverishment (Jaspers et al., 2015).

Nepal is an appropriate place to study this problem. The country has many environmental health challenges. These range from water diseases during monsoon season to breathing problems from indoor cooking smoke. Nepal also has different economic situations. Some urban areas have better access to banks and loans. Rural communities have limited banking services. This gives researchers chances to see how different situations affect how families pay for health care. Research has shown that access to improved sanitation can reduce childhood diarrhea, which would reduce the financial burden on families (Kumar & Vollmer, 2013). Studies in Thailand have demonstrated how catastrophic health expenditure affects households differently across rural and urban areas (Limwattananon et al., 2007).

When families face environmental health problems, their choices can affect them for a long time. Families that use up all their savings become vulnerable to future health problems. Those who

borrow money may get stuck in debt cycles. Understanding these patterns is important for making good health policies. Without knowing how families currently cope with these expenses, policymakers cannot design effective help for vulnerable families. Research has highlighted the importance of social risk management options for medical care in developing country contexts (Pradhan & Prescott, 2002). Studies have shown significant variations in how catastrophic health expenditure is measured and reported across different household surveys, emphasizing the need for standardized approaches (Raban et al., 2013).

Recent studies have examined the impact of public health expenditure and economic development on catastrophic health spending patterns. Research across OECD countries has shown that higher public health spending and GDP per capita can reduce the risk of catastrophic health expenditures, though the relationships are complex and context-dependent (Söyük, 2023). This finding has important implications for developing countries like Nepal as they work toward universal health coverage and financial protection for their populations. Research on financial risk protection and universal health coverage has highlighted both the evidence available and the measurement challenges that remain in this field (Saksena et al., 2014).

### **Problem Statement**

Good health is the result of Dharma – eternal bodily truth. The Shreemadbhagavadgeeta, a seminal-influential philosophical scripture of the Sanatan Vedic tradition, presents a timeless dialogue on human ethics, duty, and liberation that resonates deeply with the contemporary global vision of sustainable development (Badal 2024). Gautama Buddha, the emblem of peace and love, pioneer of Buddhism, was born in Kapilabastu, Lumbini, Nepal. The peace and love. Compassion in Buddhism is the basic element of Sustainable development. Thus Buddha is the pioneer of sustainable development. Buddha's text Dhammapada in the present sustainable era is more relevant than past (Badal, 2021). Thus health issues must be guided by the Geeta and lord Buddha. But in practice the world is taking like such issues negatively.

The problem is further complicated by the limited penetration of health insurance and formal financial protection mechanisms in Nepal. Most households must rely on their own resources or informal financing mechanisms when health emergencies arise. This reliance on self-financing can lead to several negative outcomes: depletion of household savings meant for other purposes, accumulation of high-interest debt, liquidation of productive assets, or potentially foregone

medical care when resources are insufficient. Studies examining the relationship between substance use and health financing have provided insights into how different household behaviors affect financial coping strategies. Research using nationally representative survey data from India found that regular tobacco and alcohol use varies significantly by age, gender, and economic group, with implications for health financing patterns (Neufeld et al., 2005). The national prevalence of regular smoking was estimated at 16.2%, chewing tobacco at 14.0%, and alcohol use at 4.5%, with marked differences across socioeconomic groups.

The most significant financing differentials in this research were the acute and chronic conditions which had significantly higher borrowing (14.4 versus 4.8 percent) and insurance utilization (4.0 versus 0.8 percent) than the acute illnesses. The available literature on the non-communicable diseases and household financial burden greatly supports this finding. Both Kankeu et al. (2013) and Goryakin and Suhrcke (2014) reported the significant financial burden of non-communicable illnesses on families of low- and middle-income countries, and Doshmangir et al. (2021) in their systematic review and meta-analysis have found that the diagnosis of one type of chronic illness cancer is a significant predictor of catastrophic spending on health. The trend of progressive chronic disease financing as has been seen to manifest in this study, where households slowly drain their savings and increasingly resort to borrowing and cutting of assets, are consistent with the trends of pre-existing health conditions and behaviours multiplying household financial vulnerability when health emergencies arise, can be found in India, as reported by Bonu et al. (2005). The observation is also in continuity with the study by Neufeld et al. (2005), who recorded a significant socioeconomic difference in the patterns of health behaviour related to health with a direct relationship to the trends in financing long-term health.

The choice of financing strategy has important implications for household welfare and economic stability. While some financing methods like savings may have minimal negative consequences, others such as high-interest borrowing or asset sales can trap families in cycles of poverty and vulnerability. Understanding which households are most likely to use different financing strategies and what factors influence these decisions is crucial for developing targeted interventions. Current health financing policies in Nepal lack specific provisions for the unique challenges posed by environmental health conditions. Without empirical evidence on how households currently cope

with these expenses, policymakers cannot design effective interventions to protect vulnerable families from catastrophic health expenditures related to environmental health problems.

### **Literature Review**

This literature review examines the existing research on household health financing strategies, with particular emphasis on catastrophic health expenditure and the coping mechanisms employed by households when facing health expenditures. The review focuses on verified research from peer-reviewed journals and systematic reviews. Catastrophic health expenditure has been defined as out-of-pocket payments above a share of total household expenditure that forces households to sacrifice other basic needs, sell assets, incur debts or become impoverished (Njagi et al., 2018). The World Health Organization estimates that annually 150 million people experience severe financial difficulties as a result of healthcare payments (Eze et al., 2022). Despite significant progress in expanding healthcare access in Nepal, the burden of paying for health services continues to fall heavily on individual households. Out-of-pocket expenditure accounts for a substantial portion of total health spending. This situation becomes particularly challenging when families face environmental health problems, which are increasingly prevalent due to Nepal's vulnerability to climate change, rapid urbanization, and persistent challenges with water and sanitation infrastructure.

A systematic review of catastrophic health expenditure in sub-Saharan Africa found that the average incidence was 23% at the 10% threshold of household income and 17% when the 40% threshold of non-food expenditure was applied (Njagi et al., 2018). More recent meta-analysis confirmed these patterns, showing pooled annual incidence of catastrophic health expenditure at 16.5% across the region (Eze et al., 2022). Research in Kenya slum communities has shown even higher rates, with specific determinants including household size, income level, and access to health services (Buigut et al., 2015). Environmental health conditions in Nepal create a complex web of financial challenges for households. These conditions often strike suddenly, affect multiple family members, and may require repeated treatment or long-term management. Unlike planned healthcare needs, environmental health emergencies force families to make immediate financial decisions without adequate preparation time. The seasonal nature of many environmental diseases, such as waterborne illnesses during monsoons and respiratory problems during winter months, creates predictable yet challenging financial burdens for households with limited resources.

Research across Asia has consistently shown high rates of catastrophic health expenditure. A comprehensive study using data from multiple Asian countries found that rural households were more likely to experience catastrophic payments compared to urban households, with environmental health conditions contributing significantly to this burden (van Doorslaer et al., 2007). Studies in India have documented specific patterns where tobacco and alcohol use increases the risk of impoverishment through borrowing and asset sales for hospitalization costs (Bonu et al., 2005). Research in India has also shown significant rural-urban and state-level variations in out-of-pocket expenditures and their impact on poverty (Garg & Karan, 2009). Research focusing on cancer patients has shown particularly high rates of catastrophic expenditure. A systematic review and meta-analysis found that cancer diagnosis significantly increases the likelihood of catastrophic health spending, with varying rates across different healthcare systems (Doshmangir et al., 2021). Similarly, studies examining non-communicable diseases more broadly have documented their substantial financial impact on households in low- and middle-income countries (Kankeu et al., 2013; Goryakin & Suhrcke, 2014).

Research has shown that households where tobacco or alcohol is used face higher risks of financial catastrophe during health emergencies. Analysis of household survey data found that families with tobacco users were 35% more likely to resort to borrowing or selling assets during hospitalization compared to non-using households (Bonu et al., 2005). This pattern demonstrates how pre-existing household behaviors can influence financing strategy choices during health crises. Studies have also examined the relationship between improved health infrastructure and reduced financial burden. Research on sanitation improvements in rural India found that access to improved sanitation significantly reduces childhood diarrhea, which in turn reduces the financial pressure on households from repeated episodes of illness (Kumar & Vollmer, 2013). A comprehensive review of the economic burden of illness for households in developing countries found that malaria, tuberculosis, and HIV/AIDS impose particularly severe financial burdens (Russell, 2004).

Research on health insurance in developing countries has shown mixed results regarding financial protection. A systematic review of micro health insurance found that while these schemes can improve access to care, their impact on financial protection varies significantly across different contexts and implementation models (Habib et al., 2016). Community-based health insurance has shown promise in some settings, with systematic reviews documenting improved healthcare

utilization but inconsistent financial protection outcomes (Eze et al., 2023). Studies examining universal health coverage initiatives have found important lessons about financial risk protection. Research in Bangladesh documented significant inequalities in financial risk protection despite efforts toward universal coverage (Islam et al., 2017). Analysis across multiple countries has shown that the design and implementation of health insurance schemes significantly affects their impact on catastrophic health expenditure (Söyük, 2023). Research has found that even in countries with health insurance, some counterintuitive evidence suggests that insurance may not always provide expected financial protection, highlighting the complexity of health financing systems (Ekman, 2007).

Research has consistently shown that rural and urban households face different challenges in health financing. Studies examining poverty and access to health care in developing countries have documented that rural households have less access to formal financial services but may rely more heavily on community-based support systems (Peters et al., 2008). This geographic variation in access to both health services and financial services creates different patterns of health financing across rural and urban areas. The relationship between geographic location and health financing strategies is particularly important for environmental health conditions, which often have different patterns of occurrence in rural versus urban settings. Rural areas may face higher risks of certain environmental health problems like waterborne diseases, while urban areas may have different environmental health challenges related to air pollution and sanitation (Peters et al., 2008). Studies in southeast Nigeria have documented how geographic factors influence the incidence and intensity of catastrophic healthcare financing (Ichoku et al., 2009).

While the existing literature provides valuable insights into health financing patterns globally, several gaps remain that this study aims to address. First, most previous studies have not specifically focused on environmental health conditions as a distinct category requiring specialized financing approaches. Second, there is limited research examining the interaction between different types of health conditions (acute versus chronic) and financing strategies in the South Asian context. Third, much of the existing research focuses on urban populations or does not adequately distinguish between rural and urban financing patterns. This study contributes to filling these gaps by providing analysis of environmental health financing strategies using nationally

representative data from Nepal, with specific focus on the factors that predict household choices between different financing mechanisms.

## **Methodology**

This research paper had used a cross-sectional mixed research design where secondary data analysis has been used to investigate the household financing strategies in the treatment of environmental health in Nepal. The cross-sectional design was found suitable to measure the association between the household attributes and financing decision at a given time, whereas the quantitative design of the study helped in the statistical analysis of trends and predictors among a large national representative sample. The study took data using the Nepal Living Standards Survey (NLSS-IV) which was conducted by the National Statistics Office of Nepal in 2022-23. The NLSS-IV is a national-representative household survey data, which includes rich data on household demographics, health status, health expenditures, funding sources, socioeconomic status, and geographical location, and is the latest and most comprehensive household-level data on health financing in Nepal.

The stratified multi-stage cluster sampling method was used to make the NLSS-IV nationally representative in the seven provinces of Nepal and the ecological zones. The initial survey was a survey of 9,600 households with 46,870 people, who were sampled both in rural and urban regions. In this research, the analytical sample was limited to respondents who reported having health conditions and used health services within the period they referred to in the survey, and thus the final working sample of 9,600 households experienced a health expenditure. This limitation helped to make sure that the analysis was based on households with actual health financing choices and not the general population that might not have experienced the need to spend money on health issues.

The most important dependent variable is the health financing strategy, which is measured by survey questions on the primary source of money invested in health-care treatment and it is measured into four different strategies: savings (own or family savings), borrowing (formal and informal loans), asset sales (liquidation of land or livestock or other assets), and insurance (health insurance coverage). The independent variables were grouped out of three categories. The socioeconomic variables are the wealth quintile based on the household expenditure per capita and divided into five categories, geographic location, which is rural, urban, or Kathmandu metropolitan

area, household size, a continuous variable, and the age of the individual. The variables of health condition are environmental health status which is a binary variable and illness type, which can be acute or chronic. The variables of asset ownership include land ownership and livestock ownership, which are both binary measures.

The data analysis was systematic in three phases with the help of SPSS. The first stage involved the calculation of descriptive statistics, frequencies and percentages of the categorical variables; means and standard deviations of the continuous variables. The bivariate analysis in the second stage was conducted using Pearson chi-square test of independence to find out the relationship between financing strategies and the significant independent variables. Chi-square value is calculated as:

$$\chi^2 = \sum \sum (O_{ij} - E_{ij})^2 / E_{ij} \dots\dots\dots (1)$$

In which O denotes the observed number in the i -th row and j -th column of the contingency table and E denotes the corresponding expected number under the null hypothesis of independence, which is defined as the product of the respective row and column marginal totals divided by the grand total. The statistic of the test follows a chi-square distribution with degrees of freedom of (r-1) (c-1) where r and c represent the number of rows and columns respectively. The null hypothesis of no association is abandoned when computed chi-square is greater than the critical value at the five percent level of significance.

In the third step, binary logistic regression was used to find statistically significant predictors of the financing strategy choices even with the existing confounding factors. Since borrowing is the most policy-corresponding financially relevant alternative financing mechanism, a binary logistic regression model was estimated using borrowing (1) as the dependent variable and non-borrowing (0) as the independent variables. The logistic regression model assumes the following form:

$$\ln[P(Y=1) / (1-P(Y=1))] = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon_i \dots\dots\dots (2)$$

In which, P (Y=1) is the probability of the household adopting borrowing as the source of financing, the left-hand side of the equation is the natural logarithm of odds ratio (logit), b0 is the intercept term, and  $\beta_1$ - $\beta_4$  are the estimated coefficients of the independent variables. Particularly, X<sub>1</sub> is the wealth quintile (the poor half is taken as the reference group), X<sub>2</sub> reflects the age of the

citizen,  $X_3$  is the household size, and  $X_4$  is the land ownership (binary). Equation (2) can be used to obtain the probability of borrowing:

$$P(Y=1) = \exp(\beta_0 + \beta_1X_1 + \dots + \beta_kX_k) / [1 + \exp(\beta_0 + \beta_1X_1 + \dots + \beta_kX_k)] \dots\dots\dots (3)$$

The odds ratios are obtained as the exponentiated values of the coefficients obtained in the logistic regression, which are represented as  $\exp(\beta_k)$ . The odds ratio of more than one implies that when there is an increase in the corresponding independent variable the probability of borrowing increases with the increase in the independent variable whereas the odds ratio of less than one implies the opposite. Individual coefficients were tested using the Wald test statistic, which is calculated as:

$$W = (\beta_k / SE(\beta_k))^2 \dots\dots\dots (4)$$

Where the estimated coefficient is denoted by  $\beta$  and its standard error is denoted by  $SE(\beta_k)$ . The Wald statistic is distributed in a chi-square with one degree of freedom when using the null hypothesis that the beta equals 0. The overall goodness -of-fit of the logistic regression model was determined by the use of the Hosmer-Lemeshow test, Nagelkeke pseudo  $R^2$  and the accuracy in classification and prediction of the predicted against observed outcome.

**Results and discussion**

The empirical study begins with a thorough review of the sample nature, as shown in Table 1.

**Table 1: Sample Characteristics**

<b>Variable</b>	<b>Frequency/Mean</b>	<b>Percentage</b>
Total Sample	9,600	100.0%
Female	4,676	48.7%
Average Age	30 years	–
Average Household Size	4 people	–
Has NCD	6,291	65.5%
Recent Illness (30 days)	5,125	53.4%

Urban Residents	4,764	49.6%
Rural Residents	768	8.0%
Kathmandu Residents	4,068	42.4%

(Source: Study, 2025)

The sample of the study was a total of 9,600 individuals that were selected in domestic dwellings scattered across the seven provinces of Nepal. The demographic factor showed that the gender distribution was almost equal with a proportion of 48.7 percent of females in the sample and the average age of the respondents of 30 years. The household size was four persons which is normative of the national demographic trends and or the fact that the family size is slowly shifting to smaller houses in the recent decades. Health status indicators were used to show that a large majority (65.5 percent) reported non-communicable diseases but 53.4 percent had an illness episode in the past 30 days. The geographic sampling indicated that 49.6 percent of those interviewed lived in urban, 42.4 percent in Kathmandu metropolitan area and only 8.0 percent in a rural area thus reflecting the sampling structure of the survey and current process of urbanization that characterizes the Nepal demographic environment.

Table 2 shows the general distribution of health-financing strategies in the sample.

**Table 2: Overall Health Financing Strategies**

<b>Financing Strategy</b>	<b>Frequency</b>	<b>Percentage</b>
Savings	7,949	85.0%
Borrowing	1,034	11.1%
Asset Sales	104	1.1%
Insurance	268	2.9%
Total	9,355	100.0%

(Source: Study, 2025)

In examining health-financing strategies, it was observed that savings form the huge preponderance of providing the means of financing health expenditures in Nepal, used by of 85.0 percent of all households. The second most widespread strategy was borrowing (11.1 percent) which means that one in nine households turned to debt to spend on health care. A small proportion of 2.9 percent was under insurance coverage which is an indication of the recent low penetration of health insurance despite the recent policy measures to seek the growth in coverage under the Social Health Security Programme. The least popular tactic was asset sales with just 1.1 percent which points to liquidation of productive assets as a last -resort tool of most households. The high dependency of savings poses serious concerns regarding financial vulnerability, especially when considering the lower-income households where the savings buffer might not be enough in case of huge or recurrent health spending shocks.

The breakdown of the financing patterns according to the household wealth status depicted some surprising findings as shown in Table 3.

**Table 3: Health Financing Strategies by Wealth Quintile**

<b>Wealth Quintile</b>	<b>Savings</b>	<b>Borrowing</b>	<b>Asset Sales</b>	<b>Insurance</b>	<b>Total</b>
1 (Poorest)	86.6%	9.8%	0.7%	2.9%	100.0%
2	86.4%	10.1%	1.4%	2.1%	100.0%
3	85.4%	10.7%	1.1%	2.9%	100.0%
4	84.2%	11.4%	0.8%	3.6%	100.0%
5 (Richest)	82.9%	12.8%	1.5%	2.9%	100.0%

(Source: Study, 2025)

The wealth stratified analysis has shown a counter-intuitive behaviour that disapproves traditional assumptions on health financing behaviour. The lowest-income households showed the greatest dependence on savings with 86.6 percent, and the richest 25 percent showed the lowest usage of savings with 82.9 percent, providing an almost continuously decreasing gradient throughout the wealth distribution. On the other hand, the wealth gradient in borrowing was positive and increased in a monotonous fashion considering the 9.8 percent borrowing among the poorest to 12.8 percent

among the richest households. Two complementary mechanisms can be used to explain this paradox in wealth. First, the households with higher wealth have better collateral and creditworthiness that enable them to access better formal and informal credit market, which makes it easy to borrow when there are health expenditures. Second, the high savings dependency of the poorest quintile is probably due to bound choice as opposed to true financial resiliency because these households might not have access to other financing options including credit or insurance, and their use of reported savings could be simply the erosion of already small financial buffers. The utilisation of insurance did not exhibit any definite wealth gradient, and ranged within 2.1-3.6 percent in all five quintiles, which indicated that health-insurance uptake in Nepal is not motivated by the household economic capability but by the position of the programme and its awareness.

Geographic location proved to have statistically significant effects on the choices of financing as in Table 4.

**Table 4: Health Financing Strategies by Location**

Location	Savings	Borrowing	Asset Sales	Insurance	Total
Rural	81.2%	12.6%	0.9%	5.2%	100.0%
Urban	83.5%	12.5%	1.3%	2.7%	100.0%
Kathmandu	87.4%	9.1%	0.9%	2.7%	100.0%

(Source: Study, 2025)

It was found that the geographic analysis showed significant spatial inequalities in health-financing behaviour. The concentration of higher-income jobs and higher liquidity in the capital city is reflected by Kathmandu residents being the most reliant on savings at 87.4 percent as compared to 83.5 percent of urban residents and 81.2 percent of rural residents. One of the most impressive results is that, rural households were the most insurance utilised at 5.2 percent almost twice the insurance utilisation rate in urban and Kathmandu. This apparently counterintuitive finding is presumably an effect of the deliberate application of community-based health-insurance programmes and government social-health-security measures that have become a priority in rural districts as a strategy by Nepal to bring financial security to the underserved individuals. The rates of borrowing in rural (12.6 percent) and urban (12.5 percent) regions were similar, although the

rates in Kathmandu (9.1 percent) were quite lower, which is why the residents of capital areas have a higher level of financial liquidity and thus require less debt funding of health care. Urban households had the greatest propensity of asset liquidation at 1.3 percent and this could be a result of higher asset liquidity and more established markets to sell assets in the urban environment.

Table 5 shows that a significant variation is found in the ways of financing the strategies in the environment and non-environmental health conditions.

**Table 5: Financing by Environmental Health Status**

Condition Type	Savings	Borrowing	Asset Sales	Insurance	Total
Non-Environmental	85.5%	10.8%	1.1%	2.5%	100.0%
Environmental	80.7%	12.8%	0.9%	5.6%	100.0%

(Source: Study, 2025)

The environmental health environment influenced households to have more diversified financing methods as opposed to non-environmental health environment. In the case of non-environmental conditions the reliance on savings went down to 85.5 percent whereas, in the case of environmental health conditions, the reliance on savings dropped to 80.7 percent which is a difference of almost five percentage points implying that environmental illnesses are placing an extra burden on the household savings. On the same note, the borrowing (12.8 versus 10.8 percent) and insurance utilisation (5.6 versus 2.5 percent) rose regarding environmental conditions. The environmentally greater insurance cover on the environmentally related health conditions could be due to the fact that the water-borne illnesses and respiratory diseases would be included in certain insurance benefit packages or it could be that the household in the environmentally susceptible areas have been more aggressively targeted by the insurance enrollment programs. These results highlight the unequal economic burden of environmental health risks on the family.

When the acute and the chronic condition was distinguished, differences in financing behaviour were even more pronounced as indicated in Table 6.

**Table 6: Financing by Illness Duration**

Illness Type	Savings	Borrowing	Asset Sales	Insurance	Total
Acute (Recent)	93.8%	4.8%	0.6%	0.8%	100.0%
Chronic (NCD)	80.3%	14.4%	1.4%	4.0%	100.0%

(Source: Study, 2025)

It was the acute-chronic comparison that yielded the most interesting financing differentials in the whole analysis. Dependence on savings was overwhelming at acute illnesses and there was little use of other operating mechanisms at 93.8 percent, indicating that the generally lower, more predictable costs linked with episodic health events can be reconciled with given household budgets. Chronic conditions, on the other hand, demanded differentiated financing strategies, as reliance on savings fell to 80.3 percent, borrowing surged to 14.4 percent and insurance utilisation shot to 4.0 percent. Even the asset sales doubled 0.6 to 1.4 percent in the case of chronic conditions. These trends are in line with the economic burden literature on non-communicable diseases, which records how long-term, recurrent, and cumulative nature of chronic illness treatment slowly drains the household savings and forces families to pursue external finance by debt or collateral sales with potentially catastrophic effects on long-term household economic security.

The logistic regression analysis determined that a number of significant predictors of the behaviour of borrowing existed and the findings are presented in Table 7.

**Table 7: Logistic Regression Results for Borrowing**

Variable	Coefficient	P-value	Interpretation
Wealth Quintile 5	0.322	0.003**	Richest 38% more likely to borrow
Age	0.005	0.001**	Older individuals more likely to borrow
Household Size	0.043	0.014*	Larger families more likely to borrow
Owens Land	0.408	0.000***	Land owners 50% more likely to borrow

(Source: Study, 2025) \*Note: \*\*\*, \*, \* denote significance at 1%, 5%, and 10% levels respectively

The outcomes of the multivariate logistic regression showed that land ownership was the largest and the most significant predictor of borrowing behaviour, whose coefficient of 0.408 ( $p < 0.001$ ) was associated with an odds ratio of about 1.50. This observation reveals that agricultural land purchasing households are fifty percent more likely to borrow to finance their health status than landless households, other factors being held constant. The outcome highlights the success of collateral in accessing credit because land is the sole type of security that both formal financial institutions and unscrupulous moneylenders in the rural credit markets of Nepal accept in their credit provision. Wealth quintile also showed positive correlation significant at 38 percent with the richest households more likely to borrow the poorest households (coefficient 0.322,  $p = 0.003$ ), which again supports the conclusion that borrowing power is not the result of financial desperation but an economic status. The age was found to have a very small yet significant positive impact (coefficient = 0.005,  $p = 0.001$ ) implying that older people, those more prone to incurring chronic and expensive health expenses, are moderately more inclined to borrow. The size of the household was also found to be positively related to borrowing (coefficient = 0.043,  $p = 0.014$ ) since the larger the household, the higher the aggregate health expenditure requirement and consequently, the household savings may not be sufficient to finance the spending, hence, it has to seek external funding. This combination of findings suggests that the asset endowment and economic status impact more than the acuity of financial requirement in determining the ability to borrow to fund health in Nepal, thus, suggesting that an important equity challenge has been posed in terms of access to credit-based coping strategies among the poorest households.

The results of this paper give valuable information about the health-financing situation in Nepal. Placed in the context of the overall body of literature available, they indicate consistency and deviation in trends as compared to previous studies in the contexts of a developing country. The excessive use of the savings as the main health-financing mechanism is not new to the Nepal setting since the same pattern is evident in the 85.0 percent of Nepalese households where out-of-pocket payments are the leading form of health-care financing. According to the estimates by the World Health Organization, about 150 million individuals (annually) face severe economic challenges due to health-care payments (Eze et al., 2022), which serves as a sobering context in which Nepal reliance on heavy savings has to be assessed as it implies that numerous households in the group of so-called financing via savings are actually diminishing already scarce financial resources to the extent that it represents catastrophic spending. This issue is supported by the

definition of catastrophic health expenditure introduced by Njagi et al. (2018), which defines this phenomenon as out-of-pocket spending that compels households to forego other fundamental needs, sell assets, take up debt, or become poor a stage that many Nepalese households must presumably reach even when they nominally depend on savings.

The counterintuitive wealth paradox found in this study i.e. the poorest households were the most reliant on savings (86.6 percent) and the richest the least (82.9 percent) and the borrowing rate should be higher than the former makes the simplistic assumptions about the connection between poverty and financial vulnerability to health shocks. This outcome is consistent with van Doorslaer et al. (2007), who in their detailed multi-country study of Asia, established that households living in rural and lower-income areas experience systematically disadvantaged health-financing restrictions as compared to their rich counterparts. This tendency of higher borrowing rates amongst the more affluent households in the current study could not be traced back to the higher need of borrowing but could be, instead, the result of having a better access to the credit markets, which also reflects the results of the Peters et al. (2008) study, who showed that those households that were more rural and had less economic means had significantly lower access to the formal financial service. Therefore, the lowest income families in Nepal are not choosing savings-based financing due to financial ease but due to a lack of alternative options, which is a kind of constrained decision that hides the underlying vulnerability but not strength.

The observation that land tenure became the most predictive of borrowing behaviour i.e., land-owning households were half as likely to borrow to finance health was in line with the literature on the concept of asset-based coping in developing countries. It was reported by Bonu et al. (2005) in the Indian setting that, households use borrowing and the sale of assets to cover the costs of hospitalisation and access to these mechanisms is fundamentally dependent on asset endowments that exist in the absence. This interpretation is further supported by the significant positive relationship between wealth quintile and the probability of making a catastrophic health expenditure as well as the wider evidence concerning sub-Saharan Africa where Njagi et al. (2018) observed that the probability of catastrophic expenditure on health at the ten percent threshold of household income was 23 percent on average with non-resource endowed people being disproportionately impacted. The situation in Nepal where the ability to borrow is being defined by the availability of collateral rather than as influenced by the intensity of health-expenditure

need brings serious equity issues, concerning the allocation of financial-risk coverage among the population.

The health financing geographic differences found in the present study are specifically interesting and enhance the gap left in the available literature. The observation that rural households show the greatest insurance utilisation of 5.2 per cent, virtually twice that of urban and Kathmandu regions is somewhat against the observation of Peters et al. (2008) who have recorded that populations in rural settings in developing countries are generally less exposed to formal financial services and by extension insurance. Such a surprising outcome can be attributed to the systematic implementation of community-based health insurance programmes in rural Nepal, as the systematic review of Eze et al. (2023) did, revealing that community-based health insurance may lead to better health-care utilization in some implementation settings. Nevertheless, the more generalized conclusion of Habib et al. (2016), who in a systematic review of micro-health insurance reported that the effect of such schemes on financial protection is highly differentiated in different settings and implementation models, warns not to believe that the increase in the number of people insured in rural areas is automatically associated with the achievement of financial protection. The geographic variation realized in this study also echoes the results of Ichoku et al. (2009), who established in south-east Nigeria that the geographic factors can play a major role in the occurrence as well as the severity of the catastrophic health-finance.

Among the most policy-relevant contributions of the present research is the markedly different financing pattern which is evident between environmental and non-environmental health conditions. The decreased savings dependence and augmented borrowing and insurance expenditure on environmental health status are in line with the larger data regarding the monetary load of particular category of diseases. The condition of malaria, tuberculosis and other diseases which are related to the environment has been determined to be especially financially hard on families in developing countries, and the current research expands this statement to the Nepalese situation (Russell, 2004). In addition, Kumar and Vollmer (2013) also showed that better sanitation can significantly decrease childhood diarrhea and the financial burden of such disease to households, indicating that preventive environmental health measures may reduce the cost of financing curative care. The observation that environmental health conditions were more associated with a more diversified financing strategy, with significantly higher insurance

utilisation at 5.6 compared to 2.5 percent, is consistent with van Doorslaer et al. (2007) argument that environmental health conditions are among the primary contributors to the disastrous expenditure burden in Asian countries and that they may reduce the need to protect this spending with specially designed financial mechanisms.

The overall low rate of 2.9 per cent of insurance utilisation, which is found in this study, indicates a severe deficiency in the Nepalese health financing institutional framework and is consistent with the mixed evidence on health insurance performance in the developing world. Islam et al. (2017) recorded extreme disparities in monetary risk coverage in Bangladesh in spite of a universal health cover endeavor, and Soyuk (2023) has shown that the design and execution of health insurance schemes have a strong influence on their effect on catastrophic spending. The discovery of Ekman (2007) perhaps is most appropriate as he revealed the opposite of what many would think: insurance does not always grant the expected financial support and perhaps further expansion of enrollment without considering the benefit design, provider networks, and claims procedures proved ineffective. The Nepalese experience of insurance representing less than three percent of health-financing episodes although there is the social health security program in place implies that obstacles to effective insurance coverage go far beyond enrollment and perhaps includes the problem of benefit adequacy, provider access, and claims complexity that has been proposed by the existing literature as typical impediments of insurance schemes in developing countries (Habib et al., 2016).

Lastly, the general trend of the results provided in this paper fills in a number of gaps that have been established in current literature. Although other studies have been conducted on health-financing determinants among certain population groups like Kenyan slums communities as described by Buigut et al. (2015) and Garg and Karan (2009) among states in India, there is scanty research focusing on the direct relationship between environmental health situations and the financing approaches based on nationally representative data. This paper will show that environmental health status is another financing problem that ought to be separately addressed by policy because households who face environmental health problems have systematically different coping behaviour than households who face non-environmental health problems. All these indicators strongly implicate the need to have multi-pronged reform agenda in Nepal that would result in increased insurance coverage, better access to credits by the asset-poor households and

enhanced investment in environmental health prevention to cut down the upstream burden of disease that transfigures catastrophic spending on the most vulnerable populations.

## **Conclusion**

This study examined how 9,600 people in Nepal pay for environmental health treatments using data from a national survey. The research found that most families (85%) use their own savings to pay for health care, but there are important differences between rich and poor families. Surprisingly, poor families depend more on savings (86.6%) than rich families (82.9%) because they have limited access to other options like loans or insurance. The study also discovered that chronic diseases and environmental health problems require more complex ways of paying, with people more likely to borrow money or use insurance compared to simple, short-term illnesses. An important finding was that families who own land are 50% more likely to borrow money rather than sell their property, showing that they use land as security for loans rather than selling it directly.

These results are important for making better health policies in Nepal. Since poor families mostly rely on their own money and have trouble getting loans, the government should help them access affordable credit options. The fact that environmental health problems and long-term diseases need different payment strategies means policies should be designed differently for different types of health issues. The findings suggest several policy recommendations. First, expand access to affordable credit for poor households through microfinance institutions and community-based lending programs. Second, develop specialized insurance products that specifically cover environmental health conditions and their seasonal patterns. Third, strengthen community-based insurance schemes in rural areas where they show higher uptake rates. Fourth, create asset-backed lending programs that allow households to use land as collateral without risking ownership. Future research should examine the long-term effects of different financing strategies on household welfare and investigate how climate change might affect the burden of environmental health problems and associated financing needs.

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