Assessing the Contribution of National Health Insurance Scheme to Reduce Household Out-of-Pocket Payments for Healthcare in Nepal [1]

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Abstract

Nepal launched National Health Insurance Scheme (NHIS) in 2016 aiming to reduce out-of-pocket (OOP) payments for healthcare and to ensure financial protection of households in healthcare and increase healthcare access. The systematic impact analysis of the NHIS in Nepal is sparse. The objective of the study was to analyze the contribution of NHIS to reduce OOP payments for healthcare and increase healthcare access and ensure financial protection. The primary data for this study were collected from nine wards of Tikapur Municipality of Kailali district using a structured questionnaire during first quarter of 2025. The sample of the study was 120, consisting of 62 within the experimental group and 58 in the control group from nine wards using proportionate stratified sampling based on the number of enrollee in each ward, with purposive sampling applied within strata. The Eviews software was applied for statistical analysis of the data. The estimated result of multiple regression analysis shows that the households enrolled in insurance scheme are able to reduce OOP payments for healthcare by 6.7 percent ($p < 0.01$). Moreover, the analysis revealed that higher healthcare utilization and the presence of chronic disease in household significantly increase household OOP payments. Conversely, the higher education levels of household heads

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are associated with the lower OOP payments for healthcare, indicating educated households head may be opting for cost effective healthcare thereby emphasizing preventive care. The findings highlight the increased contribution of NHIS of Nepal for the financial protection of households in healthcare expenditure and also provided valuable insight for policy implication for reforming the scheme expanding benefit package and improving administrative procedures to increase effectiveness of NHIS of Nepal.

***Keywords*:** National health insurance, OOP payments for health, financial protection
JEL Classification: I13, I14, H51, I38

Introduction

The household out-of-pocket (OOP) payment for healthcare refers to a direct payment for healthcare goods and services from the household primary income or savings, where the payment is made by the user at the time of the purchase of goods or direct health care services, such as medicines, consultation fees, and laboratory diagnostic tests (Ruggeri & Yu, 2023; WHO, 2012; Wagner et al., 2011).The OOP payments for healthcare are a significant burden on households in Nepal, where a substantial proportion of healthcare costs are paid directly by households and individuals. In this context, human health is one of the important dimensions of human capital (Fahad et al., 2023) and it is one of the main determinants of economic growth and productivity for any economy (Cole & Neumayer, 2006). Obviously, the financial pressure often leads to reduced access to necessary healthcare, delayed treatments, and, in severe cases, pushes families into poverty (Thapa & Pandey, 2020). Nepal's healthcare system faces a significant reliance on household OOP payments, creating substantial financial burdens for its citizens, particularly the low income section of society. In other words, government expenditure in the healthcare sector accounts for only 2.4 percent of GDP (MoPH, 2022), while Current Health Expenditure (CHE) per capita is USD 65.30 (WHO, 2023). In this context, household OOP payments for health constitute 57.9 percent of CHE, with a per capita expenditure of NPR 3,642.9 (USD 31.2) in FY 2018/19. The method of health financing disproportionately affects low-income households, increasing financial hardships and limiting access to healthcare facilities (Łyszczarz & Abdi, 2021). Furthermore, per capita OOP payments for healthcare increased from NPR 3,344.4 (USD 29.6) in FY 2018/19 to NPR 3,642.9 (USD 31.2) in FY 2019/20 (MoPH, 2022). These

figures highlight the critical role of OOP payments in the healthcare system of Nepal and creating a regressive impact on the health equity or healthcare access, and necessitating urgent measures to reduce financial barriers for ensuring healthcare services. In nutshell, Nepal's healthcare system heavily depends on OOP payment for health (WHO, 2021) and this type of high dependency on OOP payments is Nepal's health financing structure is likely to reduce the healthy labour force, thereby falling in efficiency and productivity in the economy.

There is consensus amongst the economist that low investment in public healthcare sector causes deterioration of living standard of people and fall in human capital formation. Therefore, substantial expenditure in public health is a critical component in gauging the living standards of the population of any nation and plays crucial role for economic development, and economic development has an important impact on health outcomes (Ahangar et al., 2018; Subedi, 2018; WHO, 2016). Hence, as a component of human capital development, improved healthcare delivery contributes to labor productivity of a nation (Amiri et al., 2021; Khan et al., 2016) and a healthy population is a result of better public healthcare provision made by the government (Ayer et al.,2024; Subedi & Adhikari, 2025; Shadmi, et al., 2020). Concerning this matter, by allocating sufficient resources to healthcare sector, countries try to achieve twin goals; firstly, reduction in the burden of diseases, thereby preparing healthier, more capable and productive workforce and secondly, fostering economic growth and productivity (Yellaiah, 2013; Raghupati & Raghupati, 2020; Magnusson, 2009). This study assesses the impact of the National Health Insurance Program (NHIP) on household OOP payments for healthcare in Nepal. Nepal, being a low income country, healthcare expenditure optimization is a pertinent issue. The research, based on empirical evidence from Tikapur Municipality, aims to understand how enrollment in the NHIP affects OOP payments for health and healthcare utilization, highlighting the ongoing challenge of affordable healthcare access in Low and Middle Income Countries (LMICs).

Nepal's journey with health insurance began in 1976 at Patan Hospital in Lalitpur. A second effort was made in 2000 by BP Koirala Institute of Health Sciences, covering 17 communities in Morang and Sunsari. In 2003, the government piloted insurance in six primary health care centers (PHCCs), followed by a free health care program in 2007 that offered Primary Healthcare Centre-level services and 35 essential medicines at no cost. Despite these steps, households faced rising financial burdens. To

address this, the Social Health Insurance Policy was introduced in 2013, leading to the creation of the Social Health Security Development Committee in 2015 and the launch of the Social Health Insurance Program in 2016 (Pradhan, 2022; Subedi & Shahi, 2025). By 2017, it was integrated into the Health Insurance Board.

The scheme aimed to improve service quality and protect families from financial hardship and to ensure Universal Health Coverage (UHC). But the studies show that OOP payments for healthcare still dominate Nepal's healthcare financing (WHO, 2021).Hence, UHC would be far cry, if this pressing issue of OOP payment for health is not addressed. Thus, Nepal's healthcare system is suffering from this pressing issue. While health insurance schemes have been introduced in Nepal to alleviate these burdens, it remains unclear to what extent health insurance effectively reduces OOP expenses and protects families from healthcare-related financial hardships. In this context, it is imperative to calibrate the efficacy of health insurance in reducing OOP payments depends on factors such as enrollment rates, coverage adequacy, and service utilization patterns (Subedi, 2023). However, limited empirical research has been conducted to quantify the impact of health insurance on OOP payments in Nepal, creating a gap in knowledge that hinders policy improvements.

This study seeks to address this gap by estimating the extent to which health insurance contributes to reducing OOP payments, providing evidence to guide policy and enhance the effectiveness of health insurance programs in alleviating healthcare burdens on Nepali households. Therefore, the pertinent research questions were: How do socio-economic and demographic characteristics of service receivers' households affect the health insurance enrollment in OOP in the study area? To what extent does health insurance enrollment reduce the burden of household OOP payments for healthcare in in the study area? The general aim of the study was to assess the role of health insurance in reducing financial burdens on households, improving access to healthcare, and identifying key factors influencing its effectiveness in the context of Nepal's healthcare system. Hence, in compliance with above research questions, firstly this study aims to analyze the socio-economic and demographic factors influencing health insurance enrollment and their association with OOP payments for healthcare in the study area. Secondly, it aims to estimate the contribution of health insurance scheme in reduction of OOP payments for healthcare in the study area. Thus, the research questions and objectives provide a clear framework for investigating the impact of health insurance on

OOP payments in Nepal, followed by determinants of health insurance enrollment and healthcare utilization in Nepal.

Review of Related Literature

Theoretical perspectives

Theoretical discussion provides appropriate guidelines for carrying out study in appropriate direction. In this context, it is desirable to go through the underpinning of the relevant theories for successful completion of the stud. Rothschild and Stiglitz (1978) proposed pooling and separating markets to address inefficiency in asymmetric information. Theories of moral hazard and adverse selection explain that insurance may increase unnecessary healthcare use (Cutler, 2000) and attract high-risk individuals, raising premiums and weakening financial protection (Nyman, 2004; Pauly, 1968). Newhouse (1993) highlights the role of technology, insurance, and consumer behavior in driving healthcare costs, stressing reforms that improve efficiency and quality rather than only cutting costs.

Rand Health Insurance Experiment highlighted how cost-sharing can affect healthcare utilization in the society. The theory postulates that individuals with higher cost-sharing reduce their use of both necessary and unnecessary services. This indicates that OOP payments can distort healthcare consumption patterns. Therefore, the Rand Health Insurance Experiment provided valuable insights into the dynamics of health insurance and highlight the effects on healthcare utilization and health outcomes pay attention for careful consideration of cost-sharing structures in health policy of country (Newhouse, 1993). Hence, health insurance makes mechanism for risk pooling, where the financial risk of healthcare expenses is distributed among all insured individuals. This pooling system reduces the financial burden on any single person. This system potentially lowers OOP payments for health when health issues arise (Arrow, 1978).

Grossman (1972) views health as both consumption and investment, influenced by income, education, age, and health status. Andersen's model explains healthcare use through predisposing (age, gender, education), enabling (income, insurance), and need factors (illness, perceived health). Integrating these models offers a comprehensive framework for analyzing determinants of insurance enrollment, healthcare use, and OOP payments, suitable for Nepal's context (Kimani et al., 2014). Therefore, current study applies Grossman's (1972) Health Demand Model and Andersen's (1995) Behavioral

Model of Health Services Use to assess Nepal's National Health Insurance Scheme (NHIS) program in reducing OOP payments.

Empirical review

The empirical literature subsequently explores the impact of health insurance on reducing OOP payments and improving healthcare access across diverse national settings.Sepehri et al. (2006) found contribution of health insurance to reduce OOP payments for health at leat16 percent to 18 percent and the reduction in expenditure is more pronounced for individuals with lower incomes. Parmar et al. (2023) found that the Indian National Health Insurance Scheme reduced OOP payments for health by 13 percent in India. Aji et al. (2013) states that Indonesia introduced three large health insurance schemes namely Askes (for civil servants, pensioners of civil servants and armed forces introduced in 1968), Jamsostek (for private formal employees introduced in 1992), and Askeskin (for poor people introduced in 2005). These health insurance schemes in Indonesia contributed to increase healthcare access, and also contributed to reduce the OOP payments with mixed effect. The evidence showed, Askeskin decreased OOP payments for health by 34 percent, Askes by 55 per cent compared with non-Askeskin and non-Askes, respectively. But, Jamsostek was found to bear a non-significant effect on OOP payments expenditures.

Goldman et al. (2018) study found that mean OOP payments for healthcare decreased by 11.9 percent in the first two years after insurance expansions, mainly among Medicaid and cost-sharing eligible individuals, and Medicaid-eligible households. Okoroh et al. (2018) findings demonstrated that the uninsured paid 1.4 to 10 times more in OOP payments for health as compared to insured and were more likely to incur CHEs than the insured. Similarly, Kanmiki et al. (2019) investigated the effect health insurance scheme in Ghana and concluded that OOP payment for health services and medications decreased by 63 percent and 62 per cent respectively and concluded that Ghana's national health insurance program has made significant contribution to reduce OOP payment for primary healthcare in public health facilities. Similarly, Tirgil et al. (2019) estimated about 33 percent reduction in OOP payments for health and it led to reduction in the incidence of catastrophic expenditures by nearly 50 percent.

Thuong et al. (2020) found health insurance policy helped increase in outpatient care utilization and reduction in OOP. The study estimated cost sharing for the poor decreased from 5 per cent to zero percent, and contributed to the poverty reduction from

20 per cent zero 5 per cent. Harish et al. (2020) study found significant reduction in OOP payments for health of health insurance insured persons. The study concluded improvements in enrolment and use of health insurance would ultimately result in improved patient satisfaction. Thapa and Pandey (2020) identified household size, educational status, and type of illness as main determinants of catastrophic health expenditure in Nepal.

Sarkodie (2021) findings that National Health Insurance Scheme(NHIS) in Ghana contributed to increases healthcare utilization by 26 percent and decreases OOP payment for health by 4 percent. Likewise, the study also identified income, age, sex, education, and location of residence as the main determinants of enrolling onto the NHIS. Similarly, Al-Hanawi et al. (2021) findings indicated that health insurance reduces OOP expenditure on health by 2.0 per cent and OOP expenditure on medicine by 2.4 percent amongst the general population in Saudi Arab. DucThanh et al. (2021) study finding revealed that health insurance provision reduced OOP payments foe health by about 21 per cent. The study also suggested that health insurance for the near-poor should be modified to increase their enrollment so as to promote universal health coverage in Vietnam. Ji et al (2024) concluded that public health insurance reduced OOP payments for health expenditure by 30 per cent without accompanying increases in healthcare utilization. But, Hooley (2022) study is contrasting with other study as this could not find the significant contribution of health insurance to reduce in OOP payments for health.

Sapkota et al. (2023) found that informal occupations and rural residency were significantly linked with lack of financial protection and lower healthcare utilization under Nepal's current health financing system. Cheng et al. (2025) investigated healthcare service use under Indonesia's national health insurance and found that utilization of outpatient/inpatient and maternal–child care was significantly influenced by wealth status, insurance type, age, gender, self-rated health, and rural–urban residence.

In summary, the empirical literature highlights the significant role of health insurance in reducing OOP payments for healthcare across diverse national contexts. Evidently, the studies show reductions OOP payments for healthcare ranging from 11.9 percent to 63 percent, with the effects more pronounced among low-income groups. In Indonesia, programs like Askeskin and Askes reduced OOP by 34 percent and 55 percent, respectively, while Jamsostek had no significant impact. Similarly, Ghana's NHIS reduced OOP payments by up to 63 percent, while India's and Vietnam's health

insurance schemes achieved reductions of 13 percent and 21 percent, respectively. Notably, health insurance expansion in countries like Saudi Arabia yielded modest OOP reductions of 2 percent and 11.9 percent. Moreover, programs in Vietnam and Turkey significantly lowered catastrophic health expenditures. Despite broad positive impacts, some studies, like Hooley (2022), found no significant effect. Overall, health insurance schemes have proven effective in reducing financial burdens, improving healthcare access, and enhancing patient satisfaction, especially in low- and middle-income countries. But, the existing body of literature did not demonstrate the literature in Nepalese context in general and particularly in the study area.

The existing literature presents the significant role of health insurance in reducing OOP payments for health and improving healthcare access, with varied nature of results across different countries. However, there is a remarkable gap in understanding the impact of National Health Insurance Scheme (NHIS) in the context of Nepalese in general and the selected study are in particular. The empirical studies from countries like India, Ghana, and Vietnam demonstrate positive reductions in OOP payments due to health insurance schemes, but such evidence for Nepal remains scarce. Moreover, the theoretical models discussed and summarized above, such as risk pooling, adverse selection, moral hazard, and catastrophic coverage, have not been extensively tested in the context of Nepalese healthcare system. In this regard, further research is required to explore how the National Health Insurance Scheme in Nepal affects OOP payments for healthcare, considering financial protection, and improvement healthcare access. Therefore, this research is expected to contribute for drawing valuable insights for improving the effectiveness and coverage of health insurance policies in Nepal.

Data and Methodology

The study applies a quantitative approach to examine the relationship between National Health Insurance Scheme (NHIS) enrollment and OOP payments for healthcare. A cross-sectional survey design is used, collecting data from household heads in Tikapur Municipality, Kailali district, Nepal. This area is chosen as it was the first local government to implement the health insurance scheme. The design captures a snapshot of insurance status and OOP payments, enabling comparison between insured and uninsured households. It follows a causal-comparative and retrospective framework, with NHIS enrollees as the experiential group and non-enrollees as the control. Relevant data was gathered using a structured questionnaire to identify determinants of healthcare

utilization, while in-depth interviews to elicit beneficiaries' experiences, enriching the understanding of program impacts.

The philosophical root of this study guides the research design, choice of methodology, data analysis and interpretation, and the overall analytical framework of the dissertation. In the ontological perspectives, this study assumes objectivism as the variables like socio-economic and demographic characteristics, health insurance enrollment, and OOP payments for healthcare are objective phenomena that can be observed and measured. Similarly, the constructs like OOP payments for health, health insurance enrollment status, household income, HH size, employment and so on are real and measurable. These are considered objective reality about healthcare and its financial impacts in Nepal. Similarly, in epistemological perspective, it follows a positivist approach, where knowledge is derived through empirical observation and statistical analysis. In the axiological perspectives, the study aims to be value-neutral, focusing on factual relationships amongst the construct without bias. Similarly, ethical principles are crucial, especially regarding the privacy and confidentiality of data and information provided by the respondents, informed consent from participants. Therefore, the study is expected to ensure that the findings benefit policymakers and service users without harm. Finally, in methodological perspective**,** the current study followed a predominantly, quantitative approach followed by qualitative approach to analyze the estimated outcome results. Therefore, it employs a mixed-methods approach combining both quantitative and qualitative methods.

The study population includes all NHIP beneficiaries in Tikapur Municipality, Kailali. A sample of 120 was selected: 62 in the experimental group (enrollees) and 58 in the control group (non-enrollees). Data were collected from nine wards using proportionate stratified sampling based on enrollee numbers, with purposive sampling applied within strata. A structured questionnaire was administered in early 2025. To enhance accuracy, the researcher used shorter recall periods, event anchoring, memory cues, calendars, and diaries, and compared responses with secondary data.

The structured questionnaire was prepared and it was administered through Google form to collect data. The enumerators were deployed to collect data. The enumerator was given orientation for data collection. The rapport was built with respondents to elicit insights into the impact of health insurance on OOP payments of

healthcare. The researcher utilized triangulation, standardize recall periods, and handle missing data to improve accuracy in healthcare utilization data analysis.

Operational definitions of variables and their measurement

The variables, their operational definition, nature and sources are of this study are presented the following Table 1.

Table 1

Variables and their Measurement

Variable Code	Operational Definition	Nature of Variable	Measurement Scale	Data Source
OOP	Out-of-Pocket payments for heath	Dependent	Continuous	Field
HiE	Health Insurance Enrollment	Independent	Binary	Field
HU	Healthcare Utilization	Independent	Continuous	Field
HHi	Household Income	Independent	Continuous	Field
HHs	Household Size	Control	Continuous	Field
Gen	Gender of household head	Control	Binary(Male=1, female=0)	Field
Chr	Prevalence of chronic disease in HH	Control	Binary(Yes=1, No=0)	Field
Emp	Employment status of HH Head	Control	Binary (Employed=1, No=0)	Field

The study employed predominantly quantitative approach to analyze the impact of the National Health Insurance Scheme on OOP payments for healthcare in Nepal. Therefore, quantitative data was analyzed using econometric techniques, specifically **OLS model** to estimate the effect of health insurance to reduce and OOP payments for health. Similarly, to summarize the data, descriptive statistics was used, while regression analysis evaluates the scheme's effectiveness across socioeconomic groups.

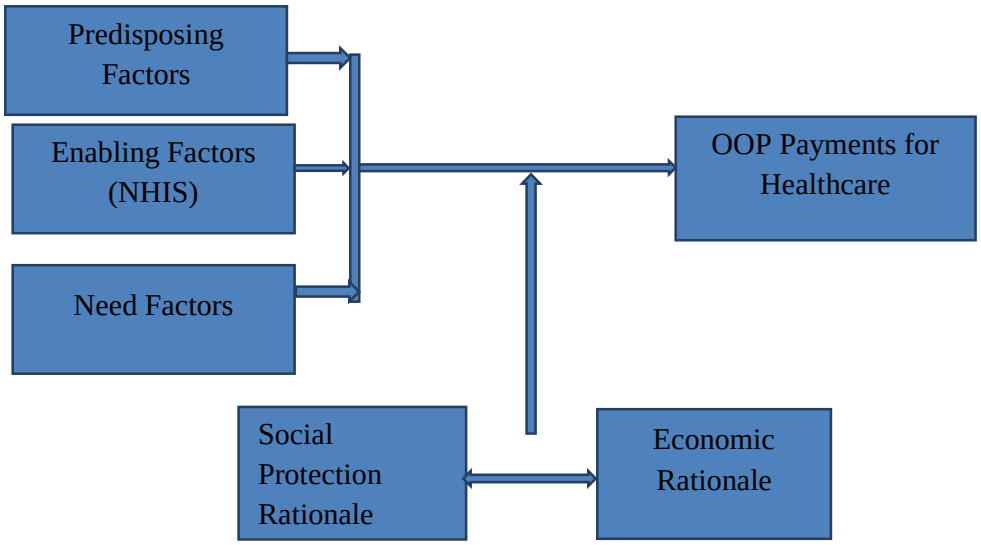
Conceptual framework of the study

Andersen Behavioral Model (1995) model has postulated key factors determining OOP payments for healthcare. Predisposing factors are attributes that make individuals more or less likely to use healthcare services before a specific need arises. They represent the social and demographic background influencing health behavior under Anderson model. Likewise, enabling factors refer to the conditions that make NHIS enrollment

possible and easier to access and use healthcare services, whereas, need factors represent the actual or perceived health conditions that drive individuals and households to enroll in NHIS for accessing healthcare services. In the Andersen Behavioral Model, these are considered the most critical and immediate determinants of NHIS enrollment for healthcare access because they reflect illness level and the individual's or HHs perceived need of healthcare. Moreover, social protection rationale refers to the justification for government or risk pooling intervention to reduce individuals' vulnerability to economic and financial risks. Furthermore, economic rationale refers to the justification for government intervention in healthcare service based on market efficiency, market failure, and long-term economic benefits. This study examines how Nepal's National Health Insurance Program (NHIP) contributes to reducing OOP payments for healthcare and its conceptual framework is built on Health Financing Theory and the Andersen Behavioral Model, which highlight the influence of individual, household, and system-level factors on insurance enrollment, healthcare use, and OOP payments for health as presented by the following figure.

Figure 1

Conceptual Framework for Healthcare Utilization



Note. The conceptual framework illustrated in the concentric circle diagram represents the multi-layered factors influencing health insurance enrollment**.** At the core is Health

Insurance Enrollment**,** which is directly shaped by theHealthcare Needs of Household Members.

Specification of regression model

The following the OLS regression model is estimated to calculate contribution of NHIS for OOP payments reduction and also identify the determinants of OOP payments for healthcare in the study area.

$$\text{OOP Payment}=\beta_0+\beta_1(\text{HiE})+\beta_2(\text{HHi})+\beta_3(\text{Edu})+\beta_4(\text{HHs})+\beta_5(\text{Emp})+\beta_6(\text{HU})+\beta_7(\text{Gen})+\varepsilon \quad ...(1)$$

In equation (1) above, β_0 denotes intercept and β_2, ... B_7 are the slope coefficients to be estimated. Likewise, ε stands for residual of error term. The acronyms given in the model are defined in Table 1 above.

Empirical Results and Discussion

The empirical result of the study is presented in a proper sequence subsequently.

Economic social and demographic profile of respondents

Table 2 below presents the socio-economic and demographic profile of households enrolled in the National Health Insurance Scheme (NHIS) provides important insights into the economic capacity, healthcare behavior, and willingness to pay (WTP) for improved insurance services among respondents. In fact, this understanding is important for assessing the sustainability and potential expansion of health insurance programs.

Table 2

Socio-Economic and Demographic Profile of Respondents

Particular	**Mean**	**SD**
Monthly average income HH members	8814.93	365.29
HH OOP payments for healthcare	2645.02	586.90
Household Size	4.45	1.54
Average age of HH head (in years)	52.10	14.68
Annual Hospital visit rate	10.35	0.84
Mean threshold of WTP for increased premium (in percent)	6.98	4.22
Social and Household Status of Respondents	**Response Category**	
Respondents with WTP for increased health	Yes79.04	

insurance premium	No 20.96
Education level of HH head (in Percent)	Illiterate 16.10Basic and Primary 32.20Secondary 27.40Bachelor 16.10Masters 8.10
Gender of HH Head (in percent)	Male 61.16Female 38.84
Employment Status of HHs Head (in percent)	Formal Employment 78.51 Informal Employment21.49
Prevalence of chronic diseases in HH(in percent)	Yes 51.60No 48.40

Note.Table 2presents key socio-economic and health-related statistics of the surveyed households in 2025.

Table 2 shows that the average monthly household income was NPR 8,814.93 (SD 365.29), with mean OOP healthcare payments of NPR 2,645.02 (SD 586.90), accounting for about 30 percent of income and indicating a significant financial burden even for insured households. The average household size was 4.45 (SD 1.54), while the mean age of household heads was 52.10 years (SD 14.68), suggesting higher health needs and reliance on insurance. Hospital visits averaged 10.35 per year (SD 0.84), reflecting high utilization likely encouraged by NHIS coverage. About 79.04 percent of enrollees were willing to pay higher premiums, with a mean threshold of 6.98 percent of income (SD 4.22).Regarding education, 16.10 percent of household heads were illiterate, 32.30 percent had basic education, 27.40 percent secondary, 16.10 percent graduate, and 8.10 percent master's degree, showing generally low to moderate educational attainment. The HH head with formal and informal employment are 78.51 percent and 21.49 percent respectively. Male household heads made up 61.16 percent compared to 38.84 percent female, consistent with patriarchal norms. Chronic diseases were reported in 51.60 percent of households, highlighting the role of insurance in covering long-term healthcare costs.

Estimated regression analysis result

The following the OLS regression model given in equation (1) is estimated to explore determinants of OOP payments for healthcare and to estimate contribution of NHIS to reduce OOP payments for healthcare. In other words, model was specified as OOP payments for healthcare is a function of health insurance enrollment status, HH income, education level of HH head, HH Size, employment status of HH head, and gender of HH head. The estimated result of the model is given Table 4 below.

Correlation matrix of explanatory variables

Table 3 shows the estimated result the correlation matrix which is important measurement of multicollinearity amongst the explanatory variables.

Table 3

Correlation Matrix of Explanatory Variables

Variables	lnHHi	lnHHs	lnHU	lnEdu	Chr	Emp	Gen	HiE
lnHHi	1.00	0.03	0.05	0.00	0.19	-0.21	0.22	0.03
lnHHs	0.03	1.00	-0.12	-0.01	-0.27	0.06	0.22	0.10
lnHU	0.05	-0.12	1.00	-0.17	0.33	0.12	0.25	0.08
lnEdu	0.00	-0.01	-0.17	1.00	-0.21	-0.15	0.04	0.02
Chr	0.19	-0.27	0.33	-0.21	1.00	0.31	0.14	-0.08
Emp	-0.21	0.06	0.12	-0.15	0.31	1.00	-0.10	0.19
Gen	0.22	0.22	0.25	0.04	0.14	-0.10	1.00	0.09
HiE	0.03	0.10	0.08	0.02	-0.08	0.19	0.09	1.00

Note. Table 3 shows the correlation matrix of explanatory variables and full form of acronyms are provided in Table 1. Data Source: Field Survey, 2025

Table 3 clearly shows that none of the independent variables are highly correlated ($|r| < 0.8$) except principal diagonal, suggesting the absence of multicollinearity issues. Hence, this indicates that the estimated coefficients in the logistic regression model provides stable and reliable coefficients, and the relationships among predictors do not distort the model's estimations. In this regard, Dormann et al. (2013) emphasized that multicollinearity can inflate the variance of coefficient estimates, leading to unreliable and biased results. However, since the correlations in this analysis are moderate or low, the risk of such distortions is minimal, ensuring the credibility of the model's inferential statistics and predictions.

Estimated result of empirical model and discussion

Table 4 shows the estimated result of OLS regression model where the model was estimated examine relationship between OOP payments for healthcare as the function of household income, household size, health insurance enrollment status, healthcare utilization trends, prevalence of chronic disease in household. Likewise, other control variables were education level, gender and employment status of household head. The Eviews software was applied for statistical analysis of the data.

Table 4

Estimated OLS Model for Estimating Determinants of OOP payments for Healthcare

Dependent Variable: OOP payments for Healthcare				
Variables	Coefficient	Std. Error	t-value	p-value
lnHHi	-0.232	0.018	-12.31	0.00
HiE	-0.067	0.007	-8.92	0.00
lnHHs	0.045	0.024	1.87	0.06
lnHU	0.270	0.013	20.16	0.00
lnEdu	-0.075	0.024	-3.10	0.00
Chr	0.093	0.009	9.86	0.00
Emp	0.055	0.018	3.03	0.00
Gen	-0.008	0.008	-0.98	0.32
Constant	4.393	0.088	49.77	0.00
R-squared	0.855			
Adjusted R-squared	0.846			
F-statistics	97.17			
D-W Statistic	1.90			

Note. Table 4 shows result of estimated regression model and used accronyms are defined in Table 1 earlier. Data Source: Field Survey, 2025.

Table 4 shows the estimated result of OLS regression model where the model explains approximately **85.5 percent**of the variability in the log of OOP payments for healthcare (lnOOP) at health level among households. The result shows that health**insurance enrollment** is significantly associated with a **reduction in OOP payments. In other words,**health**insurance enrollment** is contributing to reduce OOP payments for healthcare 6.7 percent. This result is confirming the protective role of insurance as reported by Xu et al. (2003). **Household Income (lnHHi)**is **significantly**

negative (-0.232, p<0.01), indicating that households with higher-income tend to have lower OOP payments. This result is consistent with findings by van Doorslaer et al. (2007) suggesting that richer households have better financial protection and access to pre-paid healthcare like insurance or employer schemes. **Household Size (lnHHs)**shows a **positive but marginally insignificant effect** (p < 0.10), implying larger families may spend more OOP payments for health, but the evidence is not strong. Moreover, h**ealthcare utilization (lnHU)**is **positively significant** (0.270, p<0.01) correlated with OOP payments for healthcare, meaning increased healthcare usage leads to higher OOP payments for healthcare as it is an expected result in OOP financing systems.

Education Level of HH head (lnEdu) is negatively influences OOP payments for healthcare (-0.075, p<0.01), indicating that better-educated households are more likely to avoid unnecessary, perhaps by making informed choices. This result is also consistent with the findings by Giedion and Uribe (2009). **Presence of Chronic Disease** at HH increases OOP payments for healthcare significantly (0.093, p<0.01). This result is also in line with global evidence that households with chronic illness burdens have higher financial burden (Wagstaff et al., 2003). The result also show that formally employed household heads are associated with **higher OOP payments for healthcare** compared to non-formally employed ones with the coefficient (0.055, p<0.01) suggests that households with a formally employed head spend about **5.5 percent more** on OOP payments than households with non-formally employed heads. The findings of Wagstaff et al. (2003) also confirm this. To sum up, health insurance significantly reduces household OOP payments for healthcare, while higher income and education levels also help in reducing these costs. The prevalence of chronic disease also increases OOP payments for healthcare, whereas the gender of the household head does not play a significant role on OOP payments for healthcare.

Conclusions and Policy Implications

The central focus of the current study was to assess the role of health insurance in reducing financial burdens on households, improving access to healthcare, and identifying key factors influencing its effectiveness in the context of Nepal's healthcare system. The estimated regression results reveal significant determinants of OOP payment for healthcare payments. The estimated result of multiple regression analysis shows that the households enrolled in insurance scheme are able to reduce OOP payments for healthcare by 6.7 percent (p <0.01). Moreover, the analysis revealed that higher

healthcare utilization and the presence of chronic disease in household significantly increase household OOP payments. Conversely, the higher education levels of household heads are associated with the **lower OOP payments for healthcare, indicating e**ducated households head may be opting for cost effective healthcare thereby emphasizing preventive care. However, limitations of benefit coverage and bureaucratic barriers are primary challenges of the scheme as perceived by the beneficiary. The findings highlight the increased contribution of NHIS of Nepal for the financial protection of households in healthcare expenditure and also provided valuable insight for policy implication for reforming the scheme expanding benefit package and improving administrative procedures to increase effectiveness of NHIS of Nepal.

Limitations and delimitations of the study

Limitations refer to the potential constraints in the study that are beyond the control of researchers. The limitations of the current study are as follows:

- The study is based on only 120 households, which may limit statistical power and generalizability.
- This study is based on the cross-sectional data from January to April 2025 and may restrict causal inference and tracking changes over time.
- Reliance on self-reported data for OOP payments, insurance status, and utilization may involve recall and social desirability bias.
- Traditional healing, informal care, and differences in health-seeking behavior may not be fully captured, affecting accuracy.
- Findings from Tikapur municipality may not represent urban or remote rural areas with different health infrastructures or coverage.
- Regional variations in insurance benefits, provider access, and administration that affect OOP payments were not controlled.

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