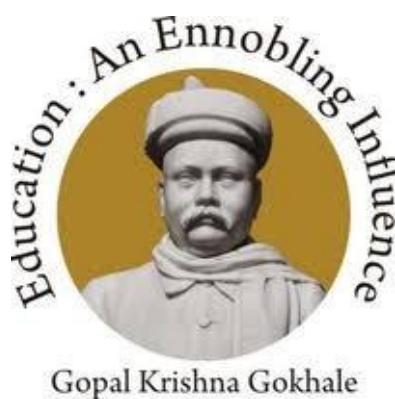


Health Insurance Coverage and Healthcare Utilization in India: Evidence and Insights from the Healthcare Market

By

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Abstract

India's healthcare system faces substantial challenges with high out-of-pocket expenditures and low insurance penetration. This research investigates health insurance coverage and healthcare utilization patterns in India, focusing on adverse selection and moral hazard phenomena.

The research explores relationships between chronic illness and insurance enrolment, examining how different ailment types influence coverage patterns and treatment-seeking behaviours.

Key findings reveal evidence of adverse selection, with chronically ill individuals having higher insurance coverage compared to healthy individuals. The analysis identifies potential moral hazard indicators, particularly among insured populations seeking treatment for accidental injuries and non-communicable diseases relative to communicable diseases. Socioeconomic factors significantly influence insurance participation. Household income, education, employment type, and social group membership emerge as critical determinants, highlighting persistent demographic disparities in coverage access.

The research quantifies behavioural patterns impacting insurance market sustainability in India. Evidence of adverse selection suggests need for risk-adjustment mechanisms, while moral hazard findings indicate importance of balanced cost-sharing arrangements. Pronounced socioeconomic gaps underscore urgency for targeted interventions supporting vulnerable populations.

These findings provide crucial implications for policymakers designing health insurance schemes under India's universal healthcare goals, recommending risk assessment frameworks, income-based subsidies, and targeted awareness campaigns for equitable coverage expansion.

Keywords: Health insurance, adverse selection, moral hazard, healthcare utilization, India, chronic illness, socioeconomic disparities

Introduction

Healthcare in India stands as one of the nation's most rapidly expanding economic sectors, with projections indicating sustained growth ahead. Yet, healthcare inequality remains a critical challenge for the policymakers. This problem extends domestically as well as globally. Examining the global scenario indicates that, catastrophic health spending—where out-of-pocket expenses surpass 10% of household consumption—has been climbing steadily across nations and time periods. The numbers are staggering: approximately 808 million individuals worldwide faced catastrophic healthcare costs in 2010, while 97 million people fell into poverty because of medical spending (Khan et al., 2021).

India follows this challenging global pattern. Research by several authors reveals that India bear enormous healthcare costs because existing prepayment systems and risk-sharing mechanisms fall deplorably short. Government healthcare spending and social insurance contributions are highly insufficient. Almost 78 percent of all healthcare expenditure comes directly from out-of-pocket expenditure (OOP) which is one of the highest in the world (Azam, 2018).

The healthcare financing landscape in India presents equally daunting challenges. The country allocates merely 1.15% of GDP to public health spending—among the world's lowest—while out-of-pocket healthcare expenses account for 50.6% of total health expenditure (Aashima & Sharma, 2023). This system places significant financial pressure on households, with roughly 78% of healthcare costs falling directly on individuals, pushing many families towards poverty through catastrophic medical expenses (Azam, 2018). These immense out-of-pocket expenditures create a vicious cycle through the way, they force households into poverty while causing catastrophic health expenditures (CHE), ultimately deterring many households from seeking essential medical care (Reshmi et al., 2021).

India's healthcare financing challenges run deep. The health financing framework fails to deliver adequate, high-quality healthcare services while leaving households vulnerable to financial losses arising due to medical expenses. Citizens receive poor quality of services for their healthcare investments, whether in public or private sectors. Public healthcare services, theoretically free or low-cost, remain severely inadequate. Consequently, most households turn to private healthcare that are expensive, unaffordable, unreliable, and financially catastrophic. Quality private healthcare remains elusive, especially in rural and remote regions. Many private practitioners lack proper qualifications and operate from substandard facilities. Household

significantly receive insufficient quantity and quality from their healthcare investments across both public and private sectors. Public services that should be accessible at free of cost or minimal fees remains grossly insufficient (Kumar et al., 2011).

The Indian government has made commitment to raise public health spending to 3% of GDP within the coming years. The critical challenge lies in determining the most effective ways to utilize this increased public funding. Over the past decade, India's policy discussions have evolved from achieving "health for all" to ensuring "health for all with financial protection. Driven by the aspiration of universal healthcare coverage for that both central and state governments have introduced numerous health insurance schemes in the recent past. This transformation has been remarkable in several ways, few of them are: from covering just 75 million people in 2007, health insurance coverage surged to 302 million by 2010. Government reports indicate health insurance reached approximately 15% of the population. This drastic expansion resulted primarily from launching India's flagship Rashtriya Swasthya Bima Yojana (RSBY) program (Mahapatro et al., 2017).

Indian healthcare receives funding from multiple sources, the sources include individual out-of-pocket payments, central and state tax revenues, external assistance, and private company profits (Azam, 2018). Apart from RSBY some additional programs include Pradhan Mantri Jan Arogya Yojana (PM-JAY) launched in 2018, alongside state-level initiatives such as Andhra Pradesh's Rajiv Aarogyasri Health Insurance Scheme (2007), Karnataka's Vajpayee Aarogyasri Scheme (2009-10), and Tamil Nadu's Chief Minister's Comprehensive Health Insurance scheme (2012). Most recently, India's central government launched PM-JAY, the world's largest government-sponsored health insurance scheme, covering nearly 500 million beneficiaries (approximately 40% of India's population), offering coverage 17 times higher (5 lakh INR annually per family) than the previous central scheme (RSBY) (Aashima & Sharma, 2023).

Even with countless health insurance programs available, India's coverage remains miserably low and predominantly voluntary, showing significant regional and socioeconomic gaps (Aashima & Sharma, 2023). The NSSO report indicates low coverage with only 14% of rural households and 19% of urban household have health expenditure coverage (*Household Social Consumption in India: Health NSS 75th Round (July, 2017 – June, 2018)*, n.d.).

Yet health insurance's core purpose—reducing financial risks from medical care and encouraging individuals to seek necessary treatment without fear of prohibitive costs remains unfulfilled (Sengupta & Roop, 2019). While India's various health insurance programs aim to

improve healthcare access for vulnerable groups, their success in reducing financial burdens and enhancing health outcomes sparks ongoing debate. Research shows that although health insurance can expand healthcare access, it does not necessarily eliminate inequalities rooted in socioeconomic differences (Dutta & Husain, 2013), which concerns the experts since health status usually correlates strongly with socioeconomic position. These insurance plans primarily cover hospital stays but exclude outpatient expenses like doctor visits and prescription medications (Sengupta & Rooj, 2019).

Though the disparity is not limited to socio-economic factors but also include disparity among the disease type. Both communicable and non-communicable diseases significantly influence healthcare use and costs throughout India. While the country continues to battle communicable diseases like tuberculosis and malaria, it simultaneously confronts increasing rates of non-communicable conditions including diabetes and heart disease (Aashima & Sharma, 2023). This dual disease burden affects insurance patterns, as people with chronic conditions more often seek insurance coverage due to their greater healthcare requirements.

Specifically, the rising disease burden has led the focus of researchers on two key concerns: First, people purchasing health insurance typically expect greater healthcare needs due to higher health risks. This phenomenon is commonly called adverse selection. Under this phenomenon the obstacles of Asymmetric Information arise, where one party (usually the insured person) knows more about their health condition than the insurer, potentially causing adverse selection. Second, health insurance lowers healthcare's effective cost, so insured people generally use more healthcare services. For instance, individuals previously undecided about using certain medical services at uninsured rates will likely use them with insurance coverage. This represents a direct price impact. A third, less recognized indirect relationship exists between insurance and healthcare: moral hazard may cause insured individuals to become less careful about unhealthy or risky behaviors, potentially creating more health problems requiring additional care. Essentially, people may change their behaviors in response to insurance status, thereby needing more healthcare (Dong, 2012).

These two economic phenomena lead to complex choices made due to incentives that distort healthcare markets. Adverse selection leads to insurance pools dominated by high-risk individuals, driving up premiums and potentially excluding healthy people, while moral hazard results in overconsumption of medical services, inflating overall healthcare costs. Together,

they represent fundamental market failures that threaten the sustainability and equity of health insurance systems.

This research specifically examines how chronic illnesses and disease types impact insurance coverage and the difficulties facing healthcare insurance markets. Since the relationship between health insurance and healthcare systems is intricate and multifaceted, addressing moral hazard and adverse selection challenges will prove essential for improving health insurance system effectiveness.

Literature Review

The discourse surrounding health insurance is multifaceted, extending beyond its potential to provide financial security against health risks.

However, A critical strand of literature initially highlights concerns about health insurance's limited capacity to foster equity in healthcare access and outcomes. The paper authored by Dutta and Husain (2013) examined the impact of health insurance on equitable access to hospital services in urban India, using unit-level data from the National Sample Survey Organization's from Jan to June 2004, Morbidity and Health Care Survey. Employing multivariate regression analysis, the study analysed the relationship between socio-economic status (SES) and hospitalization, finding that, contrary to developed countries, higher SES is associated with greater hospital service usage even with insurance. Their conclusion is that health insurance in India does not eliminate, and may even exacerbate, inequities in healthcare access related to SES disparities.

Although, this perspective is nuanced by research in specific contexts, such as rural settings. The study, Sihare et al. (2010) examined the impact of India's Rashtriya Swasthaya Bima Yojana (RSBY) micro health insurance scheme on the healthcare-seeking behaviour of the poor. The data has been collected with the help of semi-structured schedule from beneficiaries of RSBY scheme. The study contests the notion of moral hazard, arguing that increased utilization of healthcare by this population represents a 'moral opportunity' to improve their health and living standards. Analysing the effects of RSBY, the authors find that the scheme has commendably improved health outcomes; they suggest that expanding coverage to include preventive care would further reduce any incentives for misuse.

However, this optimistic view is challenged by the study conducted by Sheth (2021) the study, evaluated a micro health insurance (MHI) program offered through Self-Help Groups in Maharashtra, India, using a randomized controlled trial design to examine moral hazard and adverse selection. The study found no evidence of moral hazard, as MHI availability did not significantly increase healthcare utilization. However, it did identify adverse selection, with individuals reporting poorer prior health being more likely to enrol, suggesting that MHI offered through informal groups does not fully mitigate information asymmetries. The author concludes that while MHI via Self-Help Groups may avoid moral hazard, adverse selection remains a challenge, impacting the effectiveness of this delivery mechanism in overcoming fundamental insurance market issues.

The further literature is focused on establishment of Adverse selection and Moral Hazard, specifically in healthcare market. The study conducted by Zeckhauser (1998) investigated adverse selection in employer-sponsored health plans, using data from Harvard University and the Group Insurance Commission of Massachusetts. The study examined how individual plan choices lead to risk-based sorting and the resulting inefficiencies. They found significant adverse selection in both cases, with Harvard's equal-contribution policy leading to the disappearance of its most generous plan. The authors concluded that adverse selection is a substantial concern in multi-plan settings, and that mechanisms like risk adjustment and reinsurance are needed to mitigate its negative impacts on plan offerings and market stability.

There arises a high possibility of Moral Hazard along with adverse selection in the health insurance sector. The study conducted by Dong (2012) examined the relationship between health insurance, health behaviour, and healthcare utilization, aiming to disentangle the direct price effect of insurance from the indirect effect of behavioural moral hazard. The study used the Health and Retirement Study (HRS) data and a structural equation model to analyse these relationships. The author's findings suggest that health insurance can influence unhealthy behaviours (like heavy drinking), which in turn affects medical utilization. The paper concludes that it is crucial to consider the simultaneous relationships between insurance, behaviour, and utilization to accurately assess the impact of health insurance on healthcare demand, and to separate the behavioural moral hazard effect from the direct price effect.

Furthermore, the study conducted by Azagba et al. (2021) examined the relationship between state health insurance coverage and excessive alcohol use (binge and heavy drinking) among U.S. adults, testing the moral hazard hypothesis. Using data from the 2001-2017 Behavioural Risk Factor Surveillance System, the authors employed a difference-in-differences approach. The study found a significant association between increased health insurance coverage and higher rates of binge and heavy drinking. This suggests that expanded health insurance coverage may lead to increased engagement in risky health behaviours, supporting the presence of moral hazard and highlighting the importance of considering behavioural responses in health insurance policy.

Focusing particularly more on the analysis part, study conducted by author Bajari et al. (2014) developed a semi-parametric estimation strategy to disentangle adverse selection and moral hazard in healthcare markets, addressing the empirical challenge of distinguishing between these phenomena. Using claims-level data from a large self-insured employer, the study

estimated a structural model of healthcare demand. The authors found significant evidence of both moral hazard and adverse selection, with healthy individuals sorting into more generous plans, and substantial moral hazard. The methodology provides a valuable tool for quantifying the impact of asymmetric information on healthcare consumption, with implications for the design of more efficient health insurance contracts

There are many more evidences indicating inclusion of Adverse selection and moral hazard in modern healthcare sector. The study authored by Sengupta and Rooj (2019), investigated the effects of health insurance on hospitalization in India, focusing on adverse selection and moral hazard using a nationally representative survey and a semi-parametric copula regression approach. The study found evidence of both adverse selections, with chronically ill individuals more likely to have insurance, and potential moral hazard. Their analysis also revealed nonlinear relationships between health insurance choices/healthcare utilization and factors like age, education, and income. The authors highlight the vulnerability of older adults and rural residents, who have low insurance participation but high healthcare consumption, and stress the need for targeted healthcare policies to address these issues and support disadvantaged populations in India

Furthermore, the role of diverse ailment types in influencing both adverse selection and moral hazard within health insurance markets is an important aspect. The study authored by Nyman et al. (2018) aimed to isolate the portion of moral hazard in health care spending that is attributable to the income transfer inherent in reduced coinsurance. Using data from the Medical Expenditure Panel Survey (MEPS) on uninsured individuals, the study simulated healthcare spending under different insurance scenarios. The authors found that a significant portion of moral hazard arises from the income effect of insurance, not just the price distortion. Specifically, they determined that the 'efficient proportion' of moral hazard varies by disease, and is highest for those with diabetes and cancer. This distinction between income and price effects has implications for designing more efficient health insurance contracts and policies

Requirement for policy suggestion and from the governance view is necessity. The study by Liu et al. (2023) investigated the mechanisms of health insurance fraud between doctors and patients, employing evolutionary game theory to model the interactions. The study constructs a model that incorporates moral hazard, fraud costs, rewards, punishments, and patient bribes. Through theoretical analysis and simulation, they found that the evolution of governance in health insurance fraud is linked to the initial payment matrix and parameter selection. Crucially,

the authors determined that increasing fraud penalties and costs, and reducing moral hazard for both doctors and patients, can effectively drive the system towards a state where fraud is deterred. The paper offers insights for establishing a robust governance environment to manage health insurance fraud.

The literature surveyed indicates the following: Health insurance impacts various aspects of healthcare, from access and equity to the presence of adverse selection and moral hazard. Studies highlight the complexities of achieving equitable access, especially in developing countries, and the persistent challenges of information asymmetries in insurance markets. Furthermore, research explores the influence of health insurance on individual behaviour and the importance of effective governance to mitigate fraud and misuse within the system.

Gaps in literature:

While existing literature has extensively explored adverse selection and moral hazard in health insurance, there remains a notable gap in research that specifically examines moral hazard in India, with a nuanced analysis of how it varies across different disease types. Furthermore, the interplay of socio-economic factors in India and disease-specific moral hazard has also been under-explored.

Need for the study

This study addresses critical gaps in the existing literature on health insurance dynamics in the Indian context. While extensive research has explored adverse selection and moral hazard in global health insurance markets, there remains a notable gap in research specifically examining these phenomena in India's unique healthcare landscape. Particularly understudied is the nuanced analysis of moral hazard across different disease types (communicable, non-communicable, and accidental injuries) and how these patterns might differ from those observed in developed economies. Furthermore, the interplay between India's diverse socio-economic factors and disease-specific insurance behaviours has been inadequately explored, despite its significance for policy formulation. This research is especially timely given India's exceptionally low insurance coverage rates, as per the report given by NSS published on Household Social Consumption in India: Health NSS 75th Round (July, 2017 – June, 2018), the proportion of coverage involves 14% rural and 19% urban population combined with one of the world's highest out-of-pocket health expenditure burdens, that is, 50.6% of total health expenditure. Understanding the determinants of health insurance coverage—particularly the evidence of adverse selection among chronically ill populations and potential moral hazard in treatment-seeking behaviours—provides crucial insights for designing more effective health insurance schemes. By analysing these factors using comprehensive national survey data, this study aims to contribute valuable evidence-based recommendations for addressing the persistent challenges of asymmetric information in India's evolving health insurance market, ultimately supporting the development of more equitable and sustainable healthcare financing mechanisms.

Objectives

- To examine the relationship between chronic illness and health insurance coverage in India, with particular focus on identifying evidence of adverse selection in the health insurance market.
- To analyse the differential impact of ailment types (communicable diseases, non-communicable diseases, and accidental injuries) on the likelihood of health insurance coverage and potential signs of moral hazard.

Data and Methodology

This research uses secondary data from the ‘National Statistical Office (NSO), Ministry of Statistics and Programme Implementation, Government of India's 75th Round survey. This round was conducted from July 2017 to June 2018, focused on Household Social Consumption on Health and provides comprehensive information on various aspects of health-related indicators, healthcare utilization, and expenditure at the household and individual levels across India. The main aim of this round was to gather detailed data on Morbidity, Healthcare utilization, Healthcare expenditure, Insurance coverage and Demographic and Socio-economic characteristics.

This paper will undertake analysis in two ways- descriptive analysis and logistic regression – to study to relation between the independent and dependent variables. The dependent variable (the Y variable) or the outcome variable is ‘Health insurance’, which indicates whether the individual is covered under health insurance or not. A value of 0 indicates not covered and a value of 1 indicates they’re covered. The binary value 1 includes all type of health insurance schemes and policy namely government funded insurance scheme (e.g. RSBY, Arogyasri, CGHS, ESIS, etc.), employer supported health protection and insurance undertaken by household with insurance companies. The primary independent variable (The X variable) is ‘Chronic Ailment’ which indicates whether an individual is suffering from Chronic illness. A value of 0 indicates not suffering from chronic disease and a value of 1 indicates suffering from chronic disease. Apart from this the other primary independent variable is ‘Ailment type,’ indicating the disease for which treatment has been undertaken. The variable includes three values namely, 1 as ‘Communicable disease’, 2 as ‘non-communicable’ and 3 as ‘Accidental/Injury’. Some of the other independent variables include ‘Hospitalized’ it indicates whether the individual has been hospitalized in last 365 days, ‘Duration of Stay’ indicating the number of days hospitalization, ‘Level of care’ indicating the place at which treatment is undertaken and ‘medical expenditure’ indicating the medical expenses undertaken including the hospitalisation expense over past 365 days. Some control variables – age, sex, ‘Consumption expenditure’ which has been used as a proxy for income, ‘HH_type’ indicating household occupation, marital status, family size, education, religion, and caste – are used in the analysis. These variables were identified as controls from the literature reviewed.

Table 1 given below shows the descriptive statistics and explains the values assigned to each variable. The total sample consists of 139,895 observations of adult individuals among the

working age group i.e, 18-65. Out of that, on average, 16.4% have undertaken health insurance. The hypothesis for this study, based on the literature reviewed, is that an individual suffering from chronic in the disease have higher chances of taking health insurance.

Table-1: Description of Variables

Variable	Variable Definition	Mean	Std. Dev.
Health Insurance	1 if a person was covered by any scheme/insurance for health expenditure support 0 otherwise	0.1648646	0.3710592
Chronic Ailment	1 if a person was suffering from any chronic disease otherwise 0	0.0658946	0.2480984
Ailment type	The nature of treatment an individual underwent through, 1 if communicable disease 2 if Non-communicable disease and 3 for accidental/injuries	2.208911	0.7484865
Hospitalized	1 if a person was hospitalized in past 365 days otherwise 0	0.1876884	0.3904641
Duration of Stay	1 if the stay was short-term (1-3 days) 2 if the stay was Moderate term (4-10 days) 3 if long-term (> 10 days)	2.015601	0.8190043
Level of Care	1 if an individual undertook basic public facility, 2 if Public hospital 3 if Private hospital	2.448587	0.6179284
ln_Medical expenditure	log yearly expenditure during the last 365 days for medical treatment (Min = 0 and Max = 15.06827)	8.588605	1.772978
Religion	1 if Hindu 2 if Islam otherwise 3	1.329002	0.6396787
Marital Status	1 if Married otherwise 0	0.763107	0.4251771
Income	log yearly consumption expenditure undertaken in last 365 days (Min = 5.298317 and Max = 12.46844)	8.994907	0.6068721
Education	1 if Illiterate/Informal schooling 2 if Formal schooling 3 if Higher education	1.895533	0.6078907
HH_type	Type of household = 4 self-employed, = 3 casual labour, = 2 wage earners, = 1 others	3.231618	0.9153442
Family Size	Number of household members (Max= 31 members)	5.947932	2.73013
Social Group	1 if SC 2 if ST 3 if OBC 4 if Others		
Sex	1 if Female otherwise 0 Male	0.5040643	0.4999847
Age	Age of individuals in years (Min age = 18 years, Max age = 65 years)	36.49044	13.29509

Model –

The empirical model used for logistic regression in this study is given in Equation number 1 below:

$$Y(\text{Health Insurance}) = \beta_0 + \beta_1 (\text{Chronic Ailment}) + \beta_2 (\text{Ailment type}) + \beta_3 (\text{Hospitalized}) + \beta_4 (\text{Duration of Stay}) + \beta_5 (\text{Level of Care}) + \beta_6 (\ln_Medical\ expenditure) + \beta_7 (\text{Age}) + \beta_8 (\text{Sex}) + \beta_9 (\text{Religion}) + \beta_{10} (\text{Income}) + \beta_{11} (\text{HH_type}) + \beta_{12} (\text{Family size}) + \beta_{13} (\text{Education}) + \beta_{14} (\text{Social group}) + \beta_{15} (\text{Marital Status})$$

Figure -1

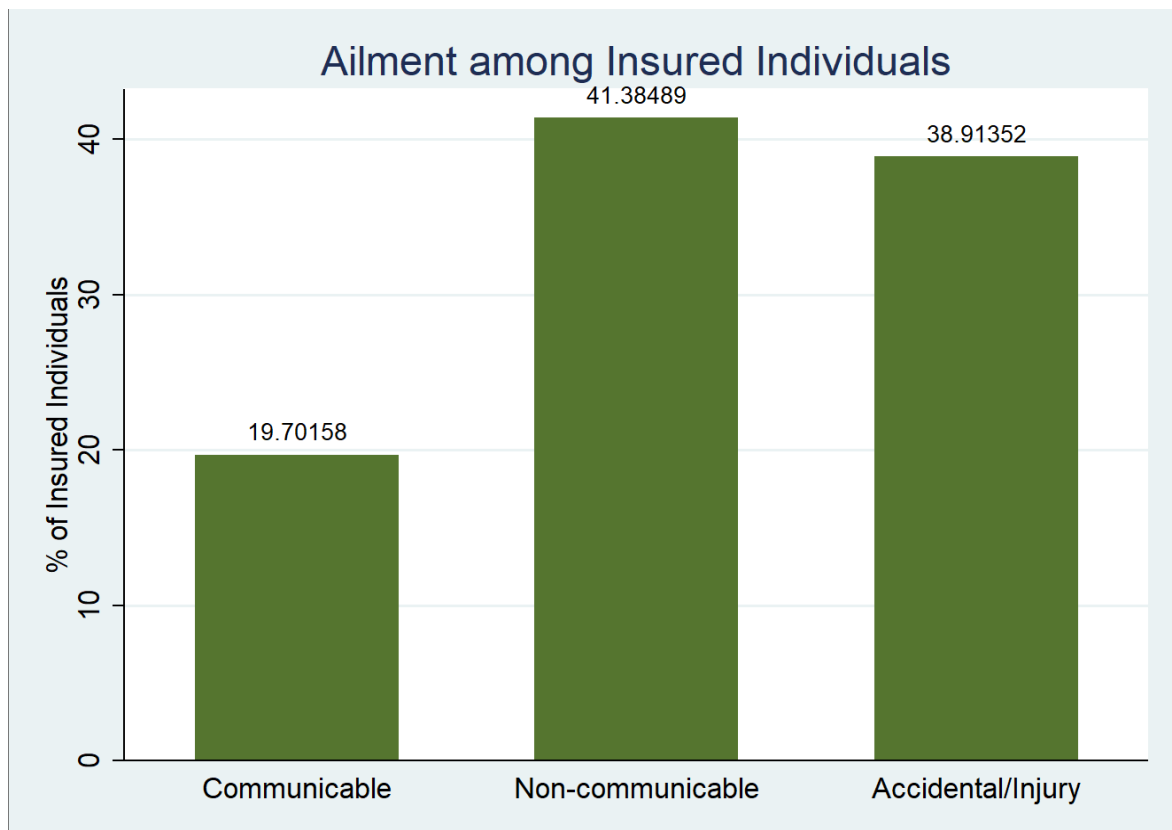


Figure 1 displays the percentage distribution of different types of ailments among the insured population. Non-communicable diseases were the most frequently reported (41.38%), nearly double the proportion of communicable diseases (19.70%). Accidental/injuries also represented a substantial portion of the reported ailments (38.91%), slightly less than non-communicable diseases. The results indicate that the percentage of individuals insured is the highest among individuals suffering from accident/injury and lowest among the individuals'' suffering from communicable diseases.

Results and Key Findings

This study investigates the determinants of health insurance coverage using a logistic regression model. The results, presented in Table 3, shed light on the factors influencing the likelihood of being insured, with a particular focus on adverse selection, and the potential for moral hazard.

Table 2: Logistic Regression

Health Insurance	Odds Ratio	Std. Err.	z	P>z	[95% Confidence Interval]	
Chronic Ailment	1.72874	0.0455434	20.78	0	1.641742	1.820348
Ailment type						
Non-communicable	1.073956	0.0225019	3.41	0.001	1.030747	1.118977
Accidental/Injury	1.104465	0.0233154	4.71	0	1.0597	1.151121
Hospitalized	0.9876008	0.0177798	-0.69	0.488	0.9533607	1.02307
Duration of Stay						
medium (4-10)	1.336811	0.0228099	17.01	0	1.292844	1.382273
Long (>10)	1.304732	0.0349728	9.92	0	1.237956	1.37511
Religion						
Hindu	0.73554	0.0188598	-11.98	0	0.6994889	0.773449
Islam	0.5466527	0.0191158	-17.27	0	0.5104416	0.5854327
Marital status	1.037029	0.0196167	1.92	0.055	0.9992848	1.076198
Income	1.843617	0.0299283	37.68	0	1.785882	1.903218
Level of care						
Public	0.8702761	0.0304184	-3.98	0	0.8126534	0.9319845
Private	1.155045	0.0423364	3.93	0	1.074977	1.241076
ln_medical expenditure	0.929659	0.0053383	-12.7	0	0.9192548	0.9401809
Education						
Formal schooling	0.9740646	0.0207303	-1.23	0.217	0.9342697	1.015555
Higher education	1.211522	0.350849	6.63	0	1.144672	1.282276
HH_type						
casual labour	1.653629	0.0695389	11.96	0	1.522801	1.795697
wage/salary	1.788785	0.0708721	14.68	0	1.655135	1.933227
self-employed	1.056191	0.415266	1.39	0.164	0.9778578	1.1408
Family Size	0.8644907	0.0032024	-39.31	0	0.8582369	0.8707901
Social Group						
ST	0.6040136	0.017707	-17.2	0	0.5702868	0.639735
OBC	0.6522956	0.0171169	-16.28	0	0.6195951	0.6867218
Others	0.4948502	0.0135724	-25.65	0	0.4689511	0.5221797
Sex						
Female	0.9893623	0.0155775	-0.68	0.497	0.9592972	1.02037
Age	1.005573	0.0006557	8.52	0	1.004288	1.006859

Number of Observation	139895
LR chi2(24)	7754.58
Prob>chi2	0
Pseudo R2	0.0626

The logistic regression model used in this study is statistically significant, as indicated by the high chi-square value and the associated p-value of less than 0.001. This confirms that the set of independent variables collectively contributes to predicting the likelihood of health insurance coverage. The model's Pseudo R-Square value of 0.0626 suggests that approximately 6.26% of the variance in insurance coverage is explained by the included predictors. While modest, the result indicates that the model possesses some explanatory power.

Consistent with the hypothesis of adverse selection, Individuals suffering from chronic illnesses have 1.73 times higher odds of being insured compared to those without chronic illnesses. This suggests that those with pre-existing health conditions have higher odd of being insured compared to those without chronic illnesses. The most probable reason for this relationship is that individuals with chronic illnesses have a higher expected need for healthcare, and they tend to possess more information about their health status than insurers. This information asymmetry can lead to adverse selection, where individuals with higher health risks are more likely to seek and obtain health insurance. This is supported by literature that demonstrates how individuals with pre-existing conditions or poorer prior health are more inclined to enrol in health insurance to mitigate potential financial burdens, ((Sengupta & Rooj, 2019); Sheth (2021))

Regarding the type of ailment, and potential indication of moral hazard, individuals treated for accidental injuries have 1.10 times higher odds of being insured compared to those treated for communicable diseases (the base category). Whereas for those treated for non-communicable diseases have 1.07 times higher odds of being insured compared to the communicable disease group. The finding suggests that individuals with insurance are more likely to seek treatment for accidental injuries and non-communicable diseases, it is consistent with the possibility of presence of moral hazard. Moral hazard occurs when having health insurance alters individuals' behaviour, leading to increased healthcare utilization. This is not necessarily due to 'recklessness,' but rather reflects how insurance reduces the out-of-pocket cost of care, influencing demand and potentially encouraging behaviours that increase the likelihood of needing care. As supported by the literature which states that although, health insurance does not seem to cause non-drinkers or healthy drinkers to become unhealthy drinkers. It is likely that health insurance encourages unhealthy drinkers to drink even more (Dong, 2012). This clearly demonstrates that insurance can influence unhealthy behaviours, such as heavy drinking, which in turn increases medical utilization, and even there's link that has been found between increased insurance coverage and excessive alcohol use (Azagba et al., 2021).

Therefore, the observed relation, particularly in the context of injuries, may indicate moral hazard, alongside the role of insurance in facilitating access to necessary care.

Although, Recent hospitalization (Hospitalized) which shows whether a person got hospitalized in past 365 days, is not significantly associated with insurance coverage. However, Individuals hospitalized for medium (4-10 days) have 1.34 times higher odds of being insured than those not hospitalized and long durations (>10 days) have 1.30 times higher odds of being insured than those not hospitalized. It indicates that whether individual got hospitalised may not strongly predict whether someone has insurances, but it does appear to be related to the duration of stay in hospital. This pattern suggests that the severity or intensity of health events may influence insurance status more than the mere occurrence of hospitalization. One possible explanation is that longer hospital stays often indicate more serious health conditions, which can increase awareness of financial risk and motivate individuals or households to seek or maintain health insurance coverage. Additionally, individuals who already perceive themselves as high-risk—due to chronic illness or recurring health issues—may be more likely to have insurance in place prior to such events. It is also plausible that some individuals acquire insurance after experiencing a major health shock, reflecting a form of adverse selection. Moreover, in the Indian context, certain government or employer-sponsored insurance schemes may be initiated or accessed during significant inpatient episodes, particularly those involving prolonged care. In contrast, the binary hospitalization variable may be too broad to capture this nuance, as it treats all hospitalization events equally regardless of severity.

When it comes to religion compared to other religion which include Christianity, Jainism, Sikhism, Buddhism, Zoroastrianism and others, The odds ratio for Hindu is 0.735. This indicates that Hindus are 0.74 times the odds of being insured compared to individuals belonging to the "Others" religious category, holding all other variables constant. This implies that Hindus have 26.5% lower odds of insurance coverage relative to the "Others" group. Whereas, the odds ratio for Muslim is 0.546. This indicates that Muslims are 0.55 times the odds of being to be insured compared to individuals belonging to the "Others" religious category, indicating that Muslims have 45.4% lower odds of being insured compared to individuals in the "Others" religious category, holding all other variables constant. Several interconnected factors may contribute to lower health insurance coverage among Hindus. Socioeconomic disparities play a significant role, While Hinduism is the majority religion, it encompasses diverse socioeconomic groups. A significant portion of Hindus may face economic constraints, limiting their ability to afford health insurance and highlighting the

impact of socioeconomic status on healthcare access in India, a factor that intersects with religious identity (Dutta & Husain, 2013).

Regarding marital status, compared to individuals who are not married, individuals who are married have 1.04 times higher odds of being insured, holding all other factors constant. There is statistically insignificant association but it is a positive association which could be attributed due to several factors. Marriage often leads to shared resources and responsibilities, potentially making health insurance more affordable or a higher priority within the household. Additionally, employer-sponsored health insurance plans often extend coverage to spouses, increasing the likelihood of married individuals being insured (*The Effects of Marriage on Health: A Synthesis of Recent Research Evidence. Research Brief*, 2007). The increased financial stability and family planning considerations associated with marriage might also contribute to a greater inclination to seek and maintain health insurance coverage.

Household consumption expenditure which has been taken as proxy for income, shows a strong positive association with insurance coverage with an odds ratio of 1.836, indicating that higher income has 1.84 times higher odds of insurance coverage. Indicating that with every one-unit increase in the logarithm of household income, the odds of having health insurance increase by 84%, holding all other variables constant. This suggests that individuals from higher-income households are significantly more likely to be insured compared to their lower-income counterparts. This positive association can be attributed to several factors: higher-income households are more capable of affording insurance premiums, tend to have greater awareness of the benefits of insurance, and are more likely to be engaged in formal employment where employer-sponsored insurance is common. These findings portray the existence of socioeconomic disparities in access to health insurance.

Whereas Family Size shows a statistically significant negative association with the likelihood of having health insurance. The odds ratio of 0.864 suggests that with each additional member in the household, the odds of being insured decrease by approximately 13.6 percent, holding all other factors constant, suggesting that larger households have 0.86 times the odds of being insured which is in alignment of existing literature. The finding implies that larger households may face greater financial constraints or other barriers that reduce their ability to purchase or maintain health insurance coverage. This result highlights the need for targeted policy interventions to improve insurance uptake among larger families, who may be more vulnerable to health-related financial shocks. Regarding the level of care, the results indicate a significant

association with health insurance coverage. Individuals seeking care at public facilities have 13% lower odds of being insured compared to basic public facility, with an odds ratio of 0.870. This finding could be attributed to several factors. Public facilities often serve lower-income populations who may face financial constraints in affording health insurance. Conversely, individuals seeking care at private have 1.16 times higher odds of being insured compared to those using basic public facilities, holding all other factors constant. This is consistent with the expectation that private healthcare is generally more expensive, making insurance a more attractive option for those who utilize it.

Household medical expenditure ($\ln_med_final_1$), used here as the log of expenditure, A higher logged value of total medical expenditure is associated with approximately 7% lower odds of being insured. This inverse association may suggest that households with higher healthcare costs have 0.924 times the odds of being insured, possibly due to access barriers, lack of awareness, financial constraints, or exclusion from coverage. Alternatively, it may reflect the presence of high-cost households who remain uninsured, perhaps because they seek care only after health shocks or because they are excluded from formal insurance due to pre-existing conditions or administrative hurdles. This pattern points to a protection gap, where those who face the greatest financial burden from healthcare are also the least likely to have insurance coverage.

The analysis reveals a mixed effect of education on health insurance coverage. Individuals with Formal schooling do not show a statistically significant difference in the odds of being insured compared to the informal/illiterate group. However, individuals with Higher education are associated with 1.21 times higher odds of being insured. This indicates that those with higher education have greater odds of having insurance compared to the informal/illiterate group. This finding suggests that higher education plays a crucial role in increasing health insurance coverage. Education can lead to increased awareness of the benefits of insurance, better employment opportunities with employer-sponsored insurance, and higher income levels, all of which facilitate insurance uptake.

Household type which indicates the occupation has significantly influences the odds of being health insurance coverage. Compared to others, Casual labour households have 1.65 times higher odds of being insured. This indicates that casual labourers have higher odds of being insured compared to others. In contrast, Wage/Salary earning households are have 1.78 times higher odds of being insured compared to others, holding all other variables constant. This can

be attributed to the stability of income and the prevalence of employer-sponsored insurance among this group. Self-employed households show 1.056 times higher odds of being insured compared to others, but this effect is not statistically significant.

Social group affiliation has a significant impact on health insurance coverage. Compared to the 'SC' category, individuals belonging to Scheduled Tribes (ST) have 0.604 times the odds of being insured compared to 'SC', holding all other variables constant. This indicates that ST individuals have approximately 39.6% lower odds of having insurance. Similarly, individuals belonging to others have 0.652 times the odds of being insured compared to SC, implying approximately 34.8% lower odds of being insured. Individuals from Other Backward Classes (OBC) have 0.494 times the odds of being insured compared to SC, indicating approximately 50.6% lower odds. These findings highlight the persistent social and economic disparities that affect access to health insurance.

The analysis shows that Female individuals have an odds ratio of 0.989, but this difference is not statistically significant. This suggests that, after controlling for other factors, there is no strong evidence of a gender-based disparity in health insurance coverage within this dataset. Further research might be needed to explore potential nuances in gender-specific access to healthcare and insurance

Age exhibits a significant positive association with health insurance coverage. This indicates that as age increases, the individuals have 1.005 times higher odds of being insured, although the effect is relatively small. For each year increase in age, the odds of being insured increase by approximately 0.5%. This finding suggests that older individuals are more inclined towards seeking and obtaining health insurance, likely due to increased awareness of health risks and the greater need for healthcare services as they age which aligns with the concept of adverse selection. The individuals with pre-existing conditions or poorer prior health are more inclined to enrol in health insurance to mitigate potential financial burdens

Summary and Conclusion

This study investigated the determinants of health insurance coverage in India with a particular focus on adverse selection and moral hazard. Using data from the National Statistical Office's 75th Round survey (2017-2018), the study analysed a sample of 139,895 adult individuals within the working age group (18-65) to understand factors influencing insurance enrolment decisions.

The analysis revealed strong evidence of adverse selection in India's health insurance market. Individuals with chronic illnesses had 1.72 times higher the odds of being insured compared to those without chronic conditions, supporting the hypothesis that those with higher anticipated healthcare needs are more inclined to seek insurance coverage. This information asymmetry, where individuals possess better knowledge about their health status than insurers, represents a significant challenge for the sustainability of health insurance systems in India.

The study also found potential indicators of moral hazard in healthcare utilization patterns. Individuals treated for accidental injuries had 1.12 times higher odds of being insured compared to those treated for communicable diseases, while those with non-communicable diseases were 1.07 times higher odds of being insured. These findings suggest that insurance coverage may influence healthcare-seeking behaviour, particularly for certain types of ailments. Additionally, it is observed that longer hospitalization durations were significantly associated with insurance coverage, further indicating that insurance facilitates extended healthcare utilization.

Socioeconomic factors played crucial roles in determining insurance coverage. Higher household consumption expenditure (used as a proxy for income) showed a strong positive association with insurance coverage. Employment type was also significant, with wage/salary earners having higher odds to be insured compared to other occupation categories, while casual labourers were 34.7% less likely to have insurance coverage. These findings highlight the persistent socioeconomic disparities in access to health insurance in India.

Education level emerged as another important determinant, with higher education significantly increasing the likelihood of insurance coverage. Interestingly, our analysis revealed significant variations in insurance coverage across social groups and religions, indicating that cultural and social factors also influence insurance decisions beyond purely economic considerations.

The study's findings have important implications for health policy in India. The evidence of adverse selection suggests a need for an insurance which would account for income transfer effects and not just focusing on reducing utilisation through cost-sharing (Nyman et al., 2017).

Moreover, the significant socioeconomic disparities in insurance coverage highlight the need for targeted policies that can extend protection to vulnerable populations, particularly casual labourers and marginalized social groups who currently demonstrate significantly lower insurance coverage rates.

In conclusion, our study provides comprehensive evidence of both adverse selection and potential moral hazard in India's health insurance market, while identifying key socioeconomic determinants of insurance coverage. These findings can inform more effective policy interventions aimed at expanding health insurance coverage, improving financial protection against catastrophic health expenditures, and addressing the persistent inequities in India's healthcare system. Future research should focus on evaluating specific policy interventions designed to mitigate adverse selection and moral hazard while expanding coverage to currently underserved populations.

Limitation and Suggestion

A significant limitation of this research is the failure to adequately address endogeneity concerns among the examined variables, which potentially compromises the validity of the estimated relationships between health insurance coverage and healthcare utilization patterns. The presence of endogeneity may arise from simultaneous causation, where healthcare utilization influences insurance selection, or from unobserved confounding factors that affect both insurance status and utilization behaviour.

To strengthen the causal inference framework in subsequent investigations, researchers should incorporate sophisticated econometric methodologies, including instrumental variable approaches or structural equation modelling techniques. The implementation of these advanced statistical methods would help in enhancing the study's contribution to the broader literature on health economics and policy evaluation.

Additionally, the model's predictive strength could be further enhanced by incorporating variables related to healthcare policies, availability of subsidies, and the structure of provider networks, which are likely to influence both access to and decisions regarding health insurance but were not captured in the current analysis due to data limitations.

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