Examining the role of health insurance: Access, equity, and financial risk protection of health care in India

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CANDIDATE'S DECLARATION

I, hereby certify that the thesis entitled, "**Examining the role of health insurance: Access, equity, and financial risk protection of health care in India**", submitted in the fulfillment of the requirements for the award of degree of **Doctor of Philosophy** in **Discipline of Management**, is an original work carried out by me under the supervision of **Dr. Rajesh Sharma,** Assistant Professor, Department of Humanities and Social Sciences, National Institute of Technology Kurukshetra. Any material borrowed, or referred to is duly acknowledged. The research work presented and reported in the thesis has not been submitted either in part or full to any other university or institute for the award of any other degree or diploma.

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CERTIFICATE BY THE SUPERVISOR

This is to certify that the thesis entitled, "**Examining the role of health insurance: Access, equity, and financial risk protection of health care in India**", submitted in the fulfillment of the requirements for the award of degree of **Doctor of Philosophy** in **Discipline of Management,** is an original research work carried out by **Ms. Aashima**, under my supervision. The matter presented in the thesis has not been submitted in part or fully to any other university or institute for the award of any degree to the best of my knowledge.

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ABSTRACT

In India, several health insurance programmes have been launched over the years to provide financial risk protection against burgeoning health expenditure. Health insurance is crucial given the rising disease burden of non-communicable diseases and injuries, growing share of private health sector, low public health spending (1.15% of gross domestic product), and high burden of out-of-pocket health expenditure (OOPE) (50.6% of the health expenditure) in India. The study first analysed the enrolment in different health insurance programmes and inequalities in health insurance enrolment at national, state, and intra-state levels over the years. The study than gauged the sub-national variations in utilization pattern and financial risk due to seeking care. The inequalities present in access to care, utilization of private providers, and the detrimental effect due to occurrence of OOPE were also analysed. Furthermore, the impact of health insurance on accessibility to inpatient care, utilization pattern of inpatient care, and financial risk protection at national and sub-national levels were examined. Lastly, the initial findings of the recently launched government sponsored health insurance scheme, Pradhan Mantri Jan Arogya Yojana (PM-JAY) was reviewed to comprehend the actual implementation and the experiences and challenges encountered under the scheme by both users and providers. The study provides a comprehensive picture from evolution of the health insurance to the impact of health insurance in providing access to care and financial risk protection to beneficiaries at national as well as across the states. The study used data from the rounds of the National Sample Survey on health and morbidity, titled, "Household Social Consumption: Health". For the analysis, descriptive statistics, multivariable logistic regression, propensity score matching, concentration index (CI), and decomposition analysis were employed in the study. Additionally, systematic review of studies exploring the aspects related to the recent GSHI scheme, PM-JAY was also done.

We observed that, enrolment under health insurance increased from nearly 1% in 2004 to nearly 15% in 2014 and 2018. It varied substantially at inter and intra-state levels. A few states such as Mizoram, Andhra Pradesh, Chhattisgarh, and Meghalaya, reported a substantial increase in health insurance enrolment over the years. By contrast, in states such as Bihar, Madhya Pradesh, Jharkhand, Uttar Pradesh, Sikkim, and Manipur, health insurance enrolment remains low across the survey years. The enrolment was consistently higher in urban areas than rural areas across all survey years (2004 (3.13% versus 0.36%), 2014 (18.02% versus 14.06%), and 2018 (19.06% versus 14.07%)). Notably, enrolment under health insurance was statistically significantly concentrated among wealthier individuals in India as well as across most states/union territories.

We also observed variations across states in terms of utilization pattern of seeking care and financial burden. The financial burden due to seeking care further varies on the basis of type of care and healthcare provider used. The financial burden in terms of catastrophic health expenditure (CHE) and impoverishment was observed to be high in India. In India, 5.56%, 2.56%, and 1.53% of households experienced CHE at 10%, 25%, 40% threshold respectively, and 1.9% of households were pushed below poverty line, respectively due to OOPE on hospitalization. On the other hand, due to incurring OOPE on outpatient care, 11.66%, 5.77%, and 3.47% of households experienced CHE at 10%, 25%, and 40% threshold respectively and 4.0% of the households experienced impoverishment. States such as Andhra Pradesh, Telangana, Kerala, Maharashtra, Uttar Pradesh, and Odisha reported the highest financial burden due to seeking care. Even among the states with good health insurance enrolment, such as, Kerala, Chhattisgarh, Andhra Pradesh, Telangana, and Rajasthan substantial financial burden due to hospitalization was observed. Outpatient care puts higher burden on patients and their family members in comparison to inpatient care, however, health insurance schemes in India majorly keeps outpatient care outside its ambit. The socio-economic inequalities were

also prevalent in case of accessibility to care, utilization of private provider, and detrimental effect of accessing care.

Furthermore, it was observed that overall enrolment under health insurance has improved the accessibility to inpatient care across most states. However, the impact of health insurance on utilization pattern of hospitalization was found to be low and limited to few states. Also, health insurance enrolment was found to be effective in reducing the financial burden to some extent among insured. In states/UTs such as, Maharashtra, Andhra Pradesh, Karnataka, Kerala, Mizoram, Delhi, and Telangana, health insurance lowers the financial risk (OOPE and catastrophic health expenditure at 10% threshold) due to seeking inpatient care for insured. Notably, financial burden due to seeking inpatient care was observed to be substantially higher among private providers irrespective of health insurance status. Lastly, several challenges including, low level of awareness regarding various facets of the scheme, continued spending by beneficiaries on drugs and diagnostic tests, co-payments demanded by healthcare providers, reimbursement issues, and low health packages rates were observed in previous government sponsored health insurance schemes and continued in recent government sponsored health insurance scheme, PM-JAY as well, that contributes to the sub-optimal outcomes of health insurance in India.

There is a need for multidimensional, comprehensive, and innovative awareness programmes, and strengthened implementation efforts at state level to increase health insurance enrolment in India. Additionally, it is imperative to increase public health spending, strengthen public health infrastructure, regulate private providers, ensure availability of medicines and diagnostics services, and include outpatient services under the ambit of health insurance, to augment financial protection in India. Furthermore, concerted efforts, such as creating in-depth knowledge about benefits and features of health insurance schemes among beneficiaries, addressing infrastructural gaps, and enhancing stewardship to restrict malpractices of providers,

are necessary to achieve the desired objectives of the health insurance programmes in the long

run in India.

<p style="text-align:center">TABLE OF CONTENTS</p>

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ATE: Average treatment effect

ATET: Average treatment effect on the treated

CGHS: Central Government Health Scheme

CHE: Catastrophic health expenditure

CI: Concentration index

E_c: Erreyger concentration index

W_c: Wagstaff concentration index

ESIS: Employees' State Insurance Scheme

GSHI: Government-Sponsored Health Insurance

MSHCS: Mizoram State Health Care Society

NSSO: National Sample Survey Office

OOPE: Out-of-pocket expenditure

PM-JAY: Pradhan Mantri Jan Aarogya Yojana

PSM: Propensity score matching

RSBY: Rashtriya Swasthya Bima Yojana

UHC: Universal health coverage

UTs: Union territories

WHO: World Health Organization

Chapter 1. Introduction

1.1 Background

Universal health coverage (UHC) is increasingly being recognized as a major development goal at the global and national levels. UHC emphasizes the countries to strengthen their healthcare systems, to ensure that everyone has access to high-quality essential healthcare services without facing financial hardships [1]. All governments striving for UHC, experience a fundamental concern regarding how to finance the health system, and the concern is more pronounced in low and middle-income countries, where public health investments are low [2,3]. In the absence of adequate financial risk protection, people rely on out-of-pocket expenditure (OOPE) for financing healthcare payments, that can expose households to financial catastrophe and may push them into poverty [4-8]. People even forego healthcare services and continue to suffer from ill-health due to financial/non-financial constraints [5,7,8].

Globally, every year around 800 million people experience financial catastrophe and nearly 100 million people are pushed below the poverty line due to high OOPE [1]. The financial burden is notably severe in low and middle-income countries [3,9,10]. According to a recent study, most impoverishment due to OOPE occurs among low-income countries [3]. Moreover, equity has also become a crucial goal for the health systems across the globe [4,11]. Excessive reliance on OOPE payments may either create financial barriers for the less well-off, exacerbating inequalities in access to healthcare, or impose a substantial and onerous financial burden for those using health services [3,9,10]. More often, poorer and less advantaged segments of the population are more vulnerable to financial risk due to health payments [4,6,12]. As per a recent study, South Asia reported the highest incidence of catastrophic health expenditure and impoverishment, with severe and highly regressive OOPE burden in India [3]. As per World Health Organisation, OOPE is the most inefficient and inequitable way of financing healthcare payments and should be replaced with pre-payment mechanism as much as possible [4].

Worldwide, health insurance has been put forward as one of the important instrument of financing health expenditures and progressing toward UHC [13,14].

Commonly, two primary healthcare financing approaches are employed in the pursuit of UHC. The first approach is the tax-funded financing system, which involves financing health services through public healthcare systems. This model is exemplified by countries such as the United Kingdom and Cuba, where healthcare services are primarily funded by general tax revenue [15,16]. The second approach is the social risk-pooling mechanism, often associated with social health insurance systems. This approach emphasizes the importance of establishing a risk-pooling mechanism to attain UHC [15-16]. This system involves a social risk-pooling mechanism where the entire population, including workers, self-employed individuals, enterprises, and the government, contributes to a health insurance fund. Contributions come from various sources, such as employee salaries and matching premiums from employers. Governments may step in to provide contributions for those unable to afford them, ensuring broad coverage. It is important to note that the structure of the risk-pooling mechanism can vary from one country to another. For example, countries like Germany, France, and Mexico have embraced comprehensive social health insurance programs as a fundamental component of their health financing strategies, covering a wide range of their populations [15-17]. In contrast, some countries like the Colombia, Philippines, and Vietnam, provide insurance coverage to poor and informal sector workers through fully subsidised insurance premiums [15-18]. In Vietnam and the Philippines, non-poor individuals have the option to voluntarily enrol in the insurance schemes, while in Colombia, non-poor workers and their families are mandatorily enrolled in these schemes [15-18].

In India, equitable and affordable access to care is a fundamental policy concern with 50.6% of the health expenditure is being financed through out of pocket of patient or their family members [19]. OOPE in India is higher than some other lower-middle income countries such

as Ghana (30.8%), Kenya (24.1%), Mongolia (27%), and Vietnam (39.6%) [19]. High OOPE in India pushes nearly 7-8% of the population into poverty each year [20,21]. India is experiencing an increasing burden of non-communicable diseases, injuries, along with an unfinished agenda of infectious diseases [22,23], and a growing share of the elderly population in total population [24]. Furthermore, higher life expectancy, increasing middle class population, life-style changes, and epidemiological transition [25,26], leads to an increased demand for healthcare services. However, public health spending in India remains abysmally low (1.15% of gross domestic product) [27], along with a growing dominance of fee-for-service private healthcare providers [28] and an overburdened public health sector [28], resulting in inadequate and unaffordable healthcare services. Expanding pre-payment mechanism through health insurance is adopted as a crucial instrument for risk-pooling and safeguarding against health shocks, and is a necessary pathway in India's pursuit of UHC [26].

1.2 Evolution of health insurance in India

Traditionally, India's healthcare financing was confined to the supply-side mechanism (i.e., strengthening of infrastructure). With a paradigm shift towards the demand-side financing mechanism, several health insurance programmes have been launched over the years in India [29-31]. The history of health insurance programmes in India goes back to early 1950s, with the introduction of Employees' State Insurance Scheme (ESIS), 1952 and Central Government Health Scheme (CGHS), 1954 for formal sector employees. CGHS, covers employees of central government, both current and retired, and their dependents, and ESIS covers the workers in factories and other enterprises [29-30]. These are social health insurance schemes, which provides coverage for large package of services, albeit available to only a small proportion of population who are engaged in the formal sector [29-31]. In 1986, Mediclaim policy was introduced to reimburse the hospitalization expenses on pay for premium basis. In 1999, the Insurance Regulatory and Development Authority of India, allowed the entry of private entities

into the insurance sector. These schemes are called private health insurance, provided by public and private sector insurance companies, which depends upon individuals' ability-to-pay premium [29-30]. Apart from these community health insurance schemes are also present in India to a small extent, that provide coverage to its members only [29,30].

Furthermore, India has given special impetus on Government-Sponsored Health Insurance (GSHI) schemes to provide coverage primarily to the poor and vulnerable [29-31] as done by several other low and middle-income countries [32,33]. The constitution of India has categorised health as a matter of state; therefore, the legislation and regulations governing healthcare and health financing vary tremendously across Indian states [23,34]. Consequently, several GSHI schemes have been launched in India over the years, at both central and state levels [30]. Government of India implemented Rastriya Swasthya Bima Yojana, 2008, to provide improved access to inpatient care and financial risk protection to below poverty line families. The scheme was later expanded to cover other defined categories of unorganised workers as well. Many states have also launched their own state-level GSHI schemes in India (for instance, Rajiv Aarogyasri Health Insurance Scheme (2007) in Andhra Pradesh, Vajpayee Arogyasri Scheme (2009-10) in Karnataka, Chief Minister's Comprehensive Health Insurance scheme (2012) in Tamil Nadu) [30]. In September 2018, the Central Government launched the largest GSHI scheme named, Pradhan Mantri Jan Aarogya Yojana (PM-JAY). This scheme is rolled out to cover 40% of the Indian poor and vulnerable population. The responsibility of implementation and regulation of the central health insurance schemes in a phased manner lies on individual states with support from the central government [23,35,36]. In GSHI schemes, the government pays premium on behalf of the insured [30].

In India, social health insurance schemes are limited to cover only formal sector employees, GSHI schemes are primarily meant to cover poor population [29,30], and thus a substantial

proportion of population is left with the choice to either arrange private health insurance on their own (constrained by ability to pay premium) or to remain uninsured.

In India, health insurance is gaining pace as a medium of financing health expenditure over the years. The National Health Accounts of India reflects that the share of insurance in financing the total health expenditure has increased substantially over the years [37]. The contribution of health insurance (consisting of social health insurance, GSHI schemes, and private health insurance schemes) in financing health expenditure increased from INR 36,610 million in 2004–05 to Rs 429,660 million in 2015–16 to 850,870 million in 2019-20. In 2019-20, out of the total contribution through health insurance, over half (53.87%) of the financing is accounted by the private health insurance. Social health insurance constituted around 29.85% share in the total health insurance, while government health insurance constituted around 16.23% share [37]. According to Insurance Regulatory and Development Authority annual report 2020-21, health insurance premium collected recorded a growth of 14.74% in 2020-21 over 2019-20 [38]. However, in spite of presence of all these schemes, a large chunk of the health expenditure is currently being financed through patient's own pocket [30].

1.3 Research gaps addressed by the study

Despite the presence of several health insurance programmes operational in India, the health insurance enrolment remains low with substantial variations across states/union territories (UTs). Previous studies have mainly focused on examining health insurance enrolment at states level, and lacks in providing a comprehensive analysis of enrolment at various levels such as, inter-state, intra-state, and how the changes occur over the years in overall health insurance enrolment and in different types of health insurance programmes. Our study contributes the existing literature by providing a disaggregated analyses of health insurance enrolment at various levels (national, state, rural-urban within each state, and socio-economic and demographic dimensions) over the years (before the initiation of GSHI schemes (2004) and in

post GSHI period (2014 and 2018). This is important to understand that how the changes occurred in health insurance enrolment with the evolution of different health insurance programmes in India, which states/UTs have shown progress, and which states/UTs are lagging behind over the years. Also, to the best of our knowledge, there is currently no study that explores the inequality in health insurance enrolment, which is a critical aspect to determine if health insurance is reaching the poor and vulnerable population. Therefore, we extended our analysis and examined the inequality in health insurance enrolment across states and rural-urban areas over the years.

Furthermore, in India, states/UTs vary considerably in terms of legislation and regulations governing healthcare, epidemiological transition, and also in terms of the health insurance landscape. Previous studies examined the financial burden due to health expenditure across rural and urban areas, various disease categories, and districts of a few states of India. Only a few studies also examined the interstate variations in terms of financial burden; these studies, however, were limited in estimating only a few aspects of financial burden and also did not assess the burden separately for outpatient and inpatient care. Studies examining health care utilization pattern across Indian states were also limited. Additionally, none of the studies have examined the scenario in the context of health insurance coverage across Indian states/UTs, which is one of the important pursuits of financing health expenditures and progressing toward UHC. Therefore, it is essential to comprehend the healthcare utilization pattern, financial burden, and associated inequalities across all Indian states/UTs. These insights are invaluable for highlighting sub-national variations and areas requiring increased policy attention. There is also a noticeable gap in studies examining inequalities in healthcare service accessibility, utilization, and associated financial risks and factors contributing to socioeconomic inequalities in India. Therefore, we have also incorporated the analysis of inequality in access to care, private provider utilization, and financial risk across states/UTs.

Given the diversity of health insurance programs in India, which cater to distinct target populations, enrolment rates, and benefits, it is imperative to assess the impact of health insurance (overall health insurance, GSHI schemes, and private health insurance) in India, to determine whether these schemes have achieved their intended objectives of improving accessibility to care and financial risk protection, and guide the policymakers in this regard. We have analysed the impact of overall health insurance, GSHI schemes, and private health insurance, separately on outcomes including, accessibility to inpatient care, utilization pattern, and financial risk protection at national level. Furthermore, previous studies were mainly focused on specific cases (i.e., particular state or insurance scheme), a holistic picture of the impact of health insurance across all states/UTs was missing. Also, there is a dearth of literature that examines the detailed pattern of healthcare utilization in context of health insurance. Therefore, we delved into analysing the impact of overall health insurance enrolment on accessibility to inpatient care, utilization pattern of inpatient care, and financial risk protection across all states/UTs in India.

Lastly, India has given a notable impetus on GSHI schemes for over a decade. Recently in 2018, a GSHI scheme, PM-JAY has also been launched to cover bottom 40% of the population. Therefore, it is pertinent to provide an overview of the initial findings of the recently launched largest GSHI scheme, PM-JAY, to assist policymakers in comprehending the scheme's implementation, experiences, and impediments encountered by both users and healthcare providers. This will contribute to improving the scheme implementation in the future and ensuring the long-term success of the program.

1.4 Objectives

Against this backdrop and to fill the gaps in the literature, we have worked on the following objectives, encompassing from enrolment in health insurance over the years to analysing the impact of health insurance across several dimensions in India.

1. To analyse the health insurance enrolment and inequality in health insurance enrolment at national, state, and intra-state levels.

2. To examine the utilization pattern of healthcare services, financial burden, and associated inequalities across states/UTs.

3. To examine the impact of overall health insurance, GSHI schemes, private health insurance on accessibility, utilization of inpatient care, and financial risk protection at national level.

4. To elucidate the impact of overall health insurance on accessibility, utilization of inpatient care, and financial risk protection across states/UTs.

5. To examine the initial findings and experience of recent GSHI scheme, PM-JAY.

1.5 Organisation of the thesis

This thesis is organized into seven chapters to accommodate all the research objectives. Each chapter is organized to be self-contained.

Chapter 1: The introductory section of the study provides information about the concept of UHC, the burden due to seeking healthcare services across the world and in India, followed by the evolution of different health insurance programmes in India. Further, research gaps addressed by the study, followed by the research objectives, and an overview of the overall thesis organization is also detailed in this chapter.

Chapter 2: The second chapter provides an analysis of health insurance enrolment at national, state, intra-state, and socio-economic and demographics levels. The enrolment under different types of health insurance programmes was also analysed at different levels. This chapter also throws light on the presence of inequality in health insurance enrolment over the years, across the states/UTs, and rural-urban areas within each state of India. In this chapter we employed the 60th, 71st, and 75th round of nationally representative sample survey on health and morbidity,

conducted by National Sample Survey Office in 2004, 2014, and 2017-2018. We used descriptive statistics, multivariable logistic regression, and concentration index for the analysis in the chapter. The examination of health insurance enrolment and inequality in health insurance enrolment across all states/UTs, and over the years would highlight the areas that have shown improvement, and the areas that are lagging behind and require greater policy attention.

Chapter 3: This chapter provides a comprehensive overview of healthcare utilization pattern, financial burden, and associated inequalities across all Indian states/UTs. The analysis was performed by type of care (inpatient/outpatient) and in the context of health insurance coverage of the respective states/UTs. The financial burden across states/UTs was disaggregated by the type of healthcare provider (private/public) as well. The outcomes include the utilization pattern (type of provider used), reasons for choosing private providers, and financial burden (in terms of OOPE, catastrophic health expenditure (CHE) incidence, impoverishment). This chapter also analysed the inequality in access to care, utilization of private provider, and occurrence of financial risk (i.e., CHE incidence) due to seeking care. The chapter used the latest 75th round of national sample survey on health and morbidity, 2017-18. Descriptive statistics and concentration index were employed in the chapter. This holistic assessment highlights the sub national variations in terms of financial burden and inequalities, major drivers of health expenditure, and the areas that require enhanced policy attention to improve utilization of healthcare services and augment financial protection in India.

Chapter 4: The fourth chapter discusses about the impact of health insurance enrolment (overall health insurance, GSHI schemes, and private health insurance) on several dimensions namely, accessibility to inpatient care, utilization pattern of hospitalization (choice of healthcare provider, number of times hospitalized, and duration of hospital stay), and financial risk protection (OOPE, CHE incidence, and impoverishment) in India. A separate examination of impact of GSHI schemes on poor individuals were also conducted. This chapter also provides

a comparison of financial burden across private and public healthcare providers. The chapter used the 75th round of national sample survey on health and morbidity, and employed descriptive statistics, multivariable logistic regression, and propensity score matching techniques to analyse the impact of different health insurance programmes on outcomes. The analysis highlights the impact of different health insurance programmes, assesses whether these programmes have achieved their objectives, and guide the policymakers in this regard.

Chapter 5: The fifth chapter provides an overview of the impact of overall health insurance enrolment on accessibility to inpatient care, utilization pattern of hospitalization, and financial risk protection across all the states/UTs in India. This chapter also employed the 75th round of national sample survey on health and morbidity. Propensity score matching techniques was used to analyse the impact of overall health insurance enrolment on outcomes. The analysis was performed separately for each state/UT for each outcome. The assessment is important to analyse the impact of health insurance separately across states/UTs, since the health insurance scenario in terms of enrolment and schemes vary across states/UTs in India.

Chapter 6: This chapter provides an assessment of initial findings of the recent health insurance scheme launched, PM-JAY, through literature review. PRISMA guidelines were followed. A total of 225 articles were retrieved from all databases, 30 studies were selected for full-text review, and finally 18 articles were included and reviewed in the chapter. The assessment highlights the impact of the scheme, experiences, and impediments to improve the scheme implementation in future. The initial experience of the scheme was synthesized for five dimensions, namely, i) awareness about the scheme, ii) utilization of the scheme, iii) experience under the scheme, iv) financial protection under the scheme, and v) challenges confronted under the scheme. The perspective of both beneficiaries and healthcare providers were reviewed.

Chapter 7: Finally, this chapter concludes the thesis with recapitulation of major findings of the study. The salient findings and conclusions of the research study pertaining to the health insurance enrolment, impact of health insurance on several dimensions, and experience of recent GSHI scheme, PM-JAY, is presented in this chapter. The chapter also detailed the policy implications, recommendations, and the area of scope for future research.

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Chapter 2 Health Insurance Enrolment in India

2.1 Introduction

Worldwide, health insurance has been adopted as one of the important pursuits of financing health expenditures and progressing toward universal health coverage [1,2]. In India, health insurance is crucial given the rising disease burden of non-communicable diseases and injuries [3], growing share of private health sector [4], low public health spending (1.15% of gross domestic product) [5], and high burden of out-of-pocket health expenditure (50.6% of the health expenditure) [6]. Several health insurance programmes have been launched in India to improve the accessibility of healthcare services and provide financial protection against medical expenses [7]. The Employees' State Insurance Scheme (ESIS), 1952 and Central Government Health Scheme (CGHS), 1954 are health insurance schemes launched for only formal sector employees. In 1999, private health insurance was also introduced, enabling individuals to buy insurance from their own income from insurance providers. India has given special impetus on Government-Sponsored Health Insurance (GSHI) schemes to provide coverage primarily to the poor and vulnerable [7]. The constitution of India has categorised health as a matter of state; therefore, the legislation and regulations governing healthcare and health financing vary tremendously across Indian states [8]. Consequently, several GSHI schemes were launched over the years in India at central level (Rashtriya Swasthya Bima Yojana (RSBY) 2008, Pradhan Mantri Jan Arogya Yojana (PM-JAY) 2018) as well as at state level (for instance, Rajiv Aarogyasri Health Insurance Scheme in Andhra Pradesh, Vajpayee Arogyasri Scheme in Karnataka, Chief Minister's Comprehensive Health Insurance scheme in Tamil Nadu). Recently, the central government of India has launched the world's largest GSHI scheme, PM-JAY, to cover nearly 500 million beneficiaries (almost 40% of Indian population), with a higher coverage (5 lakh INR to every family each year) than the previous central-level GSHI scheme (i.e., RSBY) [9]. The responsibility of implementation and regulation of the central health

insurance schemes at state level lies on individual states with the support from the central government [8-10].

Despite the presence of numerous health insurance schemes, the coverage of health insurance in India is abysmally low and largely voluntary, with substantial regional and socio-economic disparities [10,11]. However, previous literature has not focused much on disaggregated analysis of health insurance enrolment and enrolment in different types of health insurance schemes at various levels (inter-state, intra-state (rural and urban areas), and socio-economic and demographic dimensions) over the years in India. Previous studies examined the health insurance enrolment in states such as Meghalaya [12], Delhi [13], Karnataka [14], Haryana [15], Chhattisgarh [16], Andhra Pradesh [17], eight north eastern states [18], and enrolment under community-based health insurance in Bihar and Uttar Pradesh [19]. A previous study examined the coverage of only GSHI schemes across states, districts, and socio-economic levels [7]. Also, the presence of inequality in the health insurance enrolment is yet to be explored in India. Addressing these gaps in knowledge, an investigation of health insurance enrolment and inequality at multiple population levels would aid in knowing *who all are left behind*, and it would also serve as an opportunity for the PM-JAY scheme to reduce place-based disparities in coverage and ensure targeted implementation of the scheme [10].

Against this backdrop, in this chapter, we examined the proportion of population covered and yet to be covered at four levels in India: i) national, ii) state, iii) intra-state (rural and urban areas in each state), and iv) socio-economic and demographics. The coverage was assessed for overall enrolment and for different types of health insurance schemes in India. We also examined the presence of inequality in the health insurance enrolment across all states/union territories (UTs) and within rural and urban areas in each state/UT in India. Additionally, we assessed how the enrolment and associated inequality has changed over years 2004 (before the initiation of GSHI schemes) and 2014, 2018 (after the initiation of GSHI schemes). Lastly, we

examined the determinants of health insurance enrolment. The 2018 data serves as a useful base for the implementation process of PM-JAY, as the scheme was launched in 2018. This holistic assessment is expected to serve as an informative and useful guide for policymakers to assess the disparities in health insurance enrolment and inequality in enrolment over the years, and highlight the areas that are lagging behind and require greater policy attention.

2.2. Data and methodology

2.2.1 Overview of data source

The chapter employed data from the three rounds (60th, 71st, and 75th) of nationally representative surveys on health and morbidity, titled "Household Social Consumption: Health [20-22]." The three rounds of survey were conducted by the National Sample Survey Office (NSSO) during January-June 2004, January-June 2014, and July 2017-June 2018, respectively. All the surveys were based on random stratified multi-stage sampling design, with village and urban blocks as the first stage unit and households as the second stage unit. The 60th round surveyed 383,338 individuals, 71st round covered 333,104 individuals, and the sample size significantly increased in the 75th round, which covered 555,115 individuals across India. All survey rounds encompass extensive information on health, hospitalization, ailments, nature of treatment sought, cost of care, maternal and elderly health dimensions, and demographic and socio-economic characteristics of households and their members.

The 71st (2014) and 75th (2018) survey rounds collected detailed information pertaining to the enrolment under health expenditure support schemes (i.e., different health insurance scheme). However, in the 60th round, an indirect question about health insurance enrolment i.e., premium paid for ESIS/CGHS and private health insurance was asked. Therefore, those who reported paying premium for the schemes were categorized as insured in the respective scheme in the 60th round. In NSS 71st round, health insurance was categorized under five categories: i) government funded insurance schemes (e.g., RSBY, Arogyasri, CGHS, ESIS, etc.), ii)

employer-supported health protection (other than government), iii) arranged with insurance companies (i.e., private health insurance), iv) others, and v) not covered. On the other hand, 75th round provides more extensive information about health insurance schemes, and separately categorised CGHS, ESIS, and GSHI schemes. This facilitates a nuanced analysis, as CGHS and ESIS are different forms of government schemes, and are only available to those engaged in the formal sector, whereas GSHI schemes are primarily meant to cover poor and vulnerable population. The categorization of health insurance scheme under NSS 75th round was; i) government-sponsored schemes (e.g., RSBY, Arogyasri, etc.), ii) government/public sector unit as an employer (e.g., CGHS, reimbursement from government. etc.), iii) employer supported (other than government/ public sector unit) health protection (e.g., ESIS), iv) private health insurance, v) others, and, vi) not covered.

2.2.2 Statistical analysis

Descriptive statistics were used to illustrate the proportion of population insured across different levels. The determinants of enrolment under health insurance were examined using multivariable logistic regression. Furthermore, concentration index (CI) was employed in the chapter to analyse the inequality in health insurance enrolment. The details about multivariable analysis and concentration index are mentioned below. Weights provided by the NSSO were applied in the chapter as applicable. All the analysis was performed using Stata Version 14.1.

2.2.2.1 Multivariable logistic regression

Multivariable logistic regression was used to gauge the socio-economic and demographic factors associated with enrolment under health insurance.

$$logit\ (Y) = ln\frac{p}{1-p} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n$$

In the above equation, $\frac{p}{1-p}$ is the odds ratio of enrolment in health insurance. Y is the binary outcome variable (i.e., enrolment under health insurance) for i^{th} individual. $X_1 \dots X_n$

represent variables, namely, gender, age (0–18, 19–40, 41–60,61–80, >80 years), economic quintile, educational status (not literate/no formal schooling, literate with formal schooling: up to primary, up to secondary, up to higher secondary, graduation and above), marital status (never married, never married, widowed, divorced/separated), principal source of income (self-employed, regular wage, casual labour, other), place of residence (rural, urban), social group[1] (scheduled tribes (STs), scheduled castes (SCs), other backward classes (OBCs), and other category), and religion (Hinduism, Islam, Other). Economic quintiles were created by using Oxford (original OECD) equivalence scale [23] in consonance with previous studies [24,25].

2.2.2.2 Concentration index (CI)

CI was employed to investigate the inequality in health insurance enrolment across all states/UTs for all study years. CI is extensively applied to assess inequality in the area of health, such as utilization of healthcare services [26], uptake of health insurance [27], occurrence of catastrophic health expenditure [28], etc. The standard CI is defined by the following formula [29-31]:

$$CI = \frac{1}{\mu_H} 2cov(H_i, Y_i)$$

Where, Y_i is the socioeconomic rank of ith individual, μ_H is the mean health, and H_i is the health outcome. The CI ranges between -1 and 1, where 0 represents equality. In case of binary outcome, the standard CI value breaches the range [-1, 1] [32-34]; therefore, we employed the correction suggested by Erreyger (E_c) [32,33] and Wagstaff (W_c) [32,34] to measure CI for the binary outcome (i.e., enrolment under health insurance in our case). Brief details of correction for binary variable suggested by Erreyger and Wagstaff are elucidated in Supplementary file (p1). A positive CI value indicates health outcome is concentrated among the rich, while a

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[1] STs and SCs are the two most socially backward and economically disadvantaged social groups in India. OBCs include such backward classes of citizens other than the SCs and STs as specified in the lists prepared by the Government of India, which are periodically updated .

negative CI indicates that health outcome is concentrated among the poor, and a larger CI value corresponds to greater inequality (either direction). p values less than 0.05 were considered to be statistically significant.

2.3. Results

2.3.1 Health insurance enrolment at national and state level

Enrolment under health insurance increased from 1.07% population coverage in 2004 to 15.25% in 2014 and further increased to 15.53% in 2018 (Supplementary Table 2.1, Figure 2.1). Notably, with the introduction of GSHI schemes, the health insurance enrolment increased in 33 states/UTs between 2004 to 2014. Furthermore, between 2014 to 2018, health insurance enrolment increased in 21 states/UTs. Over the years, changes in health insurance enrolment varied substantially across states and UTs. Between 2004 to 2018, remarkable increase in health insurance enrolment was observed in states/UTs, Mizoram (2004: 0%; 2018: 78.57%), Andhra Pradesh (2004: 1.14%; 2018: 72.79%), Chhattisgarh (2004: 0.24%; 2018: 64.29%), Meghalaya (2004: 0.4%; 2018: 53.9%), and Dadar and Nagar Haveli (2004: 0.29%; 2018: 58.25%). By contrast, in states such as Bihar, Madhya Pradesh, Jharkhand, Uttar Pradesh, Sikkim, and Manipur, health insurance enrolment remains low across the survey years.

Figure 2.2 and Supplementary Figures 2.1-2.2 shows enrolment under different type of health insurance programs across all states/UTs over the years. In 2004, 0.37% of population was enrolled in private health insurance and 0.71% was enrolled in ESIS/CGHS scheme. On the other hand, in 2018, GSHI covered 11.70% of population, followed by CGHS (1.37%), and private health insurance (1.28%). The enrolment under government funded insurance schemes (i.e., GSHI/ESIS/CGHS) and GSHI schemes was higher than any other health insurance scheme in many states/UTs in 2014 and 2018, respectively. The highest enrolment under government scheme/GSHI schemes was observed in Mizoram, Andhra Pradesh, Telangana, Chhattisgarh in both 2014 and 2018. Conversely, states/UTs such as Chandigarh, Delhi, Maharashtra, and

Haryana reported higher uptake of private health insurance than GSHI in 2018. Importantly, the enrolment under ESIS and CGHS was low across all states. Only in a few states/UTs such as Chandigarh, Meghalaya, Himachal Pradesh, Delhi, Lakshadweep, Daman and Diu, and Andaman and Nicobar Islands, around 6-15% of the population was covered under CGHS in 2018.
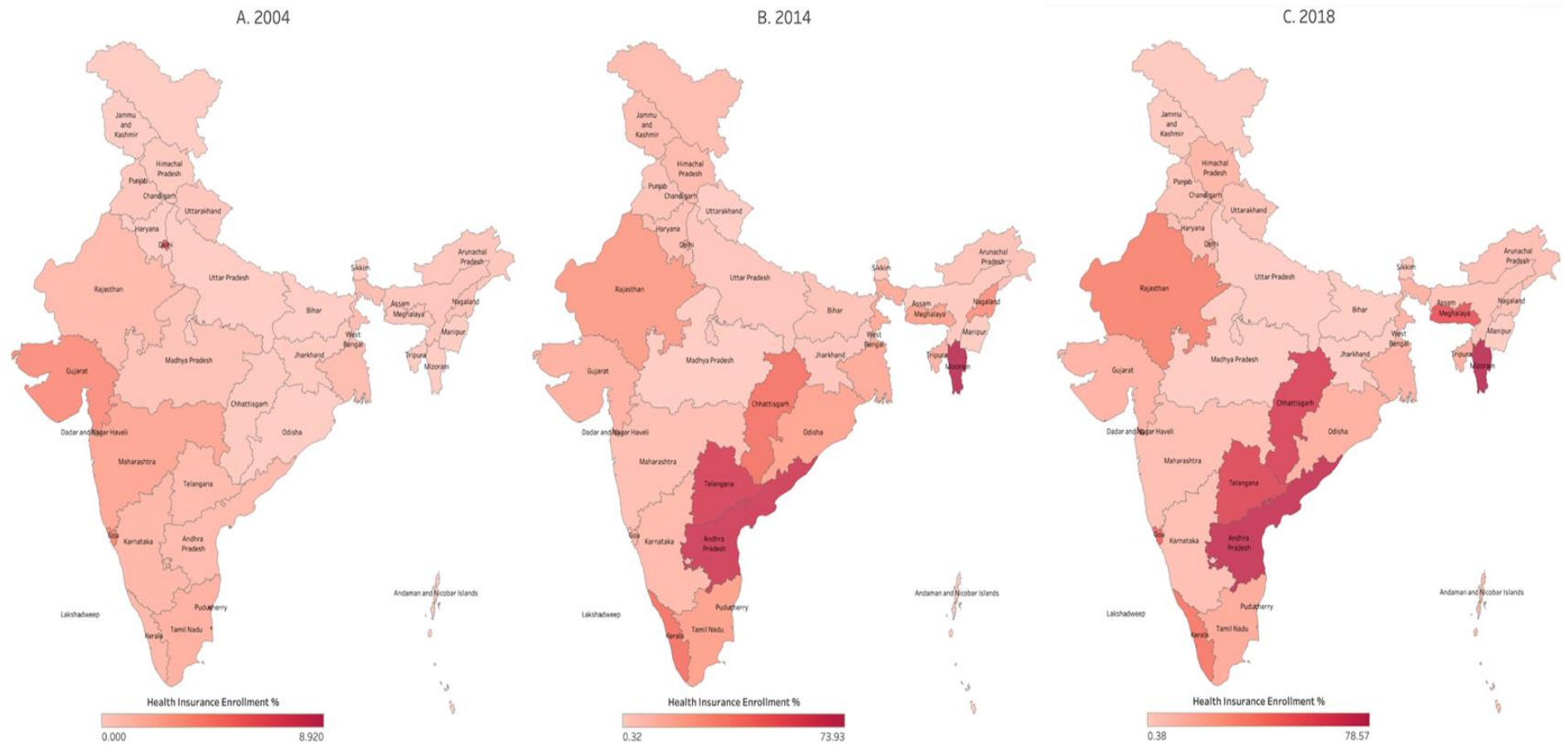
Figure 2.1 Health insurance enrolment across states/UTs over the year

States and Union territories	GSHI (%)	Government/PSU as an employer (%) (e.g. CGHS)	Employer supported (other than govt./PSU) health protection (%)(e.g., ESIS)	Private Health Insurance (%)	Others (%)	
India	11.7 [11.61 - 11.78]	1.37 [1.34 - 1.4]	1.03 [1.01 - 1.06]	1.28 [1.25 - 1.31]	0.15 [0.14 - 0.16]	Lowest
Andaman and Nicobar Islands	0.05 [0.01 - 0.09]	9.3 [8.12 - 10.47]	1.04 [0.63 - 1.45]	0.49 [0.21 - 0.77]	0.05 [0.03 - 0.07]	
Andhra Pradesh	69.97 [69.28 - 70.66]	1.75 [1.55 - 1.94]	0.66 [0.54 - 0.78]	0.35 [0.27 - 0.44]	0.06 [0.02 - 0.1]	
Arunachal Pradesh	3.15 [2.79 - 3.51]	2.36 [2.04 - 2.67]	0.07 [0.01 - 0.12]	0.68 [0.51 - 0.85]	0.97 [0.76 - 1.17]	
Assam	2.84 [2.6 - 3.08]	0.59 [0.48 - 0.7]	0.92 [0.78 - 1.06]	0.79 [0.66 - 0.92]	0.03 [0.01 - 0.06]	
Bihar	0.13 [0.09 - 0.17]	0.15 [0.11 - 0.2]	0 [0 - 0.01]	0.09 [0.05 - 0.12]	0.01 [0 - 0.02]	
Chandigarh	1.78 [1.13 - 2.44]	14.5 [12.75 - 16.24]	5.71 [4.56 - 6.86]	9.75 [8.28 - 11.22]	0.84 [0.38 - 1.29]	
Chhattisgarh	62.63 [61.85 - 63.4]	1.06 [0.89 - 1.22]	0.29 [0.21 - 0.38]	0.31 [0.22 - 0.4]	0 [0 - 0.01]	
Dadar and Nagar Haveli	56.01 [52.81 - 59.2]	0.35 [0.06 - 0.64]	1.9 [1.02 - 2.77]	0 [0 - 0]	0 [0 - 0]	
Daman and Diu	0.35 [0.08 - 0.62]	6.72 [4.7 - 8.74]	4.12 [2.52 - 5.72]	1.15 [0.29 - 2.01]	0.01 [0.00 - 0.02]	
Delhi	0.49 [0.32 - 0.66]	7.12 [6.49 - 7.75]	1.6 [1.29 - 1.9]	8.29 [7.62 - 8.96]	0.52 [0.34 - 0.7]	
Goa	37.88 [35.77 - 39.99]	2.18 [1.54 - 2.81]	0.76 [0.39 - 1.14]	1.47 [0.95 - 2]	5.75 [4.74 - 6.76]	
Gujarat	8.42 [8.05 - 8.79]	1.04 [0.91 - 1.18]	0.78 [0.66 - 0.9]	3.24 [3 - 3.47]	0.01 [0 - 0.03]	
Haryana	0.33 [0.24 - 0.41]	1.85 [1.64 - 2.06]	2.55 [2.3 - 2.79]	2.42 [2.19 - 2.66]	0.01 [0 - 0.03]	
Himachal Pradesh	2.99 [2.66 - 3.32]	6.28 [5.81 - 6.76]	2.51 [2.2 - 2.82]	0.39 [0.27 - 0.51]	0.11 [0.05 - 0.18]	
Jammu and Kashmir	0.52 [0.42 - 0.63]	1.95 [1.75 - 2.16]	0.17 [0.11 - 0.23]	0.37 [0.28 - 0.46]	0 [0 - 0]	
Jharkhand	0.01 [0 - 0.03]	0.21 [0.14 - 0.28]	0.1 [0.05 - 0.15]	0.09 [0.04 - 0.13]	0.04 [0.01 - 0.07]	
Karnataka	1.99 [1.81 - 2.17]	0.78 [0.67 - 0.9]	2.6 [2.4 - 2.81]	1.86 [1.68 - 2.04]	0.57 [0.47 - 0.67]	
Kerala	32.8 [32.15 - 33.46]	1.19 [1.04 - 1.34]	1.73 [1.55 - 1.91]	3.93 [3.66 - 4.2]	0.29 [0.21 - 0.36]	
Lakshadweep	5.97 [4.56 - 7.39]	10.56 [8.72 - 12.4]	0 [0 - 0]	0 [0 - 0]	0 [0 - 0]	
Madhya Pradesh	0.05 [0.03 - 0.08]	0.44 [0.37 - 0.51]	0.31 [0.25 - 0.37]	0.44 [0.37 - 0.52]	0.01 [0 - 0.03]	
Maharashtra	0.33 [0.27 - 0.38]	2.25 [2.11 - 2.39]	1.26 [1.16 - 1.37]	3.45 [3.28 - 3.62]	0.28 [0.23 - 0.32]	
Manipur	0.21 [0.13 - 0.29]	1.19 [1 - 1.38]	0.03 [0 - 0.06]	0.01 [0.00 - 0.01]	0.03 [0 - 0.05]	
Meghalaya	36.45 [35.3 - 37.61]	4.99 [4.47 - 5.51]	0.03 [0.01 - 0.05]	0.17 [0.07 - 0.27]	12.26 [11.47-13.04]	
Mizoram	62.48 [61.38 - 63.59]	13.63 [12.85 - 14.42]	0.57 [0.4 - 0.75]	1.43 [1.16 - 1.7]	0.46 [0.3 - 0.61]	
Nagaland	0.37 [0.21 - 0.52]	4.4 [3.88 - 4.93]	0.67 [0.46 - 0.88]	0.08 [0.01 - 0.16]	0.1 [0.02 - 0.18]	
Odisha	14.65 [14.15 - 15.15]	0.57 [0.46 - 0.67]	0.29 [0.21 - 0.36]	0.09 [0.04 - 0.13]	0.02 [0 - 0.04]	
Puducherry	1.56 [1.07 - 2.04]	1.61 [1.12 - 2.1]	1.41 [0.95 - 1.88]	0.03 [0.00 - 0.06]	0.22 [0.03 - 0.4]	
Punjab	1.91 [1.71 - 2.12]	1.73 [1.53 - 1.92]	1.64 [1.45 - 1.83]	0.91 [0.77 - 1.06]	0.07 [0.03 - 0.11]	
Rajasthan	33.08 [32.53 - 33.63]	1.58 [1.43 - 1.72]	0.25 [0.19 - 0.31]	0.27 [0.21 - 0.34]	0.01 [0 - 0.02]	
Sikkim	0.04 [0.00 - 0.08]	1.79 [1.35 - 2.23]	0.02 [0.00 - 0.04]	0.84 [0.54 - 1.15]	0.15 [0.02 - 0.27]	
Tamil Nadu	11.67 [11.29 - 12.05]	2.65 [2.46 - 2.84]	3.23 [3.02 - 3.43]	1.27 [1.14 - 1.4]	0.04 [0.02 - 0.06]	
Telangana	54.98 [54.17 - 55.79]	1.79 [1.57 - 2]	2.71 [2.44 - 2.97]	1.47 [1.28 - 1.67]	0.16 [0.09 - 0.22]	
Tripura	14.73 [13.97 - 15.48]	0 [0 - 0]	0 [0 - 0]	0.39 [0.25 - 0.52]	0.03 [0.01 - 0.05]	
Uttar Pradesh	0.11 [0.08 - 0.13]	0.53 [0.48 - 0.59]	0.3 [0.26 - 0.34]	0.4 [0.35 - 0.45]	0.07 [0.05 - 0.09]	
Uttarakhand	0.81 [0.62 - 1]	2.97 [2.61 - 3.33]	0.92 [0.72 - 1.13]	0.65 [0.48 - 0.82]	0.7 [0.52 - 0.87]	
West Bengal	8.03 [7.73 - 8.34]	2.09 [1.93 - 2.25]	1.57 [1.43 - 1.71]	1.47 [1.34 - 1.61]	0.09 [0.05 - 0.12]	Highest

Figure 2.2 Enrolment in different health insurance schemes across states/UTs in 2018

PSU: Public Sector Unit. Figures inside square brackets represent 95% confidence interval.

2.3.2 Rural-urban variations in health insurance enrolment

The health insurance enrolment was consistently higher in urban areas than rural areas in all years: 2004 (3.13% versus 0.36%), 2014 (18.02% versus 14.06%) and 2018 (19.06% versus 14.07%). This trend was prevalent in the majority of states/UTs with higher enrolment in urban areas than rural areas in 28/35, 2736 and 24/36 states/UTs in 2004, 2014, and 2018, respectively (Supplementary Table 2.1). The increase in health insurance enrolment over the years varied between rural and urban areas within the states. For instance, the enrolment in Andhra Pradesh rose from 0.11% to 77.07% in rural areas between 2004 and 2018, while in urban areas it increased from 3.83% to 63.01%. Likewise, between 2004 and 2018, intra-state disparities were witnessed in states such as, Dadar and Nagar Haveli (rural: 0% (2004), 66.26% (2018); urban: 2.77% (2004), 47.29% (2018)), Chhattisgarh (rural: 0.02% (2004), 66.86% (2018); urban: 1.58% (2004), 52.69% (2018)), and Haryana (rural: 0.04% (2004), 2.04% (2018); urban: 0.09% (2004), 17.49% (2018)). Notably, the increase in enrolment between 2004 and 2014 was higher in rural areas compared to urban areas in 21/35 states/UTs. However, between 2014 and 2018, the increase in enrolment was higher in urban areas than in rural areas in 22/36 states/UTs.

Figure 2.3 and Supplementary Figures 2.3-2.4 exhibit the enrolment under different health insurance schemes in rural and urban areas across states/UTs. A higher proportion of population was enrolled under GSHI schemes in rural areas (12.89%) than urban areas (8.85%) in 2018. Likewise, in 2014, 13.12% of rural population was enrolled under government funded insurance schemes (i.e., GSHI, ESIS, CGHS) compared to 11.97% of urban population. By contrast, the enrolment under private health insurance was higher in urban India than rural India in all years; 2004 (1.05% vs 0.14%), 2014 (3.45% versus 0.25%), and 2018 (3.79% versus 0.23%). Furthermore, enrolment under GSHI schemes was higher in rural areas than urban areas in 22/36 states/UTs, whereas enrolment under CGHS, ESIS, and private health insurance was

higher in urban areas than rural areas in 32/36, 32/36, and 31/36 states/UTs, respectively in 2018.
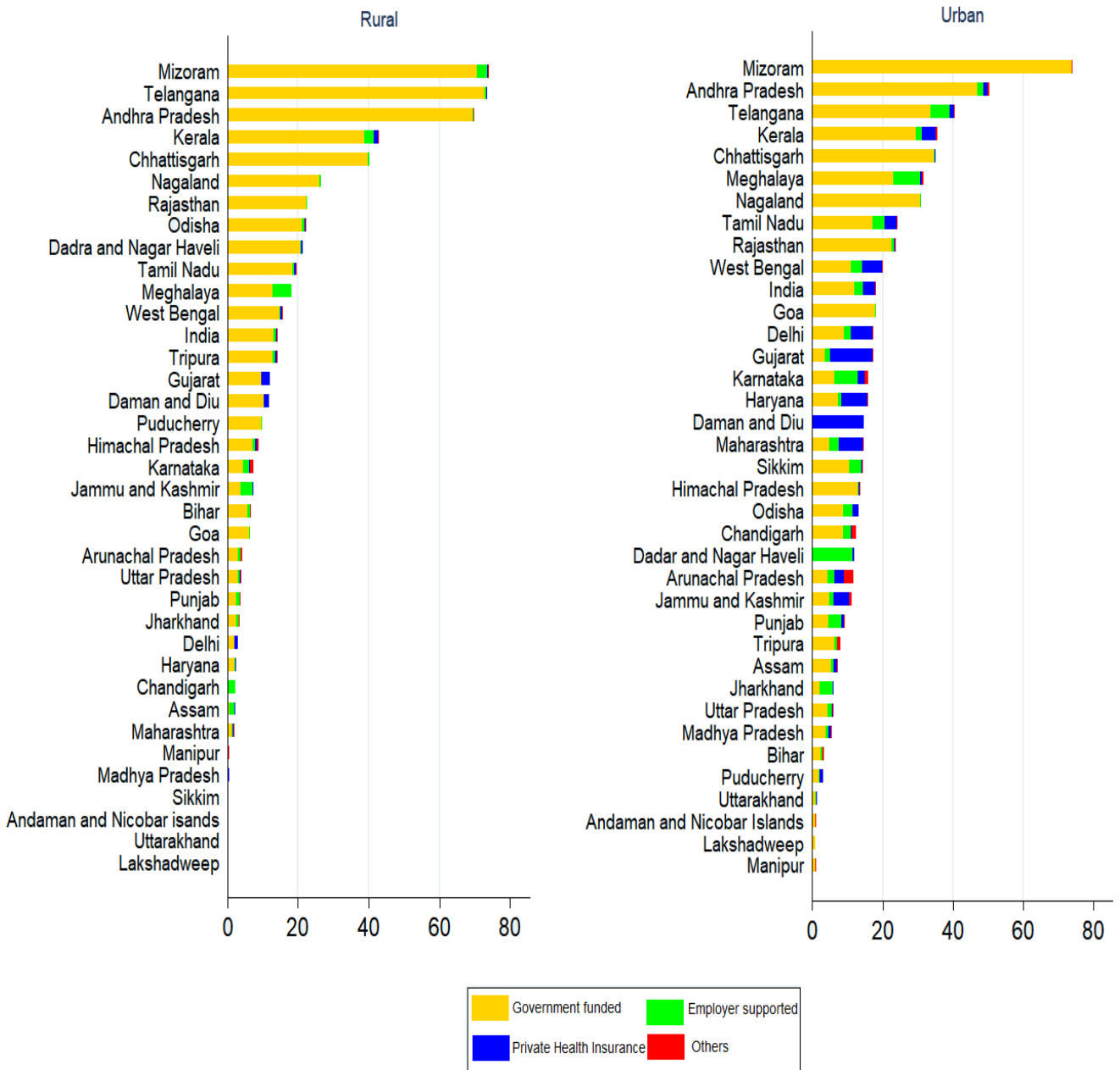
Figure 2.3 Enrolment (%) in different health insurance schemes in rural-urban areas in 2018

2.3.3 Health insurance enrolment across socio-economic and demographic dimensions

Supplementary Tables 2.2 and 2.3 shows the proportion of population enrolled under different health insurance schemes across socio-economic and demographic factors in 2004, 2014, and 2018. In 2018, health insurance enrolment was higher among individuals belonging to upper economic quintiles, those with higher educational status, aged above 40 years, urban residents, those belonging to ST social group, following Hinduism and other religion, and earning regular wages or salaries, than their respective counterparts. This pattern was almost similar in 2004 and 2014 as well. Furthermore, between 2004 and 2018, enrolment under health insurance increased across all socio-economic and demographic factors, but the extent of increase varied. For instance, the enrolment increased from 0.20% in 2004 to 10.07% in 2018 in the lowest economic quintile, while it increased from 2.95% to 25.19% in the richest economic quintile. Similarly, the increase in enrolment was higher among ST (from 0.36% to 21.65%) compared to SCs (from 0.74% to 13.13%), OBCs (from 0.73% to 15.66%), and others (from 1.89% to 15.02%) between 2004 and 2018. Moreover, the increase in enrolment was higher among individuals aged above 40 years and those practicing Hinduism and other religion (Supplementary Table 2.2 and 2.3).

Furthermore, enrolment under government funded insurance schemes (i.e., GSHI, ESIS, and CGHS) and GSHI schemes was higher than any other health insurance scheme across all socio-economic and demographic factors in 2014 and 2018, respectively. Notably, the enrolment under private health insurance was relatively higher among individuals with higher education, those belonging to upper economic quintiles, other social groups, individuals earning from regular salaries or wages, and urban residents compared to their respective counterparts in all surveyed years. A similar pattern was observed in case of enrolment under CGHS and ESIS in 2004 and 2018 (Supplementary Table 2.3).

2.3.4 Multivariable logistic regression

Table 2.1 shows the results of multivariable logistic regression to reveal the factors associated with enrolment in health insurance. Individuals residing in urban areas consistently exhibited a higher likelihood of being insured across all years; 2004 (odds ratio (OR): 2.37; p<0.05), 2014 (OR: 1.02; p<0.05), and 2018 (OR: 1.08; p<0.05) compared to their rural counterparts. The odds of being covered under any health insurance scheme increased with each gradient of economic quintile and education level in all years (p<0.05). Furthermore, the odds of being enrolled mainly increased with age in both 2014 and 2018. By contrast, individuals belonging to SC, OBC, others social groups, those who were divorced or separated, and those practicing the Islam religion, were less likely to be enrolled under health insurance in 2018 (OR<1; p<0.05). This trend was almost similar in 2004 and 2014 as well.

Table 2.1 Likelihood of health insurance enrolment across socio-economic and demographic dimensions over the years

Variables	2004	2014	2018
	Odds ratio (OR)	**Odds ratio (OR)**	**Odds ratio (OR)**
Region			
Rural areas ®			
Urban areas	2.37* [2.03 - 2.77]	1.02 [0.96 - 1.08]	1.08* [1.02 - 1.13]
Economic Quintile			
Quintile 1 ®			
Quintile 2	1.50* [1.08 - 2.07]	0.91* [0.83 - 0.99]	0.95 [0.88 - 1.02]
Quintile 3	2.00* [1.54 - 2.59]	0.85* [0.78 - 0.92]	1.18* [1.10 - 1.27]
Quintile 4	2.42* [1.86 - 3.13]	1.00 [0.91 - 1.09]	1.31* [1.21 - 1.41]
Quintile 5	5.29* [4.08 - 6.85]	1.36* [1.24 - 1.49]	1.55* [1.43 - 1.68]
Source of Earning			
Self-employed ®			
Regular Wage/Salary	6.45* [5.44 - 7.64]	1.81* [1.70 - 1.94]	1.75* [1.64 - 1.87]

Casual Labour	1.29 [0.99 - 1.68]	1.12* [1.05 - 1.20]	1.11* [1.06 - 1.17]
Others	4.43* [3.70 - 5.30]	0.95 [0.83 - 1.08]	0.98 [0.88 - 1.09]
Social Group			
Scheduled Tribes ®			
Scheduled Castes	1.47* [1.10 - 1.98]	0.69* [0.62 - 0.76]	0.63* [0.58 - 0.68]
Other Backward Classes	1.27 [0.96 - 1.68]	0.68* [0.63 - 0.75]	0.65* [0.60 - 0.70]
Others	1.47* [1.12 - 1.95]	0.63* [0.57 - 0.69]	0.70* [0.64 - 0.76]
Religion			
Hinduism ®			
Islam	0.45* [0.37 - 0.57]	0.81* [0.74 - 0.89]	0.72 * [0.66 - 0.78]
Others	1.94* [1.52 - 2.48]	1.24* [1.09 - 1.40]	0.95 [0.86 - 1.04]
Educational level			
Not literate/No formal schooling ®			
Literate with formal schooling: below primary/primary	1.19 [0.99 - 1.43]	1.18* [1.10 - 1.26]	1.13* [1.06 - 1.20]
Up to secondary	1.72* [1.43 - 2.06]	1.18* [1.09 - 1.26]	1.16 * [1.09 - 1.23]
Up to Higher Secondary	2.18* [1.74 - 2.73]	1.47* [1.32 - 1.64]	1.22 * [1.11 - 1.34]
Graduation and above	2.47* [1.98 - 3.08]	1.89* [1.69 - 2.12]	1.77 * [1.59 - 1.97]
Age			
0-18 years ®			
19-40 years	0.57* [0.45 - 0.71]	0.89* [0.80 - 0.98]	1.03 [0.94 - 1.14]
41-60 years	0.71* [0.55 - 0.92]	1.23* [1.09 - 1.38]	1.40 * [1.25 - 1.56]
61-80 years	0.42* [0.31 - 0.57]	1.36* [1.18 - 1.56]	1.45 * [1.27 - 1.65]
80 years and above	0.50* [0.28 - 0.90]	1.48* [1.05 - 2.10]	1.25 [0.94 - 1.67]
Gender			
Male ®			
Female	0.76* [0.67 - 0.85]	1.05 [1.00 - 1.11]	1.05 [1.00 - 1.10]
Marital Status			
Never married ®			
Currently married	1.79* [1.44 - 2.21]	1.09 [0.99 - 1.20]	1.03 [0.94 - 1.13]
Widowed	1.64* [1.17 - 2.30]	0.96 [0.82 - 1.12]	0.98 [0.86 - 1.13]
Divorced/Separated	0.01* [0.00 - 0.06]	0.58* [0.36 - 0.92]	0.66 * [0.46 - 0.94]

® represents reference category; *p<0.05; control variable: state. Figures inside square brackets represent 95% confidence interval.

2.3.5 Inequality in health insurance enrolment

Figure 2.4 shows the proportion of insured population in each economic quintile across all states/UTs. Majority of the insured population belonged to upper two economic quintiles in 2004 (74.23%), 2014 (52.37%), and 2018 (53.53%). The pattern was similar across 28/35, 26/36, and 30/36 states/UTs in 2004, 2014 and 2018, respectively, with a higher proportion of population covered in the upper two economic quintiles compared to lower two economic quintiles.
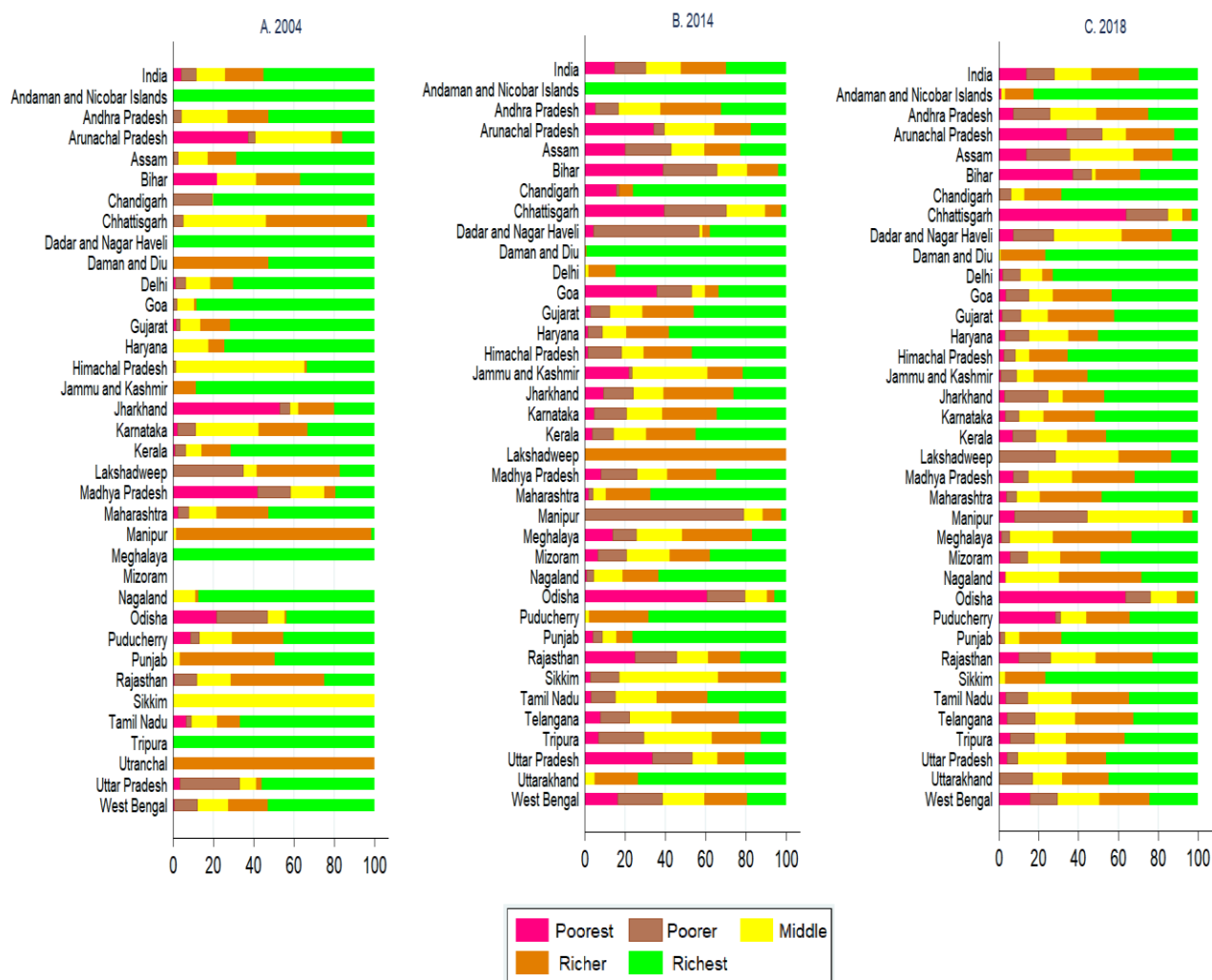
Figure 2.4 Proportion of insured population across economic quintiles over the years

The CI showed that health insurance enrolment in India was concentrated among affluent individuals in all years: 2004 (E_c: 0.03; W_c: 0.69), 2014 (E_c: 0.11; W_c:0.19), and 2018 (E_c:0.12; W_c:0.22) (Table 2.3, Figure 2.5, Supplementary Table 2.4). This trend was similar in majority of the states/UTs, with insurance enrolment statistically significantly concentrated among the rich in 22/35 states/UTs in 2004, 24/36 states/UTs in 2014, and 22/36 states/UTs in 2018. Notably, in Chhattisgarh, Rajasthan, Dadar and Nagar Haveli, Kerala, Tripura, and Odisha, health insurance enrolment was pro-rich in 2004 but became pro-poor (i.e., concentrated among poor) in 2014 and 2018. Furthermore, in states such as Arunachal Pradesh, Mizoram, Meghalaya, and Andhra Pradesh, enrolment under health insurance was concentrated among the rich in 2014 and became pro-poor in 2018. Importantly, the degree of inequality was higher in urban areas than rural areas in 2004 (E_c: 0.06 in urban versus 0.01 in rural; W_c: 0.53 in urban versus 0.49 in rural), 2014 (E_c: 0.19 in urban versus 0.06 in rural; W_c: 0.32 in urban versus 0.12 in rural), and 2018 (E_c: 0.17 in urban versus 0.08 in rural; W_c: 0.28 in urban versus 0.17 in rural). A similar pattern was observed in majority of the states/UTs, with 24/29 (17/29) states/UTs in 2004, 25/34 (23/34) states/UTs in 2014, and 28/36 (25/36) states/UTs in 2018 reporting higher inequality in urban areas than rural areas as per E_c (W_c) (Table 2.2, Supplementary Table 2.4).
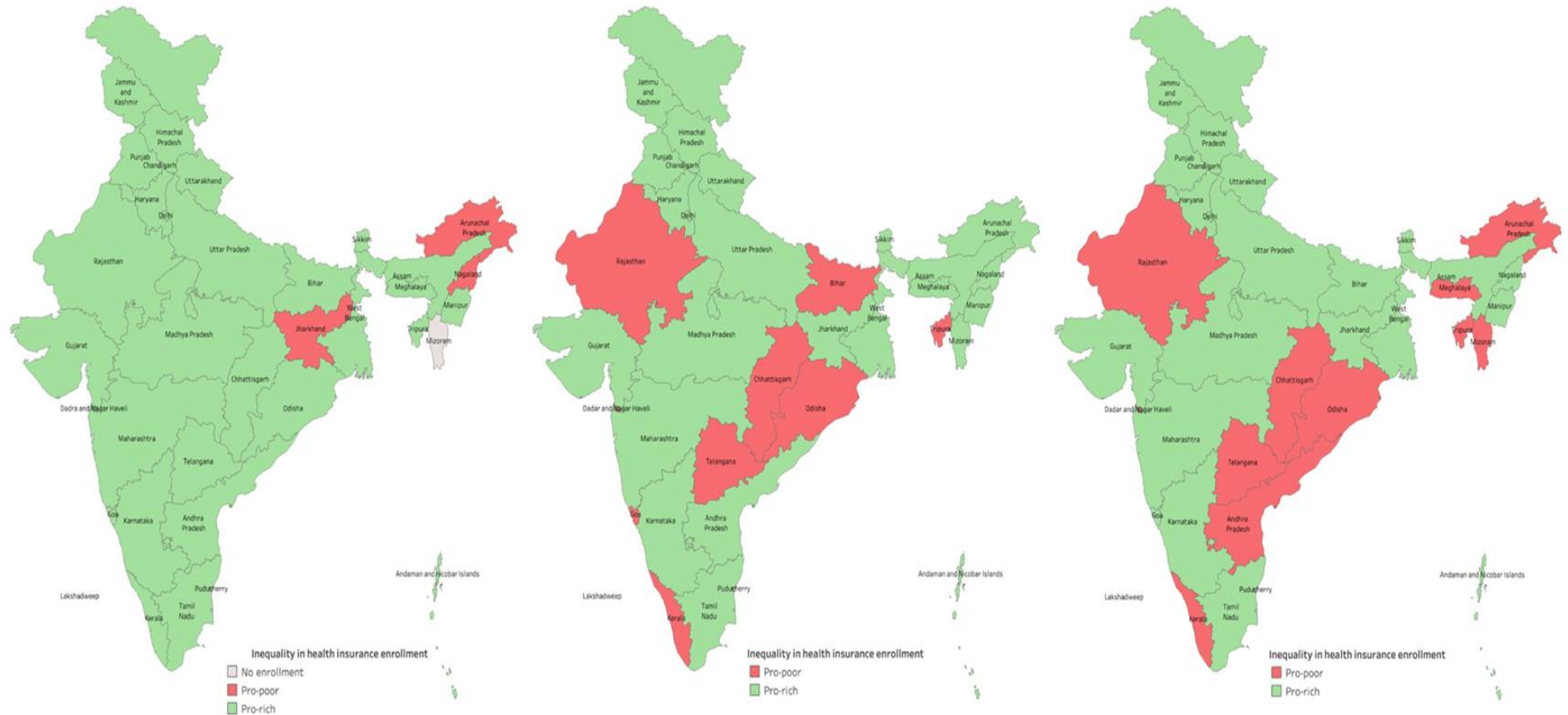
Figure 2.5 Inequality in health insurance enrolment over the years

Table 2.2 Inequality in health insurance enrolment at inter-state and intra-state level over the years

States and Union territories	2004			2014			2018		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
	E_c	E_c	E_c	E_c	E_c	E_c	E_c	E_c	E_c
India	0.029*	0.007*	0.064*	0.110*	0.056*	0.191*	0.115*	0.081*	0.174*
Andaman and Nicobar Islands	0.002	0.001	0.005	0.013*	0	0.039*	0.147*	0.118*	0.069*
Andhra Pradesh	0.037*	0.004*	0.076*	0.013	0.134*	-0.025	-0.123*	-0.044*	-0.105*
Arunachal Pradesh	-0.005*	-0.005*	0	0.022*	-0.031*	0.211*	-0.014*	-0.017*	-0.021
Assam	0.011*	0.011*	0.014*	0.014*	-0.005	0.085*	0.044*	0.012*	0.155*
Bihar	0.001	0	0.002*	-0.035*	-0.037*	0.011*	0.005*	0.001	0.025*
Chandigarh	0	0	0	0.091*	-0.047*	0.091*	0.307*	0.003	0.299*
Chhattisgarh	0.009*	0.001	0.033*	-0.009	0.048*	-0.211*	-0.05*	0.051*	-0.136*
Dadra and Nagar Haveli	0.011*		0.094*	-0.104*	-0.228*	0.185*	-0.150*	0.073	0.108
Daman and Diu	0.005	0.004	-0.001	0.294*	0.387*	0.278*	0.253*	-0.025	0.265*
Delhi	0.074*	-0.003	0.089*	0.394*	0.061*	0.403*	0.278*	0.082*	0.281*
Goa	0.063*	0.057*	0.060*	-0.126*	0.029	-0.258*	0.030	-0.032	0.118*
Gujarat	0.104*	0.019*	0.208*	0.145*	0.002	0.35*	0.076*	0.034*	0.172*
Haryana	0.001	0	0.002	0.169*	0.054*	0.294*	0.132*	0.018*	0.185*
Himachal Pradesh	0.005*	0.003*	-0.015	0.075*	0.070*	0.071*	0.151*	0.155*	-0.05*
Jammu and Kashmir	0.003*	0.002*	0.008*	0.017*	-0.013	0.087*	0.061*	0.049*	0.070*
Jharkhand	-0.001	-0.006*	0.014*	0.072*	0.056*	0.131*	0.015*	0	0.055*
Karnataka	0.029*	0.007*	0.046*	0.168*	0.079*	0.237*	0.150*	0.050*	0.272*
Kerala	0.021*	0.014*	0.038*	-0.111*	-0.166*	-0.023	-0.035*	-0.087*	0.050*
Lakshadweep	0.036*	-0.008	0.043	0.024*		0.031*	0.02	-0.035	0.005
Madhya Pradesh	0	-0.010*	0.024*	0.042*	-0.001	0.114*	0.04*	0.003*	0.11*
Maharashtra	0.059*	0.003*	0.092*	0.196*	0.035*	0.316*	0.182*	0.040*	0.261*
Manipur	0	0	0	0.002	-0.001	-0.001	0.003	-0.013*	0.019*

Meghalaya	0.013*	0.01*	0.041*	0.028*	-0.022	0.110*	-0.035*	-0.021	0.024
Mizoram				0.096*	-0.054*	0.236*	-0.114*	0.012	-0.247*
Nagaland	-0.006	-0.005	-0.004	0.301*	0.309*	0.321*	0.053*	0.023*	0.071*
Odisha	0.003*	0	0.011*	-0.147*	-0.157*	0.104*	-0.084*	-0.052*	-0.02*
Puducherry	0.120*	0.174*	0.110*	0.074*	0.286*	0.024	0.025*	0.054*	-0.028*
Punjab	0.008*	0.005*	0.013*	0.094*	0.047*	0.149*	0.095*	0.009	0.192*
Rajasthan	0.024*	0.013*	0.025*	-0.111*	-0.177*	0.047*	-0.104*	-0.078*	0.039*
Sikkim	0.002		-0.008	0.047*	-0.001	0.051	0.06*	0.085*	0.026*
Tamil Nadu	0.039*	0.012*	0.082*	0.168*	0.139*	0.188*	0.128*	0.067*	0.172*
Telangana#				-0.161*	0.032	-0.089*	-0.254*	-0.066*	-0.19*
Tripura	0.002*	0.001	0.009*	-0.101*	-0.096*	-0.079*	-0.018*	0.054*	-0.108*
Uttar Pradesh	0.013*	0.009*	0.012*	0.004	-0.030*	0.109*	0.041*	0.006*	0.133*
Uttarakhand	0.001		0.001	0.012*		0.049*	0.109*	0.047*	0.212*
West Bengal	0.03*	0.005*	0.061*	0.062*	-0.015	0.222*	0.058*	-0.007	0.172*

E_c : Erreyger concentration index. + value symbolises pro-rich enrolment; -value reflects pro-poor enrolment.
*p<0.05; #Telangana was formed in the year 2014, earlier it was part of Andhra Pradesh.

2.4. Discussion

Health insurance enrolment in India increased from nearly 1% in 2004 to 15% in 2014 and 2018. However, despite this progress, India continues to grapple with the challenge of attaining substantial health insurance enrolment. The issue of low insurance enrolment is not unique to India, as other low-and-middle income countries also reported low health insurance enrolment rates [35]. As per a systematic review, a major barrier to enrolment in insurance programs in low-and-middle income countries is a lack of understanding of how insurance works [36]. The absence of feeling about the need of health insurance [37-40] and lack of awareness are prominent roadblocks in buying insurance [38,40-46]. A study from southern India revealed that respondents expressed concerns about receiving adequate services to justify the premium amount and whether they would receive a refund in case of no utilization, and showed a preference to pay as and when health services are used [37]. Furthermore, in countries with large informal labour markets like India, evidence suggests that enrolling, retaining, and collecting insurance premiums from individuals using a voluntary, contributory mechanism can

be challenging [27,47-50]. Such individuals need to be encouraged to enrol for the scheme and make a contribution [27]. All this highlights the need to increase large-scale comprehensive and innovative awareness interventions to educate people about the about the importance of health insurance, different types of available schemes, eligibility criteria, and associated benefits.

We observed that with the introduction of GSHI schemes, the enrolment under health insurance has increased in India over the years. Notably, in states such as Mizoram, Andhra Pradesh, Telangana, Chhattisgarh, and Kerela a substantial increase in enrolment and a decrease in inequality in enrolment has been witnessed over the years. This could be attributed to the penetration of their own state-level GSHI schemes, namely Mizoram State Health Care Scheme (2008) in Mizoram [51], Rajiv Arogayasri (2007) in Andhra Pradesh [17], Mukhyamantri Swasthya Bima Yojana (2012) in Chhattisgarh [52], and Comprehensive Health Insurance Scheme (2008) in Kerela [53], and Aarogyasri Health Care Trust in Telangana [54]. Previous studies also suggest that state-based insurance scheme implementation and regulation, management, and administration characteristics partially drive enrolment under national or state scheme [10,38,55]. For instance, Mizoram has implemented the state-level scheme for the entire population in addition to the central-level scheme (RSBY) for the poor population on a self-finance or self-insurance basis since 2011. The Mizoram State Health Care Society (MSHCS) was appointed as the innovator for scheme's implementation due to prior dissatisfaction with the implementation functions of insurance companies [51]. The MSHCS assumes the functions, responsibilities, and liabilities of an insurance company, including creating awareness, preparing enrolment data, generating identification cards, creating a network of healthcare providers, processing and disbursing claims, recording claims paid, and monitoring on their own [51]. As a result, health insurance enrolment in Mizoram has significantly increased from 0% in 2004 to 78.57% in 2018, with a pro-poor insurance enrolment. By contrast, poorer states such as Bihar, Jharkhand, and Uttar Pradesh lag behind in health insurance enrolment, and

enrolment is mainly concentrated among the affluent population within these states over the years. Given that health is a state matter in India, state interventions are crucial to increase the enrolment under existing schemes, as well as under the recently launched GSHI scheme, PM-JAY.

We observed intra-state disparities in health insurance enrolment and inequality as well, with higher enrolment and greater inequality in enrolment in urban areas compared to rural areas. Additionally, there were intra-state variations in enrolment under different types of schemes, with higher enrolment in GSHI schemes in rural areas compared to urban areas, while enrolment in CGHS, ESIS, and private health insurance was relatively higher in urban areas than rural areas. These rural-urban variations in enrolment may be attributed to differences in income levels and occupations, as a higher proportion of the poor population resides in rural areas [56], while most formal sector employees reside in urban areas [57,58]. Both health insurers and healthcare providers also prefer to operate in urban areas due to the higher cost involved in customer acquisition and customer service in rural areas [56]. Furthermore, we observed a consistently low health insurance enrolment among individuals belonging to lower economic quintiles, SC and OBC categories, younger age groups, self-employed individuals, those following the Islamic religion, and with larger family sizes over the years. This calls for greater policy attention to address disparities in enrolment at sub-national and subgroup levels and to strengthen the implementation of PM-JAY scheme to ensure socio-economically inclusive coverage. Furthermore, capacity building in rural areas using digital applications, improving primary health infrastructure, and enhancing internet connectivity, would complement the efforts of health insurers to cover the poor and vulnerable population [56].

Additionally, literature has reported several other issues that are hindering the pace of insurance enrolment in India and which needs to be addressed. Lack of awareness about various aspects of GSHI schemes [7,38,43,59], and enrolment process glitches [43,59] have contributed to the

incomplete coverage of the previous central-level GSHI scheme, RSBY. The CGHS and ESIS scheme provide coverage to only formal sector employees, and ESIS scheme is only partially implemented in 153 districts and is yet to cover additional 146 districts fully as of September 2022 [60], reflecting drawbacks in the implementation process of the scheme. Furthermore, enrolment under private health insurance primarily depends on the ability to pay premium, making it unaffordable to a substantial proportion of the Indian population [61]. Consequently, enrolment in private health insurance remains low in India, with only a small proportion of the population covered in a few wealthier states/UTs and urban areas. There is a pressing need to strengthen the implementation process of the existing schemes, remove administrative obstacles to enrolment that poor people face, and leverage the learnings from the existing GSHI schemes to strengthen the implementation of PM-JAY in the near future. Additionally, expansion of private health insurance and to increase its affordability for the missing middle class are crucial to enhance coverage of the health insurance in India.

Importantly, India can also draw valuable lessons from worldwide experiences to improve health insurance enrolment. For instance, China has achieved the largest expansion of insurance coverage in history, both in terms of the scale of coverage and speed of expansion (from covering less than 50% of the population in 2005 to over 95% in 2011) [62,63], owing to efforts such as programmatic implementation strategy, delegation of financial and political responsibilities to local governments, renewed political commitment, strong public support, and heavy government subsidies [62]. Voluntary schemes can overcome barriers to enrolment if the responsibility for enrolling the poor is devolved to appropriate authorities and they are adequately incentivized as evident in New Rural Cooperative Medical Scheme in China [64,65]. The scheme achieved high enrolment people because budget transfers from the central government to local governments were contingent upon meeting a target enrolment rate [64,65]. Further, an experimental study from Indonesia found that time-limited subsidies that reduce the

strategic timing of enrolment to correspond with health needs partially increase enrolment and attract lower-cost enrolees as well [66]. Also, assistance at the point of registration may increase the attempted enrolment, as over half of households who attempted to enrol could not successfully do so [66]. Lastly, lessons documented from several developing countries' health insurance mechanism, including automatic enrolment with adequate information about entitlements, should be considered by policy makers and implementers of current health insurance schemes and designers of future schemes in support of UHC [64].

2.5 Strengths and limitations

This chapter provides a holistic picture of health insurance enrolment scenario over the years as well as at different levels in India. The chapter has used all the three health and morbidity survey of NSSO (2004, 2014, and 2018) that encompasses the period before the initiation of GSHI schemes and after the initiation of GSHI schemes. The 2018 survey has an added advantage in the context of health insurance because it provides information about CGHS, ESIS, and GSHI schemes as separate categories and serves as an informative base for PM-JAY scheme to expand coverage. Also, the chapter has not only assessed the overall health insurance enrolment but also the enrolment under different types of health insurance programmes at national, inter-state, intra-state, and socio-economic and demographics dimensions. Additionally, the chapter has examined the determinants of health insurance enrolment and how the determinants changed over time. Lastly, the chapter has advanced the limited literature by exhibiting the inequality in health insurance enrolment at various levels and over the years.

A few limitations include, First, unlike the 2014 and 2018 health surveys, the NSS 2004 survey did not provide direct details about health insurance enrolment. Therefore, the estimation of insurance enrolment in 2004 was based on the question related to the payment of insurance premiums, which may result in under-reporting or over-reporting of the actual enrolment figures. Second, the 2014 survey classified CGHS, ESIS, and GSHI schemes under a single

category, which restricted our ability to compare the variations in insurance enrolment under GSHI schemes from 2014 to 2018. Lastly, information on various GSHI schemes, including both central and state-level schemes, was grouped under a category. It would have been more beneficial if the survey had collected more specific details about enrolment under different types of GSHI schemes, enabling a more nuanced analysis.

2.6. Conclusion and policy recommendations

The chapter highlights that despite the presence of several health insurance schemes at both national and state levels, enrolment under health insurance has remained low in India. GSHI schemes have given notable impetus to provide coverage to poor and vulnerable population, social health insurance schemes cover only the organized sector employees, and thus, a substantial proportion of population is left with the choice of either going for private health insurance (constrained by the ability-to-pay premium) or to remain uninsured. Substantial disparities in health insurance enrolment were observed across states, rural-urban areas, and socio-economic and demographic levels in India over the years. Notably, the overall enrolment was observed to be higher in urban areas, while the enrolment under GSHI schemes was higher in rural areas than urban areas and in 2018. The likelihood of being enrolled was observed to be high among individuals with higher educational levels, belonging to higher economic quintiles, scheduled tribes, elderly, those earning regular wages and salaries, and following Hinduism. Lastly, health insurance enrolment remains concentrated among affluent individuals in India, with a higher inequality in enrolment in urban areas than rural areas across most of the states over the years.

To increase the low enrolment in health insurance in India, there is a need to increase multidimensional, comprehensive, and innovative awareness programmes at a larger scale to increase awareness and boosting peoples' understanding about the value of health insurance, type of schemes available, eligibility criteria, and enrolment benefits. For social inclusivity in

enrolment, multiple areas including financial inclusion, literacy initiatives, social empowerment and skill programmes, and health insurance technology solutions need to be promoted [66]. Pro-activeness and strengthened implementation efforts at state level, devolving responsibility to appropriate authorities, and reducing administrative bottlenecks in enrolment are also imperative. Additionally, expansion of private health insurance and to increase its affordability for the missing middle class are crucial to enhance coverage of the health insurance in India. Lastly, it is crucial to consider contextual differences and learn from the experiences and challenges faced under previous health insurance schemes in order to improve the implementation of the PM-JAY scheme and expand its coverage in the near future.

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2.8 Appendix (Supplementary Figures and Tables)

States and Union territories	Private Health Insurance	CGHS and ESIS	
India	0.37 [0.35 - 0.39]	0.71 [0.68 - 0.74]	Lowest
Andaman and Nicobar Islands	0.05 [0.03 - 0.07]	0.07 [0.05 - 0.09]	
Andhra Pradesh	0.24 [0.17 - 0.3]	0.9 [0.78 - 1.03]	
Arunachal Pradesh	0.33 [0.18 - 0.49]	0.04 [0.00 - 0.8]	
Assam	0.12 [0.06 - 0.17]	0.38 [0.28 - 0.48]	
Bihar	0.02 [0 - 0.04]	0.01 [0 - 0.02]	
Chandigarh	0.12 [0.02 - 0.22]	0.11 [0.01 - 0.21]	
Chhattisgarh	0.18 [0.09 - 0.28]	0.06 [0.01 - 0.11]	
Dadar and Nagar Haveli	0.29 [0.09 - 0.49]	0 [0 - 0]	
Daman and Diu	0.1 [0.00 - 0.20]	0.14 [0.12 - 0.24]	
Delhi	0.2 [0.08 - 0.32]	5.51 [4.89 - 6.13]	
Goa	1.64 [0.81 - 2.46]	2.35 [1.36 - 3.33]	
Gujarat	1.58 [1.38 - 1.78]	2.04 [1.81 - 2.27]	
Haryana	0.02 [0.00 - 0.04]	0.03 [0.01 - 0.05]	
Himachal Pradesh	0.01 [0.00 - 0.02]	0.23 [0.12 - 0.35]	
Jammu and Kashmir	0.09 [0.02 - 0.17]	0 [0 - 0]	
Jharkhand	0.18 [0.1 - 0.26]	0.16 [0.09 - 0.24]	
Karnataka	0.14 [0.08 - 0.19]	1.17 [1.01 - 1.33]	
Kerala	0.87 [0.71 - 1.03]	0.43 [0.32 - 0.54]	
Lakshadweep	0.1 [0.00 - 0.20]	4.79 [3.44 - 6.14]	
Madhya Pradesh	0.48 [0.38 - 0.57]	0.12 [0.07 - 0.17]	
Maharashtra	1.08 [0.96 - 1.2]	1.14 [1.01 - 1.27]	
Manipur	0.03 [0.01 - 0.05]	0 [0 - 0]	
Meghalaya	0 [0 - 0]	0.4 [0.21 - 0.6]	
Mizoram	0 [0 - 0]	0 [0 - 0]	
Nagaland	0.41 [0.11 - 0.7]	0.26 [0.03 - 0.49]	
Odisha	0.01 [0.00 - 0.02]	0.1 [0.05 - 0.15]	
Puducherry	3.3 [2.28 - 4.32]	5.64 [4.33 - 6.95]	
Punjab	0.1 [0.03 - 0.17]	0.42 [0.28 - 0.56]	
Rajasthan	0.19 [0.13 - 0.25]	0.95 [0.81 - 1.09]	
Sikkim	0.06 [0.02 - 0.10]	0 [0 - 0]	
Tamil Nadu	0.34 [0.26 - 0.42]	1.36 [1.2 - 1.51]	
Tripura	0.07 [0.01 - 0.13]	0 [0 - 0]	
Uttarakhand	0 [0 - 0]	0.03 [0.01 - 0.05]	
Uttar Pradesh	0.12 [0.09 - 0.15]	0.34 [0.29 - 0.38]	
West Bengal	0.36 [0.28 - 0.43]	0.63 [0.54 - 0.73]	Highest

Supplementary Figure 2.1 Enrolment (%) in different Health Insurance Schemes schemes across states/UTs in 2004

Figures inside square brackets represent 95% confidence interval

States and Union territories	Government funded insurance scheme	Employer supported health protection (other than government)	Private Health Insurance	Others	
India	12.74 [12.62 - 12.85]	1.16 [1.12 - 1.19]	1.21 [1.17 - 1.24]	0.1 [0.09 - 0.11]	Lowes
Andaman and Nicobar Islands	0.32 [0 - 0.63]	0 [0 - 0]	0 [0 - 0]	0.02 [0.00 - 0.04]	
Andhra Pradesh	62.36 [61.44 - 63.28]	0.64 [0.49 - 0.79]	0.44 [0.31 - 0.56]	0.18 [0.1 - 0.26]	
Arunachal Pradesh	3.12 [2.5 - 3.74]	0.87 [0.54 - 1.21]	0.52 [0.26 - 0.78]	0.81 [0.49 - 1.13]	
Assam	1.18 [0.99 - 1.38]	1.19 [0.99 - 1.38]	0.21 [0.13 - 0.3]	0 [0.00 - 0.01]	
Bihar	5.31 [4.98 - 5.65]	0.76 [0.63 - 0.88]	0.01 [0 - 0.02]	0.07 [0.03 - 0.11]	
Chandigarh	8.43 [6.59 - 10.27]	2.15 [1.19 - 3.12]	0.37 [0.08 − 0.67]	1.08 [0.39 - 1.76]	
Chhattisgarh	38.51 [37.28 - 39.73]	0.48 [0.31 - 0.66]	0.01 [0.00 - 0.02]	0 [0 - 0]	
Dadar and Nagar Haveli	11.06 [8.64 - 13.49]	5.43 [3.68 - 7.18]	0.44 [0.05 - 0.83]	0 [0 - 0]	
Daman and Diu	1.5 [0.48 - 2.53]	0 [0 - 0]	12.7 [9.89 - 15.5]	0 [0 - 0]	
Delhi	8.59 [7.85 - 9.34]	1.86 [1.5 - 2.21]	6.12 [5.49 - 6.76]	0.01 [0.00 - 0.02]	
Goa	13.18 [10.99 - 15.36]	0.07 [0.1 - 0.13]	0 [0 - 0]	0 [0 - 0]	
Gujarat	7.03 [6.63 - 7.44]	0.65 [0.53 - 0.78]	6.41 [6.03 - 6.8]	0 [0.00 - 0.01]	
Haryana	3.83 [3.41 - 4.25]	0.5 [0.34 - 0.65]	2.6 [2.26 - 2.95]	0 [0.00 - 0.01]	
Himachal Pradesh	7.61 [6.83 - 8.39]	0.69 [0.45 - 0.94]	0.65 [0.41 - 0.88]	0.33 [0.16 - 0.5]	
Jammu and Kashmir	3.83 [3.38 - 4.29]	3.14 [2.73 - 3.56]	0.97 [0.74 - 1.2]	0.13 [0.04 - 0.21]	
Jharkhand	2.4 [2.07 - 2.73]	1.34 [1.09 - 1.59]	0.01 [0.00 - 0.02]	0.01 [0.00 - 0.02]	
Karnataka	5.18 [4.82 - 5.53]	3.47 [3.17 - 3.76]	0.98 [0.82 - 1.14]	0.88 [0.73 - 1.03]	
Kerala	34.36 [33.49 - 35.24]	2.19 [1.92 - 2.46]	2.43 [2.15 - 2.72]	0.27 [0.18 - 0.37]	
Lakshadweep	0.77 [0.18 - 1.36]	0 [0 - 0]	0 [0 - 0]	0 [0 - 0]	
Madhya Pradesh	1.24 [1.08 - 1.4]	0.23 [0.16 - 0.3]	0.17 [0.11 - 0.23]	0.02 [0 - 0.05]	
Maharashtra	2.75 [2.55 - 2.94]	1.3 [1.16 - 1.43]	3.1 [2.89 - 3.3]	0.04 [0.01 - 0.06]	
Manipur	0.41 [0.26 - 0.56]	0.02 [0.01 - 0.03]	0.01 [0.00 - 0.02]	0.08 [0.01 - 0.14]	
Meghalaya	14.58 [13.53 - 15.62]	5.7 [5.02 - 6.39]	0.1 [0.01 - 0.19]	0.09 [0 - 0.17]	
Mizoram	71.73 [70.32 - 73.15]	1.74 [1.33 - 2.16]	0.07 [0.01 - 0.13]	0.11 [0.01 - 0.21]	
Nagaland	27.1 [25.41 - 28.8]	0.31 [0.1 - 0.52]	0 [0 - 0]	0 [0 - 0]	
Odisha	19.17 [18.45 - 19.88]	0.94 [0.77 - 1.12]	0.53 [0.39 - 0.66]	0.04 [0 - 0.08]	
Puducherry	4.83 [3.58 - 6.09]	0.27 [0.04 - 0.49]	0.65 [0.18 - 1.12]	0 [0 - 0]	
Punjab	3.28 [2.89 - 3.68]	2.04 [1.73 - 2.35]	0.26 [0.14 - 0.37]	0.02 [0.01 - 0.03]	
Rajasthan	22.29 [21.66 - 22.92]	0.22 [0.15 - 0.29]	0.06 [0.02 - 0.1]	0 [0 - 0.01]	
Sikkim	2.18 [1.56 - 2.8]	0.69 [0.34 - 1.04]	0.02 [0.00 - 0.04]	0.01 [0.00 - 0.02]	
Tamil Nadu	17.7 [17.11 - 18.28]	1.92 [1.71 - 2.14]	2.01 [1.8 - 2.23]	0.14 [0.08 - 0.2]	
Telangana	58.12 [56.93 - 59.31]	2.31 [1.94 - 2.67]	0.61 [0.42 - 0.8]	0.03 [0.01 - 0.05]	
Tripura	11.36 [10.56 - 12.16]	0.72 [0.5 - 0.93]	0.39 [0.23 - 0.55]	0.26 [0.13 - 0.39]	
Uttar Pradesh	3.26 [3.1 - 3.42]	0.73 [0.65 - 0.8]	0.12 [0.09 - 0.15]	0.03 [0.02 - 0.05]	
Uttarakhand	0.21 [0.05 - 0.37]	0.02 [0.00 - 0.04]	0.09 [0.01 - 0.17]	0 [0 - 0]	
West Bengal	13.48 [13.04 - 13.92]	1.26 [1.11 - 1.4]	1.98 [1.8 - 2.16]	0.03 [0.01 - 0.05]	Highes

Supplementary Figure 2.2 Enrolment (%) in different health insurance schemes schemes across states/UTs in 2014

Figures inside square brackets represent 95% confidence interval
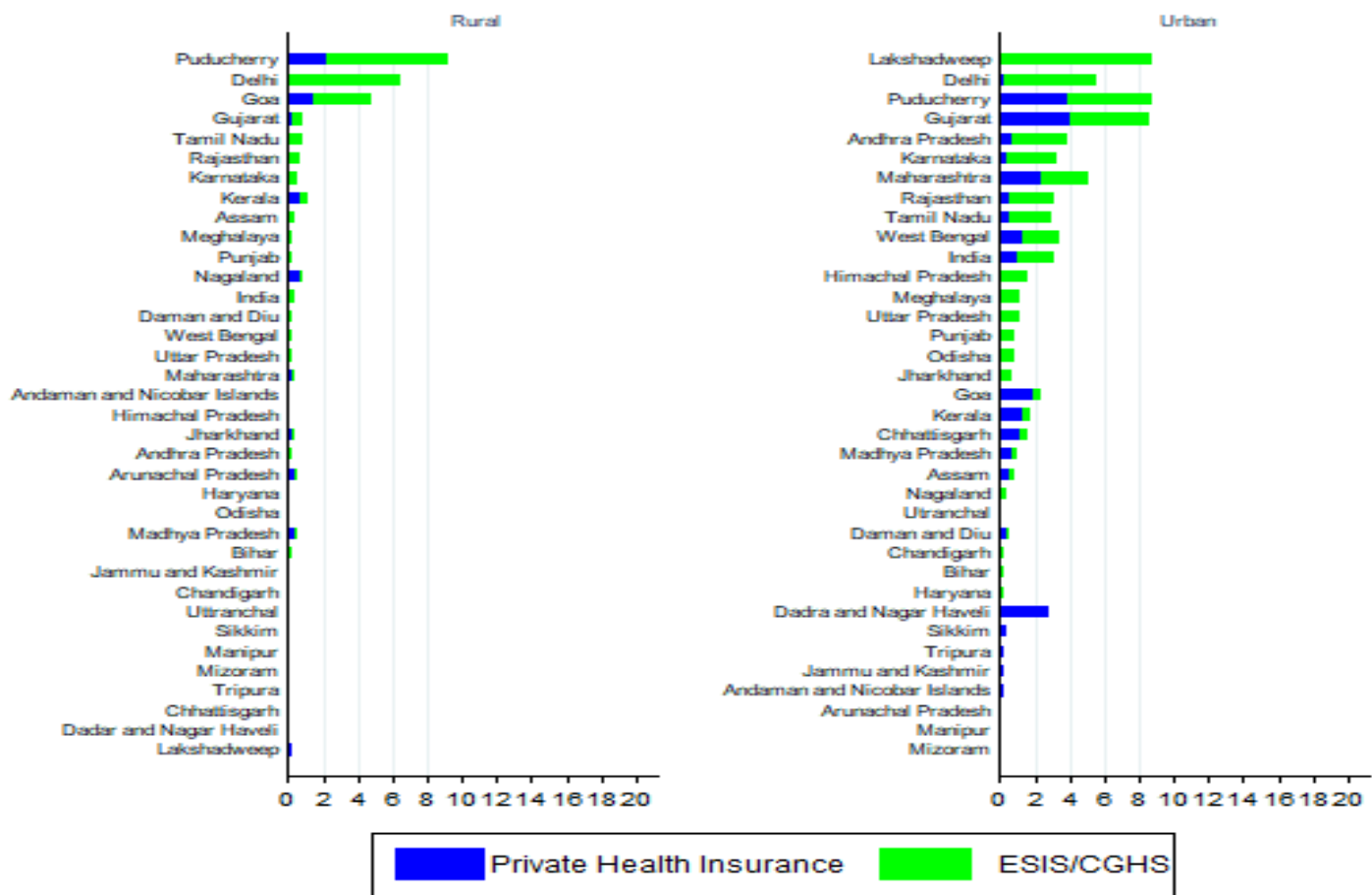
Supplementary Figure 2.3 Enrolment (%) in different health insurance schemes in rural-urban areas in 2004
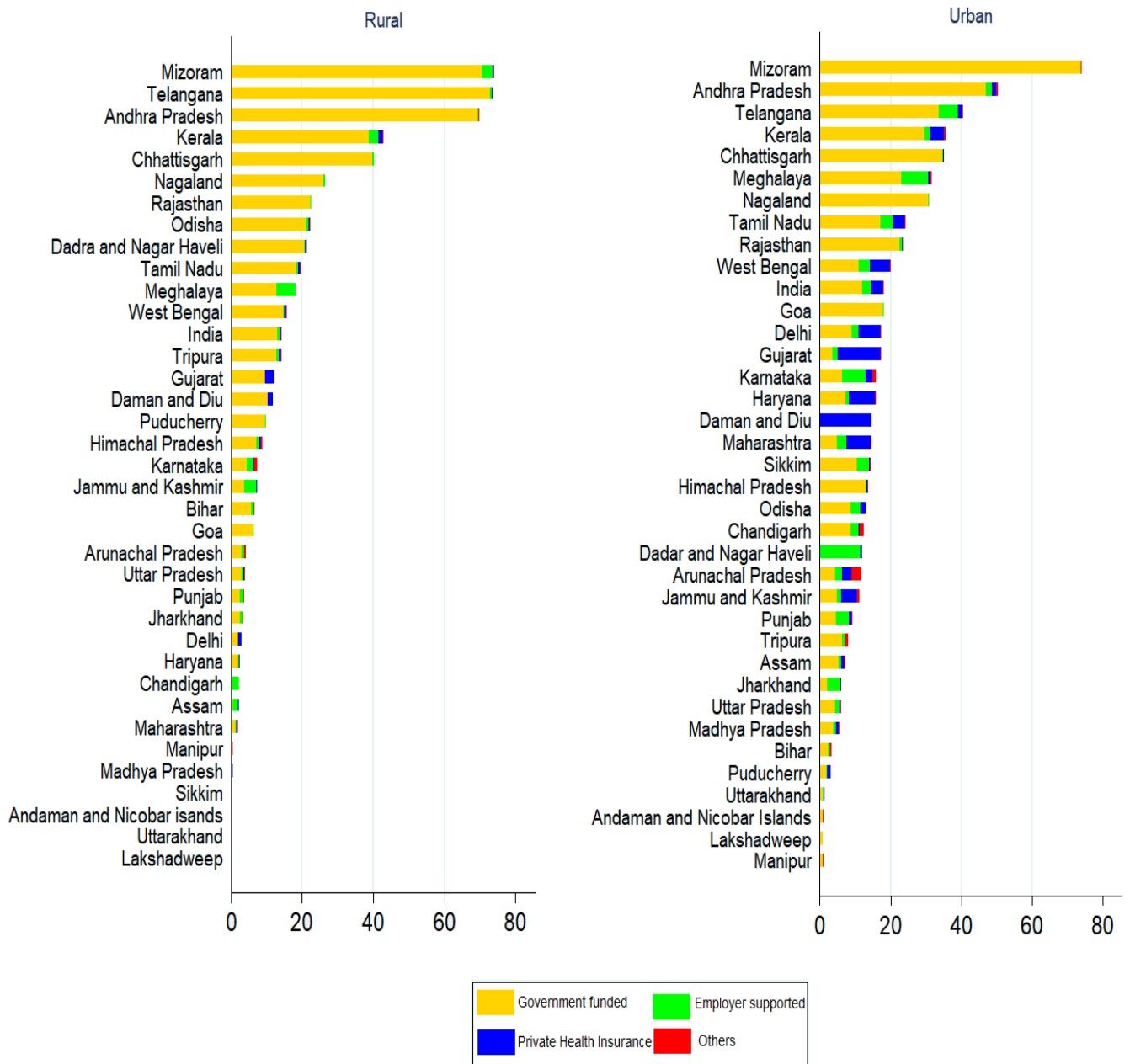
Supplementary Figure 2.4 Enrolment (%) in different health insurance schemes in rural-urban areas in 2014

Supplementary Table 2.1 Health insurance enrolment (%) at inter-state and intra-state level over the years

States and Union territories	2004			2014			2018		
	Total (%)	Rural (%)	Urban (%)	Total (%)	Rural (%)	Urban (%)	Total (%)	Rural (%)	Urban (%)
India	1.07 [1.03 - 1.1]	0.36 [0.34 - 0.39]	3.13 [3.03 - 3.22]	15.25 [15.12 - 15.37]	14.06 [13.9 - 14.21]	18.02 [17.82 - 18.22]	15.53 [15.44 -15.63]	14.07 [13.94 -14.18]	19.06 [18.89 - 19.22]
Andaman and Nicobar Islands	0.12 [0.02 - 0.22]	0.11 [0.03 - 0.19]	0.16 [0.08 - 0.24]	0.34 [0.01 - 0.66]	0.02 [0.01 - 0.03]	1.01 [0.04 - 1.98]	10.93 [9.67 - 12.19]	8.3 [6.76 - 9.84]	15.34 [13.24 - 17.45]
Andhra Pradesh	1.14 [1 - 1.28]	0.11 [0.06 - 0.17]	3.83 [3.41 - 4.25]	63.83 [62.91 - 64.74]	69.66 [68.45 - 70.88]	50.48 [49.11 - 51.84]	72.79 [72.13 - 73.46]	77.07 [76.27 -77.86]	63.01 [61.81 - 64.19]
Arunachal Pradesh	0.38 [0.22 - 0.54]	0.42 [0.22 - 0.62]	0.04 [0.02 - 0.06]	5.36 [4.55 - 6.17]	4.18 [3.29 - 5.07]	11.62 [9.68 - 13.56]	7.22 [6.69 - 7.75]	6.88 [6.27 -7.5]	8.96 [7.85 - 10.07]
Assam	0.48 [0.36 - 0.59]	0.43 [0.31 - 0.55]	0.9 [0.51 - 1.28]	2.59 [2.3 - 2.88]	2 [1.7 - 2.29]	7.08 [6.1 - 8.06]	5.17 [4.85 - 5.49]	4.22 [3.88 - 4.55]	12.28 [11.35 - 13.22]
Bihar	0.03 [0.01 - 0.06]	0.03 [0.01 - 0.05]	0.08 [0.01 - 0.15]	6.17 [5.82 - 6.53]	6.49 [6.04 - 6.94]	3.41 [2.95 - 3.87]	0.38 [0.31 - 0.45]	0.22 [0.15 - 0.28]	1.81 [1.54 - 2.08]
Chandigarh	0.21 [0 - 0.41]	0 [0 - 0]	0.23 [0.03 - 0.43]	12.04 [9.88 - 14.2]	2.23 [0.59 - 3.88]	12.42 [9.69 - 15.15]	32.57 [30.25 - 34.9]	0.11 [0.05 - 0.17]	33.74 [31.16 - 36.33]
Chhattisgarh	0.24 [0.13 - 0.35]	0.02 [0.00 - 0.04]	1.58 [1.04 - 2.12]	39.27 [38.04 - 40.5]	40.21 [38.59 - 41.83]	35.02 [33.15 - 36.89]	64.29 [63.52 - 65.06]	66.86 [65.91 - 67.81]	52.69 [51.36 - 54.01]

Dadra and Nagar Haveli	0.29	0	2.77	16.97	21.25	11.99	58.25	66.26	47.29
	[0.02 - 0.56]	[0 - 0]	[1.06 - 4.48]	[14.06 - 19.88]	[17.09 - 25.42]	[8.11 - 15.88]	[55.08 - 61.43]	[62.3 -70.21]	[42.25 - 52.33]
Daman and Diu	0.25	0.16	0.47	14.22	11.82	14.63	12.34	1.4	16.2
	[0.15 - 0.35]	[0.06 - 0.26]	[0.37 – 0.57]	[11.26 - 17.18]	[8.09 - 15.56]	[10.23 - 19.02]	[9.69 - 15]	[0.17 - 2.63]	[11.54 - 20.86]
Delhi	5.69	6.5	5.54	16.61	2.94	17.29	18.02	13.54	18.2
	[5.06 - 6.32]	[4.22 - 8.79]	[4.89 - 6.19]	[15.62 - 17.6]	[1.21 - 4.67]	[16.25 - 18.33]	[17.08 - 18.96]	[9.87 - 17.2]	[17.23 - 19.17]
Goa	3.98	4.75	2.43	13.27	6.28	17.87	48.05	56.38	42.68
	[2.71 - 5.26]	[2.58 - 6.92]	[1.12 - 3.74]	[11.07 - 15.47]	[4.08 - 8.48]	[14.31 - 21.43]	[45.88 - 50.22]	[52.9 - 59.85]	[39.94 - 45.42]
Gujarat	3.54	0.86	8.77	14.16	11.98	17.21	13.49	12.71	14.71
	[3.24 - 3.84]	[0.66 - 1.06]	[8.08 - 9.45]	[13.6 - 14.71]	[11.27 - 12.68]	[16.34 - 18.09]	[13.04 - 13.95]	[12.08 - 13.35]	[14.05 - 15.37]
Haryana	0.05	0.04	0.09	6.95	2.33	15.58	7.16	2.04	17.49
	[0 - 0.1]	[0.00 - 0.08]	[0.05 - 0.13]	[6.39 - 7.5]	[1.87 - 2.79]	[14.44 - 16.72]	[6.76 - 7.56]	[1.75 - 2.33]	[16.61 - 18.37]
Himachal Pradesh	0.24	0.09	1.61	9.31	8.85	13.57	12.28	11.3	20.87
	[0.13 - 0.35]	[0.02 - 0.16]	[0.79 - 2.43]	[8.45 - 10.17]	[7.91 - 9.78]	[11.25 - 15.88]	[11.64 - 12.93]	[10.62 - 11.98]	[18.96 - 22.78]
Jammu and Kashmir	0.09	0.06	0.24	8.09	7.28	11.21	3.01	2.36	5.36
	[0.02 - 0.17]	[0.01 - 0.11]	[0.02 - 0.45]	[7.44 - 8.73]	[6.47 - 8.08]	[10.03 - 12.38]	[2.76 - 3.27]	[2.07 - 2.65]	[4.82 - 5.9]
Jharkhand	0.32	0.25	0.67	3.76	3.13	5.9	0.45	0.03	2.25
	[0.22 - 0.43]	[0.14 - 0.36]	[0.4 - 0.95]	[3.36 - 4.17]	[2.64 - 3.62]	[5.11 - 6.68]	[0.35 - 0.55]	[0 - 0.06]	[1.85 - 2.65]
Karnataka	1.3	0.5	3.22	10.54	7.28	15.84	7.81	4.34	13.52
	[1.13 - 1.47]	[0.36 - 0.65]	[2.82 - 3.62]	[10.04 - 11.03]	[6.71 - 7.86]	[14.98 - 16.7]	[7.45 - 8.16]	[3.98 - 4.7]	[12.86 - 14.18]
Kerala	1.29	1.13	1.75	39.54	42.8	35.55	39.94	41.44	38.09
	[1.1 - 1.48]	[0.91 - 1.35]	[1.37 - 2.12]	[38.64 - 40.45]	[41.49 - 44.11]	[34.31 - 36.79]	[39.26 - 40.62]	[40.51 - 42.38]	[37.1 - 39.09]
Lakshadweep	4.89	0.22	8.83	0.78	0	0.95	16.53	12.28	17.94
	[3.53 - 6.25]	[0.02 - 0.42]	[6.38 - 1.28]	[0.18 - 1.37]	[0 - 0]	[0.03 - 1.86]	[14.31 - 18.75]	[8.93 - 15.64]	[15.11 - 20.76]

Madhya Pradesh	0.58 [0.47 - 0.68]	0.43 [0.31 - 0.54]	1.04 [0.81 - 1.28]	1.67 [1.49 - 1.85]	0.34 [0.23 - 0.45]	5.31 [4.84 - 5.78]	1.26 [1.13 - 1.39]	0.14 [0.09 - 0.2]	4.76 [4.39 - 5.12]
Maharashtra	2.22 [2.04 - 2.4]	0.29 [0.2 - 0.38]	5.07 [4.69 - 5.45]	7.19 [6.89 - 7.5]	1.76 [1.55 - 1.98]	14.46 [13.86 - 15.07]	7.56 [7.32 - 7.81]	2.37 [2.17 -2.58]	14.39 [13.93 - 14.84]
Manipur	0.03 [0.01 - 0.05]	0.04 [0.02 - 0.06]	0 [0 - 0]	0.52 [0.35 - 0.68]	0.37 [0.18 - 0.56]	0.83 [0.52 - 1.15]	1.46 [1.26 - 1.67]	1.07 [0.83 -1.3]	2.34 [1.95 - 2.73]
Meghalaya	0.4 [0.21 - 0.6]	0.29 [0.09 - 0.48]	1.18 [0.57 - 1.79]	20.52 [19.32 - 21.72]	18.16 [16.76 - 19.56]	31.8 [29.4 - 34.2]	53.9 [52.71 - 55.1]	55.25 [53.82 -56.68]	47.5 [45.32 - 49.68]
Mizoram	0 [0 - 0]	0 [0 - 0]	0 [0 - 0]	73.93 [72.55 - 75.32]	73.71 [71.74 - 75.68]	74.2 [72.25 - 76.15]	78.57 [77.64 - 79.51]	80.81 [79.47 -82.14]	75.73 [74.4 - 77.06]
Nagaland	0.67 [0.29 - 1.04]	0.87 [0.35 - 1.39]	0.32 [0.02 - 0.62]	27.43 [25.73 - 29.13]	26.43 [24.3 - 28.56]	30.75 [27.89 - 33.61]	5.62 [5.03 - 6.22]	4.17 [3.55 -4.79]	9.53 [8.18 - 10.87]
Odisha	0.11 [0.06 - 0.17]	0.02 [0.01 - 0.03]	0.78 [0.45 - 1.11]	20.73 [19.99 - 21.47]	22.14 [21.24 - 23.04]	13.1 [11.97 - 14.24]	15.61 [15.1 - 16.13]	17.43 [16.8 -18.06]	6.37 [5.7 - 7.05]
Puducherry	8.92 [7.3 - 10.54]	9.25 [6.08 - 12.42]	8.75 [6.86 - 10.64]	5.76 [4.39 - 7.12]	9.71 [6.34 - 13.07]	3.18 [1.98 - 4.39]	4.83 [3.99 - 5.67]	1.53 [0.53 -2.54]	6.94 [5.8 - 8.08]
Punjab	0.49 [0.34 - 0.64]	0.34 [0.17 - 0.51]	0.8 [0.5 - 1.1]	5.61 [5.1 - 6.13]	3.58 [3.01 - 4.15]	9.03 [8.12 - 9.95]	6.26 [5.9 - 6.63]	3.84 [3.44 -4.24]	10.27 [9.61 - 10.93]
Rajasthan	1.14 [0.99 - 1.29]	0.64 [0.5 - 0.77]	3.07 [2.63 - 3.51]	22.64 [22.01 - 23.28]	22.28 [21.45 - 23.11]	23.61 [22.62 - 24.6]	35.2 [34.64 - 35.76]	38.1 [37.39 -38.82]	25.31 [24.46 - 26.16]
Sikkim	0.06 [0.04 - 0.08]	0 [0 - 0]	0.43 [0.41 – 0.45]	2.91 [2.19 - 3.63]	0.13 [0.06 - 0.21]	14.18 [11.69 - 16.66]	2.84 [2.29 - 3.39]	3.3 [2.64 -3.95]	1.18 [0.35 - 2.01]
Tamil Nadu	1.62 [1.45 - 1.79]	0.84 [0.66 - 1.02]	3.06 [2.74 - 3.39]	21.85 [21.21 - 22.49]	19.33 [18.47 - 20.18]	24.42 [23.47 - 25.37]	18.85 [18.39 - 19.31]	16.41 [15.82 -17]	21.74 [21.02 - 22.46]

Telangana#	NA	NA	NA	61.18 [60.01 - 62.36]	73.54 [72.04 - 75.04]	40.53 [38.84 - 42.21]	61.09 [60.3 - 61.89]	70.96 [69.95 -71.97]	49.67 [48.48 - 50.87]
Tripura	0.07 [0.03 - 0.11]	0.04 [0.00 - 0.08]	0.25 [0.21 - 0.30]	12.79 [11.95 - 13.64]	14.02 [12.89 - 15.16]	8.12 [7.02 - 9.22]	15.15 [14.38 - 15.91]	17.51 [16.53 -18.48]	6.04 [5.12 - 6.96]
Uttar Pradesh	0.03 [0.01 - 0.05]	0 [0 - 0]	0.13 [0.11 - 0.15]	0.32 [0.12 - 0.51]	0 [0 - 0]	1.44 [0.82 - 2.06]	6.05 [5.55 - 6.56]	4 [3.47 -4.53]	11.96 [10.86 - 13.06]
Uttarakhand	0.45 [0.39 - 0.5]	0.27 [0.22 - 0.32]	1.13 [0.96 - 1.29]	4.15 [3.97 - 4.34]	3.67 [3.46 - 3.89]	5.82 [5.47 - 6.17]	1.41 [1.32 - 1.5]	0.42 [0.35 -0.48]	5.07 [4.8 - 5.35]
West Bengal	0.98 [0.86 - 1.1]	0.19 [0.12 - 0.26]	3.47 [3.09 - 3.85]	16.81 [16.33 - 17.3]	15.44 [14.79 - 16.09]	19.99 [19.24 - 20.74]	13.25 [12.87 - 13.62]	11.42 [10.96 -11.88]	17.72 [17.06 - 18.39]

#Telangana was formed in the year 2014, earlier it was part of Andhra Pradesh. Figures inside square brackets represent 95% confidence interval.

Supplementary Table 2.2 Overall health insurance enrolment (%) across socio-economic and demographic dimensions over the years

Socio-economic and demographic characteristics	2004	2014	2018
	Total Insured	**Total Insured**	**Total Insured**
	(%)	**(%)**	**(%)**
Economic Quintile			
Poorest	0.2 [0.17 - 0.24]	11.16 [10.92 - 11.4]	10.71 [10.52 - 10.89]
Poorer	0.41 [0.36 - 0.45]	11.95 [11.7 - 12.2]	11.1 [10.91 - 11.29]
Middle	0.75 [0.69 - 0.81]	13.12 [12.86 - 13.37]	14.25 [14.04 - 14.46]
Richer	1.03 [0.96 - 1.1]	17.2 [16.92 - 17.49]	18.26 [18.03 - 18.49]
Richest	2.95 [2.84 - 3.07]	22.85 [22.53 - 23.16]	23.5 [23.26 - 23.73]
Gender			
Male	1.23 [1.18 - 1.28]	15.04 [14.87 - 15.21]	15.27 [15.14 - 15.4]
Female	0.9 [0.85 - 0.94]	15.46 [15.29 - 15.64]	15.82 [15.68 - 15.96]
Educational level			
Not literate/no formal schooling ref	0.35 [0.32 - 0.38]	13.66 [13.46 - 13.87]	14.68 [14.5 - 14.86]
Literate with formal schooling: below primary/primary	0.71 [0.66 - 0.76]	14.41 [14.18 - 14.64]	14.13 [13.95 - 14.31]
Up to secondary	1.69 [1.6 - 1.78]	15.02 [14.78 - 15.27]	15.22 [15.03 - 15.4]
Up to higher secondary	3.44 [3.17 - 3.7]	18.28 [17.82 - 18.74]	16.27 [15.96 - 16.58]
Graduation and above	6.61 [6.24 - 6.98]	24.47 [23.95 - 24.99]	23.46 [23.1 - 23.81]
Age			
0-18 years	0.74 [0.7 - 0.79]	12.75 [12.57 - 12.94]	12.71 [12.56 - 12.86]
19-40 years	1.16 [1.1 - 1.22]	15.18 [14.98 - 15.38]	15.64 [15.48 - 15.79]

41-60 years	1.82 [1.72 - 1.93]	18.77 [18.46 - 19.08]	18.86 [18.63 - 19.09]
61-80 years	0.84 [0.74 - 0.94]	19.27 [18.74 - 19.79]	19.25 [18.84 - 19.67]
Above 80 years	1.27 [0.74 - 1.8]	21.05 [19.08 - 23.03]	19.16 [17.6 - 20.73]
Sector			
Rural	0.36 [0.34 - 0.39]	14.06 [13.9 - 14.21]	14.06 [13.94 - 14.18]
Urban	3.13 [3.03 - 3.22]	18.02 [17.82 - 18.22]	19.06 [18.89 - 19.22]
Social group			
scheduled tribes	0.36 [0.3 - 0.41]	19.09 [18.72 - 19.46]	21.65 [21.36 - 21.95]
scheduled castes	0.74 [0.68 - 0.81]	13.94 [13.65 - 14.23]	13.13 [12.92 - 13.35]
other backward classes	0.73 [0.69 - 0.77]	15.52 [15.32 - 15.71]	15.65 [15.5 - 15.8]
Others	1.89 [1.81 - 1.96]	14.41 [14.2 - 14.63]	15.02 [14.85 - 15.19]
Religion			
Hinduism	1.09 [1.05 - 1.13]	15.89 [15.74 - 16.03]	16.37 [16.25 - 16.48]
Islam	0.36 [0.31 - 0.41]	10.59 [10.32 - 10.86]	9.34 [9.14 - 9.54]
Others	2.4 [2.24 - 2.56]	17.77 [17.34 - 18.19]	19.76 [19.44 - 20.08]
Source of Earning			
Self employed	0.37 [0.34 - 0.39]	12.78 [12.62 - 12.94]	12.99 [12.87 - 13.12]
Regular wage/salary	6.48 [6.26 - 6.69]	22.71 [22.41 - 23.01]	23.56 [23.32 - 23.79]
Casual labour	0.29 [0.25 - 0.32]	14.85 [14.59 - 15.11]	14.79 [14.58 - 14.99]
Other	1.9 [1.76 - 2.05]	15.83 [15.24 - 16.41]	17.33 [16.85 - 17.81]
Marriage status			

Never married	0.83 [0.79 - 0.88]	13.35 [13.18 - 13.52]	13.52 [13.39 - 13.66]
Currently married	1.36 [1.31 - 1.41]	16.76 [16.58 - 16.94]	16.91 [16.77 - 17.04]
Widowed	0.77 [0.65 - 0.89]	18.05 [17.46 - 18.65]	19.4 [18.91 - 19.89]
Divorced/separated	0.01 [0.004 - 0.016]	13.24 [11.23 - 15.25]	19.93 [17.9 - 21.97]

Figures inside square brackets represent 95% confidence interval

Supplementary Table 2.3 Enrolment in types of health insurance scheme (%) across socio-economic and demographic dimensions over the years

Socio-economic and Demographic	2004		2014				2018				
	Private Health Insurance (%)	CGHS/ESIS (%)	Government funded insurance scheme (GSHI, ESIS, CGHS) (%)	Employer supported health protection (other than govt.) (%)	Private Health Insurance (%)	Others (%)	GSHI (%)	CGHS (%)	ESIS (%)	Private Health Insurance (%)	Others (%)
Economic Quintile											
Poorest	0.11 [0.09 - 0.14]	0.1 [0.08 - 0.12]	10.31 [10.08 - 10.54]	0.71 [0.65 - 0.77]	0.03 [0.02 - 0.05]	0.11 [0.08 - 0.13]	9.87 [9.69 - 10.05]	0.3 [0.27 - 0.33]	0.3 [0.27 - 0.33]	0.19 [0.17 - 0.22]	0.04 [0.03 - 0.06]
Poorer	0.06 [0.04 - 0.08]	0.35 [0.3 - 0.39]	11.09 [10.85 - 11.34]	0.55 [0.49 - 0.6]	0.24 [0.2 - 0.27]	0.07 [0.05 - 0.1]	9.7 [9.52 - 9.88]	0.59 [0.54 - 0.63]	0.51 [0.47 - 0.55]	0.2 [0.17 - 0.23]	0.1 [0.08 - 0.12]
Middle	0.15 [0.13 - 0.18]	0.61 [0.56 - 0.67]	11.77 [11.53 - 12.01]	0.93 [0.86 - 1]	0.37 [0.32 - 0.41]	0.05 [0.03 - 0.07]	11.8 [11.61 - 12]	1 [0.94 - 1.06]	0.71 [0.66 - 0.76]	0.66 [0.61 - 0.71]	0.08 [0.06 - 0.1]
Richer	0.3 [0.26 - 0.34]	0.74 [0.68 - 0.8]	14.83	1.21	1.04	0.12	13.92	1.54	1.31	1.28	0.21 [0.18 - 0.24]

			[14.56 - 15.1]	[1.13 - 1.3]	[0.96 - 1.12]	[0.10 - 0.15]	[13.72 - 14.13]	[1.46 - 1.61]	[1.25 - 1.38]	[1.21 - 1.34]	
Richest	1.23 [1.16 - 1.31]	1.76 [1.67 - 1.85]	15.9 [15.63 - 16.18]	2.41 [2.29 - 2.52]	4.4 [4.24 - 4.55]	0.14 [0.11 - 0.17]	13.2 [13.02 - 13.39]	3.49 [3.39 - 3.59]	2.36 [2.27 - 2.44]	4.13 [4.02 - 4.24]	0.32 [0.28 - 0.35]
Gender											
Male	0.42 [0.39 - 0.45]	0.83 [0.79 - 0.87]	12.49 [12.33 - 12.64]	1.2 [1.15 - 1.26]	1.26 [1.21 - 1.31]	0.09 [0.08 - 0.1]	11.48 [11.37 - 11.6]	1.33 [1.29 - 1.38]	1.03 [0.99 - 1.07]	1.29 [1.25 - 1.34]	0.13 [0.11 - 0.14]
Female	0.32 [0.29 - 0.35]	0.59 [0.55 - 0.62]	13.08 [12.92 - 13.24]	1.11 [1.06 - 1.16]	1.16 [1.11 - 1.21]	0.11 [0.09 - 0.13]	11.93 [11.81 - 12.05]	1.42 [1.37 - 1.46]	1.03 [1 - 1.07]	1.26 [1.22 - 1.3]	0.18 [0.16 - 0.19]
Educational level											
Not literate/no formal schooling	0.11 [0.09 - 0.13]	0.25 [0.22 - 0.27]	12.61 [12.41 - 12.81]	0.71 [0.66 - 0.76]	0.27 [0.24 - 0.3]	0.08 [0.06 - 0.1]	13.21 [13.04 - 13.38]	0.66 [0.62 - 0.7]	0.43 [0.4 - 0.46]	0.31 [0.28 - 0.33]	0.08 [0.06 - 0.09]
Literate with formal schooling : below primary/ primary	0.2 [0.17 - 0.23]	0.51 [0.47 - 0.55]	12.79 [12.57 - 13]	0.9 [0.84 - 0.96]	0.65 [0.6 - 0.7]	0.07 [0.06 - 0.09]	11.95 [11.78 - 12.12]	0.88 [0.83 - 0.93]	0.55 [0.52 - 0.59]	0.62 [0.58 - 0.66]	0.12 [0.1 - 0.14]
Up to secondary	0.5 [0.46 - 0.55]	1.2 [1.13 - 1.28]	12.69 [12.46 - 12.92]	1.01 [0.94 - 1.08]	1.19 [1.12 - 1.27]	0.13 [0.11 - 0.16]	11.88 [11.71 - 12.04]	1.27 [1.21 - 1.32]	0.94 [0.89 - 0.99]	0.95 [0.9 - 1]	0.18 [0.16 - 0.2]
Up to higher secondary	1.26 [1.1 - 1.43]	2.21 [1.99 - 2.43]	13.42 [13.02 - 13.83]	2.14 [1.97 - 2.32]	2.62 [2.43 - 2.81]	0.09 [0.06 - 0.13]	9.73 [9.48 - 9.98]	2.34 [2.21 - 2.47]	1.82 [1.7 - 1.93]	2.18 [2.06 - 2.3]	0.2 [0.17 - 0.24]

Graduation and above	3.22 [2.96 - 3.48]	3.55 [3.28 - 3.83]	13.14 [12.73 - 13.55]	4.09 [3.85 - 4.33]	7.02 [6.71 - 7.33]	0.22 [0.16 - 0.27]	7.46 [7.24 - 7.68]	4.72 [4.54 - 4.9]	4.11 [3.95 - 4.28]	6.85 [6.63 - 7.06]	0.32 [0.27 - 0.37]
Age											
0-18 years	0.21 [0.19 - 0.23]	0.54 [0.5 - 0.58]	10.98 [10.8 - 11.15]	0.95 [0.9 - 1.01]	0.76 [0.71 - 0.81]	0.06 [0.05 - 0.07]	10 [9.87 - 10.14]	1.02 [0.97 - 1.06]	0.68 [0.65 - 0.72]	0.87 [0.83 - 0.91]	0.13 [0.12 - 0.15]
19-40 years	0.43 [0.39 - 0.46]	0.75 [0.7 - 0.79]	12.61 [12.43 - 12.8]	1.32 [1.26 - 1.38]	1.14 [1.08 - 1.2]	0.11 [0.09 - 0.13]	11.6 [11.46 - 11.73]	1.23 [1.18 - 1.27]	1.36 [1.31 - 1.41]	1.31 [1.27 - 1.36]	0.14 [0.13 - 0.16]
41-60 years	0.66 [0.59 - 0.72]	1.2 [1.11 - 1.28]	15.35 [15.07 - 15.64]	1.3 [1.21 - 1.39]	1.98 [1.87 - 2.09]	0.14 [0.11 - 0.17]	13.81 [13.6 - 14.01]	1.97 [1.89 - 2.06]	1.1 [1.04 - 1.16]	1.79 [1.71 - 1.87]	0.19 [0.16 - 0.21]
61-80 years	0.45 [0.37 - 0.53]	0.43 [0.35 - 0.5]	16.24 [15.75 - 16.73]	0.93 [0.8 - 1.06]	1.93 [1.74 - 2.11]	0.17 [0.11 - 0.22]	14.58 [14.22 - 14.95]	2.27 [2.11 - 2.43]	0.69 [0.6 - 0.78]	1.56 [1.43 - 1.69]	0.15 [0.11 - 0.19]
Above 80 years	0.46 [0.15 - 0.78]	0.84 [0.41 - 1.26]	17.18 [15.35 - 19.01]	2.38 [1.64 - 3.12]	1.33 [0.77 - 1.88]	0.16 [0.03 - 0.29]	14.96 [13.54 - 16.38]	1.57 [1.08 - 2.07]	0.46 [0.19 - 0.73]	1.87 [1.33 - 2.41]	0.3 [0.08 - 0.52]
Sector											
Rural	0.14 [0.13 - 0.16]	0.23 [0.21 - 0.25]	13.12 [12.97 - 13.27]	0.62 [0.58 - 0.65]	0.25 [0.23 - 0.27]	0.07 [0.05 - 0.08]	12.89 [12.77 - 13]	0.56 [0.53 - 0.59]	0.26 [0.24 - 0.27]	0.23 [0.21 - 0.25]	0.13 [0.11 - 0.14]
Urban	1.05 [0.99 - 1.1]	2.11 [2.04 - 2.19]	11.97 [11.8 - 12.14]	2.42 [2.34 - 2.5]	3.45 [3.36 - 3.54]	0.18 [0.16 - 0.2]	8.85 [8.73 - 8.97]	3.32 [3.25 - 3.4]	2.89 [2.82 - 2.96]	3.79 [3.71 - 3.87]	0.21 [0.19 - 0.23]
Social group											
Scheduled tribes	0.09 [0.06 - 0.11]	0.27 [0.22 - 0.32]	18.25 [17.88 - 18.61]	0.5 [0.43 - 0.56]	0.2 [0.16 - 0.25]	0.14 [0.1 - 0.18]	19.55 [19.26 - 19.83]	1.05 [0.97 - 1.12]	0.26 [0.23 - 0.3]	0.42 [0.37 - 0.47]	0.37 [0.33 - 0.42]
Scheduled castes	0.16 [0.13 - 0.19]	0.6 [0.54 - 0.66]	13.06	0.59	0.23	0.05	11.02	1.09	0.69	0.26	0.07 [0.05 - 0.09]

60

			[12.78 - 13.35]	[0.53 - 0.66]	[0.19 - 0.27]	[0.03 - 0.07]	[10.82 - 11.22]	[1.02 - 1.16]	[0.63 - 0.74]	[0.23 - 0.3]	
Other backward classes	0.18 [0.15 - 0.2]	0.57 [0.53 - 0.61]	13.57 [13.38 - 13.75]	1.15 [1.09 - 1.2]	0.71 [0.66 - 0.75]	0.1 [0.08 - 0.12]	12.89 [12.76 - 13.03]	1.01 [0.97 - 1.05]	0.97 [0.93 - 1.01]	0.66 [0.62 - 0.69]	0.12 [0.1 - 0.13]
Others	0.83 [0.78 - 0.88]	1.08 [1.02 - 1.13]	9.48 [9.3 - 9.66]	1.79 [1.71 - 1.87]	3.02 [2.92 - 3.13]	0.12 [0.1 - 0.14]	7.47 [7.34 - 7.59]	2.31 [2.24 - 2.39]	1.66 [1.6 - 1.72]	3.39 [3.3 - 3.48]	0.19 [0.17 - 0.21]
Religion											
Hinduism	0.37 [0.35 - 0.39]	0.73 [0.7 - 0.76]	13.33 [13.2 - 13.46]	1.19 [1.15 - 1.23]	1.26 [1.21 - 1.3]	0.11 [0.09 - 0.12]	12.42 [12.32 - 12.52]	1.38 [1.34 - 1.41]	1.13 [1.1 - 1.17]	1.31 [1.27 - 1.34]	0.13 [0.12 - 0.14]
Islam	0.06 [0.04 - 0.08]	0.3 [0.25 - 0.35]	9.74 [9.48 - 10]	0.55 [0.48 - 0.61]	0.25 [0.2 - 0.29]	0.06 [0.04 - 0.08]	7.52 [7.34 - 7.7]	0.89 [0.83 - 0.96]	0.21 [0.18 - 0.24]	0.64 [0.58 - 0.69]	0.08 [0.06 - 0.09]
Others	1.13 [1.02 - 1.24]	1.32 [1.2 - 1.44]	12.2 [11.84 - 12.57]	2.35 [2.18 - 2.51]	3.12 [2.93 - 3.31]	0.1 [0.06 - 0.13]	11.87 [11.61 - 12.13]	2.74 [2.60 - 2.87]	1.71 [1.61 - 1.81]	2.72 [2.59 - 2.85]	0.72 [0.65 - 0.78]
Source of Earning											
Self employed	0.3 [0.28 - 0.33]	0.07 [0.05 - 0.08]	10.93 [10.78 - 11.08]	0.56 [0.53 - 0.6]	1.2 [1.15 - 1.26]	0.08 [0.07 - 0.09]	11.31 [11.2 - 11.43]	0.27 [0.25 - 0.29]	0.11 [0.09 - 0.12]	1.18 [1.14 - 1.22]	0.12 [0.11 - 0.14]
Regular wage/salary	1.43 [1.33 - 1.54]	5.12 [4.92 - 5.31]	16.18 [15.92 - 16.44]	3.7 [3.56 - 3.83]	2.71 [2.59 - 2.82]	0.13 [0.1 - 0.15]	8.55 [8.39 - 8.71]	5.99 [5.86 - 6.12]	5.3 [5.17 - 5.42]	3.34 [3.24 - 3.44]	0.37 [0.34 - 0.41]
Casual labour	0.08 [0.06 - 0.1]	0.21 [0.18 - 0.24]	14.04 [13.78 - 14.29]	0.62 [0.56 - 0.67]	0.09 [0.07 - 0.11]	0.11 [0.08 - 0.13]	14.38 [14.18 - 14.58]	0.21 [0.19 - 0.24]	0.07 [0.05 - 0.08]	0.07 [0.05 - 0.08]	0.05 [0.04 - 0.07]
Other	0.6 [0.52 - 0.69]	1.37 [1.24 - 1.49]	13.26 [12.72 - 13.81]	0.87 [0.72 - 1.02]	1.54 [1.34 - 1.74]	0.15 [0.09 - 0.21]	12.52 [12.1 - 12.94]	2.67 [2.47 - 2.88]	0.52 [0.43 - 0.61]	1.46 [1.31 - 1.61]	0.16 [0.11 - 0.21]
Marriage status											

Never married	0.25 [0.23 - 0.27]	0.59 [0.55 - 0.62]	11.26 [11.1 - 11.41]	1.14 [1.08 - 1.19]	0.88 [0.83 - 0.93]	0.08 [0.06 - 0.09]	10.22 [10.1 - 10.34]	1.16 [1.12 - 1.2]	0.96 [0.92 - 1]	1.04 [1 - 1.08]	0.14 [0.13 - 0.15]
Currently married	0.52 [0.48 - 0.55]	0.87 [0.82 - 0.91]	13.91 [13.74 - 14.08]	1.19 [1.14 - 1.25]	1.55 [1.49 - 1.61]	0.11 [0.09 - 0.12]	12.52 [12.4 - 12.65]	1.56 [1.52 - 1.61]	1.14 [1.1 - 1.18]	1.52 [1.48 - 1.57]	0.16 [0.14 - 0.17]
Widowed	0.25 [0.18 - 0.32]	0.53 [0.43 - 0.63]	15.88 [15.31 - 16.45]	1.09 [0.93 - 1.25]	0.9 [0.75 - 1.04]	0.19 [0.12 - 0.25]	16.33 [15.88 - 16.79]	1.41 [1.27 - 1.56]	0.57 [0.48 - 0.66]	0.93 [0.81 - 1.05]	0.15 [0.1 - 0.2]
Divorced/separated	0 [-0.03 - 0.04]	0.01 [-0.03 - 0.05]	10.06 [8.27 - 11.84]	0.31 [-0.02 - 0.64]	2.06 [1.22 - 2.9]	0.81 [0.28 - 1.35]	16.59 [14.69 - 18.48]	0.39 [0.07 - 0.71]	1.62 [0.98 - 2.27]	1.19 [0.64 - 1.75]	0.14 [0.05 - 0.23]

Figures inside square brackets represent 95% confidence interval

Supplementary Table 2.4 Inequality in health insurance enrolment at inter-state and intra-state level over the years (as per Wagstaff)

States and Union territories	2004			2014			2018		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
	W_c	W_c	W_c	W_c	W_c	W_c	W_c	W_c	W_c
India	0.69*	0.495*	0.529*	0.193*	0.116*	0.323*	0.217*	0.168*	0.282*
Andaman and Nicobar Islands	0.331	0.155	0.820	0.944*	0.276	0.970*	0.378*	0.388*	0.133*
Andhra Pradesh	0.814*	0.871*	0.514*	0.014	0.158*	-0.025	-0.155*	-0.063*	-0.112*
Arunachal Pradesh	-0.337*	-0.306*	-0.327	0.106*	-0.191*	0.514*	-0.053*	-0.066*	-0.064
Assam	0.592*	0.626*	0.394*	0.141*	-0.06	0.322*	0.226*	0.075*	0.359*
Bihar	0.393	0.261	0.658*	-0.152*	-0.152*	0.082*	0.358*	0.111	0.348*
Chandigarh	0.037		-0.040	0.215*	-0.536*	0.209*	0.349*	0.763	0.335*
Chhattisgarh	0.904*	0.816	0.535*	-0.010	0.05*	-0.232*	-0.055*	0.057*	-0.137*
Dadra and Nagar Haveli	0.973*		0.871*	-0.185*	-0.34*	0.437*	-0.154*	0.082	0.109
Daman and Diu	0.457	0.668	-0.031	0.602*	0.927*	0.556*	0.585*	-0.459	0.488*
Delhi	0.345*	-0.014	0.422*	0.708*	0.531*	0.701*	0.470*	0.174*	0.472*
Goa	0.415*	0.315*	0.634*	-0.273*	0.122	-0.439*	0.03	-0.032	0.120*
Gujarat	0.762*	0.564*	0.651*	0.297*	0.005	0.615*	0.162*	0.077*	0.342*
Haryana	0.343	0.119	0.679	0.654*	0.593*	0.56*	0.497*	0.231*	0.320*
Himachal Pradesh	0.544*	0.721*	-0.242	0.223*	0.218*	0.152*	0.350*	0.387*	-0.075*
Jammu and Kashmir	0.846*	0.842*	0.806*	0.058*	-0.046	0.218*	0.525*	0.536*	0.345*
Jharkhand	-0.098	-0.588*	0.529*	0.495*	0.459*	0.591*	0.856*	0.366	0.627*
Karnataka	0.566*	0.327*	0.369*	0.446*	0.292*	0.445*	0.521*	0.302*	0.581*
Kerala	0.419*	0.324*	0.559*	-0.116*	-0.17*	-0.025	-0.037*	-0.089*	0.053*
Lakshadweep	0.192*	-0.927	0.133	0.771*		0.823*	0.035	-0.082	0.009

Madhya Pradesh	0.011	0.606*	0.583*	0.635*	-0.106	0.565*	0.799*	0.548*	0.607*
Maharashtra	0.684*	0.264*	0.476*	0.734*	0.511*	0.639*	0.651*	0.435*	0.53*
Manipur	0.021	0.108		0.101	-0.063	-0.019	0.048	-0.297*	0.205*
Meghalaya	0.832*	0.88*	0.881*	0.043*	-0.037	0.126*	-0.035*	-0.021	0.024
Mizoram				0.125*	-0.069*	0.308*	-0.169*	0.020	-0.336*
Nagaland	-0.241	-0.134	-0.281	0.378*	0.397*	0.377*	0.248*	0.146*	0.206*
Odisha	0.707*	0.267	0.346*	-0.224*	-0.227*	0.229*	-0.159*	-0.089*	-0.083*
Puducherry	0.369*	0.519*	0.344*	0.340*	0.817*	0.191	0.137*	0.896*	-0.106*
Punjab	0.424*	0.356*	0.398*	0.445*	0.341*	0.452*	0.403*	0.062	0.522*
Rajasthan	0.542*	0.516*	0.209*	-0.159*	-0.256*	0.065*	-0.114*	-0.082*	0.052*
Sikkim	0.708		-0.476	0.414*	-0.246	0.105	0.539*	0.663*	0.555*
Tamil Nadu	0.607*	0.371*	0.690*	0.247*	0.222*	0.255*	0.210*	0.122*	0.253*
Telangana[#]	NA	NA	NA	-0.169*	0.041	-0.093*	-0.268*	-0.080*	-0.190*
Tripura	0.883*	0.884	0.868*	-0.227*	-0.199*	-0.264*	-0.035*	0.094*	-0.475*
Uttar Pradesh	0.73*	0.872*	0.269*	0.023	-0.215*	0.497*	0.732*	0.359*	0.693*
Uttarakhand	0.764		0.115	0.936*		0.865*	0.478*	0.309*	0.502*
West Bengal	0.762*	0.698*	0.457*	0.11*	-0.028	0.346*	0.126*	-0.017	0.294*

Wagstaff (W_c) concentration index; + value symbolises pro-rich enrolment; -value reflects pro-poor enrolment. *p<0.05; #Telangana was the formed in the year 2014, earlier it was a part of Andhra Pradesh.

Chapter 3 Pattern of Utilization of Healthcare, Financial Burden, and associated Inequalities at National and State level

3.1 Introduction

Financial protection from health expenditure is the cornerstone of universal health coverage (UHC) [1,2]. In the absence of adequate financial risk protection, people rely on out-of-pocket expenditure (OOPE) for financing healthcare payments; therefore, accessing healthcare services can expose households to financial catastrophe and impoverishment [2-6]. As per a World Health Organization (WHO) report, health expenditure pushed nearly 100 million people into poverty each year [7-8]. The concern is more pronounced in low and middle-income countries [9-11].

Catastrophic health expenditure (CHE) and impoverishment are the prominent parameters used to capture the undesirable effects of OOPE [7,11-13]. The occurrence of CHE implies that households forgo the consumption of other necessities due to high OOPE [12-13] On the other hand, impoverishment highlights that households who were earlier above the poverty line were pushed into poverty due to OOPE [2,12-13]. People even forego healthcare services and continue to suffer from ill-health due to financial/non-financial constraints [3,5-6]. Financial hardship is felt by those who incur OOPE or forgone care [2] (Figure 3.1). Accessing subsidised or free healthcare (e.g., from government, charities) and health insurance coverage may reduce the economic burden [4,14-15]. Moreover, equity has also become a crucial goal for the health systems across the globe [2,7]. More often, poorer and less advantaged segments of the population are more vulnerable to financial risk due to health payments [2,4,14]. As per a recent study, South Asia has the highest incidence of CHE and impoverishment, with one of the highest and highly regressive burden of OOPE in India [10].
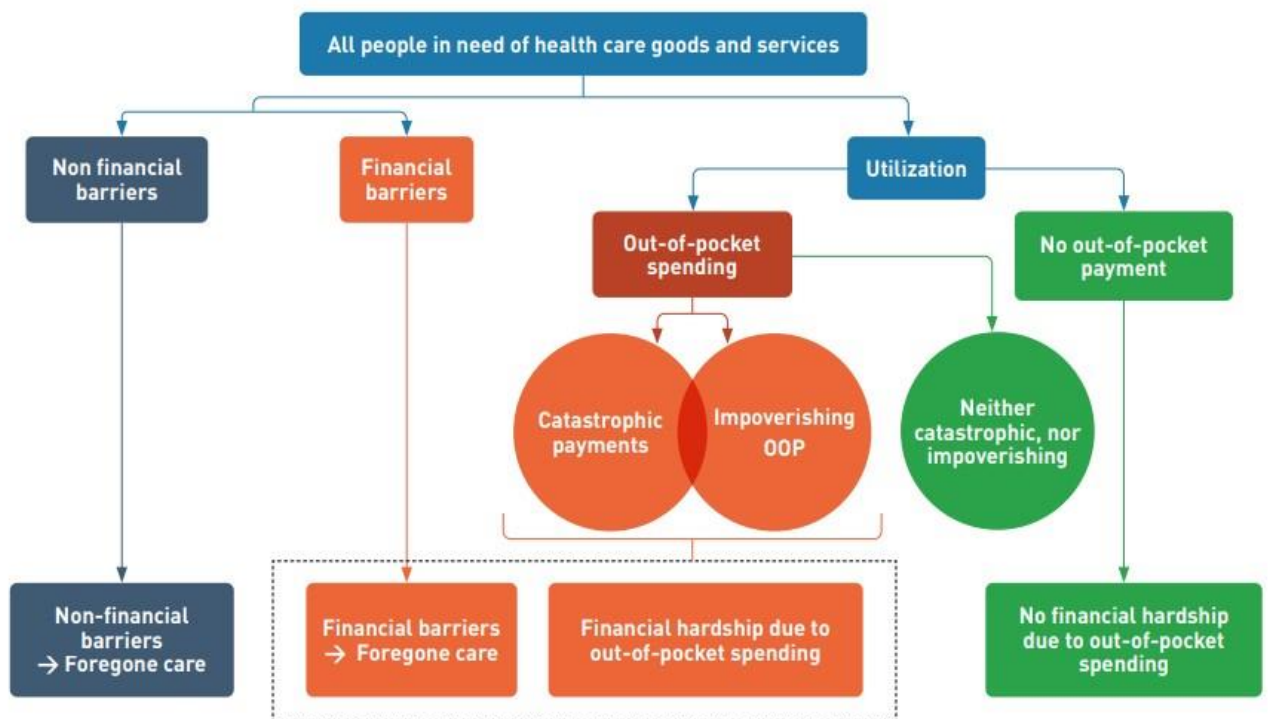
Figure 3.1 Financial hardship due to out-of-pocket health expenditure

In India, equitable and affordable access to care is a fundamental policy concern, due to low public health expenditure (1.15% of gross domestic product) [16], high OOPE (50.6% of health expenditure) [17], still high burden of infectious diseases and a rising burden of non-communicable diseases [18-19], along with an increasing dominance of private health sector [20-21].

Central and several state governments in India have introduced a number of health insurance schemes, with an unprecedented attention towards government sponsored health insurance schemes, to improve accessibility to healthcare services and providing safeguards against burgeoning health expenditures, mainly for poor and vulnerable population [22]. Indian constitution has categorised health as a matter of state; therefore, the legislation and regulations

governing healthcare differ across Indian states, resulting in substantial inter-state variations in household health spending [19]. Large inter-state differentials also exist in terms of epidemiological transition [23], health budget and infrastructure, health outcomes, and systems performance [24]. Hence, it is worthwhile to enunciate the inter-state differentials in the context of healthcare utilization pattern, associated financial burden, and inequalities.

Previous studies examined the financial burden due to health expenditure across rural and urban areas [25-27], various disease categories [28-32], and districts of a few states of India [33-34]. A few studies also examined the inter-state variations in terms of financial burden [25,35-38] and inequality [35-36], these studies, however, were limited in estimating only a few aspects of financial burden and also did not assess the burden separately for outpatient and inpatient care. Only two studies examined the healthcare utilization pattern across the Indian states [39-40]. Notably, the health expenditure and associated financial catastrophes differ significantly by the type of provider (public/private), which is still unexplored across Indian states. Additionally, none of the studies have examined the scenario in the context of health insurance coverage across Indian states/union territories (UTs), which is one of the important pursuits of financing health expenditures and progressing toward UHC [41]. Besides this, there is a dearth of studies examining the factors contributing to socio-economic inequalities in utilization of services from private healthcare provider and CHE incidence in India.

Against this background, this chapter provides a holistic picture of healthcare utilization pattern, in conjunction with financial burden and associated inequalities across all Indian states/UTs. First, we analysed inter-state differences in the utilization pattern of healthcare services (i.e., seeking care from public/private providers) for both inpatient and outpatient services. Second, we analysed the financial burden (CHE and impoverishment) due to OOPE incurred on availing the inpatient and outpatient care separately across all states/UTs. A separate analysis for

subgroup of households in which any member sought care was also conducted to examine the real financial burden of seeking care and to ensure that this is not masked behind the national average [4,15,42]. The financial burden across states/UTs was assessed in the context of health insurance coverage of the respective states and also disaggregated the financial burden by the type of healthcare provider (private/public). Third, we dissected the health expenditure into its components (medicines, diagnostic test, doctors' fees, transportation expenses, etc) and provided disaggregated analysis by the type of provider. Additionally, we examined the reasons for choosing private healthcare provider, and the provision of services provided on payment/free/partly free by the type of provider. Last, we examined the inequality in terms of access to care, utilization pattern of healthcare provider, and CHE incidence across Indian states/UTs. This comprehensive analysis would aid in identifying the drivers of health expenditure, financial burden, and inequalities, that require greater policy attention to improve utilization of healthcare services and augment better financial protection.

3.2 Data and methodology

The chapter employed the latest survey round conducted by National Sample Survey Office (NSSO) on health and morbidity, titled "Household Social Consumption: Health" [43]. The survey was conducted during 2017-18, and used a stratified multi-stage sampling design, with village and urban blocks as the first unit and household as the second unit, and covered 5,55,115 individuals (3,25,883 in rural areas and 2,29,232 in urban areas) from 1,13,823 households (64,552 in rural areas and 49,271 in urban areas) across India. The survey provides extensive details about hospitalization, ailments, nature of treatment, type of medical institution accessed (private or public), cost of care, and maternal and elderly health dimensions among the surveyed households. The survey collected information separately for the hospitalization sought by any member of the household during the last 365 days and outpatient services sought during last the

15 days from the survey date. The survey also elucidates information about whether respondents were covered by any health expenditure support schemes (i.e., health insurance).

The information pertaining to characteristics of states were extracted from National Health Profile 2020 [44]. The report titled, "India: Health of the Nation's States 2016" was referred to extract disease epidemiological transition level category of states [45].

3.2.1 Outcome variable

The main outcome variables assessed in the chapter includes, the pattern of public or private healthcare providers for inpatient and outpatient healthcare services, OOPE, incidence of CHE incidence, and impoverishment. Health expenditure was calculated as sum total of package component, medicines, diagnostic tests, bed charges, doctors'/surgeons' fee, transportation and other medical (blood, oxygen, attendant charges, personal medical appliances and physiotherapy) and non-medical expenses (registration fee, food, expenditure on escort, lodging charge, transport for others, etc.) incurred on inpatient services during the last 365 days and outpatient services utilized during the last 30 days separately. The share of different components (medicines, bed charges, doctors' fees, package, transportation for patient, other medical and non-medical expenditure) were calculated as the proportion of total health expenditure, separately for each component and disaggregated by the type of provider. Any reimbursement received was deducted from health expenditure to arrive at OOPE. Sample weights provided by the NSSO were applied in all the results of the chapter. The methodology adopted to estimate CHE and impoverishment is given below.

3.2.1.1 Catastrophic health expenditure

A household is defined to incur CHE incidence if the total household's OOPE exceeds a certain threshold of the household's consumption expenditure [26,28,29,32,35]. We have employed three thresholds in the chapter 10%, 25%, and 40% [30,36].

$$CHE_i = \begin{cases} 1, if \ \frac{OOPE_i}{HCE_i} > Z \\ 0, if \ \frac{OOPE_i}{HCE_i} \leq Z \end{cases}$$

$OOPE_i$ is the out-of-pocket health expenditure of ith household, HCE_i is the consumption expenditure, and Z is the threshold.

The proportion of households incurring CHE, i.e., incidence of CHE, was calculated using the following formula.

$$Incidence \ of \ CHE = \frac{1}{N} \sum_{i=1}^{N} CHE_i$$

where N is the number of households.

3.2.1.2 Impoverishment

The poverty headcount ratio estimates the proportion of households falling below the poverty line due to OOPE [26,28,36].

$$Poverty \ Headcount_i = \begin{cases} 1, if \ HCE_i \geq PL \ and \ (HCE_i - OOPE_i) < PL \\ 0, otherwise \end{cases}$$

HCE_i is the total household consumption expenditure of the ith household, PL is the inflation-adjusted [46] state-specific poverty line [47], and $OOPE_i$ is the out-of-pocket expenditure of the ith household.

$$Poverty \ Headcount \ ratio = \frac{\sum_{i=1}^{N} Poverty \ Headcount_i}{N}$$

N is the total number of households.

3.2.2 Statistical analysis

This chapter employed descriptive statistics and concentration index (CI). Details about CI is illustrated below.

3.2.2.1 Concentration index (CI)

CI has been applied extensively to assess inequality in healthcare. We employed the CI to measure the socio-economic inequality in the access to care, utilization of healthcare services from the private healthcare provider (generally deemed to be utilizing better quality services), and occurrence of CHE (detrimental effect of OOPE). The CI is defined by the following formula [48].

$$CI = \frac{1}{\mu_H} 2cov(H_i, Y_i)$$

Where, Y_i is the socioeconomic rank (i.e., per capita consumption expenditure), μ_H is the mean health, and H_i is the health outcome. The CI lies between -1 and 1, where 0 represents equality. A positive CI value indicates that the health outcome is concentrated among the rich, while a negative CI indicates that the health outcome is distributed among the poor and a larger CI value corresponds to greater inequality. The standard CI value breaches the range [-1, 1] in case of binary outcomes [49-51]; therefore, we employed the correction given by Erreyger [50] for analysing binary outcomes, as adopted by previous studies to measure inequality in healthcare utilization and CHE [52-55].

All the analysis were performed across all the states/UTs. We have categorised the states as per their health insurance enrolment; states with less than 25% of the population was covered in any health insurance scheme were termed as low insurance coverage states/UTs. States/UTs with 25-50% of the population covered in any health insurance scheme referred as medium

insurance coverage states, and states/UTs with majority of the population was covered under any health insurance scheme were termed as high insurance coverage states/UTs.

3.2.2.2 Decomposition Analysis

The decomposition method proposed by Wagstaff and colleagues [56] has been extensively used in literature to explore the determinants of socioeconomic inequality in the area of public health. However, critics of the technique argue that the technique is unidimensional, as the method only examines the variations in health outcomes rather than the covariance between health outcomes and socioeconomic rank [57-59]. In this study, we utilized the recent recentered influence function approach proposed by Heckley and colleagues [59] to decompose the socioeconomic inequality. This method overcomes the potential concerns [60] associated with the decomposition method given by Wagstaff and colleagues [56] and has been applied in the recent literature [61-63].

The recentered influence function technique is based upon a two-step procedure wherein the first step is about the computation of the recentered influence function of the rank-dependent index, and in the second step, the recentered influence function is regressed on a set of covariates to yield the marginal effects of the covariates on the index. The mathematical process of the recentered influence function decomposition has been mentioned elsewhere [59]. We have decomposed the Erreygers CI [64] for variables namely, accessibility care, utilization of health care services from private health care providers, and occurrence of CHE incidence. All the analysis was carried out using Stata software (version 14.1)

3.3 Results

States/UTs across India differ in their economic and health characteristics such as poverty ratio, literacy rate, health expenditure, and epidemiological transition level (Supplementary Table 3.1).

3.3.1 Utilization of healthcare services

In India, 51.0% of hospitalization incidence reported with public providers. However, in states/UTs, namely, Maharashtra (68.9%), Telangana (68.3%), Andhra Pradesh (67.3%), Karnataka (65.3%), Punjab (65.2%), Gujarat (62.8%), Kerala (62.6%), Haryana (60.3%), Daman and Diu (57.6%), Uttar Pradesh (54.6%), and Uttarakhand (53%) majority of the hospitalization was sought with private providers (Figure 3.2). All these states except Uttar Pradesh and Uttarakhand belonged to higher-middle or highest epidemiological transition level category[2]. Furthermore, on an average, medium insurance coverage states (51.0%) and high insurance coverage states (60.0%) had relatively higher incidence of hospitalization with private healthcare providers than low insurance coverage states (47.2%). In contrast, the outpatient services were mainly concentrated (70.0% of incidence) with private healthcare providers, with 23/36 states/UTs reporting majority of the outpatient services in private health facilities only (Figure 3.2).

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[2] Highest epidemiological transition level group of states have the highest burden of non-communicable diseases and injuries in comparison to communicable, maternal, neonatal and nutritional diseases, whilst the lowest epidemiological transition level group have the lowest burden of non-communicable diseases and injuries together.

A. Inpatient

B. Outpatient

Proportion of hospitalisation incidence with private provider (%)

Proportion of outpatient incidence with private provider (%)
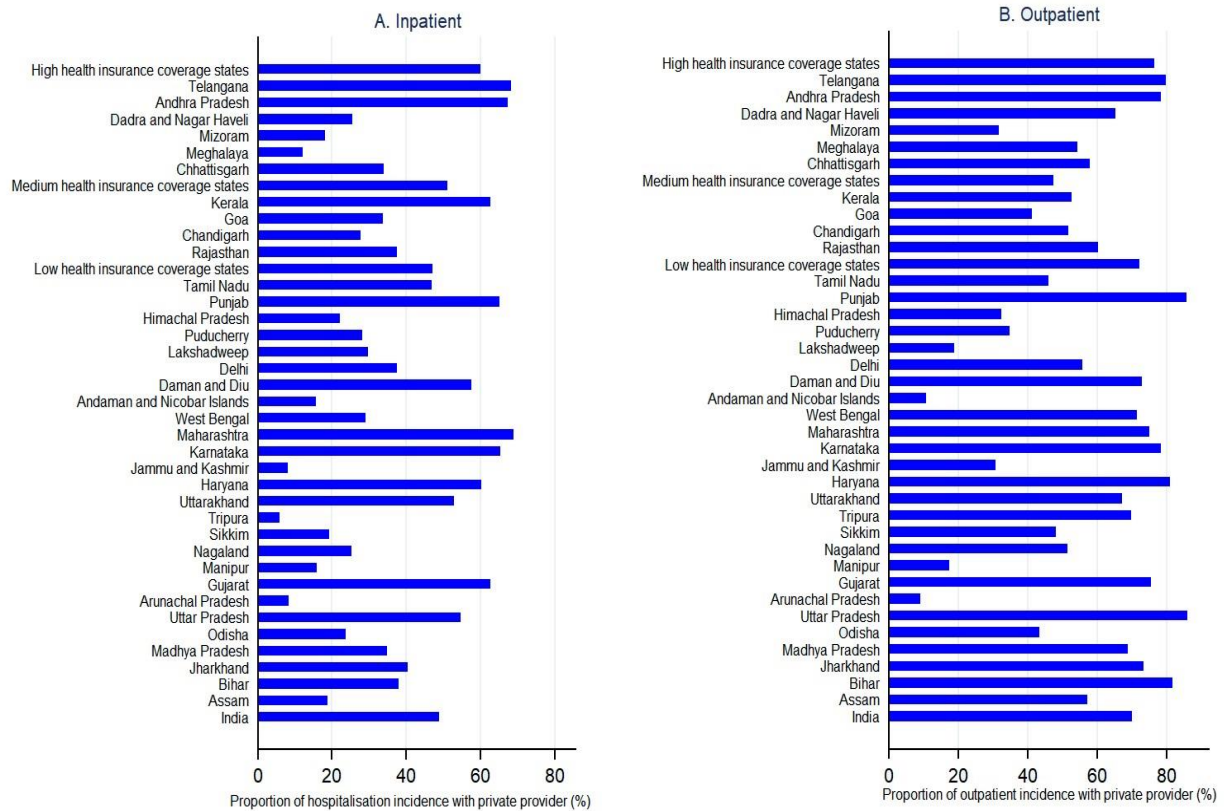
Figure 3.2 Utilization of healthcare services with private healthcare provider

Mean duration of stay in hospital was found to be relatively high in higher-middle or highest epidemiological transition level states/UTs such as Puducherry, Tamil Nadu, Kerela, Himachal Pradesh, Andhra Pradesh, Lakshadweep and Maharashtra (Supplementary Figure 3.1; Panel A). Also, mean duration of stay in hospital was higher when hospitalization was sought from private providers (6.07 days) than the public providers (4.75 days) (Supplementary Figure 3.1; Panel B). Top three reasons for not choosing the public healthcare provider (by those who chose private healthcare provider) were found to be, i) non-availability of doctor or quality of public health facilities not being satisfactory, ii) long waiting time in public healthcare facilities, and iii) preference for a trusted doctor/hospital across most states in case of both inpatient and outpatient care (Supplementary Figure 3.2). Furthermore, despite the fact that public hospitals are highly subsidized or free in India, the incidence of receiving medicines partly free and on payment basis was 47.0% and 16.8%, respectively, in case of hospitalization with a public

provider. Likewise, X-ray/Electrocardiography/Electroencephalogram/ scan was provided partially free (11.0%), and on payment basis (27.0%) in public hospitals. In case of outpatient services, those who received medicines other than AYUSH[3] reported that medicines were only partly free (23.6%), or received after giving payment (31.9%) in public health facilities (Supplementary Figure 3.3 and 3.4).

3.3.2 Inequality in access and utilization pattern of care

Access to inpatient care was slightly but statistically significantly pro-rich (i.e., concentrated among affluent individuals) in India (CI: 0.012; $p<0.05$). The pattern was similar in case of 14 states/UTs, however in all other states the inequality was not statistically significant. Accessibility to outpatient care was also observed to be statistically significantly pro-rich (CI: 0.05; $p<0.05$) in India and across 23 states/UTs (Supplementary Figure 3.5). We also observed that the utilization of inpatient (CI= 0.31; $p<0.05$) and outpatient care (CI= 0.10; $p<0.05$) from private healthcare provider was found to be statistically significantly pro-rich in India. The trend was similar across most states/UTs for both inpatient and outpatient care (Figure 3.3).

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[3] AYUSH belongs to the non-allopathic system of medicines practised in India such as Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy.
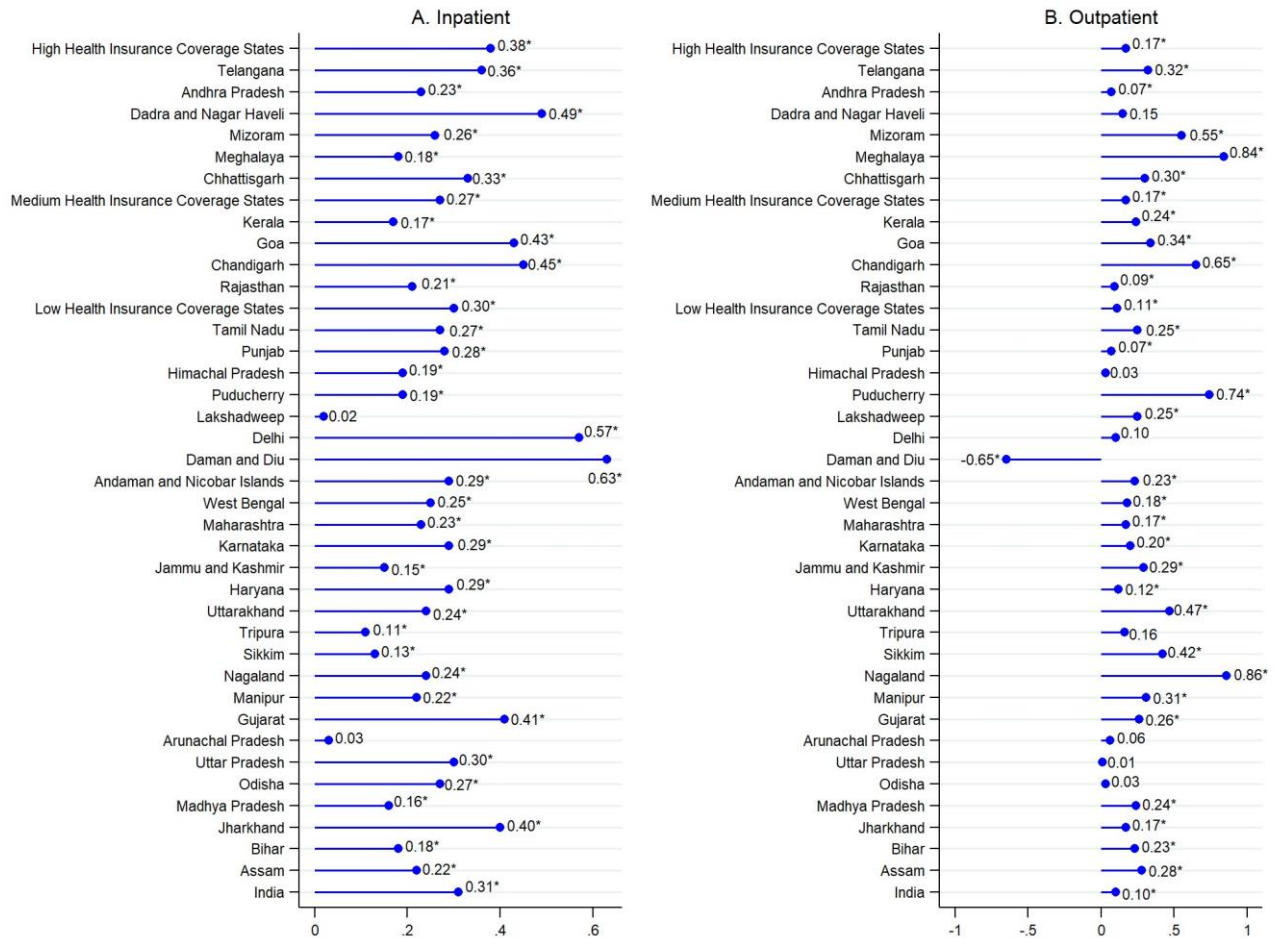
Figure 3.3 Concentration index for private provider utilization by type of care

*p<0.05

Table 3.1 depicts the factors contributing to inequality in case of access to care and utilization of services from private health care providers. Factors such as enrollment under health insurance, age (>60 years), higher education status, richest economic quintile, belonging to scheduled tribe and scheduled caste, smaller household size (5-8 members), and households dependent upon casual labour, statistically significantly contributed positively in pro-rich inequality of access to inpatient care (p<0.05). On the other hand, residing in urban area, being female, and younger age, reduced the pro-rich access to inpatient care. In case of accessing outpatient care, health insurance, residing in urban area, highest economic quintile, education (formal education upto higher secondary), being female, age (>60 years) and household dependent upon casual labour and other occupation categories, statistically significantly

increased the pro-rich inequality (p<0.05). Furthermore, in case of utilization of healthcare services (inpatient and outpatient care both) from private providers, factors such as belonging to scheduled tribe, residing in urban areas, higher education level, and age (greater than 80 years) statistically significantly increased the pro-rich inequality.,

Table 3.1 Decomposition analysis for inequality in case of access to care and utilization of services from private health care providers

Covariates	Inpatient care		Outpatient care	
	Access to inpatient care	Utilization of private healthcare provider	Access to outpatient care	Utilization of private healthcare provider
	Coefficient	Coefficient	Coefficient	Coefficient
Health Insurance	0.013* (0.002)	0.058* (0.010)	0.028* (0.003)	-0.008 (0.014)
Social Group				
Others group	Ref	Ref	Ref	Ref
Scheduled Tribes	0.015* (0.003)	0.163* (0.016)	-0.002 (0.004)	0.070 * (0.026)
Scheduled Castes	0.004* (0.002)	-0.055* (0.011)	-0.010* (0.003)	-0.094 * (0.016)
Other Backward Classes	0.001 (0.002)	-0.102 * (0.009)	-0.012* (0.002)	-0.179 * (0.013)
Urban Areas	-0.006* (0.002)	0.207* (0.009)	0.012* (0.002)	0.124* (0.012)
Economic Quintiles				
Poorest	Ref	Ref	Ref	Ref
Poorer	0.004 (0.002)	-0.057* (0.012)	-0.010* (0.003)	-0.161 * (0.019)
Middle	0.0003 (0.002)	-0.035* (0.012)	-0.013* (0.003)	-0.124 * (0.019)
Richer	-0.002 (0.002)	-0.004 (0.012)	-0.016* (0.003)	-0.161 * (0.019)
Richest	0.010* (0.002)	0.211* (0.013)	0.029* (0.003)	-0.082 * (0.020)
Education				
not literate/no formal schooling ref	Ref	Ref	Ref	Ref
literate with formal schooling: below primary/primary	0.004* (0.002)	0.020* (0.010)	0.044* (0.002)	0.008 (0.014)
upper primary/middle/secondary/upto secondary	0.006* (0.002)	0.001 (0.010)	0.042* (0.002)	0.003 (0.015)
higher secondary	0.007* (0.002)	-0.004 (0.014)	0.004 (0.003)	0.089 * (0.023)

graduation and above	0.009* (0.003)	0.195 * (0.015)	-0.010* (0.004)	0.228 * (0.023)
Household Size				
4 or less	Ref	Ref	Ref	Ref
5-8 members	0.007* (0.001)	-0.025* (0.008)	-0.002 (0.002)	-0.014 (0.011)
9 or more	-0.001 (0.002)	-0.081* (0.014)	0.005 (0.003)	-0.007 (0.023)
Female	-0.011* (0.001)	0.116* (0.008)	0.007* (0.002)	0.034 * (0.011)
Age				
0-18 years	Ref	Ref	Ref	Ref
19-40 years	-0.029* (0.002)	0.059* (0.012)	-0.001 (0.002)	-0.042* (0.017)
41-60 years	-0.003 (0.002)	-0.024 (0.012)	0.073 (0.002)	0.003 (0.015)
61-80 years	0.031* (0.003)	-0.047* (0.015)	0.227* (0.004)	0.075* (0.016)
81 years and above	0.120* (0.010)	0.229* (0.035)	0.472* (0.014)	0.086* (0.037)
Occupation of Household				
self employed	Ref	Ref	Ref	Ref
regular wage	-0.002 (0.002)	-0.002 (0.010)	-0.001 (0.002)	-0.072 * (0.014)
casual labour	0.003* (0.001)	0.032* (0.009)	0.006* (0.002)	-0.023 (0.014)
other	-0.001 (0.003)	0.101* (0.016)	0.095* (0.004)	-0.072 * (0.019)
Constant	0.003 (0.007)	0.176* (0.043)	-0.043* (0.009)	0.463 * (0.061)

Control variable: State, value in () represents standard error; * statistically significant at α=5%

3.3.3 Out-of-pocket expenditure (OOPE)

OOPE among those who sought care across states/UTs is elucidated in Supplementary Table 3.2. The highest OOPE was reported in Chandigarh (INR 31,029), followed by Punjab (INR 28,962), and Kerala (INR 28,211) for inpatient services. In case of outpatient services, the highest monthly OOPE was reported in Arunachal Pradesh (INR 4,710), followed by Tripura (INR 4,436) and Chandigarh (INR 4,205). A few high insurance coverage states such as Meghalaya (INR 4,647), Dadra and Nagar Haveli (INR 5,096), and Mizoram (INR 5,761) reported lower OOPE due to hospitalization. However, Telangana (INR 23,921), Andhra

Pradesh (INR 20,789), and Chhattisgarh (INR 18,297) reported a high OOPE due to hospitalization, despite being high insurance coverage states. Interestingly, lowest mean OOPE for outpatient care was observed in high insurance coverage states states/UTs (INR 1,628).

Furthermore, OOPE was more than 7 times higher in case of hospitalization with private providers than public providers (INR 32,244 versus INR 4,372). The difference even varied greatly across states, ranging from 3 times (Arunachal Pradesh, Nagaland, Mizoram and Himachal Pradesh) to more than 20 times (Chhattisgarh, Puducherry, Lakshadweep, and Andaman and Nicobar Islands) in private hospitals than public hospitals. The variation between public and private OOPE for outpatient services was less than inpatient services across majority of the states (Supplementary Table 3.2).

3.3.4 Share of major components to health expenditure

The share of major components in total health expenditure varied by the type of provider, although medicines constituted a major share, irrespective of the type of care and type of provider. For instance, medicines contributed 27.5%, followed by transport expenditure (18.5%) and diagnostics tests (8.7%) in case of public hospitals. On the other hand, when hospitalization was sought from private hospitals, medicines (23.1%), doctors' fee (17.6%) and package component (17.8%) contributed the highest in total health expenditure. In case of outpatient care sought from public facilities, medicines other than AYUSH (46.2%) and transportation expenditures (27.9%) were the leading contributors. However, when outpatient services were sought from private facilities, the major expenditure was on medicines other than AYUSH (63.7%), followed by doctors' fee (15.8%). Notably, non-medical expenditure such as transportation and lodging, contributed relatively higher when care was sought from the public providers (hospitalization: 34.3%; outpatient: 16.4%) than the private providers (hospitalization: 7.6%; outpatient: 3.7%) (Supplementary Figure 3.6 and 3.7).

3.3.5 Financial burden (CHE and impoverishment) among all households

Table 3.2 shows the incidence of CHE and impoverishment due to inpatient and outpatient among all households in India and across states/UTs. In India, 5.56%, 2.56%, and 1.53% of households experienced CHE at 10%, 25%, 40% threshold respectively, and 1.9% of households were pushed below poverty line, respectively due to OOPE on hospitalization. On the other hand, due to incurring OOPE on outpatient care, 11.66%, 5.77%, and 3.47% of households experienced CHE at 10%, 25%, and 40% threshold respectively and 4.0% of the households experienced impoverishment. Also, states/UTs such as, Kerala, Andhra Pradesh, Uttar Pradesh, Odisha, and Himachal Pradesh experienced high financial burden irrespective of the type of care sought. A few medium and high insurance coverage states such as Mizoram, Meghalaya, and Dadar and Nagar Haveli reported relatively low burden of CHE and impoverishment due to OOPE incurred on hospitalization, while Kerala, Andhra Pradesh, Chhattisgarh, Telangana, and Rajasthan, experienced high financial burden due to OOPE. The trend was similar for all CHE thresholds.

Table 3.2 Financial burden across Indian states/UTs by type of care

States/UTs	Inpatient care				Outpatient care			
	CHE 10 Incidence (%)	CHE 25 Incidence (%)	CHE 40 Incidence (%)	Impoverish ment (%)	CHE 10 Incidence (%)	CHE 25 Incidence (%)	CHE 40 Incidence (%)	Impoverish ment (%)
India	5.56 [5.43 - 5.69]	2.56 [2.47 - 2.65]	1.53 [1.46 - 1.6]	1.86 [1.78 - 1.94]	11.66 [11.47 - 11.84]	5.77 [5.63 - 5.9]	3.47 [3.37 - 3.58]	4.01 [3.89 - 4.12]
Assam	2.2 [1.73 - 2.67]	0.84 [0.55 - 1.14]	0.52 [0.29 - 0.75]	0.9 [0.59 - 1.2]	4.38 [3.73 - 5.04]	2.01 [1.56 - 2.46]	1.74 [1.32 - 2.16]	2.6 [2.09 - 3.11]
Bihar	4.01 [3.49 - 4.54]	1.3 [1 - 1.61]	0.7 [0.48 - 0.93]	1.59 [1.25 - 1.93]	4.71 [4.14 - 5.28]	2.59 [2.16 - 3.02]	1.58 [1.25 - 1.92]	2.27 [1.87 - 2.67]
Jharkhand	3.3 [2.67 - 3.93]	1.55 [1.12 - 1.99]	0.88 [0.55 - 1.21]	1.21 [0.82 - 1.59]	15.49 [14.21 - 16.77]	8.33 [7.36 - 9.31]	4.49 [3.75 - 5.22]	5.23 [4.44 - 6.02]
Madhya Pradesh	3.88 [3.37 - 4.38]	1.95 [1.58 - 2.31]	1.42 [1.11 - 1.72]	1.59 [1.26 - 1.92]	8.72 [7.98 - 9.46]	4.71 [4.16 - 5.27]	2.74 [2.31 - 3.17]	3.07 [2.62 - 3.52]
Odisha	6.23 [5.51 - 6.96]	3 [2.49 - 3.52]	1.86 [1.46 - 2.27]	2.22 [1.78 - 2.66]	17.4 [16.26 - 18.54]	10.49 [9.57 - 11.41]	6.29 [5.56 - 7.02]	5.54 [4.85 - 6.22]
Uttar Pradesh	7.01 [6.54 - 7.49]	3.73 [3.37 - 4.08]	2.27 [1.99 - 2.54]	2.61 [2.31 - 2.91]	15.46 [14.78 - 16.14]	8.28 [7.76 - 8.8]	5.23 [4.82 - 5.65]	6.38 [5.92 - 6.84]
Arunachal Pradesh	4.98 [3.99 - 5.96]	1.05 [0.59 - 1.5]	0.53 [0.2 - 0.86]	1.06 [0.59 - 1.52]	7.1 [5.94 - 8.26]	5.99 [4.92 - 7.06]	5.17 [4.17 - 6.17]	3.21 [2.42 - 4.01]
Gujarat	3.73 [3.16 - 4.3]	1.39 [1.04 - 1.74]	0.8 [0.53 - 1.07]	1.11 [0.8 - 1.43]	8.39 [7.56 - 9.23]	2.78 [2.28 - 3.28]	1.84 [1.43 - 2.24]	1.97 [1.55 - 2.39]
Manipur	6.3 [5.36 - 7.24]	1.88 [1.36 - 2.4]	0.89 [0.53 - 1.25]	1.62 [1.13 - 2.1]	5.33 [4.47 - 6.2]	3.16 [2.48 - 3.83]	2.17 [1.61 - 2.74]	0.69 [0.37 - 1.01]
Nagaland	1.87 [1.12 - 2.63]	0.44 [0.07 - 0.81]	0.31 [0 - 0.62]	0.81 [0.31 - 1.3]	0.71 [0.25 - 1.18]	0.50 [0.11 - 0.89]	0.08 [0.01 - 0.15]	0.02 [0.01 - 0.03]
Sikkim	2.82 [1.7 - 3.95]	0.71 [0.14 - 1.29]	0.15 [-0.11 - 0.42]	1.41 [0.61 - 2.21]	5.22 [3.71 - 6.74]	2.57 [1.49 - 3.65]	0.21 [0.10 - 0.32]	0.95 [0.29 - 1.62]
Tripura	3.66 [2.83 - 4.49]	1.16 [0.69 - 1.63]	0.58 [0.25 - 0.92]	0.95 [0.52 - 1.37]	6.92 [5.81 - 8.04]	4.37 [3.47 - 5.27]	2.45 [1.77 - 3.13]	2.15 [1.51 - 2.79]

Uttarakhand	3.42 [2.57 - 4.27]	1.41 [0.86 - 1.96]	0.67 [0.29 - 1.05]	1.11 [0.62 - 1.6]	5.3 [4.25 - 6.35]	1.50 [0.93 - 2.08]	0.4 [0.1 - 0.7]	1.11 [0.62 - 1.6]
Haryana	6.47 [5.59 - 7.36]	2.68 [2.09 - 3.26]	1.67 [1.21 - 2.13]	1.97 [1.47 - 2.47]	11.23 [10.09 - 12.37]	3.83 [3.14 - 4.52]	2.31 [1.77 - 2.86]	3.66 [2.98 - 4.34]
Jammu and Kashmir	2.91 [2.33 - 3.48]	0.74 [0.45 - 1.03]	0.37 [0.16 - 0.58]	0.72 [0.43 - 1.00]	11.89 [10.79 - 12.99]	2.39 [1.87 - 2.91]	1.01 [0.67 - 1.35]	2.34 [1.83 - 2.86]
Karnataka	5.64 [4.98 - 6.29]	2.22 [1.8 - 2.64]	1.09 [0.8 - 1.39]	1.68 [1.31 - 2.04]	7.05 [6.33 - 7.78]	3.29 [2.79 - 3.8]	1.97 [1.58 - 2.37]	2.19 [1.77 - 2.61]
Maharashtra	7.07 [6.54 - 7.6]	3.19 [2.83 - 3.56]	1.93 [1.65 - 2.22]	2.25 [1.94 - 2.55]	11.28 [10.62 - 11.93]	5.32 [4.85 - 5.79]	3.41 [3.03 - 3.78]	3.38 [3 - 3.75]
West Bengal	5.29 [4.77 - 5.82]	2.53 [2.17 - 2.9]	1.5 [1.22 - 1.78]	1.93 [1.61 - 2.25]	19.37 [18.45 - 20.29]	8.76 [8.10 - 9.42]	4.94 [4.43 - 5.44]	6.26 [5.70 - 6.83]
Andaman and Nicobar Islands	3.38 [1.89 - 4.87]	2.31 [1.07 - 3.54]	1.45 [0.47 - 2.43]	1.15 [0.27 - 2.03]	1.65 [0.6 - 2.7]	0.35 [0.14 - 0.56]	0.34 [0.14 - 0.55]	0.3 [0.15 - 0.45]
Daman and Diu	0.96 [0.04 - 1.88]	0.35 [0.01 - 0.69]	0.17 [0.05 - 0.29]	0.13 [0.07 - 0.19]	9.25 [4.21 - 14.29]	0.19 [0.057 - 0.32]	0.1 [0.04 - 0.16]	0.05 [0.02 - 0.08]
Delhi	3.46 [2.5 - 4.42]	1.11 [0.56 - 1.66]	0.5 [0.13 - 0.87]	0.58 [0.18 - 0.98]	6.63 [5.32 - 7.94]	2.84 [1.97 - 3.72]	2.31 [1.52 - 3.1]	2.26 [1.48 - 3.04]
Lakshadweep	7.48 [3.75 - 11.21]	3.23 [0.72 - 5.73]	2.1 [0.07 - 4.14]	1.41 [0.26 - 2.56]	4.53 [1.58 - 7.48]	3.43 [0.85 - 6.01]	1.87 [0.05 - 3.69]	1.4 [0.26 - 2.54]
Puducherry	3.08 [1.66 - 4.49]	1.65 [0.61 - 2.69]	1.06 [0.22 - 1.89]	1.26 [0.35 - 2.18]	2.08 [0.91 - 3.25]	0.62 [0.02 - 1.22]	0.5 [0.08 - 0.92]	0.51 [0.07 - 0.95]
Himachal Pradesh	6.42 [5.39 - 7.45]	3.19 [2.45 - 3.93]	1.87 [1.3 - 2.44]	2.04 [1.45 - 2.64]	14.16 [12.69 - 15.62]	7.9 [6.77 - 9.04]	4.39 [3.53 - 5.25]	5.22 [4.29 - 6.16]
Punjab	5.7 [4.93 - 6.47]	2.52 [2 - 3.04]	1.72 [1.29 - 2.16]	1.84 [1.39 - 2.29]	13.06 [11.94 - 14.18]	5.78 [5 - 6.56]	2.77 [2.23 - 3.32]	4.00 [3.35 - 4.66]
Tamil Nadu	4.32 [3.84 - 4.8]	2.1 [1.76 - 2.44]	1.27 [1 - 1.53]	1.28 [1.01 - 1.55]	6.98 [6.37 - 7.59]	3.75 [3.3 - 4.21]	2.32 [1.96 - 2.67]	2.94 [2.54 - 3.34]
Low Health Insurance Coverage States	5.28 [5.13 - 5.43]	2.42 [2.32 - 2.52]	1.45 [1.37 - 1.53]	1.81 [1.72 - 1.9]	11.31 [11.1 - 11.51]	5.58 [5.43 - 5.73]	3.38 [3.26 - 3.5]	3.99 [3.86 - 4.12]
Rajasthan	4.66 [4.07 - 5.24]	2.08 [1.68 - 2.47]	1.38 [1.06 - 1.7]	1.71 [1.35 - 2.06]	8.31 [7.55 - 9.08]	4.88 [4.28 - 5.47]	2.81 [2.35 - 3.26]	3.53 [3.02 - 4.04]

Chandigarh	2.21 [0.67 - 3.75]	1.28 [0.1 - 2.45]	0.72 [0.10 - 1.34]	0.6 [0.02 - 1.18]	13.49 [9.91 - 17.07]	6.03 [3.53 - 8.52]	0.59 [0.21 - 0.97]	3.02 [1.23 - 4.82]
Goa	4.19 [2.32 - 6.05]	1.87 [0.61 - 3.12]	1.45 [0.34 - 2.56]	1.65 [0.47 - 2.84]	6.54 [4.24 - 8.84]	1.19 [0.18 - 2.2]	0.39 [0.19 - 0.59]	0.57 [0.13 - 1.01]
Kerala	13.72 [12.71 - 14.73]	6.35 [5.63 - 7.06]	3.75 [3.19 - 4.31]	3.61 [3.06 - 4.16]	26.78 [25.48 - 28.08]	12.22 [11.26 - 13.19]	7.24 [6.48 - 8]	6.4 [5.68 - 7.11]
Medium Health Insurance Coverage States	7.91 [7.39 - 8.43]	3.61 [3.25 - 3.97]	2.23 [1.95 - 2.52]	2.38 [2.09 - 2.68]	15.04 [14.34 - 15.73]	7.5 [6.99 - 8.01]	4.35 [3.96 - 4.75]	4.52 [4.12 - 4.92]
Chhattisgarh	4.07 [3.36 - 4.78]	2.42 [1.86 - 2.97]	1.47 [1.03 - 1.9]	1.28 [0.87 - 1.69]	7.02 [6.10 - 7.94]	3.56 [2.89 - 4.22]	2.23 [1.7 - 2.77]	2.00 [1.49 - 2.50]
Meghalaya	0.78 [0.3 - 1.26]	0.29 [0 - 0.57]	0.10 [0.07 - 0.13]	0.37 [0.04 - 0.69]	0.90 [0.38 - 1.41]	0.47 [0.1 - 0.83]	0.02 [0.01 - 0.03]	0.44 [0.08 - 0.81]
Mizoram	1.36 [0.78 - 1.94]	0.28 [0.02 - 0.55]	0.19 [0.03 - 0.35]	0.24 [0 - 0.48]	4.38 [3.36 - 5.41]	2.13 [1.4 - 2.85]	1.17 [0.63 - 1.71]	0.36 [0.06 - 0.67]
Dadra and Nagar Haveli	1.28 [0.32 - 2.24]	0.16 [0.04 - 0.28]	0.16 [0.04 - 0.28]	0.32 [0.14 - 0.5]	3.47 [0.88 - 6.07]	0.23 [0.04 - 0.42]	0.09 [0.03 - 0.15]	3.32 [0.78 - 5.86]
Andhra Pradesh	7.17 [6.39 - 7.95]	3.19 [2.66 - 3.72]	1.80 [1.4 - 2.2]	2.19 [1.75 - 2.64]	17.97 [16.81 - 19.14]	9.34 [8.46 - 10.22]	5.44 [4.75 - 6.12]	5.68 [4.98 - 6.38]
Telangana	5.3 [4.57 - 6.03]	2.46 [1.96 - 2.97]	1.3 [0.93 - 1.67]	1.77 [1.34 - 2.2]	6.64 [5.83 - 7.44]	2.78 [2.25 - 3.32]	1.79 [1.36 - 2.22]	2.46 [1.96 - 2.97]
High Health Insurance Coverage States	5.78 [5.4 - 6.17]	2.72 [2.45 - 2.99]	1.52 [1.32 - 1.72]	1.83 [1.6 - 2.05]	11.64 [11.1 - 12.17]	5.80 [5.41 - 6.19]	3.46 [3.15 - 3.76]	3.77 [3.45 - 4.09]

Value in [] represents 95% confidence interval

3.3.6 Inequality in CHE incidence

The CHE incidence at 25% and 40% threshold due to inpatient care were observed to be slightly concentrated among poor households (CI: -0.005, -0.004, respectively, $p < 0.05$). Across states/UTs, the CHE incidence were statistically significantly pro-poor in 7 states at 10% threshold, and in only 5 states/UTs at 25% and 40% threshold. In states namely, Maharashtra, Karnataka, Kerala, and Arunachal Pradesh the CHE incidence were statistically significantly pro-poor at all thresholds due to inpatient care. In states namely, Jharkhand and Chhattisgarh the CHE incidence were statistically significantly concentrated among rich households. In case of outpatient care, the CHE incidence at 10% (CI: -0.017; $p < 0.05$), 25% (CI: -0.074; $p < 0.05$), and 40% (CI: -0.087; $p < 0.05$) threshold were statistically significantly concentrated among poor households. The trend was similar in 12, 14, 13 states/UTs at 10%, 25%, and 40% threshold respectively, with a pro-poor CHE incidence (Table 3.3).

Table 3.3 Concentration index for CHE incidence by type of care

States/UTs	Inpatient care			Outpatient care		
	CHE 10	CHE 25	CHE 40	CHE 10	CHE 25	CHE 40
India	0.0001	-0.005*	-0.004*	-0.017*	-0.074*	-0.087*
Assam	0.009	0.003	0.001	0.013	-0.101	-0.156*
Bihar	0.001	-0.001	-0.003	-0.097*	-0.061	-0.026
Jharkhand	0.023*	0.011*	0.004	-0.031	0.013	0.04
Madhya Pradesh	-0.003	-0.006	-0.007	0.002	-0.067	-0.027
Odisha	0.019*	0.009	0.006	0.004	-0.109*	-0.196*
Uttar Pradesh	0.014*	0.001	-0.001	0.003	0.003	0.018
Arunachal Pradesh	-0.059*	-0.016*	-0.008*	-0.05	-0.021	-0.048
Gujarat	-0.001	-0.0004	0.001	0.179*	0.092	0.001
Manipur	-0.008	0	-0.001	-0.168*	-0.365*	-0.505*
Nagaland	-0.006	-0.002	-0.002	0.652*	0.790*	-0.215
Sikkim	-0.031*	-0.012	-0.003	0.037	0.346*	-0.323
Tripura	-0.011	0.004	0.001	-0.108*	-0.214*	-0.343*
Uttarakhand	-0.007	-0.01	-0.003	0.124*	-0.061	-0.269
Haryana	-0.019	-0.011	-0.005	-0.121*	-0.258*	-0.347*
Jammu and Kashmir	-0.012	-0.005	-0.004	-0.241*	-0.324*	-0.362*
Karnataka	-0.026*	-0.016*	-0.009*	0.025	-0.087	-0.129*
Maharashtra	-0.039*	-0.025*	-0.015*	-0.088*	-0.151*	-0.185*

West Bengal	0.005	-0.002	-0.004	0.013	0.012	-0.048
Andaman and Nicobar Islands	0.022	0.019	0.011	0.601*	0.753	0.76
Daman and Diu	0.008	-0.003	-0.004	-0.021	-0.611	-0.814
Delhi	-0.007	-0.01	-0.006	-0.285*	-0.303*	-0.232*
Lakshadweep	-0.014	0.014	0.01	0.333	0.419	0.188
Puducherry	-0.007	-0.009	-0.007	0.27	-0.079	-0.184
Himachal Pradesh	-0.026*	-0.014	-0.004	-0.132*	-0.271*	-0.174*
Punjab	-0.024*	-0.011	0.007	-0.185*	-0.347*	-0.241*
Tamil Nadu	-0.007	-0.009*	-0.007*	-0.192*	-0.224*	-0.242*
Low Health Insurance Coverage States	-0.005*	-0.007*	-0.124*	-0.050*	-0.111*	-0.124*
Rajasthan	-0.003	-0.006	-0.005	0.067*	0.043	-0.006
Chandigarh	0.022	0.015	0.012	-0.380*	-0.386*	0.097
Goa	0.012	-0.008	-0.003	0.143	0.035	-0.286
Kerala	-0.054*	-0.035*	-0.021*	-0.066*	-0.014	-0.038
Medium Health Insurance Coverage States	0.013*	0.0002	0.052	0.124*	0.093*	0.052*
Chhattisgarh	0.021*	0.018*	0.014*	0.206*	0.194*	0.134
Meghalaya	0.008	0.002	0.001	-0.649*	-0.643*	0.602
Mizoram	0.007	-0.0002	0.0002	-0.033	-0.345*	-0.605*
Dadra and Nagar Haveli	0.01	-0.0002	-0.0002	-0.058	0.377	0.998
Andhra Pradesh	0.001	-0.009	-0.007	-0.034	-0.044	-0.029
Telangana	-0.008	-0.016	-0.007	0.045	-0.167*	-0.025
High Health Insurance Coverage States	0.009	-0.005	0.001	0.024	-0.024	0.001

*p<0.05

Decomposition analysis showed that higher education status of household head, large household size, female-headed households, and households dependent upon regular salary/wage reduced the concentration of CHE incidence among poor households in the case of inpatient care (Supplementary Table 3.3). On the other hand, belonging to scheduled tribe, upper economic quintiles, and household size (5-8 members), statistically significantly increased the pro-poor inequality in CHE incidence due to hospitalization. The pattern was similar at all three thresholds. Furthermore, health insurance contributed negatively to the pro-poor inequality only at 10% threshold of CHE in case of inpatient care.

In the case of outpatient care, belonging to scheduled tribes, upper economic quintiles, and households dependent upon other occupation, contributed positively to the pro-poor inequality of CHE occurrence. Residing in urban areas and higher education status of household head, reduced the pro-poor inequality in occurrence of CHE (Supplementary Table 3.3).

3.3.7 Financial burden (CHE and impoverishment) among those who sought care

Among those who sought inpatient care (outpatient care), 34.7% (52.06%) of households experienced CHE incidence at 10% threshold (Table 3.4). The highest CHE incidence among those who sought inpatient care were observed at all thresholds in Andhra Pradesh, Telangana, Kerala, Maharashtra, Uttar Pradesh, Odisha while low CHE incidence were observed in Dadra and Nagar Haveli, Mizoram, and Meghalaya. On an average, even the medium insurance coverage states/UTs (CHE 10: 34.59%; CHE 25: 15.53%; CHE 40: 9.42%) and high insurance coverage states/UTs (CHE 10: 42.93%; CHE 25: 19.81%; CHE 40: 11.07%) experienced high CHE incidence due to seeking hospitalization. Interestingly, the CHE incidence (at 10% threshold) was lower in high insurance coverage states (49.06%) and medium insurance coverage states (47.94%) than low insurance coverage states (53.19%) in case of outpatient care. The pattern was similar at 25% and 40% threshold as well (Table 3.3). The CHE incidence at 10% threshold due to hospitalization was seven folds when care was sought from private providers (60.14%) in comparison to when care was sought from public providers (8.99%). The pattern was similar across most states/UTs at all thresholds. Likewise, the burden was higher in case of outpatient care as well in public facilities than private facilities (Supplementary Table 3.4 and 3.5).

Furthermore, among those who sought hospitalization 11.4% of households experienced impoverishment. A few high insurance coverage states (Meghalaya and Mizoram) faced low impoverishment, while a few faced high impoverishment (Andhra Pradesh and Telangana), resulting in an overall high impoverishment due to hospitalization across high insurance

coverage states category (13.43%). In case of outpatient care, 16.9% of households experienced impoverishment, ranging from 0.5% in Daman and Diu to 32.2% in Meghalaya. On an average, interestingly, the impoverishment due to outpatient care was lower in high insurance coverage states (15.1%) and medium insurance coverage states (13.8%) category than low insurance coverage states (17.7%) (Table 3.4). Furthermore, the impoverishment was higher when care was sought from private facilities (inpatient: 18.5%; outpatient: 18.9%) than public facilities (inpatient: 3.9%; outpatient: 12.1%). The pattern was similar across most states/UTs (Supplementary Table 3.4 and 3.5).

Table 3.4 Financial burden among those who sought care across Indian states/UTs

States/UTs	Inpatient care				Outpatient care			
	CHE 10 (%)	CHE 25 (%)	CHE 40 (%)	Impoverishment (%)	CHE 10 (%)	CHE 25 (%)	CHE 40 (%)	Impoverishment (%)
India	34.66 [34.33 - 34.99]	15.59 [15.34 - 15.84]	9.14 [8.94 - 9.34]	11.36 [11.14 - 11.58]	52.06 [51.47 - 52.65]	25.77 [25.25 - 26.29]	15.51 [15.09 - 15.94]	16.94 [16.49 - 17.38]
Assam	20.7 [19.14 - 22.27]	7.77 [6.74 - 8.8]	4.81 [3.99 - 5.64]	8.59 [7.51 - 9.67]	60.51 [54.7 - 66.32]	27.71 [22.39 - 33.03]	24.05 [18.97 - 29.13]	30.6 [25.12 - 36.08]
Bihar	28.34 [26.88 - 29.81]	9.16 [8.22 - 10.1]	4.9 [4.2 - 5.6]	11.26 [10.23 - 12.29]	66.12 [61.81 - 70.42]	36.31 [31.94 - 40.68]	22.16 [18.38 - 25.93]	26.73 [22.71 - 30.75]
Jharkhand	26.19 [24.25 - 28.13]	12.22 [10.77 - 13.66]	6.6 [5.5 - 7.69]	9.7 [8.39 - 11]	69.81 [66.29 - 73.33]	37.55 [33.84 - 41.26]	20.21 [17.13 - 23.29]	19.42 [16.39 - 22.46]
Madhya Pradesh	25.17 [23.83 - 26.52]	12.53 [11.5 - 13.56]	9.07 [8.18 - 9.96]	10.31 [9.37 - 11.25]	62.26 [59.2 - 65.31]	33.66 [30.68 - 36.64]	19.55 [17.05 - 22.06]	21.12 [18.55 - 23.7]
Odisha	39.25 [37.52 - 40.99]	18.68 [17.3 - 20.06]	11.48 [10.35 - 12.61]	13.93 [12.7 - 15.16]	75.47 [72.83 - 78.11]	45.52 [42.46 - 48.57]	27.29 [24.56 - 30.03]	20.06 [17.6 - 22.52]
Uttar Pradesh	39.75 [38.64 - 40.86]	20.42 [19.51 - 21.33]	11.83 [11.09 - 12.56]	13.91 [13.13 - 14.7]	59.7 [57.94 - 61.45]	31.96 [30.29 - 33.63]	20.19 [18.76 - 21.63]	23.58 [22.06 - 25.1]
Arunachal Pradesh	28.93 [25.98 - 31.88]	6.06 [4.51 - 7.61]	3.06 [1.94 - 4.18]	6.14 [4.58 - 7.71]	68.79 [62.13 - 75.45]	58.07 [50.97 - 65.16]	50.05 [42.87 - 57.24]	28.08 [21.62 - 34.54]
Gujarat	24.02 [22.5 - 25.54]	8.77 [7.77 - 9.78]	4.91 [4.14 - 5.68]	7.23 [6.31 - 8.15]	37.99 [34.86 - 41.12]	12.59 [10.45 - 14.73]	8.31 [6.53 - 10.09]	8.49 [6.69 - 10.29]
Manipur	38.49 [36.3 - 40.69]	11.5 [10.06 - 12.94]	5.47 [4.44 - 6.49]	9.92 [8.58 - 11.27]	88.49 [82.53 - 94.46]	52.37 [43.04 - 61.7]	36.08 [27.11 - 45.06]	9.83 [4.27 - 15.4]
Nagaland	21.08	4.91	3.49	9.1	63.5	44.17	6.91	1.51

	[18.25 - 23.92]	[3.41 - 6.41]	[2.21 - 4.76]	[7.1 - 11.1]	[39.91 - 87.09]	[19.83 - 68.5]	[5.87 - 7.95]	[0.47 - 2.55]
Sikkim	22.9 [19.53 - 26.27]	5.6 [3.75 - 7.44]	1.26 [0.37 - 2.16]	11.38 [8.83 - 13.92]	54.69 [45.75 - 63.64]	26.92 [18.95 - 34.89]	2.17 [0.45 - 3.89]	9.88 [4.52 - 15.24]
Tripura	15.62 [13.76 - 17.48]	5.06 [3.94 - 6.18]	2.51 [1.71 - 3.32]	3.91 [2.91 - 4.9]	72.96 [65.83 - 80.09]	46.05 [38.05 - 54.06]	25.81 [18.78 - 32.83]	18.2 [12.01 - 24.4]
Uttarakhand	29.3 [26.65 - 31.94]	11.9 [10.02 - 13.78]	5.4 [4.08 - 6.71]	9.57 [7.86 - 11.28]	50.34 [44.03 - 56.65]	14.29 [9.87 - 18.71]	3.8 [1.39 - 6.22]	9.31 [5.64 - 12.98]
Haryana	32.59 [30.58 - 34.59]	11.67 [10.3 - 13.05]	7.39 [6.27 - 8.51]	9.13 [7.89 - 10.36]	49.58 [45.97 - 53.18]	16.9 [14.19 - 19.6]	10.22 [8.03 - 12.4]	16.07 [13.42 - 18.72]
Jammu and Kashmir	16.72 [15.23 - 18.22]	4.24 [3.43 - 5.05]	2.07 [1.5 - 2.64]	4.16 [3.35 - 4.96]	45.28 [42.1 - 48.46]	9.11 [7.27 - 10.94]	3.83 [2.61 - 5.06]	8.87 [7.05 - 10.69]
Karnataka	38.16 [36.54 - 39.77]	14.94 [13.76 - 16.13]	7.29 [6.43 - 8.15]	11.30 [10.25 - 12.35]	58.86 [55.33 - 62.38]	27.48 [24.28 - 30.68]	16.44 [13.79 - 19.1]	16.94 [14.25 - 19.62]
Maharashtra	44.11 [42.9 - 45.33]	19.67 [18.7 - 20.64]	11.71 [10.92 - 12.5]	14.00 [13.15 - 14.85]	42.72 [40.84 - 44.59]	20.15 [18.63 - 21.68]	12.90 [11.63 - 14.18]	12.08 [10.84 - 13.31]
West Bengal	29.05 [27.79 - 30.3]	13.79 [12.84 - 14.75]	8.18 [7.42 - 8.94]	10.52 [9.67 - 11.37]	54.95 [53.12 - 56.78]	24.86 [23.27 - 26.45]	14 [12.73 - 15.28]	17.78 [16.37 - 19.19]
Delhi	22.17 [19.51 - 24.83]	6.64 [5.05 - 8.23]	3.03 [1.93 - 4.12]	3.42 [2.26 - 4.58]	35.69 [29.47 - 41.91]	15.3 [10.63 - 19.97]	12.42 [8.14 - 16.71]	12.21 [7.96 - 16.47]
Himachal Pradesh	35.09 [32.66 - 37.52]	16.53 [14.64 - 18.42]	8.82 [7.38 - 10.27]	9.94 [8.42 - 11.46]	52.62 [48.86 - 56.38]	29.37 [25.94 - 32.8]	16.31 [13.53 - 19.09]	19.29 [16.31 - 22.26]
Punjab	37.13 [35.23 - 39.04]	15.7 [14.27 - 17.14]	10.81 [9.58 - 12.03]	11.73 [10.46 - 13]	36.24 [33.47 - 39.02]	16.04 [13.92 - 18.15]	7.69 [6.15 - 9.23]	10.84 [9.05 - 12.64]
Tamil Nadu	34.12 [32.8 - 35.44]	16.38 [15.34 - 17.41]	9.75 [8.93 - 10.58]	9.97 [9.14 - 10.81]	42.05 [39.65 - 44.45]	22.62 [20.59 - 24.65]	13.96 [12.28 - 15.64]	17.48 [15.64 - 19.33]
Low health insurance coverage states	33.62 [33.25 - 33.99]	15.06 [14.78 - 15.34]	8.85 [8.63 - 9.07]	11.29 [11.04 - 11.54]	53.19 [52.5 - 53.88]	26.27 [25.66 - 26.88]	15.92 [15.42 - 16.43]	17.72 [17.2 - 18.25]

Rajasthan	24.69 [23.27 - 26.1]	10.94 [9.92 - 11.97]	7.16 [6.32 - 8.01]	8.99 [8.05 - 9.92]	50.9 [47.87 - 53.94]	29.86 [27.08 - 32.63]	17.18 [14.89 - 19.47]	19.76 [17.34 - 22.17]
Chandigarh	20.11 [14.98 - 25.23]	11.1 [7.08 - 15.11]	6.33 [3.22 - 9.45]	5.12 [2.31 - 7.94]	45.72 [36.14 - 55.29]	20.42 [12.67 - 28.16]	2.01 [-0.69 - 4.71]	10.25 [4.42 - 16.07]
Goa	24.68 [19.9 - 29.47]	11.2 [7.7 - 14.7]	8.69 [5.56 - 11.81]	9.91 [6.6 - 13.23]	33.14 [25.84 - 40.43]	6.05 [2.35 - 9.74]	1.98 [0.18 - 3.78]	2.88 [0.29 - 5.47]
Kerala	45.03 [43.33 - 46.73]	20.35 [18.97 - 21.73]	11.77 [10.67 - 12.88]	11.2 [10.12 - 12.28]	46.75 [44.89 - 48.6]	21.33 [19.81 - 22.86]	12.64 [11.41 - 13.87]	11.16 [9.99 - 12.33]
Medium health insurance coverage states	34.59 [33.5 - 35.67]	15.53 [14.71 - 16.36]	9.42 [8.76 - 10.09]	10.06 [9.37 - 10.74]	47.94 [46.41 - 49.47]	23.9 [22.6 - 25.21]	13.88 [12.82 - 14.94]	13.82 [12.76 - 14.87]
Chhattisgarh	28.86 [26.91 - 30.8]	16.67 [15.07 - 18.27]	10.7 [9.38 - 12.03]	9.3 [8.06 - 10.55]	46.97 [42.64 - 51.29]	23.79 [20.1 - 27.48]	14.94 [11.85 - 18.03]	11.86 [9.06 - 14.66]
Meghalaya	4.95 [3.5 - 6.39]	1.74 [0.87 - 2.62]	0.5 [0.03 - 0.97]	2.27 [1.28 - 3.27]	64.83 [42.13 - 87.53]	33.7 [11.23 - 56.17]	1.38 [0.17 - 2.59]	32.2 [9.99 - 54.41]
Mizoram	6.07 [4.67 - 7.48]	1.46 [0.75 - 2.16]	0.92 [0.36 - 1.49]	1.29 [0.62 - 1.95]	49.46 [41.45 - 57.46]	24 [17.17 - 30.84]	13.18 [7.77 - 18.6]	4.11 [0.93 - 7.29]
Dadra and Nagar Haveli	9.58 [4.75 - 14.4]	1.23 [0.58 - 1.88]	1.23 [0.58 - 1.88]	2.44 [0.09 - 4.79]	30.17 [14.01 - 46.32]	2.02 [0.93 - 3.11]	0.74 [0.28 - 1.20]	0.77 [0.31 - 1.23]
Andhra Pradesh	48.09 [46.32 - 49.86]	21.06 [19.62 - 22.51]	11.79 [10.65 - 12.93]	14.52 [13.27 - 15.77]	50.79 [48.41 - 53.18]	26.39 [24.28 - 28.49]	15.36 [13.64 - 17.08]	15.36 [13.64 - 17.08]
Telangana	47.7 [45.81 - 49.6]	21.93 [20.36 - 23.49]	11.36 [10.15 - 12.56]	15.65 [14.27 - 17.03]	44.79 [40.99 - 48.59]	18.8 [15.81 - 21.79]	12.09 [9.6 - 14.59]	16.14 [13.32 - 18.95]
High health insurance coverage states	42.93 [41.96 - 43.9]	19.81 [19.03 - 20.59]	11.07 [10.46 - 11.69]	13.43 [12.76 - 14.1]	49.06 [47.29 - 50.84]	24.45 [22.92 - 25.97]	14.58 [13.33 - 15.83]	15.09 [13.82 - 16.36]

3.4 Discussion

This is the first comprehensive study encompassing not only the utilization pattern of healthcare services, but also presenting the holistic picture of financial burden associated with the usage of inpatient and outpatient facilities of all households as well as among those households who utilized healthcare. The financial burden was disaggregated by the type of provider (public/private) as well across all Indian states/UTs. Additionally, the chapter analysed the inequality in terms of accessibility to care, utilization of private health facilities, and occurrence of CHE incidence across the states/UTs. The chapter reported high inter-state differentials in terms of utilization of healthcare services and financial burden.

The utilization of public hospitals was higher for inpatient care, except in case of some relatively well-off states (such as Maharashtra, Telangana, Punjab, Gujarat, Kerala, Haryana), wherein the utilization of private hospitals was higher (>50%) and the mean duration of hospitalization was also relatively high. This may be partially explained by the high or higher epidemiological transition level in such states (i.e., high non-communicable diseases burden) [45], as the volume and type of health services needed are directly associated with the dominant disease burden [29-31,35,38]. Moreover, much of the non-communicable diseases care is provided by the private healthcare sector [30-31,38,65-67]. Previous studies have also suggested that wealthier states invest more on health, have vast provision of private healthcare services [37,68-70], and their residents usually have more financial resources to spend on healthcare [44,71]. On the other hand, the outpatient services were heavily concentrated among private healthcare providers (~70%) in India, as well as across majority of states. Such variations can be attributed to the availability of public and private facilities, and cost as well as quality of healthcare services across states [21,72]. Previous studies have also suggested that people's preference for providers depends upon proximity, reputation and accessibility, with private healthcare providers outperforming public ones in all parameters [34]. For instance, a

study from Haryana, Uttar Pradesh, and Gujarat found that outpatient care was more accessible with private healthcare facilities due to shorter travelling distance [34].

We also found that the financial burden varied greatly across states, with relatively wealthier states (such as Chandigarh, Maharashtra, Kerala, Haryana, and Punjab) accounting for the highest OOPE for hospitalization. A few well-off states including, Kerala, Maharashtra, Haryana, Himachal Pradesh, and Punjab, also experienced substantial CHE and impoverishment due to inpatient and outpatient care among all households. All this might be attributed to their higher ability to pay, higher access, accompanied by greater preference for private facilities, and increased awareness about health benefits. The higher expenditure in such states also reflects costly treatment of non-communicable diseases, as these states belong to higher/high epidemiological transition level categories, which have comparatively greater non-communicable diseases burden than lower epidemiological transition level ones. The financial burden was also copiously high in poorer states such as Odisha and Uttar Pradesh among all households as well as among those who sought care for both inpatient and outpatient care. The reasons for the same can be attributed to the low income, lack of financial protection measures (i.e., low health insurance coverage), and low public health expenditure in poorer states [35]. Also, a relatively low burden in some poorer states such as Bihar, Jharkhand could be attributed to lower health access and poor infrastructure facilities [36]. Notably, in consonance with previous studies [34,73], we found that outpatient services put more financial strain on households in comparison to inpatient services. The brunt of outpatient care can be attributed to frequent visits, small but continued expenditure, and heavy reliance on private health sector [34]. Also, lack of health insurance coverage for outpatient services immiserates the situation; even a recently launched government sponsored health insurance, i.e., Pradhan Mantri Jan Arogya Yojana in 2018 has kept outpatient services outside its ambit [74-75].

Furthermore, states with higher proportion of population covered under any health insurance scheme such as Kerala, Chhattisgarh, Andhra Pradesh, Telangana, and Rajasthan also faced substantial financial burden due to hospitalization. This might be attributable to higher utilization of hospital care among insured [76-77], but limited effectiveness of insurance schemes [74-82] or only marginal effectiveness of the schemes [83-85] in safeguarding against the colossal burden of health expenditure, as reported by the previous literature. Factors such as low awareness about various facets of health insurance (such as information regarding stipulated benefits one is entitled to, how to avail benefits, number of family members covered, list of empanelled hospitals, and ailments covered) [86-90], leakage of government sponsored health insurance to upper economic quintiles [25,90-92], supplier-induced demand, lack of coverage for outpatient care, and continued spending on medicines, diagnostics, and consumable, are few of the reasons for less than expected outcome by health insurance in India [19,86-93]. Even in the recently launched government sponsored health insurance scheme, Pradhan Mantri Jan Arogya Yojana, several challenges including registration of ineligible households, no formation of information, education, and communication cell across several states, and delays in claim reimbursement were highlighted [94-95]. On the other hand, we observed low CHE and impoverishment due to inpatient services in a few smaller states/UTs with good health insurance coverage (such as Meghalaya, Mizoram, Dadra and Nagar Haveli, and Chandigarh) due to inpatient services. Another noticeable observation was lower OOPE for outpatient services in high insurance coverage states (such as Dadra and Nagar Haveli, Chhattisgarh, Goa, and Meghalaya), that might be due to an incentive present to both patients and providers to convert outpatient cases into inpatient cases, as most of the health insurance schemes reimburse hospitalization incidence only [79,96-97].

Inequality issues in terms of access to care, utilization of healthcare provider, and financial protection were found to be prevalent in India. For instance, the accessibility to inpatient care,

outpatient care, and also the utilization of private providers were observed to be concentrated among affluent patients. On the other hand, the occurrence of CHE incidence were observed to be concentrated among poor households only in few states/UTs in case of inpatient care and in 30-40% of states/UTs in case of outpatient care. This reflects that costly services from private healthcare providers were more accessible by affluent patients while negative repercussions due to healthcare expenses were relatively pronounced among poorer households. The finding is in line with a study that reported that accessibility to inpatient services is greater among those with higher socio-economic class than less affluent ones in at national level [98]. Another study reported that utilization of private sector for outpatient services has become more inequitable across expenditure quintiles, favouring the rich at the national level during the period 1995–96 to 2004 [40]. In terms of CHE, a study reported the concentration of CHE incidence among the poor [99], while another study reported occurrence of CHE incidence among rich in India in 2014, however, the CHE incidence was found to be pro-poor across many states [35]. The difference in results might be due to the different approach used to measure CHE and different survey year [35,99]. Furthermore, we observed that factors including enrolment under health insurance, richest economic quintile, formal education (upto higher secondary), aged more than 60 years, and dependent on casual labour contributed positively to inequality to access to inpatient and outpatient care both. We also found that residing in urban areas, being female, elderly, having a high education level, or belonging to scheduled tribe statistically significantly increased the concentration of private health care provider utilization among wealthier population, regardless of the type of care (inpatient or outpatient) sought. On the other hand, belonging to scheduled tribe, upper economic status, and household size (5-8 members) mainly contributed positively to the concentration of CHE incidence among poor households. In short, variation in living standards, educational levels, social class, and rural-urban differences need

to be addressed to reduce the inequalities exhibited in the utilization of health care services from private providers and financial burden of both inpatient and outpatient health care.

We observed that the overall health expenditure varies substantially between public and private providers, but the variation across providers is less in case of outpatient care. Utilization of private health facilities puts exorbitant burden on households, as highlighted by previous studies as well [28,30-31,67]. We also found deleterious effect of utilizing private health facilities across all states/UTs in case of both inpatient and outpatient care. Medicines, doctor's fee, and package component were the main contributors (~59%) to health expenditures incurred in private hospitals, whereas medicines and doctors' fee were found to be the main contributors (~83%) to health expenditure in case of private outpatient care. Private healthcare facilities are largely unregulated, and issues of transparency, over-charging, unnecessary tests and treatments, and malpractices were reported in private health sector in India [92,100-101]. Also, this sector mainly caters to tertiary care services and employ advanced technologies and sub-specialties that eventually lead to colossal financial burden [100]. In addition, recommendation of branded and expensive medicines rather than generic medicines is also prevalent [102]. A considerable portion of health expenditure on diagnostic tests (e.g., contributing 10% in private hospitals expenditure; 5% in private outpatient care), may be attributed to screening procedures, avoidable tests, and suppliers induced demand in India and worldwide [103-104]. A well-established mechanism of paying commissions to doctors, when doctors refer patients for diagnostic testing in the private sector are also prevalent practices in India [72]. Improved regulation is one of the potential drivers to reduce cost and enhance quality of care [19,102].

The utilization of healthcare services in the public sector led to relatively lower burden of CHE incidence for households. However, inter-state variations were prevalent, with states such as Manipur, Arunachal Pradesh, Odisha, and Himachal Pradesh reporting high CHE incidence

burden even among households who sought care (irrespective of type of care) from the public facilities. Notably, in case of outpatient care the CHE incidence burden was substantially high throughout, even among those who sought care from public facilities. The major contributors to health expenditure in case of public facilities were medicines, transportation, non-medicine related expenditure and diagnostics test that collectively contributed to 89% and 94% of inpatient and outpatient care expenditure, respectively. Despite the fact that public facilities are subsidized or free, we observed medicines or diagnostic tests were available only partly free or were provided on a payment basis. The low availability of free drugs and diagnostics tests, and irregular supply of essential drugs at public healthcare facilities compel households to buy them from open markets, which raises healthcare expenditure [19,105-106]. The situation varies across states with Tamil Nadu, Rajasthan, and Delhi providing medicines free-of-cost and ensuring greater availability than other states [19]. Also, the Pradhan Mantri Bhartiya Janaushadhi Pariyojana, has saved up to USD $23 million of citizen's money on drugs during 2020 to 2021 by providing quality generic medicines at affordable prices [107]. The most over-looked item of health expenditure is non-medicine costs (such as expenditure on travel and accommodation), which contributes even more than medical components when hospitalization was sought from public hospitals. Studies suggest unavailability of diagnostic tests and inadequate health infrastructure as the key reasons for medical travel [108-109]. This shows that in order to keep non-medical related costs in check, a comprehensive and dependable primary healthcare system is needed [109]. Furthermore, several predicaments in the public health system such as insufficient healthcare infrastructure, perceived low-quality care, long-waiting times, and unavailable services in public facilities were also found, that need to be addressed.

As per the latest report by NITI Aayog (2021) [110], the capacity and quality of healthcare services in India's public health sector have been constrained due to low public health

expenditure. Also, a WHO report highlights that the countries with higher public health expenditure are able to provide greater financial protection from catastrophic and impoverishing health spending [1,111]. However, in India, public health spending is dismally low, and the National Health Policy 2017 recommends increasing public health spending to 2.5% of gross domestic product and making sustained investments to strengthen the public health system as few of the measures toward progressively achieving UHC [112]. Furthermore, WHO global monitoring report advises countries to invest additionally in primary healthcare (1% of gross domestic product), along with prioritising health promotion and disease prevention for long-term sustainability [111]. The key barriers to access to care such as poor infrastructure, weaknesses in the design of coverage policies, shortages and inefficient distribution of qualified health workers, prohibitively expensive good quality medicines and medical products, and lack of access to digital health and innovative technologies also need to be addressed by countries, particularly by low and middle-income countries such as India, to accelerate the progress towards UHC [1,9].

3.5. Conclusion and policy implications

The results suggest substantial variations among states/UTs in terms financial burden, with further variation observed based on by type of care and provider used. These interstate variations have pertinent policy ramifications and accordingly state-specific policies and budgetary allocations should be revised. There is also an urgent need to regulate pricing in private health sector (such that services are more affordable and people does not fall below poverty line by accessing care), and strengthen public healthcare facilities, primary care, and improving the availability of health infrastructure and resources, to improve accessibility to care and safeguard against health expenditure. To deal with overwhelming health expenditures, states need to take care of cost of medicines (irrespective of type of care and type of provider) and non-medical costs in public health facilities Furthermore, issues such as lack of knowledge

about health insurance scheme's features and benefits among beneficiaries, supplier-induced demand, continued spending on drugs and diagnostics even among insured, need to be addressed to augment better financial protection. Also, given the rising burden of non-communicable diseases in India that result in chronic conditions requiring frequent outpatient visits [34], it is imperative to include outpatient care under the ambit of health insurance coverage. Coverage of outpatient services can also improve access to primary care and even promote viability of inpatient health insurance scheme [96]. Lastly, in order to address inequalities prevalent in utilization of healthcare and financial risk, efforts must be made in conjunction with multi-sectoral approaches to address all key drivers of inequality; differentials in living standards, educational levels, social-class, as well as rural-urban differences.

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3.7 Appendix (Supplementary Tables and Figures)

Supplementary Table 3.1 States profile

States/ Union-territories	Population 2015-16 (in Crores)	Literacy rate (%)	Poverty (%)	Total State Expenditure (INR in Crores)	Total State Expenditure on Health (INR in crores)	Health Expenditure as a % of Total State Expenditure	GSDP 2015-16 Current Prices (INR in crores)	Per Capita Health Expenditure (INR)	Health Expenditure as a % of GSDP	Epidemiological transition Level (ETL)
Andhra Pradesh	4.95	67	9.2	106638	5013	4.70%	609934	1013	0.82%	higher middle ETL
Arunachal Pradesh	0.13	65.4	34.7	11740	673	5.73%	20433	5177	3.29%	lower middle ETL
Assam	3.23	72.2	32	70428	4992	7.09%	226276	1546	2.21%	lowest ETL
Bihar	10.33	61.8	33.7	128706	5067	3.94%	381501	491	1.33%	lowest ETL
Chhattisgarh	2.57	70.3	39.9	65898	3480	5.28%	260776	1354	1.33%	lowest ETL
Goa	0.2	88.7	5.1	12010	729	6.07%	54275	3643	1.34%	Highest ETL
Gujarat	6.25	78	16.6	126821	7432	5.86%	1025188	1189	0.72%	lower middle ETL
Haryana	2.73	75.6	11.2	85037	3055	3.59%	485184	1119	0.63%	higher middle ETL
Himachal Pradesh	0.71	82.8	8.1	28373	1894	6.67%	112852	2667	1.68%	Highest ETL
Jharkhand	3.34	66.4	37	59995	2891	4.82%	231294	866	1.25%	lowest ETL
Karnataka	6.21	75.4	20.9	138715	6980	5.03%	1012804	1124	0.69%	higher middle ETL

Kerala	3.56	94	7.1	88960	5207	5.85%	557947	1463	0.93%	Highest ETL
Madhya Pradesh	7.73	69.3	31.6	132647	5535	4.17%	530443	716	1.04%	lowest ETL
Maharashtra	11.94	82.3	17.4	237327	12066	5.08%	2001223	1011	0.60%	higher middle ETL
Manipur	0.26	76.9	36.9	9841	536	5.45%	19233	2061	2.79%	lower middle ETL
Meghalaya	0.28	74.4	11.9	9253	623	6.73%	25967	2223	2.40%	lowest ETL
Mizoram	0.11	91.3	20.4	7731	645	8.34%	15339	5862	4.20%	lower middle ETL
Nagaland	0.24	79.6	18.9	10156	588	5.79%	19816	2450	2.97%	lower middle ETL
Odisha	4.23	72.9	32.6	81741	3921	4.80%	330874	927	1.19%	lowest ETL
Punjab	2.9	75.8	8.3	57963	3400	5.87%	391543	1173	0.87%	Highest ETL
Rajasthan	7.25	66.1	14.7	175589	9858	5.61%	683758	1360	1.44%	lowest ETL
Sikkim	0.06	81.4	8.2	5431	308	5.66%	16954	5126	1.81%	lower middle ETL
Tamil Nadu	6.92	80.1	11.3	171349	8543	4.99%	1161963	1235	0.74%	Highest ETL
Tripura	0.38	87.2	14	12537	829	6.62%	34368	2183	2.41%	lower middle ETL
Uttar Pradesh	21.64	67.7	29.4	312811	15872	5.07%	1119862	733	1.42%	lowest ETL
Uttarakhand	1.06	78.8	11.3	30799	1871	6.07%	175772	1765	1.06%	lower middle ETL
West Bengal	9.31	76.3	20	135929	7239	5.33%	-	778	-	higher middle ETL
Delhi	2.1	86.2	9.9	36520	4183	11.45%	548081	1992	0.76%	Higher- middle ETL
Jammu & Kashmir	1.24	67.2	10.3	49294	2925	5.93%	119093	2359	2.46%	
A & N Islands	0.05	86.6	1	-	310	-	5932	6201	5.23%	
Chandigarh	0.17	70.3	21.8	-	378	-	28643	2224	1.32%	

D & N Haveli	0.04	76.2	39.3	-	98	-	-	2451	-	Higher- middle ETL*
Daman and Diu	0.03	87.1	9.9	-	62	-	-	2073	-	
Lakshadweep	0.01	91.8	2.8	-	60	-	-	6018	-	
Puducherry	0.16	85.8	9.7	6062	534	8.82%	25060	3340	2.13%	

Data Source: National health profile 2020 and India and Health of the Nation's States 2016. *All Union-territories (except Delhi) were combined and reported Higher-middle ETL as per the India: Health of the Nation's States 2016 report.

Supplementary Table 3.2 Out of pocket health expenditure among those who sought care by type of provider across Indian states/UTs

States/UTs	Inpatient during last 365 days			Outpatient during last 30 days		
	Total OOPE (INR)	OOPE[+] (Public Provider) (INR)	OOPE[+] (Private Provider) (INR)	Total OOPE (INR) [+]	OOPE[+] (Public Provider) (INR)	OOPE[+] (Private Provider) (INR)
India	18460.65 [18133.73 - 18787.57]	4372.47 [4232.02 - 4512.92]	32244.1 [31638.14 - 32850.05]	2028.2 [1965.65 - 2090.75]	1154.45 [1054.25 - 1254.64]	2367.48 [2286.26 - 2448.71]
Assam	10743.16 [9315.19 - 12171.13]	4619.803 [4283.675 - 4955.93]	36201.45 [29845.27 - 42557.63]	2527.96 [2048.31 - 3007.61]	3180.43 [2330.8 - 4030.06]	2204.54 [1610.42 - 2798.66]
Bihar	9063.58 [8439.86 - 9687.31]	3205.881 [2913.05 - 3498.71]	18332.92 [17104.87 - 19560.97]	2206.69 [1921.44 - 2491.94]	1264.05 [655.87 - 1872.24]	2376.65 [2058.89 - 2694.41]
Jharkhand	14257.12 [12438.04 - 16076.19]	4522.102 [3269.59 - 5774.61]	28884.37 [25071.69 - 32697.06]	2223.07 [1899.03 - 2547.11]	946.71 [721.06 - 1172.36]	2683.81 [2254.21 - 3113.42]
Madhya Pradesh	12366.58 [11370.18 - 13362.98]	2189.681 [1910.543 - 2468.82]	30673.2 [28145.24 - 33201.17]	2393.42 [2101.64 - 2685.2]	1137.54 [908.23 - 1366.86]	2985.28 [2624.31 - 3346.24]
Odisha	13471.17 [12286.42 - 14655.92]	6128.134 [5615.54 - 6640.73]	35700.01 [31453.27 - 39946.76]	1596.52 [1481.88 - 1711.15]	1436.39 [1296.63 - 1576.14]	1750.33 [1554.99 - 1945.67]
Uttar Pradesh	20040.53 [18988.02 - 21093.04]	3892.55 [3300.57 - 4484.53]	33096.86 [31367.84 - 34825.87]	2528.4 [2223.01 - 2833.79]	2687.24 [1393.09 - 3981.4]	2478.66 [2200.27 - 2757.06]
Arunachal Pradesh	6727.126 [6143.62 - 7310.64]	5754.287 [5294.353 - 6214.22]	17280.07 [13355.14 - 21205]	4709.66 [3884.4 - 5534.92]	4679.9 [3822.54 - 5537.25]	3891.47 [2229.62 - 5553.32]
Gujarat	15546.71 [14350.73 - 16742.7]	2183.13 [1786.324 - 2579.936]	23005.15 [21250.62 - 24759.67]	1467.42 [1343.6 - 1591.24]	634.39 [480.23 - 788.55]	1739.16 [1587.2 - 1891.12]
Manipur	15892.13 [13758.01 - 18026.25]	9439.45 [8978.33 - 9900.58]	50186.72 [38084.09 - 62289.36]	3642.07 [2938.08 - 4346.05]	3850.01 [3013.12 - 4686.9]	2633.19 [1776.18 - 3490.19]
Nagaland	9522.31 [8470.66 - 10573.96]	6169.01 [5590.46 - 6747.56]	19703.31 [16430.37 - 22976.25]	2517.57 [1309.1 - 3726.03]	2319.71 [138.81 - 4500.62]	2663.35 [1628.84 - 3697.87]

Sikkim	9268.62 [8139.86 - 10397.37]	5480.32 [5029.75 - 5930.89]	25512.85 [20630.84 - 30394.85]	1704.36 [1365.52 - 2043.19]	1178.85 [863.26 - 1494.44]	2230.72 [1464.24 - 2997.2]
Tripura	8892.04 [7671.82 - 10112.27]	5540.05 [4994.21 - 6085.9]	49303.57 [36883.78 - 61723.36]	4435.91 [2402.81 - 6469.01]	1100.45 [860.81 - 1340.1]	5983.23 [2954.49 - 9011.98]
Uttarakhand	17179.47 [15190.61 - 19168.34]	3439.71 [3026.64 - 3852.77]	28923.92 [25405.18 - 32442.66]	1592.77 [1328.25 - 1857.29]	816.99 [584.89 - 1049.08]	1999.55 [1629.84 - 2369.26]
Haryana	20397.4 [18850.59 - 21944.22]	4478.2 [3721.02 - 5235.38]	30482.46 [28172.74 - 32792.18]	2024.67 [1782.67 - 2266.67]	1355.69 [830.07 - 1881.31]	2128.74 [1869.38 - 2388.1]
Jammu and Kashmir	9670.52 [8563.528 - 10777.51]	6780.84 [5836.34 - 7725.34]	42040.52 [35662.09 - 48418.95]	1148.09 [1037.65 - 1258.52]	1070.75 [931.16 - 1210.34]	1245.25 [1073.12 - 1417.37]
Karnataka	17560.41 [16426.42 - 18694.39]	4496.95 [4106.91 - 4887]	24219.74 [22567.66 - 25871.82]	1882.39 [1726.74 - 2038.04]	1094.54 [853.61 - 1335.47]	2109.35 [1923.11 - 2295.59]
Maharashtra	24577.61 [23223.19 - 25932.03]	5248.68 [3947.79 - 6549.58]	32728.05 [30928.31 - 34527.78]	1821.7 [1684.51 - 1958.89]	607.67 [499.76 - 715.58]	2212.18 [2037.64 - 2386.72]
West Bengal	17168.13 [15453.82 - 18882.44]	3955.29 [3673.96 - 4236.62]	44320.66 [40875.21 - 47766.11]	2019.75 [1781.89 - 2257.62]	989.18 [875.45 - 1102.9]	2452.31 [2106 - 2798.62]
Andaman and Nicobar Islands	27855.42 [20543.06 - 35167.78]	5334.55 [3265.76 - 7403.35]	119468 [92928.68 - 146007.3]	1000.69 [438.86 - 1562.51]	367.56 [294.24 - 440.88]	5608.04 [69.35 - 11146.74]
Daman and Diu	17063.66 [9126.197 - 25001.13]	1430.07 [1141.84 - 1718.3]	28782.53 [13516.86 - 44048.2]	1348.07 [822.55 - 1873.59]	348.45 [331.07 - 365.82]	1724.28 [1136.38 - 2312.17]
Delhi	18332.77 [14742.74 - 21922.8]	3950.78 [3019.39 - 4882.17]	38649.32 [31445.37 - 45853.27]	2183.35 [1680.52 - 2686.18]	1185.61 [769.53 - 1601.68]	3127.07 [2292.56 - 3961.57]
Lakshadweep	20929.34 [14971.65 - 26887.02]	2659.04 [1672.47 - 3645.6]	64416.67 [45142.59 - 83690.75]	1190.24 [409.42 - 1971.07]	677.26 [139.80 - 1214.72]	5540.96 [2132.26 - 8949.65]
Puducherry	19942.54 [11768.43 - 28116.65]	3056.49 [2185.73 - 3927.25]	62536.71 [36434.48 - 88638.94]	1583.91 [782.49 - 2385.33]	662.68 [201.01 - 1126.37]	2862.2 [1652.83 - 4071.58]
Himachal Pradesh	22361.01 [19491.61 - 25230.42]	13965.28 [11376.95 - 16553.61]	47900.16 [38561.77 - 57238.56]	2599.73 [2088.05 - 3111.41]	2886.96 [2146.61 - 3627.31]	2031.49 [1529.53 - 2533.44]
Punjab	28961.47 [26660.84 - 31262.1]	8208.3 [6800.77 - 9615.83]	39983.4 [36549.56 - 43417.25]	1856.95 [1563.63 - 2150.26]	1524.79 [976.72 - 2072.86]	1898.56 [1558.44 - 2238.68]

Tamil Nadu	20071.76 [18583.72 - 21559.79]	3092.15 [2944.43 - 3239.86]	38500.67 [35547.55 - 41453.79]	1767.88 [1548.07 - 1987.68]	444.79 [380.62 - 508.97]	3212.22 [2786.9 - 3637.53]
Low Health Insurance Coverage States	17738.61 [17377.92 - 18099.3]	4210.15 [4057.27 - 4363.03]	31892.49 [31220.9 - 32564.09]	2054.62 [1976.45 - 2132.79]	1218.93 [1085.63 - 1352.23]	2372.22 [2274.11 - 2470.33]
Rajasthan	14579.66 [13454.85 - 15704.48]	5686.63 [4705.26 - 6668.01]	28879.06 [26700.83 - 31057.28]	2529.15 [2278.66 - 2779.65]	1286.68 [1051.67 - 1521.69]	3368.25 [2975.07 - 3761.43]
Chandigarh	31028.7 [22317.08 - 39740.31]	14785.7 [7755.96 - 21815.43]	69665.87 [47058.31 - 92273.43]	4204.59 [1055.26 - 7353.92]	2409.37 [1873.66 - 2945.09]	6131.40 [439.90 - 11822.90]
Goa	18709.78 [14789.06 - 22630.5]	4318.83 [3291.37 - 5346.3]	35662.6 [25741.78 - 45583.42]	1322.65 [879.84 - 1765.46]	978.84 [763.49 - 1194.2]	1456.57 [762.56 - 2150.57]
Kerala	28210.99 [26172.93 - 30249.06]	7748.02 [6962.23 - 8533.82]	37947 [34857.75 - 41036.25]	2144.67 [1970.17 - 2319.17]	933.18 [821.38 - 1044.97]	2938.54 [2618.24 - 3258.83]
Medium Health Insurance Coverage States	21353.03 [20238.39 - 22467.67]	6429.54 [5760.51 - 7098.56]	34772.02 [32738.18 - 36805.87]	2280.85 [2134.18 - 2427.52]	1065.81 [964.79 - 1166.83]	3114.27 [2852.59 - 3375.95]
Chhattisgarh	18297.3 [14474.09 - 22120.5]	2565.93 [2197.45 - 2934.4]	51778.96 [40600.32 - 62957.59]	1149.68 [976.05 - 1323.3]	575.47 [443.92 - 707.02]	1585.51 [1296.49 - 1874.54]
Meghalaya	4646.69 [3754.51 - 5538.86]	2468.6 [2216.08 - 2721.12]	21081.67 [16218.86 - 25944.48]	1632.46 [648.12 - 2616.79]	2097.93 [1419.59 - 2776.28]	1114.63 [780.98 - 1448.28]
Mizoram	5761.07 [4737.44 - 6784.69]	4242.85 [3353.27 - 5132.42]	12791.39 [8901.347 - 16681.43]	2196.24 [1744.93 - 2647.55]	1943.97 [1327.99 - 2559.96]	2711.77 [2156.31 - 3267.23]
Dadra and Nagar Havel	5096.02 [2538.06 - 7653.98]	823.57 [574.26 - 1072.89]	16263.3 [7729.96 - 24796.65]	949.61 [493.56 - 1405.67]	164.31 [98.32 - 230.3]	1568.98 [832.36 - 2305.6]
Andhra Pradesh	20788.76 [19259.62 - 22317.91]	3091.41 [2709.17 - 3473.66]	27889.26 [25724.14 - 30054.38]	1672.38 [1545.77 - 1798.99]	962.16 [663.91 - 1260.42]	1850.59 [1706.22 - 1994.96]
Telangana	23921.13 [22487.55 - 25354.7]	3769.51 [3378.84 - 4160.18]	33359.38 [31413.01 - 35305.75]	1746.27 [1572.92 - 1919.62]	656.38 [513.61 - 799.15]	1988.01 [1782.12 - 2193.91]
High Health Insurance Coverage States	20654.54 [19610.7 – 21698.38]	3057.71 [2879.15 – 3236.27]	31940.73 [30108.44 – 33773.01]	1627.73 [1538.71 - 1716.74]	824.13 [669.45 - 978.81]	1858.97 [1750.74 - 1967.2]

[ ] represents confidence interval; [+] denotes OOPE of households who sought care from only private/public healthcare providers

Supplementary Table 3.3 Decomposition Analysis for Inequality in CHE Incidence

Covariates	Inpatient care			Outpatient care		
	CHE 10	**CHE 25**	**CHE 40**	**CHE 10**	**CHE 25**	**CHE 40**
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Health Insurance	-0.011*	-0.006	-0.004	-0.012	-0.004	-0.006
	(0.005)	(0.003)	(0.003)	(0.007)	(0.005)	(0.004)
Social Group						
Others group	Ref	Ref	Ref	Ref	Ref	Ref
Scheduled Tribes	0.042*	0.024 *	0.019 *	-0.011	0.025*	0.026*
	(0.007)	(0.005)	(0.004)	(0.009)	(0.007)	(0.005)
Scheduled Castes	0.007	0.001	0.001	-0.027*	-0.005	0.004
	(0.005)	(0.003)	(0.003)	(0.007)	(0.005)	(0.004)
Other Backward Classes	-0.006	-0.009*	-0.007*	-0.032*	-0.003	-0.002
	(0.004)	(0.003)	(0.002)	(0.006)	(0.004)	(0.003)
	-0.007	-0.003	0.001	-0.017*	-0.013*	-0.004
Urban Areas	(0.004)	(0.003)	(0.002)	(0.006)	(0.004)	(0.003)
Economic Quintiles						
Poorest	Ref	Ref	Ref	Ref	Ref	Ref
Poorer	0.022*	0.021*	0.019*	0.039*	0.034*	0.022*
	(0.005)	(0.004)	(0.003)	(0.007)	(0.005)	(0.004)
Middle	0.023*	0.022*	0.021*	0.038*	0.035*	0.023*
	(0.005)	(0.004)	(0.003)	(0.008)	(0.006)	(0.004)
Richer	0.014*	0.016*	0.018*	0.016*	0.025*	0.020*
	(0.005)	(0.004)	(0.003)	(0.008)	(0.006)	(0.004)
Richest	0.020*	0.023*	0.025*	0.014	0.027*	0.021*
	(0.006)	(0.004)	(0.003)	(0.008)	(0.006)	(0.005)
Education of Household Head						
not literate/no formal schooling ref	Ref	Ref	Ref	Ref	Ref	Ref
literate with formal schooling: below primary/primary	-0.006	-0.004	-0.003*	0.010	0.004	0.004
	(0.004)	(0.003)	(0.002)	(0.006)	(0.005)	(0.004)

upper primary/middle/secondary/up to secondary	-0.021* (0.004)	-0.013* (0.003)	-0.012* (0.002)	-0.016* (0.006)	-0.004 (0.004)	0.004 (0.004)
higher secondary	-0.033* (0.006)	-0.024* (0.004)	-0.017* (0.004)	-0.048* (0.009)	-0.027 (0.006)	-0.006 (0.005)
graduation and above	-0.043* (0.006)	-0.026* (0.004)	-0.021* (0.004)	-0.062* (0.009)	-0.036 (0.007)	-0.024* (0.005)
Household Size						
4 or less	Ref	Ref	Ref	Ref	Ref	Ref
5-8 members	0.012* (0.004)	0.005* (0.002)	0.005* (0.002)	-0.015* (0.005)	-0.0002 (0.004)	0.007* (0.003)
9 or more	-0.059* (0.009)	-0.018* (0.006)	-0.004 (0.005)	-0.063* (0.012)	-0.002 (0.009)	0.001 (0.007)
Female headed Household	-0.017* (0.005)	-0.012* (0.003)	-0.008* (0.003)	-0.003 (0.007)	-0.009 (0.005)	0.011* (0.004)
Occupation of Household						
self employed	Ref	Ref	Ref	Ref	Ref	Ref
regular wage	-0.013* (0 .005)	-0.008* (0.003)	-.004 (0.003)	-0.026* (0.006)	0.006 (0.005)	0.001 (0.004)
casual labour	0.001 (0.004)	0.001 (0.003)	0.0002 (0.002)	0.005 (0.006)	0.017 (0.004)	0.015* (0.003)
other	-0.003 (0.006)	0.008 (0.004)	0.011* (0.003)	0.043* (0.009)	0.062 (0.006)	0.032* (0.005)
Any elderly member in house	0.012* (0.004)	0.003 (0.003)	0.002 (0.002)	0.048* (0.005)	0.009 (0.004)	-0.004 (0.003)
Constant	-0.035 (0.018)	-0.025* (0.013)	-0.025* (0.010)	-0.080* (0.026)	-0.069 (0.019)	-0.053* (0.015)

Supplementary Table 3.4 Financial burden due to inpatient care by type of provider

States/UTs	Inpatient care							
	Public Health Facilities				Private Health Facilities			
	CHE 10 (%)	CHE 25 (%)	CHE 40 (%)	Impoverishment (%)	CHE 10 (%)	CHE 25 (%)	CHE 40 (%)	Impoverishment (%)
India	8.99 [8.71 - 9.26]	2.86 [2.7 - 3.02]	1.42 [1.31 - 1.53]	3.93 [3.75 - 4.12]	60.41 [59.91 - 60.91]	27.92 [27.46 - 28.38]	16.47 [16.09 - 16.85]	18.5 [18.1 - 18.9]
Assam	11.78 [10.36 - 13.19]	2.38 [1.71 - 3.05]	1.64 [1.08 - 2.2]	6.94 [5.82 - 8.05]	60.38 [56.33 - 64.43]	30.97 [27.14 - 34.8]	18.09 [14.9 - 21.28]	15.93 [12.9 - 18.96]
Bihar	6.79 [5.59 - 7.99]	0.8 [0.37 - 1.22]	0.57 [0.21 - 0.93]	5.31 [4.24 - 6.37]	63.47 [61.3 - 65.63]	22.36 [20.49 - 24.23]	11.48 [10.05 - 12.91]	20.83 [19 - 22.65]
Jharkhand	7.93 [6.29 - 9.57]	3.62 [2.49 - 4.75]	1.82 [1.01 - 2.63]	3.71 [2.57 - 4.86]	53.03 [49.75 - 56.3]	24.66 [21.83 - 27.49]	13.81 [11.55 - 16.08]	17.21 [14.73 - 19.69]
Madhya Pradesh	3.72 [2.97 - 4.47]	1.41 [0.95 - 1.88]	0.54 [0.25 - 0.83]	2.09 [1.53 - 2.66]	62.25 [59.74 - 64.77]	31.86 [29.44 - 34.28]	23.81 [21.6 - 26.02]	23.76 [21.55 - 25.96]
Odisha	26.56 [24.72 - 28.39]	8.61 [7.44 - 9.77]	3.97 [3.16 - 4.78]	9.19 [7.99 - 10.39]	79.54 [76.61 - 82.48]	48.8 [45.17 - 52.43]	34.13 [30.68 - 37.57]	27.21 [23.97 - 30.44]
Uttar Pradesh	6.95 [6.02 - 7.89]	3.19 [2.55 - 3.84]	2.15 [1.62 - 2.68]	3.97 [3.25 - 4.69]	67.45 [66.06 - 68.84]	34.52 [33.11 - 35.93]	19.08 [17.92 - 20.24]	21.89 [20.67 - 23.12]
Arunachal Pradesh	25.83 [22.83 - 28.83]	4.78 [3.32 - 6.24]	2.93 [1.78 - 4.09]	5.42 [3.87 - 6.97]	62.8 [52.71 - 72.9]	18.22 [10.16 - 26.29]	4.6 [0.23 - 8.98]	14.74 [7.34 - 22.15]
Gujarat	1.82 [0.98 - 2.66]	0.38 [0.01 - 0.75]	0.31 [0.04 - 0.58]	2.64 [1.63 - 3.65]	36.18 [34.08 - 38.29]	13.18 [11.7 - 14.66]	7.16 [6.03 - 8.29]	9.77 [8.47 - 11.07]
Manipur	30.77 [28.47 - 33.07]	6.4 [5.18 - 7.62]	2.08 [1.37 - 2.79]	7.61 [6.29 - 8.93]	79.81 [75.49 - 84.13]	38.63 [33.39 - 43.87]	22.93 [18.41 - 27.45]	22.03 [17.57 - 26.48]
Nagaland	13.33 [10.53 - 16.13]	1.88 [0.76 - 3]	1.42 [0.45 - 2.4]	8.47 [6.18 - 10.77]	44.66 [38.22 - 51.1]	14.1 [9.59 - 18.61]	9.75 [5.91 - 13.59]	11.03 [6.97 - 15.09]
Sikkim	12.18 [9.28 - 15.08]	0.87 [0.04 - 1.69]	0.12 [0.09 - 0.15]	7.53 [5.19 - 9.87]	70.43 [61.57 - 79.29]	25.85 [17.35 - 34.35]	5.9 [1.33 - 10.47]	27.32 [18.67 - 35.97]
Tripura	10.78 [9.11 - 12.45]	2.54 [1.69 - 3.39]	1.24 [0.65 - 1.84]	2.77 [1.88 - 3.65]	82.32 [75.35 - 89.29]	42.22 [33.2 - 51.25]	17.14 [10.25 - 24.03]	17.26 [10.35 - 24.17]
Uttarakhand	3.64 [2.05 - 5.22]	0.48 [0.11 - 0.85]	0 [0 - 0]	4.95 [3.11 - 6.78]	52.85 [48.82 - 56.87]	22.19 [18.84 - 25.54]	9.91 [7.5 - 12.32]	13.57 [10.81 - 16.33]
Haryana	4.22 [2.81 - 5.63]	1.09 [0.37 - 1.82]	0.36 [0.06 - 0.66]	1.04 [0.33 - 1.75]	51.55 [48.79 - 54.32]	18.52 [16.37 - 20.67]	11.9 [10.11 - 13.69]	14.49 [12.55 - 16.44]

Jammu and Kashmir	11.73 [10.37 - 13.1]	2.61 [1.93 - 3.28]	1.28 [0.81 - 1.76]	3.6 [2.81 - 4.39]	73.88 [68.2 - 79.56]	22.15 [16.78 - 27.52]	11.34 [7.24 - 15.43]	10.52 [6.55 - 14.48]
Karnataka	8.73 [7.08 - 10.38]	2.87 [1.9 - 3.85]	0.99 [0.41 - 1.56]	4.75 [3.5 - 6]	53.37 [51.33 - 55.41]	21.16 [19.49 - 22.83]	10.31 [9.07 - 11.55]	14.46 [13.02 - 15.9]
Maharashtra	10.4 [9.02 - 11.78]	4.16 [3.26 - 5.07]	1.06 [0.6 - 1.52]	3.42 [2.6 - 4.25]	58.62 [57.15 - 60.08]	26.19 [24.88 - 27.5]	16.14 [15.05 - 17.24]	18.51 [17.36 - 19.67]
West Bengal	9.28 [8.29 - 10.27]	2.61 [2.06 - 3.15]	1.1 [0.75 - 1.46]	3.86 [3.21 - 4.52]	73.04 [70.78 - 75.3]	38.57 [36.09 - 41.05]	24.01 [21.84 - 26.19]	25.17 [22.96 - 27.38]
Andaman and Nicobar Islands	3.93 [1.87 - 5.98]	1.18 [0.04 - 2.32]	1.18 [0.04 - 2.32]	1.1 [0 - 2.21]	86.05 [77.43 - 94.68]	66.06 [54.28 - 77.85]	35.36 [23.46 - 47.26]	27.64 [16.51 - 38.78]
Daman and Diu	0 [0 - 0]	0 [0 - 0]	0 [0 - 0]	0 [0 - 0]	33.61 [18.78 - 48.43]	12.43 [2.07 - 22.78]	6.05 [1.43 - 10.67]	4.39 [2.04 - 6.74]
Delhi	4.43 [2.55 - 6.32]	1.03 [0.11 - 1.96]	0.94 [0.06 - 1.83]	2.16 [0.82 - 3.49]	48.6 [44.09 - 53.12]	14.78 [11.58 - 17.99]	5.83 [3.72 - 7.95]	5.16 [3.16 - 7.16]
Lakshadweep	1.19 [0.99 - 1.39]	0 [0 - 0]	0 [0 - 0]	0.42 [0.08 - 0.76]	93.11 [83.18 - 103.04]	43.01 [23.6 - 62.42]	29.3 [11.46 - 47.14]	16.35 [1.85 - 30.85]
Puducherry	2.3 [0.55 - 4.05]	0.82 [0.24 - 1.40]	0.82 [0.24 - 1.40]	2.26 [0.52 - 4]	70.04 [62.19 - 77.88]	38.15 [29.83 - 46.47]	23.26 [16.03 - 30.5]	24.84 [17.44 - 32.24]
Himachal Pradesh	23.61 [21.12 - 26.1]	9.06 [7.38 - 10.75]	4.88 [3.61 - 6.15]	5.90 [4.52 - 7.28]	66.64 [61.34 - 71.93]	31.58 [26.37 - 36.8]	20.68 [16.13 - 25.22]	20.11 [15.61 - 24.6]
Punjab	13.33 [11.07 - 15.6]	3.71 [2.45 - 4.97]	2.47 [1.43 - 3.5]	3.92 [2.63 - 5.21]	49.34 [46.83 - 51.84]	21.99 [19.91 - 24.06]	15.27 [13.47 - 17.07]	15.92 [14.09 - 17.75]
Tamil Nadu	4.99 [4.14 - 5.84]	0.91 [0.54 - 1.28]	0.42 [0.17 - 0.68]	1.40 [0.94 - 1.86]	66.57 [64.63 - 68.51]	33.27 [31.33 - 35.21]	20.16 [18.51 - 21.81]	19.24 [17.62 - 20.86]
Low Health Insurance Coverage States	9.04 [8.73 - 9.34]	2.80 [2.62 - 2.98]	1.38 [1.26 - 1.51]	4.04 [3.82 - 4.25]	60.18 [59.6 - 60.75]	27.9 [27.37 - 28.43]	16.47 [16.04 - 16.91]	18.79 [18.33 - 19.25]
Rajasthan	7.06 [5.94 - 8.18]	2.83 [2.11 - 3.56]	2.04 [1.43 - 2.66]	3.77 [2.94 - 4.6]	52.87 [50.29 - 55.45]	23.12 [20.94 - 25.3]	15.18 [13.32 - 17.03]	17.86 [15.88 - 19.84]
Chandigarh	9.49 [5.08 - 13.89]	3.71 [0.87 - 6.56]	1.91 [0.15 - 3.67]	4.2 [1.18 - 7.21]	47.71 [35.08 - 60.35]	29.37 [17.84 - 40.89]	17.14 [7.61 - 26.68]	6.52 [0.27 - 12.76]
Goa	4.02 [1.38 - 6.66]	0.76 [0.14 - 1.38]	0.56 [0.14 - 0.98]	2.55 [0.43 - 4.66]	54.42 [44.19 - 64.65]	14.95 [7.62 - 22.28]	9.01 [3.13 - 14.89]	8.83 [3.00 - 14.66]
Kerala	15.27 [13.03 - 17.51]	5.53 [4.1 - 6.96]	2.36 [1.41 - 3.31]	3.02 [1.95 - 4.09]	58.44 [56.31 - 60.56]	26.55 [24.64 - 28.46]	15.99 [14.4 - 17.57]	14.36 [12.85 - 15.88]
Medium Health Insurance Coverage States	9.81 [8.81 - 10.81]	3.72 [3.08 - 4.36]	2.13 [1.64 - 2.61]	27.6 [26.09 - 29.1]	56.39 [54.78 - 57.99]	25.25 [23.84 - 26.66]	15.65 [14.47 - 16.83]	15.56 [14.38 - 16.73]

|								
Chhattisgarh	8.99 [7.44 - 10.54]	2.56 [1.7 - 3.42]	1.36 [0.73 - 1.99]	3.57 [2.57 - 4.58]	69 [65.64 - 72.36]	45.59 [41.97 - 49.2]	30.06 [26.73 - 33.39]	21.72 [18.73 - 24.72]
Meghalaya	0.52 [0.02 - 1.02]	0.2 [0.04 - 0.36]	0 [0 - 0]	1.39 [0.51 - 2.28]	38.7 [31.6 - 45.8]	13.42 [8.46 - 18.39]	4.13 [1.23 - 7.03]	8.83 [4.69 - 12.96]
Mizoram	3.74 [2.49 - 4.98]	0.96 [0.32 - 1.6]	0.69 [0.15 - 1.24]	1.19 [0.48 - 1.91]	16.78 [11.66 - 21.89]	3.87 [1.23 - 6.51]	2.05 [0.11 - 3.99]	1.77 [0.03 - 3.51]
Dadra and Nagar Haveli	0.97 [0.09 - 1.85]	0.05 [0.03 - 0.07]	0.05 [0.03 - 0.07]	1.06 [0.09 - 2.00]	33.73 [18.29 - 49.18]	5.00 [2.12 - 7.88]	5 [2.12 – 7.88]	6.84 [1.41 – 12.27]
Andhra Pradesh	7.12 [5.41 - 8.84]	1.14 [0.43 - 1.85]	0.79 [0.2 - 1.38]	2.02 [1.08 - 2.96]	64.98 [62.93 - 67.02]	28.62 [26.69 - 30.56]	15.65 [14.09 - 17.21]	19.31 [17.62 - 21.01]
Telangana	7.12 [5.33 - 8.9]	3.94 [2.59 - 5.3]	0.04 [0.01 - 0.07]	6.48 [4.77 - 8.19]	66.74 [64.58 - 68.9]	30.09 [27.99 - 32.19]	16.54 [14.84 - 18.25]	19.72 [17.9 - 21.54]
High Health Insurance Coverage States	7.27 [6.52 - 8.01]	2.18 [1.76 - 2.6]	0.75 [0.5 - 1]	35.81 [34.43 - 37.19]	65.66 [64.35 - 66.97]	30.61 [29.34 - 31.88]	17.26 [16.22 - 18.3]	19.57 [18.48 - 20.67]

Value in [] represents 95% confidence interval

Supplementary Table 3.5 Financial burden due to outpatient care by type of healthcare provider

States/UTs	Outpatient care							
	Public Health Facilities				Private Health Facilities			
	CHE 10 (%)	CHE 25 (%)	CHE 40 (%)	Impoverishment (%)	CHE 10 (%)	CHE 25 (%)	CHE 40 (%)	Impoverishment (%)
India	36.85 [35.83 - 37.87]	16.11 [15.34 - 16.89]	9.46 [8.84 - 10.08]	12.13 [11.44 - 12.81]	57.86 [57.13 - 58.59]	29.46 [28.78 - 30.13]	18 [17.43 - 18.57]	18.86 [18.28 - 19.44]
Assam	72.72 [63.72 - 81.73]	39.26 [29.39 - 49.14]	34.37 [24.77 - 43.98]	52.14 [42.04 - 62.24]	56.59 [49.18 - 63.99]	21.51 [15.37 - 27.65]	18.58 [12.77 - 24.4]	14.13 [8.92 - 19.34]
Bihar	52.34 [41.11 - 63.57]	21.1 [11.93 - 30.28]	7.43 [1.53 - 13.32]	20.6 [11.5 - 29.69]	68.6 [63.96 - 73.23]	39.05 [34.18 - 43.92]	24.81 [20.5 - 29.13]	27.84 [23.36 - 32.31]
Jharkhand	47.94 [40.15 - 55.73]	24.69 [17.97 - 31.42]	9.12 [4.63 - 13.61]	13.44 [8.13 - 18.76]	77.96 [74.24 - 81.68]	42 [37.58 - 46.43]	24.54 [20.68 - 28.41]	21.34 [17.67 - 25.02]
Madhya Pradesh	44.35 [38.47 - 50.23]	21.3 [16.46 - 26.15]	13.66 [9.59 - 17.73]	11.07 [7.35 - 14.78]	70.65 [67.21 - 74.09]	39.96 [36.26 - 43.66]	22.59 [19.43 - 25.75]	25.37 [22.08 - 28.65]
Odisha	70.36 [66.63 - 74.09]	37.24 [33.29 - 41.19]	23.9 [20.41 - 27.39]	15.65 [12.68 - 18.62]	81.28 [77.52 - 85.04]	55.77 [50.98 - 60.57]	31.75 [27.26 - 36.24]	26.96 [22.68 - 31.24]
Uttar Pradesh	57.23 [52.9 - 61.57]	30.94 [26.88 - 34.99]	16.34 [13.1 - 19.58]	26.29 [22.43 - 30.15]	59.91 [57.95 - 61.86]	31.97 [30.11 - 33.82]	20.76 [19.15 - 22.38]	22.97 [21.29 - 24.64]
Arunachal Pradesh	68.7 [61.79 - 75.61]	56.76 [49.38 - 64.15]	49.31 [41.86 - 56.76]	29.68 [22.87 - 36.49]	68.15 [40.62 - 95.69]	68.15 [40.62 - 95.69]	54.54 [25.11 - 83.96]	9.71 [0.79 - 18.63]
Gujarat	23.43 [17.67 - 29.18]	5.84 [2.65 - 9.03]	4.89 [1.96 - 7.82]	7.47 [3.9 - 11.04]	42.72 [39.05 - 46.39]	14.91 [12.27 - 17.55]	9.50 [7.33 - 11.68]	8.90 [6.79 - 11.01]
Manipur	87.43 [80.54 - 94.32]	56.04 [45.73 - 66.35]	39.15 [29.01 - 49.29]	9.81 [3.63 - 15.99]	93.26 [81.98 - 104.53]	34.45 [13.08 - 55.82]	20.71 [2.49 - 38.93]	8.45 [0.06 - 16.84]
Nagaland	17.16 [6.21 - 28.11]	14.75 [3.80 - 18.55]	14.75 [3.80 - 25.7]	2.02 [0.07 – 3.97]	97.65 [84.36 - 110.93]	65.84 [24.27 - 107.41]	1.14 [0.16 - 2.12]	1.14 [0.16 - 2.12]
Sikkim	35.36 [25.37 - 45.35]	8.18 [2.45 - 13.9]	3.04 [-0.55 - 6.63]	17.23 [9.34 - 25.12]	74.32 [58.14 - 90.5]	46.15 [27.68 - 64.61]	1.28 [0.88 - 1.68]	2.07 [1.67 - 2.47]
Tripura	51.6 [38.02 - 65.19]	17.09 [6.86 - 27.32]	9.26 [1.38 - 17.14]	8.72 [1.05 - 16.39]	82.86 [75.29 - 90.44]	59.47 [49.6 - 69.35]	33.46 [23.97 - 42.95]	22.58 [14.17 - 30.99]
Uttarakhand	36.93 [26.42 - 47.44]	13.19 [5.82 - 20.56]	1.20 [0.17 – 2.23]	19.83 [11.15 - 28.52]	57.31 [49.59 - 65.02]	14.89 [9.34 - 20.44]	5.17 [1.72 - 8.63]	3.66 [0.73 - 6.59]

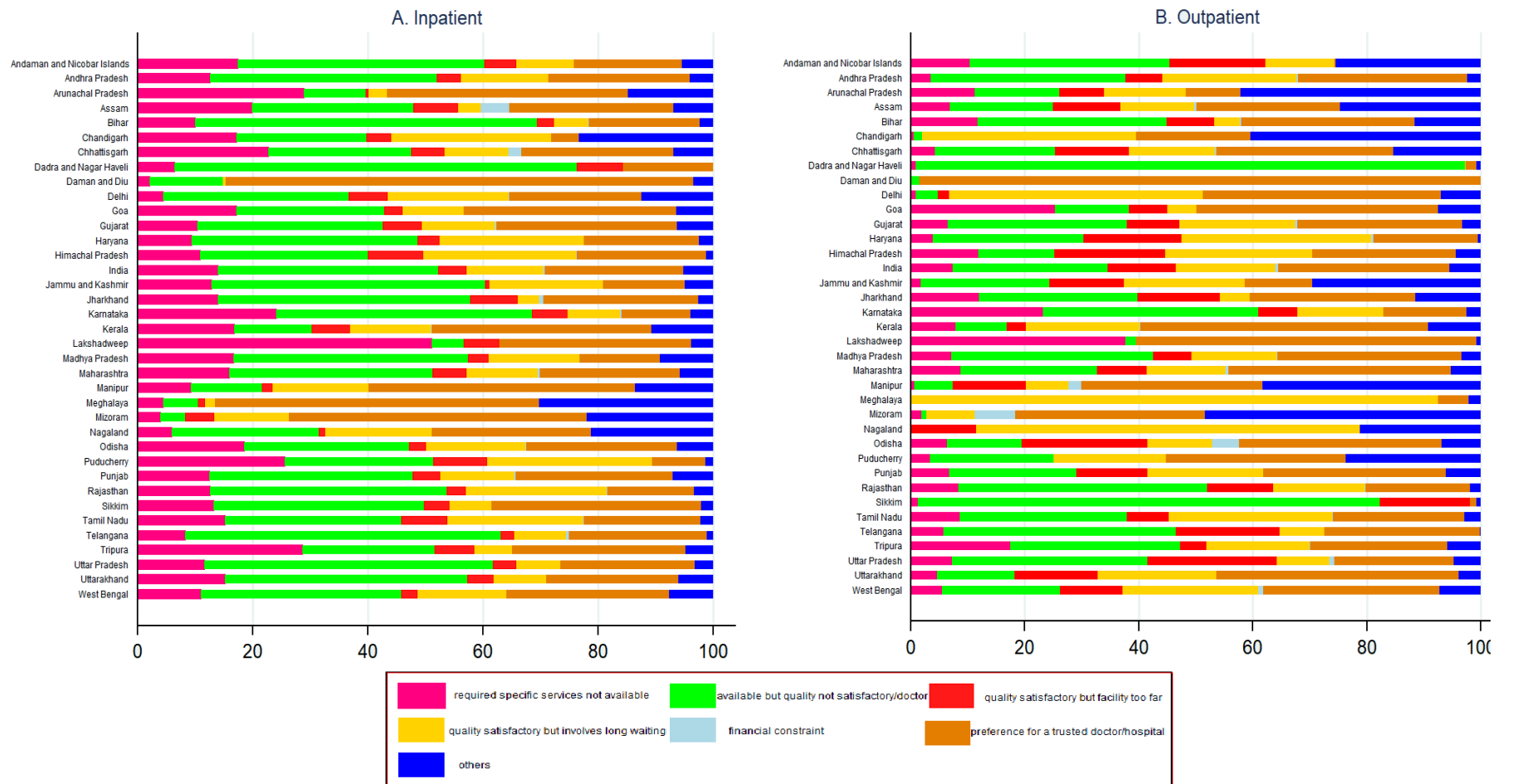|								
Haryana	31.1 [23.26 - 38.94]	6.66 [2.44 - 10.88]	2.4 [0.19 - 4.61]	9.51 [4.55 - 14.48]	53.15 [49.09 - 57.22]	19.2 [16 - 22.41]	12.01 [9.36 - 14.66]	16.4 [13.38 - 19.42]
Jammu and Kashmir	46.26 [42.29 - 50.23]	8.92 [6.65 - 11.19]	3.4 [1.96 - 4.84]	10.15 [7.75 - 12.56]	42.15 [36.62 - 47.67]	8.99 [5.79 - 12.19]	4.15 [1.92 - 6.39]	5.73 [3.13 - 8.33]
Karnataka	38.84 [31.77 - 45.9]	22.19 [16.17 - 28.21]	16.73 [11.32 - 22.14]	14.23 [9.16 - 19.29]	66.05 [62.07 - 70.03]	29.47 [25.64 - 33.3]	16.46 [13.34 - 19.57]	17.91 [14.69 - 21.13]
Maharashtra	20.6 [17.2 - 23.99]	6.07 [4.07 - 8.07]	4.16 [2.48 - 5.83]	3.19 [1.72 - 4.66]	49.99 [47.83 - 52.14]	24.52 [22.66 - 26.37]	15.65 [14.08 - 17.22]	15.16 [13.61 - 16.71]
West Bengal	41.19 [37.76 - 44.62]	14.57 [12.11 - 17.03]	8.60 [6.64 - 10.55]	15.00 [12.51 - 17.49]	60.2 [58 - 62.39]	28.88 [26.84 - 30.91]	16.16 [14.5 - 17.81]	19.32 [17.54 - 21.09]
Andaman and Nicobar Islands	0.97 [0.77 - 1.17]	0.04 [0.02 - 0.06]			53.62 [24.14 - 83.09]	14.25 [6.41 - 22.09]	13.89 [6.55 - 21.23]	12.26 [7.12 -17.4]
Daman and Diu	98.01 [78.66 - 117.36]				97.62 [89.34 - 105.9]	2.71 [0.12 - 5.30]	1.44 [0.03 - 2.85]	0.67 [0.05 - 1.29]
Delhi	34.86 [25.43 - 44.3]	5.12 [0.75 - 9.48]	4.36 [0.32 - 8.4]	4.77 [0.55 - 8.99]	36.56 [28.22 - 44.91]	24.95 [17.45 - 32.44]	20.06 [13.12 - 27]	19.01 [12.21 - 25.81]
Lakshadweep	3.64 [0.6 - 6.68]	2.62 [0.99 - 4.25]	2.62 [0.99 - 4.25]	2.35 [1.08 - 3.62]	64.04 [34.3 - 93.79]	40.02 [9.65 - 70.39]	36.97 [7.05 - 66.89]	25.42 [1.57 - 49.27]
Puducherry	6.96 [3.22 - 10.70]	4.49 [3.8 - 5.18]	3.6 [0.85 - 6.35]	4.96 [3.73 - 6.19]	54.02 [37.02 - 71.03]	13.95 [2.13 - 25.77]	10.71 [0.16 - 21.26]	7.59 [1.45 - 13.29]
Himachal Pradesh	52.77 [47.98 - 57.56]	31.84 [27.38 - 36.31]	17.17 [13.56 - 20.79]	22.07 [18.09 - 26.04]	51.26 [44.77 - 57.75]	25.99 [20.3 - 31.69]	15.83 [11.09 - 20.56]	14.99 [10.36 - 19.62]
Punjab	36.07 [28.58 - 43.56]	19.1 [12.97 - 25.23]	9.17 [4.67 - 13.68]	11.53 [6.55 - 16.51]	36.52 [33.46 - 39.57]	15.19 [12.91 - 17.46]	7.2 [5.56 - 8.84]	10.57 [8.62 - 12.52]
Tamil Nadu	15.56 [12.88 - 18.24]	4.68 [3.12 - 6.24]	2.81 [1.59 - 4.03]	6.11 [4.34 - 7.88]	69.35 [66.27 - 72.43]	41.28 [37.99 - 44.57]	26.05 [23.11 - 28.98]	29.09 [26.06 - 32.13]
Low Health Insurance Coverage States	39.98 [38.77 - 41.19]	17.4 [16.46 - 18.34]	10.39 [9.64 - 11.15]	13.12 [12.28 - 13.95]	58.16 [57.32 - 59]	29.56 [28.78 - 30.33]	18.05 [17.39 - 18.7]	19.47 [18.8 - 20.15]
Rajasthan	32.84 [28.32 - 37.35]	16.95 [13.35 - 20.56]	8.35 [5.69 - 11]	16.58 [13.01 - 20.16]	62.85 [58.94 - 66.76]	37.99 [34.06 - 41.92]	23.78 [20.33 - 27.22]	22.43 [19.06 - 25.81]
Chandigarh	49.74 [35.88 - 63.6]	31.76 [18.85 - 44.66]	1.54 [0.87 - 2.21]	19.65 [8.64 - 30.67]	36.83 [23.18 - 50.47]	11.53 [2.49 - 20.57]	2.66 [1.89 - 3.43]	2.25 [1.95 - 2.55]
Goa	30.99 [21.64 - 40.34]	1.92 [0.85 - 2.99]	1.8 [0.89 - 2.71]	3.15 [0.38 - 5.92]	31.82 [20.04 - 43.61]	8.00 [1.13 - 14.86]	2.20 [1.51 - 2.89]	2.57 [1.43 - 3.71]

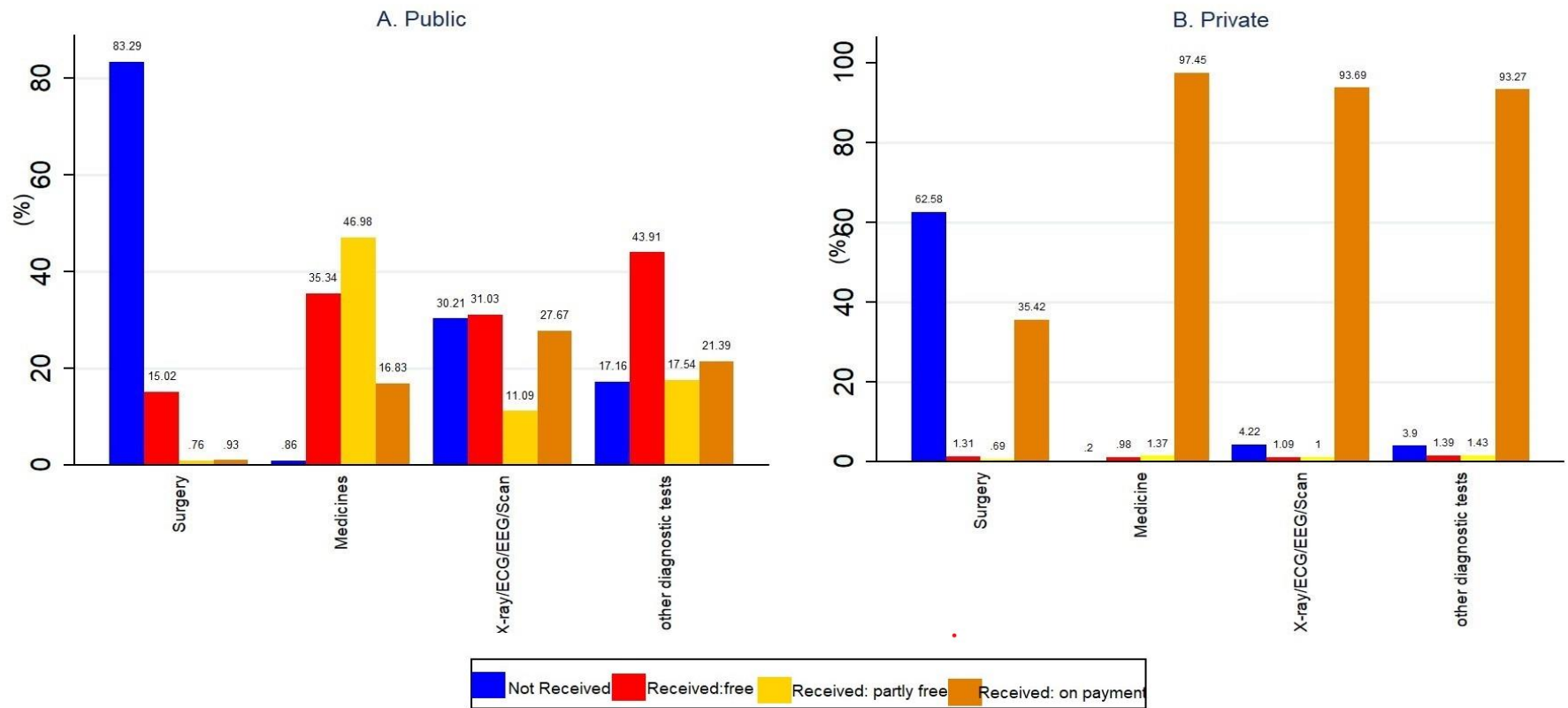|								
Kerala	27.65 [24.91 - 30.38]	10.13 [8.28 - 11.97]	5.74 [4.32 - 7.17]	6.35 [4.85 - 7.84]	57.66 [55.03 - 60.29]	29.27 [26.85 - 31.7]	17.94 [15.89 - 19.98]	13.1 [11.3 - 14.9]
Medium Health Insurance Coverage States	29.63 [27.39 - 31.88]	12.49 [10.87 - 14.12]	6.49 [5.28 - 7.7]	9.78 [8.32 - 11.24]	59.13 [57 - 61.26]	32.08 [30.06 - 34.1]	19.78 [18.05 - 21.5]	16.28 [14.69 - 17.88]
Chhattisgarh	28.26 [22.08 - 34.44]	11.44 [7.07 - 15.81]	7.74 [4.07 - 11.4]	5.73 [2.54 - 8.92]	62.31 [56.68 - 67.94]	32.75 [27.3 - 38.2]	19.38 [14.79 - 23.97]	16.58 [12.26 - 20.9]
Meghalaya	89.08 [67.47 - 110.7]	58.99 [24.9 - 93.08]	0 [0 - 0]	56.14 [21.75 - 90.53]	37.85 [4.24 - 71.46]	5.56 [0.32 - 10.80]	2.92 [0.75 - 5.09]	5.56 [0.32 - 10.80]
Mizoram	44.98 [35.08 - 54.88]	26.14 [17.39 - 34.88]	16.6 [9.19 - 24]	3.11 [0.35 - 5.87]	58.65 [45.13 - 72.16]	19.62 [8.72 - 30.52]	6.02 [0.51 - 11.53]	6.26 [0.39 - 12.13]
Dadra and Nagar Haveli	0 [0 - 0]	0 [0 - 0]	0 [0 - 0]	1.16 [0.26 - 2.06]	53.96 [28.73 - 79.18]	3.62 [0.83 - 6.41]	1.33 [0.46 - 2.22]	0.47 [0.09 - 0.85]
Andhra Pradesh	25.96 [21.23 - 30.69]	13.53 [9.84 - 17.22]	8.36 [5.37 - 11.34]	8.47 [5.46 - 11.47]	56.05 [53.31 - 58.78]	29.03 [26.53 - 31.53]	17.63 [15.53 - 19.73]	17.5 [15.41 - 19.6]
Telangana	20.68 [13.01 - 28.36]	10.25 [4.51 - 16]	4.47 [0.55 - 8.38]	12.17 [5.98 - 18.37]	50.42 [46.18 - 54.65]	19.48 [16.13 - 22.83]	12.56 [9.75 - 15.37]	15.68 [12.6 - 18.76]
High Health Insurance Coverage States	25.66 [22.57 - 28.75]	12.59 [10.24 - 14.94]	7.46 [5.6 - 9.32]	8.67 [6.67 - 10.66]	55.31 [53.22 - 57.4]	27.17 [25.3 - 29.05]	16.61 [15.05 - 18.18]	16.98 [15.4 - 18.56]

Value in [] represents 95% confidence interval
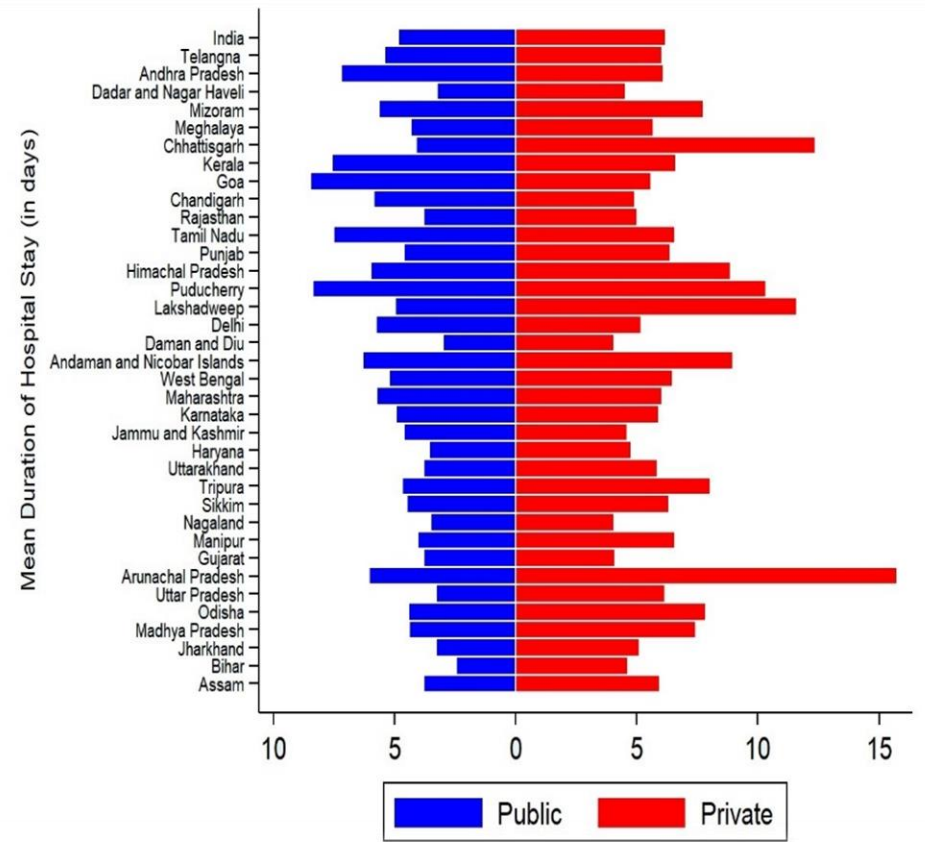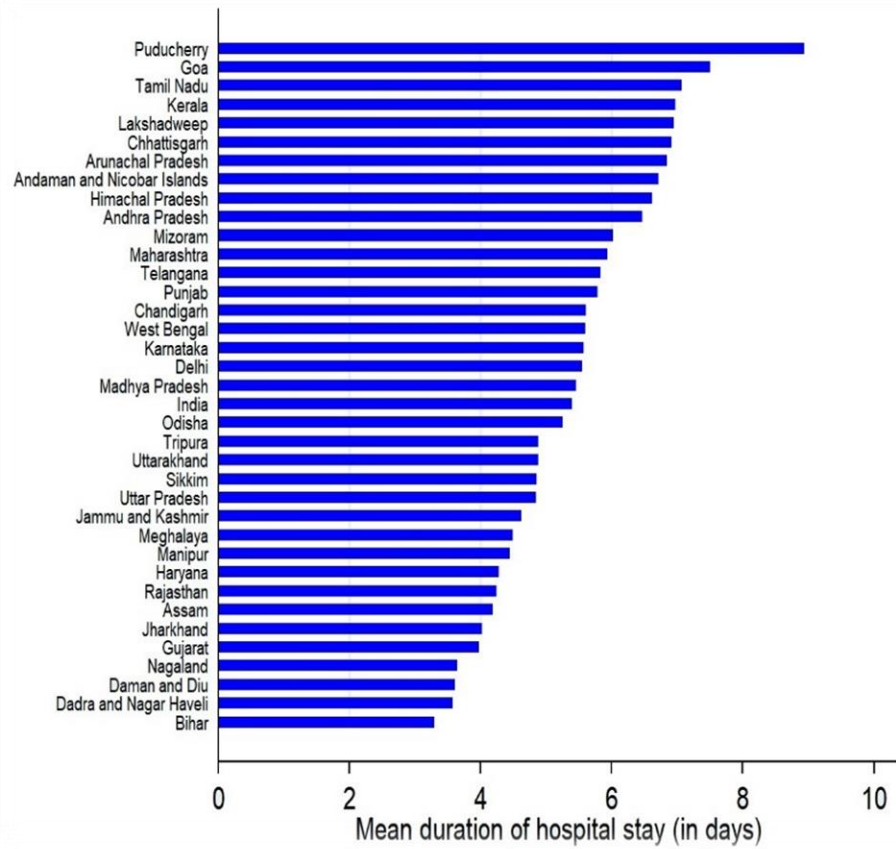
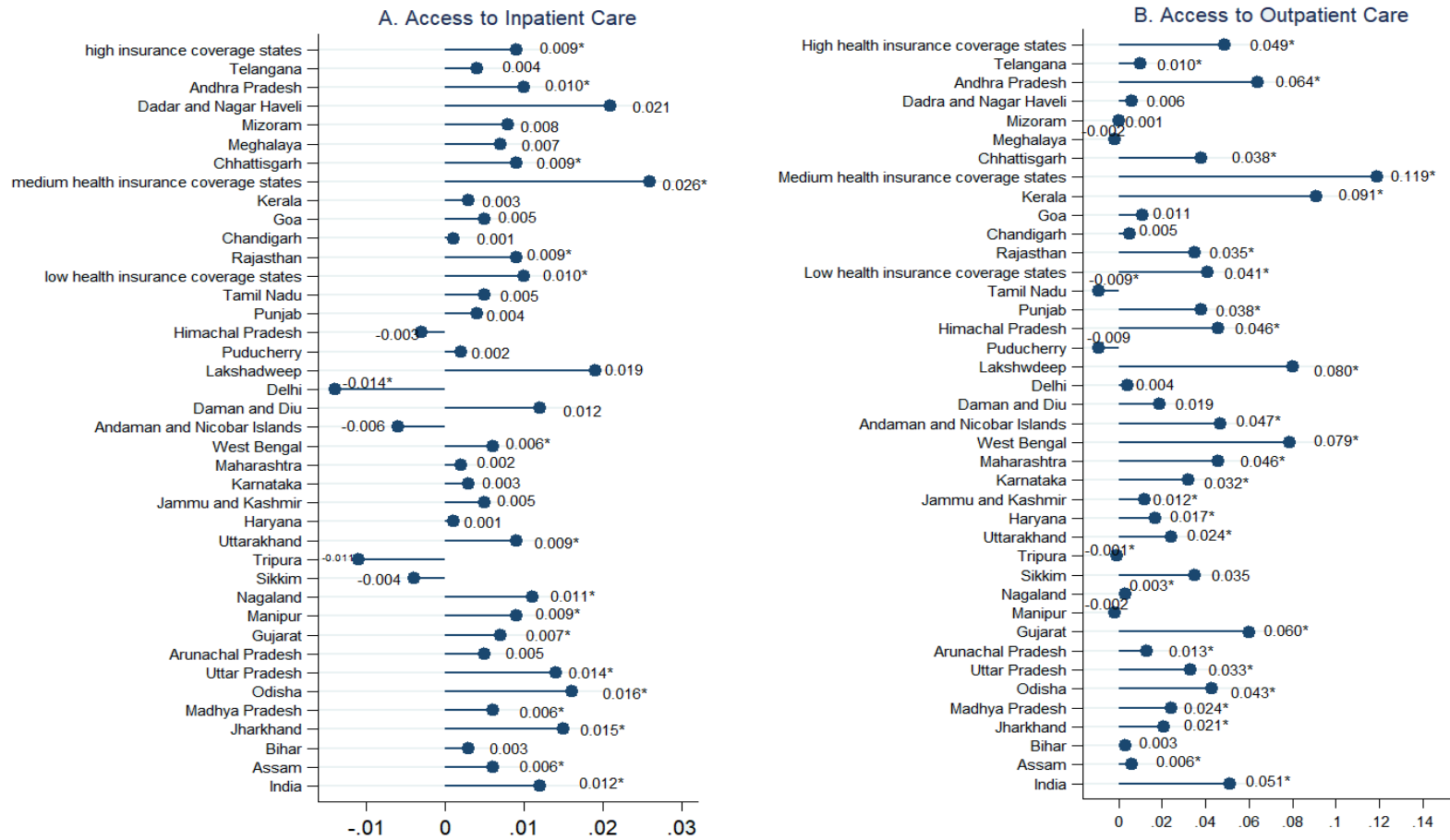**Supplementary Figure 3.1 Mean duration of hospitalization**

Supplementary Figure 3.2 Reasons for not choosing public facilities by type of care

A. Public

B. Private

Legend: Not Received | Received:free | Received: partly free | Received: on payment

Supplementary Figure 3.3 Healthcare services received/not received and break-up by payment category across type of provider in inpatient care
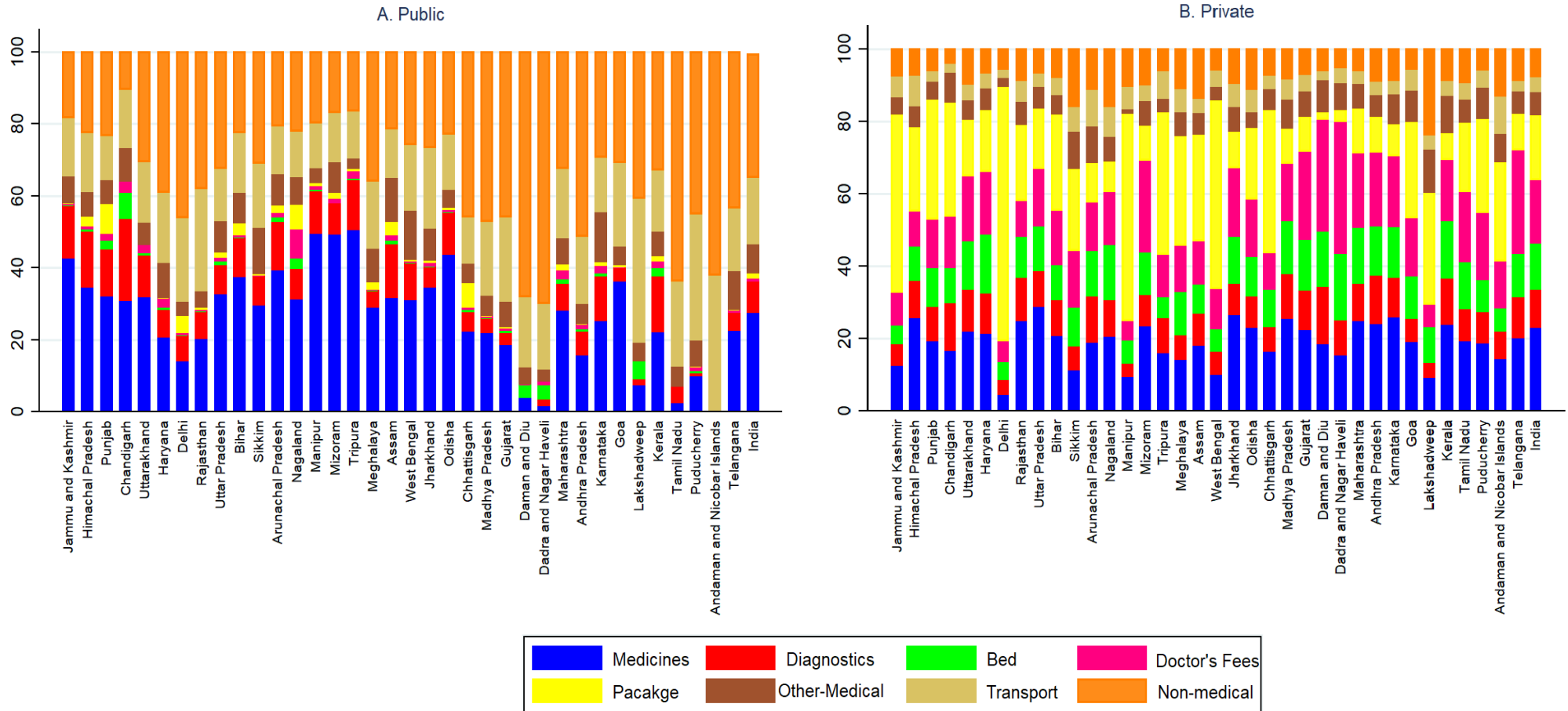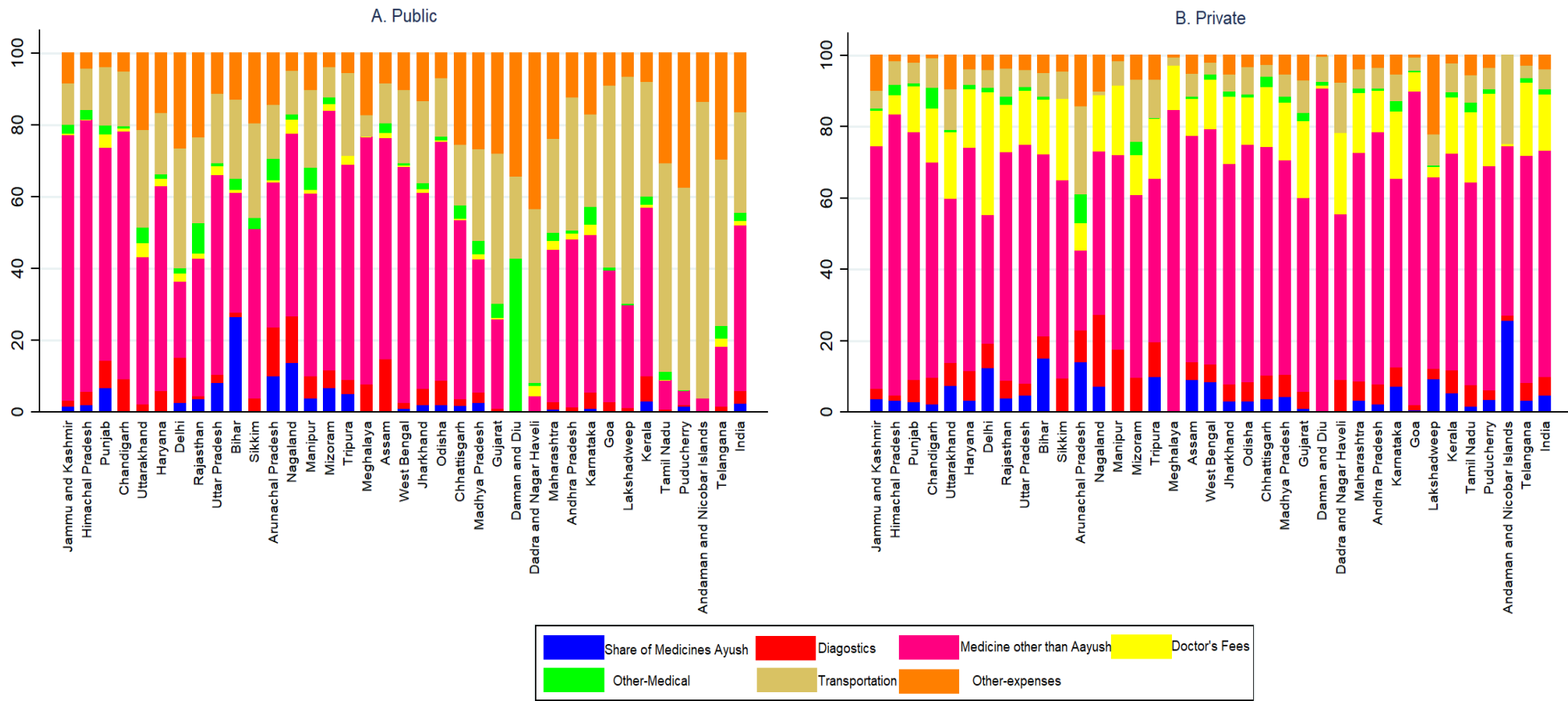
A. Public

B. Private

Legend: Not Received | Received: free | Received: partly free | Received: on payment
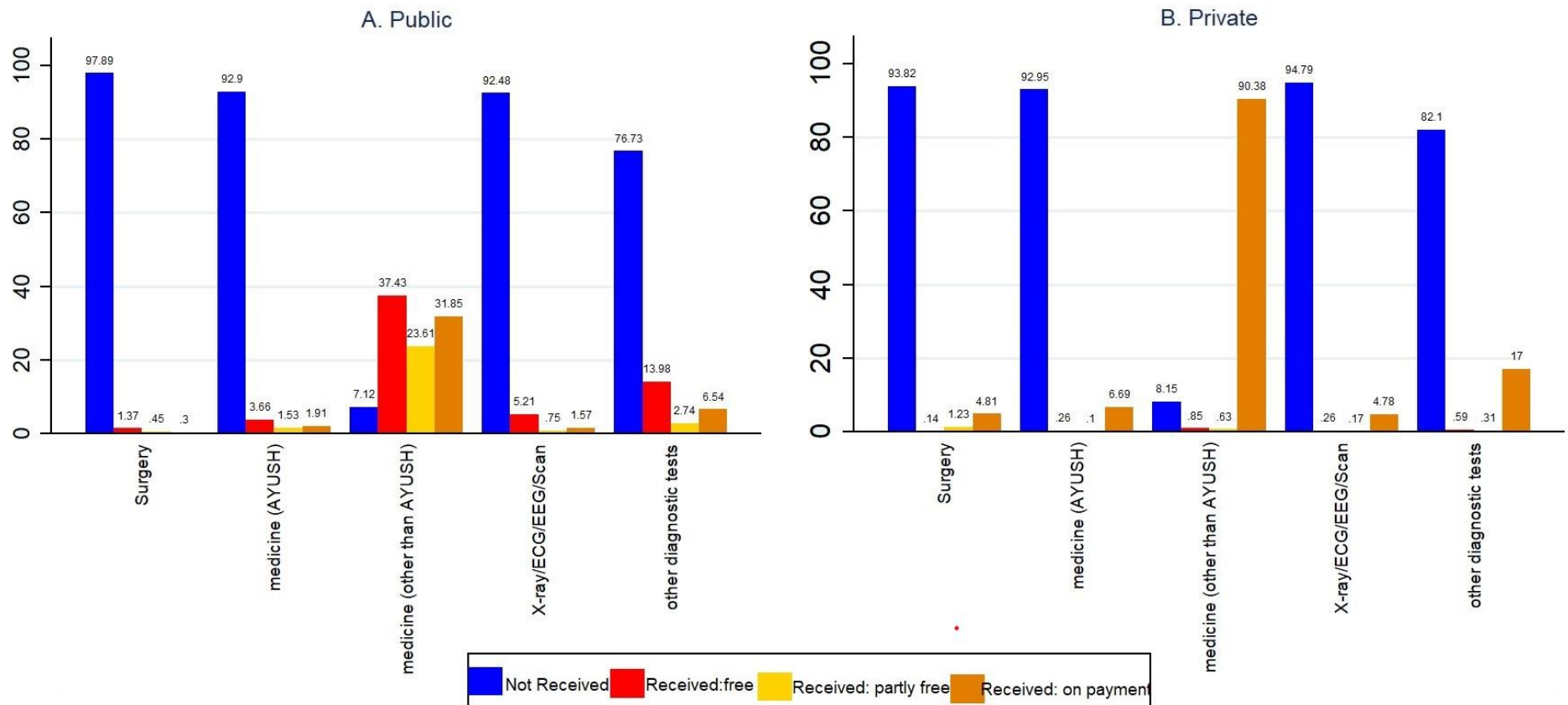
Supplementary Figure 3.4 Healthcare services received/not received and break-up by payment category across type of provider in outpatient care

A. Access to Inpatient Care

high insurance coverage states	0.009*
Telangana	0.004
Andhra Pradesh	0.010*
Dadar and Nagar Haveli	0.021
Mizoram	0.008
Meghalaya	0.007
Chhattisgarh	0.009*
medium health insurance coverage states	0.026*
Kerala	0.003
Goa	0.005
Chandigarh	0.001
Rajasthan	0.009*
low health insurance coverage states	0.010*
Tamil Nadu	0.005
Punjab	0.004
Himachal Pradesh	-0.003
Puducherry	0.002
Lakshadweep	0.019
Delhi	-0.014*
Daman and Diu	0.012
Andaman and Nicobar Islands	-0.006
West Bengal	0.006*
Maharashtra	0.002
Karnataka	0.003
Jammu and Kashmir	0.005
Haryana	0.001
Uttarakhand	0.009*
Tripura	-0.011
Sikkim	-0.004
Nagaland	0.011*
Manipur	0.009*
Gujarat	0.007*
Arunachal Pradesh	0.005
Uttar Pradesh	0.014*
Odisha	0.016*
Madhya Pradesh	0.006*
Jharkhand	0.015*
Bihar	0.003
Assam	0.006*
India	0.012*

B. Access to Outpatient Care

High health insurance coverage states	0.049*
Telangana	0.010*
Andhra Pradesh	0.064*
Dadra and Nagar Haveli	0.006
Mizoram	0.001
Meghalaya	-0.002
Chhattisgarh	0.038*
Medium health insurance coverage states	0.119*
Kerala	0.091*
Goa	0.011
Chandigarh	0.005
Rajasthan	0.035*
Low health insurance coverage states	0.041*
Tamil Nadu	-0.009*
Punjab	0.038*
Himachal Pradesh	0.046*
Puducherry	-0.009
Lakshwdeep	0.080*
Delhi	0.004
Daman and Diu	0.019
Andaman and Nicobar Islands	0.047*
West Bengal	0.079*
Maharashtra	0.046*
Karnataka	0.032*
Jammu and Kashmir	0.012*
Haryana	0.017*
Uttarakhand	0.024*
Tripura	-0.001*
Sikkim	0.035
Nagaland	0.003*
Manipur	-0.002
Gujarat	0.060*
Arunachal Pradesh	0.013*
Uttar Pradesh	0.033*
Odisha	0.043*
Madhya Pradesh	0.024*
Jharkhand	0.021*
Bihar	0.003
Assam	0.006*
India	0.051*

Supplementary Figure 3.5 Inequality in access to care

*p<0.05

Supplementary Figure 3.6 Share of various components to total health expenditure in inpatient care

Supplementary Figure 3.7 Share of various components to total health expenditure in outpatient care

Chapter 4 Impact of Health Insurance on Accessibility, Utilization of Inpatient care, and Financial Risk Protection in India

4.1. Introduction

Universal health coverage (UHC) is a globally advocated concept that aims to ensure that everyone has access to essential and quality healthcare services without facing financial hardships [1]. It has been adopted as one of the Sustainable Development Goals, reaffirming its position as a key global health priority. According to the World Health Organization (WHO), UHC is an ambitious but achievable goal and is a political choice [1]. India has also shown its commitment towards achieving UHC [2], albeit it strives hard with one of the lowest public health spending (1.15% of gross domestic product) [2], and one of the highest out-of-pocket health expenditure (OOPE) (50.6% of health expenditure) across the globe [3]. Nearly, 8% of the Indian population is pushed below the poverty line due to OOPE incurred on healthcare services [4]. The rising burden of non-communicable diseases and an unfinished agenda of infectious diseases [2,5,6], coupled with a significant presence of the private sector in the existing healthcare system [5,7,8], has proliferated high financial burden due to healthcare services in India. The escalating cost of healthcare services, along with increased need and demand for healthcare due to rising income, increasing life expectancy, and epidemiological transition, have made health coverage imperative in India [9].

Traditionally till 2007, India's healthcare financing was confined to the supply-side mechanism (i.e., strengthening of infrastructure) [10,11]. With a paradigm shift towards the demand-side financing mechanism, India has given a special impetus to government sponsored health insurance (GSHI) schemes [11-13], as done by several other low and middle-income countries [14,15]. Pre-payment mechanism through health insurance is a crucial instrument for risk-pooling and safeguarding against health shocks, and is a necessary pathway in India's pursuit of UHC [9]. Over the years, a number of GSHI schemes have been launched to improve the

accessibility of healthcare services and safeguard people against associated financial catastrophes [9,11,12]. Indian policymakers have also acknowledged and advocated private health insurance as a medium of coverage [16]. Two schools of thought have emerged internationally about private health insurance. The proponents claim that it can bridge public financing gaps, whereas critics argue that private health insurance overlooks the social aspects, escalates health costs, allows cream skimming, and increase inequity [17,18]. However, in India, GSHI schemes are primarily meant to cover the below-poverty-line population [11,12], and thus a substantial proportion of population is left with the choice to either arrange private health insurance on their own (if not covered by employer schemes) or to remain uninsured [9].

Against this backdrop, it is imperative to examine the impact of health insurance (overall health insurance, GSHI, and private health insurance) in India, assess whether these schemes have achieved their objectives, and guide the policymakers in this regard. We examined five aspects relating to health insurance, using data from the recent health and morbidity survey, conducted by the National Sample Survey Organisation (NSSO). First, we analysed the impact of health insurance programmes on accessibility to inpatient care. Second, we studied the utilization pattern of hospitalization (choice of healthcare provider, number of times hospitalized, and duration of hospital stay) in the context of health insurance programmes. Third, we explored health insurance as a strategy to safeguard against OOPE, catastrophic health expenditure (CHE) at various thresholds, and impoverishment due to OOPE. Fourth, we evaluated the impact of GSHI schemes on poor individuals separately. Lastly, we also compared the financial burden (i.e., OOPE and CHE incidence) across private and public healthcare providers.

Previous literature has primarily focussed on evaluating the impact of GSHI schemes in the context of poor population [19-21] or at the state level covering Chhattisgarh [22,23], Haryana [24], Uttar Pradesh [24,25], Gujarat [24], Maharashtra [25], Andhra Pradesh [26], Karnataka [26], Tamil Nadu [26], and Jharkhand [19]. A few studies have analysed the impact of GSHI

schemes at the national level, but were mainly limited to evaluating the financial protection aspect only [21,27,28]. Moreover, most studies were based on previous rounds of NSSO [20,22,23,26-28], and there is no conclusive evidence regarding the impact of GSHI schemes in providing financial risk protection India [10,29]. Furthermore, accessibility to inpatient care has been explored in the context of health insurance [19,20,22-24,26], but there is a dearth of literature examining the in-depth pattern of utilization of hospitalization in the context of health insurance in India. Even though private health insurance is one of the prominent options available for those who are not eligible for GSHI or are not insured by the employer, its effectiveness has not been explored in Indian context. The previous literature is mainly limited to investigating the challenges and prospects for private health insurance in India [30,31]. Lastly, previous studies have paid little attention to the role of health insurance in preventing impoverishment, even though the need for measuring the '*impoverishing effect*' under UHC via insurance schemes has been the subject of recent debates in SDGs [22,32]. Therefore, it is crucial to provide a holistic assessment of the impact of health insurance (overall insurance, GSHI, and private health insurance) towards accessibility and utilization pattern of hospitalization and financial risk protection in Indian context using the latest nationally representative sample survey.

4.2. Data and methodology

4.2.1 Overview of data source

This chapter employs the latest (75th round) survey of NSSO on health and morbidity 2018, titled "Social Consumption: Health," which encompasses extensive information on hospitalization, ailments, nature of treatment sought, cost of care, and maternal and elderly health dimensions [33]. The survey laid a special emphasis on inpatient care; respondents were asked if any household member sought inpatient care during the last 365 days. If any member reported seeking inpatient care, further details about the number of times hospitalized, duration

of hospital stay, type of healthcare provider used (private or public), nature of ailment, and expenditure incurred on treatment etc., were recorded [33]. A total of 91,445 hospitalization incidence were reported by the survey. The survey also contained question about whether the respondents were covered under any health insurance scheme, which were categorized into five groups: GSHI schemes, government employer (e.g., CGHS), employer other than government (e.g., ESIS), voluntarily insurance arranged from insurance companies (i.e., private health insurance), and others.

4.2.2 Outcome indicators

The chapter analysed several outcomes in the context of health insurance schemes. The accessibility to inpatient care was first evaluated in relation to health insurance status and then the chapter examined two main outcomes (utilization pattern and financial protection) for the hospitalization incidence reported only. The utilization pattern of hospitalization (i.e., realised access) was analysed in terms of three indicators: i) type of healthcare provider (public hospital or private hospital), ii) duration of stay in hospital (short duration or long duration), iii) number of times hospitalized (once or more than once). The duration of stay in hospital was considered 'short' if it was up to six days, while it was considered 'long' if the stay was for more than six days[4].

The financial protection was assessed through parameters, namely, OOPE, CHE, and impoverishment. The survey provides extensive information about expenditure incurred on hospitalization across various components namely, package component, doctor's fee, costs of medicines, diagnostic tests, bed charges, other medical expenses, and transportation. Information regarding any amount reimbursed was also reported separately by the NSSO [33]. OOPE was calculated by adding all medical and transportation expenses for each incidence of

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[4] In case of duration of hospital stay, six days have been taken as base, because the mean duration of hospital stay was recorded as 5.78 days.

hospitalization, and deducting any cash reimbursement received by the patient. The methodology provided by Wagstaff and Doorslaer [34] was applied to estimate CHE. An incidence of health expenditure was considered to be catastrophic if OOPE exceeded 10% (CHE10), 25% (CHE25), or 40% (CHE40) of the total annual household consumption expenditure [23,26,27]. The monthly household consumption expenditure was multiplied by twelve to arrive at annual household consumption expenditure. In consonance with previous studies [35,36], we applied Oxford (original OECD) equivalence scale [37] to convert household consumption expenditure into household consumption expenditure per equivalent adult, which was subsequently used to create economic quintiles for each sector (rural and urban). The sampling weights provided by the NSSO were applied in the analysis, as applicable.

Our analysis for various outcomes was restricted to hospitalization incidence, because most of the health insurance schemes in India are mainly limited to cover hospitalization [11,13]. We analysed outcomes for overall insured (in any type of scheme) in general, and GSHI schemes and private health insurance, in particular. The employer-provided health insurance schemes (such as CGHS and ESIS) were not studied separately, because these schemes are mandatory (social) health insurance schemes and are available only to formal sector employees [11,12,13].

To check the effectiveness of GSHI schemes, the analysis was first done for the entire sample (irrespective of economic status), and then the analysis was carried out separately for the poor persons because GSHI schemes are primarily meant to provide access and financial protection to economically disadvantaged population [11,12]. We have used inflation-adjusted official poverty line, as suggested by the Tendulkar Committee (Planning Commission) [38] to identify poor and non-poor individuals.

We also compared the poverty headcount before (pre) and after (post) incurring OOPE for those who sought hospitalization, disaggregated by health insurance status (insured or uninsured).

The individuals whose annual per capita consumption expenditure was initially above the poverty line but later fell below it due to hospitalization-related OOPE were considered to have experienced '*impoverishment*' [4,39], and in this context, the role of health insurance was evaluated.

4.2.3 Statistical analysis

Descriptive statistics, multivariable logistic regression, and propensity score matching (PSM) methods were employed in the chapter.

4.2.3.1 Multivariable logistic regression

Multivariable logistic regression was employed to examine the association between binary outcome variables (namely, accessibility to inpatient care, utilization pattern of hospitalization, and occurrence of CHE and impoverishment) and health insurance status.

$$logit(Y) = ln\frac{p}{1-p} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 \dots \dots \beta_n x_n \qquad (3)$$

In the above equation, Y is the binary outcome variable, x_1 is the explanatory variable (i.e., health insurance status), $x_2 \dots \dots \dots x_n$ represent the covariates.

$\frac{p}{1-p}$ is the odds ratio measures the probability that y=1 relative to the probability that y=0. Logistic regression was run separately for different health insurance status (i.e., overall insured, GSHI insured, private health insurance, and poor persons insured with GSHI) for every outcome. All the results are reported with 95% confidence interval and p-values.

4.2.3.2 Propensity score matching (PSM)

The chapter intends to compare the difference in outcome among insured and uninsured, however, a direct comparison of outcome between the groups may lead to biased estimate of the treatment effect (i.e., health insurance in our case) [40-42]. In observational studies, treatment assignment is a non-random process based on an individual's baseline characteristics,

therefore, treatment groups may not be comparable in their pre-treatment characteristics [40-42]. Therefore, in line with previous studies [20,23,25,27,43], we employed the PSM technique to measure the treatment effect (i.e., health insurance enrolment), as this technique ensures the matching of background characteristics in treatment and comparison group; thereby, controls for confounding bias while estimating treatment effects [40-42].

In PSM, there are two prominent estimates; average treatment effect (ATE) and average treatment effect on the treated (ATET). ATE measures the treatment effect in the entire sample while ATET measures the effect of the intervention among those who were ultimately treated [42,43]. The chapter focuses on the impact of enrolment in health insurance on several outcome (utilization of inpatient care, and financial burden), therefore, in tandem with the literature [20,23,25,27,43] we estimate the ATET. ATET estimates the average difference in outcomes that the treatment group obtained with treatment (i.e., health insurance enrolment) and the treatment group would have obtained in the absence of health insurance. ATET is measured through the following equation.

$$ATET = E(Y_1 - Y_0/(D = 1)) = E(Y_1/D = 1) - E(Y_0/D = 1) \qquad (4)$$

In the above equation, ATET represents the change in outcome due to health insurance, Y_1 is the estimate of an outcome value if treated (insured), Y_0 is the estimate of an outcome value if not treated (not insured), D=1 is the participation status in case of treatment, and D=0 is the participation status of the untreated. We have matched for variables such as age, gender, education, social class, sector (rural/urban), and economic quintiles for utilization outcomes. In addition to these variables, type of healthcare provider, and ailment category were also matched for financial protection outcomes.

Additionally, we performed a separate analysis using PSM to compare the financial burden (OOPE and CHE) among private healthcare provider (treatment group) and public healthcare

provider (comparison group) as well [44]. The analysis was performed separately for insured and uninsured sample. For all the outcomes, balance diagnostic was also carried out to check balance in covariates among treatment and comparison group after matching and is depicted in Appendix. Additionally, to assess the robustness of our results, we also employed different matching methods including nearest-neighbor, radius caliper, kernel, and stratification matching. All the analysis was carried out using Stata (version 14.1).

4.3. Results

4.3.1 Accessibility to inpatient care

We found that the odds of seeking inpatient care were statistically significantly higher among the overall insured (odds ratio (OR): 1.22; 95% confidence interval (CI) [1.17 - 1.28], $p < 0.05$), indicating that the insured were more likely to access inpatient care than the uninsured. Likewise, insured under GSHI schemes (OR: 1.20 [1.15 - 1.26], $p < 0.05$), private health insurance (OR: 1.32 [1.17 - 1.48], $p < 0.05$), and even the poor persons insured under GSHI schemes (OR: 1.17 [1.05 - 1.32], $p < 0.05$) were statistically significantly more likely to seek inpatient care than uninsured (Table 4.1). Next, we examined the utilization pattern and financial risk protection for a total of 91,228 hospitalization incidence reported during the last 365 days (Supplementary Table 4.1).

Table 4.1 Accessibility to hospitalization across health insurance status

Model		Hospitalized (Yes = 1, No = 0)
		Odds Ratio
Model 1	Uninsured	Ref
	Overall Insured	**1.22*** [1.17 - 1.28]
Model 2	Uninsured	Ref
	GSHI Insured	**1.20*** [1.15 - 1.26]
Model 3	Uninsured	Ref
	Private health insurance	**1.32*** [1.17 - 1.48]
Model 4 (Among poor persons only)	Uninsured	Ref
	GSHI Insured	**1.17*** [1.05 - 1.32]

* p<0.05; Figures inside square brackets represent 95% confidence interval. Odds ratio is presented for the main interest variable (health insurance) for all models. Controlled variables: Age, Literacy, Economic Quintile, Sector (Rural/Urban), Social class, Gender.

4.3.2 Utilization pattern for hospitalization incidence

Descriptive statistics showed that the usage of private hospitals was higher among overall insured (54.62%) than uninsured (47.52%). Those insured under private health insurance sought hospitalization primarily at private hospitals (in 91.65% of cases). On the other hand, poor persons insured under GSHI schemes sought hospitalization mainly at public hospitals (in 70.86% of cases) (Figure 4.1, Panel A). The incidence of hospitalization more than once was also relatively higher among overall insured (18.22%), insured under GSHI schemes (19.07%), and private health insurance (13.93%) in comparison to uninsured (11.17%). Even among the poor persons insured under GSHI schemes reported a higher incidence of hospitalization more than once (16.25%) than uninsured poor (7.59%) (Figure 4.1, Panel B). Likewise, the incidence of longer duration of hospitalization was higher among insured (overall insured: 29.98%; GSHI: 29.55%; private health insurance: 27.69%) than uninsured (23.84%) (Figure 4.1, Panel C).
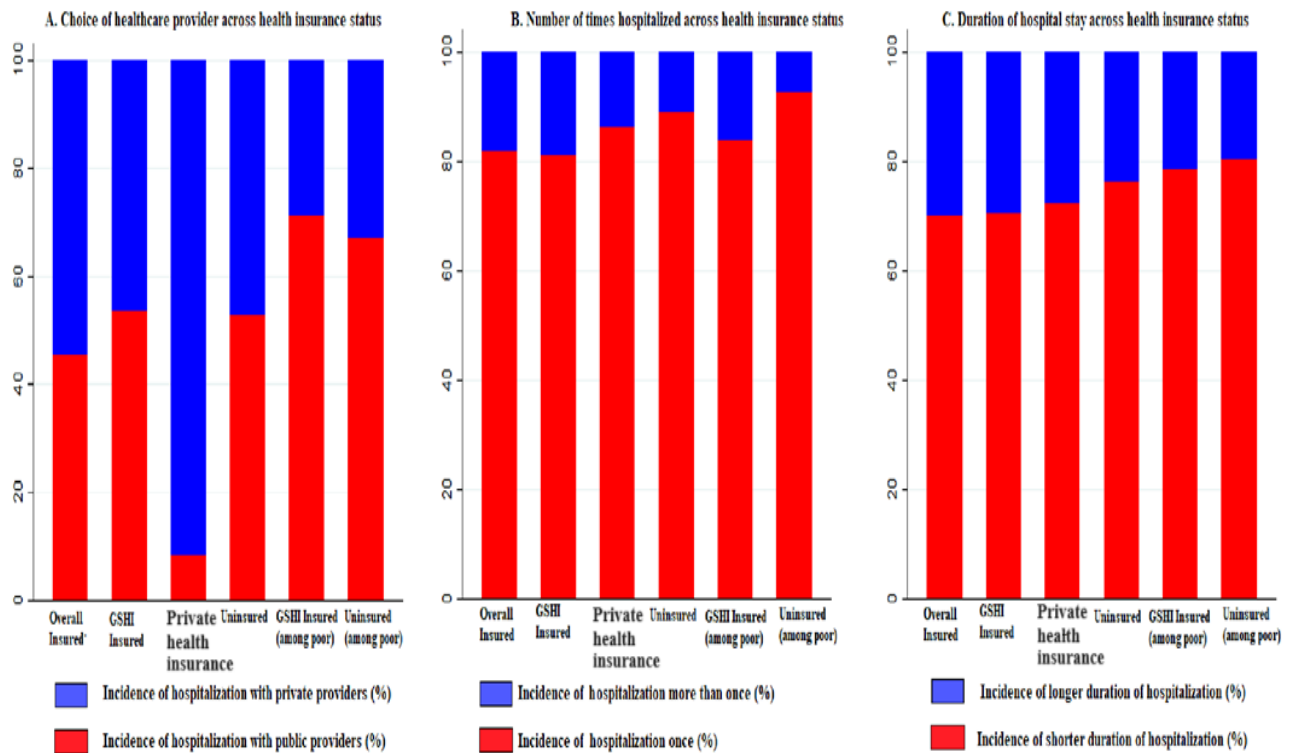
Figure 4.1 Utilization pattern of hospitalization across health insurance status

Multivariable logistic regression showed that the likelihood to utilize the private hospitals, seek hospitalization more than once, and longer duration of hospitalization was higher among overall insured in general, and GSHI insured particular (OR > 1, p < 0.05) in comparison to the uninsured (Supplementary Table 4.2). Enrolment under private health insurance statistically significantly increased the likelihood of utilizing private hospitals (OR: 4.54 [3.32 - 6.19], p < 0.05), but the likelihood of longer duration of hospital stay and hospitalization more than once was not statistically different among insured under private health insurance and uninsured (p > 0.05). On the other hand, enrolment under GSHI schemes statistically significantly increased the likelihood of seeking hospitalization more than once (OR: 2.34 [1.78 - 3.07], p < 0.05) among poor persons enrolled, but did not statistically significantly impact the utilization of

private hospitals and duration of stay for the insured poor persons compared to uninsured poor persons (p > 0.05) (Supplementary Table 4.2).

The PSM results for the utilization pattern of hospitalization are presented in Table 4.2. We observed a marginally higher incidence of utilizing private hospitals, hospitalization more than once, and longer duration of hospital stay in case of overall insured (3.06%, 4.59%, 4.48% respectively) and GSHI insured (1.28%, 4.70%, 4.56%, respectively) in comparison to the uninsured (p < 0.05). The incidence of utilizing private hospitals was statistically significantly higher (19.33%) among those insured with private health insurance (p < 0.05), while the incidence of longer duration of hospitalization and hospitalization more than once were not statistically different among insured under private health insurance and uninsured (p > 0.05). On the other hand, among the poor persons, the incidence of hospitalization more than once was higher by 4.81% among GSHI insured than uninsured (p < 0.05), whereas the incidence of hospitalization with private provider and longer duration of hospital stay were not statistically different among GSHI insured and uninsured (p > 0.05) (Table 4.2).

Table 4.2: Analysis of utilization pattern of hospitalization across health insurance status using PSM

Model	Treatment/Control Group	Private provider utilization (%)	Hospitalized more than once (%)	Longer duration of stay in hospital (%)
		Coefficient	Coefficient	Coefficient
Model 1	Overall Insured	**0.0306*** [0.0229 to 0.0383]	**0.0459*** [0.0401 to 0.0516]	**0.0448*** [0.0373 to 0.0524]
	Uninsured ©			
Model 2	GSHI Insured	**0.0128*** [0.0035 to 0.0220]	**0.0470*** [0.0402 to 0.0538]	**0.0456*** [0.0367 to 0.0544]
	Uninsured ©			
Model 3	Private health insurance	**0.1933*** [0.1785 to 0.2081]	0.0146 [-0.0017 to 0.0309]	0.0124 [-0.0095 to 0.0342]
	Uninsured ©			
Model 4 (Among poor persons only)	GSHI Insured	**-0.0129** [-0.0347 to 0.0089]	**0.0481*** [0.0321 to 0.0640]	0.0120 [-0.0087 to 0.0328]
	Uninsured ©			

© denotes Control Group; *p<0.05; Figures inside square brackets represent 95% confidence interval.

4.3.3 Financial burden due to hospitalization

4.3.3.1 Out-of-pocket health expenditure (OOPE)

Descriptive statistics showed that the mean OOPE for hospitalization was lower among overall insured (INR 13432 (USD 197))[5] and GSHI insured (INR 11487 (USD 168)) than the uninsured (INR 14938 (USD 219)) (Supplementary Figure 4.1). Also, in case of poor persons the mean OOPE was lower among GSHI insured (INR 7739 (USD 113)) than uninsured (INR 8581 (USD 126)). By contrast, the OOPE was higher among those insured under private health insurance (INR 24258 (USD 355)) even when compared to the uninsured. Likewise, median OOPE for hospitalization was lower among overall insured (INR 3600 (USD 53)) and GSHI insured (INR 3300 (USD 48)) than the uninsured (INR 4620 (USD 68)) (Figure 4.2, Panel A). Poor persons enrolled under GSHI schemes also reported a lower median OOPE (INR 1600 (USD 23)) than uninsured poor persons (INR 6600 (USD 97)) (Figure 4.2, Panel A).

PSM results showed that OOPE was lower among overall insured by INR 6,412 (USD 94) compared to uninsured ($p < 0.05$) (Table 4.3). Also, OOPE was INR 3,314 (USD 49) lower among GSHI insured than uninsured ($p < 0.05$), whereas for the poor persons enrolled under GSHI, the decline in OOPE was not statistically significant (INR 1,057 (USD 15), $p > 0.05$) compared to the uninsured poor persons. By contrast, enrolment under private health insurance reduced OOPE by INR 13,511 (USD 198) for insured compared to uninsured ($p < 0.05$).

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5. USD 1 = INR 68.30 using the average 2018 exchange rate.
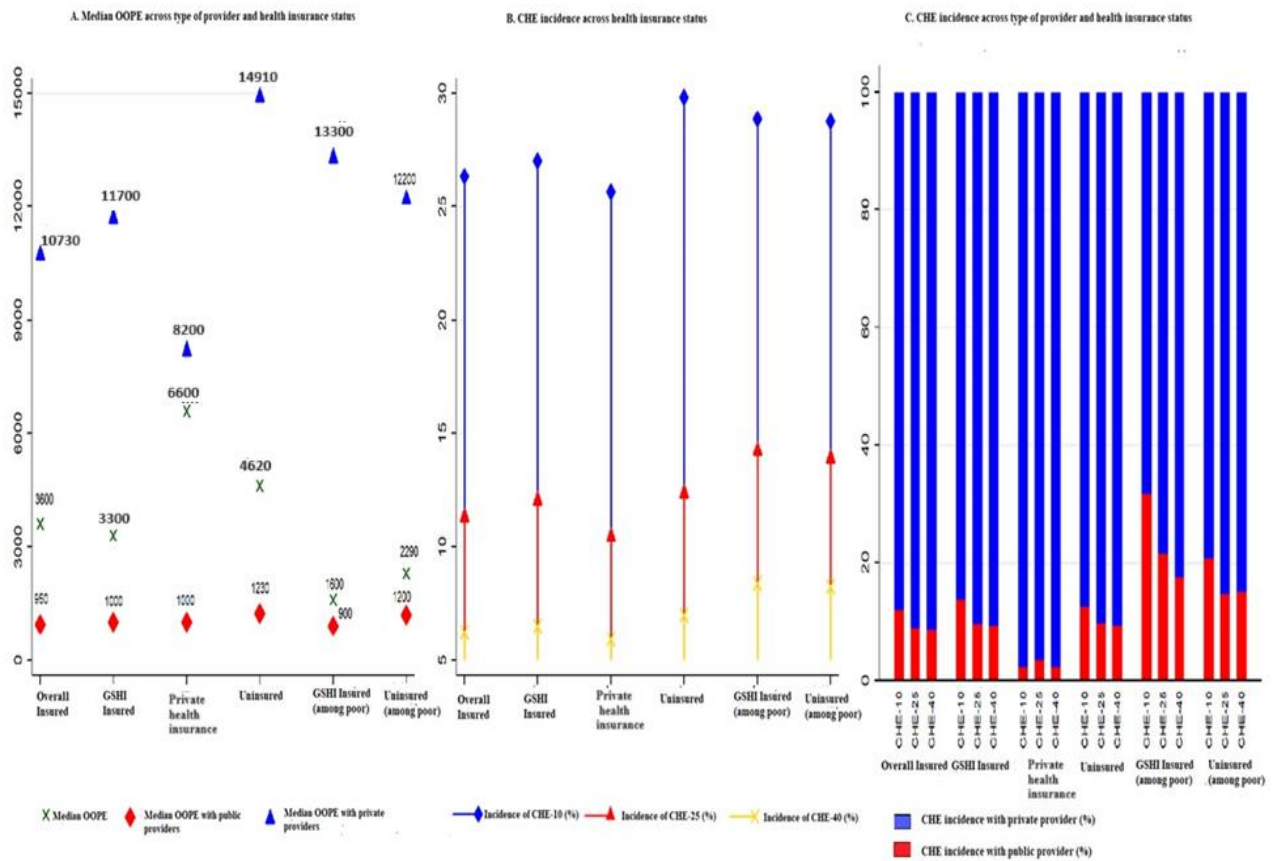
Figure 4.2 CHE and OOPE across health insurance status

4.3.3.2 Incidence of catastrophic health expenditure (CHE)

Descriptive statistics showed that CHE incidence at 10% threshold was relatively lower among overall insured (26.35%) than uninsured (29.81%), while the incidence of CHE at 25% and 40% threshold was almost similar among the overall insured and uninsured. The incidence of CHE at all thresholds was either slightly lower or similar among GSHI insured in comparison to uninsured, while the incidence of CHE was either slightly higher or similar among poor persons insured under GSHI than uninsured poor persons at all thresholds (Figure 4.2, Panel B). The incidence of CHE among those insured under private health insurance was 25.65%, 10.45%, and 5.94% at 10%, 25%, and 40% threshold, respectively. According to multivariable logistic regression, the likelihood of incurring CHE at all thresholds was statistically significantly lower among overall insured, insured under GSHI schemes, and insured under

private health insurance compared to uninsured (OR<1; p < 0.05) (Supplementary Table 4.3). However, in case of poor persons, the likelihood of incurring CHE was not statistically different among GSHI insured and uninsured at all thresholds (Supplementary Table 4.3).

PSM results showed that the CHE incidence was 7.33%, 2.61%, and 1.34% lower among overall insured than uninsured at CHE10, CHE25, and CHE40, respectively (p < 0.05) (Table 4.3). The enrolment under GSHI schemes, statistically significantly decreased the incidence of CHE10 by 3.74% and CHE25 and CHE40 by 1.09% and 0.79%, respectively, for the insured (p < 0.05). By contrast, enrolment under GSHI schemes did not lead to any statistically significant decline in CHE incidence for the poor persons insured compared to the poor persons uninsured, at all thresholds (p > 0.05). On the other hand, enrolment under private health insurance statistically significantly decreased CHE incidence by 13.47% at 10% threshold, 4.61% at 25% threshold, and 2.65% at 40% threshold for the insured in comparison to uninsured (p < 0.05).

Table 4.3: Analysis of financial protection across health insurance status using PSM

Model	Treatment/ Control group	OOPE (INR)	CHE-10 (%)	CHE-25 (%)	CHE-40 (%)
		Coefficient	Coefficient	Coefficient	Coefficient
Model 1	Overall Insured	-6412.28* [-7345.96 to -5478.60]	-0.0733* [-0.0811 to -0.0654]	-0.0261* [-0.0323 to -0.0198]	-0.0134* [-0.0183 to -0.0086]
	Uninsured ©				
Model 2	GSHI Insured	-3313.83* [-4036.96 to -2590.71]	-0.0374* [-0.0463 to -0.0285]	-0.0109* [-0.0181 to -0.0036]	-0.0079* [-0.0136 to -0.0022]
	Uninsured ©				
Model 3	Private health insurance	-13511.15* [-17704.37 to -9317.92]	-0.1347* [-0.1603 to -0.1092]	-0.0461* [-0.0654 to -0.0268]	-0.0265* [-0.0415 to -0.0114]
	Uninsured ©				
Model 4 (Among poor persons only)	GSHI Insured	-1056.94 [-2155.08 to 411.94]	-0.0203 [-0.0425 to 0.0020]	-0.0036 [-0.0155 to 0.0227]	-0.0034 [-0.0189 to 0.0121]
	Uninsured ©				

© denotes Control Group; *p<0.05; Figures inside square brackets represent 95% confidence interval.

4.3.3.3 Impoverishment and health insurance enrolment

Approximately 4-9% increase in the poverty headcount was observed due to OOPE, irrespective of the health insurance status (Supplementary Table 4.4). Multivariable logistic regression showed that overall insured, GSHI insured, and insured with private health insurance were less likely to fall below poverty line due to OOPE (OR<1, $p<0.05$) in comparison to the uninsured (Supplementary Table 4.5). Furthermore, PSM results showed that enrolment in health insurance reduced the poverty headcount by 1.43% among overall insured compared to uninsured ($p < 0.05$). Enrolment under GSHI schemes reduced the impoverishment by only 0.87% for the insured compared to the uninsured ($p < 0.05$). By contrast, enrolment under private health insurance decreased the poverty headcount by 2.91% for the insured than uninsured ($p < 0.05$) (Table 4.4).

Table 4.4: Impoverishment due to OOPE across health insurance status using PSM

Model	Treatment/Control Group	Impoverishment due to OOPE (%)
		Coefficient
Model 1	Overall Insured	**-0.0143*** [-0.0192 to -0.0093]
	Uninsured ©	
Model 2	GSHI Insured	**-0.0087*** [-0.0150 to -0.0025]
	Uninsured ©	
Model 3	Private health insurance	**-0.0291*** [-0.0411 to -0.0172]
	Uninsured ©	

© denotes Control Group; *$p<0.05$; Figures inside square brackets represent 95% confidence interval.

4.3.4 Robustness check

Supplementary Table 4.6 provides the results for robustness, in which PSM technique was employed with different methods of matching, namely, nearest-neighbor, radius caliper, kernel, and stratification. The robustness results indicate that overall health insurance impacted the utilization of inpatient care by marginally increasing the incidence of hospitalization with private hospitals, longer duration of stay in hospital, and hospitalization more than once, and

reduced the financial burden (OOPE, CHE, and impoverishment) for the insured. The enrolment under GSHI schemes also impacted the utilization of inpatient care and provided financial risk protection for the insured to some extent. Additionally, among poor persons, enrolment under GSHI schemes increased the incidence of hospitalization more than once and also reduced the OOPE to some extent ($p < 0.05$). However, GSHI schemes did not statistically significantly reduce the CHE incidence for the poor persons insured in comparison to poor persons uninsured. Lastly, enrolment under private health insurance statistically significantly increased hospitalization incidence with private providers and reduced the financial burden for the insured, but did not statistically impact the incidence of hospitalization more than once and longer duration of stay (Supplementary Table 4.6).

4.3.5 Financial burden across healthcare providers

Descriptive statistics showed that OOPE at private hospitals was substantially higher than public hospitals, irrespective of the health insurance status (Figure 4.2, Panel A, Supplementary Figure 4.1). Also, out of all the CHE incidence reported (at each of the three thresholds), a remarkably high proportion of incidence (nearly two-third) occurred with private hospitals, irrespective of the health insurance status (overall, GSHI, private health insurance, and uninsured) (Figure 4.2, Panel C).

PSM results also confirmed that OOPE was higher by INR 21,878 (USD 320) and CHE incidence was higher by 41.07% (at 10% threshold), 18.80% (at 25% threshold), and 10.46% (at 40% threshold) in private hospitals than public hospitals ($p<0.05$). Among insured, OOPE was higher in private hospitals than public hospitals by INR 19,554 (USD 286) ($p<0.05$). Also, CHE incidence was 35.80%, 16.42%, and 9.01% higher in private hospitals than public hospitals at 10%, 25%, and 40% threshold, respectively ($p<0.05$). Likewise, in the case of uninsured as well, OOPE and CHE incidence (at all thresholds) was statistically significantly higher in private hospitals than public hospitals ($p < 0.05$) (Table 4.5).

Table 4.5: Analysis of financial burden across healthcare provider using PSM

Model	Treatment/ Control group	OOPE (INR)	CHE-10 (%)	CHE-25 (%)	CHE-40 (%)
		Coefficient	Coefficient	Coefficient	Coefficient
Model 1 (Total)	Private Provider	21877.76* [21207.83 to 22547.69]	0.4107* [0.4041 to 0.4174]	0.1880* [0.1831 to 0.1929]	0.1046* [0.1009 to 0.1084]
	Public provider ©				
Model 2 (Insured)	Private Provider	19553.87* [18216.46 to 20891.27]	0.3580* [0.3443 to 0.3717]	0.1642* [0.1541 to 0.1744]	0.0901* [0.0824 to 0.0979]
	Public Provider ©				
Model 3 (Uninsured)	Private Provider	22984.98* [22256.89 to 23713.07]	0.4334* [0.4261 to 0.4407]	0.1979* [0.1924 to 0.2034]	0.1097* [0.1054 to 0.1139]
	Public Provider ©				

© denotes Control Group; *p<0.05; Figures inside square brackets represent 95% confidence interval.

4.4. Discussion

This chapter conveys a new body of evidence and provides a comprehensive picture by demonstrating the impact of health insurance (overall health insurance, GSHI schemes, and private health insurance) on accessibility, utilization, and financial risk protection from OOPE due to hospitalization in India.

We observed a small but statistically significantly higher likelihood of accessing inpatient care among insured (irrespective of the type of health insurance) than uninsured in India. Previous studies have also found an increase in accessibility to inpatient care among insured [10,20,22,28,29]. We also observed a statistically significant but marginally higher incidence of seeking hospitalization more than once and longer hospital stays among overall insured and GSHI insured compared to the uninsured. Even among the poor persons enrolled under GSHI, the incidence of hospitalization more than once was marginally higher than the poor persons uninsured. All this could be attributed to a genuine decline in financial barriers to accessing

care among insured, presence of moral hazard, or due to provider-induced demand [10,20,45,46]. This could also be due to conversion of outpatient cases into hospitalization cases by healthcare providers, owing to coverage of mainly hospitalization by almost all health insurance programmes in India [46,47].

Health insurance including GSHI schemes allows beneficiaries to choose healthcare services from both public and private empanelled facilities in India [11,12,47]. We observed that only a slightly higher incidence of hospitalization in private hospitals among overall insured and GSHI insured than uninsured. Moreover, those insured under private health insurance majorly sought hospitalization from private hospitals, owing to an extensive network of large urban-based private hospitals empanelled under private health insurance [11,48]. Furthermore, the primary reasons for seeking hospitalization at private hospitals than public hospitals were observed to be unsatisfactory quality or unavailability of doctors, preference for a trusted doctor/hospital, required services not available, and a long waiting time at public health facilities (Supplementary Figure 4.2).

In terms of financial protection, health insurance, in general, was found to be effective in reducing the financial burden for the insured to some extent. Enrolment under GSHI schemes also marginally reduced OOPE, CHE incidence, and impoverishment resulting from seeking hospital care. These findings align with previous studies that also highlight the ability of GSHI schemes to provide financial protection to some extent [22,25,27,28]. GSHI schemes provide inpatient services through a wide network of empanelled hospitals [11,12,47] and are based upon a package system, which has several advantages. Packages rates are easy to administer, are less complicated, and represent huge advantage over itemized fee-for-service payment mechanism applied by most private insurers [11,47]. Importantly, healthcare providers do not receive a payment unless they provide treatment to the beneficiaries [11,47].

Additionally, robustness analysis showed that GSHI schemes reduced OOPE among the poor persons as well. However, we found that GSHI schemes did not statistically significantly reduce the CHE incidence for the poor people insured in tandem with previous studies [19,21]. Despite this, it is noteworthy that these schemes have improved accessibility to inpatient services. The success of GSHI schemes could be further enhanced by addressing a crucial issue raised in previous studies. For instance, previous studies [49-53] emphasised that low awareness among beneficiaries regarding various aspects of health insurance, such as information regarding stipulated benefits one is entitled to, how to avail benefits, number of family members covered, list of empanelled hospitals and ailments covered, limits their ability to fully reap the benefits of GSHI schemes. Other issues such as, leakage of the central-level GSHI scheme (i.e., RSBY) to individuals above the poverty line [12,19,54], supplier-induced demand, reimbursement issues, lack of coverage for outpatient care, and continued spending on medicines, diagnostics, and consumables [49-57], also needs attention to ensure that GSHI schemes effectively achieve their desired objectives.

Private health insurance was found to be effective in reducing the financial burden (i.e., OOPE, CHE incidence, and impoverishment) resulting from hospitalization for the insured compared to the uninsured. The benefits provided by private health insurance plans largely depend on the specific policy chosen at the time of purchase, which is influenced by the customer's ability-to-pay premiums. As a result, uptake of private health insurance is primarily confined to upper economic quintiles (83.54% of insured belong to the upper two quintiles) and urban areas (84.86% of insured belong to urban areas), covering only 1.28% of the Indian population. It was also observed that majority of hospitalization cases (>90%) among those insured under private health insurance occurred in private hospitals, which are more expensive than public hospitals [28,44,58,59]. There is a possibility of overcharging by private providers and interventions by insurance companies may help reduce the OOPE among those insured under

private health insurance. Certain issues in private health insurance such as complex insurance products with waiting period clauses, exclusions for certain conditions, sub-limit caps on specific services [9,60,61,62], and lack of clarity regarding the same [60], may contribute to its limited uptake and may also lead insured individuals to unknowingly seek expensive services without realizing that their insurance coverage at hospital is limited [16,60]. Furthermore, the success of a private health insurance requires the creation of a sizable and diverse risk pool [9]. The uptake of private health insurance can be increased through several measures including standardizing and simplifying health insurance products, increasing awareness about private health insurance, and improving its affordability, particularly among the missing middle population that can pay nominal premiums [9].

This chapter highlights the importance of public health facilities as the financial burden was substantially lower among those who sought care in public hospitals rather than private ones. Conversely, the OOPE and CHE burden was copiously higher in private hospitals, irrespective of health insurance status, in concordance with previous studies [22,23,26,27,58]. Private hospitals in India primarily focus on tertiary care services, employing advanced technologies and specialized expertise [63]. However, they are inadequately monitored, as suggested by the reports published by WHO [5], Oxfam [8], and previous literature [11,63,64], which is a concerning issue. Patients often lack transparency regarding healthcare charges imposed by private hospitals, and instances of overpricing, unnecessary treatments, malpractices, and inadequate patient care have been reported in India [5,8,54,63,64]. All the above-mentioned factors reinforce the need to increase public health spending and strengthen public healthcare system to augment better financial risk protection against health expenditures [2,5,9,58,65]. As per WHO report, countries with higher public health expenditure are able to provide greater financial protection from catastrophic and impoverishing health spending, and encourages the countries to invest additionally in primary healthcare [1]. Lastly, it is crucial to address key

barriers to accessing care, such as poor infrastructure, shortages and inefficient distribution of qualified health workers, prohibitively expensive good quality medicines and medical products, and lack of access to digital health and innovative technologies, to progress towards UHC [66].

4.5 Strengths and limitations

The chapter used the latest NSSO 2018 survey data in comparison to the earlier studies that were based upon previous NSSO 2014 round. The latest round has an added advantage in the context of health insurance because it provides information about CGHS, ESIS, and GSHI schemes as separate categories. By contrast, the previous surveys showed a merged category for CGHS, ESIS, and GSHI, even though the CGHS and ESIS are very different forms of government schemes and are available only to formal sector employees. Moreover, the chapter has advanced the limited literature by exhibiting a holistic picture about the role of health insurance (overall health insurance, GSHI, and private health insurance) in India in terms of accessibility, utilization, and financial protection for inpatient care, and also analysed the impact of GSHI on poor persons separately. Additionally, to ensure the robustness of our findings, we have conducted analyses using different matching techniques, which confirmed major findings.

There are few limitations pertaining to this chapter. Survey information pertaining to hospitalization required long recall time (365 days), and therefore, it is prone to recall bias. The likelihood of excess hospitalization in terms of longer duration of stay or multiple cases of hospitalization could also be due to the moral hazard, which could not be segregated due to data constraints. The survey collected information on various GSHI schemes (different central and state governments schemes) under one category, it would have been more robust if the questionnaire contained more specific question about the types of GSHIs. Last, the impact of the recently launched PM-JAY scheme could be gauged in the coming years through future rounds of NSSO.

4.6 Conclusion and policy recommendations

We observed that health insurance, in general, and GSHI in particular, impacted the accessibility and utilization of inpatient service to some extent and also provided marginal financial risk protection by reducing OOPE, CHE, and impoverishment for the insured beneficiaries. However, GSHI schemes were not found to be effective in reducing CHE burden for the poor enrolled population. We also observed a substantially higher financial burden among private providers in comparison to public providers, irrespective of the health insurance status.

Policy measures must include scaling up of interventions to increase awareness about the benefits of health insurance, increasing knowledge about the eligibility for GSHI schemes, and educating enrolled ones about various facets of health insurance scheme. Notably, health insurance in India primarily covers inpatient care and exclusion of outpatient services is exiguous to avert the financial burden, especially in a scenario where outpatient expenses catastrophically impact a larger share of Indian households than inpatient expenses and the rising non-communicable disease burden necessitates frequent outpatient visits to manage the disease [67,68]. Therefore, health insurance products with both inpatient and outpatient benefits are required. In addition, increasing public health spending and strengthening of public health facilities are imperative to augment financial risk protection. Lastly, improved regulatory implementation for private healthcare providers and formulation of viable pricing options that aim to control costs, ensure optimal quality of care and health outcomes, and are acceptable to a large section of the private healthcare sector while also being sensitive to the weaker sections of society are crucial in the realm of a socially inclusive environment [5,8,63,64].

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4.8 Appendix

I Supplementary Figures and Tables

Supplementary Table 4.1: Hospitalization incidence

Health Insurance Status	Hospitalization Incidence (N = 91,445)
Overall Insured	19,306
Uninsured	71,922
Total	**91,228#**
GSHI Insured	12,702
Private health insurance	1,888
Among poor persons	
GSHI Insured	1866
Uninsured	13120
Total	**14986**

#Health insurance status was not available for 217 cases.

Supplementary Table 4.2: Logistic regression results for utilization of hospitalization across health insurance status

Model	Dependent variable / Independent variable (Health Insurance status)	Utilization of Private Provider (Private = 1, Public = 0)	Hospitalization more than once (Hospitalized more than once = 1, Hospitalized once = 0)	Longer duration of stay in hospital (Longer duration = 1, Shorter duration = 0)
		Odds Ratio	**Odds Ratio**	**Odds Ratio**
Model 1	Uninsured	Ref	Ref	Ref
	Overall Insured	**1.04*** [0.97 - 1.12]	**1.52*** [1.40 - 1.66]	**1.19*** [1.11 - 1.28]
Model 2	Uninsured	Ref	Ref	Ref
	GSHI Insured	**1.05*** [1.01 - 1.10]	**1.67*** [1.52 - 1.84]	**1.23*** [1.14 - 1.34]
Model 3	Uninsured	Ref	Ref	Ref
	Private health insurance	**4.54*** [3.32 – 6.19]	**0.82** [0.64 - 1.03]	**0.97** [0.87 - 1.09]

Model 4 (Among poor persons only)	Uninsured	Ref	Ref	Ref
	GSHI Insured	**0.84** [0.67 - 1.03]	**2.34*** [1.78 – 3.07]	**0.99** [0.79 - 1.26]

*p<0.05; Figures inside square brackets represent 95% confidence interval. Odds ratio is presented for the main interest variable (Health insurance) for all models. Controlling variable: Age, Literacy, Economic Quintile, Sector (Rural/Urban), Gender, Social Class.

Supplementary Table 4.3: Logistic regression results for financial protection across health insurance status

Model	Dependent variable / Independent Variable (Health Insurance status)	Occurrence of CHE-10 (Yes=1, No=0)	Occurrence of CHE-25 (Yes=1, No=0)	Occurrence of CHE-40 (Yes=1, No=0)
		Odds Ratio	**Odds Ratio**	**Odds Ratio**
Model 1	Uninsured	Ref	Ref	Ref
	Overall Insured	**0.66*** [0.61 - 0.72]	**0.78*** [0.70 - 0.87]	**0.78*** [0.68 - 0.89]
Model 2	Uninsured	Ref	Ref	Ref
	GSHI Insured	**0.78*** [0.71 - 0.86]	**0.89*** [0.83 - 0.94]	**0.83*** [0.71 - 0.97]
Model 3	Uninsured	Ref	Ref	Ref
	Private health insurance	**0.35*** [0.29 - 0.43]	**0.54*** [0.41 - 0.72]	**0.57*** [0.38 - 0.87]
Model 4 (Among poor persons only)	Uninsured	Ref	Ref	Ref
	GSHI Insured	**1.07** [0.84 – 1.38]	**1.06** [0.75 - 1.50]	**1.02** [0.71 - 1.48]

*p<0.05; Figures inside square brackets represent 95% confidence interval. Odds ratio is presented for the main interest variable (Health insurance) for all models. Controlled Variable: Age, Economic Quintile, Sector (Rural/Urban), Gender, Social Class, Literacy, Ailment, Type of Provider (Public/Private).

Supplementary Table 4.4: Poverty headcount across health insurance status

Insurance Status	Pre-Poverty Headcount	Post-Poverty Headcount	Additional Poverty Headcount due to OOPE
Overall Insured	1,905 (11.68%)	3,081 (18.97%)	1,176 (7.29%)
Uninsured	12,522 (22.75%)	18,619 (32.16%)	6,097 (9.41%)
GSHI Insured	1,719 (14.75%)	2,682 (23.15%)	963 (8.40%)
Private health insurance	32 (1.68 %)	84 (5.39%)	52 (3.71%)

Figures inside brackets represent weighted percentage.

Supplementary Table 4.5: Logistic regression results for impoverishment across health insurance status

Model			Impoverishment due to OOPE (Yes=1, No=0)
			Odds Ratio
Model 1		Uninsured	Ref
		Overall Insured	**0.74*** [0.65 - 0.85]
Model 2		Uninsured	Ref
		GSHI Insured	**0.80*** [0.69 - 0.93]
Model 3		Uninsured	Ref
		Private health insurance	**0.44*** [0.24 – 0.79]

*$p<0.05$; Figures inside square brackets represent 95% confidence interval. Odds ratio is presented for the main interest variable (Health insurance) for all models. Controlled Variable: Age, Quintile, Sector (Rural/Urban), Gender, Social Class, Literacy, Ailment, Type of Provider.

Supplementary Table 4.6: Results for robustness estimates using different matching methods

Model 1: Overall Insured versus Uninsured

Matching method / Outcomes		Nearest-neighbor (3) matching	Nearest-neighbor (5) matching	Kernel matching	Radius caliper matching	Stratification Matching
		ATET				
Utilization of Inpatient Care	Private provider utilization (%)	0.0323*	0.0338*	0.0257*	0.0192*	0.0190*
	Longer duration of stay in hospital (%)	0.0459*	0.0467*	0.0426*	0.0404*	0.0405*
	Hospitalized more than once (%)	0.0455*	0.0455*	0.0376*	0.0360*	0.0359*
Financial Risk Protection	OOPE (INR)	-6498.28*	-6409.41*	-5127.90*	-5994.51*	-6030.18*
	CHE-10 (%)	-0.0710*	-0.0684*	-0.0651*	-0.0679*	-0.0684*
	CHE-25 (%)	-0.0246*	-0.0226*	-0.0206*	-0.0225*	-0.0225*
	CHE-40 (%)	-0.0140*	-0.0133*	-0.0109*	-0.0122*	-0.0122*
	Impoverishment	-0.0137*	-0.0134*	-0.0166*	-0.0140*	-0.0140*

Model 2: GSHI insured versus Uninsured

Matching method / Outcomes		Nearest-neighbor (3) matching	Nearest-neighbor (5) matching	Kernel matching	Radius caliper matching	Stratification Matching
		ATET				
Utilization of Inpatient Care	Private provider utilization (%)	0.0160*	0.0181*	-0.0112*	0.016*	0.0145*
	Longer duration of stay in hospital (%)	0.0467*	0.0481*	0.0459*	0.0433*	0.0421*
	Hospitalized more than once (%)	0.0468*	0.0474*	0.0416*	0.0395*	0.0388*
Financial Risk Protection	OOPE (INR)	-3474.78*	-3832.80*	-3906.06*	-3935.58*	-3956.95*
	CHE-10 (%)	-0.0366*	-0.0358*	-0.0301*	-0.0313*	-0.0316*
	CHE-25	-0.0115*	-0.0104*	-0.0077*	-0.0086*	-0.0088*

	(%)					
	CHE-40 (%)	-0.0085*	-0.0087*	-0.0061*	-0.0068*	-0.0069*
	Impoverishment	-0.0074*	-0.0067*	-0.0078*	-0.0087*	-0.0086*

Model 3: Private health insurance versus Uninsured						
Outcomes	Matching method	Nearest-neighbor (3) matching	Nearest-neighbor (5) matching	Kernel matching	Radius matching	Stratification Matching
				ATET		
Utilization of Inpatient Care	Private provider utilization (%)	0.1930*	0.1933*	0.2578*	0.2251*	0.2213*
	Longer duration of stay in hospital (%)	0.0136	0.0151	0.0208	0.0225*	0.0143
	Hospitalized more than once (%)	0.0148	0.0151	0.0187	0.0165	0.0153
Financial Risk Protection	OOPE (INR)	-13903.37*	-13658.17*	-9195.85*	-11997.62*	-12410.70*
	CHE-10 (%)	-0.1418*	-0.1402*	-0.1182*	-0.1424*	-0.1474*
	CHE-25 (%)	-0.0479*	-0.0479*	-0.0356*	-0.0421*	-0.0461*
	CHE-40 (%)	-0.0234*	-0.0249*	-0.0201*	-0.0227*	-0.0252*
	Impoverishment	-0.0307*	-0.0292*	-0.0309*	-0.0274*	-0.0274*

Model 4: GSHI Insured versus Uninsured (among poor persons)						
Outcomes	Matching method	Nearest-neighbor (3) matching	Nearest-neighbor (5) matching	Kernel matching	Radius matching	Stratification Matching
				ATET		
Utilization of Inpatient Care	Private provider utilization (%)	-0.0091	-0.0052	-0.0398*	-0.0422	-0.0480*
	Longer duration of stay in hospital (%)	0.0149	0.0169	0.0141	0.0088	0.0043
	Hospitalized more than once (%)	0.0478*	0.0470*	0.0432*	0.0401*	0.0385*
	OOPE (INR)	-1079.64*	-1152.99*	-1585.69*	-1425.91*	-1580.26*
	CHE-10	-0.0171	-0.0212	-0.0279	-0.0295	-0.0341*

Financial Risk Protection	(%)					
	CHE-25 (%)	0.0063	0.0032	-0.0024	-0.0029	-0.0058
	CHE-40 (%)	0.0024	-0.0011	-0.0062	-0.0063	-0.0079

*p<0.05.

Supplementary Figures
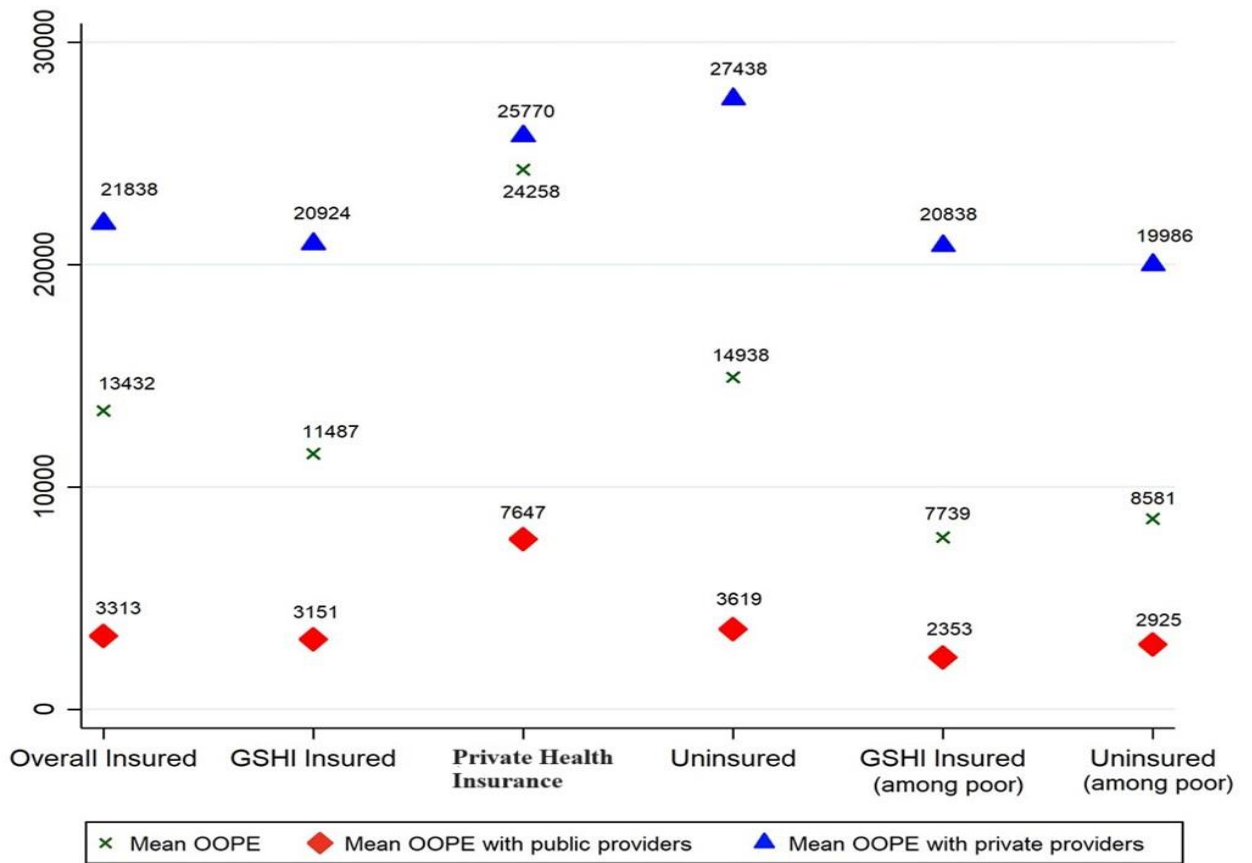
Supplementary Figure 4.1: Mean OOPE across type of provider and health insurance status
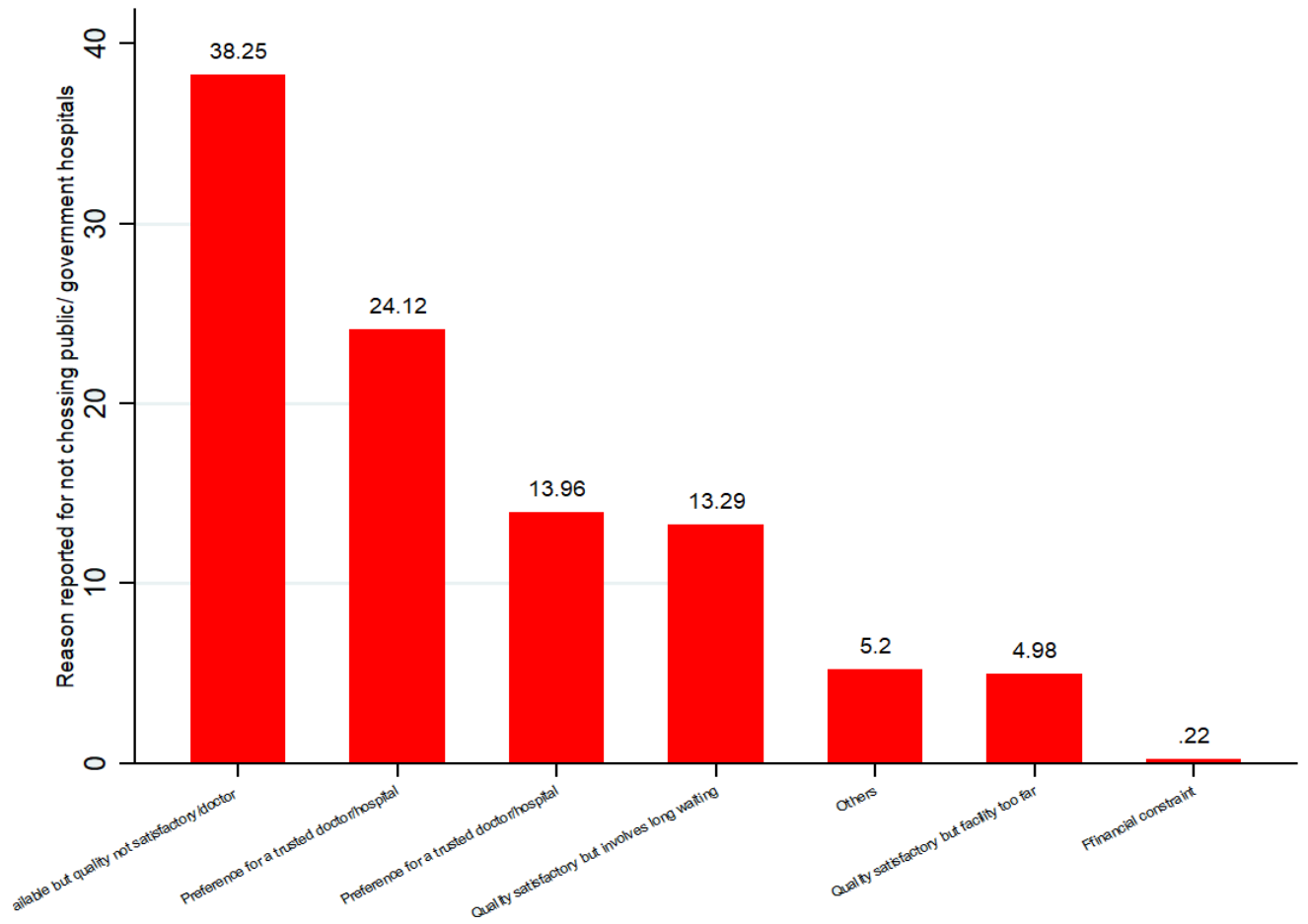
Supplementary Figure 4.2: Reasons for not choosing Public Hospitals

II. Balancing across covariates for different outcome variables

1. Balancing results for utilization pattern of hospitalization

a) Overall Insured versus Uninsured

Covariates	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Gender (male®)				
Female	-0.102	0.000	1.053	1.000
Age (0-18 years ®)				
19-40 years	-0.108	0.000	0.992	1.000
41-60 years	0.104	-0.003	1.141	0.996
61-80 years	0.096	0.001	1.245	1.002
80 years and above	0.027	0.011	1.293	1.103
Literacy (Not literate/No formal schooling ®)				
Literate with formal schooling: below primary/primary	-0.045	0.003	0.941	1.004
Up to secondary	-0.018	-0.001	0.984	0.999
Up to Higher Secondary	-0.002	0.000	0.995	1.000
Graduation and above	0.165	-0.002	1.442	0.996
Quintile (Quintile 1 ®)				
Quintile 2	-0.162	0.001	0.727	1.001
Quintile 3	-0.071	-0.001	0.889	0.999
Quintile 4	0.049	0.000	1.070	1.000
Quintile 5	0.293	-0.001	1.286	0.999
Sector (rural®)				
urban	0.093	0.001	1.020	1.000
Social class (Others ®)				
Scheduled Tribes	0.192	0.003	1.508	1.005
Scheduled Castes	-0.082	-0.002	0.860	0.997
Other backward classes	-0.036	-0.001	0.985	1.000
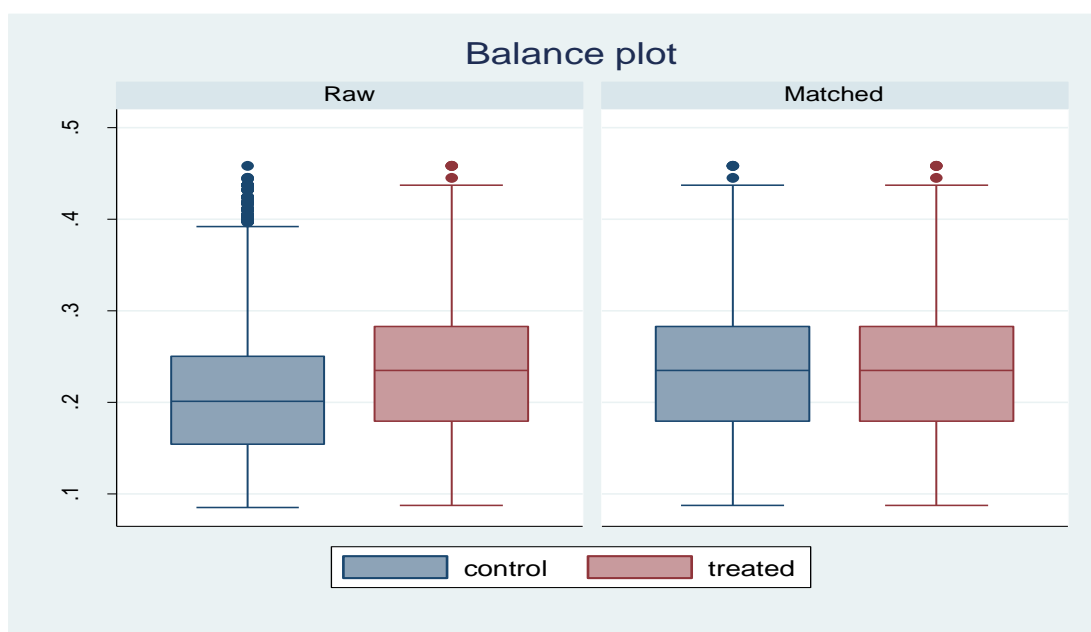
b) GSHI Insured versus Uninsured

Covariates	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Gender (male®)				
Female	-0.092	0.001	1.049	0.999
Age (0-18 years ®)				
19-40 years	-0.085	0.000	0.996	1.000
41-60 years	0.075	-0.001	1.103	0.999
61-80 years	0.089	-0.001	1.228	0.999
80 years and above	0.017	0.012	1.177	1.122
Literacy (Not literate/No formal schooling ®)				
Literate with formal schooling: below primary/primary	0.058	0.004	1.072	1.004
Up to secondary	0.016	-0.003	1.014	0.998
Up to Higher Secondary	-0.087	0.001	0.786	1.002
Graduation and above	-0.153	-0.001	0.621	0.998
Quintile (Quintile 1 ®)				
Quintile 2	-0.087	0.002	0.854	1.004
Quintile 3	-0.014	-0.001	0.979	0.998
Quintile 4	0.068	0.000	1.096	1.000
Quintile 5	0.098	-0.001	1.113	0.999
Sector (rural®)				
urban	-0.221	0.003	0.889	1.003
Social class (Others ®)				
Scheduled Tribes	0.252	0.002	1.666	1.003
Scheduled Castes	-0.016	0.000	0.973	1.000
Other backward classes	0.094	-0.001	1.027	1.000
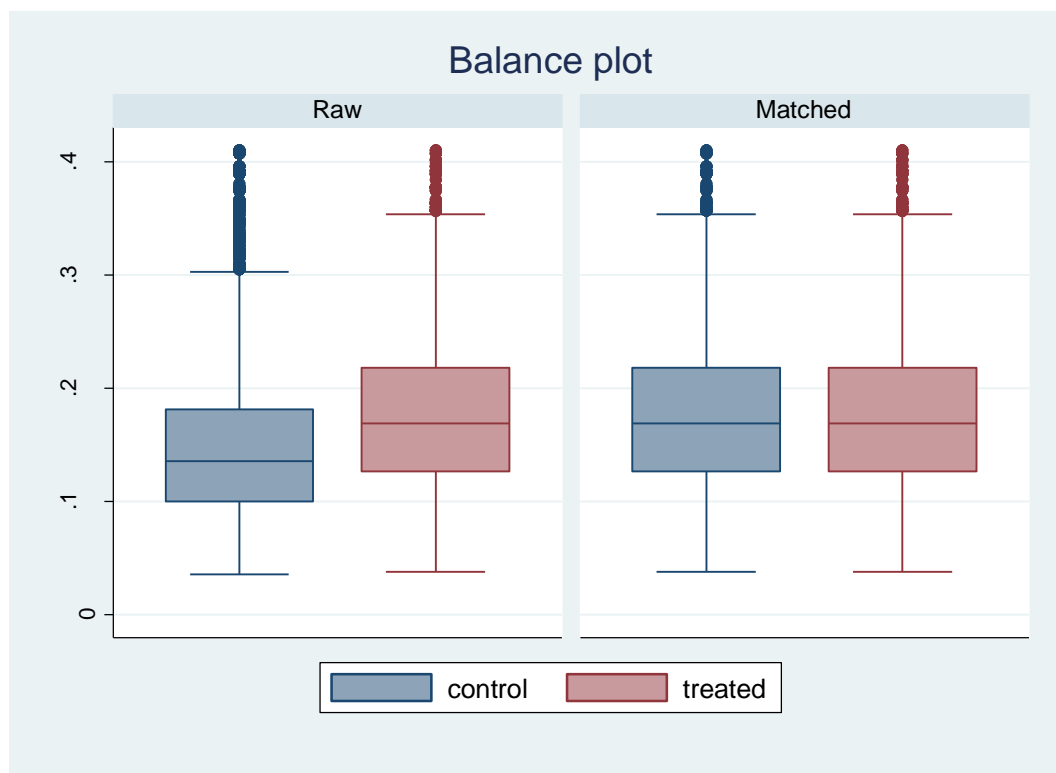
Balance plot

c) **Private health insurance versus Uninsured**

Covariates	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Gender (male®)				
Female	-0.148	0.000	1.071	1.000
Age (0-18 years ®)				
19-40 years	-0.187	0.000	0.973	1.000
41-60 years	0.165	-0.001	1.216	0.999
61-80 years	0.163	0.001	1.421	1.003
80 years and above	0.089	0.004	2.097	1.026
Literacy (Not literate/No formal schooling ®)				
Literate with formal schooling: below primary/primary	-0.341	0.000	0.527	1.000
Up to secondary	-0.194	-0.001	0.807	0.998
Up to Higher Secondary	0.111	0.003	1.287	1.006
Graduation and above	0.876	0.000	2.691	1.000
Quintile (Quintile 1 ®)				
Quintile 2	-0.468	0.003	0.248	1.014
Quintile 3	-0.303	0.000	0.523	1.000
Quintile 4	-0.018	0.001	0.974	1.002
Quintile 5	0.896	-0.002	1.262	1.001

Sector (rural®)				
urban	1.080	0.002	0.440	0.996
Social class (Others ®)				
Scheduled Tribes	-0.292	0.003	0.328	1.016
Scheduled Castes	-0.414	-0.002	0.321	0.990
Other backward classes	-0.371	0.000	0.750	1.000
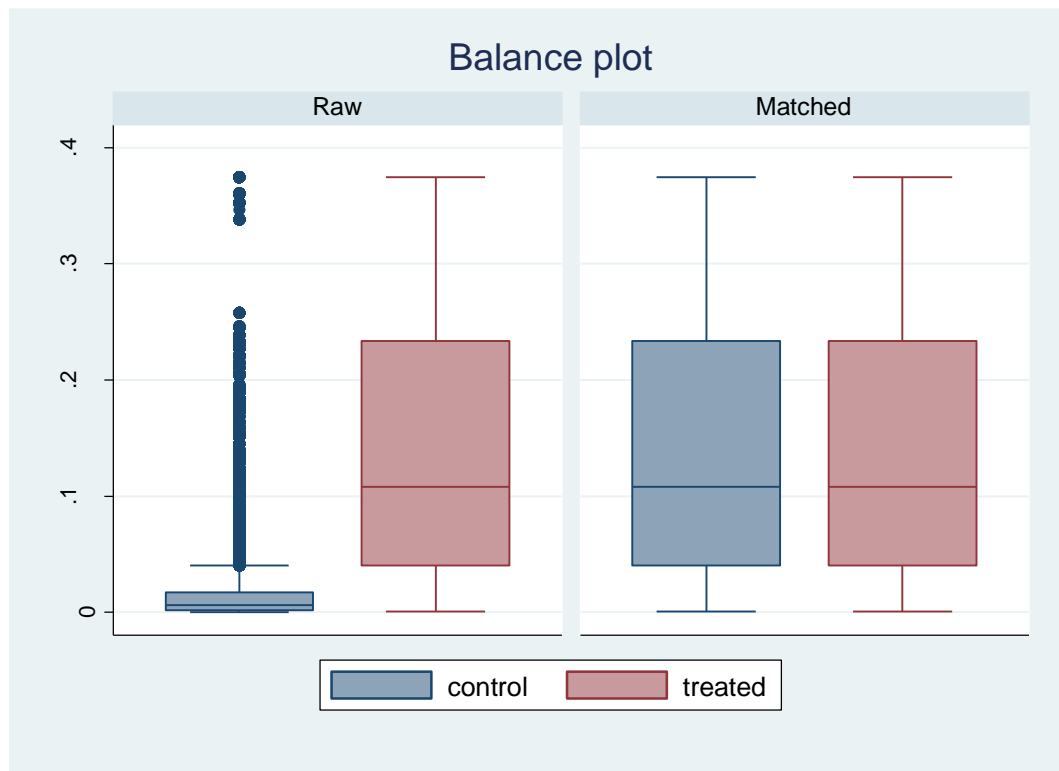
d) **GSHI Insured versus Uninsured (among poor persons only)**

Covariates	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Gender (male®)				
Female	-0.073	-0.003	1.055	1.002
Age (0-18 years ®)				
19-40 years	-0.048	-0.002	1.012	1.000
41-60 years	0.057	-0.003	1.099	0.996
61-80 years	0.093	0.009	1.306	1.023
80 years and above	0.027	0.000	1.494	1.000
Literacy (Not literate/No formal schooling ®)				
Literate with formal schooling: below primary/primary	0.053	-0.008	1.056	0.992
Up to secondary	0.042	0.001	1.041	1.001
Up to Higher Secondary	-0.010	-0.004	0.966	0.985
Graduation and above	-0.079	0.007	0.642	1.048

Quintile (Quintile 1 ®)				
Quintile 2	-0.086	-0.003	0.909	0.997
Quintile 3	-0.019	0.054	0.719	4.989
Quintile 4				
Quintile 5	-0.140	0.003	0.826	1.004
Sector (rural®)				
urban	0.350	0.001	1.563	1.001
Social class (Others ®)	-0.119	0.001	0.842	1.002
Scheduled Tribes	-0.034	-0.001	0.990	1.000
Scheduled Castes				
Other backward classes				
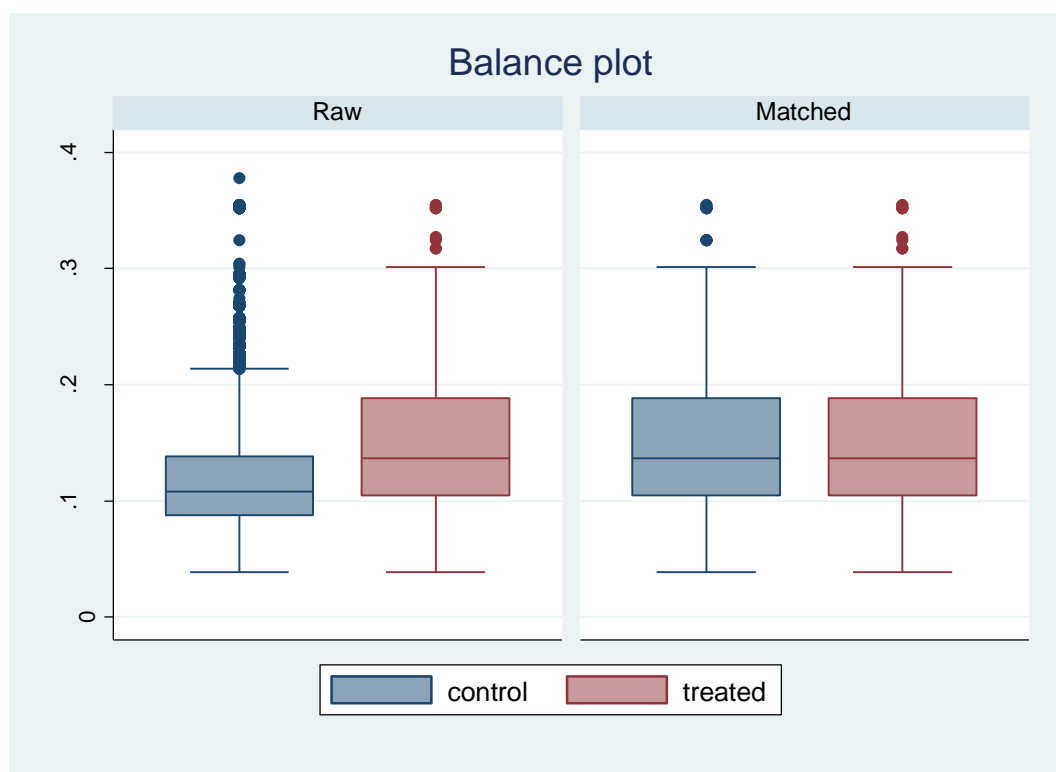
2. **Balancing results for financial protection (i.e., out-of-pocket health expenditure and Catastrophic Health Expenditure)**

a) **Overall Insured versus Uninsured**

Covariates	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Gender (male®)				
Female	-0.102	-0.012	1.053	1.005
Age (0-18 years ®)				
19-40 years	-0.108	-0.010	0.992	0.998
41-60 years	0.104	-0.009	1.141	0.990

61-80 years	0.096	-0.007	1.245	0.985
80 years and above	0.027	0.031	1.293	1.344
Literacy (Not literate/No formal schooling ®)				
Literate with formal schooling: below primary/primary	-0.045	0.015	0.941	1.021
Up to secondary	-0.018	-0.004	0.984	0.997
Up to Higher Secondary	-0.002	0.003	0.995	1.006
Graduation and above	0.165	-0.012	1.442	0.977
Quintile (Quintile 1 ®)				
Quintile 2	-0.162	0.011	0.727	1.025
Quintile 3	-0.071	-0.004	0.889	0.993
Quintile 4	0.049	0.002	1.070	1.002
Quintile 5	0.293	-0.009	1.286	0.995
Sector (rural®)				
urban	0.093	0.007	1.020	1.001
Social class (Others ®)				
Scheduled Tribes	0.192	0.010	1.508	1.018
Scheduled Castes	-0.082	0.013	0.860	1.027
Other backward classes	-0.036	-0.013	0.985	0.995
Provider (Public®)				
Private Provider	0.137	-0.014	1.000	1.002
Ailment (Infections®)				
Cancers	0.052	0.033	1.509	1.285
Blood Diseases	0.006	0.036	1.052	1.377
Endocrine, Metabolic, Nutritional	0.033	0.008	1.253	1.056
Psychiatric & Neurological	0.008	0.009	1.039	1.043
Genito-Urinary	0.054	-0.004	1.266	0.985
Obstetric	-0.035	-0.001	0.775	0.990
Eye	0.027	-0.003	1.184	0.981
Ear	0.006	0.020	1.107	1.398
Cardio-Vascular	0.057	-0.014	1.220	0.957
Respiratory	0.019	0.027	1.114	1.169
Gastro-Intestinal	0.001	-0.008	1.004	0.973
Skin	0.005	0.030	1.059	1.475
Musculo-Skeletal	0.041	0.000	1.234	1.000
Injuries	0.015	-0.013	1.045	0.964
Others	0.070	0.016	1.671	1.109
Childbirth	-0.120	-0.005	0.891	0.994
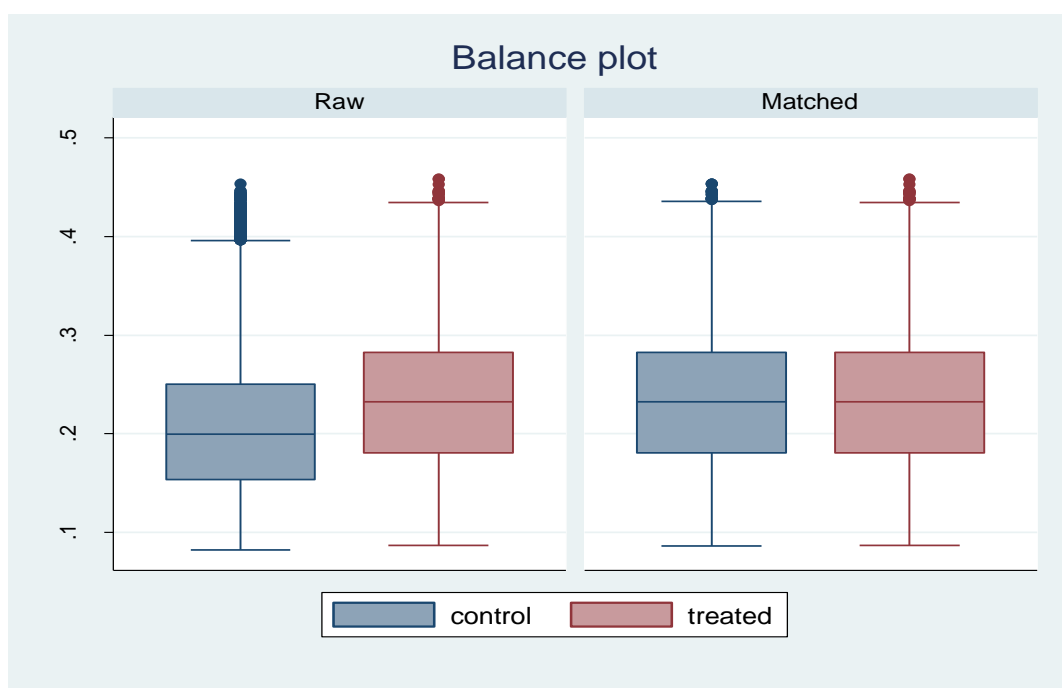
b) GSHI Insured versus Uninsured

Covariates	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Gender (male®)				
Female	-0.092	-0.006	1.049	1.003
Age (0-18 years ®)				
19-40 years	-0.085	-0.004	0.996	1.000
41-60 years	0.075	-0.015	1.103	0.983
61-80 years	0.089	-0.012	1.228	0.976
80 years and above	0.017	0.029	1.177	1.336
Literacy (Not literate/No formal schooling ®)				
Literate with formal schooling: below primary/primary	0.058	0.007	1.072	1.009
Up to secondary	0.016	0.004	1.014	1.003
Up to Higher Secondary	-0.087	0.006	0.786	1.018
Graduation and above	-0.153	0.002	0.621	1.007
Quintile (Quintile 1 ®)				
Quintile 2	-0.087	-0.002	0.854	0.995
Quintile 3	-0.014	-0.001	0.979	0.999
Quintile 4	0.068	-0.004	1.096	0.995
Quintile 5	0.098	0.004	1.113	1.004
Sector (rural®)				
urban	-0.221	0.017	0.889	1.013
Social class (Others ®)				
Scheduled Tribes	0.252	0.006	1.666	1.010
Scheduled Castes	-0.016	0.009	0.973	1.016

	Standardized differences		Variance ratio	
Other backward classes	0.094	-0.016	1.027	0.997
Provider (Public®)				
Private Provider	-0.028	-0.010	0.996	0.998
Ailment (Infections®)				
Cancers	0.039	0.046	1.379	1.461
Blood Diseases	0.013	0.024	1.114	1.224
Endocrine, Metabolic, Nutritional	0.021	0.009	1.153	1.066
Psychiatric & Neurological	0.016	0.000	1.076	1.002
Genito-Urinary	0.049	0.000	1.244	0.999
Obstetric	-0.049	-0.006	0.693	0.953
Eye	0.036	0.022	1.250	1.142
Ear	0.012	0.022	1.202	1.445
Cardio-Vascular	0.031	-0.018	1.119	0.940
Respiratory	0.023	0.026	1.140	1.159
Gastro-Intestinal	-0.012	-0.012	0.960	0.961
Skin	0.002	0.039	1.019	1.720
Musculo-Skeletal	0.024	0.005	1.134	1.025
Injuries	0.031	-0.023	1.095	0.939
Others	0.061	0.039	1.571	1.320
Childbirth	-0.096	-0.004	0.915	0.996
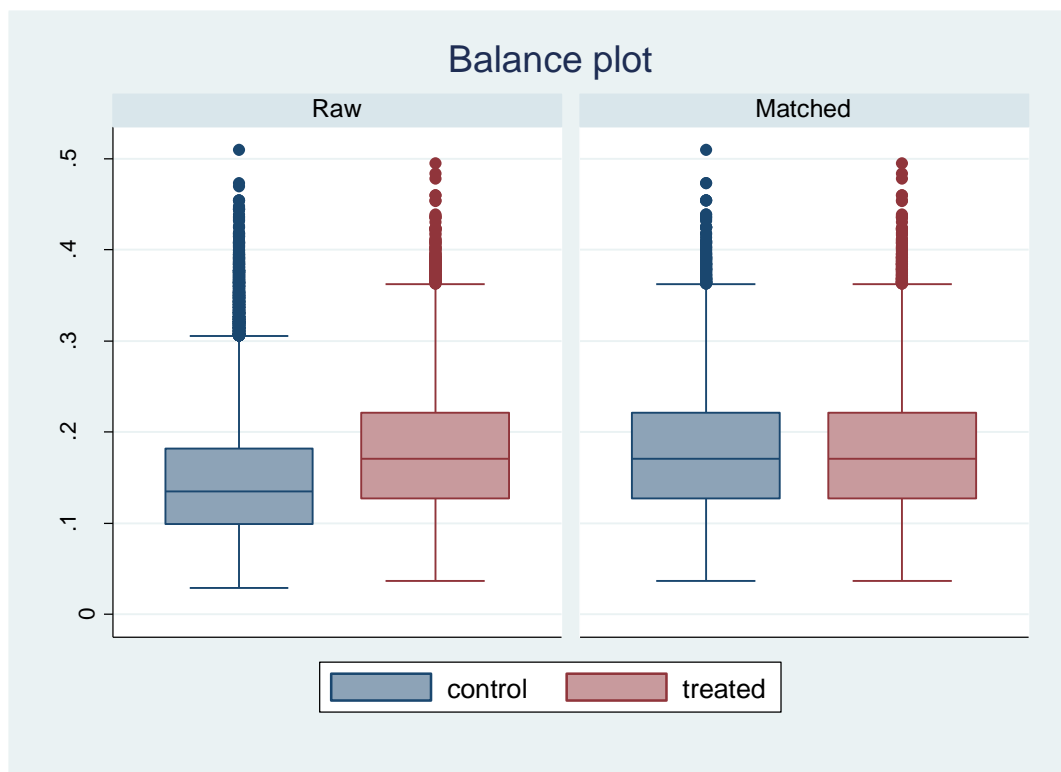
Balance plot

c) **Private health insurance versus Uninsured**

Covariates	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Gender (male®)				
Female	-0.148	-0.023	1.071	1.007

Age (0-18 years ®)				
19-40 years	-0.187	0.012	0.973	1.004
41-60 years	0.165	-0.004	1.216	0.997
61-80 years	0.163	-0.014	1.421	0.975
80 years and above	0.089	0.008	2.097	1.053
Literacy (Not literate/No formal schooling ®)				
Literate with formal schooling: below primary/primary	-0.341	-0.031	0.527	0.926
Up to secondary	-0.194	-0.015	0.807	0.980
Up to Higher Secondary	0.111	0.008	1.287	1.015
Graduation and above	0.876	0.028	2.691	1.005
Quintile (Quintile 1 ®)				
Quintile 2	-0.468	0.023	0.248	1.120
Quintile 3	-0.303	-0.009	0.523	0.974
Quintile 4	-0.018	0.005	0.974	1.008
Quintile 5	0.896	-0.007	1.262	1.004
Sector (rural®)				
urban	1.080	-0.016	0.440	1.039
Social class (Others ®)				
Scheduled Tribes	-0.292	0.025	0.328	1.149
Scheduled Castes	-0.414	-0.010	0.321	0.961
Other backward classes	-0.371	-0.005	0.750	0.994
Provider (Public®)				
Private Provider	1.089	-0.004	0.331	1.011
Ailment (Infections®)				
Cancers	0.073	0.047	1.753	1.405
Blood Diseases	0.017	0.027	1.150	1.257
Endocrine, Metabolic, Nutritional	0.035	0.022	1.267	1.154
Psychiatric & Neurological	-0.037	0.022	0.830	1.128
Genito-Urinary	0.103	0.018	1.535	1.068
Obstetric	-0.061	-0.009	0.626	0.924
Eye	0.026	-0.010	1.174	0.944
Ear	-0.007	0.021	0.883	1.498
Cardio-Vascular	0.122	-0.024	1.492	0.937
Respiratory	0.014	0.026	1.081	1.165
Gastro-Intestinal	0.039	-0.008	1.131	0.978
Skin	0.025	0.037	1.322	1.541
Musculo-Skeletal	0.123	-0.016	1.777	0.941
Injuries	-0.049	0.000	0.856	1.000
Others	0.034	0.029	1.307	1.255
Childbirth	-0.216	-0.004	0.793	0.995
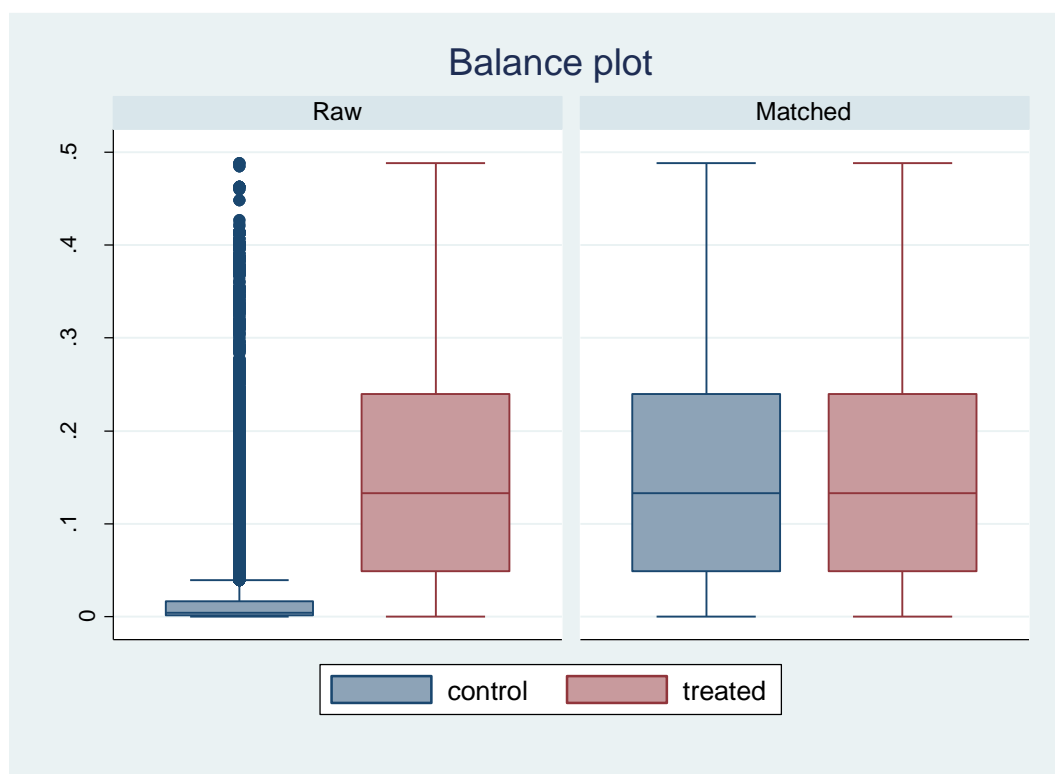
Balance plot

d) **GSHI Insured versus Uninsured (among poor persons only)**

Covariates	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Gender (male®)				
Female	-0.073	0.019	1.055	0.988
Age (0-18 years ®)				
19-40 years	-0.048	-0.020	1.012	1.004
41-60 years	0.057	-0.017	1.099	0.974
61-80 years	0.093	-0.012	1.306	0.970
80 years and above	0.027	0.064	1.494	3.321
Literacy (Not literate/No formal schooling ®)				
Literate with formal schooling: below primary/primary	0.053	0.025	1.056	1.025
Up to secondary	0.042	-0.018	1.041	0.985
Up to Higher Secondary	-0.010	-0.011	0.966	0.962
Graduation and above	-0.079	-0.004	0.642	0.978
Quintile (Quintile 1 ®)				
Quintile 2	-0.086	-0.029	0.909	0.967
Quintile 3	-0.019	0.000	0.719	1.000
Sector (rural®)				
urban	-0.140	0.019	0.826	1.032
Social class (Others ®)				
Scheduled Tribes	0.350	-0.002	1.563	0.998
Scheduled Castes	-0.119	0.042	0.842	1.075

Other backward classes	-0.034	-0.021	0.990	0.993
Provider (Public®)				
Private Provider	-0.097	0.025	0.925	1.024
Ailment (Infections®)				
Cancers	0.013	0.064	1.150	2.238
Blood Diseases	0.019	0.027	1.163	1.246
Endocrine, Metabolic, Nutritional	0.014	0.058	1.133	1.775
Psychiatric & Neurological	-0.033	0.006	0.841	1.036
Genito-Urinary	0.025	0.017	1.135	1.087
Obstetric	-0.068	-0.017	0.616	0.873
Eye	0.038	-0.047	1.274	0.772
Ear	-0.039	-0.021	0.495	0.667
Cardio-Vascular	0.021	0.027	1.102	1.134
Respiratory	-0.019	0.016	0.882	1.119
Gastro-Intestinal	-0.042	-0.014	0.861	0.951
Skin	0.032	0.000	1.437	1.000
Musculo-Skeletal	0.055	0.053	1.389	1.369
Injuries	0.017	-0.011	1.052	0.968
Others	0.047	0.059	1.461	1.638
Childbirth	-0.085	-0.014	0.953	0.991

Balance plot
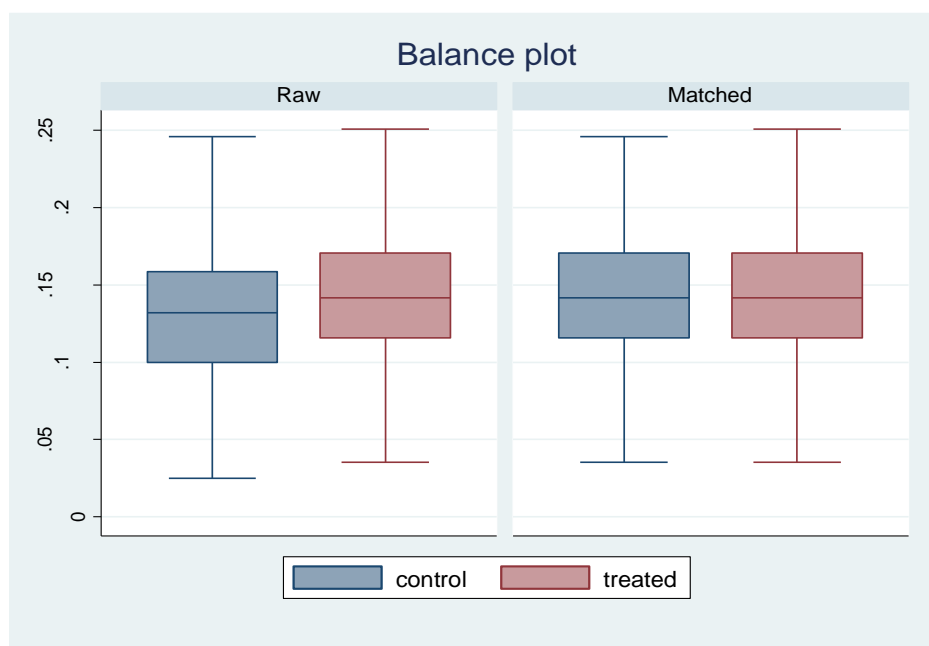
3. Balancing results for impoverishment due to out-of-pocket health expenditure

a) Overall Insured Vs. Uninsured

Covariates	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Gender (male®)				
Female	-0.093	-0.010	1.054	1.005
Age (0-18 years ®)				

19-40 years	-0.099	-0.009	0.999	0.999
41-60 years	0.099	-0.009	1.138	0.990
61-80 years	0.087	-0.002	1.233	0.995
80 years and above	0.021	0.024	1.233	1.274
Literacy (Not literate/No formal schooling ®)				
Literate with formal schooling: below primary/primary	-0.049	0.001	0.935	1.001
Up to secondary	-0.017	0.000	0.985	1.000
Up to Higher Secondary	-0.003	0.004	0.992	1.009
Graduation and above	0.168	-0.007	1.444	0.988
Quintile (Quintile 1 ®)				
Quintile 2	-0.170	0.008	0.714	1.019
Quintile 3	-0.071	0.002	0.889	1.004
Quintile 4	0.052	-0.010	1.074	0.987
Quintile 5	0.296	-0.003	1.295	0.998
Sector (rural®)				
urban	0.096	0.006	1.021	1.001
Social class (Others ®)				
Scheduled Tribes	0.204	0.003	1.527	1.005
Scheduled Castes	-0.085	0.012	0.855	1.025
Other backward classes	-0.044	-0.011	0.982	0.995
Provider (Public®)				
Private Provider	0.137	-0.016	1.007	1.002
both	0.034	0.046	1.318	1.479
Ailment (Infections®)				
Cancers	0.030	0.027	1.323	1.285
Blood Diseases	0.002	0.033	1.017	1.384
Endocrine, Metabolic, Nutritional	0.022	0.015	1.174	1.112
Psychiatric & Neurological	0.005	0.005	1.025	1.026
Genito-Urinary	0.052	-0.009	1.268	0.965
Obstetric	-0.047	-0.007	0.692	0.945
Eye	0.025	0.011	1.171	1.071
Ear	0.010	0.029	1.170	1.664
Cardio-Vascular	0.050	-0.008	1.201	0.971
Respiratory	0.016	0.030	1.103	1.205
Gastro-Intestinal	-0.008	-0.006	0.975	0.979
Skin	-0.003	0.037	0.958	1.710
Musculo-Skeletal	0.041	-0.002	1.243	0.992
Injuries	0.017	-0.014	1.052	0.960
Others	0.064	0.020	1.647	1.152
Childbirth	-0.111	-0.008	0.909	0.992
more than one	0.060	0.014	1.605	1.100
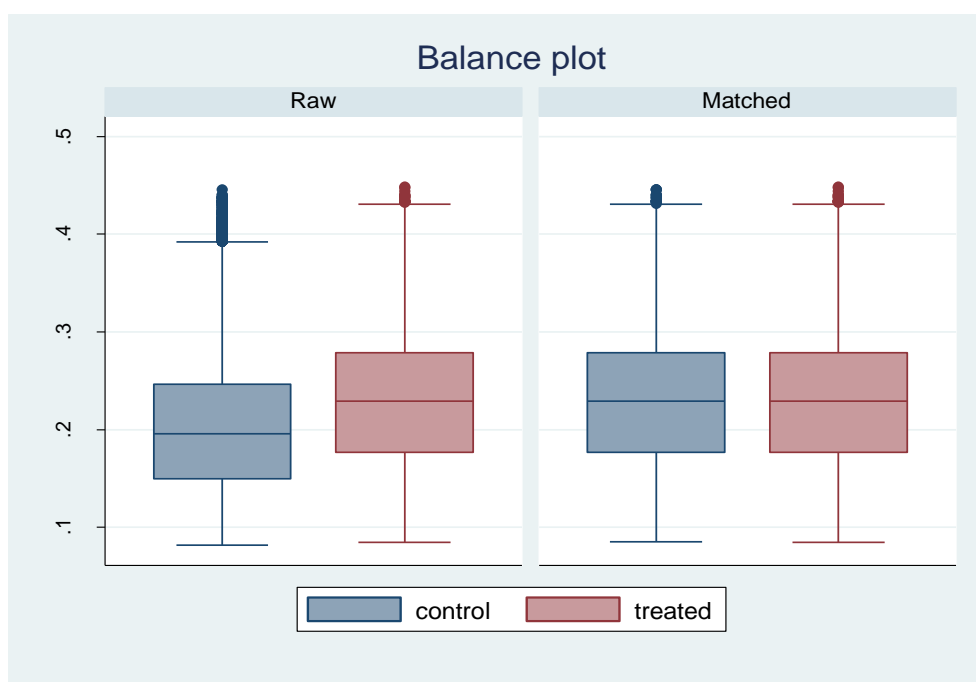
Balance plot

b) GSHI Insured versus Uninsured

Covariates	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Gender (male®)				
Female	-0.077	-0.007	1.045	1.003
Age (0-18 years ®)				
19-40 years	-0.075	0.000	1.001	1.000
41-60 years	0.074	-0.016	1.105	0.980
61-80 years	0.077	-0.007	1.207	0.985
80 years and above	0.008	0.037	1.084	1.523
Literacy (Not literate/No formal schooling ®)				
Literate with formal schooling: below primary/primary	0.049	0.002	1.062	1.003
Up to secondary	0.021	-0.006	1.018	0.996
Up to Higher Secondary	-0.080	-0.004	0.804	0.987
Graduation and above	-0.150	0.005	0.633	1.018
Quintile (Quintile 1 ®)				
Quintile 2	-0.095	0.012	0.842	1.025
Quintile 3	-0.012	-0.002	0.981	0.996
Quintile 4	0.067	0.003	1.095	1.004
Quintile 5	0.103	-0.014	1.121	0.986
Sector (rural®)				
urban	-0.216	0.014	0.891	1.011
Social class (Others ®)				
Scheduled Tribes	0.263	0.015	1.675	1.023
Scheduled Castes	-0.016	0.001	0.973	1.002

Other backward classes	0.081	-0.016	1.024	0.997
Provider (Public®)				
Private Provider	-0.028	-0.002	0.994	1.000
both	0.038	0.020	1.357	1.171
Ailment (Infections®)				
Cancers	0.018	0.025	1.195	1.281
Blood Diseases	0.003	0.037	1.028	1.451
Endocrine, Metabolic, Nutritional	0.005	0.014	1.041	1.115
Psychiatric & Neurological	0.009	0.000	1.044	1.002
Genito-Urinary	0.051	-0.003	1.265	0.986
Obstetric	-0.057	-0.010	0.627	0.918
Eye	0.036	-0.003	1.251	0.985
Ear	0.017	0.026	1.294	1.525
Cardio-Vascular	0.023	-0.009	1.093	0.966
Respiratory	0.014	0.018	1.088	1.113
Gastro-Intestinal	-0.022	-0.002	0.930	0.994
Skin	-0.006	0.035	0.924	1.679
Musculo-Skeletal	0.027	-0.004	1.158	0.981
Injuries	0.033	-0.010	1.102	0.973
Others	0.058	0.019	1.582	1.147
Childbirth	-0.083	-0.006	0.933	0.995
more than one	0.052	0.021	1.515	1.165
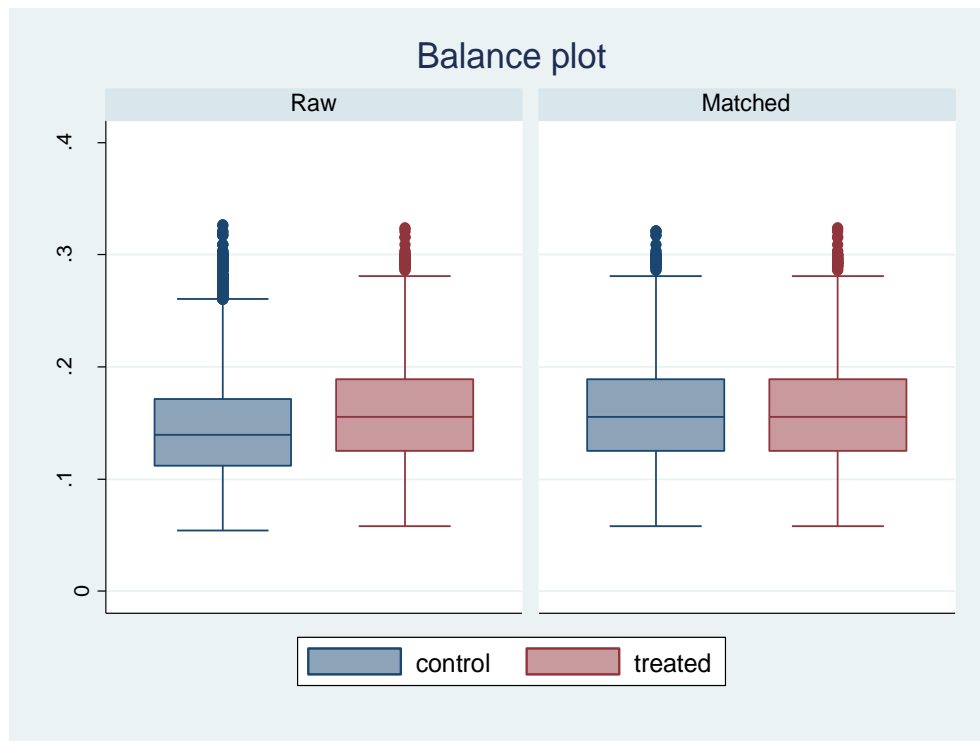
Balance plot

c) Private health insurance versus Uninsured

Covariates	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Gender (male®)				
Female	-0.167	-0.027	1.084	1.009
Age (0-18 years ®)				
19-40 years	-0.191	-0.019	0.982	0.995
41-60 years	0.152	0.003	1.207	1.003
61-80 years	0.174	0.021	1.471	1.04
80 years and above	0.085	0.057	2.103	1.589
Literacy (Not literate/No formal schooling ®)				
Literate with formal schooling: below primary/primary	-0.342	-0.008	0.524	0.98
Up to secondary	-0.193	-0.027	0.81	0.965
Up to Higher Secondary	0.108	0.007	1.274	1.014
Graduation and above	0.874	0.031	2.652	1.005
Quintile (Quintile 1 ®)				
Quintile 2	-0.463	0.025	0.258	1.128
Quintile 3	-0.309	-0.014	0.514	0.96
Quintile 4	-0.012	0.004	0.983	1.007
Quintile 5	0.9	-0.001	1.276	1.001
Sector (rural®)				
urban	1.091	-0.027	0.433	1.068
Social class (Others ®)				
Scheduled Tribes	-0.292	0.003	0.341	1.017
Scheduled Castes	-0.426	-0.003	0.3	0.988
Other backward classes	-0.371	0.015	0.75	1.019
Provider (Public®)				
Private Provider	1.121	0.002	0.333	0.994
both	-0.085	0.029	0.378	1.597
Ailment (Infections®)				
Cancers	0.052	0.053	1.591	1.615
Blood Diseases	0.019	0.033	1.186	1.348
Endocrine, Metabolic, Nutritional	0.036	0.021	1.291	1.153
Psychiatric & Neurological	-0.024	0.028	0.882	1.176
Genito-Urinary	0.095	0	1.51	1
Obstetric	-0.083	-0.012	0.481	0.883
Eye	0.016	-0.008	1.107	0.955
Ear	-0.003	0.022	0.951	1.498
Cardio-Vascular	0.109	-0.011	1.46	0.969
Respiratory	0.033	0.007	1.21	1.04
Gastro-Intestinal	0.014	-0.024	1.047	0.928
Skin	0.02	0.044	1.259	1.744
Musculo-Skeletal	0.125	-0.033	1.811	0.883
Injuries	-0.041	-0.002	0.879	0.993

Others	0.049	0.023	1.489	1.189
Childbirth	-0.218	-0.006	0.805	0.993
more than one	0.069	0.035	1.704	1.28

Balance plot
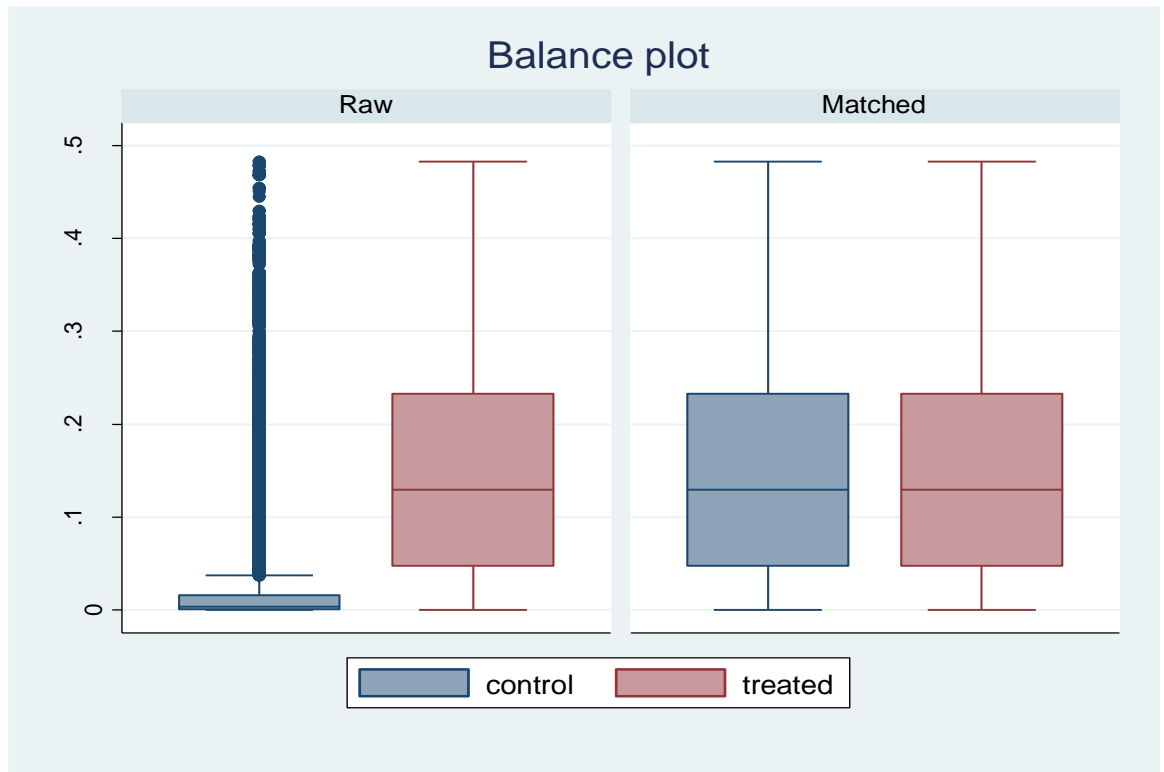
Chapter 5 Impact of Health Insurance on Accessibility, Utilization of Inpatient Care, and Financial Risk Protection across States/Union territories

5.1 Introduction

The reliance on out-of-pocket expenditure (OOPE) to finance healthcare is a common feature in many low- and middle-income countries [1-2]. People lacking sufficient financial safeguards, face the risk of incurring large unforeseen medical expenditures. These unforeseen expenditures sometimes lead to reduction in living standards, poverty, and indebtedness [3-4]. In India, 50.6% of the health expenditure is financed through out of pocket [5].

Several health insurance programmes have been launched to improve accessibility to care and safeguard people against associated financial catastrophes in India [6]. India has initiated social health insurance schemes, such as Employee state health insurance schemes (ESIS) 1952 and Central Government health scheme (CGHS) 1954 to provide coverage to formal sector employed. Private health insurance is also available in India that enables individuals to buy health insurance on their own based on their ability-to-pay premium [6]. Furthermore, government-sponsored health insurance (GSHI) schemes have received tremendous attention in India as a measure for risk-pooling and for safeguarding against health shocks, mainly for poor and vulnerable population [6]. Indian constitution has categorised health as a matter of state [7], therefore GSHI schemes are prevalent at both national (Rashtriya Swasthya Bima Yojsana (RSBY) 2008, Pradhan Mantri Jan Arogya Yojana (PM-JAY) 2018) and state level (e.g., Rajiv Aarogyasri Health Insurance Scheme (2007) in Andhra Pradesh, Vajpayee Arogyasri Scheme (2009-10) in Karnataka, Chief Minister's Comprehensive Health Insurance scheme (2012) in Tamil Nadu) [6].

In India, there is considerable variation in health insurance enrolment and prevailing schemes across different states [6], highlighting the need to evaluate the impact of health insurance across all states. Previous studies were mainly limited to examining the impact of only GSHI schemes in a few states, namely, Chhattisgarh [8-9], Haryana [10-11], Maharashtra [12-14], Gujarat [10-11,15], Uttar Pradesh [10-12,16], Andhra Pradesh [13,17], Karnataka [17-20], Bihar [16], Tamil Nadu [17], Kerela [21], Jharkhand [22], and Odisha [23]. A few studies analysed the impact of any health insurance scheme [24-27] or any GSHI schemes at the national level only [28-29]. Existing studies provides mixed results regarding the effectiveness of health insurance in providing financial protection to insured beneficiaries [30-31]. A comprehensive examination of the impact of health insurance across all Indian states is missing. Also, previous studies were conducted in different years with different datasets, which limits the comparability between them. Furthermore, studies examining pattern of utilization of inpatient care in the context of health insurance are limited [9-10,17,29]. Additionally, previous studies were mainly focused on specific cases (i.e., particular state or insurance scheme), and lacks in providing a comprehensive examination of the impact of overall health insurance enrolment on accessibility, utilization pattern of inpatient care, and financial risk protection across all states and union territories (UTs) in India.

Against this backdrop, in this chapter, we first analysed the impact of health insurance in providing access to inpatient care. Second, we analysed the role of health insurance towards the utilization pattern of inpatient care (measured in terms of type of provider, duration of hospital stay, and number of times hospitalized). Third, we assessed the impact of health insurance in safeguarding against financial risk (OOPE, catastrophic health expenditure (CHE) at various thresholds, and impoverishment due to OOPE). Entire analysis was performed separately for each of the states/UTs of India. Furthermore, we review and extensively discuss the findings of the previous literature that examined the impact of the health insurance schemes in providing

financial protection in India. This comprehensive assessment of the impact of health insurance across all states/UTs, is expected to serve as an informative guide to assess whether health insurance has met its objectives and to identify the states/UTs that require greater policy attention.

5.2. Data and methodology

5.2.1 Overview of data source

The most recent round (75th round) of the nationally representative survey on health and morbidity, entitled "Social Consumption: Health" was employed in the chapter [32]. The survey was conducted by the National Sample Survey Organisation (NSSO) during July 2017 to June 2018, and covered 555,115 persons (325,883 in rural areas and 229,232 in urban areas) from 113,823 households (64,552 in rural areas and 49,271 in urban areas) in India. The survey collected extensive information about hospitalization, cost of care, nature of ailment, maternal and elderly health dimensions, and demographic and socio-economic characteristics of households and their members. A total of 91,445 hospitalization incidence were reported during the last 365 days [32]. Information regarding the coverage of households under any health insurance scheme was also recorded and categorized into five groups; government-sponsored (e.g., RSBY, Arogyasri), government employer (e.g., CGHS), employer-supported (other than government employer, for instance, ESIS), insurance arranged on their own (also known as private health insurance), and others [32].

5.2.2 Outcome variables

The primary outcome variables analysed were accessibility to inpatient care, utilization of inpatient care (in terms of type of provider, duration of hospital stay, and more than once hospitalized), and financial risk due to inpatient care in context of health insurance. Access to inpatient care is determined by whether an individual has undergone hospitalization during the

last 365 days preceding to the survey. The utilization pattern was analysed in terms of type of healthcare provider, more than once hospitalized, and duration of hospital stay[6]. The financial protection was measured through OOPE incurred, catastrophic health expenditure incidence (CHE), and impoverishment. We computed OOPE by summing all hospitalization-related expenditures, such as package component, doctors'/surgeons' fees, medicines, diagnostic tests, bed charges, other medical expenses, and transportation expenses, and then deducting any reimbursement received. The methodology provided by Wagstaff and Doorslaer [34] was applied to estimate CHE. An incidence of health expenditure was considered to be catastrophic if OOPE exceeded 10% (CHE 10), 25% (CHE 25), or 40% (CHE 40) of the total annual household consumption expenditure [9,17,28,34]. Furthermore, impoverishment was said to be experienced, if individuals whose annual per capita consumption expenditure was initially above the poverty line but later fell below it due to hospitalization-related OOPE were considered [35-36]. For all outcomes, the impact of overall health insurance enrolment (i.e., enrolled in any health insurance scheme) was analysed separately in each state/UTs. We have restricted our analysis to hospitalization cases only, as most of the health insurance schemes in India are mainly limited to cover inpatient care.

5.2.3 Statistical analysis

We employed propensity score matching (PSM) technique to gauge the effectiveness of health insurance in providing financial protection to Indian households.

The study aims to compare the outcomes between insured and uninsured. However, a direct comparison of outcomes between the groups may lead to biased estimate of the treatment effect (i.e., health insurance in our case) [37-39], because treatment groups may not be comparable in their pre-treatment characteristics [37-39]. Therefore, in line with previous studies [9,12,28-

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[6] The duration of stay in hospital was considered 'short' if it was up to six days, while it was considered 'long' if the stay was for more than six days.

29,40], we have employed the PSM technique that controls the confounding bias, hence, clearly demonstrating the impact of treatment. We estimated the impact of health insurance on accessibility, utilization of inpatient care, and financial risk protection across states/UTs.

We estimated the average treatment effect on the treated (ATET), that measures the average difference in outcomes that the treatment group obtained with health insurance coverage and the treatment group would have obtained without health insurance. ATET is measured through the following equation [20,41-43].

$$ATET = E(Y_1 - Y_0|(D = 1)) = E(Y_1|D = 1) - E(Y_0|D = 1) \qquad (2)$$

In the above equation, ATET represents the change in outcome due to health insurance, Y_1 is the estimate of an outcome value if treated (insured), Y_0 is the estimate of an outcome value if not treated (not insured), D=1 is the participation status in case of treatment, and D=0 is the participation status of the untreated. Variables namely, age, gender, education, social class, sector (rural/urban), and economic quintiles were used as matching variable for utilization outcomes, and additionally type of healthcare provider and ailment category were also used for financial protection outcomes. Nearest neighbour matching method was used to match the covariates between the groups [28,38,39,41]. The model was run separately for each state/UT. All the analysis was carried out using Stata software (version 14.1).

5.3 Results

5.3.1 Health insurance enrolment across States/UTs

In India, a dismally low proportion of the population (15.53%) was found to be enrolled under any health insurance scheme, with a substantial variation across states/UTs (Figure 5.1). In 22 out of 36 states/UTs, insurance enrolment was lower than the national average. Notably, in Mizoram (78.57%), Andhra Pradesh (72.79%), Chhattisgarh (64.29%), Telangana (61.09%), Dadra and Nagar Haveli (58.25%), and Meghalaya (53.9%), majority of the population was

enrolled in any health insurance scheme. By contrast, in Puducherry, Jammu and Kashmir, Sikkim, Manipur, Uttar Pradesh, Madhya Pradesh, Jharkhand, and Bihar, less than even 5% of the population was enrolled under any health insurance scheme. Of all the health insurance schemes prevalent in India, the highest enrolment was observed under GSHI schemes followed by CGHS, and private health insurance (1.28%) (Supplementary Table 5.1). In many states/UTs, higher enrolment was observed in GSHI schemes compared to any other health insurance scheme, while in a few well-off states/UTs, such as Chandigarh, Delhi, Maharashtra, and Haryana, higher enrolment was reported under private health insurance. Nearly 5-15% of the population was enrolled under CGHS in a few states/UTs, such as Chandigarh, Mizoram, Lakshadweep, Andaman and Nicobar Islands, Delhi, Daman and Diu, Himachal Pradesh, and Meghalaya. However, enrolment under ESIS and other health insurance schemes was very low across most states/UTs.
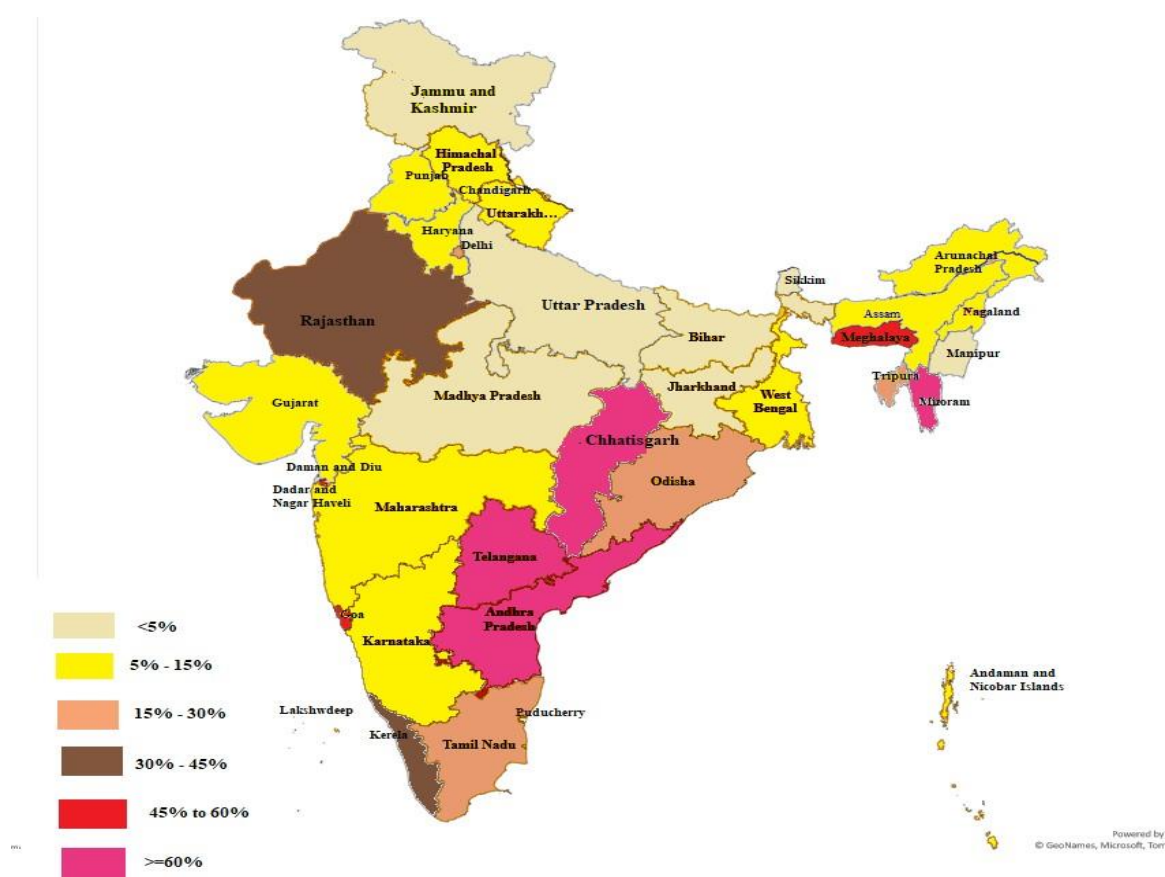
Figure 5.1 Health insurance enrolment across states/UTs

5.3.2 Impact of health insurance on accessibility and utilization pattern of inpatient care across states/UTs

Table 5.1 presents the impact of health insurance on accessibility and utilization pattern of hospitalization using PSM. Access to inpatient care was statistically significantly higher among insured than uninsured in 21/32 states/UTs (p<0.05). In states/UTs such as Chandigarh, Uttarakhand, Tripura, Assam, Chhattisgarh, Dadar and Nagar Haveli, Andhra Pradesh, Goa, Tamil Nadu, and Telangana health insurance enrolment did not statistically significantly lead to higher utilization of inpatient care in comparison to uninsured (p>0.05).

Furthermore, among those who utilized the inpatient care, hospitalization episodes more than once were also statistically significantly higher among insured than uninsured across most states/UTs (p<0.05). On the other hand, hospitalization episodes with private providers were marginally but statistically significantly higher among insured than uninsured in a few states/UTs namely, Delhi, Karnataka, Maharashtra, West Bengal, Sikkim, Tripura, Odisha, and Meghalaya (p<0.05). In Kerala and Punjab, the hospitalization episodes with private providers were statistically significantly lower among insured than uninsured (p<0.05). Similarly, the episodes of longer duration of hospital stay were statistically significantly higher among insured in only few states namely, Maharashtra, Himachal Pradesh, Punjab, Odisha, Uttar Pradesh, Manipur, and Sikkim (p<0.05) (Table 5.1).

Table 5.1 Impact of health insurance on accessibility and utilization of inpatient care across states/UTs

States/UTs	Access to inpatient care	Utilization pattern of inpatient care		
		Private provider	Duration of longer stay	More than once hospitalized
	ATET	ATET	ATET	ATET
Assam	0.0219 [-0.0054 to 0.0491]	0.0467 [-0.0457 to 0.1391]	0.033 [-0.0533 to 0.1194]	0.0348 [-0.0073 to 0.0769]
Bihar	0.1055* [0.0465 to 0.1645]	-0.1526 [-0.2657 to -0.0395]	0.031 [-0.0672 to 0.1291]	-0.0531 [-0.0973 to -0.009]
Jharkhand	0.1322* [0.0576 to 0.2068]	-0.1418 [-0.3244 to 0.0407]	-0.0273 [-0.1732 to 0.1186]	0.0215* [0.0709 to 0.3588]
Madhya Pradesh	0.0366* [0.0081 to 0.0651]	0.0208 [-0.0623 to 0.1038]	0.0739 [-0.0071 to 0.1548]	0.113* [0.0482 to 0.1777]
Odisha	0.0172* [0.0014 to 0.0330]	0.0498* [0.0064 to 0.0931]	0.0553* [0.0079 to 0.1028]	0.0996* [0.0641 to 0.1351]
Uttar Pradesh	0.0333* [0.0109 to 0.0557]	-0.0066 [-0.0611 to 0.0478]	0.0672* [0.0044 to 0.1300]	0.1002* [0.0507 to 0.1498]
Arunachal Pradesh	0.0734* [0.0453 to 0.1016]	0.0448 [-0.0281 to 0.1177]	-0.0056 [-0.1022 to 0.0909]	-0.0256 [-0.0504 to -0.0007]
Gujarat	0.0246* [0.0104 to 0.0387]	-0.0097 [-0.0543 to 0.0348]	0.0328 [-0.0099 to 0.0754]	0.1171* [0.0864 to 0.1479]
Manipur	0.0989* [0.0445 to 0.1533]	0.0105 [-0.0693 to 0.0904]	0.1215* [0.0173 to 0.2257]	-0.0005 [-0.0016 to 0.0005]
Nagaland	0.069* [0.0251 to 0.1129]	-0.0709 [-0.1736 to 0.0318]	-0.0035 [-0.0553 to 0.0482]	-0.0094 [-0.0275 to 0.0087]
Sikkim	0.2409* [0.1583 to 0.3234]	0.0268* [0.1535 to 0.3835]	0.0189* [0.0450 to 0.3347]	0.0357 [-0.0303 to 0.1017]
Tripura	0.0178 [-0.0099 to 0.0455]	0.0371* [0.0002 to 0.0741]	0.0341 [-0.0395 to 0.1076]	0.1091* [0.0569 to 0.1614]
Uttarakhand	0.0175 [-0.0189 to 0.0539]	-0.01 [-0.1236 to 0.1036]	0.053 [-0.0592 to 0.1653]	0.1207* [0.0634 to 0.1779]
Haryana	0.0518* [0.0292 to 0.0745]	0.0521 [-0.0117 to 0.1158]	0.0467 [-0.0143 to 0.1078]	0.0661 [0.0155 to 0.1167]
Jammu and Kashmir	0.0222 [-0.0021 to 0.0466]	-0.0116 [-0.0836 to 0.0603]	-0.0293 [-0.0866 to 0.0279]	-0.002 [-0.0419 to 0.0378]
Karnataka	0.0361* [0.0160 to 0.0563]	0.0634* [0.0239 to 0.1030]	0.0515* [0.0012 to 0.1019]	0.089* [0.0592 to 0.1187]

Maharashtra	0.0425* [0.0279 to 0.0571]	0.0417* [0.0152 to 0.0682]	0.0458* [0.0077 to 0.0839]	0.0765* [0.0471 to 0.1059]
West Bengal	0.0265* [0.0136 to 0.0393]	0.0989* [0.0639 to 0.1339]	0.0202 [-0.0171 to 0.0575]	0.0413* [0.0103 to 0.0723]
Delhi	0.0271* [0.0025 to 0.0518]	0.1941* [0.1157 to 0.2724]	0.0229 [-0.057 to 0.1029]	0.0275 [0 to 0.0550]
Himachal Pradesh	0.0467* [0.0213 to 0.0720]	0.0827 [0.0094 to 0.1561]	0.1138* [0.0449 to 0.1827]	0.1828* [0.1227 to 0.2430]
Punjab	0.0484* [0.0255 to 0.0712]	-0.1206* [-0.1883 to -0.0530]	0.0869* [0.0241 to 0.1496]	0.0622* [0.0169 to 0.1075]
Tamil Nadu	0.0103 [-0.0024 to 0.0230]	0.0293 [-0.0064 to 0.0650]	0.0237 [-0.0133 to 0.0606]	0.0731* [0.0470 to 0.0992]
Rajasthan	0.0097* [0.0008 to 0.0185]	0.0448 [0.009 to 0.0806]	-0.0484* [-0.0786 to -0.0183]	0.0847* [0.062 to 0.1074]
Chandigarh	0.0315 [-0.0208 to 0.0837]	0.0945 [-0.0621 to 0.2511]	0.0219 [-0.1281 to 0.1719]	0.1813* [0.0851 to 0.2774]
Goa	-0.0248 [-0.0669 to 0.0173]	-0.0445 [-0.1804 to 0.0913]	-0.0812 [-0.2357 to 0.0733]	0.0278 [-0.0264 to 0.0820]
Kerala	0.0219* [0.0091 to 0.0346]	-0.1021* [-0.1352 to -0.0689]	0.0215 [-0.0112 to 0.0542]	0.0274 [-0.0005 to 0.0553]
Chhattisgarh	0.0056 [-0.0079 to 0.0190]	0.0088 [-0.0426 to 0.0603]	0.0179 [-0.0256 to 0.0615]	0.0401* [0.0185 to 0.0617]
Meghalaya	0.0416* [0.0252 to 0.0579]	0.0794* [0.0191 to 0.1396]	0.0267 [-0.0397 to 0.0930]	0 [-0.0006 to 0.0006]
Mizoram	0.0678* [0.0462 to 0.0894]	-0.0238 [-0.1220 to 0.0744]	0.0692 [-0.0484 to 0.1869]	-0.0023 [-0.0234 to 0.0188]
Dadra and Nagar Haveli	-0.0661 [-0.1363 to 0.0041]	0.0449 [-0.1633 to 0.253]	-0.0192 [-0.0954 to 0.057]	0.0897* [0.0161 to 0.1634]
Andhra Pradesh	-0.0017 [-0.0168 to 0.0134]	-0.0749 [-0.1178 to -0.032]	0.0082 [-0.0460 to 0.0625]	0.0957* [0.0717 to 0.1196]
Telangana	0.0072 [-0.0096 to 0.0241]	-0.0831 [-0.1343 to -0.0319]	-0.0379 [-0.082 to 0.0061]	0.0302* [0.0151 to 0.0453]

*$p < 0.05$; Figures inside square brackets represent 95% confidence interval. ATET: average treatment effect on treated. Puducherry, Andaman and Nicobar Islands, Lakshadweep, and Daman and Diu union territories were dropped from the analysis due to the small sample size.

5.3.3 Impact of health insurance on financial risk protection across states/UTs

Table 5.2 presents the impact of health insurance on OOPE, CHE, and impoverishment. Health

insurance enrolment statistically significantly reduced the OOPE for insured in comparison to

uninsured in 12 states/UTs (p<0.05). Substantial decrease in OOPE among insured was observed in Assam, Uttar Pradesh, Karnataka, Maharashtra, Delhi, and Punjab in comparison to uninsured (p<0.05). The incidence of CHE-10 was statistically significantly lower among insured by more than 10% in states/UTs namely, Assam, Uttar Pradesh, Uttarakhand, Jammu and Kashmir, Maharashtra, Delhi, Punjab, Dadra and Nagar Haveli, and Andhra Pradesh (p<0.05). In states namely, Gujarat, Karnataka, Tamil Nadu, Kerala, Meghalaya, and Telangana, the reduction in CHE-10 among insured was between 5 to 10%. In all other states, health insurance was observed to be statistically ineffective in reducing the financial burden (p>0.05). In some states with good health insurance enrolment rate, such as, Rajasthan, Chandigarh, Goa, and Chhattisgarh, health insurance did not statistically significantly reduce the OOPE and CHE incidence among insured than uninsured (p>0.05). Furthermore, CHE-25 was statistically significantly lower among insured in Delhi, Uttar Pradesh, Maharashtra, Andhra Pradesh, Kerala, and Telangana (p<0.05). The CHE-40 incidence was statistically significantly lower in only Andhra Pradesh, Telangana, and Maharashtra (p<0.05). Lastly, health insurance enrolment reduced the impoverishment incidence in few states such as Punjab, Assam, Maharashtra, Kerala, and Telangana (p<0.05). All of this indicates that health insurance enrolment has alleviated the financial burden among insured to some extent, albeit limited to certain states (Table 5.2).

Table 5.2 Impact of health insurance on OOPE, CHE, and Impoverishment across states/UTs

State/Union -territories	OOPE	CHE 10	CHE 25	CHE 40	Impoverishment
	ATET	ATET	ATET	ATET	ATET
Assam	-13665.78*	-0.1573*	-0.0820	-0.0407	-0.0663*
	[-25433.72 to -1897.85]	[-0.2597 to -0.0549]	[-0.1729 to 0.0090]	[-0.1014 to 0.0199]	[-0.1282 to -0.0044]
Bihar	3907.622	-0.0322	-0.0231	-0.0109	-0.0072
	[-27892.58 to 35707.83]	[-0.2225 to 0.1582]	[-0.1370 to 0.0908]	[-0.0747 to 0.0529]	[-0.0617 to 0.0473]
Jharkhand	3649.51	0.024	0.0625	0.0449	0.0387
	[-11577.82 to 18876.85]	[-0.1148 to 0.1628]	[-0.0561 to 0.1811]	[-0.0655 to 0.1553]	[-0.0330 to 0.1103]
Madhya Pradesh	-2189.945	-0.1108	-0.0147	-0.0056	0.0128
	[-14338.77 to 9958.88]	[-0.2056 to -0.0161]	[-0.0843 to 0.0549]	[-0.0596 to 0.0484]	[-0.0258 to 0.0513]
Odisha	619.3699	-0.0105	0.0125	0.0215	-0.014
	[-2806.87 to 4045.61]	[-0.0651 to 0.0442]	[-0.0330 to 0.0579]	[-0.0166 to 0.0597]	[-0.0525 to 0.0244]
Uttar Pradesh	-12610.74*	-0.1385*	-0.0693*	-0.0231	-0.0177
	[-22149.65 to -3071.84]	[-0.2114 to -0.0657]	[-0.1182 to -0.0205]	[-0.0585 to 0.0122]	[-0.0475 to 0.0121]
Arunachal Pradesh	-1048.416	-0.0228	-0.0142	-0.0201	-0.0481
	[-3350.50 to 1253.67]	[-0.1101 to 0.0646]	[-0.0538 to 0.0255]	[-0.0449 to 0.0047]	[-0.1075 to 0.0113]
Gujarat	-2051.341	-0.0805*	-0.0460*	-0.0074	0.0147
	[-6276.99 to 2174.31]	[-0.1276 to -0.0334]	[-0.0840 to -0.0080]	[-0.0379 to 0.0231]	[-0.0107 to 0.0402]
Manipur	-877.9216	-0.1013	0.0062	-0.0182	-0.0092
	[-5724.60 to 3968.76]	[-0.2227 to 0.0201]	[-0.0704 to 0.0829]	[-0.0505 to 0.0141]	[-0.0831 to 0.0647]
Nagaland	-592.0262	-0.1156	-0.0162	0.0031	0.0012
	[-6992.05 to 5807.99]	[-0.2087 to -0.0226]	[-0.0515 to 0.0191]	[-0.0106 to 0.0168]	[-0.0510 to 0.0510]
Sikkim	-3119.727	-0.2317	0.0013	0.0159	-0.0055
	[-8847.80 to 2608.34]	[-0.3786 to -0.0849]	[-0.0475 to 0.0475]	[-0.0379 to 0.0696]	[-0.0730 to 0.0621]
Tripura	-255.005	-0.0164	0.0261	-0.0003	0.028
	[-3161.77 to 2651.76]	[-0.0816 to 0.0488]	[-0.0088 to 0.061]	[-0.0230 to 0.0225]	[-0.0028 to 0.0588]
Uttarakhand	-6183.068	-0.1382*	-0.0348*	0.0354	0.003
	[-19460.05 to 7093.92]	[-0.2497 to -0.0267]	[-0.1193 to 0.0498]	[-0.0337 to 0.1046]	[-0.0617 to 0.0677]
Haryana	-2123.616	-0.0474	-0.0059	0.0131	-0.004
	[-8185.25 to 3938.02]	[-0.1159 to 0.0210]	[-0.0462 to 0.0343]	[-0.0175 to 0.0437]	[-0.0366 to 0.0287]
Jammu and Kashmir	-4257.871	-0.117*	0.0063	0.0097	-0.0025
	[-11335.16 to 2819.41]	[-0.1961 to -0.0379]	[-0.0425 to 0.0551]	[-0.0247 to 0.0440]	[-0.0319 to 0.0269]

Karnataka	-10302.05*	-0.0935*	-0.0374*	-0.0126	-0.0023
	[-14386.28 to -6217.83]	[-0.1481 to -0.0388]	[-0.0772 to 0.0024]	[-0.0396 to 0.0144]	[-0.0287 to 0.0242]
Maharashtra	-12041.91*	-0.1822*	-0.0566*	-0.0247*	-0.0386*
	[-18650.50 to -5433.33]	[-0.2272 to -0.1372]	[-0.0929 to -0.0203]	[-0.0514 to 0.0020]	[-0.0659 to -0.0113]
West Bengal	-5228.565	-0.1259	-0.0305	-0.0049	-0.0273
	[-11194.53 to 737.40]	[-0.1649 to -0.0870]	[-0.0618 to 0.0008]	[-0.0294 to 0.0197]	[-0.052 to -0.0025]
Delhi	-21098.83*	-0.2033*	-0.0784*	-0.0412	-0.0084
	[-35956.46 to -6241.21]	[-0.2967 to -0.1100]	[-0.1529 to -0.0038]	[-0.0989 to 0.0164]	[-0.0468 to 0.0301]
Himachal Pradesh	3206.737	-0.0173	0.0431	0.0463	0.0080
	[-6958.89 to 13372.37]	[-0.0926 to 0.0580]	[-0.0095 to 0.0957]	[0.0029 to 0.0898]	[-0.0408 to 0.0567]
Punjab	-17159.67*	-0.1068*	-0.0470	-0.0341	-0.062*
	[-28017.46 to -6301.87]	[-0.1761 to -0.0375]	[-0.1025 to 0.0085]	[-0.0806 to 0.0124]	[-0.1156 to -0.0083]
Tamil Nadu	-3963.50*	-0.0493*	-0.0225	-0.0162	-0.0198
	[-7958.38 to 31.48]	[-0.0835 to -0.0152]	[-0.0511 to 0.0061]	[-0.0400 to 0.0077]	[-0.0455 to 0.0060]
Rajasthan	118.1636	0.01	0.0017	0.0047	0.0067
	[-2299.73 to 2536.06]	[-0.0220 to 0.0421]	[-0.0230 to 0.0263]	[-0.0128 to 0.0223]	[-0.0170 to 0.0305]
Chandigarh	-31341.31	-0.1639	-0.1039	-0.1299	-0.1288
	[-66546.27 to 3863.65]	[-0.3368 to 0.0090]	[-0.2591 to 0.0513]	[-0.2716 to 0.0118]	[-0.2936 to 0.0360]
Goa	-4551.75	-0.007	-0.0499	-0.0049	-0.0554
	[-11866.59 to 2763.10]	[-0.0948 to 0.0807]	[-0.1212 to 0.0214]	[-0.0333 to 0.0235]	[-0.1270 to 0.0162]
Kerala	-6596.52*	-0.0686*	-0.0317*	-0.0095	-0.0222*
	[-9785.82 to -3407.21]	[-0.1003 to -0.0370]	[-0.0554 to -0.0079]	[-0.0274 to 0.0084]	[-0.0452 to 0.0008]
Chhattisgarh	-1907.579	-0.0341	-0.0442	-0.0117	-0.0200
	[-19995.53 to 16180.37]	[-0.0804 to 0.0122]	[-0.0875 to -0.0010]	[-0.0438 to 0.0204]	[-0.0520 to 0.0121]
Meghalaya	-4595.981*	-0.0509*	-0.0489	-0.0352	-0.0052
	[-8782.34 to -409.62]	[-0.1041 to 0.0023]	[-0.1036 to 0.0057]	[-0.0810 to 0.0105]	[-0.0290 to 0.0185]
Mizoram	-4161.77*	-0.1099	-0.0166	0.0014	0.0051
	[-6068.05 to -2255.49]	[-0.1928 to -0.0270]	[-0.0412 to 0.0081]	[-0.0157 to 0.0184]	[0.0006 to 0.0096]
Dadra and Nagar Haveli	-243.62	-0.2564*	0.0064	0.0128	0.0278
	[-4372.24 to 3884.99]	[-0.4299 to -0.0829]	[-0.0224 to 0.0352]	[-0.0128 to 0.0384]	[-0.0118 to 0.0673]
Andhra Pradesh	-5242.29*	-0.11*	-0.0532*	-0.0486*	-0.0291
	[-9166.62 to -1317.96]	[-0.1587 to -0.0612]	[-0.0980 to -0.0084]	[-0.0898 to -0.0074]	[-0.0706 to 0.0123]
Telangana	-4593.48*	-0.0768*	-0.0582*	-0.0371*	-0.0366*
	[-8682.34 to -504.61]	[-0.1229 to -0.0306]	[-0.0980 to -0.0185]	[-0.0750 to 0.0008]	[-0.0694 to -0.0038]

*p<0.05; Figures inside square brackets represent 95% confidence interval. ATET: average treatment effect on treated. Puducherry, Andaman and Nicobar Islands, Lakshadweep, and Daman and Diu union territories were dropped from the analysis due to the small sample size.

5.4 Discussion

To the best of our knowledge, this is the first study that analysed the role of health insurance across several dimensions namely, accessibility to inpatient care, utilization pattern of inpatient care, and financial risk protection across all states/UTs in India.

We observed a small but statistically significantly higher accessibility to inpatient care among insured than uninsured across majority of the states/UTs. Previous studies have also reported a higher accessibility to inpatient care among insured [8,27,29-31]. The hospitalization episodes more than once, were also higher among insured than uninsured. This observed trend could be attributed to a genuine decline in financial barriers to accessing care among insured, presence of moral hazard, or due to provider-induced demand [29-30,44-45]. Furthermore, in India, public health facilities are overburdened and have been reported to lack timely and quality services [46-47]. However, we observed that the hospital episodes with private provider were only marginally higher among insured and uninsured in only few states. This may be attributed to the high cost in private health facilities irrespective of health insurance status as highlighted by the studies [8,9,17,28,48]. Also, utilization of type of provider depends upon the availability [49-50] and empanelment under different health insurance programmes [51]. For instance, as per a policy brief, no private hospital was empanelled in aspirational[7] districts of nine states under recently launched GSHI scheme, PM-JAY [51]. Additionally, longer duration of stay was also not statistically significantly differed among insured and uninsured across most states/UTs. This finding aligns with a previous study focused on poor individuals [29]. This is likely

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[7] Aspirational districts are the most under-developed districts across the country, which are chosen to quickly and effectively transform under "Aspirational districts" programme

because the length of hospital stay is primarily determined by the patient's health condition, and providers have little incentive to prolong stays due to low packages rates in GSHI schemes [29]. Additionally, providers are often unaware of the patient's insurance status as this is typically handled by hospital administrative divisions [29]. By contrast, in Maharashtra, Himachal Pradesh, Punjab, Odisha, Uttar Pradesh, Manipur, and Sikkim, the episodes of longer duration of hospital stay were higher among insured than uninsured. Overall, this reflects that health insurance enrolment has increased the accessibility to inpatient care among insured, however the utilization pattern of inpatient care (i.e., private provider usage and longer duration of hospital stay) were not impacted much by the health insurance status.

We found that health insurance was statistically significantly effective in reducing both OOPE and CHE (at 10% threshold) for insured in some states such as, Assam, Uttar Pradesh, Karnataka, Maharashtra, Delhi, Punjab, Tamil Nadu, Kerala, Meghalaya, Andhra Pradesh, and Telangana. However, the incidence of CHE at 25%, 40% threshold and impoverishment were not statistically different among insured and uninsured across most states. Furthermore, in states with good health insurance enrolment along with the presence of their own state GSHI schemes, such as Rajasthan, Goa, and Chhattisgarh, health insurance was not found to be effective in reducing the financial burden for the insured.

Previous literature reported the lack of effectiveness of GSHI schemes in providing the financial protection in states such as, Chhattisgarh, Gujarat, Haryana, and Uttar Pradesh, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu, and Jharkhand (Supplementary Table 5.2). On the other hand, few studies conducted in Bihar, Haryana, Karnataka, Uttar Pradesh and Maharashtra, reported effectiveness of health insurance schemes in reducing the financial burden. It was observed that previous studies examining any health insurance scheme or any GSHI scheme at the national level also reported marginal effectiveness of health insurance in providing financial risk protection to the insured (Supplementary Table 2). The difference in

results could be attributed to the differences in data, year, methodology, and scheme analysed (as most studies were restricted to analysing state-specific GSHI schemes). The prominent reasons highlighted by previous literature for limited effectiveness of GSHI schemes in reducing financial burden were, i) low awareness among beneficiaries regarding various facets of health insurance (such as information regarding stipulated benefits one in entitled to, procedure to avail benefits, number of family members covered, list of empanelled hospitals, ailments covered) [12,14-15,52-54], ii) continued spending on medicines, diagnostics, and consumables [12,14-15,52,54-58]. Studies have also reported malpractices by empanelled private hospitals, such as overbilling of insurance patients, persuading beneficiaries to utilize services that are not covered, performing unnecessary procedures on insured patients to claim insurance money, and lack of transparency in billing [7,55,59-61]. The inadequate monitoring of private healthcare providers is also a concerning issue [7,59-61]. Furthermore, problems with beneficiary card, long waiting time at empanelled hospitals, reimbursement issues, low package rates, and no coverage for outpatient care were other plausible reasons reported for less-than-optimal outcomes of health insurance in India [12,15,52-55].

There is a pressing need to strengthen public health sector and improve regulations for healthcare providers, and address challenges encountered under health insurance schemes to augment financial risk protection in India.. Also, it is important to increase public health expenditure in India. According to the WHO report [62], countries with higher public health expenditures can offer greater financial protection against catastrophic and impoverishing health spending. Furthermore, health insurance in India, mainly provides coverage for the inpatient care, and outpatient care remains outside the ambit of health insurance. Even the recently launched central-level GSHI scheme, PM-JAY, which aims to cover bottom 40% of the Indian population, do not provide coverage for outpatient services [63]. India is undergoing an epidemiological transition with an increasing burden of non-communicable disease [64-65]

that require frequent consultations, regular visits to a doctor, diagnostic tests, and long-term medication support to manage the disease progression. Outpatient care also puts colossal financial burden in India [35,66]. Providing outpatient services can improve access to primary care and promote viability of an inpatient health insurance scheme [67]. Evidence suggests that composition of the benefit package have an impact on utilization and financial risk protection [68]. For instance, In China, New Rural Cooperative Medical System was reformed to include out-patient services, utilization by the poor [68]. It is therefore imperative to provide coverage for both outpatient and inpatient care under the ambit of health insurance to improve utilization and augment better financial protection in India.

5.5. Conclusion and policy recommendation

We found that health insurance enrolment has increased accessibility to inpatient care among insured, however the utilization pattern of inpatient care in terms of utilizing private healthcare provider and longer duration of hospital stay were not impacted much by the health insurance status across states/UTs. Also, health insurance was observed to be effective in providing financial protection to insured in some states. Concerted efforts, such as increasing health insurance enrolment, raising awareness about prevalent schemes and their eligibility criteria, and informing beneficiaries about the procedures to avail benefits, are required. There is also an urgent need to include outpatient services under the purview of health insurance to reduce the financial burden and make health insurance more viable. Better monitoring, supervision, and regulation by state authorities are required to provide effective coverage under health insurance. Furthermore, strengthening of public healthcare facilities, regulating private healthcare providers, and incentivizing the public healthcare sector to compete for better service provision are equally important in delivering quality and affordable healthcare services in India.

5.6 References

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5.7 Appendix (Supplementary Figure and Table)

Supplementary Table 5.1 Health Insurance enrolment across different programmes in India

States and Union Territories	GSHI (%)	CGHS (%)	ESIS (%)	PHI (%)	Others (%)	Overall Insured (%)	Uninsured (%)
India	11.7	1.37	1.03	1.28	0.15	**15.53**	**84.47**
States							
Andhra Pradesh	69.95	1.75	0.66	0.35	0.06	**72.79**	**27.21**
Arunachal Pradesh	3.15	2.36	0.07	0.68	0.97	**7.23**	**92.78**
Assam	2.84	0.59	0.92	0.79	0.03	**5.17**	**94.83**
Bihar	0.13	0.15	0	0.09	0.01	**0.38**	**99.62**
Chhattisgarh	62.63	1.06	0.29	0.31	0	**64.29**	**35.71**
Goa	37.88	2.18	0.76	1.47	5.75	**48.04**	**51.95**
Gujarat	8.42	1.04	0.78	3.24	0.01	**13.49**	**86.51**
Haryana	0.33	1.85	2.55	2.42	0.01	**7.16**	**92.84**
Himachal Pradesh	2.99	6.28	2.51	0.39	0.11	**12.28**	**87.72**
Jharkhand	0.01	0.21	0.1	0.09	0.04	**0.45**	**99.55**
Karnataka	1.99	0.78	2.6	1.86	0.57	**7.8**	**92.19**
Kerala	32.8	1.19	1.73	3.93	0.29	**39.94**	**60.06**
Madhya Pradesh	0.05	0.44	0.31	0.45	0.01	**1.26**	**98.73**
Maharashtra	0.33	2.25	1.26	3.45	0.28	**7.57**	**92.44**
Manipur	0.21	1.19	0.03	0.01	0.03	**1.47**	**98.54**
Meghalaya	36.45	4.99	0.03	0.17	12.26	**53.9**	**46.1**
Mizoram	62.48	13.63	0.57	1.43	0.46	**78.57**	**21.43**
Nagaland	0.36	4.4	0.67	0.08	0.1	**5.61**	**94.38**
Odisha	14.65	0.57	0.29	0.09	0.02	**15.62**	**84.39**
Punjab	1.91	1.73	1.67	0.91	0.07	**6.29**	**93.71**
Rajasthan	33.08	1.58	0.25	0.27	0.01	**35.19**	**64.8**
Sikkim	0.04	1.79	0.02	0.84	0.15	**2.84**	**97.16**
Tamil Nadu	11.67	2.65	3.23	1.27	0.04	**18.86**	**81.15**
Telangana	54.98	1.79	2.71	1.47	0.16	**61.11**	**38.91**
Tripura	14.73	0	0	0.39	0.03	**15.15**	**84.85**
Uttar Pradesh	0.11	0.53	0.3	0.4	0.07	**1.41**	**98.59**
Uttarakhand	0.81	2.97	0.92	0.65	0.7	**6.05**	**93.95**
West Bengal	8.03	2.09	1.57	1.47	0.09	**13.25**	**86.75**
Union Territories							
Andaman and Nicobar Islands	0.05	9.3	1.04	0.49	0.05	**10.93**	**89.07**
Chandigarh	1.78	14.5	5.71	9.75	0.84	**32.58**	**67.43**
Dadar and Nagar Haveli	56.01	0.35	1.9	0	0	**58.26**	**41.75**
Daman and Diu	0.35	6.72	4.12	1.15	0.01	**12.35**	**87.66**
Delhi	0.49	7.12	1.6	8.29	0.52	**18.02**	**81.98**
Jammu and Kashmir	0.52	1.95	0.17	0.37	0	**3.01**	**96.99**
Lakshadweep	5.97	10.56	0	0	0	**16.53**	**83.47**
Puducherry	1.56	1.61	1.41	0.03	0.22	**4.83**	**95.17**

Supplementary Table 5.2 Summary of previous studies examining the impact of health insurance on financial risk protection in India.

S. No.	Authors	Aim, Data, and Methodology	Impact of health insurance schemes on financial risk protection
National Level Studies			
1.	Ranjan et al., 2018 [28]	The study analysed the effectiveness of any GSHI in providing financial protection against hospitalization-related OOPE at the national level. The study used NSSO Health Survey, 2014. It used descriptive statistics, multivariate logistic regression, and propensity score matching (PSM).	• In rural areas, the average annual OOPE was INR 3,994 in public hospitals and INR 20,445 in private hospitals for uninsured. However, those who were insured under GSHI schemes in rural areas, incurred average annual OOPE of INR 2,848 in public hospitals and INR 17,943 in private hospitals. • In urban areas, the average annual OOPE was INR 6,322 in public hospitals and INR 27,102 in private hospitals for uninsured. However, those who were insured under GSHI schemes in urban areas, incurred average annual OOPE of INR 2,738 in public hospitals and INR 19,111 in private hospitals. • Mean OOPE on hospitalization was lower among those covered under GSHI schemes (INR 10,943) compared to uninsured (INR 14,436). • Only 2.8% of hospitalizations among the insured received cashless treatment compared to 1.5% among those without insurance. • The CHE incidence (OOPE>10% of household consumption expenditure) was 40.2% among uninsured and 38.2% among GSHI insured. The CHE incidence (OOPE>25% of household consumption expenditure) was 18.5% among uninsured and 17.9% among GSHI insured. • PSM results for all quintile groups showed that GSHI led to 13% reduction in CHE-10 and 6% reduction in CHE-25 among insured households compared to uninsured. • PSM results for bottom three economic quintiles showed that GSHI led to 0.4% and 1% decrease in CHE-10 and CHE-25, respectively, among insured households compared to uninsured.

2.	Mahapatro et al., 2017 [27]	The study assessed the impact of health insurance schemes against OOPE at the national level. The study used NSSO Health Survey, 2014. Bivariate analysis and two-part model were employed.	• Descriptive analysis showed that the annual average hospitalization-related OOPE was INR 18,510 for private/other insurance holder, INR 12,408 for those enrolled under GSHI schemes, and INR 15,647 for uninsured. • Two-part model showed that insured individuals had a lower probability of incurring positive OOPE than uninsured (p<0.01). Also, level of OOPE was lower for insured than uninsured.
3.	Sahoo and Madheswaran, 2014 [24]	The study aimed to estimate the effect of health insurance on OOPE at the national level. It used IHDS, 2004-05. It employed two-part and logit model.	• The CHE incidence (OOPE>10% of household consumption expenditure) was 27.36% for insured and 36.51% for uninsured. The CHE incidence (OOPE>10% of household non-food expenditure) was 41.5% for insured and 60.9% for uninsured. • Two-part model showed that insured households were significantly less likely to incur OOPE (-0.297) and incurred lower OOPE (-0.171) than uninsured (p<0.01). • Logit regression showed that health insurance decreased the likelihood of incurring CHE by 8% (p<0.01) and experiencing impoverishment by 3% (p<0.1).
4.	Apyayee at al., 2021 [25]	The study aimed to analyse the changes in insurance coverage and healthcare spending pattern and assess the relationship between health insurance and OOPE at the national level. It used two cross-sectional surveys: NSSO Health Survey, 2004-05 and NSSO Health Survey, 2014-15. Bivariate analysis and two-part model were employed.	• Insurance coverage increased from 1.07% in 2004-05 to 15.25% in 2014-15. Also, OOPE has doubled over the decade. • Notably, OOPE was not uniformly low for all insured persons; for instance, OOPE was higher among insured than uninsured in the case of inpatient cases being females, urban residents, belonging to middle, higher and highest monthly per capita expenditure quintiles, all occupational groups, higher educated, adult persons, and scheduled caste and other backward class groups. • Two-part model showed that insured individuals were less likely to incur inpatient and outpatient OOPE compared to uninsured (p<0.001). Moreover, conditional on incurring OOPE, the OOPE was lower among insured (INR 3,705) than uninsured (INR 6,443) in the case of inpatient care. Likewise, for outpatient care, OOPE was lower among insured (INR 226) than uninsured (INR 360).

5.	Gupta, 2021 [26]	The study aimed to assess the effect of health insurance schemes on accessibility to healthcare services and financial risk protection at the national level. It used two cross-sectional surveys: NSSO Health Survey, 2004-05 and NSSO Health Survey, 2014-15. Descriptive statistics and regression analysis (logistic and pooled OLS) were used.	• The average mean hospitalization-related OOPE (at 2004 prices) was INR 5,041 (INR 5,786) among insured (uninsured) in rural areas and INR 6,643 (INR 9,568) among insured (uninsured) in urban areas. • Pooled OLS regression showed that government insurance statistically significantly reduced OOPE by 17.5% for households (p<0.01). However, a further analysis of interaction of GSHI with economic quintiles showed that OOPE reduced only for the highest economic quintiles. Compared to the lowest economic quintile, households in the highest quintile with insurance had statistically significantly lower OOPE by 27.2% (p<0.01). • It indicates the potential success of only comprehensive schemes, such as central government health schemes (CGHS) and employee state insurance scheme (ESIS), that are offered to formal sector employees. As OOPE of insured lower economic quintiles did not reduce, success of the GSHI scheme (RSBY) for the poor is contentious.
6.	Sriram & Khan, 2017 [29]	The study assessed the effect of GSHI on hospitalization incidence and OOPE for the poor population at the national level. The study used NSSO Health survey, 2014. The sample contained 64,270 below-poverty-line people. Logistic regression and Tobit model were used.	• The average annual inpatient OOPE for poor was INR 8,149. • Tobit results showed that enrolment under GSHI did not statistically significantly reduced OOPE (coefficient: INR -950.36, p>0.05).
State-level Studies			

1.	Nandi et al., 2017 [8]	The study analysed hospital utilization and OOPE in public and private health sectors under the GSHI scheme in the state of Chhattisgarh. The study extracted and analysed the Chhattisgarh state sample (n= 6026 members) from the NSSO Health Survey 2014. Descriptive statistics and multivariate logistic regression were employed.	• Insured ones were less likely to incur OOPE, however, 95.1% of insured who sought hospitalization at private hospitals and 66.0% of insured who sought hospitalization at public hospitals incurred OOPE. • Out of all the households with at least one member hospitalized, 35.5% experienced CHE (OOPE>10% of monthly household consumption expenditure). • The study found that despite having insurance coverage, majority still incurred OOPE on hospitalization.
2.	Garg et al., 2020 [9]	The study analysed the impact of GSHI on improving access and financial protection for inpatient care in the state of Chhattisgarh. The study employed three cross-sectional surveys: NSSO Health Survey 2004, NSSO Health Survey 2014, and primary data collected at the end of 2019. Multivariate analysis, PSM, and instrumental variable method was employed.	• Descriptive statistics showed that mean and median OOPE for hospitalization at private hospitals was lower among Pradhan Mantri Jan Arogaya Yojana (PMJAY) enrolled compared to unenrolled. • OLS model showed no association between the size of OOPE and enrolment under PMJAY or any GSHI schemes (p>0.05). • PSM results showed that PMJAY and any GSHI schemes did not statistically significantly decrease OOPE (INR -4,614 and INR -1,066, respectively) (p>0.05). • PSM results showed no association between PMJAY enrolment and CHE-10 (Average treatment effect on treated (ATET): 0.02), CHE-25 (ATET: 0.05), and CHE-40 (ATET: 0.04) (p>0.05). Likewise, enrolment under any GSHI was not associated with CHE-10 (ATET: 0.003), CHE-25 (ATET: 0.02), and CHE-40 (ATET: 0.01) (p>0.05). CHE-10, CHE-25, and CHE-40 was defined as OOPE>10%, 25%, and 40% of household consumption expenditure, respectively. • As per instrumental variable method also, OOPE and CHE were not statistically significantly impacted by PMJAY and any GSHI (p>0.05).
3.	Prinja et al., 2019 [10]	The study analysed the role of health insurance in general and RSBY (GSHI scheme) in particular on healthcare utilization and financial risk protection. A cross-sectional study was conducted during April and September, 2014, to interview 62,335	• Descriptive statistics showed that the average annual OOPE for hospitalization was INR 32,573 (USD 543) among insured and INR 24,788 (USD 413) among uninsured population. • Average hospitalization-related OOPE was highest for population enrolled under private insurance (INR 73,508 (USD 1225)) and lowest for population enrolled under RSBY (INR 15,687 (USD 261)).

		individuals from 12,134 households in eight districts of three Indian states (Gujarat, Haryana and Uttar Pradesh). Descriptive statistics and multivariate regression with binary logit were employed.	• Nearly 28% of insured population and 26% of uninsured population experienced CHE (OOPE>40% of household non-food consumption expenditure) due to hospitalization. • CHE was higher for those enrolled under RSBY (39%), followed by private health insurance (23%), and state government schemes (21%). • Average OOPE for outpatient care sought during last 15 days was INR 961 (USD 16) among insured and INR 840 (USD 14) among uninsured population. • Multivariate analysis showed that population enrolled under RSBY had higher odds (Odds Ratio: 2.47) for incurring CHE compared to population enrolled under other health insurance schemes (p<0.05).
4.	Gupta et al., 2017 [11]	The study analysed the impact of various health insurance schemes on OOPE for hospitalization. Between April and September 2014, a total of 62,335 individuals from 12,134 households were sampled from eight districts across three Indian states (Haryana, Gujarat, and Uttar Pradesh). Descriptive statistics and regression analysis was performed.	• Health insurance statistically significantly reduced hospitalization-related OOPE only in the state of Haryana. In Gujarat and Uttar Pradesh, health coverage did not impact OOPE. • Mainly insurance schemes for government employees and Mediclaim statistically significantly reduced OOPE in Haryana.
5.	Sabharwal et al., 2014 [12]	The study analysed the impact of RSBY (GSHI) on socially excluded households. The study was conducted in Moradabad district in the state of Uttar Pradesh and Aurangabad district in the state of Maharashtra (April - July 2012). The sample size of the quantitative survey was 1,500 households: (1,050 beneficiary households and 450 non-beneficiary households). The study employed quasi-experimental mixed-methods approach (quantitative and qualitative	• Descriptive statistics showed that the average annual household expenditure on inpatient care was INR 4,173 (USD 67) for beneficiaries who used the RSBY smart card, INR 12,548 (USD 201) for beneficiaries who have not used RSBY smart card, and INR 9,611 (USD 154) for non- beneficiaries. • PSM analysis showed that annual inpatient expenditure was lower by INR 3,620 (USD 58) for treated households (RSBY beneficiaries) than control households (non-beneficiaries) (p<0.01). • Treated households (RSBY beneficiaries) were 6% less likely to be indebted than control households (non-beneficiaries) (p<0.1) and 13% less likely to finance inpatient treatment by borrowing (p>0.1). • PSM analysis showed that there was no statistically significant difference between treated households (RSBY beneficiaries) and control households (non-beneficiaries) in annual household outpatient expenditure (p>0.1).

		methodologies). PSM technique and qualitative interviews were used.	• PSM analysis showed that RSBY did not have statistically significant impact on the total (inpatient and outpatient both) monthly health expenditure of treated households (RSBY beneficiaries) (p>0.1).
6.	Rao et al., 2014 [13]	The study compared the effects of the Rajiv Aarogyasri Health Insurance Scheme of Andhra Pradesh with health financing innovations including the RSBY in Maharashtra over time on accessibility and OOPE for inpatient care. The study used two cross-sectional surveys: NSSO Health Survey 2004 and primary survey conducted in 2012. The study used DID methodology.	• Average inpatient expenditure increased in both states from 2004 to 2012, but the increase was significantly greater in Maharashtra (unadjusted DID: −498.2; p=0.0009). • Proportions of households incurring large inpatient expenditures and incurring large borrowings to finance inpatient expenses increased in both states, but the increase was smaller in Andhra Pradesh. • Health innovations in Andhra Pradesh had a greater beneficial impact on hospitalization-related expenditures than innovations in Maharashtra, and the Aarogyasri scheme is likely to have contributed to these impacts in Andhra Pradesh, at least in part.
7.	Rent and Ghosh, 2015 [14]	The study assessed the impact of Rajiv Gandhi Jeevandayee Arogya Yojana (RGJAY) (GSHI scheme) in providing financial protection to the insured for hospitalization in Mumbai, Maharashtra. During August-September 2013, primary data was collected by conducting exit interviews of beneficiaries (n=152) who had utilized the scheme in eight empanelled tertiary care hospitals in Mumbai and Mumbai Suburban district. Secondary data of utilization of RGJAY packages and data from the grievance department of RGJAY were analysed to examine the most commonly reported problems faced by beneficiaries. Descriptive statistics was employed.	• Despite being enrolled in RGJAY, 63% of beneficiaries still incurred OOPE for hospitalization, and 88.23% of below-poverty-line persons paid for diagnostics, medications, or consumables. • In private hospitals, the most common reasons for paying for services were procedure was not covered under RGJAY (30%) and lack of knowledge (18%), whereas in public hospitals, the common reasons were lack of information (33%) and unavailability of time to complete all the necessary paperwork (19%). • More than three-fifth of beneficiaries incurred median OOPE of INR 3,000 (USD 49) and mean OOPE of INR 6,914 (USD 113). The mean total OOPE was INR 12,625 (USD 207) if indirect costs were considered. • When only direct expenditure was considered, 15% of insured sample households experienced CHE (OOPE> 10% of household consumption expenditure). The CHE incidence increased to 30% if indirect expenses were included.
8.	Devadasan et al., 2013	The study analysed the impact of RSBY (GSHI scheme) in providing financial protection from	• Despite being enrolled in RSBY, 58% of patients (299 out of 520) incurred OOPE at the time of hospitalization.

		hospitalization-related OOPE in the state of Gujarat. The survey was conducted in Patan district (in Gujarat) in 2011. The sample contained 2,920 households who were enrolled in RSBY. Descriptive statistics was used.	• 94% (484/520) of patients enrolled under RSBY incurred indirect expenses. • Out of 299 patients who incurred OOPE, 174 had used RSBY card for hospitalization. • Patients incurred OOPE primarily because they were asked to buy medicines and diagnostics, although the same were included in the benefit package.
9.	Raza et al., 2016 [16]	The study aimed to analyse the enrolment, dropout and effectiveness of RSBY (GSHI scheme). It used household level panel data from Uttar Pradesh and Bihar. The baseline survey was canvassed between March and May 2010 and covered 3,686 households. The follow-up survey was conducted between March and April in 2012, during which 3,318 households were revisited. In the following year, during the same time, 3,307 households were re-interviewed for the third time. Regression was used in the study.	• Almost all hospitalized households (both RSBY and non-RSBY) incurred OOPE. The inpatient OOPE incurred by RSBY households was INR 12,034 and by non-RSBY households was INR 14,020. • The probability of incurring any debt was 80% (RSBY households) and 79% (non-RSBY households) and the amount of debt did not differ significantly. • In Bihar, RSBY led to reduction in OOPE (36%; $p<0.1$) and amount of debt incurred (55%; $p<0.05$) due to hospitalization. • However, RSBY had no impact on financial protection in Uttar Pradesh ($p>0.1$).
10.	Garg et al., 2019 [17]	The study aimed to evaluate the impact of GSHI schemes (Rajiv Arogayasri Scheme in Andhra Pradesh, Vajpayee Arogyasri Scheme (VAS) in Karnataka, and Chief Minister's Comprehensive Health Insurance Scheme in Tamil Nadu) in improving utilization of inpatient services and financial risk protection.	• Descriptive statistics showed that the mean OOPE was substantially higher among those who sought hospitalization in private hospitals than public ones, irrespective of the insurance status in Karnataka, Andhra Pradesh, and Tamil Nadu. For instance, in Andhra Pradesh, the mean annual OOPE was INR 2,864 among GSHI insured and INR 2,355 among uninsured at public hospitals. In private hospitals, the mean OOPE was INR 15,827 among GSHI insured and INR 17,934 among uninsured in 2014. • The CHE incidence at all thresholds (OOPE>10%, 25%, and 40% of household consumption expenditure) was also higher for utilization of private hospitals than public ones and was almost similar for GSHI insured and uninsured. For instance, in Andhra Pradesh, CHE-25 was 2.7% (1.7%) in

		The study used two cross-sectional surveys: NSSO Health Survey, 2004 and NSSO Health Survey, 2014. Descriptive statistics and Instrumental Variable method were used.	public hospitals among GSHI insured (uninsured) and 17.7% (17.1%) in private hospitals among GSHI insured (uninsured). • Instrumental variable results showed that OOPE and CHE incidence did not significantly decrease with enrolment under GSHI in the three states.
11.	Barnes et al., 2016 [18]	The study estimated the impact of VAS (GSHI) on financial risk in the state of Karnataka. It surveyed 6,964 households with below-poverty-line cards from the treatment (VAS) and control villages (non-VAS). Standard quantile regression was used in the study.	• Access to VAS was associated with 0.71% reduction in CHE (OOPE>40% of household's non-food expenditure) (p<0.01). • Although the evidence for reduced incidence of catastrophic costs is weak, the reduction in the mean amount paid over the catastrophic limit ranged from INR 10,000 to INR 37,000, at various thresholds, nearly all of which were statistically significant. • 24.2% of those who did not have access to VAS and 20.7% of those who had access to VAS reported the need to borrow money to finance OOPE, and the difference was statistically significant (p<0.01). Moreover, conditional on borrowing, households with access to VAS, on average borrowed INR 1,199 less than those who did not have access to the scheme (p<0.05). • Conditional on incurring OOPE for inpatient care, the mean reduction in OOPE across quantiles associated with VAS coverage was INR 5,203.
12.	Sood et al., 2014 [19]	The study evaluated the impact of VAS on hospital use, OOPE, and mortality in the state of Karnataka. It conducted surveys in September 2012. Participants included 31,476 households (22,796 below poverty line and 8,680 above poverty line) in 300 villages where the scheme was implemented and 28,633 households (21,767 below poverty line and 6,866 above poverty line) in 272 neigboring matched villages ineligible for the scheme.	• The mean inpatient OOPE was INR 32,256 for VAS area and INR 49,238 for non-VAS area at all health facilities. At tertiary care facilities, the mean OOPE was INR 26,725 for VAS area and INR 62,966 for non-VAS area. • The scheme was associated with a 34% reduction in OOPE for admission to hospital at all health facilities (p<0.001). The reduction in OOPE was 58% when the study examined only admissions in tertiary care facilities, and 64% at tertiary care facilities (excluding short admissions and admissions through the emergency room) (p<0.001).

		Ordinary least squares, multivariate ordinary least squares, logit and multivariate logit methods were used.	
13.	Aggarwal, 2010 [20]	The study evaluated the impact of Yeshasvini, community-based health insurance scheme in the state of Karnataka. Between December 2007 and May 2008, the study interviewed 4,109 households (both insured and uninsured) in villages in rural Karnataka. The study used propensity score matching method.	• PSM results showed that in the case of surgery, total borrowings were 36% and 30% less for enrolees in the better-off and the worse-off group, respectively. • The financial impact was not significant for hospitalization and maternal care. • Inpatient treatment (except surgery) resulted in increased borrowings for the relatively better-off Yeshasvini group. • Overall health expenditures were 19–20% higher for Yeshasvini enrolled compared to uninsured.
14.	Philip et al., 2016 [21]	The study aimed to compare socio-demographics, healthcare utilization, and OOPE of 149 insured and 147 uninsured below-poverty-line households for the Comprehensive Health Insurance Scheme in the state of Kerala. The survey was conducted in Trivandrum district of Kerala. Descriptive statistics and multivariate logistic regression analysis were employed.	• Average OOPE for hospitalization was higher among insured (INR 448.95) than uninsured households (INR 159.93) ($p < 0.05$).
15.	Sinha, 2018 [22]	The study assessed whether RSBY (GSHI scheme) improved care seeking and reduced CHE and impoverishment among insured population. The study was conducted during April-June, 2014 in two blocks of Ranchi district in	• RSBY did not statistically significantly reduce (odds ratio: 0.925, $p > 0.05$) the likelihood of incurring CHE (OOPE> 40% of household's capacity to pay) among the enrolled households. • RSBY enrolled households were statistically significantly more likely to fall into poverty (odds ratio: 1.52, $p < 0.05$) due to health expenditure.

| | | Jharkhand with 1,643 below-poverty-line households.

Descriptive statistics and logistic regression analysis were employed. | |
|---|---|---|---|
| 16. | Panda and Rout, 2018

[23] | The study estimated healthcare expenditure of beneficiaries enrolled under RSBY and Biju Krushak Kalayan Yojanaaim (BKKY) Scheme, evaluated the extent of scheme utilization, and highlighted obstacles faced by beneficiaries in rural Odisha.

A list of 5,461 beneficiary households (until 31 December 2016) under RSBY and BKKY in Barachana Block was collected from community health centre. Out of the list, 200 beneficiary households were selected from Barchana block in Jajpur district in the state of Odisha. The study took 188 sample households for analysis.

Descriptive statistics were used. | • The mean hospitalization OOPE was INR 8,856.
• 47.5% of beneficiaries incurred OOPE for their treatment.
• Only 5.7% of beneficiaries could fully access the facilities of the scheme.
• The average claimed amount was INR 6,246 and received amount was INR 3,632.
• Only 58.15% of the claimed amount was realized. |

Chapter 6 An Assessment of Pradhan Mantri Jan Arogya Yojana, largest Government Sponsored Health Insurance Scheme

6.1 Introduction

Universal health coverage (UHC) aims to ensure access to essential and quality healthcare services to all without facing financial hardships and is a globally-advocated concept under the sustainable development goals [1]. Globally, every year around 800 million people experience financial catastrophe and nearly 100 million people are pushed into poverty due to out-of-pocket health expenditure (OOPE) [1]. As per a recent study, South Asia has the highest incidence of catastrophic health expenditure and impoverishment, with a severe and regressive OOPE burden in India [2]. In India, OOPE is estimated to be 50.6% of the total health expenditure [3], and high OOPE pushes nearly 7-8% of the Indian population into poverty each year [4,5]. India is experiencing an increasing burden of non-communicable diseases and injuries, an unfinished agenda of infectious diseases [6,7], and a continuously growing share of the elderly population [8]. All this leads to an increased demand for healthcare services. However, public health spending in India remains abysmally low (1.15% of gross domestic product) [9], along with a growing dominance of fee-for-service private healthcare providers [10] and an overburdened public health sector [11], resulting in inadequate and unaffordable healthcare services [10,11].

India has put a special impetus on government-sponsored health insurance (GSHI) schemes [12], as done by several other low- and middle-income countries [13,14], to improve the accessibility of healthcare services and safeguard against financial catastrophes. In 2018, the government of India launched the world's largest publicly financed health insurance scheme, Pradhan Mantri Jan Arogya Yojana (PM-JAY), under the ambit of Ayushman Bharat [11,15]. It is a crucial step to progress toward India's underlying commitment to UHC to "leave no one behind" [11,15]. The PM-JAY aims to provide health coverage to economically weaker sections

and low-income households, who are otherwise deprived of basic healthcare services due to financial constraints. It provides coverage of INR 500,000 (USD[8] 6,093.1) per family per year to the bottom 40%[9] of the Indian population (approximately 500 million beneficiaries) [11,15]. The scheme has rightfully shifted from a poor-only approach to an expansive approach covering a significant number of vulnerable and deprived citizens [16], without imposing any limit on family size, age, and pre-existing conditions to ensure the inclusion of women, children, and elderly [11,15].

The coverage provided under the PM-JAY is over three times the per capita income of India (USD 1974.4)[10]. Also, the scheme provides a 17-fold enhanced financial coverage than the previous central-level GSHI scheme, Rashtriya Swasthya Bima Yojana (RSBY), and 2-4 folds more generous coverage than the other existing state-level GSHI schemes in India [17,18]. The scheme currently covers 1949 procedures and provides coverage for secondary and tertiary care [15], along with coverage of medical expenses incurred three days prior to hospitalization and up to fifteen days following discharge [11,15]. Under the scheme, health services are offered in a convenient and cashless manner with a wide network of empanelled hospitals, along with a portable feature that allows the patients to seek care in any empanelled hospital across districts/states [15]. Currently, the scheme is adopted by 33 out of 36 states/union territories in India. As of February 2, 2023, 43.4 million hospital admissions amounting to INR 517,490 million (USD 6,306.2 million) were registered under the PM-JAY scheme [19].

Two schools of thought have emerged regarding the scheme. The proponents claim that the scheme will promote healthy competition among public and private healthcare providers, leading to improved quality of healthcare services and reduced costs. By contrast, opponents of the scheme express concerns about the inadequate regulation of private providers and insurers,

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[8] $1 = INR 82.06 on February 2, 2023.
[9] 21.9% of the population was below poverty line as per the census of India, 2011.
[10] Per capita income in 2018 in India.

risk of supplier-induced demand, potential for moral hazard, and ineffective targeting that may result in the exclusion of vulnerable population [20]. In India, previous central-level and state-level GSHI schemes were found to be less effective in providing financial safeguards to the beneficiaries owing to challenges such as low public awareness, low coverage, and unethical hospital practices [21-23].

Therefore, after more than five years since the inception of the scheme, it becomes imperative to assess the impact of scheme and leverage the learnings from the experiences and impediments to improve the scheme implementation in future. For this purpose, we conducted a review of the existing studies and synthesized the experiences of the PM-JAY scheme across different parts of India focusing on five dimensions: i) awareness, ii) utilization, iii) experience, iv) financial protection, and v) challenges confronted under the scheme. The perspective of both beneficiaries and healthcare providers were reviewed. To the best of our knowledge, this is the first review to provide a comprehensive picture of the PM-JAY scheme. This holistic review is expected to assist policymakers in comprehending the scheme's implementation and impact, and would also serve as an informative guide to overcome obstacles in the near future and ensure the long-term success of the scheme. The PM-JAY experience in India may also provide valuable insights to low- and middle-income countries as well that aspires to enhance their public health insurance systems.

6.2 Methodology

Search strategy: Electronic databases, namely PubMed, Web of Science, and Scopus, were used to search studies on the PM-JAY scheme, published since the scheme's inception (September 2018) until January 2023. A comprehensive search was conducted using a combination of keywords, *"Ayushman Bharat" OR "Pradhan Mantri Jan Arogya Yojana" OR "PMJAY".*

Inclusion and exclusion criteria: All the identified studies were compiled in Microsoft excel for the screening purpose. The studies were screened according to the PRISMA guidelines [24]. Initially, duplicates were removed from the list of identified studies. Thereafter, a two-step procedure was used to extract the relevant articles. In the first step, both researchers independently evaluated the titles and abstracts of the initially identified studies based on inclusion and exclusion criteria. Primarily, studies examining the various dimensions and experience related to the scheme based on interviews or survey of patients/beneficiaries/healthcare providers were included. Studies examining conceptual, theoretical details about the scheme or providing protocol to examine the outcomes related to the study were excluded. Also, articles published before September 2018 (launch year of PM-JAY) were excluded. In the second step, complete texts of potentially relevant articles were assessed by both authors to determine if they met the inclusion criteria. Studies such as protocols, theoretical papers, and those solely describing the scheme were excluded. The final analysis included studies that provided evidence through interviews or surveys (either quantitative or qualitative), and focused on assessing the awareness, utilization, experience, financial protection, experience, and challenges encountered under the scheme by providers or beneficiaries. At this stage, a bibliographic search of the selected studies was conducted to uncover any additional relevant articles. Any disagreements among the researchers were resolved through mutual consensus.

Quality assessment: To evaluate the study design, risk of bias, and report the quality of the included studies, we employed the appraisal tool for cross-sectional studies (AXIS) [25] for quantitative studies and critical appraisal skills program (CASP) [26] checklist for qualitative studies in tandem with other review studies [27-29]. For mixed-method studies, the quantitative and qualitative components of the study were assessed separately using their respective checklists.

The AXIS tool has 20 items, with seven items assessing the quality of reporting, seven items evaluating the study design, and six items examining potential bias [25]. CASP considers three broad issues through 10 questions when appraising a qualitative study: i) Are the results of the study valid? ii) What are the results? iii) Will the results help locally? [26].

Each article was independently evaluated by both researchers. Any discrepancies in quality assessment score were resolved through discussion until a consensus was reached. The articles were classified as high quality (meeting over 70% of the quality criteria), moderate quality (meeting between 40% and 70% of the quality criteria), and low quality (meeting less than 40% of the quality criteria) [27,30].

Data extraction: Information pertaining to aim, sample size and respondents, study period, study design, sampling method, data collection tool, methodology, and study type (quantitative/qualitative) were extracted from the selected studies. Due to the heterogeneity in data, narrative synthesis was performed on the basis of the outcomes of the included studies.

6.3 Results

A total of 225 articles were retrieved from all databases, including bibliographic search, out of which 90 were identified as duplicates and were excluded. The titles and abstracts of the remaining 135 studies were screened according to the inclusion and exclusion criteria (Table 6.1). Subsequently, 30 studies were selected for full-text review, and finally 18 articles were included and reviewed in the chapter. Schematic representation of the selection process is shown in Figure 6.1.
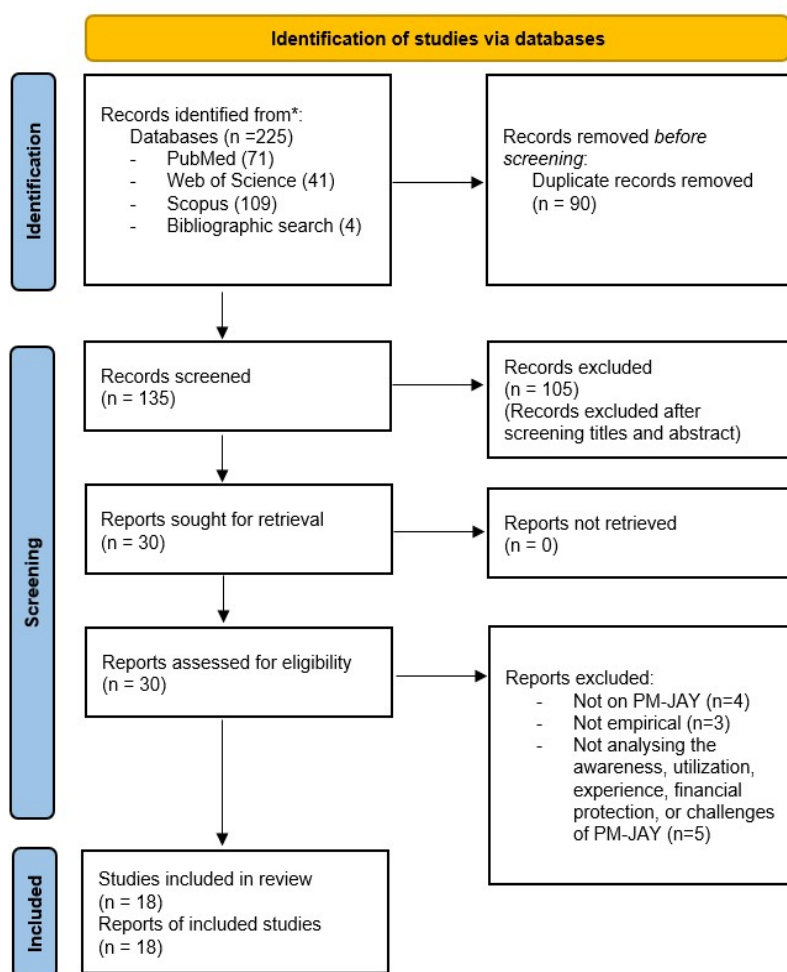
Figure 6.1 PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram

6.3.1 Characteristics of studies

The characteristics of the included studies are presented in Supplementary Table 6.1. Out of 18 studies, 14 were quantitative [18,31-43], 3 were qualitative [44-46], and 1 was a mixed study [47]. Nearly 85% of the quantitative studies were of high quality, while the remaining studies were of moderate quality (Supplementary Table 6.2a). However, many studies did not provide information about non-responders. Three qualitative studies (including the qualitative part of the mixed study) were of high quality, and one qualitative study was of moderate quality (Supplementary Table 6.2b).

The included studies were conducted in 14 different states and union territories of India, namely, Karnataka [31-33], Bihar [34,35,47], Delhi [18], Uttar Pradesh [35-37], Tamil Nadu [35,38,45,47], Uttarakhand [39], Jharkhand [44], Chhattisgarh [35,40,41], Gujarat [35,42,46], Madhya Pradesh [42,46], Jammu and Kashmir [43], Haryana [47], Kerala [45], and Meghalaya [35]. Out of these mentioned states and union territories, Karnataka, Tamil Nadu, Chhattisgarh, Gujarat, Kerela, and Meghalaya have prior experience in implementing their own state level GSHI scheme. Studies assessed a wide variety of outcomes (Supplementary Table 6.1), including awareness about the scheme among eligible population/beneficiaries [18,35,36,38,43,47] and healthcare workers, [34,39,45], utilization of the scheme [31-33,38,40,47], and the experiences and challenges faced by beneficiaries [18,31,42,44,47] and healthcare providers [34,37,39,45,46]. Also, some studies examined the financial burden among users of the scheme [18,33,38,40,41,42,44].

6.3.2 Awareness of the scheme

6.3.2.1 Awareness of the scheme in general

Table 6.1 presents the awareness about PM-JAY as reported by studies. Five studies [35,36,38,43,47] assessed the general level of awareness about the scheme by examining whether respondents had heard or knew about it. Three studies reported high level of awareness [35,36,38], one study found overall low awareness with variations across states [47], and another study reported low level of awareness [43]. The highest level of awareness was reported in Gujarat [35], followed by Uttar Pradesh [35,36], and Chhattisgarh [35]. In Bihar [35,47] and Tamil Nadu [35,38,47], the level of awareness showed mixed results, varying from 9.84% to 59.98% and 38.03% to 77.3%, respectively, which can be attributed to differences in survey timings [35,38,47] and areas or districts covered [35,38,47]. By contrast, the level of awareness was low in Meghalaya [35], Haryana [47], and rural areas of Jammu and Kashmir [43].

Table 6.1 Awareness about PM-JAY

Awareness in General (Have heard or know about the PMJAY scheme)	• Across rural areas: Uttar Pradesh: 84.8% (212/250) of individuals [36]; Tamil Nadu: 77.3% (232/300) of household representatives [38]; Jammu and Kashmir: 28.15% (107/380) of individuals [43]. • Across states: 61.5% (7,147/11,618) of adult household representatives surveyed across six states [35] and 27% (731/2,713) of households surveyed across three states [47] were aware about the scheme. The awareness varied across states: Gujarat (93.62% (1,600/1,709)) [35]; Uttar Pradesh (86.06% (2,223/2,583)) [35]; Tamil Nadu (58.63% (530/904) [47], 38.03% (664/1,746)) [35]; Bihar (59.98% (1,553/2,589) [35], 9.84% (90/915)) [47]; Chhattisgarh (57.46% (855/1,488)) [35]; Meghalaya (16.76% (252/1,503)) [35]; Haryana (12.41% (111/894)) [47].
Awareness about various facets of the PM-JAY scheme	Among those who reported general awareness about the scheme in Jammu and Kashmir (N=107) [43], across three states [47], and across five states (N=6483*) [35], and among patients who utilized the scheme in New Delhi# (N=120) [18] and in Jharkhand [44], the respective studies also assessed their awareness about various aspects of the scheme: • Eligibility: 31.77% [43]; 75.9% [35] • Scheme benefits: 21.49% [43] • Covers hospitalization expenses: 42.4% [47]; 55.0% [35] • Financial coverage: 31.7% [35]; 62.1% [47]; 65.0% (78/120) [18] • Balance in the card left and treatment cost: (0/57) [44] • Coverage period (in years): 31.7% [35]; 24.5% [47] • Details of empanelled providers: 36.67% [18]; 47.6% [47] • Covers pre- and/or post-hospitalization expenses: 5.8% [35]; 2.7% [47] • No cap on family size: 3.8% [35]; 55.8% [47]; 77.5% [18] • Doesn't include transportation allowance: 2.0% [35]; 49.8% [47] • Portability benefits: 0.7% [35]; 43.9% [47] • Addition of new family members: 60.6% [47] • Age limit for dependents: 40.2% [47] • Treatment package: 51.7% [47] • Diagnostics covered: 33.5% [47] • Treatment without the e-card: 36.9% [47] • Grievance mechanism: 18.6% [47] • The scheme permits multiple treatments at any authorized Indian hospital until the family's designated financial limit is reached: 54.17% [18]

	• No refunds or reimbursements will be provided for OOPE on medicines/consumables: 44.17% [18].
Awareness among healthcare providers about the PM-JAY scheme	• In Kerala (10) and Tamil Nadu (11), all interviewees (mainly healthcare workers) were aware of PMJAY [45]. • All 181 surveyed healthcare workers (Reddy et al 2020) and 99.5% (409/411) of surveyed healthcare workers [34] had heard about the PM-JAY scheme. Participants scored low on both the awareness score (Mean (SD): 4.5(1.96) out of maximum score of 10 [39]; 5.52(1.8) out of maximum score of 9) [34] and the readiness score (Mean (SD): 16(5) [39]; 18.49(4.5) [34] out of maximum score of 25) [34,39]. • Senior residents reported statistically significantly lower awareness compared to faculties (p<0.05) [39] Nursing officers reported statistically significantly lower awareness than junior residents, senior residents, and faculties (p<0.05) [34]. • No statistically significant differences in readiness scores were found when gender [34], departments [34,39], and designation of healthcare workers were compared (p>0.05) [34]. • The linear regression model showed an increase of 0.432 units [34] and 0.531 units [39] in readiness for every unit increase in awareness score (p<0.05).

* The study did not ask details about the various features of the scheme in Tamil Nadu; [#] The study reported the awareness of the patients who were admitted in All India Institute of Medical Science, Delhi and availed the benefits of scheme; SD: Standard Deviation.

6.3.2.2 Awareness about various facets of the scheme

Five studies [18,35,43,44,47] assessed the awareness regarding various facets of the scheme among respondents who reported general awareness about the scheme [35,43,47] or had utilized the scheme [18,44]. The findings revealed that the awareness level was low for most aspects, including details about coverage of hospitalization expenses [35,47], empanelled hospitals [18,47], balance in beneficiary card [44], grievance mechanism [47], and benefits of the scheme [43] such as coverage of pre or post-hospitalization expenses [35,47], portability benefits [35,47], etc. Awareness about eligibility [35,43] and coverage amount under the scheme [18,35,47] showed mixed results across studies (Table 6.1).

6.3.2.3 Source of information

Beneficiaries got to know about the PM-JAY scheme through a combination of official and unofficial sources, exhibiting considerable variations across states (Table 6.2). Official sources, such as letter from the government and accredited social health activist (ASHA) workers[11] were found to be the major sources of information in Gujarat, Haryana, Bihar, and Tamil Nadu [35,42,47]. Ayushman Kendra was identified as the major source of information by a study conducted among patients who utilized healthcare services in New Delhi [18]. By contrast, 70% of beneficiaries in Madhya Pradesh got to know about the scheme through informal sources such as friends, relatives, newspapers, or internet, and none of the beneficiaries received scheme-related letter from the government [42]. Notably, studies even reported that 2-30% of respondents got to know about the scheme upon arriving at the hospital [18,35,42,47].

One study assessed the source of awareness about the eligibility for the scheme and found that government letter in Gujarat and visiting nearest common service center in Madhya Pradesh were the primary sources for acquiring information about the eligibility criteria [42]. Additionally, one study examined the source of disseminating information about the benefits of the scheme [47] and reported that Ayushman Mitra (AM)[12] or ASHA workers were the primary sources in Bihar and Haryana, whereas friends, neighbours, or political party cadres were the main sources in Tamil Nadu [47] (Table 6.2). Furthermore, according to the PM-JAY guidelines, patients are entitled to receive information through calls and SMS regarding various processes throughout their hospitalization. In Gujarat, although a majority of the beneficiaries received SMS during verification steps (56-57%), only a small number of beneficiaries received SMS for hospitalization processes (admission and pre-authorization request (10%), pre-authorization

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[11] ASHA workers are community health workers employed by the Ministry of Health and Family Welfare as a part of India's National Rural Health Mission.

[12] Ayushman Mitra (AM) refers to a certified frontline health service professional who is present at each of the empanelled hospitals and serves as a first point of contact for beneficiaries. They assist with beneficiary identification documentation and claim process along with the medical coordinator.

approval (28%), and discharge (5%)) [42]. By contrast, in Madhya Pradesh, a substantially lower proportion of patients received SMS across all processes (1-9%) [42]. Notably, only the post-discharge feedback calls were made to nearly 60% and 50% of beneficiaries in Gujarat and Madhya Pradesh, respectively [42].

6.3.2.4 Awareness of the scheme among healthcare workers

Three studies [34,39,45] reported that almost all healthcare providers knew about the PM-JAY scheme (Table 6.1). However, the awareness and readiness scores among healthcare workers were found to be low [34,39]. The level of awareness was statistically significantly lower among nursing officers [34] and senior residents [39] compared to faculties. Importantly, two studies indicated that the readiness to implement PM-JAY increases as the awareness of scheme among healthcare workers improves [34,39].

Table 6.2 Source of awareness

Sources States	Letter from the Prime Minister/ASHA workers/Village health workers	Ayushman Kendras	Hospital premises	Friends and relatives	News/ Television (TV)/ Radio/ Internet/ Web/etc.	Others
Sources for disseminating information about the PM-JAY scheme						
Gujarat [42] (N=100)	Letter: 74% Village health workers: 11%		7%		8%	
Madhya Pradesh [42] (N=100)	0		30%	25%	45%	
New Delhi[#] [18] (N=120)		44.77%	25.83%	13.33%	16.67%	
Across six states* [35] (N=7147)	Letter: 29.9% Asha workers: 54.2%		7.1%	59%	TV: 7.6% Radio: 1.3%	Panchayat:12% Aanganwadi Workers: 11% Many others Kiosk:1.8% Health Camps: 1.3% Arogya Mitra: 1.1% Other: 6.9%
Bihar [47] (N=90)	72.22%		2.2%		3.33% (self-checked at mobile/web)	Registration during special drive: 7.78% NA: 12.22% Other: 2.22%

Haryana [47] (N=111)	77.48%		13.51%		0	Registration during special drive: 4.50% NA: 4.50%
Tamil Nadu [47] (N=530)	95.28%		3.58%		0	Registration during special drive: 0.19% NA: 0.94%

Source of information for checking the eligibility under the PM-JAY scheme

Sources / States	Letter from the Prime Minister	Visiting the nearest common service center	At empanelled hospitals at the time of hospitalization	At empanelled hospitals without hospitalization	Others
Gujarat [42] (N=100)	82%	8%	5%	3%	2%
Madhya Pradesh [42] (N=100)	0	50%	25%	22%	3%

Source of information about the benefits offered by the PM-JAY scheme

Sources / States	Arogya Mitra/ASHA/ Other village Healthcare workers	Friends/neighbours/political party cadres	Radio/Television/ Newspaper	CHC/District hospitals	Bill boards/posters	Others/NA
Bihar* [47] (N=90)	62.22%	20%	11.11%	8.89%	0	Others: 20% NA: 14.44%
Haryana* [47] (N=111)	53.15%	26.13%	27.73%	42.34%	17.12%	Others: 27.93% NA: 5.41%
Tamil Nadu* [47] (N=530)	0	32.07%	19.43%	0.94%	8.30%	Others: 11.32% NA: 36.03%

6.3.3 Utilization of the scheme

The utilization of the scheme ranged from 30% among those in need of hospitalization [47] to 78.8% among COVID-19 patients [31] (Table 6.3). Three studies [32,33,38] reported that nearly 50% of the surveyed respondents utilized the scheme, with an exception of only 13.1% utilization among non-COVID patients during the pandemic [32]. A study from Chhattisgarh, reported that enrolment under PM-JAY scheme did not statistically significantly increase the utilization of hospital care [18].

Table 6.3 Utilization of the scheme

Study	Utilization of the scheme	Socio-demographics characteristics of those who utilized the scheme			
		Gender	Age	Education	Others
Shrisharath et al., (2022) [31]	Among COVID-19 patients: 78.8% (714/906)	Male: 62.04% (443/714) Female: 37.95% (271/714)			
GV and Maiya, (2020) [38]	47.24% (60/127)				
Johnson et al., (2023) [33]	Among Head and Neck cancer patients: 54.1% (196/362)	Male: 76.5% (150/196) Female: 23.5% (46/196)	Mean Age: 53.60 years. 19–40 years: 15.3% (30/196) 41-60 years: 56.6% (111/196) 61–80 years: 27.6% (54/196) >80 years: 0.5% (1/196)		
Rao et al., (2022) [32]	COVID-19 patients: 51.3% (701/1367)	Male: 61.77% (433/701) Female: 38.23% (268/701)			

	Non-COVID: 13.1% (2353/17942)				
Trivedi et al (2022) [42]	All beneficiaries who utilized the scheme were surveyed	Males: 54.55% (109/200) Females 45.5% (91/200)	Mean Age Gujarat: 49.1 years Madhya Pradesh: 42.2 years	Illiterate or no formal education: 27% (54/200) Primary education (1–8 standard): 42.5% (85/200) Secondary education (9–12 standard and diploma etc.: 24.5% (49/200) Graduation and above: 6% (12/200)	Religion Hindu: 89% (178/200) Muslim: 11% (22/200) Social group Socially marginalized and backward castes: 74% (148/200) General caste: 25.5% (51/200) Occupation Labour work: 36.5% (73/200) Self-employed: 34% (68/200) salaried job: 20.5% (41/200) others: 1% (2/200)
Gowda et al. (2022) [18]	All patients who utilized the scheme were analysed	Male: 63.87% (76/120) Female: 36.13% (44/120)	Mean Age: 36.37 years	Illiterate:45.83% (55/120) Matric: 36.67% (44/120) Graduates:14.17% (17/120) Post graduate: 3.33% (4/120)	Rural: 69.17% (83/120) Urban: 30.83% (37/120)
MOU [47]	Overall, 30% (33/108) of those who need the services Bihar: 44.44% (4/9) Haryana: 39.47% (15/38) Tamil Nadu: 22.95% (14/61)				
Garg et al., (2020) [40]	In Chhattisgarh, enrolment				

under PM-JAY did not statistically significantly increase the utilization of hospital care in comparison to uninsured (p>0.05).			

Studies examining the socio-economic characteristics of users of the scheme indicated that higher proportion of individuals were males [18,31-33,42] and were aged less than 60 years [18,33,42]. Additionally, it was observed that individuals with lower educational background [18,42], those from socially marginalized and backward classes [42], and residing in rural areas [18] also availed healthcare services under the PM-JAY scheme (Table 6.3).

6.3.4 Experience

6.3.4.1 Experience of utilization of the scheme among users

The scheme received overall high satisfaction [18,42], with nearly 90% of patients reporting satisfaction and no difficulties in utilizing the scheme [18], and 76.5% were satisfied with their hospitalization experience under the scheme [42] (Supplementary Table 6.3). One study assessed beneficiaries' experience over specific aspects, and found that 81% of beneficiaries were satisfied or highly satisfied with the registration process and 52% of beneficiaries received assistance from PM-JAY helpdesks for documents, computerized registration, and guidance about treatment within the hospital premises [42]. The overall satisfaction, satisfaction with registration process, and help received from PM-JAY helpdesks were higher in Gujarat compared to Madhya Pradesh and in public hospitals compared to private hospitals [42]. Furthermore, the average time taken for admission and pre-authorization request, pre-authorization approval, and discharge processes (i.e., indicators of prompt attention) was

statistically significantly lower in Gujarat than Madhya Pradesh [42]. Notably, the satisfaction level was statistically significantly higher among beneficiaries who resided in urban areas, received assistance at PM-JAY helpdesk, and did not incur OOPE [42].

6.3.4.2 Experience/opinion of healthcare providers

A study evaluated the satisfaction of public and private hospitals regarding various aspects of the scheme [37], and reported a high level of satisfaction (87.5% - 100%) among hospitals in areas such as infrastructure and document required for empanelment, online empanelment process, and physical verification process of empanelment [37]. However, satisfaction was lower for health packages and claim settlement aspects under the scheme, and was particularly lower among private hospitals (health packages: 30.4%; claim settlement: 52.2%) in comparison to public hospitals (health packages: 50.0%; claim settlement: 62.5%) [37]. A study interviewed healthcare providers and highlighted that the scheme could benefit the public healthcare sector, as the treatment rates in public hospitals are lower than the package rates under the scheme, resulting in profits for public hospitals [45] (Supplementary Table 6.3).

6.3.5 Financial protection

Mixed results were observed regarding the effectiveness of the scheme in reducing the financial burden of the beneficiaries [18,33,38,40-42,44-46] (Table 6.4). Two studies reported that most beneficiaries (80-90%) did not incur OOPE while utilizing healthcare services under the scheme [18,38]. One study reported that the scheme reduced the medical expenses by 87.5% for head and neck cancer patients [33]. Additionally, a study after interviewing 21 healthcare workers revealed that all workers anticipated and witnessed notable benefits of the scheme, particularly for households living below the poverty line, rural residents, or individuals requiring expensive medical care [45].

By contrast, two studies found that enrolment in PM-JAY did not reduce OOPE and catastrophic health expenditure for insured beneficiaries in Chhattisgarh [40,41]. Beneficiaries reported incurring expenses in various situations, including: i) expenses prior to hospitalization [44,46] and admission fees [44], ii) difference between the treatment cost and reimbursement under PM-JAY [38,42,46], iii) post-treatment charges, including follow-up [44]. Most users incurred OOPE on medicines, consumables, and diagnostics tests [18,42,44], as they were told that certain inputs were either unavailable or were not covered under the scheme [42,44].

Table 6.4 Financial protection under the scheme

Gowda et al., 2022 [18]	• 81.67% (98/120) of patients who utilized the scheme didn't purchase any consumables/medicines during their stay in hospital. • 18.3% (22/120 patients) incurred OOPE on Medicines/Consumables.
GV and Maiya, 2021 [38]	• Among those who utilized the scheme, 90% (54/60) of households didn't incur any additional amount, whereas 39.88% (69/173) of uninsured households faced financial burden • 10% (6/60 beneficiaries) of households incurred additional amounts on healthcare
Johnson et al., 2023 [33]	• The scheme reduced OOPE from INR 17,370,279 to INR 3,297,970 for 196 head and neck cancer patients who utilized the scheme.

D'Cruze, 2020 [44]	• 93% (53/57) of respondents reported that their health expenditure was almost the same as their expenditure prior to PM-JAY.
	• Respondents reported occurrence of expenditure on the following:
	  - Diagnostics: 93% (53/57 beneficiaries)
	  - Admission fee for hospitalization: 91% (52/57 beneficiaries)
	  - Paying post treatment charges: 93% (53/57 beneficiaries)

Garg et al., 2020, 2022 [40,41]	• PM-JAY enrolment was statistically not effective ($p > 0.05$) in reducing OOPE and catastrophic health expenditure (CHE) in Chhattisgarh [40,41]. • Higher financial burden in private hospitals than public hospitals - OOPE: Private hospitals: PM-JAY insured (INR 19,375) and uninsured (INR 20,261)); Public hospitals: PM-JAY insured (INR 3,078) and uninsured (INR 2,974) [40] - CHE at 25% threshold: Private hospitals: PM-JAY insured (43.6%) and uninsured (39.5%); Public hospitals: PM-JAY insured (7.6%) and uninsured (INR 7.9%) in 2019 [40]; In 2020, Private hospitals: 56.2%; Public hospitals: 10.9% [41]. • Utilization of private hospitals statistically significantly increased OOPE and incidence of CHE [40,41].

Trivedi et al., 2022 [42]	• 10% of beneficiaries in Gujarat and 42% of beneficiaries in Madhya Pradesh reported OOPE. • The mean OOPE was higher among patients in Gujarat (INR 1,511) than Madhya Pradesh (INR 27,648). • Most respondents incurring OOPE cited expenses for medicines or diagnostic tests. • 20% of beneficiaries (mostly from private hospitals in Madhya Pradesh) reported difference between treatment cost and reimbursement under PM-JAY. • 18% of patients in public hospitals incurred OOPE compared to 34% in private hospitals. • OOPE– Private hospitals: PM-JAY insured (INR 19,375) and uninsured (INR 20,261)); Public hospitals: PM-JAY insured (INR 3,078) and uninsured (INR 2,974)
Pillai and Obasanjo, 2020 [45]	• This study interviewed participants working in the healthcare field (either in healthcare management or as medical practitioners) and reported that all participants foresee and witnessed benefits of the scheme, particularly for families living below the poverty line, people from rural areas, or families requiring expensive care. • However, the PM-JAY scheme does not cover outpatient care and therefore, patients have to pay expenses for outpatient investigations, medical tests, and laboratory work from their own pockets.
Saxena et al., 2022 [46]	• It was reported that beneficiaries incurred expenses incurred prior to hospitalization. • In Madhya Pradesh, 472 packages (mostly non-surgical procedures) under PM-JAY are restricted for government hospitals. So, the patients requiring multimodal treatment (using more than one package) in private hospitals, may have to pay for packages reserved for public hospitals, without knowing this at the time of admission.

Notably, the PM-JAY scheme only covers inpatient care, leaving patients to bear OOPE for outpatient services [45,46]. Furthermore, a study reported instances of private hospitals in Madhya Pradesh charging patients requiring multimodal treatment (involving more than one package) because certain packages were exclusively reserved for public hospitals under PM-JAY and were not covered in private hospitals [46]. Lastly, few studies reported that OOPE and incidence of catastrophic health expenditure was substantially higher in private hospitals, irrespective of the health insurance status [40-42,46].

6.3.6 Challenges encountered

6.3.6.1 Challenges encountered by users of the scheme

Supplementary Table 6.4 shows that beneficiaries encountered several challenges while utilizing the scheme, including delays in receiving beneficiary card [44,47] and authorization approval [31], limited knowledge on how to access and use the services under scheme [31,47], treatment denial [44], and delays in treatment initiation [44,46]. Also, 42% of patients reported that they faced differential treatment for being PM-JAY beneficiaries [44]. Notably, patients often found themselves in a weak position to advocate for free treatment [44].

6.3.6.2 Challenges faced or perceived by healthcare providers

The main challenges faced by the healthcare providers were low health package rates and delays in claim settlement under the scheme [37,44-46] (Supplementary Table 6.4). Hospitals in Gujarat and Madhya Pradesh reported an average turnaround time of over 90 days for full claim settlement, which was substantially longer than the time specified in the guidelines [42]. Notably, more than 75% of public and private hospitals considered PM-JAY scheme inferior to private health insurance [37], owing to complaints reprisal, time taken for claim processing and reimbursement, denial of reimbursement of health packages, and rates of health benefit packages [37]. In addition, two studies highlighted the lack of training provided to healthcare workers about the scheme [34,39] and one study reported training provided was software centric and lacked in content around capacity-building in terms of package selection, documentation, and other processes [46]. Providers also reported that no auto-approval for preauthorization was received as per the guidelines and the transaction management system portal does not provide a procedure-wise list of documents needed for pre-authorization and claim settlement request that can reduce or eliminate the chance of missing out on essential documents [46]. A mixed-design study through interactions with key officials and field visits reported various challenges such as inadequate human resources with necessary skills to implement the scheme at the state

level, insufficient time and manpower to distribute official letters and other information materials, lack of infrastructure (especially temporary office space), and failure of kiosks to provide beneficiaries with detailed information about the scheme or packages resulted in low awareness and knowledge about the scheme [47].

6.4. Discussion

India, grappling with substantial burden of OOPE, has taken a major leap towards UHC by launching PM-JAY, the world's largest government-sponsored health insurance scheme. This chapter conducted an extensive review of awareness, utilization, experiences, financial protection, and challenges associated with the scheme, drawing insights from a total of 18 studies. To the best of our knowledge, this is the first comprehensive review that assesses the preliminary impact of the scheme from the perspective of both users and healthcare providers.

We observed a reasonably high level of general awareness about the scheme among both users [35,36,38] and healthcare providers [34,39,45], even during the initial implementation phase. This could be attributed to the National health authority's (NHA) strong emphasis on information, education, and communication (IEC) activities since the launch of the scheme. Various methods, such as use of mass media (leaflets, booklets, hoardings, television, radio spots, social media campaigns etc.), educational campaigns [11,15,35,42,47], official websites, and letters from the government to beneficiaries, have been employed to disseminate information about PM-JAY [11,15,35,42,47]. In contrast, awareness of the previous central-level GSHI, RSBY, was reported to be low [48,49], reaching only 57% of its targeted beneficiaries even after being operational for several years [21]. The contrasting awareness levels of PM-JAY and RSBY, highlights the improved communication and implementation process of the recent PM-JAY scheme compared to RSBY. However, despite these initiatives, we observed considerable inter-state variations in awareness levels [35,36,38,43,47] and use of formal information sources to disseminate information [18,35,42,47]. Also, there is notable lack

of comprehensive understanding regarding various scheme features such as benefits of the scheme, services covered, and hospitals empanelled under the scheme [18,35,43,47]. Similar issues were observed in the case of RSBY as well [22,48-52]. It is believed that awareness and knowledge about the scheme is crucial for enrolment, utilization, and ultimate success of the scheme [14,35,42,53].

Since the responsibility of the implementation of PM-JAY at state-level lies with the respective states, proactive efforts at the state level are imperative [15,54,55]. For instance, a special drive called "Apke Dwar Ayushman" was initiated, which involved multiple IEC activities, collaborating with state health agencies to establish grassroots network of healthcare workers and front-line workers to mobilise beneficiaries, training of workers, and mobilization of beneficiaries, leading to identification of more than 150 million new beneficiaries, with majority of them belonging to the empowered action group (EAG)[13] states. This highlights the importance of state-based initiatives in expanding the awareness and reach of PM-JAY [15,55].

Based on existing studies, we observed an overall positive experience among beneficiaries who utilized the scheme [18,42]. The NHA has also reported positive experience of beneficiaries based on 1.63 million feedback calls conducted between September 2021 and August 2022 [15]. The utilization of the scheme was found to be low-to-moderate during the initial years of its inception [32,33,38,40,47]. Several issues, including beneficiaries' lack of knowledge to access the scheme benefits [18,35,43,44,47], delays in issuance of beneficiary card [31,44,47] and treatment approvals [42,46], and initial denial of treatment by empanelled hospitals [44], hinder the effective utilization and timely treatment under the scheme. Additionally, the lack of knowledge and training among healthcare providers regarding PM-JAY [34,39], poses

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[13] The government of India constituted the EAG states to ensure focused attention towards eight states (Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Odisha, Rajasthan, Uttar Pradesh, and Uttarakhand). These states are socio-economically backward and lag behind in terms of basic health infrastructure and health outcomes.

challenges for patients at hospitals [56], necessitating the need to strengthen and broaden the scope of training activities.

Furthermore, stark differences in health infrastructure across states may lead to varied utilization of the scheme [57]. For instance, as per a policy brief, hospitals in aspirational districts[14] are less specialized [58], and no private hospitals were empanelled in aspirational districts in nine states [58]. Notably, in 2020, more than 60% of empanelled hospitals under PM-JAY were concentrated in five states, Karnataka, Gujarat, Uttar Pradesh, Tamil Nadu, and Rajasthan, and all but Uttar Pradesh have prior experience in implementing state-level GSHI schemes [59]. Although, the portability feature under PM-JAY scheme enables beneficiaries to seek care in states other than their home state, not all beneficiaries particularly the poor and vulnerable possess the financial resources and knowledge to effectively access distant healthcare [60]. A policy brief reported that patients from states such as Madhya Pradesh, Uttar Pradesh, and Bihar, reported the highest portability cases mainly due to unavailability of services in their home state [61]. However, 37% of the surveyed patients did not avail follow-up care, reflecting challenges in the continuity of care when accessing services across borders [61]. All this shows that the limited availability of health infrastructure and concentration of healthcare providers in certain regions may restrict the beneficiaries' ability to utilize and fully avail the benefits of PM-JAY.

The findings of financial protection offered by PM-JAY varied across studies, with some studies reporting a reduction in OOPE [18,33,38], while others highlighting the scheme's limitations in this aspect [40,41,44]. We observed that despite being enrolled under PM-JAY, many beneficiaries still incur expenses on various items such as medicines, consumables, and diagnostic tests [18,38,42,44,46]. A study revealed that 47.0% of the grievances related to the

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[14] Aspirational districts are the most under-developed districts across the country, which are chosen to quickly and effectively transform under "Aspirational districts" programme

scheme were financial complaints [62]. In India, persistent issues of low availability of free or subsidised drugs and diagnostic tests, coupled with irregular supply of essential drugs at public healthcare facilities, force individuals to buy them from open markets, resulting in OOPE, as observed in RSBY as well [49-52]. One of the main reasons for the constrained capacity and quality of India's public health sector is the low level of government health spending as highlighted by a recent report published by NITI Aayog[15] [63]. However, it is expected that as the penetration and utilization of PM-JAY will increase, it will correspondingly raise the financial gains for public district hospitals [45,64], as the treatment cost in the public sector is lower than the reimbursement of packages under the scheme [45,64]. Thus, PM-JAY has the potential to offer a dual advantage to reduce the financial burden of beneficiaries while also providing an opportunity for the public health sector to leverage the profits earned under the scheme to upgrade and strengthen their infrastructure.

Notably, studies have reported a higher financial burden for patients who accessed care at private hospitals compared to public hospitals, irrespective of their health insurance status [40-42]. Concerns of over-charging and malpractices by private healthcare providers were witnessed in previous health insurance schemes [7,10,65,66] and continue to be observed in the current scheme as well [67,68]. An audit revealed that private hospitals discharge PM-JAY patients early and engage in fraudulent activities to minimize costs [69]. To combat such practices, the government has taken measures such as delisting certain hospitals or imposing fines on those found engaging in fraudulent activities [15,70,71]. NHA has also initiated the usage of artificial intelligence and machine learning to detect fraud and suspected transactions [15,72]. Also, recently NHA has announced to introduce a new system to measure and grade hospital performance on the basis of value of healthcare services (which includes dimensions namely,

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[15] The National Institution for Transforming India (NITI Aayog) is the premier policy think tank of the Government of India, providing directional and policy inputs.

beneficiary satisfaction, hospital readmission rate, extent of OOPE, confirmed grievances, and improvement in-patient's health-related quality of life) rather than volume of services provided, to incentivize providers to deliver high-quality treatment to beneficiaries [73].

It is noteworthy that private hospitals have shown reluctance or dissatisfaction in joining PM-JAY scheme, due to low cost of healthcare packages offered under the scheme and delays in claim settlement process [37,45,46,74-76]. A study reported that nearly 42% and 20% of the total health benefit packages under the scheme had prices that were less than 50% of the actual treatment cost in 2018 and 2019, respectively [77]. Larger hospitals find it difficult to sustain with PM-JAY as the reimbursements are lower than their actual costs [44-46]. These issues may also be responsible for hospitals demanding payments directly from patients [44,46]. The NHA has revised a few healthcare packages based on expert recommendations [15,55]; however, most states have not yet migrated to the updated package rates [55,78]. Additionally, the NHA has piloted the Diagnosis Related Groups system, which is a grouping system that classifies each patient's case according to the diagnosis and other characteristics such as patient's age, case severity, co-morbidity and procedures performed, when determining reimbursement rates for specific hospital episodes in five states to reduce the inefficiencies in current package rate system [15,62].

Lastly, PM-JAY provides coverage for secondary and tertiary care [11,15]. However, the exclusion of outpatient services is insufficient to avert financial burden in the Indian scenario, where the burden of non-communicable disease is rising, leading to an increased need for frequent outpatient visits to manage these diseases [40,79]. Moreover, evidence suggests that outpatient services impose a greater financial burden on Indian households compared to inpatient services [4,63]. The previous central-level GSHI, RSBY, also did not cover outpatient care, which led to inadequate financial protection provided by the scheme [22,23,50,80], highlighting the need to cover outpatient services under the ambit of PM-JAY.

6.5 Limitations

As with all studies, our study also has a few limitations. As our main objective was to analyse the impact of PM-JAY from the perspective of users and providers, we have excluded some studies which were solely describing the processes involved under the scheme. Also, due to heterogeneity in outcomes studied, methodology, and population in the reviewed studies we could not perform meta-analysis. Lastly, the results are preliminary given the ongoing evolution of the scheme over the years. Nonetheless, this comprehensive review could serve as a useful guide to strengthen the implementation of the scheme in future.

6.6. Conclusion and policy recommendations

Amidst the rising burden of non-communicable diseases and heavy reliance on OOPE in India, the PM-JAY scheme is a well-intended initiative aimed at alleviating the financial burden of seeking healthcare faced by poor and vulnerable sections of the population. This chapter highlights that the awareness about the scheme in general was observed to be reasonably good among both users and healthcare providers. However, awareness about various facets of the scheme such as hospitals empanelled, services covered, and benefits entitled, were observed to be low among users. The utilization of scheme was observed to be low to medium with overall positive experience among users. Additionally, aspects related to the scheme including awareness, use of formal modes of information dissemination, prompt attention in empanelled hospitals, and infrastructural availability varied across states. A few other challenges such as delays in receiving beneficiary card and treatment initiation, and inadequate training of healthcare personnels in empanelled hospitals were also reported. The financial protection provided by the scheme showed mixed results, with continued spendings on drugs, consumables, and diagnostic tests, and no coverage for outpatient services. Furthermore, the empanelled private hospitals expressed dissatisfaction and concerns regarding packages rates being lower than the cost of treatment and delays in reimbursement.

To address these concerns, policy measures including scaling multidimensional, innovative, and comprehensive awareness programmes to provide holistic knowledge to beneficiaries about the scheme's features are imperative to increase the utilization of the scheme and enable full realisation of the scheme's benefits. Mandating a clear budget and a roadmap for state governments to undertake aggressive IEC activities are also needed. To increase financial risk protection, there is a necessity to increase public health spending, strengthen public health sector, ensure availability of essential drugs and diagnostic services in health facilities, and consider outpatient services under the purview of PM-JAY. Moreover, it is important to address the concerns and reasons for dissatisfaction among healthcare providers, by expediting the claim settlement processes and continually rationalizing treatment packages such that these are feasible for the program to pay as well as attractive enough for providers to join the scheme. States should also be encouraged to adapt to the latest health benefit packages introduced and updated by NHA under the scheme. Differential pricing based on geographical (e.g., tier 1, tier 2, tier 3 city) and provider facility variation (e.g., size of hospital), quality adjustments, etc., may also be considered [62,81]. Strengthening the stewardship function of the government is also necessary to monitor the delivery of care by providers, combat malpractices, and prioritize quality assurance [82]. Furthermore, continuous improvement in IT-system, expansion of training programmes of those involved in service delivery, ensuring compliance of guidelines across states, continuous monitoring and audits, are also required for improving the delivery of services, and overall experience of the scheme. States facing difficulties in implementing the scheme may learn from the experience of other states that have implemented state-level GSHI schemes previously. Lastly, addressing the disparities in health infrastructure and manpower availability across states is vital to ensure the inclusive success of the scheme across all Indian states.

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6.8 Appendix (Supplementary Tables)

Supplementary Table 6.1 Characteristics of the reviewed studies

Author	Aim of the study	Details of participants surveyed/interviewed	Study period	Study design	Sampling technique	Data collection tool	Methodology	Type of Study
Studies conducted among general population								
Shrisharath et al., (2022) [31]	To analyse the usage of PM-JAY among COVID-19 patients hospitalized in a tertiary care hospital in Dakshina Kannada district, Karnataka.	A total of 1,367 COVID-19 positive cases were admitted to the hospital. Among them, 906 patients were admitted to the general ward, and the utilization of the scheme was analysed for these 906 patients, since these patients were eligible for the scheme.	March 2020 to May 2021.	Record-based, cross-sectional study.	Universal sampling. All the patients admitted with COVID-19 were taken as study subjects.	Data was collected from hospital medical records.	Descriptive statistics were employed.	Quantitative
Parisi at al., (2022) [35]	To assess awareness of the PM-JAY scheme in six states among eligible population, and explore the determinants of awareness of PM-JAY as	11,618 respondents (adult representative from each surveyed household) from six states (Bihar, Chhattisgarh, Gujarat, Meghalaya, Tamil Nadu and Uttar Pradesh).	December 2019 to February 2020.	Cross-sectional household survey	To form a representative sample of eligible PM-JAY beneficiaries at the district level, a random selection was made using the 2011 census data from 50 administrative	Data was collected through household survey embedded within the framework of a larger evaluation of PM-JAY.	• Descriptive statistics were employed. • Bivariate analysis and chi square tests were used to determine whether the observed differences between	Quantitative

					blocks within each district of respective states. These blocks served as primary sampling units for the selection process.		• respondents aware of PM-JAY and those unaware were statistically significant. • Two multivariable logistic regression models were used to explore the socio-economic and demographic factors influencing awareness of PM-JAY and awareness of one's own eligibility.	
Sachdev et al., (2022) [36]	To evaluate the awareness regarding various social security schemes, including PM-JAY, among rural population in Uttar Pradesh.	250 individuals in the rural healthcare center of a dental college, Shivrajpur, Kanpur village, Uttar Pradesh.	July 2021 to September 2021.	Community-based cross-sectional study.	Universal sampling. All individuals who came into contact in the study area were requested to participate in the survey.	A pretested questionnaire was used to collect data.	• Descriptive statistics were employed. • Differences between the two groups were compared using the chi-square test.	Quantitative
GV and Maiya, (2020) [38]	To analyse the awareness, coverage, and utilization of	300 households in Mappedu region of Thiruvallur district, Tamil Nadu.	January 2020 to March 2020.	Community-based cross-sectional study.	Simple random sampling using lottery method	A pretested questionnaire was used to	• Descriptive statistics were employed.	Quantitative

	PM-JAY in the rural field practice area of Saveetha Medical College and Hospital, Chennai, Tamil Nadu.				was used to select the households.	collect the responses.	• Chi-square test was used to find the statistical difference in the categorical variables.	
Gowda et al., (2022) [18]	To assess the implementation and satisfaction levels of the PM-JAY scheme in the inpatient department of AIIMS, New Delhi.	120 patients who were hospitalized in AIIMS and utilized the benefits of the scheme.	January 2019 to June 2019.	Cross-sectional study.	Universal sampling, all the beneficiaries who availed the services at AIIMS were studied.	A questionnaire was designed and validated to collect the responses.	• Descriptive statistics were employed. • A p-value of p<0.05 was considered statistically significant.	Quantitative
D'cruze, (2020) [44]	To gauge experiences and challenges of PM-JAY scheme in Jharkhand.	• Interviewed 57 patients treated under the PMJAY. • Interviewed six government officials, seven hospital managers, five Arogya Mitras and five health workers and	Interviews with patients during September 2018 and March 2019. Interviews with officials during February		Obtained a list of patients treated under PM-JAY from district health office, Ranchi. Then traced and interviewed patients who could be successfully contacted by phone before meeting them in person.	Interviews were conducted.	Narrative	Qualitative

		ASHA workers.	and July 2019.					
Garg et al., (2020) [40]	To evaluate the performance of PM-JAY in improving utilization and financial protection for hospital care in Chhattisgarh.	15,361 respondents in 2019.	October to November 2019.	Cross-sectional survey conducted in 2019.*	Two-stage stratified sampling method similar to national sample survey.	Data was collected through survey.	• Ordinary Least Squares regression for OOPE and log of OOPE • Probit model for catastrophic health expenditure • Propensity Score Matching and Instrumental Variable methods were also applied.	Quantitative
Trivedi et al., (2022) [42]	To examine the responsiveness of PM-JAY by measuring prompt attention in service delivery, access to information, and financial burden among beneficiaries.	200 PM-JAY beneficiaries (or their caregivers); 100 beneficiaries from Gujarat and Madhya Pradesh each.	March to August 2019.		Multi-stage sampling method with the use of probability proportional to size.	A structured questionnaire was created to gather information about the patient's hospitalization experience, taking into consideration PM-JAY guidelines. The draft	• Descriptive statistics were used. • Mann–Whitney U test) was used to compare beneficiaries' responses across states, hospitals across states, and hospitals within a state. • A cumulative odds ordinal	Quantitative

| | | | | | | questionnaire was reviewed and approved by technical experts from the World Health Organization and the National Health Authority. Prior to data collection, the revised questionnaire was piloted for accuracy and validity through discussions with in-house experts and a field test. | logistic regression with proportional odds was conducted to determine the effect of various independent variables on the beneficiary's satisfaction with the hospitalization experience under PMJAY. | |
| Langer et al., (2020) [43] | To examine the health expenditure, awareness of health insurance, and coverage among rural households. | A total of 380 families from the Ranbir Singh Pura block of Jammu district, Jammu & Kashmir, Union Territory. | September 2019 to December 2019. | Community-based cross-sectional, study. | Random Sampling | Data was collected through developing a questionnaire. It was developed by the authors using a review of literature from the relevant studies and was duly | Descriptive statistics and chi square test were employed. | Quantitative |

						pretested before being put to use.		
Garg et al., (2022) [41]	To analyse the impact of government-sponsored health insurance (including PM-JAY) on non-covid hospitalization during the pandemic in Chhattisgarh.	15,470 individuals in 2019 and 14,926 in 2020.	First survey was conducted from November 2019 to December 2019. The survey was repeated in November 2020 to December 2020.	Panel data. Two repeated annual household surveys with the same sample households.	Two-stage population-based sample.	Data was collected through survey.	• Descriptive statistics were employed. • Ordinary least square regression was used for OOPE. • Probit model was used for CHE. • Propensity score matching technique was employed to examine the impact of PM-JAY on OOPE and CHE.	Quantitative
Johnson et al., (2023) [33]	To estimate total direct medical cost and OOPE among head and neck cancer patients using Ayushman Bharat scheme in Karnataka.	A total of 362 head and neck cancer patients were admitted to the hospital during the study period, out of which 196 patients utilized the scheme and were included in the study.	October 2019 to October 2021.	Retrospective observational study was conducted for six months.		Data was collected through medical records.	Descriptive and inferential statistics were used.	Quantitative

Rao et al., (2022) [32]	To assess the utilization of PM-JAY scheme among covid and non-covid patients admitted to a tertiary care hospital at Mangalore, Dakshina Kannada District, Karnataka.	1,367 covid-19 patients and 16,684 non-covid patients admitted.	July 2020 to May 2021.	Record-based, cross-sectional study.		Data was collected through the hospital medical records.	• Descriptive statistics were employed. • Statistical analysis was carried out using the Chi-square test.	Quantitative
Studies conducted among healthcare providers								
Nirala et al., (2022) [34]	To assess the level of awareness and preparedness in implementing PMJAY among the healthcare workers in a tertiary care health facility, All India Institute of Medical Sciences (AIIMS), Patna, Bihar.	411 healthcare workers, including faculty, resident doctors, and nursing officers were taken as study participants.	October 2021 to February 2022.	Cross-sectional study.	Purposive sampling	Data was collected using predesigned, pretested, and validated questionnaire.	• The difference in awareness and readiness score across sex and departments of healthcare workers was calculated by independent t-test. Similarly, the differences in scores across designation of healthcare workers was assessed by one-way ANOVA followed by	Quantitative

| | | | | | | | Tukey's post-hoc analysis.
 • Pearson's correlation and linear regression was used to examine the correlation and relationship, respectively between awareness and readiness scores. | |
| Reddy et al, (2020) [39] | To assess the awareness and readiness of healthcare workers in implementation of PM-JAY in an empanelled tertiary care hospital, AIIMS Rishikesh. | 181 participants were included in the study, comprising of faculty members, senior residents and junior residents working at AIIMS Rishikesh, Uttrakhand. | December 2018 to January 2019. | Cross-sectional study. | Convenient sampling | Predesigned, pretested questionnaire was used to collect the data. | • Descriptive statistics were employed.
 • Awareness score and readiness scores were compared across department using one-way ANOVA followed by post hoc test Bonferroni.
 • Pearson's correlation followed by linear regression was used to assess relation between awareness and readiness scores. | Quantitative |

Verma et al., (2022) [37]	To identify the challenges in implementation of PMJAY from the perspective of empanelled hospitals in Meerut district of Uttar Pradesh.	8 public and 23 private hospitals were randomly selected from the list of PMJAY empanelled hospitals in Meerut district.	August 2020 to July 2021.	Cross-sectional study.	Simple random sampling	Predesigned and pretested questionnaire was used to interview PM-JAY Medical Officer co-ordinators in hospitals.	Descriptive statistics were used.	Quantitative
Pillai and Obasanjo, (2020) [45]	To assess the initial challenges encountered during the implementation of the PM-JAY by interviewing healthcare workers who were involved in the roll-out of the scheme in Kerala and Tamil Nadu.	• Interviewed 21 health workers (10 from Kerala and 11 from Tamil Nadu),	July 7, 2019 to July 23, 2019.		Convenient sampling	Qualitative semi-structured interviews were conducted through separate questionnaires created for the two states, taking into account the pre-existing programs and different implementation strategies they employed for PM-JAY.	Narratives review	Qualitative
Saxena et al., (2022) [46]	To understand how the processes put in place to manage hospital-based	• Site visits were done for 14 hospitals (7 from Gujarat and 7	March to August 2019.			Data was collected through review of operational guidelines by visiting	Transcripts of the interviews and observation lists were reviewed manually.	Qualitative

	transactions, from the beneficiary's arrival at the hospital until their discharge are being implemented in PM-JAY and how to improve them to strengthen the scheme's operation.	from Madhya Pradesh) • Interviews with 53 stakeholders (Ayushman Mitra, Nodal Officer, Healthcare Provider, Head of the hospital).				hospitals and also through a semi-structured interview for interviewing stakeholders. The checklist of things to observe in each of the hospitals were prepared, and revised on the basis of suggestions of WHO team.		

Study conducted on eligible population and government officials

MOU [47]	To assess awareness of PM-JAY and its features among beneficiaries, examine dimensions of awareness creation processes, and explore the supply side constraints in awareness	• A total of 2700 households of target beneficiaries (915 households from Bihar, 894 from Haryana, and 904 from Tamil Nadu). • 20 in-depth interviews with key officials	June to July 2019.	Cross-sectional household survey.	Systematic two stage sampling.	Data was collected through a questionnaire, which was prepared in consultation with officials of National Health Authority/State Health Agencies, and pilot tested in all states for clarity, consistency and	Descriptive statistics and interview.	Mixed

	creation and identification processes of the scheme in Bihar, Haryana, and Tamil Nadu.	involved in the implementation of PM-JAY and around 10 interviews of beneficiaries at registration kiosks.					acceptability to respondents.		

* The study also employed two rounds of the National Sample Survey (2004: when there was no GSHI scheme, 2014: when older GSHI schemes were in operation) and conducted one primary survey to analyse PM-JAY scheme. Hence, we have reviewed the findings of the primary survey only, which analyses the impact of PM-JAY scheme.

Supplementary Table 6.2a Quality assessment of cross-sectional studies using AXIS

Study Reference / Questions	[18]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]	[40]	[42]	[43]	[47]
Q1. Were the aims/objectives of the study clear?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Q.2 Was the study design appropriate for the stated aim(s)?	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Q.3 Was the sample size justified?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Q.4 Was the target/reference population clearly defined? (Is it clear who the research was about?)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Q.5 Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y

Question														
Q.6 Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?	Y	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	Y
Q.7 Were measures undertaken to address and categorise non-responders?					N	N	N		N	N	Y	Y	Y	N
Q.8 Were the risk factor and outcome variables measured appropriate to the aims of the study?	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Q.9 Were the risk factor and outcome variables measured correctly using instruments/ measurements that had been trialled, piloted or published previously?	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Q.10 Is it clear what was used to determined statistical significance and/or precision estimates? (eg, p values, CIs)	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N
Q.11 Were the methods (including statistical methods) sufficiently described to enable them to be repeated?	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Q.12 Were the basic data adequately described?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Q.13 Does the response rate raise concerns about non-response bias?					N*	N*	N*		N*	N*	Y	Y	Y	N*
Q.14 If appropriate, was information about non-responders described?					N	N	N		N	N	Y	N	Y	N
Q.15 Were the results internally consistent?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Q.16 Were the results for the analyses described in the methods, presented?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Q.17 Were the authors' discussions and conclusions justified by the results?	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Q.18 Were the limitations of the study discussed?	N	Y	N	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y
Q.19 Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Q.20 Was ethical approval or consent of participants attained?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Criteria met	15	12	14	15	16	17	14	16	16	16	20	19	19	16

Y: Criteria met; N: Criteria not met; N*: No information provided (hence, counted as criteria not met). One study [41] used panel data, hence AXIS tool cannot be applied.

Supplementary Table 6.2b Quality assessment of qualitative studies using CASP

Study Reference Questions	[44]	[45]	[46]	[47]
Was there a clear statement of the aims of the research?	N	Y	Y	Y
Is a qualitative methodology appropriate?	Y	Y	Y	Y
Was the research design appropriate to address the aims of the research?	Y	Y	Y	Y
Was the recruitment strategy appropriate to the aims of the research	Y	N	Y	Y
Was the data collected in a way that addressed the research issue	Y	Y	Y	Y

Has the relationship between researcher and participants been adequately considered?	N	Y	Y	N*
Have ethical issues been taken into consideration?	N*	Y	Y	Y
Was the data analysis sufficiently rigorous?	Y	N	Y	Y
Is there a clear statement of findings?	Y	Y	Y	Y
How valuable is the research?	Y	Y	Y	Y
Score	7	8	10	9

Y: Criteria met; N: Criteria not met; N*: No information provided (hence, counted as criteria not met)

Supplementary Table 6.3 Experience of users and providers with the scheme

Experience of users	<u>Overall Satisfaction/Experience</u> • 92.5% (111/120) of the patients who utilized the scheme were satisfied/totally satisfied with the scheme and 88% of patients did not experience any problems while using the scheme [18]. • 76.5% (153/200 beneficiaries) were satisfied/highly satisfied with their hospitalization experience [42]; Gujarat (82%); Madhya Pradesh (71%); public hospitals (82%); private hospitals (66%) [42]. • The odds of satisfaction were higher among beneficiaries who did not incur OOPE, resided in urban areas, and received help at the PM-JAY registration desk (p<0.05) [42]. <u>Experience on specific aspects</u> • Trivedi et al [42] assessed the experience of beneficiaries in Gujarat (N=100) and Madhya Pradesh (N=100) across several aspects of the scheme. - Registration process: 81% (162/200) satisfied/highly satisfied; Gujarat (86%); Madhya Pradesh (77%); Public hospitals (83%); Private hospital (77%).

	- Received assistance with information about PM-JAY, document submission and computerized registration, and guidance regarding treatment within the hospital: 52% (104/200) of beneficiaries; Statistically significantly higher help in public hospitals than private hospitals ($p<0.05$). - Mean time for admission and pre-authorization request: 32 minutes in Gujarat and 75 minutes in Madhya Pradesh ($p<0.05$); 40 minutes in public hospitals and 73 minutes in private hospitals ($p<0.05$). - Mean time for pre-authorization approval: 150 minutes in Gujarat and 480 minutes in Madhya Pradesh ($p<0.05$); 140 minutes in public hospitals and 376 minutes in in private hospitals ($p>0.05$). - Mean time to complete the discharge process: 63 minutes in Gujarat and 119 minutes in Madhya Pradesh ($p<0.05$); 94 minutes in public hospitals and 96 minutes in private hospitals ($p>0.05$).

Experience/ Opinions of Healthcare Providers	**Satisfaction on specific aspects**
	• Satisfaction among healthcare providers (public (N=8) and private (N=23) [37]:
	  - Infrastructure and document requirements for empanelment under PM-JAY: Public hospitals: 87.5%, Private hospitals: 95.7%, Total: 93.5%.
	  - Online process of empanelment: Public hospitals: 87.5%, Private hospitals: 95.7%, Total: 93.5%.
	  - Physical verification process of empanelment: 100% of both public and private hospitals.
	  - Health benefit packages: Public hospitals: 50.0%, Private hospitals: 30.4%, Total: 35.5%.
	  - Claim settlement: Public hospitals: 62.5%, Private hospitals: 52.2%, Total: 54.8%.
	• A study analysed the adherence of the PMJAY guidelines in empanelled hospitals in Gujarat and Madhya Pradesh and reported the following experience [46]:
	  - In all the hospitals, Ayushman Mitra (AM) were able to operate hospital transaction management system (TMS) for making pre-authorization requests and scanning and uploading the required documents for obtaining preauthorization approval in the TMS. AMs with medical or paramedical background made hospital operations efficient by eliminating or substantially minimizing the queries through a) understanding the doctor's prescription and selecting the appropriate package for blocking, b) uploading the required medical reports for the selected package in first instance.
	  - None of the hospitals indicated any instances of repeated denial of the pre-authorization request.
	  - The telephonic pre-authorization approval for emergency was not in place in any of the hospitals; however, it did not impact the emergency admissions.

	- Discharge guidelines i.e., filling of online discharge summary form by operator and the discharge of patients with a discharge summary were followed in all hospitals of both states. • A qualitative study reported that healthcare workers in Kerela and Tamil Nadu highlighted the benefits of PMJAY for public sector hospitals, as treatment rates in these hospitals are lower than the package rates under the scheme, resulting in profits for hospitals. These profits can be used by public hospitals to upgrade medical equipment, improve infrastructure, and hire more health professionals to combat the issue of staff shortages and overcrowding [45].

Supplementary Table 6.4 Challenges reported by users and providers with the scheme

Challenges faced by users	• 192 COVID-19 patients were unable to utilize the scheme's benefits due to lack of authorization from their taluk/district hospital or inadequate awareness about the scheme [31].
	• Beneficiaries faced long waiting time at kiosks in common service centers for completing the identification process and had to wait for weeks to receive their e-cards [47].
	• Despite being in need of hospitalization and being aware of the PMJAY, 95% (71/75) of respondents were unable to seek care due to a lack of knowledge about where and how to use the scheme [47].
	• A study reported several challenges encountered by beneficiaries in Jharkhand [44]:
	  - Many first-time users faced delays in obtaining beneficiary cards due to network failures or prolonged communications with the central office.
	  - 30% (17/57) of respondents were initially denied treatment; certain hospitals listed as empanelled on website refused to admit patients citing reasons such as empanelment was still in process or the memorandum of understanding was not signed yet.
	  - 42% (23/54) of respondents faced differential treatment for being PMJAY patients.
	  - In few cases, patients were told that a certain treatment was not covered by the PMJAY. In two cases, admitted patients were simply informed of the dis-empanelment of the hospital and were asked to pay the remaining fees. Consequently, patients often found themselves in a weak position to advocate for free treatment.
	  - Private hospitals sometimes required a referral from a public hospital, particularly in women's health cases, which remains difficult to obtain.
	  - The scheme failed to reach individuals without digital access.

	• In Gujarat, private hospitals did not register beneficiaries and instead instructed patients to register themselves in the Beneficiary Identification System[16] at public hospital, municipal corporation offices or common service centers. Conversely, patients visiting private hospitals had to go to a nearby government hospital/office to obtain the card and then return to the hospital for treatment, resulting in delays [46].
Challenges faced/ perceived by healthcare providers /officials	• Healthcare workers received inadequate training on PMJAY: Only 6.1% (25/411) of healthcare workers received some form of training [34]; None of the healthcare workers received any training on PMJAY [39]. By contrast, although all 14 surveyed hospitals in Gujarat and Madhya Pradesh indicated receipt of training for providers (especially Ayushman Mitra), they reported that training was software-centric and lacked in content around building capacity in package selection, documentation, and other processes [46]. • Main drawback identified by healthcare workers in Tamil Nadu (7/11) and Kerala (9/10) was the lack of participation and unwillingness of private hospitals, especially corporate private hospitals, to enrol under the PMJAY due to low package rates. Majority of private corporate hospitals expressed concerns about the potential financial challenges their institutions would face if they were to implement the PMJAY package rates for procedures and treatments [45]. Likewise, almost all hospitals in Gujarat [46], Madhya Pradesh [46], and Jharkhand [44] raised concerns about the rates and content of various packages. • As per PMJAY guidelines for hospital-based transactions, the turn-around time for claim payment should be 15 days for within state claims (45 days in Gujarat) and 30 days for inter-state claims. However, hospitals in both Gujarat and Madhya Pradesh reported an average turnaround time of over 90 days for full payment of their claims [46]. In Madhya Pradesh, hospitals raised concerns that insurer often makes repeated queries very late in the claim settlement stage. Some hospitals also expressed dissatisfaction regarding the full or partial rejection of claims by the insurer without providing clear reasons for the rejection, and the lack of redressal thereof [46]. • 75% (6/8) of public hospitals and 78.3% (18/23) of private hospitals considered PMJAY inferior to private health insurance. The primary reasons for their poor perception were complaints reprisal (91.7% (22/24)), lengthy claim processing and reimbursement time (83.3% (20/24)), denial of reimbursement of health packages (70.8% (17/24)), and rates of health benefit packages (66.7% (16/24)) [37]. • According to guidelines, insurers must respond to pre-authorization requests within six hours of receiving them, either by approving or rejecting them. If they fail to do so, the request is automatically approved. However, hospitals did not report any case of auto-approval after six hours, with private hospitals in Madhya Pradesh experiencing delays of up to 24 hours at times. Although public hospitals in both states start treatment, private hospitals wait for approval to commence treatment. In Madhya Pradesh, there were cases when hospitals received queries after six hours of submitting pre-authorization requests, which sometimes were not in alignment with treatment protocols, resulting in delays in treatment initiation [46].

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[16] Beneficiary Identification System is used to search the list of eligible beneficiaries to identify and register targeted individuals.

	• Hospital Transaction Management System, which is used to capture the inpatient data (including admission, treatment, and discharge) at the hospital level, and share it with the insurer for hospital claims and financial settlement, does not provide a procedure-wise list of documents at the submission window. Such a checklist can minimize or eliminate the possibility of missing essential documents during pre-authorization and claim settlement request [46]. • Health workers in Tamil Nadu expressed concerns about the potential misuse of the PMJAY scheme, such as patients colluding with corrupt doctors to manipulate pre-existing conditions in order to receive benefits of the scheme [45]. • Based on interactions with key officials and observations from field visits, a study reported that inadequate human resources with requisite skills to implement the scheme at the state-level, lack of time and manpower to distribute PM letters and other information, education, and communication materials, lack of infrastructure, mainly temporary office space, and insufficient sharing of detailed information about the scheme and packages by kiosks with beneficiaries were the main reasons for low awareness and knowledge about the scheme [47].

Chapter 7. Conclusion, Policy Implications, and Future Scope of Research

7.1 Conclusion and Policy Implications

The thesis comprehends the enrolment under different health insurance programmes over the years including the period pre introduction of GSHI schemes and the period post GSHI schemes. The thesis also elaborates on the utilization pattern, financial burden due to seeking care across states/UTs to elucidate a comprehensive picture about the variations across the states/UTs. The financial burden was analysed by type of care, type of provider, and also in context of health insurance enrolment in respective states/UTs. The inequality in access to care, utilization of private provider, and occurrence of financial burden was also analysed. Furthermore, the study also provides a comprehensive assessment of impact of different health insurance programmes (overall health insurance, GSHI scheme, private health insurance) on accessibility to inpatient care, utilization pattern of inpatient care, and the financial risk protection at national level. Additionally, the impact of overall health insurance enrolment across all states/UTs were analysed for a variety of dimensions. Lastly, the thesis has also examined the initial impact of recent GSHI scheme launched, PM-JAY, in terms of awareness about the scheme, utilization, experience, challenges encountered under the scheme, and the financial protection provided by the scheme.

In **chapter 2** we examined the health insurance enrolment (overall enrolment and in different programmes) over the years and observed that health insurance enrolment has increased over the years; however, it still remains low in India despite the presence of several health insurance schemes at both national and state levels. Intra state variations exits in health insurance enrolment, with substantial increase in health insurance enrolment was observed in states/UTs, Mizoram, Andhra Pradesh, Chhattisgarh, Meghalaya, and Dadar and Nagar Haveli over the

years. By contrast, in states such as Bihar, Madhya Pradesh, Jharkhand, Uttar Pradesh, Sikkim, and Manipur, health insurance enrolment remains low across the survey years. Furthermore, the enrolment under health insurance was consistently higher in urban areas than rural areas over all the survey years. By contrast, the enrolment under GSHI schemes was higher in rural areas than urban areas across, whereas enrolment under CGHS, ESIS, and private health insurance was higher in urban areas than rural areas. Most of the enrolment was observed with GSHI schemes across many states, conversely, in states/UTs such as Chandigarh, Delhi, Maharashtra, and Haryana higher enrolment under private health insurance than GSHI scheme were observed. Importantly, the enrolment under ESIS and CGHS was low across all states.

Major barrier in health insurance enrolment is the absence of feeling of need of health insurance and lack of awareness are prominent roadblocks in buying insurance in low-and-middle income countries. In India, social health insurance schemes (CGHS, ESIS) meant to cover the formal sector employees. GSHI schemes mainly provides coverage to poor and vulnerable population. Therefore, a substantial proportion of population is left with the choice of either opting for private health insurance (constrained by the ability-to-pay premium) or to remain uninsured. Also, challenges in implementation of the schemes needs to be addressed, for instance, ESIS scheme is only partially implemented in several districts, despite being in operational since many years. Likewise, coverage of previous central-level GSHI scheme, RSBY remains incomplete, despite being in operation for more than a decade. In countries with large informal labour markets like India, previous evidence suggests that enrolling, retaining, and collecting insurance premiums from individuals using a voluntary, contributory mechanism can be challenging. Furthermore, health insurance enrolment remains concentrated among affluent individuals in India over the years. It was also observed that among individuals belonging to lower economic quintiles, marginalized social class (scheduled tribe and other backward class), younger age groups, self-employed individuals, and those following the Islamic religion, health

insurance enrolment remain low over the years. All this calls for large scale multidimensional, innovative, and comprehensive awareness programmes to make people understand about the need of health insurance and also to make them aware about the schemes available and the eligibility criteria in different health insurance schemes. Pro-activeness on the part of states is also imperative in increasing the enrolment. Mandating a clear budget and a roadmap for state governments to undertake aggressive information, education, and communication activities are also crucial. Additionally, since the private health insurance enrolment was observed to be restricted among only affluent ones, urban areas, and in only few wealthier states/UTs, there is a need to increase its affordability for the missing middle class who possess the capacity to pay nominal premiums.

In **chapter 3**, we observed high financial burden of seeking care throughout the states/UTs. Substantial financial burden in terms of CHE incidence (at all thresholds) and impoverishment was observed in Andhra Pradesh, Telangana, Kerala, Maharashtra, Uttar Pradesh, Odisha while relatively low burden was observed in Dadra and Nagar Haveli, Mizoram, and Meghalaya. The states with high health insurance enrolment also reported high financial burden. These interstate variations have pertinent policy ramifications and accordingly state-specific policies and budgetary allocations should be revised. The financial burden further varied by type of care and type of provider, with substantially high burden in case of seeking outpatient care than inpatient care and seeking care from private providers than public providers. India is experiencing an epidemiological transition with increasing non-communicable disease, that result in chronic conditions requiring frequent outpatient visits, and seeking outpatient care puts substantial burden in India, underscoring the need to cover outpatient services under the ambit of health insurance. Furthermore, we observed that medicines contributed the highest irrespective of the type of care and type of provider, and transportation and non-medical costs contributed substantially in public health facilities, that needs greater policy attention. The financial burden

of seeking healthcare in public facilities is lower in comparison to private healthcare facilities. However, certain issues in public facilities such as unavailability of medicines, diagnostics services, and quality and timely services were witnessed, that highlights the pressing need to strengthening the public health facilities and increasing of public health expenditure in India. Inequality was observed in access to care, with access to inpatient care slightly higher among affluent individuals across some states, while access to outpatient care was pro-rich across majority of states/UTs. The utilization of private provider was pro-rich in case of inpatient care as well as outpatient care across most states/UTs. On the other hand, the occurrence of CHE incidence were observed to be concentrated among poor households in few states/UTs in case of inpatient care and in 30-40% of states/UTs in case of outpatient care.

In **chapter 4**, we analysed the impact of different health insurance programmes (overall health insurance in general, and GSHI, and private health insurance in particular) on several outcomes, including accessibility to inpatient care, utilization pattern of hospitalization, and the financial risk of seeking inpatient care. We found a small but statistically significantly higher likelihood of accessing inpatient care among insured under health insurance programmes (overall health insurance, GSHI schemes, and private health insurance) than uninsured in India. The incidence of hospitalization and more than once was also statistically significantly higher among insured. All this reflects an improved accessibility to inpatient care among insured (irrespective of type of health insurance) in comparison to uninsured. On the other hand, we observed a statistically significant but only marginally higher incidence of hospitalization with private providers and incidence of longer hospital stays among overall insured and GSHI insured compared to the uninsured. In context of financial risk protection, overall insurance, GSHI insurance found to be statistically significantly effective in reducing the OOPE, and CHE due to seeking inpatient care to some extent at national level. Additionally, robustness analysis showed that GSHI schemes reduced OOPE among poor persons as well. However, we found that GSHI schemes

did not statistically significantly reduce the CHE incidence for poor people insured. Private health insurance was found to be effective in reducing the financial burden (i.e., OOPE, CHE incidence, and impoverishment) resulting from hospitalization for the insured compared to the uninsured. The financial burden was substantially higher when inpatient care was sought from private healthcare providers irrespective of health insurance status.

Chapter 5, detailed the impact of overall health insurance enrolment across the states/UTs. We found that accessibility to inpatient care was statistically significantly higher across majority of states/UTs. Also, the hospitalization episodes more than once were also statistically significantly higher across most states/UTs. However, state level analyses, revealed that incidence of hospitalization with private providers and incidence of longer duration of hospital stay has been only marginally differ among insured and uninsured in some states. Furthermore, health insurance enrolment was found to be effective in reducing the financial burden (OOPE and CHE (at 10% threshold) due to hospitalization in few states such as Maharashtra, Andhra Pradesh, Karnataka, Kerala, Mizoram, Delhi, and Telangana. However, health insurance enrolment was found to be largely ineffective in reducing the CHE incidence at 40% threshold and impoverishment.

From **chapter 4 and 5**, it was observed that health insurance enrolment has improved the accessibility to inpatient care and even the more than once hospitalization at national and across most states as well. However, the utilization pattern in terms of private provider utilization and longer duration of stay has not been impacted much by the enrolment under health insurance. Furthermore, health insurance enrolment was found to be effective in providing financial risk protection to some extent and in some states/UTs only, however, a major impact in reducing the financial burden and impoverishment yet to be observed. The major roadblocks discussed in **chapter 4 and 5**, reported by previous studies that contributed in limited effectiveness of health insurance scheme were low awareness among beneficiaries regarding various aspects of health

insurance (such as information regarding stipulated benefits one is entitled to, how to avail benefits, number of family members covered, list of empanelled hospitals and ailments covered, etc.,) and continued spending on medicines, diagnostics, and consumables. Other issues such as, reimbursement issues, lack of coverage for outpatient care, and continued spendings on medicines and diagnostics test even among insured, also needs attention to ensure that health insurance effectively achieve their desired objectives. Further issues of co-payment asked by hospitals from the insured, malpractice of overbilling of insurance patients, and often lack transparency regarding healthcare charges in case of private hospitals is well documented in India. All such issues were even continued to be reported in new GSHI scheme, PM-JAY as well, as highlighted in **chapter 6**. Such issues need greater policy attention to enhance the effectiveness of health insurance in improving the accessibility to care and augmenting better financial protection to insured in India. The utilization of PM-JAY scheme was observed to be low to moderate with overall positive experience among users. The financial protection provided by the PM-JAY also showed mixed results, with continued spendings on drugs, consumables, and diagnostic tests, and no coverage for outpatient services. Moreover, concerns of low health packages rates, and reimbursement delays have been raised by private providers, even in PM-JAY. Therefore, it is important to address the concerns, by expediting the claim settlement processes and continually rationalizing treatment packages such that these are feasible for the program to pay as well as attractive enough for providers to join the scheme. Importantly, health insurance schemes initiatives should accompany with the strengthening of the public sector, increasing public health expenditure, and improved regulations for providers etc., to enhance the viability and effectiveness of health insurance and providing safeguards from financial risk. Lastly, strengthening the stewardship function of the government is also necessary to monitor the delivery of care by providers, combat malpractices, and prioritize

quality assurance to better augment financial protection and in making the health insurance schemes achieve their intended objectives.

7.2 Recommendations for future research

Our study is based upon cross-sectional survey, future studies may undertake longitudinal studies exploring the impact of health insurance across several dimensions including accessibility, financial protection, and health outcomes. Longitudinal studies will aid in determining the long-term impact of health insurance on outcomes. Future research studies may also incorporate the supply side factors that is likely to affect the demand for healthcare and the financial aspect (such as subsidies providing by government to public healthcare providers). Also, studies may undertake efforts to analyse comprehensively the unmet needs in India (i.e., forging treatment due to financial/non-financial constraints) and may unravel the reasons and factors that influence these needs. The role of health insurance towards such unmet needs may also be examined. An analyses of health insurance on morbidity are also imperative in India, if nationally representative survey would provide necessary data for the same in future.

Furthermore, future research studies should focus on exploring the impact of PM-JAY across the states/UTs as PM-JAY scheme is evolving with time. Large scale studies exploring the effectiveness of PM-JAY are imperative. Also, household surveys are usually prone to recall bias, collection of patient level data from hospitals may provide an exact estimate of the actual OOPE incurred and the role of health insurance can be gauged for the same. Additionally, experiences and challenges confronted among insured patients may also be gauged through qualitative studies. Lastly, an examination of health insurance can be expanded to investigate its influence in providing accessibility and financial protection in case of specific disease conditions, particularly chronic illnesses.

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