

**Beneficiary Targeting, Utilization of Public Hospitals and
Financial Protection under Government Sponsored Health
Insurance in Kerala: Evidence from Large-Scale Datasets
During 2008-2022**

*A Thesis submitted to University of Hyderabad in
partial fulfilment of the requirement for the award of*

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in

Economics

By

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March, 2024

Dedicated to,

The Late Mrs. Aleyamma Alexander
My Grandmother and guardian angel

&

The Late Shri. Oommen Chandy
The epitome of public service



DECLARATION

This is to state that the thesis entitled “Beneficiary Targeting, Utilization of Public Hospitals and Financial Protection under Government Sponsored Health Insurance in Kerala: Evidence from Large-Scale Datasets During 2008-2022” submitted to the School of Economics, University of Hyderabad for the award of the degree of Doctor of Philosophy in Economics, is an original work done by me with the supervision of Prof. (Retd). S. Sandhya and Prof. Phanindra Goyari, School of Economics, University of Hyderabad. The same has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or any other similar title of recognition in India or abroad. I hereby agree that my thesis can be deposited in Shodhganga/INFLIBNET.

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A. Publication:

1. Philip, Cyril & Sandhya. S. (2023) Polarization in the Utilization of Public Hospitals and Government-Sponsored Health Insurance (GSHI): The Unique Case of Kerala. *South Asian Journal of Management* 30(3). 73-99. <https://doi.org/10.62206/sajm.30.3.2023.73-99> [P-ISSN: 0971-5428, E-ISSN: 2584-007X, UGC-CARE listed journal].

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Acronyms

AAY:	Antyodaya Anna Yojana
ABDM:	Ayushman Bharat Digital Mission
ABHA:	Ayushman Bharat Health Accounts
ABPMJAY:	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana
ABPMJAY-KASP:	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana - Karunya Arogya Suraksha Padhati
AMS:	Adivasi Munnetra Sangam
APL:	Above-Poverty Line
ASHA:	Accredited Social Health Activists
ATT:	Average Treatment Effect on the Treated
BCE:	Budgeted Capital Expenditure
BPL:	Below Poverty Line
CAG:	Comptroller and Auditor General
CBHI:	Community-Based Health Insurance
CDS:	Centre for Development Studies
CEB:	Census Enumeration Blocks
CES:	Consumption Expenditure Surveys
CEM:	Coarsened Exact Matching
CGHS:	Central Government Health Scheme
CHC:	Community Health Centres
CHE:	Catastrophic Expenditures
CHIAK:	Comprehensive Health Insurance Agency of Kerala
CMIE:	Centre for Monitoring Indian Economy
CPPF:	Claim Pay-out per Family
CPI:	Communist Party of India
CR:	Claims Ratio
CSS:	Centrally Sponsored Scheme

DID: Difference-in-Difference
DLHS: District level Household Survey
ECR: Enrolment Conversion Ratio
EI: Erreygers Index
EMCP: Enhanced Malaria Control Project
ESIS: Employees' State Insurance Scheme
ETL: Epidemiological Transition Level
FHTC: Functional Household Tap Connections
GDP: Gross Domestic Product
GHIP: Gross Health Insurance Premiums
GSDP: Gross State Domestic Product
GSHI: Government Sponsored Health Insurance
HBP: Health Benefit Packages
HCR: Headcount Ratio
HFR: Healthcare Facility Registry
HLEG: High Level Expert Group
HMCPF: Health Minister's Cancer Patient Fund
HMDG: Health Minister's Discretionary Grant
HPR: Healthcare Professionals Registry
HR: Hospitalisation Ratio
ICDS: Integrated Child Development Services
ID: Insurance Density
IEC: Information, Education and Communication
IHIE: India Health Insurance Experiment
IHHL: Individual Household Latrines
IMCP: Intensified Malaria Control Project
IMI: Intensified Mission Indradhanush
IDSP: Integrated Disease Surveillance Programme
IP: Insurance Penetration

IP: Inpatient

OP: Outpatient

IP OOPE: Inpatient Out-of-Pocket Expenditures

IPO-H ratio: Ratio of IP OOPE to Household Consumption Expenditure

IPPI: Intensified Pulse Polio Immunization

IRDAI: Insurance Regulatory and Development Authority of India

ITT: Intention to Treat

JJM: Jal Jeevan Mission

KBF: Karunya Benevolent Fund

KPI: Key Performance Indicator

MGNREGA: Mahatma Gandhi National Rural Employment Guarantee Act

MIM: Multivariate Imbalance Measure

MoHFW: Ministry of Health and Family Welfare

MPO: Modified Plan of Operations

MPI: Multi-dimensional Poverty Index

NBA: Nirmal Bharat Abhiyan

NCD: Non-communicable Diseases

NFHS: National Family Health Survey

NFSA: National Food Security Act

NHA: National Health Accounts

NHA: National Health Authority

NHM: National Health Mission

NHS: National Health Services

NHSRC: National Health Systems Resource Centre

NITI Aayog: National Institution for Transforming India Aayog

NMCP: National Malaria Control Programme

NRHM: National Rural Health Mission

NSO: National Statistical Office

NSDP: Net State Domestic Product

NSS: National Sample Survey
NUHM: National Urban Health Mission
NVBCD: National Vector Borne Disease Control Programme
OADR: Old-Age Dependency Ratio
OOPE: Out-of-Pocket Expenditures
OP OOPE: Outpatient OOPE
PC: Population Coverage
PDS: Public Distribution System
PHC: Primary Health Centre
PHH: Priority households
PM-ABHIM: Pradhan Mantri-Ayushman Bharat Health Infrastructure Mission
PMBJP: Pradhan Mantri Bharatiya Janaushadhi Pariyojana
PMT: Proxy-Means Targeting
PPS: Probability Proportional to Population Size
PPSWR: Probability Proportional to Size with Replacement
PPRA: Proportion of Persons that Responded as Ailing
PSM: Propensity Score Matching
PSU: Primary Sampling Units
RAS: Rajiv Aarogyasri Scheme
RAHA: Raigarh, Ambikapur Health Association
RAN: Rashtriya Arogya Nidhi
RCC: Regional Cancer Centre
RSBY-CHIS: Rashtriya Swasthya Bima Yojana - Comprehensive Health Insurance Scheme
SAT Hospital: Sri Avittam Thirunal Hospital
SATT: Sample Average Treated Effects on the Treated
SBM: Swatch Bharat Mission
SC: Scheduled Caste
SCHIS: Senior Citizens Health Insurance Scheme

SCTIMST: Sree Chitra Tirunal Institute for Medical Sciences and Technology
SCI: Service Coverage Index
SDH: Sub-Divisional Hospitals
SECC: Socio-Economic Caste Census
SEDG: Socio-Economic, Demographic and Geographic Groups
SEWA: Self Employed Women's Association
SHA: State Health Agency
SLM: Solid and Liquid waste Management
SNDP: Sree Narayana Dharma Paripalana Yogam
ST: Scheduled Tribe
TFR: Total Fertility Rate
TPA: Third-Party Administrators
TPDS: Targeted Public Distribution System
TSC: Total Sanitation Campaign
UFS: Urban Frame Survey
UHC: Universal Health Coverage
UIP: Universal Immunization Programme
VAS: Vajpayee Arogyashree Scheme
WHO: World Health Organization
YHIS: Yeshasvini Health Insurance Scheme

Abstract

The thesis explores two sets of research problems relating to Government Sponsored Health Insurance (GSHI) in Kerala. The first set relates to the effectiveness of beneficiary targeting, specifically whether any BPL households have been excluded from GSHI coverage and the fiscal implications of extending GSHI coverage to any excluded BPL household. The second set explores the difference in the utilisation of public hospitals between GSHI-covered and non-covered households and its implication on the financial protection of GSHI-covered households, compared to the non-covered households.

Firstly, regarding beneficiary targeting, it was found that 35.4 per cent of BPL households were excluded from GSHI in Kerala in 2019, which might have become a structural issue. Extending coverage to the excluded BPL households would improve not just the GSHI coverage, but the concentration of poor households and socio-economically vulnerable groups within GSHI. However, the rising costs of GSHI as well as the lower ceiling rate for GSHI cost-sharing between the union and state governments could be obstacles in the way of extending coverage to the excluded BPL households in Kerala. Secondly, it was found that the utilization of public hospitals for GSHI-covered was about 23 percentage points higher, compared to the non-covered households. This vast difference in Kerala, was the highest in the country, indicating that the utilization of public hospitals might have become polarized on the basis of GSHI coverage in the state. The disaggregated results showed that the polarization could be stronger among socially and economically well-off households, as opposed to poorer households, which again lent credence to the polarization hypothesis. Thirdly, the polarization could have lowered the out-of-pocket and catastrophic expenditures for the GSHI-covered households in Kerala. However, it did not have much impact in the frequency of distress financing for inpatient expenditures or the concentration of poor households in the ratio of inpatient expenditures to total household expenditure, among the GSHI covered households, both in the aggregated and disaggregated analysis. Hence, GSHI provided only modest financial protection to beneficiaries in Kerala and not deep and meaningful financial protection, in case of inpatient care.

Keywords: Kerala, GSHI, exclusion of BPL households, ceiling rate, polarization in the utilization of public hospitals, catastrophic health expenditures, frequency of distress financing, ratio of inpatient expenditures to total household expenditure, deep and meaningful financial protection.

JEL Classification codes: I13, I18

Chapter 1 - An Overview of the Thesis

1.1 Background and motivation of the study¹

The economic (Balakrishnan & Parameswaran, 2007), demographic (Ram & Ram, 2021) and epidemiological transitions (Dandona et al., 2017) in India along with a boom in private hospitals (Hooda, 2015) and the reliance on them has led to impoverishing health expenditures (Mohanty & Dwivedi, 2021). In this context, health insurance could act as a hedge against impoverishing health expenditures. However, even in 2022, the penetration of non-life insurance (which includes health insurance) in India has only reached 1 per cent of the total population compared to the global average of 3.9 per cent (Insurance Regulatory and Development Authority of India, 2022). This could be due to high health insurance premiums and the inability of the general public in understanding the operation of health insurance (Bhatia, 2023). To overcome these long-standing issues and provide financial protection to the most economically vulnerable households (mainly unorganized sector and households falling under the poverty lines), the union government has introduced many government-financed health insurance schemes, funded by taxes, right from Indian Independence (Patnaik et al., 2018). The current study evaluates the functioning of government-sponsored health insurance schemes² in Kerala³ between 2008 and 2022. For the same, it is important to understand why Kerala has been chosen as the study area.

Similar to India, Kerala has been experiencing economic (Kannan, 2005; Kannan, 2023) demographic (Bhat & Rajan, 1990) and epidemiological transitions (Dandona et al., 2017) challenging the famed Kerala model of development in the 1970s (Centre for Development Studies, 1975). The declining investments in the public health sector and the boom in private hospitals since the 1980s led to private hospitals' dominance in inpatient and outpatient care (Kutty, 2000; Dilip, 2010). The period between 1986 and 2004 also saw this reliance on private hospitals narrowing between the rich and the

¹ The background and motivation are explored in much detail in Chapter 2.

² There is a difference between government financed health insurance and government sponsored health insurance. This difference is explained in Chapter 2.

³ See G(C) in Glossary.

poor, implying impoverishing health expenditures for the poor (Dilip, 2010). All these developments necessitated the introduction of Government Sponsored Health Insurance (GSHI)⁴ in Kerala from 2008 onwards, beginning with the state-level adoption of the national-level scheme of Rashtriya Swasthya Bima Yojana (RSBY).

GSHI schemes in Kerala should have matured in the 15 years between 2008 and 2022. Given the failure of GSHI schemes (particularly RSBY) in ensuring financial protection in various states of India (Prinja et al., 2017; Reshmi et al., 2021), it was necessary to investigate various aspects of GSHI schemes in Kerala that could impact the financial protection of the beneficiary households. These aspects revolved around two questions: 1. Whether GSHI covered all eligible beneficiary households in Kerala 2. Whether GSHI-covered households had significantly lower healthcare expenditures than the non-GSHI households in Kerala.

1.2 Major economic theories and factors that explain the purchase of health insurance⁵

Before delving into the research problems, it is important to review some major theories and factors influencing the purchase of health insurance.

The topic of health insurance began attracting attention after the seminal work of Kenneth J Arrow in 1963 (Arrow, 1963). This work focussed on the role of information asymmetry and the market failures in health insurance and medical markets. However, even apart from Arrow's theory, Schneider (2004) reviews many theories which explores the reasons behind the purchase of health insurance.

Arrow's work concentrated on decision-making under uncertainty. However, one could analyse the demand for health insurance without bringing uncertainty, through the consumer theory which could view health insurance as a normal good with positive elasticity of demand, implying that the poor are less likely to insure. Also under consumer theory, health insurance could also be treated as a substitute for user fees/out of pocket expenditures, in which a rise in user fees could lead to a rise in the demand

⁴ See G(A) in Glossary.

⁵ This section deals with theories and factors studied from international studies. India-specific and Kerala-specific studies have been reviewed in Chapters 2-5.

for health insurance and consequently raise health insurance premiums. (Schneider, 2004).

Unlike consumer theory, decisions made under uncertainty could be influenced by many other factors. The purchase of health insurance could be viewed as a decision to manage uncertainty. So, the following discussion, starting with expected utility would discuss theories on consumer decisions under uncertainty and how they could be applied to health insurance.

One of the most important among the theories that deal with choice under uncertainty is that of expected utility. Originally proposed by Daniel Bernoulli (Bernoulli, 1738) to solve the St. Petersburg Paradox⁶ and later developed by John Von Neumann and Oskar Morgenstern⁷ (Von Neumann & Morgenstern, 1947) expected utility (EU) could be applied to study the purchase of health insurance. Along with EU theory, if one assumes that an individual is risk-averse (an individual is considered to be risk averse if the utility of the expected value of wealth is greater than the expected utility of wealth,

⁶ Discovered by Nicholas Bernoulli, and later partly solved by his cousin, Daniel Bernoulli, in 1738, St. Petersburg Paradox was a situation in which participants were willing to enter a gamble which offered infinite expected value (expected value is the sum of payoffs from each draw of the game/gamble, weighted by corresponding probabilities) for a very small entry fee. The solution of Bernoulli was based on the principle that people value different sums of payoff/ wealth (wealth was used by Bernoulli) differently, giving rise to the concept of utility.

Specifically, instead of expected value, he introduced the concept of expected utility, in which the utility (defined as the natural logarithm of an individual's payoff from the game at each draw) would be weighted by the corresponding probability of winning. He showed that unlike expected value, the sum of expected utility was finite (based on log specification) and converged to a specific value. The anti-log of this sum yielded a very small sum, which could be considered as the entry fee for the gamble, thus explaining why the entry fee of such gambles with infinite expected value could be very small (See G1.8 in Glossary).

⁷ Neumann and Morgenstern gave an axiomatic framework for the expected utility theory in which they showed that when the 5 preference axioms of preference viz., completeness, transitivity, continuity, monotonicity and substitution are satisfied, a utility function would exist which could be specified as the sum of utilities (which is again a function of a payoff/outcome) weighted by respective probabilities. This was called as the expected utility function (See G1.3 in Glossary).

implying a concave utility function⁸), then he/she will fully insure if health insurance is offered at an actuarially fair premium⁹ (Varian, 2010).

One of the most important assumptions in expected utility in state-independence i.e., utility does not depend on the state of external environment. However, when it comes to health, this assumption may not hold. Utility in different states of health could be different. Finkelstein et al. (2009) defined health state dependence as “the effect of health on the marginal utility (MU) of a constant amount of nonmedical consumption.” Health state dependence is of two types: (i) Negative state dependence (NSU)¹⁰: in NSU, the MU of non-medical consumption is positively correlated with the state of health i.e. MU declines when health deteriorates. This could happen as many non-medical goods such as travel etc act as complement goods to good health. (ii) Positive state dependence (PSU)¹¹: In PSU, the MU of non-medical consumption increases as health declines. Examples for PSU includes increase in expenditures on medicines and nursing assistants. This is because certain non-medical goods act as substitutes to good health. According Finkelstein et al. (2009), “if there is positive state-dependent utility, the optimal amount of health insurance benefits would be higher than with state-independent utility, and optimal life-cycle savings would increase.”

Varian (2010) further demonstrates the concept of optimal amount of insurance¹² (health insurance in this case) using the theory of state-dependent/contingent utility. In this theory, one could construct an indifference curve and budget constraint between consumption in good state (C_g) and consumption in bad state (C_h). Both the indifference curve and budget constraint show a trade-off, with the former having a constant trade-off (constant slope) and the latter having diminishing trade-off (diminishing slope). The slope of the budget line is $(\gamma/(1 - \gamma))$, where γ is the price

⁸ Here utility is a function of wealth.

⁹ Actuarially fair premium is that amount of premium which is equal to the expected value of loss (expected value of loss is the amount of loss multiplied/weighted by the probability of loss). See G1.1 in Glossary.

¹⁰ See G1.4 in Glossary

¹¹ See G1.6 in Glossary

¹² See G1.5 in Glossary

of consumption in the bad state (bad health), and $1 - \gamma$ is the price of consumption in the good state (good health). The slope of the indifference curve at any given point is the marginal rate of substitution between the two states of utility. Optimal level of insurance would be obtained at the tangency point of the indifference curve and the budget curve i.e., when $(\gamma/(1 - \gamma))$ equals the marginal rate of substitution.

A major deviation from the expected utility framework was the prospect theory¹³, formulated by Daniel Kahneman and Amos Tversky (Kahneman & Tversky, 1979) one of the early and fundamental cornerstones in behavioural economics. Before explaining how this theory could be used to study the purchase of health insurance, it is important to understand this theory. One of the central ideas in prospect theory (PT) is how people perceive losses and gains from the viewpoint of a reference point. This reference point would be measure of status quo (like current wealth, current income etc.). To further understand how gains and losses are assessed, the theory introduces the concept of value function, which describes the relationship between the subjective values that a person assigns to losses and gains¹⁴ (negative or positive changes in status quo (like current wealth)), based on a reference point. Mathematically, the value function could be denoted by v , which will be a function of changes in outcomes with respect to a reference point.

In the value function, relative to a reference point (current wealth), gains (positive changes in current wealth) have diminishing sensitivity and losses (negative changes in current wealth) have increasing sensitivity. Assuming a graph with four quadrants (with value on the y-axis, gains on the right-hand side of the x-axis and losses on the left-hand side of the x-axis) and the origin as the reference point, gains would exhibit a concave function (lying in the first quadrant¹⁵) and losses would exhibit a convex function (lying in the third quadrant). This will result in an almost S-shaped value function (Kahneman & Tversky, 1979). Further, the value function is steeper in the third-quadrant than in the first quadrant, implying that individuals suffer more in case

¹³ See G1.7 in Glossary

¹⁴ The value function places importance not on the final state (for example final stock of assets) but on positive or negative changes from a reference point (current wealth/income etc.).

¹⁵ The naming of the quadrants from first to fourth is counter-clockwise, beginning with the upper right-hand quadrant (positive values of both x and y axes).

of losses, compared to gains of an equivalent amount. This concept is known as loss-aversion.

Next, the theory introduces the concept of weighting function which explains how people subjectively evaluates the probability of events. Mathematically, the weighting function could be denoted as π , in which the decision weights $\pi(p)$ would be a function of probability p . According to prospect theory, people overweight small probabilities and underweight larger probabilities, explaining why rare events could have a larger bearing on a person's decision under uncertainty. "Hence the weighting function is relatively sensitive to changes in probability near the end points 0 and 1, but is relatively insensitive to changes in probability in the middle region" (Fennema & Wakker, 1997). This leads to a non-linear weighting function.

The risk attitude of an individual is jointly determined by attitude towards outcomes (value function) and attitude towards probability (weighting function) rather than expected utility alone (Kahneman & Tversky, 1979). Thus, according to prospect theory, in the case of health insurance, when potential losses ($x < 0$) are considered (payment of insurance premium), the overweighting of small probabilities (in this case, say the probability of a disease) would make a person risk-averse and lead to the purchase of health insurance¹⁶.

Later, prospect theory was updated by incorporating a cumulative weighting function in which the decision weights are defined separately for gains and losses using cumulative probabilities. This updated version of prospect theory came to be known as cumulative prospect theory (CPT) (Tversky & Kahneman, 1992)¹⁷. Specifically, "a cumulative probability describes the probability for receiving an outcome or anything better than that outcome. Decision weights for gains are obtained as differences between transformed values¹⁸ of cumulative probabilities. Similarly, for losses, decision weights are obtained as differences between transformed values of consecutive

¹⁶ Please refer page 285 of Kahneman and Tversky (1979) for a detailed description of this result. This is to understand how weighting function supersedes the value function (which encourages risk-seeking when faced with losses, inhibiting the purchase of health insurance) to produce the result regarding health insurance.

¹⁷ See G1.2 in Glossary

¹⁸ To know about the transformed values of cumulative or decumulative probabilities, please refer page 55 of Fennema & Wakker (1997).

decumulative probabilities, i.e. probabilities describing the receipt of an outcome or anything worse than that outcome” (Fennema & Wakker, 1997). One of the consequences of CPT is that unlike PT, only extreme and not small probabilities are overweighted. So, the application of PT to health insurance may work as well in CPT, only if the probabilities are very small.

Apart from the theories explained above, Baicker et al. (2012) lists more factors, again drawing from behavioural economics, which explain the take-up of health insurance. These factors include choice overload and complexity (as the types, choices and complexity of health insurance schemes increase, especially in the case of private insurance, people may forgo health insurance), lack of understanding of costs and benefits of health insurance (People may find it difficult to understand the concepts of insurance like premium and the benefits of insurance like risk-sharing). Other factors could include present bias and time inconsistent preferences (people may give more importance to events in the near future rather than events in the distant future like the incidence of a disease and hence not purchase health insurance), susceptibility to channel factors (minor contextual cues like ease/unease of enrolling in a health insurance plan may channel behavior toward or away from purchasing health insurance) and influence of social comparisons (if enrolment in health insurance is a societal norms, then this could positively influence the purchase of health insurance by an individual).

1.3 Two sets of research problems

The two sets of research problems explored in this thesis are summarised below.¹⁹:

1.3.1 First set of research problems: What has been the performance of GSHI in terms of coverage of eligible (poor/deprived) households in Kerala? Have there been lapses in the targeting of beneficiary households?

The coverage and enrolment of eligible beneficiary households in GSHI are essential key performance indicators (KPIs) to assess the success of GSHI. However, the more critical question for a social security scheme like GSHI would be whether all eligible (poor households selected according to certain criteria) households are covered.

¹⁹Chapters 3, 4 and 5 include the conceptual frameworks and literature review, which helps to frame the research problem. This is not included here, as this chapter only provides an overview. For detailed explanations, please see Chapters 3, 4 and 5.

Given that the coverage of below-poverty line (BPL) households was the very foundation on which RSBY (the first major pan-Indian GSHI scheme) was designed, it is pertinent to analyze whether any BPL households have been excluded from GSHI and if so, what is the disaggregated impact of the same (To what extent does the exclusion of BPL households translate to the exclusion of rural households, ST/SC households, households with poorly educated heads, households in poorer districts and other vulnerable households etc.). Further, since GSHI schemes are government-funded, exploring the fiscal implications of correcting any potential exclusion of eligible households is also essential.

1.3.2 Second set of research problems: Have the GSHI schemes in Kerala been able to financially protect beneficiary households from hospitalization expenses—the primary aim of GSHI schemes?

Systematic reviews (including both primary and secondary studies) have concluded that there was no conclusive evidence to prove that GSHI schemes in India have successfully provided financial protection to its beneficiaries (Prinja et al., 2017; Reshmi et al., 2021). However, data from the state government suggested a golden opportunity for greater financial protection for the GSHI-covered households in Kerala. This data showed that the share of public hospitals in GSHI claims (for inpatient care) dramatically rose during 2008-2020, partly due to the state government's policies. However, the comparison of utilization data in a recent large-scale field survey (Nair & Varma, 2021) suggested that the percentage share of private hospitals was still dominant in inpatient care, when the total population was considered. In this context, a possible answer reconciling both of these facts could be a polarization in the utilization pattern, with a high reliance on public hospitals by GSHI-covered households and a high reliance on private hospitals by the non-GSHI households.

The above phenomenon of polarization could reduce the out-of-pocket expenditures (OOP) of the GSHI-covered households to a large extent. However, the more pertinent question would be whether the same reduction in OOP led to reductions in catastrophic expenditure and lower distress financing (the use of debt and sale of assets) among the GSHI-covered households at aggregated (population-level) and disaggregated (sub-population-level) levels.

1.4 Research Objectives

The first set of research problems lead to four objectives, which are:

- 1 To understand the various phases of growth in key performance indicators (KPIs) related to the main GSHI schemes in Kerala between 2008 and 2022 and their contemporary significance.
- 2 To compare the extent to which BPL households have been integrated into the GSHI net in Kerala compared to other states in which GSHI coverage is high.
- 3 To analyze the disaggregated impact of the complete/incomplete integration of BPL households into GSHI across socio-economic categories between 2016 and 2019 in Kerala.
- 4 To examine the implications on cost-sharing ratios of GSHI between the union and state governments after the complete integration of BPL households into GSHI in Kerala.

The second set of research problems lead to five more objectives, which are:

- 5 To compare the population coverage and growth in hospitalization claims under various GSHI schemes implemented in Kerala with other Indian states during 2018–2022.
- 6 To compare the difference in utilization of public hospitals between GSHI-covered and non-covered households, among inpatient admissions and outpatient visits, across Indian states with the highest GSHI coverage in 2017–18.
- 7 To study the difference in the utilization of public hospitals, between GSHI covered and non-covered households, in both inpatient admissions and outpatient visits, in each socio-economic, demographic and geographic groups in Kerala.
- 8 To analyze the aggregate impact of GSHI on the financial protection of beneficiary households in Kerala.
- 9 To analyze the disaggregated impact of GSHI on the financial protection of beneficiary households in Kerala seeking inpatient care.

1.5 Data and methodology

1.5.1 Data

Three large-scale datasets have been used for the first set of research questions, to investigate the effectiveness of beneficiary targeting within GSHI schemes in Kerala. These are the fourth and final round of District Level Facility Survey (DLHS-4), conducted in 2012-13 in India and 2013 in Kerala. The fourth and fifth rounds of the National Family Health Survey²⁰ (NFHS-4 and NFHS-5), conducted in 2015-16 and 2019-21 (2016 and 2019 for Kerala) were also used. The details of the sample size, design and the need for these datasets are discussed in sub-section 3.12.1 of Chapter 3. All these surveys had a stratified multi-stage design. (The details of sample size, design and the need for these datasets are discussed in sub-section 3.12.1 of Chapter 3). Apart from large-scale surveys, data published in various publications of the Government of Kerala were also used (for details, please see sub-section 3.12.1 of Chapter 3).

For the second set of research questions, to investigate the differences in the utilization of public hospitals and financial protection between GSHI-covered and non-covered households, data on individual hospitalization episodes (inpatient admissions), outpatient visits and household-level medical expenditures from the 75th round of National Sample Survey (NSS)²¹ conducted in 2017–18 were used. The details of the sample size, design and the need for these datasets are discussed in sub-sections 4.8.1 and 4.8.2 of Chapter 4 and 5.6.2 of Chapter 5. Additionally, to understand the increase/decrease in hospitalizations during 2018–2022, state-wise data from the factsheets published by the National Health Authority (NHA) was used.

1.5.2 Methodology

In the first set of research problems, for the first objective, five key performing indicators (KPIs), viz., population coverage (PC), enrolment ratio (ER), hospitalization ratio (HR), claim payout-per-household (CPPH) and claims ratio (CR) were calculated. For the second objective, firstly, the extent of integration between Below Poverty Line (BPL) households and GSHI-covered households²² in Kerala was investigated, using the unit-level records of DLHS-4, NFHS-4 and NFHS-5.

²⁰ See G(D) in Glossary.

²¹ See G(E) in Glossary.

²² See G(B) in Glossary.

Following this, an inter-state analysis (selecting ten states with the highest GSHI coverage in NFHS-5, including Kerala) of the concentration of poor households²³ in GSHI and BPL households was estimated and compared using the Erreygers Index (EI). Then, the ratio of two odds- the percentage of BPL households to have GSHI coverage over the percentage of non-BPL households to have GSHI coverage was estimated and compared to understand to what extent the pro-poor concentration among BPL households was transmitted to GSHI households.

For the third objective, the disaggregated impact of the complete/incomplete integration of BPL households into GSHI was studied by analyzing the changes in coverage (using the two-sample proportions test to test whether the changes in proportions are statistically significant) and distributional changes in GSHI (using z-statistic to test whether the changes in EI was statistically significant) across various socio-economic, demographic and geographic variables, between 2016 and 2019, using data from NFHS-4 and NFHS-5. For this, two scenarios were compared, viz., the current scenario—the coverage of GSHI among the total households in Kerala in 2019 as per NFHS-5 and the simulated scenario- the coverage of GSHI among the total households in Kerala in 2019, if the excluded BPL households were extended GSHI coverage.

For the fourth objective, the percentage share of GSHI costs borne by the union and state governments (cost-sharing ratios) in 2020–21 and 2021–22 was calculated for both current and simulated scenarios, for which two cost-sharing ratios were calculated for both scenarios:

- a. **The effective cost-sharing ratio:** The ratio at which costs were shared between the governments for only the households that the union government deemed eligible to be beneficiaries in Kerala, based on Socio-Economic Caste Census (SECC) 2011, without considering the ceiling rate²⁴.

²³ See G(H) in Glossary.

²⁴ This is the rate (per insured family/household) at which union and state governments divide the costs of GSHI based on certain ratios. For example, in the beginning of PMJAY in India in 2018, the ceiling rate was ₹1,052 which was raised to ₹1,500 in 2022. The current cost sharing ratio between the union and state governments is 60:40. So in 2022, based on the ceiling rate of ₹1500, the union government would pay ₹900 and the balance of ₹600 would be borne by the state government.

- b. **The final cost-sharing ratio:** The ratio at which costs were shared between the governments for all the GSHI-covered households in Kerala (identified by both union and state governments), without considering the ceiling rate.

For further details regarding the methodology for the first set of research problems, please see sub-section 3.12.2 of Chapter 3.

In the second set of research problems, for the fifth objective, the total growth in the hospitalization claims under various GSHI schemes associated with PMJAY for various Indian states was calculated from the commencement of the scheme (various states joined PMJAY in various years) until 2021–22.

For the sixth objective, firstly, the percentage of GSHI-covered households was estimated (a household was considered to be GSHI-covered if GSHI covered the household head). Following this, the top 10 states with the highest GSHI coverage were selected for the analysis at the inpatient and outpatient levels. Then, for each state, the unadjusted and adjusted odds ratios for the utilization of public hospitals were estimated based on whether GSHI covered the household or not. For this purpose, a set of logistic regressions was employed, first with only the 'GSHI' variable apart from the intercept (unadjusted models), followed by adjusting the unadjusted model for other significant socio-economic variables (adjusted model).

For the seventh objective, two sample proportions test was conducted to test whether the difference in the utilization of public hospitals between GSHI-covered and non-covered households across socio-economic, demographic and geographic subgroups was statistically significant. This was done separately for both inpatient and outpatient records in Kerala.

For the eighth objective involving the aggregate analysis, outcome variables related to out-of-pocket expenditures (OOPE), catastrophic expenditures (CHE), distress financing and utilization were estimated for inpatient, outpatient and combined samples. Then, using coarsened exact matching (CEM), the imbalances in the socio-economic and demographic variables between GSHI and non-GSHI groups were reduced. The estimates of differences in the mean values of the outcome variables between GSHI and non-GSHI groups obtained from CEM were compared to the corresponding differences obtained from the unmatched sample (evaluated using two-sample t-tests). The aggregate analysis also included an analysis of distributional equity in the outcome variables using the concentration index (CI) and the Erreygers index

(EI). Further, using z-statistic, it was tested whether the difference in CI/EI between GSHI-covered and non-covered households was statistically significant.

For the ninth objective, only the inpatient sample was considered. Within the inpatient sample, the mean difference between GSHI and non-GSHI groups across various socio-economic, demographic and geographic variables regarding three variables were considered. They were inpatient out-of-pocket expenditures (IP OOP), the ratio of IP OOP to household consumption expenditure called IPO-H and distress financing. Further, using the concentration index (CI) and Erreygers index (EI), the distribution of IP OOP and IPO-H were analyzed, respectively, in both GSHI-covered and non-covered households. Further, using z-statistic, it was tested whether the difference in CI/EI between GSHI-covered and non-covered households in each socio-economic, demographic and geographic subgroup was statistically significant.

For further details regarding the methodology for the second set of research problems, please see sub-sections 4.8.2 of Chapter 4 and sub-section 5.6.2 of Chapter 5.

1.6 Chapters in the Thesis

Chapter 1 – An Overview of the Thesis: Chapter 1 (the current chapter) provides a brief overview of the thesis's background and motivation, theories and factors explaining the purchase of health insurance, research objectives, data and methodology.

Chapter 2- Setting the Context for Government-Sponsored Health Insurance (GSHI) in India with a Special Focus on Kerala: Chapter 2 discusses the need for GSHI in Kerala from a very broad perspective. The first part of the chapter started with the state of Universal Health Coverage (UHC) in the world and examined the major public health issues India had to deal with. Further, it also discusses the failures of community health insurance schemes, the subdued insurance penetration and density in India, and the current progress of CGHS and ESIS, two of the oldest health protection schemes in India. Further, the effect of rising GSHI coverage and expenditures on national health accounts (NHA) is also discussed.

The second part of the chapter deals with Kerala, the state of interest for this thesis. It starts with a profile of Kerala, including a discussion on its geography, demography and economy. Next, the historical reasons behind the famous Kerala model of health are explored. This is followed by a brief discussion of the current challenges that Kerala faces including the catastrophic and impoverishing health expenditures.

Chapter 3- Inequalities and Paradoxes in Beneficiary Targeting within Government-Sponsored Health Insurance in Kerala during 2008-2022: This chapter addresses the first set of research questions using the framework suggested by Coady et al. (2004) regarding how governments in developing countries with limited resources must target eligible populations to avoid inefficiencies in social transfers associated with anti-poverty programmes.

The focus of GSHI schemes in Kerala has been to cover the most vulnerable population and most importantly, the Below-Poverty line (BPL) households. This chapter analyzed whether GSHI schemes has successfully covered these households, after over a decade of implementation. This chapter also analyzes the fiscal implications of covering the additional BPL families if they were extended GSHI coverage.

At a policy level, this chapter provides policy suggestions for correcting the paradoxes in the simultaneous targeting regimes of GSHI beneficiaries that the union and state governments rely on.

Chapter 4: Polarization in the Utilization of Public Hospitals and GSHI: The Unique Case of Kerala: This chapter addresses the first part of the second set of research questions regarding the difference in the utilization of public hospitals between GSHI-covered and non-covered households. Most importantly, this chapter analyzes evidence from the 75th round of the NSS, which could characterize this difference in the utilization of public hospitals between GSHI-covered and non-covered households as a polarizing phenomenon.

Towards this end, the chapter compares the aforementioned difference in Kerala to other states with higher GSHI coverage. After this, an analysis of this difference across various socio-economic, demographic and geographic groups in Kerala is performed. All these analyses are done in the background of the state government's policies regarding the utilization of public hospitals under GSHI.

The policy implication of the results in this chapter should be lower medical expenditures for the GSHI beneficiaries, which is investigated in Chapter 5.

Chapter 5 – Did the Polarization in the Utilization of Public Hospitals Translate into Deep and Meaningful Financial Protection for GSHI Beneficiaries in Kerala?

The ultimate aim of GSHI schemes is to impart financial protection to its beneficiaries. Based on the results of the previous chapter, this chapter analyzes the aggregated (for the whole population) and disaggregated (for socio-economic subgroups like Scheduled Castes (SC)²⁵, Scheduled Tribes (ST)²⁶, OBC, etc.) impact of GSHI through outcome indicators like out-of-pocket and catastrophic expenditures along with distress financing. The distribution of these indicators is also analyzed to determine whether they are concentrated among the poorer or richer groups. This chapter could provide insights into whether GSHI could provide its beneficiaries with deep and meaningful financial protection in Kerala.

Chapter 6 - Summary, major findings, policy suggestions and scope for future research: This chapter summarizes the objectives, its methodology and the main findings of each chapter, along with policy suggestions/implications. Further, this chapter also observes the study's strength, acknowledges the general limitations, and brings out the scope for future research.

²⁵ See G(F) in Glossary

²⁶ See G(G) in Glossary

Chapter-2

Setting the Context for Government Sponsored Health Insurance (GSHI) in India with a special focus on Kerala

2.1 Introduction

India has successfully battled many public health challenges, both of which were inherited from British India (Harrison, 1994; Tumbe, 2020) and originating after Indian Independence. Most of these public health challenges were related to the spread of infectious diseases, which severely curtailed the life expectancy¹ of the average Indian (Klein, 1973). Even with limited resources and other accompanying challenges like population growth and poverty, the nation successfully controlled vector-borne diseases like malaria, water-borne diseases like cholera and vaccine-preventable diseases like smallpox and polio. A combination of famine control measures (Davis, 1951), sanitation measures (Harrison, 1994), indigenous development of vaccines (Lahariya, 2014) and disease surveillance helped control these diseases.

However, the economic growth and structural transformation of the Indian economy since the 1990s along with the rapid urbanization since the 2000s produced food habits (consumption of excessive carbohydrates, fats and sugar) lifestyles (sedentary occupations in the service sector of the economy), addictions like consumption of tobacco and alcohol and polluted environment (indoor and outdoor air pollution, water pollution) which led to the rise of non-communicable diseases (NCDs)² like cardiovascular and respiratory diseases (Dandona et al., 2017). The economic and epidemiological transitions³ post-1990s also coincided with stagnant public expenditures in healthcare infrastructure (Hooda, 2013) and a consequent boom in private hospitals (Hooda, 2015). Along with the slow pace of private insurance and a huge informal sector, this led to millions of households descending into poverty in

¹ See G2.12 in Glossary.

² See G2.17 in Glossary.

³ See G2.6 in Glossary.

India, due to the consumption shock of exorbitantly high health expenditures (Berman et al., 2010).

The state of Kerala experienced urbanization (Lal & Nair, 2017) and epidemiological transition at a much more rapid pace than at the national level (Dandona et al., 2017). Combined with an explosion of private hospitals (Government of Kerala, 2019) and the preference of Keralites towards them (Dilip, 2010), the economically vulnerable households in Kerala witnessed impoverishing healthcare expenditures (Mohanty & Dwivedi, 2021). To address the economic vulnerability of the poor households in the informal sector, towards impoverishing healthcare expenditures, Government Sponsored Health Insurance (GSHI)⁴ was introduced both by the union and state governments, around 2008. The government of Kerala too implemented GSHI schemes, right from 2008. 2022 would mark 15 years since the rollout of the first major GSHI scheme – Rashtriya Swasthya Bima Yojana (RSBY), both at the national and state level. The state government rolled out many more GSHI schemes, sometimes solely financed by the state government or in collaboration with the union government.

The 15 years of history that GSHI had in Kerala ought to have produced some significant outcomes, especially in covering economically vulnerable households and extending tangible financial protection to them. As a prelude and background to these research themes, this chapter delves into the history of public health in India and further explores the socio-economic, epidemiological and historical reasons that led to the evolution of GSHI schemes in India and Kerala.

2.2 The global progress of Universal Health Coverage (UHC)

Universal Health Coverage is a part of the Sustainable Development Goals (SDGs) of the United Nations. Specifically, goal no. 3 of SDG⁵ aims to “ensure healthy lives and promote well-being for all at all ages”. Further, target 3.8⁶ of this goal is to “achieve universal health coverage⁷, including financial risk protection, access to quality

⁴ GSHI would be defined later in this chapter.

⁵ See G2.21 in Glossary.

⁶ See G2.22 in Glossary.

⁷ See G2.25 in Glossary.

essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.”

These definitions adopted into the above-mentioned SDG goal and target is a toned-version (which is capable of being monitored) of a much broader definition of UHC by the World Health Organisation (WHO):

“Universal health coverage means that all people have access to the full range of quality health services they need, when and where they need them, without financial hardship. It covers the full continuum of essential health services, from health promotion to prevention, treatment, rehabilitation and palliative care”.

Moving forward from definitions, the progress of UHC could be monitored using two indicators: a. Indicator 3.8.1- Coverage of essential health services b. Indicator 3.8.2- Proportion of population with large household expenditures on health, as a share of total household expenditure or income.

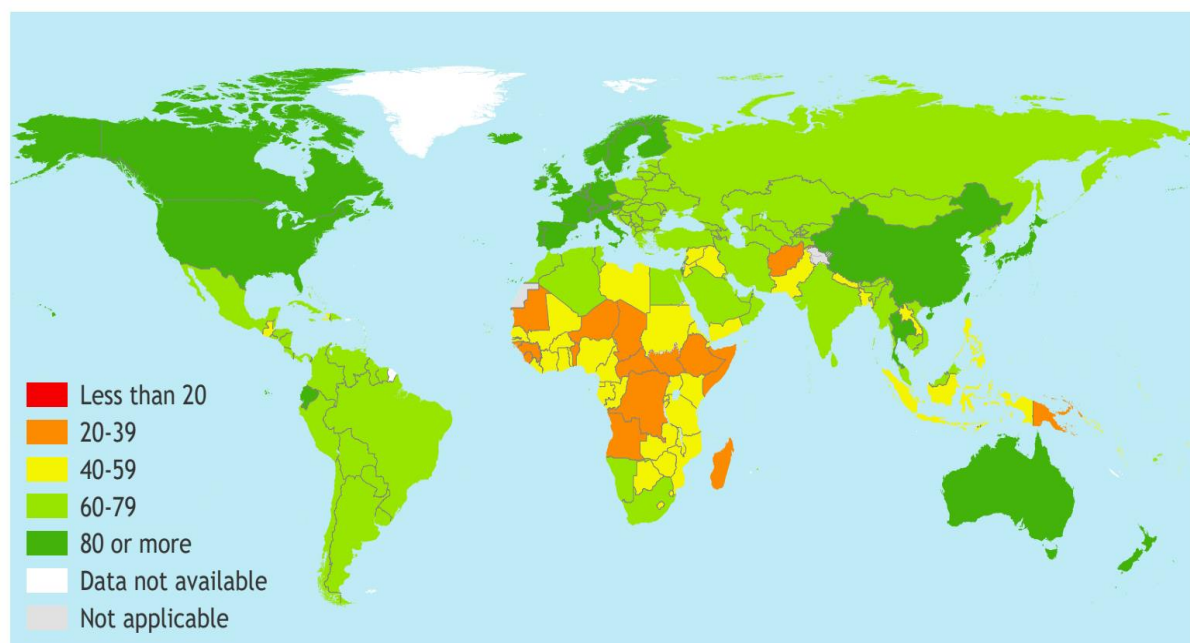
To monitor indicator 3.8.1, based on the availability of data from various nations on outcomes related to a. reproductive, maternal, newborn and child health (RMNCH) b. infectious diseases c. non-communicable diseases and d. service capacity and access, a service coverage index (SCI)⁸ was constructed (WHO & World Bank, 2021a).

Next, to monitor indicator 3.8.2, multiple indicators were used (WHO and World Bank, 2021b). Some of them were: a. out-of-pocket expenditure b. catastrophic expenditure (defined as 10 per cent and 25 per cent of total household consumption expenditure) c. impoverishing health expenditures (health expenditures that will push households into poverty).

The findings of UHC SCI are shown in Figures 2.1 and 2.2. Fig 2.1 shows that the average UHC SCI values in 2019 were the highest in the US, Canada, China, Australia and most European countries, followed by most of the East European countries, Latin American countries and most of the Central Asian countries (except Pakistan and Afghanistan). The lowest SCI values were observed for African countries and some island nations of South Asia. However, as per Fig 2.2, the situation in most of the African countries has improved substantially since 2000.

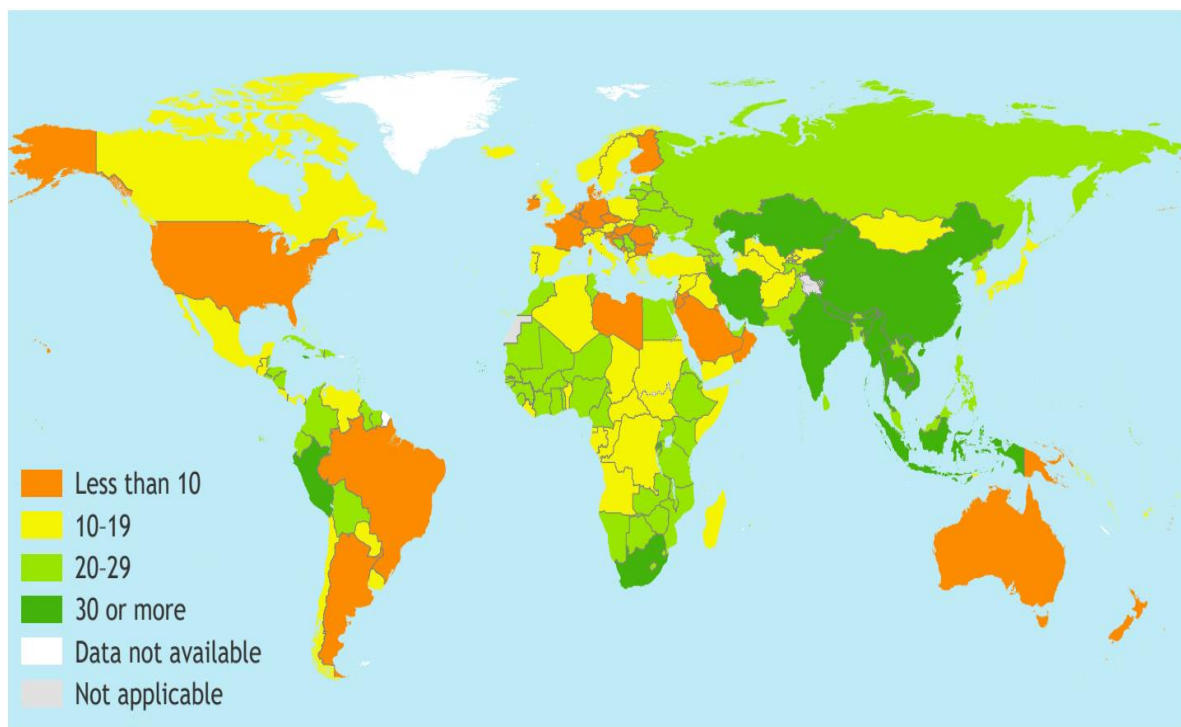
⁸ See G2.27 in Glossary.

Fig 2.1: Status of UHC SCI in 2019 (before COVID-19 pandemic)



Source: Tracking Universal Health Coverage 2021 Global Monitoring Report (WHO and World Bank)

Fig 2.2: Progress in UHC SCI between 2000 and 2019

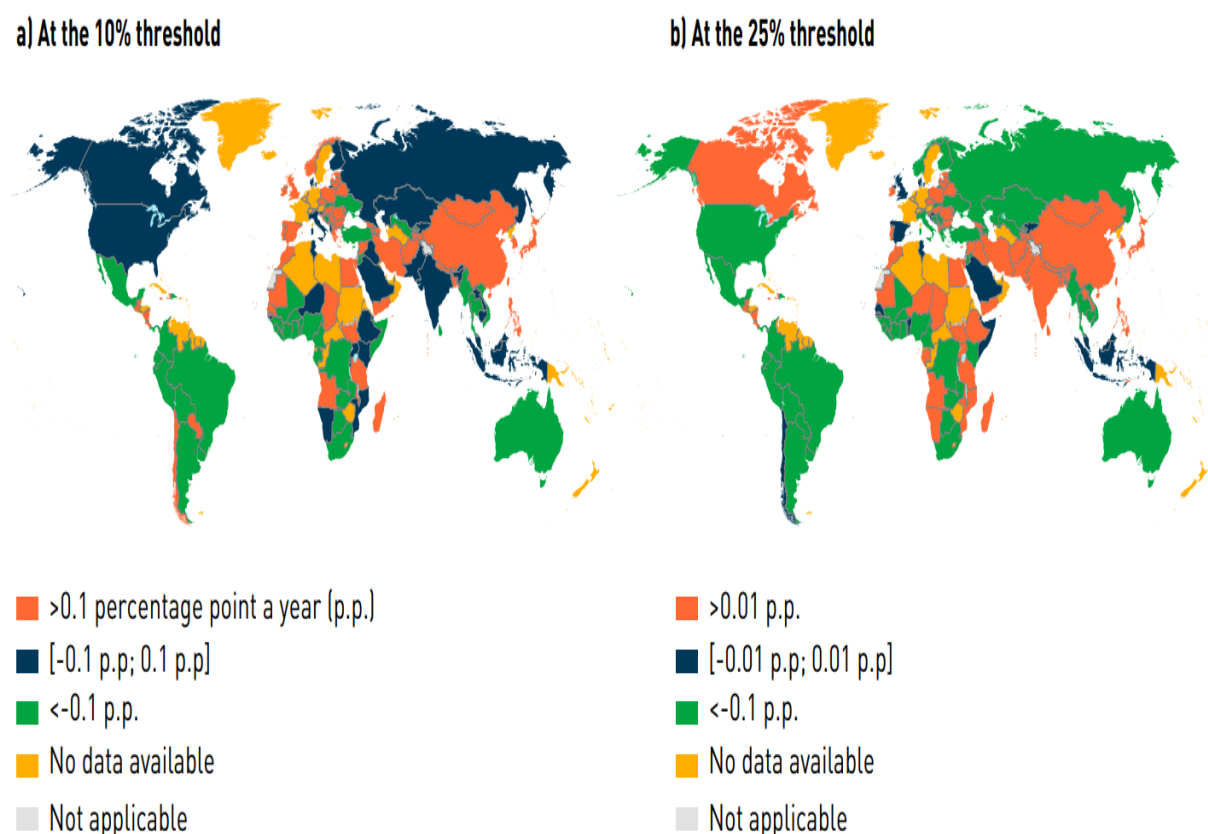


Source: Tracking Universal Health Coverage 2021 Global Monitoring Report (WHO and World Bank)

Further, the pre-pandemic trends in catastrophic health expenditure (CHE) made it clear that between 2000 and 2017, the percentage of households facing CHE (at the 10 per cent level) rose from 12.7 per cent in 2000 to 13.2 per cent in 2017 (WHO & World Bank, 2021b). In absolute terms, the population facing CHE rose from 940 million to 996 million. From Figure 2.3, it is clear that most Asian and African countries witnessed a deterioration in CHE by 0.1 percentage points per year (using the 10 per cent threshold).

More importantly, due to the economic recession and steep fall in government revenues due to COVID-19, the progress achieved in UHC SCI could be adversely affected along with further deterioration in financial protection.

Fig 2.3: Average percentage point change in the incidence of catastrophic health spending (2000-2017)



Source: Global monitoring report on financial protection in health 2021 (WHO and World Bank)

2.3 Defining Universal Health Coverage for India

From Figures 2.1 and 2.2, it is clear that India improved its UHC SCI by more than 30 percentage points between 2000 and 2019, reaching a range of 60-79 per cent in 2019 (WHO & World Bank, 2021a). However, the country's performance in financial protection has not been impressive. In fact, from Figure 2.3, it is clear that using the 25 per cent threshold, catastrophic health expenditures have been rising in India, between 2000 and 2019.

To contextualize the simultaneous improvement in service coverage and deterioration of financial protection, it is pertinent to study the evolution of UHC in India. Before delving into the same, one should understand how UHC has been defined for India.

In 2012, inspired by and expanding on the Universal Health Coverage (UHC) cube of WHO, encompassing elements of availability, accessibility and affordability, the High-Level Expert Group (HLEG) Report on UHC, set up by the erstwhile Planning Commission, defined UHC for India (Planning Commission of India, 2012) as⁹:

“Ensuring equitable access for all Indian citizens, resident in any part of the country, regardless of income level, social status, gender, caste or religion, to affordable, accountable, appropriate health services of assured quality (promotive, preventive, curative and rehabilitative) as well as public health services, addressing the wider determinants of health, delivered to individuals and populations, with the government being the guarantor and enabler, although not necessarily the only provider, of health and related services.”

Although the above definition is comprehensive and detailed compared to the WHO definition, in the following discussion, UHC in India will be analyzed mainly from two viewpoints: a. Health outcomes due to public health interventions (mainly dealing with promotive and preventive care) and b. Health financing, affordability of healthcare and the need for GSHI (mainly dealing with curative care).

⁹ See G2.26 in Glossary.

2.4 Major public health interventions in India and their outcomes

India began dealing with health and healthcare issues, right from the times of the British Raj, which introduced the Epidemic Diseases Act of 1897, public health acts and sanitary commissions in various British presidencies, to control the outbreak of infectious diseases like cholera, plague and malaria (Harrison, 1994; Tumbe, 2020).

In this dire context of public health, Bhore Committee (1943) recommended the establishment of primary health centres (PHCs), a model that was envisaged to be similar to the National Health Services (NHS) in the UK¹⁰. Through PHCs and other public health institutions, India began addressing each public health challenge, beginning with the control of communicable diseases and extending to services related to population control and even maternal and child health.

The battle with epidemics continued even after Indian Independence. Even when independent India was considered a third-world country, having an underdeveloped economy and limited government budget, the nation successfully fought battles against smallpox (eradicated in 1979) and more recently polio (eradicated in 2012). India even successfully fought the AIDS pandemic through the development of the generic version of anti-retroviral medicines¹¹ and more recently COVID-19, again by indigenously developing vaccines.

However, the success in the control of communicable has not always been consistent in India. The prime example of the same was the National Malaria Control Programme (NMCP), launched in 1948 to control the huge burden of malaria at the time of Indian Independence (in 1947 it was estimated that 22 per cent of the population were suffering from malaria. This implied that annually, 7.5 crore individuals were being infected, of which 80 lakhs succumbed to death). NMCP which focussed on indoor residual spraying of DDT and monitoring and surveillance of malaria outbreaks led to a dramatic reduction in the annual incidence of malaria within just five years of NMCP. This led the NMCP to be renamed as National Malaria Eradication Programme (NMEP) in 1958.

¹⁰ Apart from public health, Bhore Committee was also instrumental in setting up the three-tier healthcare system in India.

¹¹ Apart from the development of generic version of anti-retro viral drugs, AIDS control in India also involved a huge grass-roots level exercise to identify vulnerable groups like sex workers, homosexual males, drug users, clustered in various hot zones like Andhra Pradesh, North-east India etc. and targeted therapy among these groups (Rao, 2017).

However, due to the complacency in surveillance and the resistance that the mosquito and the parasite developed to insecticides and anti-malarial drugs respectively, malaria resurged in 1976, shocking the nation with about 6.5 million cases of infection (Rahi & Sharma, 2022). This time, instead of espousing insecticides, the modified plan of operations (MPO), framed in 1977 focussed on a. early diagnosis and prompt treatment b. vector control and c. IEC with community participation. These measures succeeded in reducing the malarial incidence to 2 million by 1984, after which programmes like Enhanced Malaria Control Project (EMCP) and Intensified Malaria Control Project (IMCP) reduced the malarial incidence and deaths to a large extent (World Bank, 2010).

Later, to integrate the efforts to combat infectious diseases spread by vectors (mostly by mosquitoes) like malaria, the National Vector Borne Disease Control Programme (NVBCD) was formed in 2002 by integrating the control of kala-azar, dengue, lymphatic filariasis, Japanese encephalitis and chikungunya to the National Malaria Control Programme.

The resurgence of malaria was not the last time that infectious diseases took the country by surprise. In 1994, a plague epidemic broke out in Surat (Lin, 1995). This surprise attack laid bare the lacunae in the monitoring and surveillance of infectious diseases in India. To overcome these deficiencies, in 2004, the Integrated Disease Surveillance Programme (IDSP), was launched which monitors weekly outbreaks of epidemic-prone diseases, through a network of districts (in all districts of India) and state surveillance units (DSU/SSU).

Another successful and annually run programme for routine immunization in India has been the Universal Immunization Programme (UIP). As of 2022, UIP which was launched in 1985 has been the largest public-funded immunization programmes targeting about 2.67 crore new-borns and 2.9 crore pregnant women annually. To improve the full immunization¹² of children above 90 per cent, the Government of India launched Mission Indradhanush in 2014 which was scaled up to Intensified Mission Indradhanush (IMI) 1.0, Intensified Mission Indradhanush (IMI) 2.0, Intensified Mission Indradhanush (IMI) 3.0 and finally Intensified Mission Indradhanush (IMI) 4.0. These intensified efforts have started showing encouraging

¹² Full immunization refers to the percentage of children aged between 12 and 23 months who are vaccinated with BCG, measles-containing vaccine - (MCV)/MR/MMR/Measles, and 3 doses each of polio (excluding polio vaccine given at birth) and DPT or pentavaccine (NFHS-5) (see G2.7 in Glossary).

results. Full immunization among children aged 12-23 months has risen from 62 per cent in NFHS-4 (2015-16) to 76.4 per cent in NFHS-5 (2019-21).

The success of these measures to control infectious diseases is reflected in the impressive improvement in life expectancy at birth. Both the male and female life expectancy rose substantially in the 1881-202 period. While the male life expectancy at birth rose from 23.7 years in 1881 (Dandekar, 1972) to 70 years in 2020 (table 2B), female life expectancy rose from 25.6 years in 1881 (Dandekar, 1972) to 72 years in 2020 (Table 2B).

Another main public health challenge issue was the gargantuan and complex issue of undernutrition. One of the main reasons behind undernutrition in the years following Independence was the lack of self-sufficiency in domestic food production and the reliance on food-surplus countries (like the USA) to feed the country with the second-largest population in the world. Even with large imports of food, the country faced severe droughts and consequently famines in two consecutive years- 1964-65 and 1965-66 (Badhwar, 2014; Mancombu, 2022). Along with the Indo-Pak war in 1965 and cuts in food imports from the USA, India faced massive food insecurity in this period.

This state of food insecurity was addressed through the introduction of the Green Revolution¹³ (Swaminathan, 2000) in parts of Punjab, Haryana and parts of western Uttar Pradesh, beginning in 1966. Although a decision to improve food self-sufficiency in India, the Green Revolution played a significant role in reducing the food poor in India, by making available food grains (mainly cereals like rice and wheat) to the poor through the public distribution system (PDS).

Another major initiative towards addressing undernutrition in India (for children below the age of 6 years) was the introduction of Integrated Child Development Services (ICDS) in 1975. ICDS, through a grass-roots network of Anganwadis and Anganwadi workers, provided a package of child services including nutritious meals, preschool education, immunization and even health check-ups of children and mothers.

Further, the National Food Security Act (NFSA) enacted in 2013 made food a legal right. However, all these measures gave more importance to food security rather than

¹³ Green Revolution involved growing high-yielding variety of rice and wheat by applying large amounts of water, chemical fertilizers and pesticides along with advanced farm machinery like tractors.

nutritional security (Pingali et al.,2017) due to which issues like undernourishment (Karlsson et al., 2021) and anaemia (Scott et al., 2022; Sharif et al, 2023) in children and women continue to strongly exist in India.

Even after significant reductions since Independence, in the early 2000s, it was felt that more focus must be placed on basic health indicators such as infant mortality rate, maternal mortality rates, stunting, and wasting of children below 5 years, lower institutional delivery, etc., especially in rural areas. Accordingly, the National Rural Health Mission (NRHM) was launched in 2005 followed by the National Urban Health Mission (NUHM) in 2013, both of which were later subsumed into the National Health Mission (NHM).

NHM envisaged improving the basic health indicators related to reproductive and child health by engaging at the grassroots levels through frontline health personnel called Accredited Social Health Activists (ASHA). Studies have shown that NRHM had a significant impact on various indicators like infant mortality rate (Prinja et al., 2021).

Another main challenge for India was the rapidly growing population. However, barring the dark and coercive episode in population control during the national emergency (1975-77), the country has been successful in controlling its population¹⁴ after the peak explosion in the 1960s, through incentives, information, education and communication (IEC). The drawback of these ‘family welfare’ schemes was that they put the entire onus of population control on women by focussing on female sterilization (Mona & Suri, 2022) and failed to effectively control the population growth in big and populous states like Uttar Pradesh and Bihar.

Even with the control of infectious diseases and significant reductions in basic mortality indicators, undernutrition and population growth, the nation ignored two main and basic determinants of good health – access to sanitation and clean drinking water. It had always been on the radar of the union and state governments, but progress in these parameters was very slow-paced.

To overcome the failure of the Total Sanitation Campaign (TSC) and Nirmal Bharat Abhiyan (NBA) (schemes aimed at improving sanitation launched in the 1990s and 2000s) in ensuring household-level and community-level sanitation, the union government launched the Swachh Bharat Mission (SBM) in 2014. SBM had two

¹⁴ The total fertility rate (TFR) for India touched 2.0 in NFHS-5 (2019-2021).

components- the rural component called SBM-Gramin and the urban component called SBM-Urban. Till 2021, SBM has succeeded in building about 11 crore individual household latrines (IHHL) and all states have declared themselves open defecation-free (ODF)¹⁵. Although 2.23 lakh community sanitary complexes were built, the focus on solid and liquid waste management (SLM) was inadequate. Through SBM Phase-II, launched in 2020, the union government aims to improve SLM and other neglected areas like behaviour change, etc.

After sanitation, to improve access to clean drinking water, the Jal Jeevan Mission (JJM) was launched on August 15, 2019, to provide functional household tap connections (FHTC) in rural areas. As a result of the mission, FHTC improved dramatically from 16.64 per cent on August 15 2019 to 62.9 in June 2023¹⁶.

Along with access to sanitation and clean drinking water, both of which immensely benefitted women beneficiaries, another major scheme aimed at improving access to clean cooking fuel was the Pradhan Mantri Ujjwala Yojana (PMUY). Like SBM and JJM, PMUY was also a social security aimed to tackle both social (walking long distances to collect firewood for chulla stoves) and health issues (indoor air pollution) faced by women (particularly in vulnerable groups like ST/SC, most backward classes, islanders and forest dwellers, employed in tea gardens, households who are beneficiaries of Pradhan Mantri Awas Yojana -PMAY (affordable housing to identified poor households) and Antyodaya Anna Yojana (AAY)). PMUY, launched in 2016, provided LPG connections to 8 crore households in the first phase (2016-2019) and in the second phase (from 2021 onwards), aims to provide LPG connections to another 1.6 crore households¹⁷.

Public health challenges are ever-evolving, and new ones emerge even while legacy issues like access to sanitation are being addressed. Even while India has not satisfactorily addressed the issue of under-nutrition, the issue of over-nutrition has

¹⁵ While it is true that the access to improved sanitation increased substantially between NFHS-4 (2015-16) and NFHS-5, from 48.5 per cent in 2015-16 to 70 per cent in 2019-21, it was much lower than the claims of the union government in the Swachh Survekshan Grameen (SSG). SSG claimed that the access to toilets was 95.4 per cent in 2022, while the corresponding figure for improved sanitation in rural area was just about 65 per cent.

¹⁶ <https://ejalshakti.gov.in/jjmreport/JJMIndia.aspx>

¹⁷ <https://www.pmuy.gov.in/about.html>

emerged, evidenced by the rising percentage of obese or overweight individuals (Gupta et al., 2023). Similarly, issues like diabetes (Varghese et al., 2023) and hypertension (Amarchand et al., 2022) loom large along with tobacco (Bharati et al., 2023) and alcohol consumption (Singh and Kumar, 2022). The union government has again launched various national programmes¹⁸ to tackle these issues.

Last but not least, all the above efforts in public health spearheaded by the union government would not have been successful without the participation of the state governments. This is because health is a state subject as per the seventh schedule of the Indian constitution. Although the union government may frame health policies, the on-ground implementation falls on the shoulders of the state government. Hence all these public health schemes to tackle communicable diseases, reproductive & child health, and malnutrition were successful, in large part, due to the contribution of the state governments through health personnel, health infrastructure at the local level and health financing (through state budgets).

The mantra throughout this journey of public health advancements in India was to develop cost-effective strategies at a population scale that could have the maximum impact on strategically selected health issues.

2.5 The need to address the affordability of healthcare in India

All these standalone public health interventions have delivered significant results, although they leave behind a lot of room for improvement, especially in the case of health financing. In the context of health financing, the issue of impoverishing medical expenditures and the huge share of out-of-pocket expenditures caught the attention of policymakers in the early 2000s (Government of India, 2005).

Along with the boom in private hospitals, another reason for the aforementioned medical expenditures was the epidemiological transition (Barik & Arokiaswamy, 2016) which implied a rising share of non-communicable diseases (such as cardiovascular diseases, respiratory diseases, cancers, etc.) in the total disease burden (compared to the share of communicable nutritional, reproductive, and child diseases). In 2019, the share of non-communicable diseases in the total disease burden of India was about 61 per cent (Table 2B).

¹⁸ A detailed discussion of the national programmes launched by the Government of India and Government of Kerala to combat non-communicable diseases is presented in Chapter 4.

This implied expensive surgeries, diagnostics, drugs, longer inpatient stays, and frequent outpatient visits, a potent combination that led to increased health expenditures, especially for the economically vulnerable sections of Indian society. Using National Sample Survey data, it was estimated that almost 63 million people were being pushed into poverty due to high health expenditures (Berman et al., 2010).

2.6 The introduction of CGHS and ESIS and their performance: Early efforts for social security in India

To counter the impact of these impoverishing medical expenditures, before 2008, until the introduction of RSBY, the governments at the union and state levels had introduced insurance for its employees like Central Government Health Scheme (CGHS)¹⁹ (launched in 1954) and Ex-Servicemen Contributory Health Scheme (ECHS) (launched in April 2003). The formal sector was also covered by introducing the Employees' State Insurance Scheme (ESIS)²⁰ in 1952 through the Employees State Insurance Act, of 1948.

It would be worthwhile to analyze the performance/impact of some of these government-funded schemes, as per the data in the National Health Profile of 2021 (Government of India, 2021). According to this document, as of 2021, CGHS covered about 37.5 lakh beneficiaries through 12.83 lakh primary cardholders and its services were available in 72 cities through a wide network of diagnostic centres, hospitals, wellness centres, dental clinics, eye care clinics, under allopathy and AYUSH systems of medicine. Between 2010-11 and 2020-21, the aggregate expenditure²¹ by the central government on CGHS more than doubled, from ₹1,296 crores in 2010-11 to ₹4,204 crores in 2020-21. The per-capita expenditure also more than doubled, from ₹4,050 in 2010-11 to ₹11,063 in 2020-21 (Government of India, 2021).

Larger than CGHS, ESIS is a scheme with a very large beneficiary pool of 13.25 crores in 2020, covering 3.41 crore insured persons/family units. Unlike CGHS, this

¹⁹ See G2.2 in Glossary.

²⁰ See G2.5 in Glossary.

²¹The expenditure refers to reimbursements and the total outflow due to the healthcare utilization by beneficiaries.

beneficiary pool has more than doubled from about 5 crore beneficiaries in 2009 to the current level in 2020. The aggregate expenditure on medical benefits under ESIS increased manifold. It rose from ₹1,273 crores in 2009 to ₹9,368 crores in 2020 (Government of India, 2021).

Other than CGHS and ESIS, the union government funds many other schemes (Government of India, 2021) like the Health Minister's Discretionary Grant (HMDG) and the umbrella scheme of Rashtriya Arogya Nidhi (which includes Rashtriya Arogya Nidhi (RAN), The Health Minister's Cancer Patient Fund (HMCPF) and financial assistance for rare diseases).

Having analyzed the main government-funded health insurance/social security measures to provide financial protection against healthcare expenditures, it would be interesting to understand the growth in private insurance and health insurance in India.

2.7 The slow pace of insurance, its association with economic growth²² and the current status of health insurance in India

Health insurance, which emerged after the economic liberalization in 1991, was another way to extend health insurance to more individuals. But it has not taken off as expected. Even with high economic growth rates, the penetration²³ (ratio of insurance premiums to GDP) and density²⁴ of insurance (ratio of insurance premiums to population) have remained low in India (Insurance Regulatory and Development Authority of India (IRDAI), 2022).

This does not mean that there was no growth in these indicators. Both penetration and density in India improved from 2.71 per cent and 11.5 USD²⁵ in 2000-01 to 4.2 per cent and 91 USD in 2021-22 respectively (Figures 2.4 and 2.5). However, this is much lower than in advanced economies or even emerging Asian economies (Table 2.1). Also, the growth in these two indicators has been mainly fuelled by the growth in life insurance, compared to non-life insurance (including health insurance).

²² Economic growth implies annual growth rate in GDP.

²³ See G2.9 in Glossary.

²⁴ See G2.10 in Glossary.

²⁵ USD- US Dollars.

Table 2.1: Comparison of insurance penetration and density in India compared to other regions in the world (2021-22)

Region	Penetration (%)			Density (USD)		
	Life	Non-Life	Total	Life	Non-Life	Total
USA and Canada	2.7	8.7	11.4	1823	5960	7782
Advanced EMEA	4.8	3.2	8.0	2226	1468	3694
Emerging EMEA	0.6	1.0	1.6	35	58	92
Advanced Asia-Pacific	6.0	3.0	9.0	2325	1187	3512
Emerging Asia-Pacific	2.1	1.6	3.7	132	100	232
India	3.2	1.0	4.2	69	22	91
World	3.0	3.9	7.0	382	492	874

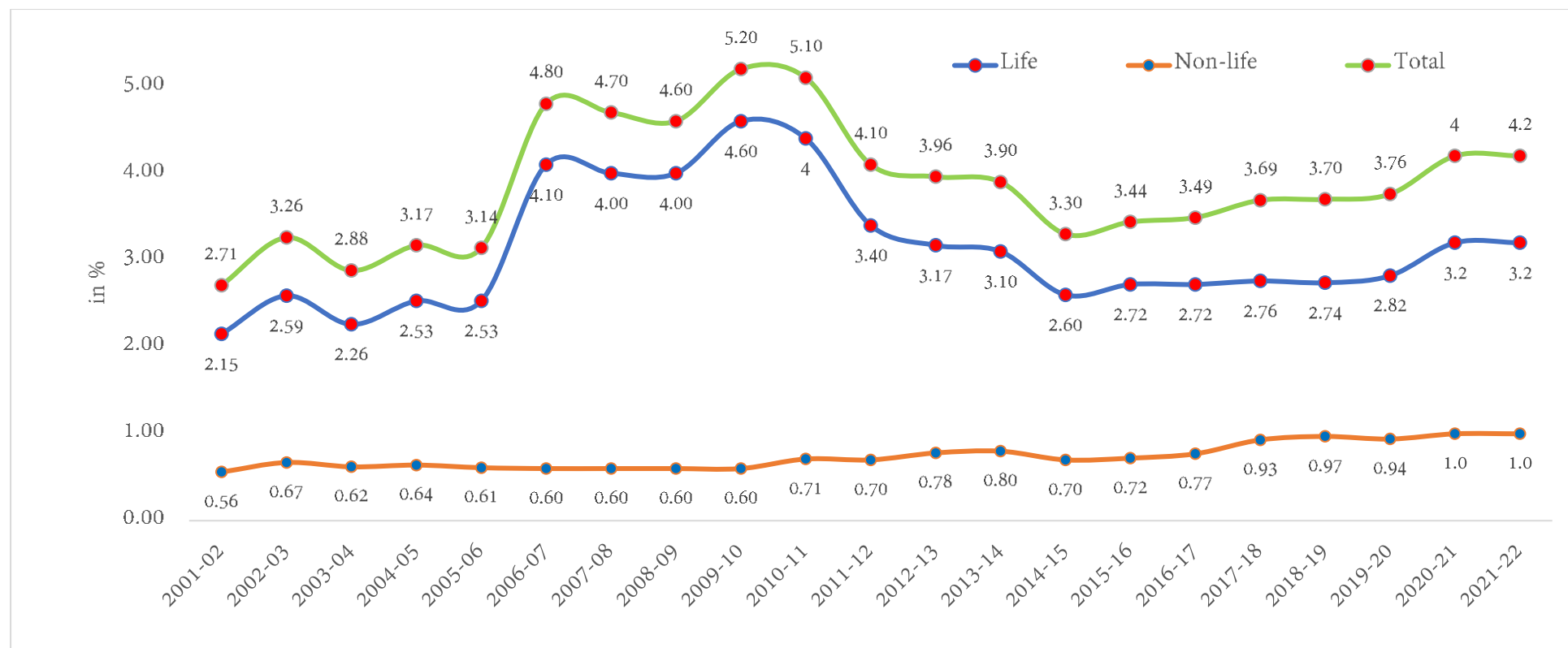
Note: EMEA- Europe, Middle East and Africa

Source: Swiss Re, Sigma 4/2022, cited in Annual Report 2021-22, IRDAI.

Another interesting fact about the growth in insurance penetration (IP) and insurance density (ID) in India is that it almost coincided with or outperformed the country's economic growth phases (even with fluctuations) during the period between 2000 and 2011. However, the period since 2011 has witnessed contradictions in the relationship between economic growth and the growth in IP/ID. The following is a detailed summary of the relationship between economic growth and growth in IP and ID.

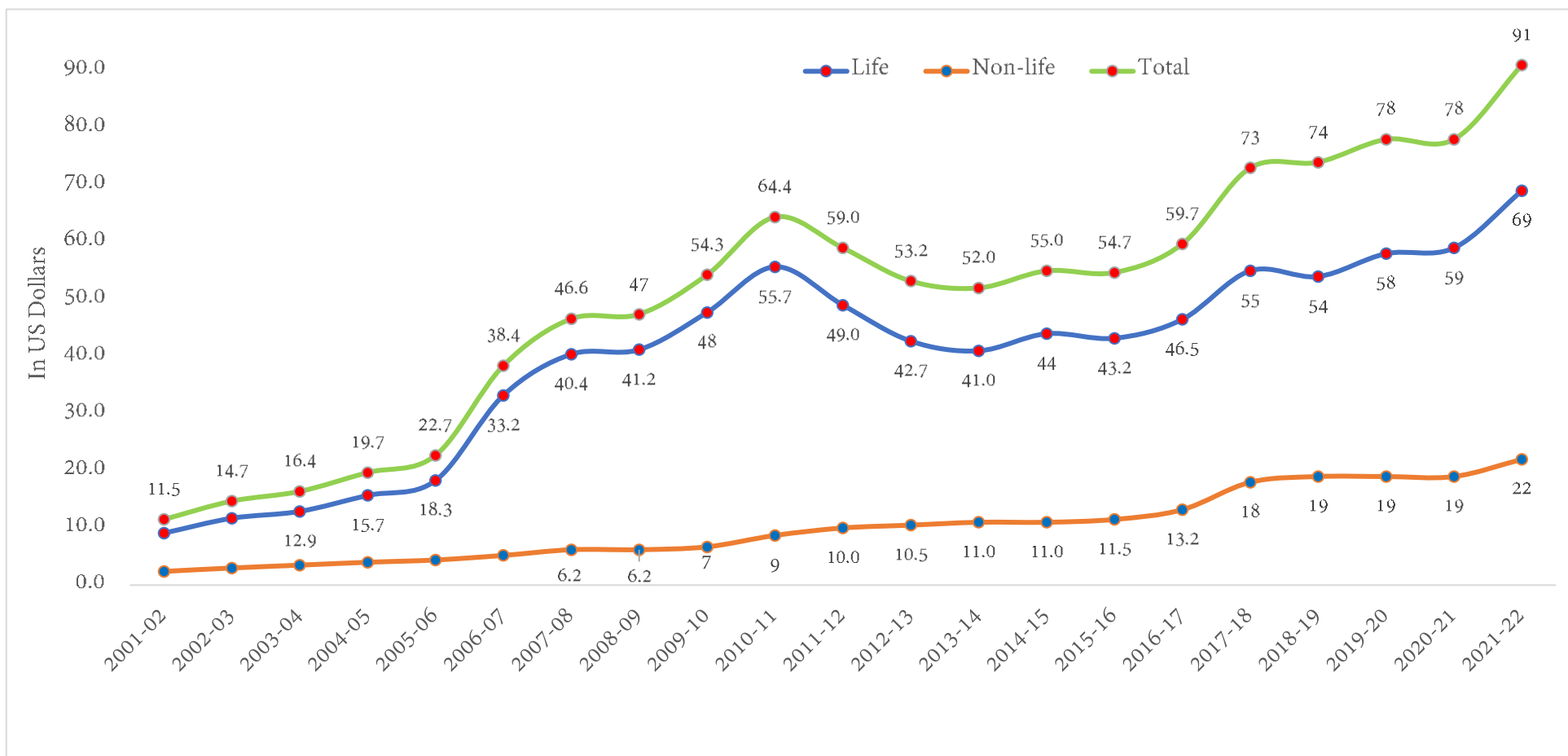
After a lull in the 2000-2002 period, India experienced high economic growth ranging between 7 and 8 per cent from 2003 to 2007. It can be seen that IP and ID also grew steadily during this period. Next, the period between 2008 and 2011 witnessed wide fluctuations in the growth rate, but still, IP and ID maintained the growth momentum.

Fig 2.4: Insurance penetration (IP) in India (2000-2022)



Source: Annual Report 2021-22, IRDAI.

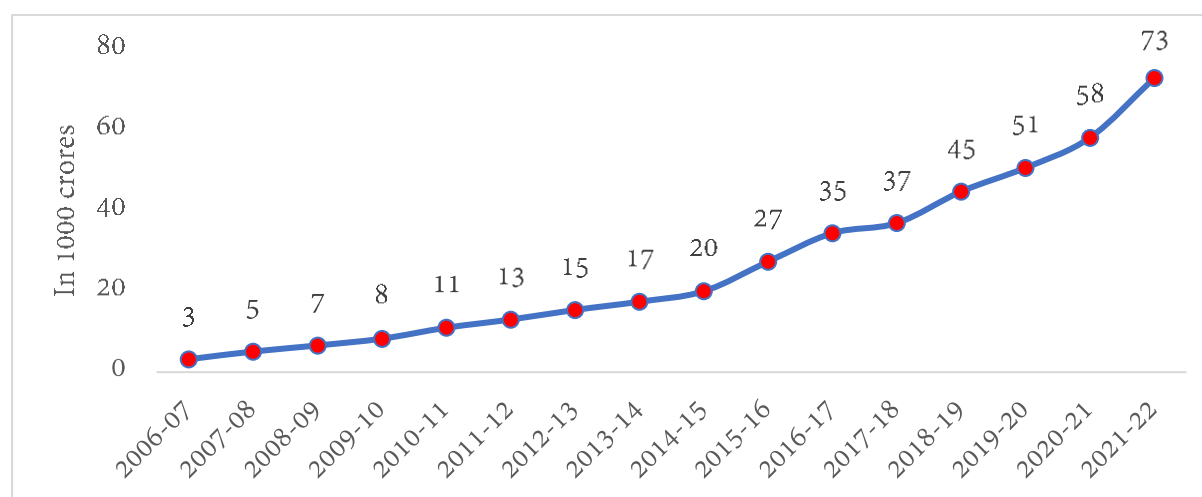
Fig 2.5: Insurance density (ID) in India (2000-2022)



Source: Annual Report 2021-22, IRDAI.

In the period between 2011 and 2016, following the global economic recession, economic growth in India rebounded, starting at 5.2 per cent in 2011 and peaking at 8.3 per cent in 2016. After 2016, the economic growth plummeted continuously to reach 3.7 per cent in 2019.

Fig 2.6: Trends in gross health insurance premium (2006-22)



Source: Compiled from IRDAI annual reports.

Table 2.2: Policies, covered lives and gross premium for health insurance in 2020-2022

Class of Business	No. of Policies (lakhs)		No. of Lives Covered (lakhs)		Gross Premium (₹ crore)	
	2020-21	2021-22	2020-21	2021-22	2020-21	2021-22
Government Sponsored Business	0.001 (-53.50)	0.001 (0.00)	3,429 (-5.26)	3,065.08 (-10.62)	4,290.00 (-12.82)	6,075.87 (41.63)
Group Business	9.09 (19.49)	7.00 (-36.30)	1,186.95 (26.92)	1,622.88 (36.73)	28,108.09 (8.61)	36,890.58 (31.25)
Individual Business	228.30 (32.95)	219.25 (-3.96)	531.39 (22.94)	516.23 (-2.85)	25,839.77 (29.48)	30,085.07 (16.43)
Total	237.39 (32.38)	226.25 (-5.20)	5,147.47 (3.22)	5,204.19 (1.10)	58,237.86 (14.74)	73,051.52 (25.44)

Note: The figures in parentheses indicate growth (in per cent) over the previous year.

Source: Annual report 2021-22, IRDAI

However, the growth of IP and ID dropped or remained sluggish in the 2011-2016 period and rose in the 2016-2019 period. This contradiction between economic

growth and the growth in IP/ID since 2011 became even more pronounced after the COVID-19 pandemic in 2020. The pandemic may have motivated households to subscribe to more life and non-life insurance, despite the negative economic growth (-6.6 per cent in 2020).

The fluctuating relationship that ID and IP had with economic growth did not necessarily apply to the growth in gross health insurance premiums (GHIP). Throughout 2006-2022, GHIP grew impressively, regardless of the trends in economic growth. From Figure 2.6, it was evident that by 2022, GHIP had grown to nearly 25 times the corresponding figure in 2006-07. Furthermore, as shown in Table 2.2, this performance implied that, including government-sponsored insurance, in 2021-22, approximately 52 crore individuals were covered by health insurance.

2.8 Community-based Health Insurance (CBHI) in India

The most significant and serious exclusion from all the government-funded insurance schemes mentioned above, as well as social security measures like ESIS and private health insurance, pertained to economically vulnerable people in India, primarily employed in the informal sector.

One solution to this exclusion was community-based health insurance (CBHI)²⁶. The country has a long history of numerous community-based health insurance (CBHI) schemes, such as a. Student's Health Home scheme in West Bengal, covering 5.2 million full-time students, from Class 5 to university, launched in the year 1952. b. Voluntary Health Services (VHS), Madras²⁷, in the erstwhile state of Madras in 1972, which covered 1,04,247 individuals²⁸. c. Raigarh, Ambikapur Health Association (RAHA)- launched in 1972, with an enrolment of 92,000 individuals in modern-day Chhattisgarh d. The CBHI that was launched in 1992 by SEWA²⁹ covering 5,34,674 women members of the SEWA union and their husbands in 11 districts of Gujarat. e. ACCORD scheme for scheduled tribes in the Gudalur Taluk of Nilgiris district in Tamil Nadu, covering 13,070 individuals in the Adivasi Munnetra Sangam (AMS). f.

²⁶ See G2.3 in Glossary.

²⁷ Chennai was known as Madras until 1996 when it was renamed.

²⁸ The state of Madras was renamed as Tamil Nadu in 1968.

²⁹ SEWA stands for Self Employed Women's Association.

Yeshasvini Health Insurance Scheme (YHIS) in Karnataka in 2003, covering about 25 lakh members in various co-operative societies (Devadasan et al., 2004).

CBHI was funded through members' compulsory contributions to a corpus fund, which was used to finance healthcare expenditures. CBHI faced several deficiencies, including localized and small risk pools, adverse selection (resulting in more enrolment of individuals at higher risk of hospitalization), irregular member contributions, and partial financial protection (Devadasan et al., 2004; Devadasan et al., 2007).

2.9 GSHI³⁰, its definition and early progress in India (from 2008-2017)

Having understood CBHI in India and its issues, it's a ripe moment to understand the evolution of GSHI and its progress in India. Before that, it's necessary to clearly define GSHI in the Indian context.

In the Indian context, Government Sponsored Health Insurance (GSHI) could be defined as a financial protection scheme, mainly for secondary and tertiary level of curative care, implemented universally or in a targeted manner for identified vulnerable populations, financed by the government (single-payer), through taxes/hybrid sources and implemented either through government or strategically purchased from private healthcare providers³¹. GSHI schemes on a periodically revised list of health benefit packages (HBP)³², priced at affordable rates. GSHI is slightly different from terms like government-financed/publicly financed health insurance which might also imply insurance for government employees like CGHS of the union government, which the governments provide as part of an employer-employee relationship. Compared to this, the word 'sponsored' in GSHI implies the government being a sponsor for the GSHI-insured population, without any services rendered in return.

Rashtriya Swasthya Bima Yojana (RSBY) was one of the first pan-Indian GSHI schemes introduced in 2008, following the failure of the Universal Health Insurance

³⁰ The definition of GSHI is operational in nature, framed by the author for the specific application in the thesis.

³¹ This is an operational definition, formulated by the author for this thesis.

³² As of June 2023, the HBP 2.2 of ABPMJAY (the major umbrella GSHI scheme in India) includes 920 packages and 1,670 procedures covered by 26 specialties.

Scheme (UHS), which was launched in 2003. RSBY assured a maximum sum of ₹30,000 for a family of five, on a family floater basis at a yearly registration fee of ₹30 for inpatient expenditures. The introduction of RSBY also coincided with the launch of various state-level GSHI schemes, especially in south India like the Rajiv Aarogyashree Scheme (RAS) of erstwhile Andhra Pradesh (launched in 2007), Vajpayee Arogyasri Yojana in Karnataka (launched in 2010), Comprehensive Health Insurance Scheme (CHIS) in Kerala (launched in 2008, along with RSBY), Chief Minister's Comprehensive Health Insurance Scheme ('Kalaingar scheme') in Tamil Nadu (launched in 2009). These schemes, along with numerous others in different states, offered various coverage amounts (sometimes even exceeding ₹3 lakhs), had diverse state-level eligibility criteria for beneficiary households (mostly based on possession of a below-poverty-line (BPL) card), and largely involved private hospitals.

In addition to RSBY, the union government introduced the Senior Citizens Health Insurance Scheme (SCHIS) in 2016 as a top-up scheme based on RSBY. It aims to provide yearly financial assistance of up to ₹30,000 to each senior citizen (individuals aged 60 and above) in a household covered by RSBY.

2.10 A major milestone in the GSHI journey of India: Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY), its structure and initial achievements

One of the major milestones in the GSHI story of India happened in 2018 when the Government of India introduced the Ayushman Bharat scheme with two pillars Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)³³ and health and wellness centres (HWCs). ABPMJAY aimed to provide financial protection to the bottom 40 per cent of the Indian population, including all other vulnerable groups who were previously covered by RSBY, by covering hospitalization expenditures, including diagnostics and medicines, for 3 days before and 15 days after hospitalization. ABPMJAY extended insurance coverage of 5 lakhs on a family floater basis with no restrictions on family size, the age of family members, or pre-existing conditions. Similar to RSBY, ABPMJAY was also implemented as a centrally sponsored scheme (CSS), implying the participation of state governments. The state governments implemented ABPMJAY by merging with state-level schemes (which

³³ See G2.1 in Glossary.

were funded by state governments) and branding the schemes (by giving the scheme's elements like state-level names, logos, etc.) along with ABPMJAY.

Regarding implementation, ABPMJAY and related state-level schemes are implemented in one of three ways³⁴: 1. Insurance mode: Implemented through an insurance company 2. Assurance/Trust mode: Implemented through a trust/body managed by the state government, without involving insurance companies 3. Mixed/Hybrid mode: A part of the insurance scheme is implemented through insurance companies, while the other part is implemented through government-managed trust. Table 2C in the appendix lists the various GSHI schemes in various India as of March 2022 with the mode of implementation (insurance/assurance/mixed mode).

ABPMJAY, being a health insurance scheme, is comprised of various entities like public and private insurance companies, public and private hospitals (EHCP-Empanelled Healthcare Providers) and third-party administrators (TPAs). While the above entities are the hard infrastructure/tangible elements of ABPMJAY, the smooth functioning of the scheme includes the soft/digital infrastructure like the Beneficiary Identification System (BIS), Transactions Management Systems (TMS), Hospital Empanelment Module (HEM) and Grievance Portal. To coordinate the hard and soft infrastructure of ABPMJAY, the National Health Authority and state health agencies (SHAs) have been constituted at the federal and state levels respectively.

Between 2018 and June 2023, ABPMJAY managed to issue approximately 23 crore golden cards and covered around 5.3 crore hospitalizations worth about 65,000 crores³⁵. The following section will examine some of the companion schemes of ABPMJAY and the impact of these schemes on the National Health Accounts.

³⁴ See G2.14 in Glossary.

³⁵ <https://dashboard.pmjay.gov.in/publicdashboard/#/>

2.11 Companion schemes of ABPMJAY, aimed at improving financial protection from medical expenditures

Similar to RSBY, ABPMJAY ignored outpatient expenses in which the share of drug expenditure is very high. As a remedy, ABPMJAY was accompanied by revamping (revamped in 2015) the almost defunct Jan Aushadhi scheme originally launched in 2008 (relaunched as Pradhan Mantri Bharatiya Janaushadhi Pariyojana (PMBJP)³⁶ to provide generic drugs at affordable rates (discounts ranging between 10 to 90 per cent of market price). In 2023, with a network of 9303 Janaushadhi Kendras (most of which joined post-2014) and a product basket of 1800 drugs (most of which are procured from pharmaceutical companies in the public sector) and 285 surgical items, PMBJP has resulted in savings of approximately ₹20,000 crore between 2015 and 2023 (Press Information Bureau, 2023).

Realizing the need for strong public health infrastructure during the COVID-19 pandemic, a scheme to build medium-sized- hospitals (150 beds) with critical care³⁷, the Pradhan Mantri-Ayushman Bharat Health Infrastructure Mission (PM-ABHIM) was launched in February 2021. PM-ABHIM could also serve to support the ailing public health infrastructure, especially in speciality and critical care. In under-served districts with little incentive for private parties to start private hospitals with speciality care, the government-funded ABHIM could be a potential game-changer.

Similar to ABHIM, which was designed to plug the gap in physical infrastructure, the union government has launched the Ayushman Bharat Digital Mission (ABDM) to establish the necessary digital infrastructure, which can further the journey towards UHC. ABDM aims to create digital personal health records (PHR) through the establishment of the Ayushman Bharat Health Accounts (ABHA), which includes separate registries for all health facilities (Healthcare Facility Registry-HFR) and healthcare professionals (Healthcare Professionals Registry-HPR). As of June 2023, about 40.3 crore ABHA have been generated and about 2.1 lakh health facilities and about 2 lakh healthcare professionals have registered in HFR and HPR respectively.

³⁶ See G2.20 in Glossary.

³⁷ The scheme also included development of rural and urban health and wellness centres (HWCs), Block Public Health Units in 11 high focus states, integrated public health labs in all districts, 5 new regional National Centre for Disease Control (NCDC), 20 metropolitan health surveillance units etc.

2.12 The macro-impact of GSHI schemes in India

The impact of all these measures could already be starting to show some positive results. Even though in the early stages of GSHI, at the micro level (household) there was no conclusive evidence to suggest that GSHI schemes were effective in providing financial protection (Prinja et al., 2017; Reshmi et al., 2021), some recent evidence from National Health Accounts (NHA) of 2019-20 paint a macro-picture, which may suggest that GSHI is on the path to becoming successful in India. From the 7 rounds of National Health Accounts (NHA), between 2013 and 2020, the share of out-of-pocket expenditures (OOPE) in total health expenditure (THE) at the national level reduced by about 17 percentage points, from 64.2 per cent in 2013-14 to 47.1 per cent in 2019-20³⁸. This happened due to the government's share (both union and state governments) in THE, which rose from 28.6 per cent in 2013-14 to 41.4 per cent in 2019-20³⁹.

Even while the share of OOPE in THE at the national level reduced to 47.1 per cent in 2019-20, the corresponding share in Kerala remained high at 67.9 per cent. (As per NHA 2019-20, Kerala was the state with the second largest share of OOPE, after Uttar Pradesh). To understand the reasons behind the large share of OOPE in Kerala, an examination of various social, economic, demographic and epidemiological factors, unique to the state is required.

To understand the reasons behind the large share of OOPE in Kerala, an examination of various social, economic, demographic and epidemiological factors, unique to the state is required. Therefore, the next section paints a brief profile of Kerala, followed by a deeper examination of the factors that necessitate the introduction of GSHI in Kerala.

³⁸ These claims of the government, about the reduction in the share of OOPE, have been contested by Muraleedharan et al. (2022).

³⁹ The rise in the share of government expenditure in total health expenditure (THE) might also be instrumental in raising the total health expenditure by the government nearer to the target of 2.5 per cent that the National Health Policy, 2017 envisaged by 2022.

2.13 A basic profile of Kerala: Geography, demography, social and religious composition and distribution, the structural composition of the economy and related economic indicators

1. Geography of Kerala - 'God's Own Country'⁴⁰: The state of Kerala lies between the Arabian Sea and the Western Ghats. Spread over 38,863 sq. km⁴¹, Kerala is situated between the northern latitudes⁴² of 8°.17'.30"⁴³ N and 12°. 47'.40" N and east longitudes⁴⁴ 74°.27'.47" E and 77°.37'.12" E and forms just 1.18 per cent of India's landmass. With a population of about 3.34 crore⁴⁵ (spread over 14 districts) which forms about 2.76 per cent of the Indian population, the population density⁴⁶ of Kerala is one of the highest in the country (860 per sq. km).

Even within this narrow stretch of land, Kerala is blessed with 41 westward flowing rivers, 3 eastward flowing rivers and a huge forest cover. 54.6 per cent of the state is covered by forests while the national average is 21. 71 per cent in 2021⁴⁷. The forests are also mostly situated in the high ranges of Kerala with an elevation of 600 m and above. Along with high-ranges, in the decreasing order of elevation, there are four other physio-graphic zones in Kerala a. foothill zone (300 to 600 m) b. upland region (100-300 m) c. midlands (20-100 m) and d. coastal areas and lowland areas (below 20 m)⁴⁸.

⁴⁰ The motto of Kerala tourism

⁴¹ <http://www.old.ecostat.kerala.gov.in/index.php/geography>

⁴² See G2.11 in Glossary.

⁴³ 8°.17'.30" should be read as 8 degrees (°), 17 minutes (') and 30 seconds (").

⁴⁴ See G2.13 in Glossary.

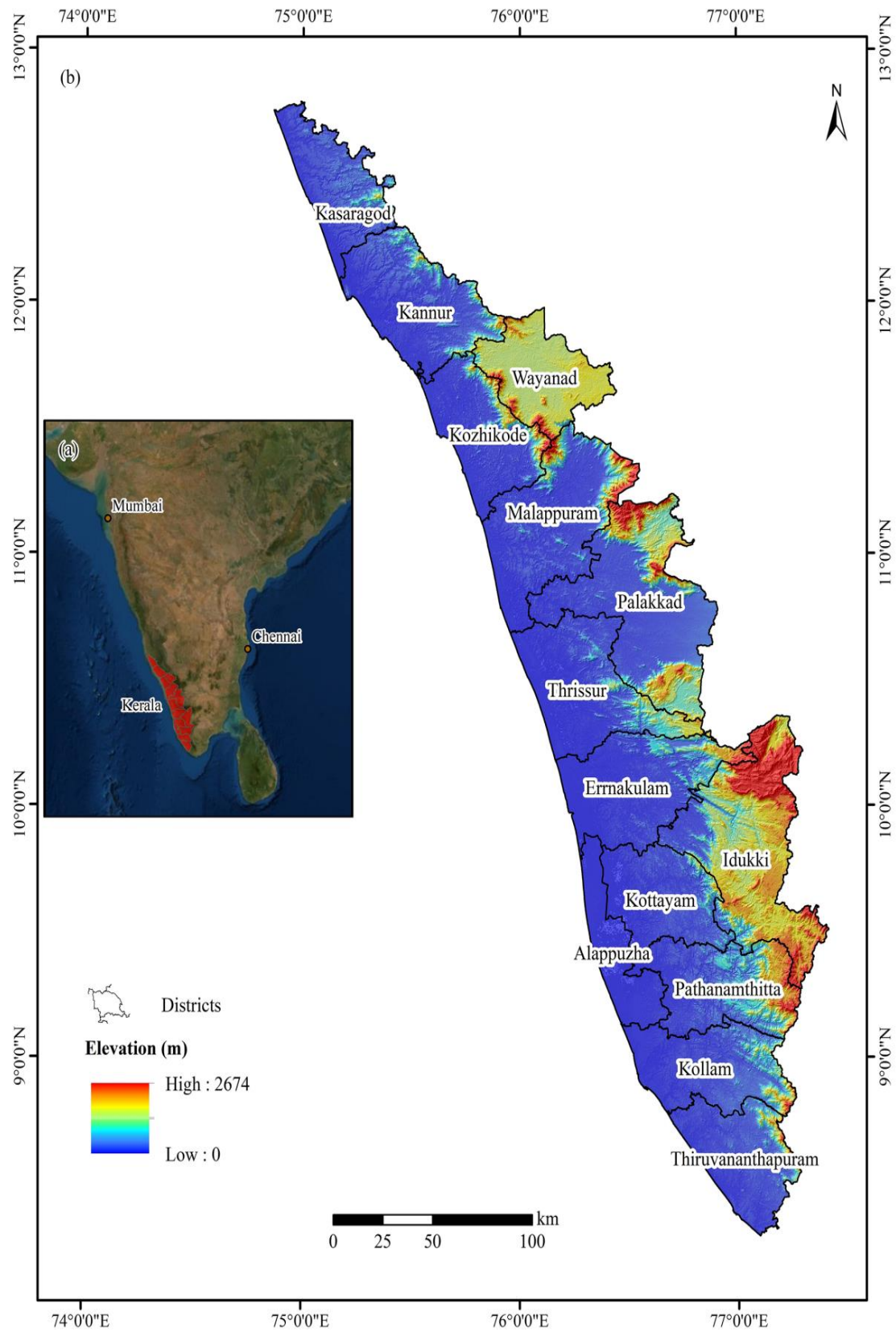
⁴⁵ As per Census of India, 2011.

⁴⁶ See G2.19 in Glossary.

⁴⁷ https://frienviis.nic.in/Database/Forest-Cover-in-India-2021_3550.aspx

⁴⁸ https://kerenviis.nic.in/Database/ENVIRONMENT_824.aspx

Fig 2.7: Heatmap of the elevation in the 14 districts of Kerala



Source: Hao et al., 2020.

There are many consequences of this diversity in physiography. The dense forest cover on high ranges of the Western Ghats blocks the monsoon winds and provides Kerala bountiful rain, with an average yearly rainfall between 3000 mm. The mountains and rivers emerging from them have also led to the construction of 81 dams in Kerala for electricity generation, flood control and irrigation. While the rivers and rains are shaped by the Western Ghats, the proximity to the Arabian Sea has created a coastline of about 590 km, with many seaports and harbours. The combination of all these geographical features has also led to a distinct weather pattern with a maximum temperature of 33 degrees centigrade to a minimum temperature of 20 degrees centigrade.

2. **Demographic structure, transitions and potential consequences in Kerala:** Kerala has experienced a major demographic transition⁴⁹. Kerala started with a population of almost 64 lakhs in 1901 which boomed to 3.5 crore in 2021 (Government of India, 2020). The population in Kerala is not uniformly distributed across various districts. In 2011, while 5 districts (Malappuram, Thiruvananthapuram, Ernakulam, Thrissur and Kozhikode) had a population above 30 lakhs (3 million), another 4 districts had a population ranging between 20 and 30 lakhs (Palakkad, Kollam, Kannur and Alappuzha). While 4 districts had a population ranging between 10 and 20 lakhs (Kottayam, Kasaragod, Pathanamthitta and Idukki), only 1 district had a population below 10 lakhs (Wayanad) (Table 2A). Though it currently has a population of about 3.5 crore in 2021 (Government of India, 2020), various indicators of population growth have slowed considerably over time in Kerala. The decadal growth rate of the population in Kerala, after peaking in 1961-71 at 26.29 per cent, reached 4.91 per cent in 2001-11 (the lowest decadal growth rate of the population in India). The declining population growth in Kerala could also be expressed through the total fertility rate (TFR)⁵⁰. Kerala was the one of the first major states in India to reach below replacement level fertility rate in 1988.

⁴⁹ See G2.23 in Glossary

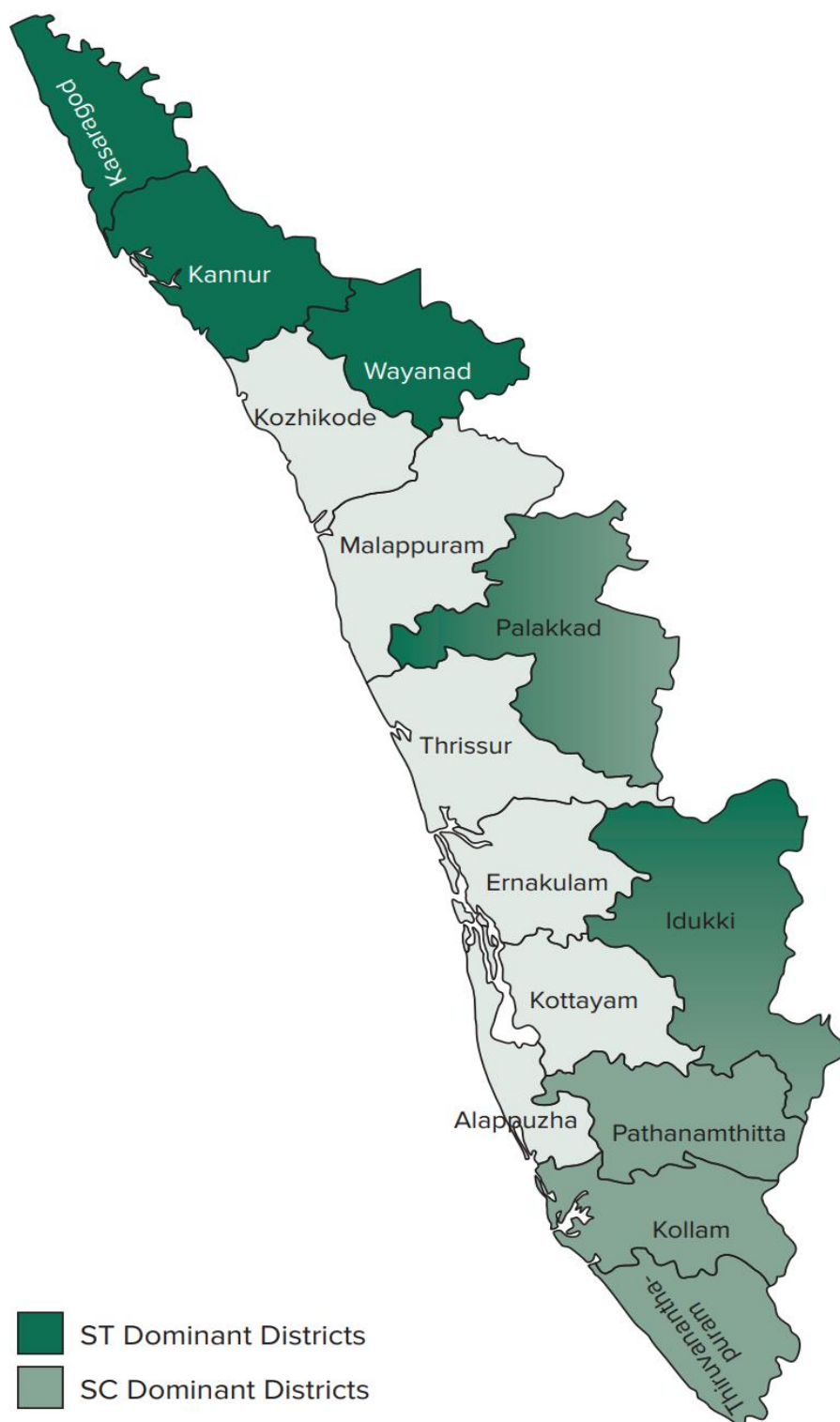
⁵⁰ See G2.24 in Glossary

There are two worrying developments in the demographic transition of Kerala.

- a. The first one is regarding the rising share of the elderly population which is a direct consequence of the demographic transition, characterised by low crude death rates and high life expectancy at birth. As per the report of the Technical Group on Population Projections for India and States 2011-2036 (Government of India, 2020), out of 21 major states, in 2021, Kerala had the highest share of elderly population (population above the age of 60 years) at 16.5 per cent. Further, by 2031, this share is projected to rise to 20.9 per cent. Kerala has the highest life expectancy in India too. As per the report of the Sample Registration System, for the period 2014-18, the life expectancy in Kerala was 72.5 years and 77.9 years for males and females respectively. However, the falling fertility rate (currently estimated at 1.8 children per woman) and dwindling share of the working-age population (population aged between 15 and 59 years) have shot up the old-age dependency ratio (OADR)⁵¹ in Kerala. While the OADR was 19.6 per cent in 2011 for Kerala, the highest in the country among major states, the projections for 2021 and 2031 were even more dire, with the same expected to reach 34.3 per cent in 2031.
 - b. The second most concerning demographic development in Kerala is the simultaneous existence of out-migration of native Keralites (Zachariah & Rajan, 2016) from Kerala and in-migration of inter-state migrants into Kerala. At its peak, Kerala had an estimated out-migrant population of about 25 lakhs in 2013 (Kannan & Hari, 2020). Regarding inter-state migrants, Kerala had an estimated population of a minimum of 28.2 lakhs and a maximum of 34.5 lakhs (Parida & Raman, 2021) of inter-state migrants. In the long run along with aging, migration too has the potential to change the composition of Kerala's society.
3. **Social and religious composition/concentration across Kerala:** The share of scheduled tribes (ST) and scheduled castes (SC) in Kerala's population is very low compared to their share in the national population. According to the Census 2011, while the share of the ST and SC population in Kerala's population was 1.5 and 9.1 per cent respectively, the corresponding share in the national population was 8.6 and 16.6 per cent respectively. (Table 2A).

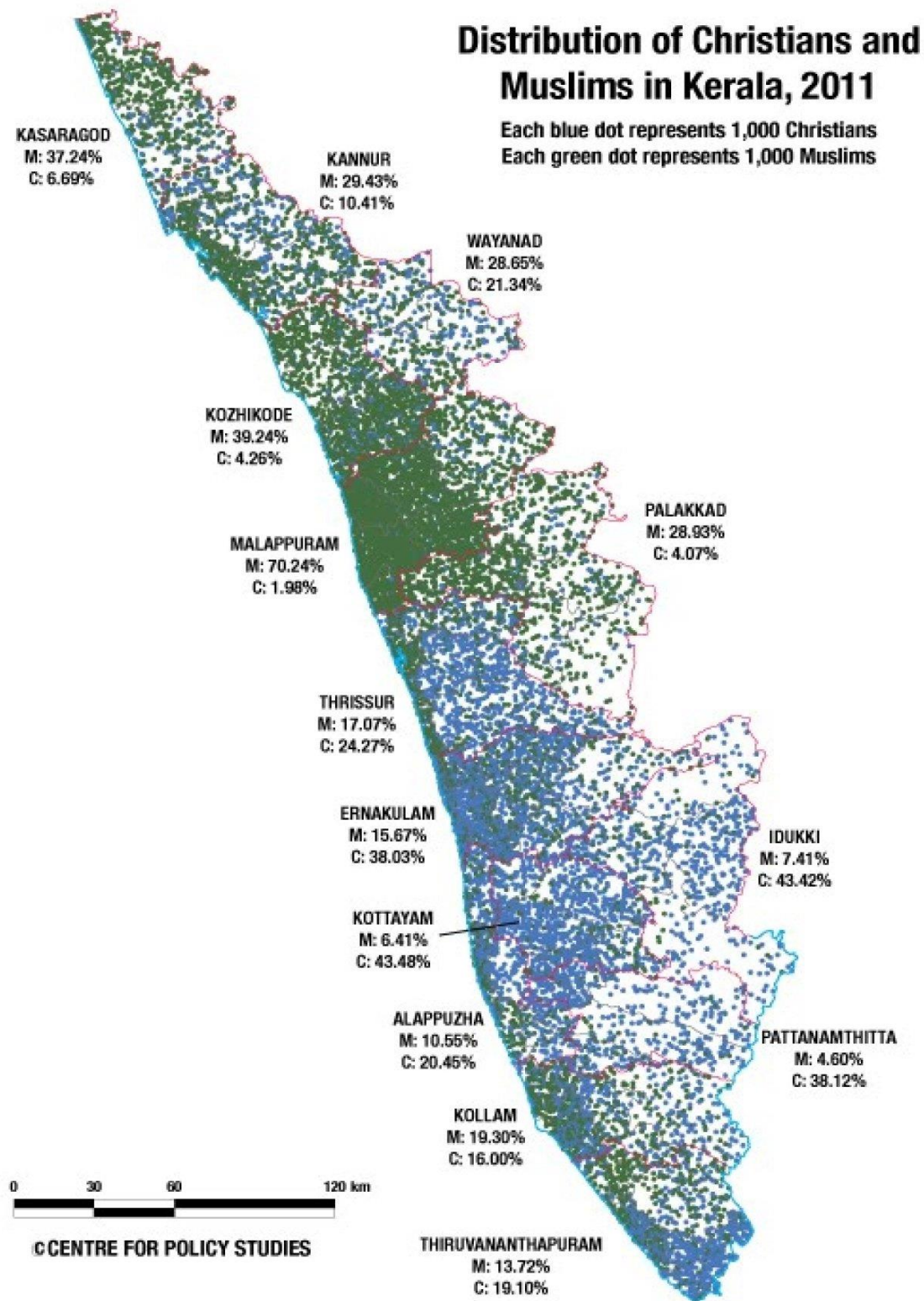
⁵¹ See G2.18 in Glossary

Fig 2.8: Districts with a higher concentration of ST/SC population in Kerala



Source: Health Dossier 2021: Reflections on Key Health Indicators, National Health Systems Resource Centre (NHSRC), Ministry of Health & Family Welfare, Government of India.

Fig 2.9: Concentration of Christians and Muslims in sub-districts of Kerala (based on Census 2011)



Source: Centre for Policy Studies, Chennai, India.

Further, the ST/SC population was also concentrated in certain districts of Kerala. The concentration of the ST population was also much higher in the top five districts (Wayanad, Idukki, Palakkad, Kasaragod and Kannur) with the highest ST population (71.5 per cent) than in the top 5 districts (Palakkad, Pathanamthitta, Idukki, Kollam and Thiruvananthapuram) with the highest SC population (46.6 per cent) (Table 2A).

The religious composition in Kerala is also very different from the national picture (Table 2A). While at the national level, the share of Hindus was about 80 per cent, the corresponding figure in Kerala was just about 55 per cent. This implied that the share of minorities (Muslims and Christians) in Kerala's population was higher than their corresponding share in the national population.

While the share of Muslims in India was about 14.2 per cent, the corresponding share in Kerala was almost 26.5 per cent. Similarly, while the share of Christians in the Indian population was about 2.3 per cent, the corresponding share in Kerala was 18.4 per cent. Within Kerala, again similar to the distribution of the SC/ST population, the distribution of religious minorities is not uniform across districts. While the northern districts had a higher concentration of Muslims, the southern districts had a higher concentration of Christians (Fig 2.9).

4. **The structural composition of the economy and related economic indicators:**
The per-capita income (per capita net state domestic product (NSDP)⁵², at current prices) of Kerala in 2021-22 was about 2.3 lakhs compared to the corresponding national figure of about 1.5 lakhs, implying that the former was about 53 per cent higher than the national average (Table 2A). Along with a consumption-led growth in the domestic economy, remittances of about ₹90,000 crores between 2015 and 2020 (14.3 per cent of NSDP), play a role in raising the per-capita income of the state (Kannan & Hari, 2020).

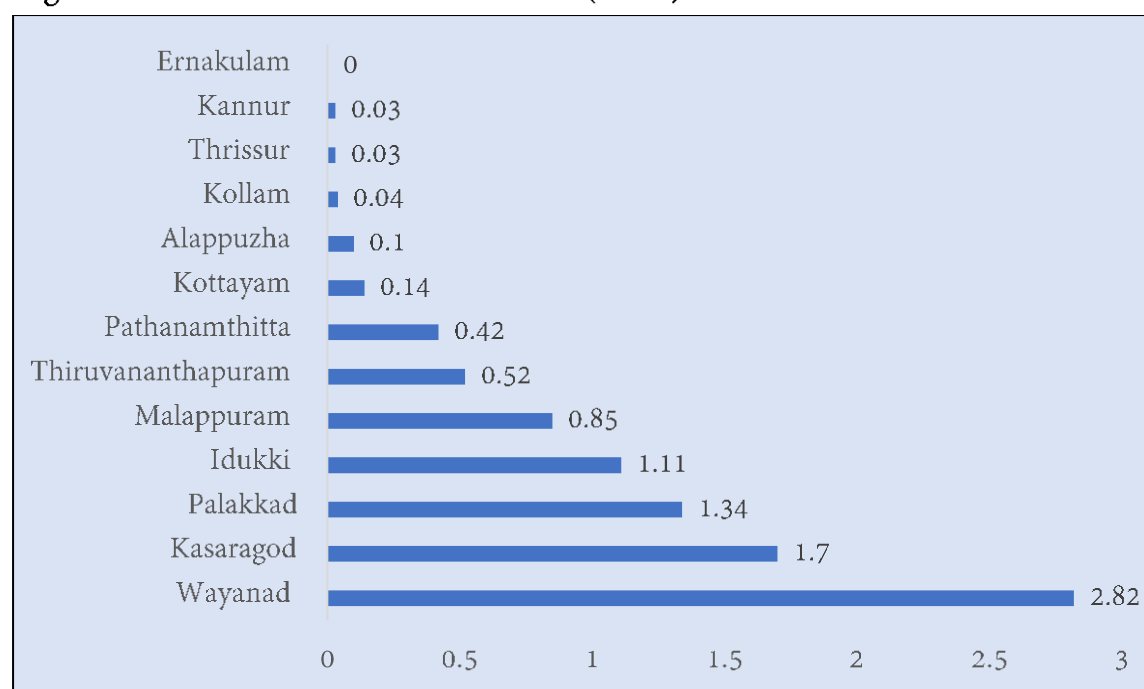
The flip side of the success in higher per-capita income is reflected in the poverty in the state. Kerala has the lowest population of poor which according to Tendulkar estimates was just 7 per cent (headcount ratio-HCR⁵³) in 2011-12

⁵² See G2.16 in Glossary.

⁵³ See G2.8 in Glossary.

(based on consumption expenditure surveys of the National Sample Survey Organisation). Even this statistic hid the fact that while 10 out of 14 districts reported an HCR of less than 10 per cent, 4 districts (Kasaragod, Palakkad, Idukki and Wayanad) reported an HCR between 10 and 33 per cent (Bhandari & Chakraborty, 2014). Even among these poor 4 districts, the district of Wayanad reported an HCR of about 33 per cent. The poverty estimates using consumption expenditure are also confirmed by the multi-dimensional poverty index (MPI)⁵⁴, which is mostly based on household assets and possessions. Based on NFHS-5 data, the HCR of multi-dimensionally poor in Kerala was estimated to be 0.55 per cent in 2019-21, the lowest in the country (NITI Aayog, 2023). However, similar to the inter-district variation in the Tendulkar estimates, Figure 2.10 also shows district-wide differences in the HCR of MPI in Kerala.

Fig 2.10: District-wise headcount ratio (HCR) of MPI in Kerala



Source: India National Multidimensional Poverty Index: A Progress Review 2023, NITI Aayog.

The transition in the structural composition of Kerala was more advanced than the transformational story at the national level of leapfrogging from the dominance of agriculture to the dominance of services. For example, while the share of the tertiary sector (mainly comprised of services) in Kerala's Gross State

⁵⁴ See G2.15 in Glossary.

Value Added (GSVA) in 2021-22 was 61.1 per cent, the corresponding share at the national level was 53.6 per cent (Table 2A). This shift in the sectoral composition of GSVA also coincided with the emergence of urban centres (municipalities and municipal corporations) (Lal & Nair, 2017). While the share of the population living in urban centres in the 2011 census was 48 per cent in Kerala, the corresponding national figure was 31.2 per cent.

Although Kerala presents a story of impressive growth in macro figures, the distribution of the growth is the most impactful indicator of how the growth was experienced by various socio-economic groups. Kerala is also home to pockets of poverty like traditional coastal fishing communities, scheduled tribes and Tamil migrant workers, working in the plantations of Kerala (Ramachandran, 1997). Apart from such sectional deprivation, there would also be economically vulnerable populations among other socio-economic groups in the state.

2.14 The historical reasons behind the paradox of Kerala model of development: the co-existence of economic backwardness and health advancements⁵⁵

The Kerala model of development was a phrase that was coined in the late 1970s, after the 1975 study by the Centre for Development Studies (CDS), Thiruvananthapuram in collaboration with the Committee on Development Planning, United Nations and the Rockefeller Foundation (Centre for Development Studies, 1975). It described the paradox of Kerala's advancements in health (control of population growth, higher life expectancy and lower infant mortality rates) and education (high literacy rates), without a commensurate rise in per-capita income. In the 1970s, Kerala's progress in these health and education parameters was even better than neighbouring countries

⁵⁵ This title is influenced by a book published by Centre for Development Studies (CDS), Trivandrum in 1984 titled, "Health Status of Kerala: Paradox of Economic Backwardness and Health Development", authored by P.G. K Panikkar and C.R. Soman. It was one of the first comprehensive study of Kerala's health development, probing the historical reasons for health advancements and collating a wide array of data related to nutrition, communicable diseases and non-communicable diseases. The study even collected data related to housing, sanitation, supply of drinking water etc., which are the social determinants of health.

of India and even matched the progress that some developed nations achieved then. Rightly so, this Kerala model also came to be known as ‘good health at low cost’.

According to Kutty (2000) and Ramachandran (1997) along with Panikar and Soman (1984)⁵⁶, there are many historical reasons for creating an environment that led to the development of public health in Kerala. Some of them are listed below: -

1. **The Ayurvedic culture in Kerala:** Kerala has a rich legacy of Ayurveda and treatments like *uzhieil* (massage), *marmachikitsa* (treatment for diseases of certain vital parts of the body), *balachikitsa* (paediatrics), *netracikitsa* (ophthalmology), *visacikitsa* (toxicology), *bhutapasmara pratividhi* (psychiatric treatment) and remedies for wounds, fractures and bruises, that stem from this Indic system of medicine (Variar,1985).

Ayurveda was introduced to the brahmin-scholars having the knowledge of Sanskrit through the canonical text of *Ashtangahrdayam* (composed between 6th and 7th century CE) by a Buddhist monk from Sindh region (now in Pakistan). This knowledge in this text was combined with the knowledge of local healers (who had deep knowledge about various herbs in Kerala⁵⁷) to create the Kerala version of Ayurveda. The practice of Ayurveda flourished in the Nila Valley of the Malabar region between the 13th and 17th centuries, along with mathematics and astronomy, due to the patronage of royal families and support from Hindu temples (Menon and Spudich, 2010). Over time, the knowledge from Persian and Arab medicine (which came to the shores of Kerala through maritime trade) was also incorporated to produce a strong body of Ayurvedic literature (Menon and Spudich, 2010).

⁵⁶ The explanations in this section are mainly taken from these works and as such won't be cited every time.

⁵⁷ Apart from spices, being a bio-diversity hotspot, Kerala was famous in Europe for its herbs and medicinal plants too. Along with Itty Achuthan (a local expert in herbs), Hendrik van Rheede, the Governor of Dutch Malabar from 1669 to 1676, compiled detailed knowledge the medicinal properties of the flora in the Malabar region, called *Hortus Malabaricus*. This work spanned 12 volumes of 500 pages each.

Even before the advent of Western medicine, this Ayurvedic culture, nurtured a care-seeking behaviour among Keralites, to approach *vaidyas*⁵⁸ (Ayurvedic healers) for treatment, rather than engage in self-treatment (Kutty, 2000).

2. **The progressive attitude of the rulers in the princely states of Travancore and Cochin and the influence of Britishers on the state policy of the princely states:** At the time of Indian Independence and before the formation of Kerala on linguistic lines, Kerala was divided into 3 parts: a. The princely state of Travancore (spanning much of the 6 southern-most districts in modern-day Kerala- Idukki, Kottayam, Alappuzha, Pathanamthitta, Kollam and Thiruvananthapuram plus some districts in modern-day Tamil Nadu like Nagercoil.) b. The princely state of Cochin (spanning much of the central districts of Ernakulam, Thrissur and Palakkad) c. Malabar district of erstwhile Madras Presidency: comprising of northern districts (modern-day districts of Kasargode, Kannur, Wayanad Kozhikode and Malappuram).

Similar to the strategy of the Government of India in the early years of Independence, to control communicable and vector-borne diseases like malaria, the Travancore kings also focussed on the control of deadly diseases like smallpox ('vasoori') and vector-borne diseases like malaria and filariasis. In the case of smallpox (which was a major issue in the late 18th century and almost all of the 19th century), due to the widely prevalent vaccine hesitancy, the Travancore rulers took many steps like getting members of the royal family vaccinated in 1810-14 (to promote vaccination drive among the commoners) (Gopalakrishnan, 2022). However, the vaccine hesitancy continued so strongly that vaccination had to be made compulsory in 1877-78. for public servants, lawyers, prisoners and students (Koji,1995). By 1935, 59 per cent of the population was vaccinated against smallpox and in the next two years, the entire population was extended the protection (Panicker,1975).

Similarly, the battle against cholera (caused by unhygienic water) was won through the efforts of the staff at the Public Health Department, who took steps to increase sanitation in the markets, repairing, cleaning, maintaining and construction (to provide protected water supply in water-deficient areas) of public tanks. The hookworm survey conducted in 1930-31 combined with the malaria

⁵⁸ Originally, the practice of Ayurveda was limited to 18 families of *Ashtavaidyas* in Kerala.

and filariasis survey in 1931-32 led to focussed efforts which led to a significant reduction in mortality from these diseases (Panicker, 1975). All these efforts had a miraculous impact on the overall mortality rate which dropped from 20 in 1911-12⁵⁹ to 14.6 in 1941 and 9.1 in 1970-71⁶⁰(Panikar & Soman, 1984).

Apart from these efforts to control the mortality from communicable diseases, the rulers of Travancore also doubled down on building physical health infrastructure. The civil hospital (later General Hospital, Thiruvananthapuram), a hospital for women and children (Sri Avittam Thirunal (SAT) Hospital), lunatic asylum, leprosy and ophthalmic hospitals, sanitation department and a public health lab (Gopalakrishnan, 2022).

3. **The missionary activities of the protestant missionaries from Britain in the Travancore state:** The protestant missionaries (CMS⁶¹ and LMS⁶² missionaries) who came with the British colonizers, particularly in the 19th century contributed to the development of dispensaries and hospitals, particularly in the princely states of Travancore (Koji,1995) and Cochin, along with the development of primary schools and colleges. The progressive outlook of the missionaries also influenced the royal family of Travancore to adapt to Western medicine (allopathy).

Travancore was one of the most caste-ridden regions in the country, with deeply entrenched concepts of purity and pollution. Witnessing the caste practices in Kerala, Swami Vivekananda, labelled the region as a ‘lunatic asylum’. The missionaries also resisted the caste system and practices like untouchability. Not surprisingly, the missionaries concentrated on depressed classes (lower castes and untouchables) and focused on converting them to Christianity (Houtart & Lemerminier, 1978). The presence of Christian-run medical institutions has

⁵⁹ In the Travancore region.

⁶⁰ The decline on mortality was not uniform across the state. The Malabar region (northern Kerala) had higher mortality rates than the Travancore region.

⁶¹ Church Missionary Society.

⁶² London Missionary Society.

become so dominant that in 2017-18, the share of the same in all institutions⁶³ run by religious organizations was 78.2 per cent (328 out of 419) (Government of Kerala, 2019).

4. **Movements to reform the caste system in Kerala:** Caste (especially socio-economically backward caste) could be considered as an important pre-disposing factor in healthcare utilization model proposed by Andersen (Andersen, 1968). In this context, it would be important to consider the caste reforms that happened in Kerala. Caste reforms in Kerala happened both among the oppressed castes (*Izhavas* and *Pulayas*) and the oppressor castes (*Namboothiris* and *Nairs*).

Even before caste reforms took the form of social movements, many progressive steps like the abolition of *pulapeddi* and *mannapeddi* (these were evil and anti-women customs by which lower caste men of *pulaya* and *mannan* could pollute women of upper caste, which would then result in the women being evicted from the caste) (Balakrishnan, 2021). Another progressive step was the abolition of slavery in Travancore (in 1812 by Rani Gowri Lakshmi Bai). Like *pulapeddi* and slavery, another socially evil caste practice was the 'breast tax', which was imposed on women of a lower caste who were not allowed to cover their breasts using upper cloth. This evil practice was abolished in 1859, after the Channar revolt (Singh, 2019).

As mentioned above, the two main anti-caste movements among the oppressed castes were the *Izhava* and *Pulaya* movements. The *Izhava* movement was spearheaded by Sree Narayana Guru, Kumaran Ashan and Dr. Palpu and worked through Sree Narayana Dharma Paripalana Yogam (SNDP Yogam) (King, 2015). The main demands of the *Izhava* social reform movement were against untouchability and against caste-Hindu prohibitions on access by members of the caste to roads, bathing places, water sources and other public places, for free entry into Hindu temples, literacy and education, for employment in government jobs, and for greater representation in the restricted-franchise legislature of the Travancore state (an issue on which the *Izhava* social-reform movement made common cause for a time with representatives of the Christian and Muslim communities in Travancore). Similar to the *Izhava* movement, in the 1890s, in

⁶³ Most of the Christian run hospitals however qualified under not-for-profit organizations rather than corporate (for-private) hospitals.

Travancore, Ayyankali led the *Pulaya* movement to gain access to roads, education and other civil rights (Jishnu, 2018).

Although not in the shape of social movements, there were also some caste reforms among the upper castes. For example, the spread of higher education among *Nairs* led them to shift from being feudal lords to civil servants in the government. Further, through legislation the marriage law and the property law were amended. This led to the cessation of *sambandham* marriages⁶⁴ and paved the way for partitioning the ancestral properties. Further, the *Marumakkatayam* Acts in Malabar, Cochin, and Travancore broke up the joint family system of Nairs (Kodoth, 2001).

5. **The role of the early Communist governments:** The Communist Party of India (CPI) which was formed in 1939 was the consequence of the larger social upheavals in Kerala's society (Jeffrey, 1978). The newly formed party was heavily involved in agrarian movements (both in the Malabar region and southern Kerala) and trade unions, focussing on concepts of tenancy reforms, land redistribution, etc (Issac, 1986). All these efforts captured the public imagination and helped CPI to become the first democratically elected communist government in the world in 1957 (soon after Kerala's formation in 1956 along linguistic lines). The Agrarian Relations Bill 1957 (which was first brought in as an ordinance) took years (it was in 1969 that the most comprehensive land reform act was passed by Kerala legislative assembly) to be implemented (Radhakrishnan, 1981). Similarly, the educational reforms passed in 1959, mainly sought to regulate the recruitment, remuneration and tenure security of teachers in government-aided institutions in Kerala.

The progressive reforms of the first communist government in Kerala faced a hostile union government (which used Article 356 of the Indian constitution to dismiss the communist government in 1959) and a hostile domestic environment (the liberation struggle – *Vimochana samaram*, spearheaded by upper castes like Nairs, Syro-Malabar Church and supported by Indian Union Muslim League and Indian National Congress (Shefi, 2019)). Short tenures and political instability

⁶⁴ An evil practice mainly among Namboodiris (Brahmins and temple priests) and Nairs, whereby the men could enter into informal marriages with women in other upper-caste homes.

(Nossiter, 1982) were constant comrades of the communist governments. The only exception to this was the coalition government led by C. Achutha Menon (1970-77⁶⁵). When considering the legacy of the communist governments on the development of healthcare infrastructure, one cannot ignore the contributions of the Achutha Menon (AM) cabinet. AM, known as a 'Nehruvian communist' supported state-led development like Jawaharlal Nehru, at the national level. During the 9 years of AM, many institutions like Sree Chitra Tirunal Medical Centre⁶⁶ Institute and Regional Cancer Centre (RCC) in Thiruvananthapuram (Kutty, 2020). This period also witnessed the establishment of one primary health centre and high school in each village panchayat.

These institutional and social reforms that influenced the public health culture and development of health infrastructure in Kerala were not mutually exclusive and always interacted, influenced and reinforced each other.

2.15 The widening fault lines in the 'Kerala model' and the need for GSHI

Having analyzed the Kerala model of healthcare and traced its evolution through Kerala's history, it would be an opportune time to understand the current state of the Kerala model and the challenges it faces.

Kerala is head and shoulders above the national average in basic health indicators. Table 2B compares the infant mortality rate (6 in Kerala vs. 30 in India), maternal mortality rates (43 in Kerala vs. 113 in India), life expectancy (75.3 years in Kerala compared to 69.4 years in India) and sex ratio at birth (957 in Kerala vs. 899 in India). Due to the better performance in these indicators and more, related to the control of communicable diseases along with mother and child health (Table 2B),

⁶⁵ The Achutha Menon government got an extension for 2 years 1975-77, due to the internal emergency in India.

⁶⁶ Which later developed into Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST).

Kerala has retained the position as the state with the highest score in all four rounds⁶⁷ of NITI Aayog's Health Index (NITI Aayog, 2021).

But a closer look beneath the veneer of this success also reveals serious challenges and even paradoxes. One such serious but neglected issue in the construction of the above-mentioned Health Index is the epidemiological transition happening in Kerala (Chathukulam et al., 2023). Epidemiological transition refers to the increasing share of non-communicable diseases in the overall disease burden (burden of both death and disability⁶⁸). Currently, Kerala ranks very high among the high ETL states (ETL or epidemiological transition level is a concept formulated by the Global Burden of Disease Study), with the share of non-communicable diseases as high as about 77 per cent (compared to 61.4 per cent at the national level) in the total disease burden (Table 2B). This transition to non-communicable diseases is reflected in the share of individuals suffering from diseases like diabetes and hypertension in Kerala, one of the highest in India (Table 2B).

The above-mentioned challenge of non-communicable diseases is just the tip of the iceberg. There are many other challenges (Thresia & Mohindra, 2011), big and small, some of which are listed below:

1. Kerala registers almost 100 per cent of all deaths, yet the share of medically certified deaths is just half (11.6 per cent) of what it is at the national level (20.7 per cent) (Table 2B). This will significantly affect mortality estimates of specific causes of death emerging out of Kerala.
2. Kerala has managed to control the spread and mortality of many communicable diseases like cholera, malaria, dengue, etc. (Table 2B). However, due to Kerala's weather conditions, population density and integration with the rest of the world (the vacation trips to Kerala by emigrants from Kerala and the flow of domestic and international tourists into Kerala), the state is very vulnerable to new

⁶⁷ The first round of the Health Index used data from the reference year (RY) of 2015-16 and compared it to the data in the base year (BY) of 2014-15. In the subsequent rounds, the BY and RY have been: Round 2 (BY: RY – 2015-16:2017-18), Round 3 (BY: RY – 2017-18:2018-19) and Round 4 (BY: RY – 2018-19:2019-20).

⁶⁸ See G2.4 in Glossary

communicable diseases like chikungunya, H1N1 (swine flu), Nipah virus (which spread in the Kozhikode and Malappuram districts, killing 17 people in 2018 (Yadav et al., 2022)) and more recently COVID-19 (the first case of COVID-19 in India occurred in Kerala in January 2020).

3. Even while Kerala has managed to achieve almost 100 per cent institutional deliveries, almost 40 per cent of all deliveries are c-section, almost twice the corresponding figure at the national level and much above the WHO recommended level of 10-15 per cent of total deliveries. Also, unlike the national picture, in Kerala, the difference in c-section rates between public and private hospitals is very small (Table 2B).
4. Even while Kerala has achieved a death rate of around 7 per cent⁶⁹, a life expectancy of about 75 years and controlled mortality due to communicable diseases, other avenues for mortality opened up in the form of road accidents and suicides (Table 2B). Although the severity of road accidents was much lower in Kerala compared to India, Kerala lost about 4,440 lives to road accidents in 2021. Next to accidents, suicides have also emerged as a major public health challenge in Kerala (Halliburton, 1998; Soman et al., 2009). The suicide rate in Kerala in 2021 was 26.9 compared to 12 in India (Table 2B).
5. Kerala has a strong network of three-tier health infrastructure (spanning primary, secondary and tertiary healthcare) in the public sector. As of 2021, there were around 5484 sub centres 940 primary health centres (PHCs), 229 community health centres (CHCs), 87 sub-divisional hospitals (SDHs), 47 district hospitals (DHs), 8 medical colleges and 38,097 beds (Government of India, 2021). Among these medical institutions, although allopathic institutions dominate, Kerala has a good network of AYUSH institutions too, in the public sector. But the growth in the expansion of public health infrastructure was the highest in the pre-1980s period, after which Kerala witnessed a huge boom in private hospitals (Kutty, 2000). While only 1,922 private hospitals were established before 1990, by 2017-18, this number rose to 12,363 (Government of Kerala, 2019).

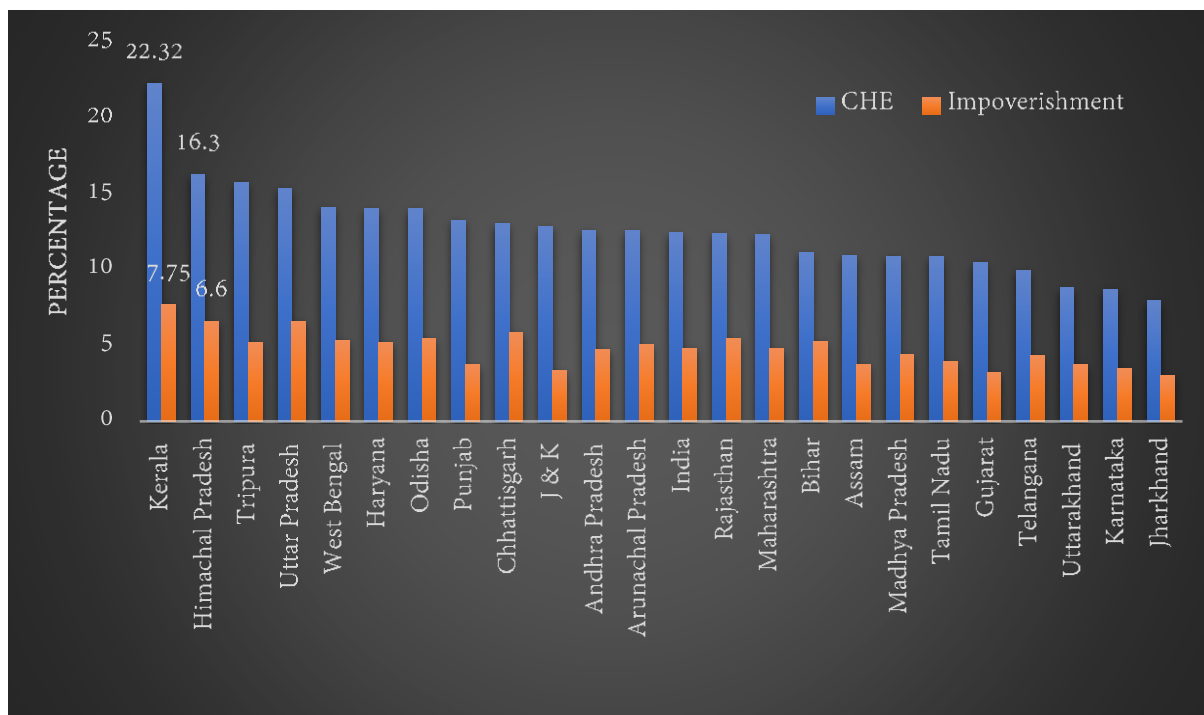
As per the report of the 75th round of the National Sample Survey (NSS), the share of government hospitals in hospitalization cases in Kerala is low at about 40 and

⁶⁹ In 2020-22, it may have risen due to COVID-19.

36 per cent in rural and urban areas respectively. There is also evidence that the difference in utilization of private hospitals in Kerala was narrowing between the rich and non-rich consumption quintiles, for hospitalized care, in the period between 1986 and 2004 (Dilip, 2010). Coupled with the heavy reliance on private hospitals and factors like the rising share of the elderly, higher life expectancies and a very high share of non-communicable diseases in the total burden, implied higher frequency of hospitalization and out-patient expenditures which were more expensive. So, it should come as no surprise that Kerala became a state with one of the highest incidences of treatment-induced impoverishment in the country (Mohanty & Dwivedi, 2021). In short, the famed Kerala model of healthcare deteriorated from ‘good health at low cost’ in the 1970s to ‘poor health at exorbitant cost’ by the early 2000s.

The last challenge of rising medical expenditures in Kerala motivated the Government of Kerala to introduce GSHI in Kerala, starting with RSBY in 2008. As noted in the introduction of this chapter, in 2023, it would have been 15 years since the implementation of GSHI in Kerala, sufficient time for the GSHI to mature and yield significant results.

Fig 2.11: Incidence of catastrophic healthcare expenditures (at 25% level) and related impoverishment in 2004-05 (before the introduction of GSHI in 2008).



Source: Constructed from Mohanty and Dwivedi (2021).

2.16 Summary

This chapter briefly summarizes the setting in which GSHI developed in India. The first part of the chapter began with the global progress of universal health coverage (UHC) and moved on to the major public health interventions and health financing in India. Further, the past record of GSHI schemes in India and companion schemes to improve financial protection to vulnerable families was examined.

The second part of the chapter began with an introduction to Kerala, the study area of the thesis, focusing on the geography, demography and economy of Kerala. Following this, the 'Kerala model of healthcare' and the historical reasons behind the evolution of the model was discussed. More importantly, the fault lines that have emerged in this healthcare model, including impoverishing medical expenditures are discussed. This discussion forms the basis on which the subsequent 4 chapters have been built.

Appendix to Chapter 2

Table 2A: A comparison of various socio-economic indicators between Kerala and India

Indicators	Kerala	India
General indicators of Geography and Demography		
Population (projected population in 2021) in crores ³	3.54	136
Districts (No.) ⁵	14	757
Area (sq.km) ²	38,863	3,287,263
Population density (projected population per sq.km) ³	910	413
Average household size (No. of members) ³	4.25	4.85
Forest cover (sq.km) ¹	21,253	7,13,789
Percentage of area covered by forests (%) ¹	54.7	21.71
Classification of districts based on population ²	Population	Districts (numbers)
	<10 Lakhs	1
	≥ 10 Lakhs - <20 Lakhs	4
	≥20 Lakhs - <30 lakhs	4
	≥30 Lakhs	5
Indicators of economic growth and structural composition of the economy.		
	Kerala	India
Net National Income (India)/ Net State Domestic Product (2021-22) in ₹ crore ⁴ (in current prices)	8,11,517	2,05,29,727
Per capita NNI/NSDP (2021-22) ⁴ in current prices	2,30,601	1,50,007
Share of primary sector (%) ⁸ in Gross Value Added (India)/Gross State Value Added (GSVA) in 2020-21	10.04	18.6
Share of secondary sector (%) ⁸ in Gross Value Added (India)/Gross State Value Added (GSVA) in 2020-21	28.95	27.8
Share of tertiary sector (%) ⁸ in Gross Value Added (India)/Gross State Value Added (GSVA) in 2020-21	61.1	53.6
Poverty HCR (Tendulkar estimate) ⁷	7	22

Indicators of social and religious composition		
	Kerala	India
Share of urban population (%) ²	71	34.4
Share of 60+ population (%) ³	16.5	9.7
Share of ST population (%) ²	1.5	8.6
Share of SC population (%) ²	9.1	16.6
ST-SC Dominant (Top 5) Districts of Kerala ⁶		
ST Dominant Districts (%)	SC Dominant Districts (%)	
Wayanad - 18.53%	Palakkad - 14.37%	
Idukki - 5.03%	Pathanamthitta - 13.74%	
Palakkad - 1.74%	Idukki - 13.12%	
Kasaragod - 3.74%	Kollam - 12.46%	
Kannur - 1.64%	Thiruvananthapuram - 11.3%	
Top 5 ST dominant district accounts for - 71.46%	Top 5 SC dominant district accounts for - 46.55%	
Religious composition		
	Kerala	India
Share of Hindu population (%) ²	54.7	79.8
Share of Muslim population (%) ²	26.56	14.2
Share of Christian population (%) ²	18.4	2.3

Sources: 1. India State of Forest Report (2021), Forest Survey of India, Ministry of Environment, Forest and Climate Change, Government of India.

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<https://spb.kerala.gov.in/economic-review/ER2022/>

Table 2B: A comparison of selected health parameters between Kerala and India

Indicators	Kerala	India
Key mortality and fertility indicators.		
Infant Mortality Rate (IMR) ¹	6	28
Crude Death Rate (CDR) ¹	7	6
Crude Birth Rate (CBR) ¹	13.2	19.5
Maternal Mortality Ratio (MMR) ²	19	97
Neo-Natal Mortality Rate (NNMR) ¹	5	20
Under Five Mortality Rate (U5MR) ¹	8	32
Still Birth Rate ¹	4	3
Total Fertility Rate (TFR) ¹	1.5	2
Life expectancy at birth (years) for all individuals ³ .	75	70
Life expectancy at birth (years) for males ³ .	71.9	68.6
Life expectancy at birth (years) for females ³ .	78	71.4
Sex Ratio at birth for births in the last five years ⁸ .	951	929
Disease Burden (2019)⁵		
	Kerala	India
Share of communicable, maternal, neonatal and nutritional diseases (CMNND) and conditions in the total disease burden (%)	11.83	30.6
Share of non-communicable diseases (NCDs) in the total disease burden (%)	76.92	57.9
Share of injuries in the total disease burden (%)	11.25	11.4
Birth, death registration and medical certification of death (2021)		
	Kerala	India
Children under age 5 years whose birth was registered with the civil authority ⁹ (%)	99	89.1
Deaths in the last 3 years registered with the civil authority ⁹ (%)	97.4	70.8
Percentage of medically certified deaths to total registered deaths ⁷ (%)	11.2	22.5
Public Health infrastructure⁴ (2021)		
	Kerala	India
Sub-centres	5,484	1,57,819

Primary Health centres (PHCs)	940	30,579
Community Health Centres (CHCs)	229	5,951
Sub-district hospitals (SDHs)	87	1,224
District Hospitals (DHs)	47	764
Government Medical Colleges (GMCs)	8	307
Indicators related to specific health issues (2021-22)		
Maternal Health⁸		
	Kerala	India
Percentage of pregnant women who had antenatal checkup (ANC) in the first trimester	86.5	75.7
Percentage of pregnant women who received 4 or more ANC check-ups to total ANC registrations	90.4	81.41
Total reported deliveries	4,60,850	2,14,10,780
Percentage of institutional deliveries to total reported deliveries	99.9	95.1
Percentage of C-section deliveries (public + private) to reported institutional (public + private) deliveries	42.41	23.3
Percentage of C-sections conducted at public facilities to deliveries conducted at public facilities.	42.89	15.5
Infrastructure for newborn care⁴ (2019-20).		
	Kerala	India
Sick New Born Care Unit (SNCU)/Neonatal Intensive Care Unit (NICU)	21	844
New Born Stabilization Unit (NBSU)	68	2,421
New Born Care Corner (NBCC)	101	20,336
Child health & nutrition⁸		
	Kerala	India
Prevalence of diarrhoea (reported) in the last 2 weeks preceding the survey (%)	4.3	7.3
Children with diarrhoea in the last 2 weeks who received oral rehydration salts (ORS) (%)	61.1	60.6

Children under 5 years who are underweight (weight-for-age) (%)	19.7	32.1
Child Immunization⁸		
	Kerala	India
Children aged 12-23 months fully vaccinated based on information from vaccination cards only (%)	85.2	83.8
Children aged 12-23 months who have received BCG (%)	97.6	95.2
Children aged 12-23 months who have received their first dose of measles-containing vaccine (%)	88.3	87.9
Family Planning⁸		
	Kerala	India
Unmet need for spacing (%)	7	4
Communicable Diseases		
Integrated Disease Surveillance Programme (IDSP)		
	Kerala	India
Number of districts with functional IDSP unit	14	720
Tuberculosis (2022)⁹		
	Kerala	India
Tuberculosis case notification rate (%)	63	153
Death rate among TB-notified patients in 2020 (%)	8.1	4.3
Malaria, Kala Azar, Dengue, Japanese Encephalitis, Chikungunya (2022)¹⁰		
	Kerala	India
Malarial cases	439	1,76,522
Kala Azar cases (in 2021)	1	1,276
Dengue cases	4,432	2,33,251
Japanese Encephalitis cases	2	1,109
Chikungunya (Suspicious cases)	1,511	148,587
Deaths due to Malaria	0	83
Deaths due to Kala Azar	0	28
Deaths due to Dengue	29	303

Deaths due to Japanese Encephalitis	0	130
HIV ⁸		
Women (age 15-49 years) who have comprehensive knowledge of Human Immunodeficiency Virus (HIV)/ Acquired Immuno-deficiency Syndrome (AIDS) (%)	34.8	21.6
Men (age 15-49 years) who have comprehensive knowledge of HIV/AIDS (%)	45.4	30.7
Non-Communicable Diseases (NCDs) and risk factors of NCDs ⁸		
Diabetes and Hypertension		
	Kerala	India
Women - Mildly elevated Blood Pressure (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) (%)	15.5	12.4
Men- Mildly elevated Blood Pressure (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) (%)	19.2	15.7
Women - Blood sugar level - high (141-160 mg/dl) (%)	8.3	6.1
Men - Blood sugar level - high (141-160 mg/dl) (%)	9.8	7.3
Tobacco Use and Alcohol Consumption among Adults (age 15 years & above) ⁸		
	Kerala	India
Women who use any kind of tobacco (%)	2.2	8.9
Men who use any kind of tobacco (%)	16.9	38
Women who consume alcohol (%)	0.2	1.3
Men who consume alcohol (%)	19.9	18.8
Accidents and Suicides		
Road Traffic Accident ¹¹		
	Kerala	India
Total number of road accidents	33,296	4,12,432
Number of persons killed in road accidents	3429	1,53,972
Total number of fatal road accidents	3,262	1,42,163
Severity (road accident deaths per 100 accidents) of road accidents	10.3	37.3

Suicides ¹²				
Total number of suicides	9,549		1,64,033	
Male suicides	7,487		1,18,979	
Female suicides	2,056		45,026	
Transgender suicides	6		28	
Suicide rate (Total suicides/mid-year projected population)	26.9		12	
Healthcare Financing				
National Health Accounts (NHA) (2019-20) ¹³				
	Kerala		India	
Per Capita Government Health Expenditure (in ₹)	2,590		2,014	
Government Health expenditure as a percentage of Gross Domestic Product (GSDP)/GDP	1.1		1.35	
Government Health Expenditure as percentage of General Government Expenditure (GGE)	8		5.01	
OOPE as a Share of Total Health Expenditure (THE) (in percentage)	67.9		47.1	
Health expenditure of union government (MOHFW)/state government as a share of total expenditure in 2021-22 (Actuals) expressed in %.	7.31		2.21	
Indicators of household-level utilization pattern and healthcare expenditures (2017-18) ¹⁴				
	Kerala		India	
	Rural	Urban	Rural	Urban
OPD - Percentage of non-hospitalized cases using public facility	52	42	33	26
IPD - Percentage of hospitalized cases using public facility	40	36	46	35
OPD - Per non-hospitalized ailing person (in ₹) in last 15 days - Public	252	367	472	486
OPD - Per non-hospitalized ailing person (in ₹) in last 15 days - Private	843	743	845	915

IPD - Per hospitalized case (in ₹) - Public	5,827	5,295	5,729	5,939
IPD - Per hospitalized case (in ₹) - Private	25,812	30,370	28,816	34,122
IPD - Percentage of diagnostics expenditure as a proportion of inpatient medical expenditure in public hospitals.	25	27	18	17
IPD - Percentage of drug expenditure as a proportion of inpatient medical expenditure – Public	44	43	53	43
Childbirth - Average out-of-pocket expenditure per delivery in a public health facility (₹)	7,650	7,552	2,402	3,091
Childbirth - Average out-of-pocket expenditure per delivery in a private health facility (₹)	30,441	31,096	20,692	26,701

Main Source: Inspired from Health Dossier 2021: Reflections on Key Health Indicators, National Health Systems Resource Centre (NHSRC), Ministry of Health & Family Welfare, Government of India.

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 13. National Health Accounts (NHA): Estimates for India 2019-20, National Health Accounts Technical Secretariat (NHATS), NHSRC, Ministry of Health & Family Welfare, Government of India.
 14. Estimated by NHSRC, from unit-level records of the 75th round of National Sample Survey (NSS), Ministry of Statistics and Programme Implementation (MOSPI), Government of India.

Note: OOPE = [Total Medical Expenditure + Transportation Cost] – Reimbursement.

Table 2C: State-wise GSHI schemes in India (as of 2021).

State/UT Name	Name of Scheme in the State/UT	Name of the State Health Agency	Mode of Implementation	Date of Roll- Out (DD/MM/YYYY)	Name of the Insurance Company	Total Number of Households in the State/UT	Source of Data for 'Total Number of Households in the State/UT'	Number of Eligible Families under ABPMJAY			Non-ABPMJAY Families (Covered under the State Scheme beyond 5 Lakhs)
								As per SECC/RSBY database (After NULL exercise where applicable)	Additional Families (Covered by State up to 5 Lakh)	Total	
Andaman and Nicobar Islands	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPM JAY)	State Health Agency, Andaman and Nicobar Islands	Trust	23-9-2018		92,717	SECC 2011	11,500		11,500	56,322
Andhra Pradesh	Ayushman Bharat-Dr. YSR Arogyasri Healthcare Scheme	Dr. YSR Arogyashri Healthcare Trust (Dr YSRAHCT)	Trust	1-1-2019		1,63,06,552	Current Civil Supplies Department	54,67,524	85,23,463	1,39,90,987	85,30,000
Arunachal Pradesh	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPM JAY); Chief Minister Arogya Arunachal Yojana	Chief Minister's Arogya Arunachal Society	Trust	23-9-2018		2,60,217	SECC 2011	88,611		88,611	1,71,606
Assam	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY);	Atal Amrit Abhiyan Society	Trust	23-9-2018		64,27,614	SECC 2011	26,96,996		26,96,996	33,26,531

	Atal Amrit Abhiyan										
Bihar	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	Bihar Swasthaya Suraksha Samiti	Trust	23-9-2018		2,00,74,242	SECC 2011	1,08,11,015		1,08,11,015	
Chandigarh	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	State Health Agency, Chandigarh	Trust	23-9-2018		3,00,000	Census Department of UT, Statistical Department	30,074		30,074	
Chhattisgarh	Ayushman Bharat PMJAY Dr. Khubchand Baghel Swasthya Bima Yojana (AB PMJAY - DKBSY)	State Health Agency	Trust	9-16-2018		64,42,062	Chhattisgarh Food security act Food, Civil Supplies & Consumer Protection Department (As on 05-03 2020)	36,50,364	19,20,555	55,70,919	8,71,143
DNH and DD	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	State Health Agency, Dadra and Nagar Haveli and Daman and Diu	Insurance	23-9-2018	The Oriental Insurance Company Ltd.	1,82,586	General Survey RGI (Registrar General of India) - 2019	26,342	1,68,927	1,95,269	
Goa	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	State Health Agency, Goa	Trust	23-9-2018		3,43,611	Census 2011	36,431		36,431	2,91,503

	Deen Dayal Swasthaya Seva Yojana										
Gujarat	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY); Mukhyamantri Amrutam & Mukhyamantri Vatsalya	Gujarat State Health Protection Society	Insurance	23-9-2018	1.The Oriental Insurance Company Ltd. 2. Bajaj Allianz	79,97,384 Enrolled Families *	For ABPMJAY: SECC 2011 For State Beneficiary: MA & MAV Beneficiary	43,83,948	36,13,436	79,97,384	
Haryana	Ayushman Bharat Haryana Health Protection Mission	Haryana Health Protection Authority	Trust	15-8-2018				15,45,936		15,45,936	
Himachal Pradesh	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	Himachal Pradesh Swasthya Bima Yojana Society	Trust	23-9-2018		14,83,280	Statistical Outline Report of HP 2017-2018	4,78,985		4,78,985	562000(April)
Jammu And Kashmir	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY) SEHAT	State Health Agency Jammu and Kashmir	Insurance	12-1-2018	IFFCO Tokio General Insurance Company	20,94,081	SECC 2011	5,97,801	14,56,497	20,54,298	
Jharkhand	Ayushman Bharat- Mukhyamantri Jan Arogya Yojana (AB-	Jharkhand State Arogya Society	Hybrid	23-9-2018	National Insurance Company	57,10,933	PDS database	28,05,753	29,05,180	57,10,933	

	MJAY)										
Karnataka	AB-ArK (Ayushman Bharat-Arogya Karnataka)	Suvarna Arogya Suraksha Trust (SAST)	Trust	31-10- 2018		1,73,86,486	Census 2011	62,09,073	52,90,927	1,15,00,000	
Kerala	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana - Karunya Arogya Suraksha Paddhati (ABPMJAY- KASP)	State Health Agency, Kerala	Trust	4-1-2019		87,06,546	Current Civil Supplies Department	22,05,505	19,57,783	41,63,288	2,16,000
Ladakh	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	State Health Society (NHM)	Trust	12-1-2018		39,615	SECC 2011	10,904	28,638	39,542	
Lakshadweep	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	State Health Agency, Lakshadweep	Insurance	23-9-2018	IFFCO Tokio General Insurance Company Limited	18,115	Ministry of Food & Civil Supplies 2019	1,425	10,895	12,320	
Madhya Pradesh	Ayushman Bharat-Madhya Pradesh 'Niramayam' Yojana	Deen Dayal Swasthya Suraksha Parishad	Trust	23-9-2018		1,47,23,864	SECC 2011	83,57,257	25,04,396	1,08,61,653	
Maharashtra	Ayushman Bharat Pradhan Mantri	State Health Assurance	Hybrid	23-9-2018	United India	2,69,36,170	Census 2011	83,63,664		83,63,664	1,38,45,284

	Jan Arogya Yojana (ABPMJAY); Mahatma Jyotiba Phule Jan Arogya Yojana (MPJAY)	Agency			Insurance Company Limited						
Manipur	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	State Health Agency (SHA), Manipur	Trust	23-9-2018		5,78,939	SECC 2011	2,73,250		2,73,250	1,40,344
Meghalaya	Megha Health Insurance Scheme (MHIS) Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	State Nodal Agency Meghalaya	Insurance	2-1-2019	Reliance General Insurance Company Ltd.	5,54,131	SECC 2011	3,47,013	2,07,118	5,54,131	
Mizoram	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	Mizoram State Health Care Society	Trust	10-1-2018		2,26,147	SECC 2011	1,94,859		1,94,859	
Nagaland	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	SHA (AB-ABPMJAY), Nagaland	Insurance	23-9-2018	The Oriental Insurance Company Ltd.	3,79,164	SECC 2011	2,33,328		2,33,328	
Puducherry	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	State Health Agency, Puducherry	Trust	23-9-2018		2,79,857	SECC 2011	1,03,434		1,03,434	74,621

Punjab	Ayushman Bharat Mukhya Mantri Sehat Bima Yojana	State Health Agency Punjab	Trust	20-8-2019		55,13,071	SECC 2011, NFSA, Traders, J Farmers, BOCW, Journalist.	14,64,802	29,46,877	44,11, 679	
Rajasthan	Ayushman Bharat -Mukhya Mantri Chiranjeevi Swasthya Bima Yojana	Rajasthan State Health Assurance Agency	Insurance	9-1-2019	New India Assurance	1,80,70,963	Census 2011	58,95,363	75,02,474	1,33,97,837	
Sikkim	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	State Health Agency, Sikkim	Trust	23-9-2018		1,20,014	SECC 2011	39,738		39,738	
Tamil Nadu	Pradhan Mantri Jan Arogya Yojana-Chief Minister's Comprehensive Health Insurance Scheme (ABPMJAY- CMCHIS)	Tamil Nadu Health System Project (TNHSP)	Hybrid	23-9-2018	United India Insurance Ltd.	2,06,53,494	Civil Supplies Corporation	77,70,928	59,82,170	1,37,53,098	
Telangana	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY) - Aarogyasri scheme	Aarogyasri Health Care Trust	Trust	18-05- 2021			Civil Supplies Department	25,90,010	61,66,832	87,56,842	

Tripura	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	State Health Agency Tripura	Trust	23-9-2018		8,75,621	SECC 2011	4,90,964		4,90,964	
Uttar Pradesh	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY) and Mukhiya Mantri Jan Arogya Abhiyan (MMJAA)	State Agency for Comprehensive Health and Integrated Services (SACHIS)	Trust	23-9-2018		3,24,75,784	SECC 2011	1,16,84,453	49,22,597	1,66,07,050	
Uttarakhand	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY) Atal Ayushman Uttarakhand Yojana	State Health Authority	Trust	23-9-2018		25,39,653	NFSA+SECC 2011 + ESI + Government Employees / Pensioners	5,23,536	10,45,932	15,69,468	2,55,004
Total						20,97,95,529		8,93,90,786	5,71,54,697	14,65,45,483	2,77,78,358

Source: Compiled by National Health Authority, Ministry of Health and Family Welfare, Government of India.

Chapter 3

Inequalities and Paradoxes in Beneficiary Targeting within Government Sponsored Health Insurance in Kerala during 2008-2022

Summary

Background: Government Sponsored Health Insurance (GSHI) was a policy solution to tackle the burgeoning medical expenditures in Kerala. Started in 2008 with RSBY, 2022 would mark 15 years of GSHI implementation in Kerala.

Data and Methods: In this context, firstly, the study focussed on understanding the key performance indicators (KPI) related to GSHI, like population coverage, enrolment ratio, hospitalization ratio, claims ratio and claims payout per household (CPPH). For this, time-series records spanning 2008-2022, published by Government of Kerala were used. Secondly, the extent of integration between Below Poverty Line (BPL) households and GSHI-covered households in Kerala was investigated, using unit level records of the 4th round (2012-13) of District Level Household Survey (DLHS) along with fourth (2015-16) and fifth rounds (2019-21) of National Family Health Survey (NFHS). Following this, an inter-state analysis (selecting 10 states with the highest GSHI coverage in NFHS-5, including Kerala) of the concentration of poor households in GSHI and BPL households was estimated and compared using the Erreygers Index (EI). Then the ratio of two odds- the percentage of BPL households to have GSHI coverage over the percentage of non-BPL households to have GSHI coverage was estimated and compared to understand to the extent to which the pro-poor concentration among BPL households was being transmitted to GSHI households.

Then the disaggregated impact of the complete/incomplete integration of BPL households into GSHI was studied by analysing the changes in coverage (using the two-sample proportions test to test whether the changes in proportions are statistically significant) and distributional changes in GSHI (using z-statistic to test whether the changes in EI was statistically significant) across various socio-economic, demographic and geographic variables, between 2016 and 2019. For the last objective, data from National Health Authority and Kerala Economic Review, 2022 were used to explore how the costs of GSHI could be shared between union and state governments, after fully integrating the excluded BPL households.

Results: Despite the brisk performance of KPIs, the growth in population coverage between 2016 and 2019 came with no rise in pro-poor concentration, especially among vulnerable social groups like Scheduled Tribes and Scheduled Castes and households with poorly educated heads. Further, compared to other states, Kerala had a high concentration of poor households in its BPL households which was not translating to an equally higher concentration of poor households in the GSHI, due to the rigidities in the targeting regimes, which excluded 35.4 per cent of BPL households. However, extending GSHI coverage to the excluded households could act as a panacea to these issues.

Although all socio-economic groups gain statistically significant coverage after fully integrating the excluded BPL households into the GSHI net, considering a growth in coverage of more or equal to 20 percentage points, along with a rise in the concentration of poor households, households belonging to SC and ST communities, households with poorly educated heads (no education, preschool and primary education), along with households residing in Kasargode, Palakkad and Trivandrum stand to gain the most.

Interestingly, this growth, even while favouring the socially and economically backward groups in Kerala, did not discriminate between rural and urban areas or between various household sizes (Across rural/urban area and various household sizes, the rise in GSHI coverage as well as rise in concentration of poor households was almost the same). This is a testament to the effectiveness of BPL targeting in Kerala and highlights the need for fully integrating the excluded BPL households into GSHI.

Also, given that CPPH has almost doubled between 2021-2022, under the current ceiling rate fixed by union government, even the complete integration of BPL households will not result in a balanced distribution of GSHI costs between the union and state governments.

Conclusions: Full integration of BPL households into GSHI, upward revision in the ceiling rate and adoption of BPL households in Kerala as the basis for inter-governmental cost sharing could be the policy fixes for GSHI in Kerala.

Keywords: GSHI, BPL, KPI, pro-poor concentration, ceiling rate.

JEL codes: I13, I18

3.1 Introduction

Traditionally, discussions on identifying beneficiaries in anti-poverty programs like Government Sponsored Health Insurance (GSHI) have centred on targeting, particularly regarding inclusion (of ineligible or non-poor households or individuals) and exclusion (of eligible or poor households or individuals) errors. This has led the union and state governments in India to develop targeting mechanisms like the Socio-Economic Caste Census (SECC) 2011 with inclusion and exclusion criteria along with deprivation scores to sharpen targeting. Nevertheless, even after extensive targeting efforts, some exclusion and inclusion errors are inherent to any targeting method.

The debate on how these errors could be rectified is very contentious and often very technical, too. Besides, to a large extent, the targeting of beneficiaries depends on the administrative capability of the government to identify the beneficiaries correctly. Even then, exclusion and inclusion errors are difficult to eliminate. A more practical approach to targeting would be to investigate whether the current targeting systems could cover higher proportions of poorer groups compared to the well-off groups.

To implement this practical approach, concentration indices¹ could be used. However, the variable in question (GSHI coverage) is binary. So, this chapter uses the modified or corrected concentration index (also known as the "Erreygers Index" (EI)) as a tool to examine the effectiveness of beneficiary targeting for the GSHI schemes in Kerala. Since the coverage of below-poverty-line (BPL) households² was the primary focus of all GSHI schemes in Kerala, beneficiary targeting will be analyzed by exploring whether the exclusion of BPL households exists. Finally, the chapter will analyze the cost-sharing in GSHI schemes between union and state governments and explore options on how to increase the population coverage of GSHI while ensuring balance in the inter-governmental cost-sharing.

To understand these aforementioned issues, it is pertinent to understand the need for beneficiary targeting and various types of targeting methods.

¹ The common approach to study the concentration of a continuous variable weighted by its socio-economic rank.

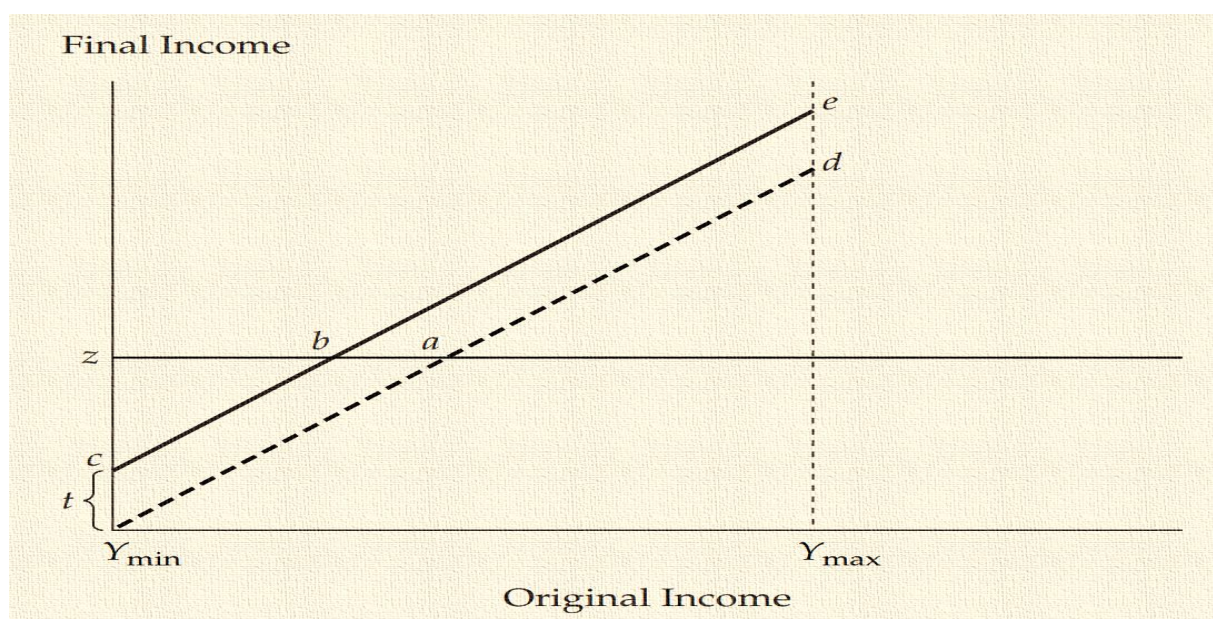
² See G3.4 in Glossary.

3.2 What is the need for targeting? A theoretical framework by Coady et al. (2004)

The motivation for targeting arises, when a government, especially in a developing country, has to implement an anti-poverty/welfare program within a limited budget (again, a feature of developing countries), by focusing on maximizing its reach among the most vulnerable and needy sections of the society. This idea has been formulated into the theoretical framework by Coady et al. (2004). A visual explanation of the same is shown in Fig 3.1 which compares two types of transfers: an optimal and a sub-optimal transfer.

The x-axis plots the pre-transfer income/original income, ($y_{\max}$ and $y_{\min}$ being the maximum and minimum income) and y-axis plots the post-transfer income/final income. The line $dy_{\min}$ shows the pre-transfer situation of original and final incomes being equal (along the line).

Figure 3.1: Comparison of optimal and sub-optimal (uniform) transfers



Source: Coady et al. (2004)

Consider two types of transfers:

- (i) The first type of transfer is based solely on the poverty gap (the difference between original income and the poverty line, za). It aims to close these gaps among poor households without any leakages to non-poor households. This is known as the targeted approach.

(ii) The second one is a ‘uniform’ transfer of an equal amount ($t = c - y_{\min}$) to poor and non-poor households alike. This resulted in leakages to non-poor households and did not eliminate the poverty of the poor households.

Two forms of “inefficiency” were associated with the uniform transfer: (i) While some poor households received transfers exceeding their poverty gaps, (ii) all non-poor households also received transfers. Therefore, imperfect targeting resulted in a lower poverty impact for a given budget. The solution to the same is enhanced targeting which screens out the ineligible households.

The challenge is to identify the eligible beneficiaries and weed out the ineligible ones, especially in countries like India, where the poor co-exist with the rich in distinct and nuanced ways. For example, due to the distinct geographical clustering of slums, it may be easy to identify the slum residents, as beneficiaries of an affordable housing scheme. But what about the other poor urban households, living in houses with 1 room on rent, on a hand-to-mouth existence, with deprivations very comparable to a slum resident? This is an example where a more nuanced approach to beneficiary targeting is required. This example also leads to the next question. What are the different types of targeting mechanisms/methods that can effectively capture such nuances and complexities of the beneficiary population?

3.3 Types of targeting methods

There exist various targeting methods to effectively identify the beneficiaries. Based on Coady et al. (2004), they could be classified as follows:

- I. **Individual/Household Assessment**³: In this method an official/social worker, verifies the eligibility of every household, based on exhaustive field visits. The gold standard for this type of assessment is the verified means test, in which the official collects information, along with credible sources for verification. The best example is verification of the income reported by a household, using pay stubs, income tax records, etc.

It is quite obvious that such a fool-proof method is not possible in developing countries with large rural economies, dominated by farm and non-farm sectors, and urban economies, dominated by households employed in informal sectors

³ See G3.23 in Glossary.

with no records of employment or wage/salary. This leads to alternative and more realistic household assessment methods of three types:

- i. **Simple means test⁴:** This is largely a qualitative assessment of a household's eligibility, conducted by an official/social worker, through visually examining its overall standard of living, possession of assets, etc. This method relies on the judgment and potential bias of the inspecting authority, which is a significant drawback. Usually, this method could be viewed as a quick, cost-effective and preliminary assessment of the eligibility of a household to be a beneficiary, acting as a precursor to more rigorous and objective targeting methods.
- ii. **Proxy means test (PMT)⁵:** This is a more objective and quantitative version of the simple means test, wherein instead of a qualitative judgment, a beneficiary household is identified, based on certain proxies (suitable alternatives/substitutes) in lieu of income. This could be the households' consumption expenditure and mainly the possession of assets (luxury goods like multi-room houses, cars, refrigerators, washing machines, etc. and non-luxurious goods like single-room houses, radio, bullock carts, etc.), demographic structure of the household (to identify dependents such as children and elderly), occupation and education of the household members, etc. Each of these criteria could be assigned a weight and 'deprivation scores' could be calculated as an aggregate of these weights. Cutoffs based on these scores could be used to discriminate between beneficiary and non-beneficiary households. Additionally, and more relevant to India, such methods also come with automatic inclusion and exclusion criteria, both being a set of conditions, the fulfillment of which will automatically lead to the inclusion or exclusion of a household to/from the beneficiary list. Despite being highly contentious, the BPL censuses of 1992, 1997, and 2002, along with the Socio-Economic Caste Census (SECC) conducted by the Ministry of Rural Development, Government of India, in 2011, serve as notable examples of multi-stage PMT in India.

⁴ See G3.35 in Glossary.

⁵ See G3.30 in Glossary.

The major drawback of PMT is that compared to the simple means test, it involves huge administrative costs and even considerable social costs. The administrative costs will include the remuneration of government officials/enumerators (if any) and mainly the procurement costs of equipment (printing of paper schedules, purchase/design of handheld devices/software for surveys) and logistics costs (like travel allowances for enumerators).

But the social costs are indirect and more significant in a nation like India where a good number of enumerators could be government teachers/civil servants. The social costs involved are the teaching hours foregone (and consequently the learning outcomes of students), for the teachers, and the other administrative activities in the district (issuing certificates, monitoring local-level government schemes, etc.), for the civil servants. However, these costs may be offset to a large extent, if the economies of scale involved in these exhaustive surveys are well-exploited. An example of the same would be using the beneficiary lists in identifying beneficiaries for multiple schemes, eliminating the need and costs for ad hoc surveys.

Another major drawback of PMT is the lack of frequent updation. In developing countries, with high growth rates like India, millions of deprived households improve their standard of living every year and climb the economic ladder. Additionally, there also exist phenomena like rapid urbanization and migration, which continue to create a very important class of 'urban poor'. So, this requires that surveys like SECC be conducted with higher frequency, incorporating the rapidly changing rural-urban proportions, to capture the dynamic changes in deprivation status.

Unfortunately, this is not the case. The gap between BPL censuses of 1992, 1997 and 2002 was just 5 years each whereas the gap between the BPL census of 2002 and SECC of 2012 was roughly 10 years, twice the gap between previous censuses. Added to the widening of the gap, a new SECC has not been conducted after 2012. Given that the population census precedes SECC and that the Population Census of 2021 has not been conducted (as of June 2023), the gap between the future and the last SECC would even exceed 10 years.

- iii. **Community targeting⁶:** Unlike PMT, this method involves assessment at the local levels by local authorities/officials with deep knowledge of their respective language, history, culture and policy environment. The best example of this method would be a committee consisting of gram sarpanch/village elders, local government officials, etc. who could decide the eligibility of the beneficiary households.

However, this method can also come with significant bias if the power structures at the local level is biased towards the socially and economically forward communities. This method can be rendered more transparent through democratic participation and consultation with community members in such committees.

- II. **Categorical targeting or statistical targeting/group targeting⁷:** As the name suggests, this is a targeting method, that involves selecting a particular group, category, or region with high clusters/concentration of poverty and deprivation, with almost uniform intra-group characteristics.

Due to these uniformities, they form a distinct stratum and as such identification and verification becomes easy. A vaccination program, targeting children in the 0-5 age interval, is an example where the age category itself distinguishes the targeted groups irrespective of the ethnicity, social and economic background, etc. of the children. Similarly, selecting primitive scheduled tribes living near or within forests with almost uniform social, cultural and economic structures is another example of categorical targeting.

- III. **Self-selection/self-targeting⁸:** This is a method which by its very design will only be chosen by the targeted (poor) beneficiaries. For example, job schemes in rural areas usually involving manual labour with a payment in cash/kind (only after the completion of work), would only be chosen by individuals with low opportunity costs of the time invested in the scheme.

An unemployed individual or an agricultural labourer in the off-season are the best examples of individuals having such lower opportunity costs. A regular

⁶ See G3.7 in Glossary.

⁷ See G3.5 in Glossary.

⁸ See G3.33 in Glossary.

salaried individual will not opt for these job schemes unless she/he experiences unemployment.

The best example of this method in India is the Mahatma Gandhi National Rural Employment Guarantee Scheme (MNREGS) 2005, which aimed to offer demand-based employment for a guaranteed 100 days to the rural population. Similarly, subsidies for kerosene (considered to be an ‘inferior’ good), routed through PDS, would be used only by households with non-electrified homes, having no cheaper sources for lighting/households having an erratic and deficient power supply.

In reality, in the case of India and Kerala, most of these methods are not mutually exclusive and often used in conjunction with each other, with PMT methods like SECC 2011 being very widely used.

A discussion about beneficiary targeting in India, in the era of digital governance, with the mantra ‘maximum governance and minimum government’, would be incomplete without examining the adoption of digital infrastructure in the authentication of beneficiaries, post the targeting. After the introduction of Aadhar, expansion of common service centers (CSC) and higher penetration of mobile phones and networks, especially in rural areas⁹, a host of government services are now being provided on the backbone of a digital infrastructure.

Primary among them is the ‘Aadhar stack’ which is a bunch of digital services built on Aadhar, starting with the use of biometrics to scan and verify the identity of the beneficiary (thus aiding in avoiding identity fraud) and continuing to even payment and settlement systems enabled by Aadhar (like Aadhar enabled Payment System-AePS). A good example of Aadhar-enabled targeting would be beneficiary verification using fingerprint scanners at PDS shops, and AePS would be the payment of MNREGA dues after such verification at CSCs in rural areas. This could overcome the lack of cellphone and mobile network penetration in rural areas.

Having understood the pros and cons of various targeting methods, one could now turn to the evaluation of targeting/mistargeting errors. Primarily, this involves understanding the exclusion and inclusion errors discussed below.

⁹ Although the period since 2000s has witnessed higher rural penetration of telecom infrastructure, there is still a sizeable gap between urban and rural areas.

3.4 Errors of Targeting

Again, following Coady et al. (2004), Table 3.1 illustrates exclusion and inclusion errors.

- a) Errors of exclusion or under-coverage¹⁰ (U): This error happens when the eligible beneficiaries are left out of the scheme. More formally, it could be defined as the percentage of poor households that are not included in the program. Mathematically,

$$U = \frac{N_{(p,o)}}{N_p} * 100 \dots (3.1)$$

where $N_{(p,o)}$ is the number of poor households who are left out of the program and N_p is the total number of poor households. In Table 3.1, the same is $(10/40) * 100 = 25\%$.

- b) Errors of inclusion or Leakage (L)¹¹: As the name indicates, it is the percentage of ineligible (non-poor) households receiving the benefits. Mathematically,

$$L = \frac{N_{(np,i)}}{N_i} * 100 \dots (3.2)$$

where $N_{(np,i)}$ is the number of non-poor households in the program and N_i is the total number of households in the program. In Table 3.1, the same is $(10/40) * 100 = 25\%$.

Table 3.1: An illustration of targeting errors

Welfare Status of Households			
Households	Poor	Non-poor	Total
Excluded from the programme	10 (U=25 %) (Exclusion Error)	50 (Successful targeting)	60
Included in the programme	30 (Successful targeting)	10 (L=25%) (Inclusion error)	40 ($N_{(np,i)}$)
Total	40 ($N_{(p,o)}$)	60	100

Note: U and L denote undercoverage and leakage percentages, respectively.

Source: Coady et al. (2004)

¹⁰ See G3.16 in Glossary.

¹¹ See G3.17 in Glossary.

In these examples, it is easy to see that the errors of targeting depend on the most contentious issue of the definition of poverty or more clearly on the poverty lines, distinguishing the poor and the non-poor. These poverty lines could be based on income, consumption, or multi-dimensional indicators of socio-economic status.

Even after settling the basis of targeting, in an era of competing populist schemes of union and state governments in India, errors of targeting could be a very contentious issue. This is because, with the second largest population in the world, differences even in the decimal places of targeting errors in India, may imply that tens of thousands or even lakhs of households are either included or excluded.

Having understood the mistargeting errors, it is important to understand that these errors are just starting points to assess the effectiveness of beneficiary targeting. There exist many other measures, tools and ways to assess beneficiary targeting. Apart from these ways, there could be even issues like connections with politicians that could influence the inclusion/exclusion of a beneficiary household (Panda, 2014). The succeeding section will provide a brief literature review of all of these themes.

3.5 A brief review of different approaches and factors affecting beneficiary targeting

Cornia and Stewart (1993) focussed on ‘E’ (E for excessive coverage i.e., coverage of non-target population) and ‘F’ (F stands for failure to reach the target population) errors in targeting within the nutritional programmes in 9 countries (India, Zambia, Jamaica, Pakistan, Egypt, Sri Lanka, Tunisia, Mexico and the Philippines). Based on the results from these countries, the study suggested a trade-off between E and F errors. It implies that when efforts are made to reduce E errors, F errors would rise. Although with imperfections, the study recommended a progressive tax system (taxation based on income- higher taxes for the rich and lower taxes for the poor) combined with efforts to reduce F errors. The progressive tax system would help in countervailing the rise in E errors (due to reducing F errors).

Grosh and Baker (1995) studied the effectiveness of the proxy-means targeting in identifying the eligible population for social programs in three countries (Bolivia, Peru and Jamaica). The study used the World Bank’s The Living Standards Measurement Study (LSMS) and found that household characteristics (possession of assets like radio, motorbike, etc.) location (rural, urban etc.), level of education attained (although it could be difficult to capture) could help to significantly reduce the under-coverage of beneficiaries and leakage (to the ineligible). The study found that more

proxies should be preferred to fewer proxies as the former improves targeting (although with diminishing returns for additional proxies). The study also found improvement in targeting when only the poorest 50 per cent of the population was considered for the social program.

Ravallion (2009) compared the suitability of 4 targeting measures, to measure the impact on poverty, emanating from cash transfers in China. The cash transfers were part of the 'Minimum Livelihood Guarantee Scheme', popularly known as Di Bao (DB) in China. The study used the data of the 35 largest cities, captured by China's Urban Household Short Survey (UHSS), conducted in 2003-04.

The first three targeting measures were based on the concentration curve (S, NS and CI). The concentration curve was defined as the "share of total transfers going to the poorest p% of the population ranked by household income per person." The share going to the poor (S) was defined as the "share of transfers going to those who are initially deemed poor." Normalized share (NS) was defined as "share going to the poor divided by the proportion who are poor." The concentration index (CI) was defined as the "area between the concentration curve and the diagonal (along which everyone receives the same amount)." The fourth measure was targeting differential (TD) which was gain based on coverage rate (CR). CR was defined as the percentage of transfers being received by the poor/non-poor. TD was the difference in the CR of poor and non-poor.

The study found that S, NS and CI revealed much about the effectiveness of the DB program in eliminating urban poverty. On the other hand, TD had a "statistically significant positive correlation with the program's poverty impacts." It was also found that the cities of China that are better at targeting the DB programme were generally not the ones that made the biggest impact on urban poverty. Further, except for S, no other targeting measure was a significant predictor of "the cost-effectiveness of the DB program in reducing the poverty gap index". Based on these observations, the study recommended focusing on the main outcome of anti-poverty programs, i.e., reduction of poverty rather than on targeting measures.

Khera (2008) critically analyzed the criteria used by the BPL census 1997 to identify BPL households through a field survey (consisting of qualitative elements like focus group discussions) conducted in 2000 in 8 villages spread across 4 districts (Barmer, Bikaner, Jaipur and Udaipur) in Rajasthan. The study found many conceptual and implementational challenges associated with identification criteria like the size of land-holding (which did not inform about the quality/fertility of the land). Khera

observed coming across households with five bighas of land which was mostly sand dunes and households who relied on cattle rearing, instead of agriculture. Further, Khera raised concerns about the 5-year gap between successive BPL censuses and put forward an example to illustrate the effect of these long gaps. Khera observed that Rajasthan experienced a prolonged drought in the four-year period between 2000-03, which impoverished many households. BPL censuses would be incapable of capturing the full effects of the drought, due to the large gaps. There were implementation issues too. Lack of awareness on the part of the beneficiaries regarding the selection criteria, lack of clarity among the enumerators regarding the eligibility criteria, the arbitrary behaviour of higher authorities (in striking off names suggested by the local-level enumerators) etc. The study found that “of the one-third of sample households that were classified as BPL, nearly a quarter have been wrongly included. Besides, 44 per cent of the households which should have been counted as BPL were wrongly excluded.”

Ram et al. (2009) studied the distribution of BPL cards across various socio-economic indicators and across the poor and non-poor in Indian states. The study used NFHS-3 and applied the conditions prescribed by the BPL census 1997 to the survey data for this study. The study found that households with *pucca* houses with three or more sleeping rooms, a motorized vehicle, both televisions and refrigerators and landholdings of 5 acres or more, also possess a BPL card. More importantly, the study estimated that about 44 per cent of the BPL cards may be in the possession of non-poor households (defined as households belonging to the top three quintiles of the assets-based wealth index, constructed from NFHS-3). Also, about 60 per cent of the households living in abject deprivation¹² did not possess BPL cards. These observations hinted at both inclusion and exclusion errors, although the study never used these terms.

Dreze and Khera (2010) suggested modified targeting criteria involving exclusion and inclusion criteria to identify a ‘social assistance base’ (SAB) – a group of households akin to the BPL list. SAB emanated from the failure of the BPL Census 2002, to correctly identify households below the poverty line. This was because it used

¹² Following Srinivasan and Mohanty (2004), abject deprivation was defined “as a situation where a household does not have any adult literate member, lives in a *kaccha* house in rural areas and in *kaccha* or semi *pucca* in urban areas, no land in rural areas and no toilet facility in urban areas, no drinking water facility of his or her own, not owning any consumer durables such as a bicycle, television or radio and no electricity for his/her house.”

a composite score based on multiple criteria which were not easily verifiable. As such SAB was suggested as an 'alternative' to the BPL census 2002. SAB was based on simple and verifiable exclusion and inclusion criteria. The exclusion criteria focussed on 2 elements: 1. A list of durable assets including cars, refrigerators, landline telephones, scooters and colour televisions. 2. Composite amenities which referred to the simultaneous access to electricity, piped water and a flush toilet. The inclusion criteria were based on 5 elements: (1) SC/ST households (2) Landless households (3) Households with no adult member educated beyond class 5 (4) Households headed by single women. (5) Households with at least one adult member working as an agricultural labourer. Based on the above exclusion and inclusion criteria, the study proposed four methods.

“(i)Exclusion Approach: Reject a household if and only if it meets any of the exclusion criteria. (ii) Inclusion Approach: Select a household if and only if it meets any of the inclusion criteria. (iii) Play-safe Approach: Reject a household only if it meets exclusion criteria but not inclusion criteria. (iv) Restrictive Approach: Select a household only if it meets inclusion criteria but not exclusion criteria.”

The above approaches were applied to the unit-level data of NFHS-3 and a strong selection between SAB and economic status was found for each approach, thus junking the need for the score-based approach of BPL Census 2002. The study also opposed the idea of national and state quotas suggested by the union government in favour of the above approaches. However, the study suggested imparting powers to local governments to include more beneficiaries, should the SAB exclude some eligible households. Thus, the proposed SAB list was also fortified with the flexibility to adapt to local requirements.

Panda (2014) studied whether the connection to a local politician increases the likelihood of having a BPL card. Using IHDS-1 (2004-05) and a recursive bivariate probit model (RBP) to adjust for the endogeneity issue of political connections, the study observed that the former hypothesis holds in both rural and urban areas. In light of these findings, the study concluded by quoting previous literature that instead of implementing proxy-means targeting alone, “a hybrid of proxy means and community targeting (where villagers rank everyone from richest to poorest)” is preferable.

Asri (2017) analyzed the effectiveness of the targeting reforms brought in by the Government of India in 2007 to the National Old Age Pension Scheme (which was

originally launched in 1995). In addition to the age criterion set in 1995, the 2007 reforms focussed on targeting the economically insecure elderly population using the BPL cards and removed the cap on the number of beneficiaries. The study used a balanced panel of individuals from two rounds (2004-05 and 2011-12) of the India Human Development Survey (IHDS), who qualify for the old age pension, based on the age criterion of individual states. The study also considered a sample consisting of individuals who were 10 years younger than the age criteria. From this sample, the study found that the exclusion and inclusion errors reduced substantially from 87 per cent to 68 per cent and from 51 per cent to 41 per cent respectively, in the two rounds of IHDS, implying success of the targeting reforms.

Asri et al. (2022) built on the Asri (2017) study. Using the two rounds of IHDS, the 2022 study investigated whether simple and verifiable eligibility criteria could lead to better targeting of old-age pensions in India. Apart from age, the various state-level eligibility criteria were clubbed into four groups: destitution, income, land holding, and BPL card holding. The results indicated that simple and more verifiable eligibility criteria (like BPL card holding) could lead to a substantial reduction in exclusion errors. However, the effect of the same on inclusion errors was not observed. The study thus lays down three suggestions for beneficiary targeting – “(i) the substantive relevance of the criteria, (ii) the verifiability of the criteria, and (iii) the monitoring of their enforcement”. The first two conditions could reduce exclusion errors while the third could address inclusion errors. However, the study cautioned that while using improved targeting criteria as mentioned above can sharpen targeting, one should also ensure that the poverty (defined as asset poverty in the study) was also strongly correlated with the eligibility criteria.

3.6 Mistargeting of beneficiaries in GSHI schemes within India and Kerala

Along with investigating the financial protection of RSBY¹³ beneficiaries, Ghosh and Gupta (2017) studied the mistargeting errors in RSBY using the 71st round of NSS. The study found that 36.52 per cent of beneficiaries belonged to the richest two quintiles (classified based on consumption expenditure). Further, almost half of the

¹³ See G3.31 in Glossary.

respondents belonged to the non-poor category¹⁴ and almost 20 per cent belonged to the general category. All these pieces of evidence point to mistargeting errors.

WHO (2022) was another study on the effectiveness of beneficiary targeting in a GSHI scheme (Ayushman Bharat Pradhan Mantri Jan Arogya Yojana¹⁵ (ABPMJAY)), conducted by Oxford Policy Management (OPM) for WHO in the two states of Haryana (Kurukshetra and Sirsa districts) and Uttarakhand in 2021, using both quantitative and qualitative methods. The quantitative method included a household using a structured questionnaire from 1159 households in Haryana and 962 households in Uttarakhand. The qualitative methods included key informant interviews and focus group discussions of 31 individuals, involved in various institutions related to ABPMJAY and public health.

To study the mistargeting errors, they were further divided into design errors and implementation errors. While the design errors included both exclusion and inclusion errors due to errors in targeting mechanisms like SECC 2011, implementation errors dealt with errors in implementing eligibility norms (due to differences in eligibility norms of union and state governments).

For this, 4 kinds of beneficiary eligibility were considered.: 1. CE-eligible 2021: Households who were identified to be eligible due to belonging to the poorest 40 per cent of the state's population, based on consumption expenditure data from the 76th round of NSS in the OPM ABPMJAY 2021 survey. 2. AI-eligible: "Households under study identified as eligible based on the bottom 40% threshold of the asset index estimated from NFHS data in the OPM ABPMJAY 2021 survey." 3. Modified SECC-Eligible 2021 criteria: "Households under study identified as eligible based on the SECC eligibility criteria but observed in the OPM ABPMJAY 2021 survey" 4. PE-Eligibility 2011: "Households under study identified as eligible in SECC 2011 using proxy measures (enrolment status in other schemes using SECC 2011 to target eligible) in 2011."

¹⁴ The poor and non-poor were classified using state-level poverty lines for 2011-12, after adjusting for price changes between 2013-14 and 2011-12.

¹⁵ See G3.3 in Glossary.

The results of the study found that the design errors i.e., exclusion due to errors in SECC 2011, were low in both Haryana and Uttarakhand. So, implementation errors dominated the overall mistargeting errors. In Uttarakhand, it was found that although expansion of eligibility rules reduced exclusion errors, it also increased inclusion errors. “In the study region, no household in the bottom 40% had (i) a graduate degree, (ii) a motorised two, three or four-wheeled vehicle or (iii) at least 2.5 acres of irrigated land with at least one irrigation equipment.” This implied that these criteria could be used as effective exclusion criteria in the study region. Further, although the awareness about ABPMJAY was high in both states, a large majority were ignorant of their eligibility status.

Philip and Ravindran (2017) studied the financial protection offered by GSHI (CHIS scheme in Kerala) among the elderly in the Kollam district (a part of 600 non-rich households in Kerala, selected for the primary survey). Along with financial protection, the study also explored certain aspects of targeting effectiveness, even though it was not explicitly stated. The study found that “single elderly from a socially backward caste, living alone in *kutcha* or semi-*pucca* houses were excluded from CHIS.”

3.7 The evolution of beneficiary targeting methods in India

From the literature review, it was found that there were many disadvantages of the targeting methods in India, especially related to the identification of BPL households (Khera, 2008; Dreze & Khera, 2010). However, these were results related to each specific study. To fully contextualize these results, it is important to understand the evolution of the targeting methods used in India, from a wider canvas.

One of the key aspects that should be understood while studying beneficiary targeting would be that there exists a divergence in the board-room ‘estimation’ and on-ground ‘identification’ of ‘poverty lines/deprivation criteria’ in India and the number of households falling above and below such poverty thresholds.

The estimation of poverty has traditionally been the focus of the erstwhile Planning Commission. Although poverty estimations pre-date the Planning Commission, from 1971 onwards, a systematic estimation of poverty lines, separately for rural and urban areas, using the National Sample Surveys’ consumption expenditure surveys (CES), was begun by the Planning Commission, based on the recommendations of Dandekar and Rath Committee (Dandekar & Rath, 1971). Over time and through the

recommendations of various committees (Alagh Committee 1979, Lakdawala Committee, 1993 and Tendulkar Committee, 2009), the methodology for poverty estimation evolved to incorporate various consumption items of different recall periods, developed from just a calorie-equivalent approach and diversified to accommodate foods containing proteins and fat. The methodology also included non-food items such as private expenditure on health and education. Poverty lines made from such enhanced methodology were also adjusted for inflation, both across geographies (various states) and time, using various measures of consumer-price index (Gaur & Rao, 2020). In the end, even the data for poverty calculation used in the latest Rangarajan Committee (2014) (Planning Commission of India, 2014) changed from NSS CES to the consumption pyramids survey of the Centre for Monitoring Indian Economy (CMIE).

Ironically, in spite of these various methods for poverty estimations (based on consumption expenditure of the household on various food and non-food items), the real and on-ground identification of poor households was done using BPL censuses of 1992, 1997 and 2002, which were replaced by the Socio-Economic Caste Census (SECC) in 2011.

The BPL census of 1992 was largely based on income which was followed by a BPL Census in 1997 which identified beneficiaries through a two-step mechanism. The first step was specifying certain exclusion criteria based on household assets, to exclude the non-poor households. In the second step, the BPL households were identified using household consumption expenditure along with other criteria like age, sex, educational status, social group affiliation and skill training (Hiraway, 2003).

Following various deficiencies of both these censuses, which included the difficulties in accurately assessing income, consumption expenditure, exclusion and deprivation criteria, a new BPL census of 2002 was conducted in the rural areas, by the Ministry of Rural Development, for developing a deprivation-based score and rank for households (Dreze & Khera, 2010). The deprivation score was based on thirteen indicators. These were: (i) size of land holding, (ii) type of houses, (iii) clothing (iv) food security (v) sanitation (vi) ownership of consumer durables (vii) literacy status (viii) status of the household labour force (ix) means of livelihood (x) status of children (xi) indebtedness (xii) migration and (xiii) preference of assistance. For each of these thirteen indicators, the households were awarded scores on a five-point scale from 0-4. A low score indicated a higher level of poverty and deprivation and vice-versa. For each household, the scores from these 13 indicators were summed up to get the

aggregate score of the household. Thus, the aggregate score of the household ranged from a minimum of zero to a maximum of 52. The households were then arranged in ascending order to obtain the BPL list (Sundaram, 2003).

From the above discussion, it would be clear that the BPL Census of 2002 was an example of identifying the poor households using ‘proxy-means’ like household assets (which could stand as proxies for household income and consumption, when they cannot be readily and accurately assessed). However, the arbitrariness of the deprivation indicators, lack of transparency and the high costs of data collection were some of the issues in the BPL Census of 2002 (Dreze & Khera, 2010). A major government report which highlighted some of these issues was the N.C Saxena Committee (Government of India, 2009), constituted by the Government of India, to address the deficiencies in the BPL Census 2002.

The BPL Census of 2002 was followed by the SECC in 2011, in which, following the recommendations of the N.C Saxena Committee to improve the BPL Census of 2002, five criteria for automatic inclusion and thirteen criteria for automatic exclusion were applied, which filtered in the most eligible households and filtered out the most ineligible households respectively. For the rest of the households, not qualifying for automatic exclusion and inclusion, deprivation scores based on seven deprivation criteria were calculated. The criteria were (i) households with only one room, *kutcha* walls and *kutcha* roof (ii) no adult member between the ages of 16 and 59 years (iii) female-headed households with no adult male member between 16 and 59 years (iv) households with disabled member and no able-bodied adult member (v) Scheduled caste (SC)/Scheduled tribe (ST) household (vi) households with no literate adult above 25 years (vii) landless households deriving a major part of their income from manual casual labour. Households with the highest deprivation score would be given priority to be included in the BPL list and other welfare schemes. Even though SECC, 2011 a PMT method evolved as a result of improving BPL censuses over 2 decades, many issues regarding exclusion of eligible households and state-level quotas persist (Alkire & Seth, 2013a; Alkire & Seth, 2013b).

Although SECC 2011 provided the general framework to identify the vulnerable/deprived sections of the population, the National Food Security Act (NFSA), 2013 empowered the state governments to set their targeting frameworks to identify the Antyodaya Anna Yojana (AAY)¹⁶ and priority households (PHH)¹⁷ in

¹⁶ See G3.1 in Glossary.

each state. However, the percentage of eligible households who could qualify as PHH was determined by the union government and each state was allocated a ‘quota’, proportionate to state-wise poverty calculations done by the Planning Commission. While nationally, about two-thirds of all households were covered by NFSA (Press Information Bureau, 2019), Kerala, a developed state was given a quota of 1.54 crore (about 46 per cent of Kerala’s population), and Bihar, an under-developed state was allocated about 8.71 crore individuals (about 84 per cent of Bihar’s population).

Accordingly, various state governments set different exclusion and inclusion criteria (Dreze et al., 2019)¹⁸, to identify the quota of the population allocated for them.

3.8 The evolution in the design and beneficiary targeting of GSHI schemes in Kerala: A tale of two targeting regimes

Given that the evolution in the methods of beneficiary targeting in India has been very complex, it is vital to understand how these complex methods were adopted in conjunction with other measures to identify GSHI beneficiaries in Kerala.

Rashtriya Swasthya Bima Yojana (RSBY) was launched in October 2008, as a centrally sponsored scheme (CSS)¹⁹ for BPL households and unorganized workers²⁰ as part of the Unorganized Workers’ Social Security Act 2008. RSBY had a maximum sum assured of ₹30,000 per household (covering only 5 members) and was implemented as

¹⁷ The classification of below and above poverty line households (BPL and APL) that existed under the targeted public distribution system (TPDS) since 1997 was replaced by priority households (PHH) (See G3.29 in Glossary) and non-priority households after NFSA 2013.

¹⁸ The criteria were generally based on the dimensions of the house (below a specific area, measured in square feet), vehicles owned, luxury assets owned and occupation (whether household members are employed in government service).

¹⁹ CSS are schemes aimed at social and economic development in Indian states, implemented by the state governments and funded by union and state governments in a certain ratio. Currently, the sharing ratio between union and state governments is 60:40, except for north-eastern and Himalayan states (see G3.8 in Glossary).

²⁰ Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) workers, construction workers, domestic workers, sanitation workers, mine workers, licensed railway porters, street vendors, beedi workers, rickshaw pullers, rag pickers and auto/taxi drivers.

a cashless²¹ and family floater scheme²². The benefits also included a travel allowance of a maximum of ₹1,000 per year. There was no age limit for the registration of members and pre-existing conditions were allowed. However, RSBY also included an annual renewal with a registration fee of ₹30.

Another feature of RSBY was the ‘smart card’ with an embedded chip that stored the details of the registered members of the household along with their biometric information (like fingerprints). The chip also contained details of past treatments and the sum utilized by the household members.

Regarding the beneficiary identification in Kerala, the union government stipulated that RSBY being a CSS, the premium costs of the scheme would be shared only for about 11.79 lakh households, identified through the BPL census of 2002 in the state (Government of Kerala, 2016). However, the state government found that an additional 10 lakh households qualified as eligible (those households who were BPL according to the estimation of the state government, but were excluded from the central list) and extended the benefits of RSBY to these households, agreeing to bear the entire premium costs of the additional households. A state-government-sponsored scheme called the Comprehensive Health Insurance Scheme (CHIS) was introduced to cover all the additional households. CHIS also allowed APL households²³ to join the scheme upon the payment of premium and the cost of smart card²⁴ (Government of Kerala, 2014).

Together, the scheme was called RSBY-CHIS²⁵. RSBY-CHIS was implemented through insurance companies²⁶ and third-party administrators (TPAs)²⁷.

²¹ Cashless and reimbursement are two modes of claim settlement in insurance. While in reimbursement mode, the individual is reimbursed for the hospitalization expenditure, in cashless mode, the insurance companies settle the hospital bills directly with the empanelled hospital.

²² In the family floater insurance scheme, the maximum sum assured would be jointly available for all family members and not each member individually (See G3.20 in Glossary).

²³ See G3.2 in Glossary.

²⁴ The payment of premiums by APL households was later discontinued.

²⁵ See G3.32 in Glossary.

²⁶ Many insurance companies such as United India Insurance and mainly Reliance Insurance were involved in RSBY-CHIS scheme at various points of time.

For implementing the whole scheme, a special purpose vehicle called the Comprehensive Health Insurance Agency (CHIAK) was also formed in 2011-12. Keeping in view the need for additional funds for cancer etc., the state government introduced CHIS-PLUS (Government of Kerala, 2017), in February 2011, a top-up scheme on RSBY, wherein every beneficiary household of RSBY-CHIS would be eligible for additional assistance up to ₹70,000. Following the directions from the union government in 2014-15, the state government expanded RSBY to cover members of various welfare boards and its pensioners, all scheduled tribes and scheduled caste populations, households engaged in fishing, etc (Press Information Bureau, 2011).

The modes of implementation²⁸ were different for RSBY-CHIS and CHIS Plus. While RSBY-CHIS was implemented through the insurance route (through insurance companies), CHIS-PLUS had a non-insurance route (the state government directly paid for the hospitalization expenses to the empanelled hospitals).

In 2012, another GSHI scheme called the Karunya Benevolent Fund (KBF)²⁹ was implemented by the state governments to financially assist households with members suffering from chronic diseases. It involved one-time assistance of up to ₹3 lakhs for the treatment of kidney diseases and ₹2 lakhs for other prescribed diseases, for households having an annual income (annual income as per the ration card) below ₹3 lakhs. However, haemophilia patients had no such restrictions on financial assistance. KBF was funded through the proceeds from the sale of the ‘*Karunya lottery*,’ managed by the Department of State Lotteries, Government of Kerala (Government of Kerala, 2017).

In 2016, the state government also participated in another CSS called the Senior Citizens Health Insurance Scheme (SCHIS)³⁰. Under SCHIS, elderly above the age of 60 members in households covered by RSBY-CHIS could avail an additional coverage of up to ₹30,000 per member over and above the RSBY entitlement.

²⁷ TPAs are private entities that help insurance companies in claim processing, empanellment of hospitals, etc (See G3.37 in Glossary).

²⁸ See G3.38 in Glossary.

²⁹ See G3.24 in Glossary.

³⁰ See G3.34 in Glossary.

In April 2019, following the nationwide rollout of Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY) in September 2018, the state launched Ayushman Bharat Pradhan Mantri Jan Arogya Yojana -Karunya Arogya Suraksha Padhati (ABPMJAY-KASP), subsuming all the hitherto fragmented GSHI schemes (RSBY-CHIS, CHIS PLUS and SCHIS) into it (Government of Kerala, 2023). Under ABPMJAY-KASP, which was implemented as a cashless scheme, the maximum sum assured was raised to ₹5 lakh with no restrictions on household size (although like RSBY-CHIS, ABPMJAY-KASP was a family floater scheme), age of members or pre-existing conditions. There was also no need for any registration fees or yearly renewal. The state government also offered to cover pre-hospitalization expenditures of 3 days and post-hospitalization expenditures of up to 15 days. ABPMJAY-KASP currently offers 1635 benefit packages under Health Benefit Package 2.1. Also, under ABPMJAY-KASP, the smart card was replaced by a golden card which was seeded with Aadhar.

More importantly, the beneficiary targeting of ABPMJAY-KASP was very similar to RSBY-CHIS. For ABPMJAY, the BPL Census 2002 was replaced by SECC 2011 for almost 21.5 lakh ABPMJAY households who were covered by the union government in a 60:40 ratio. The use of SECC closely followed the recommendations of the Sumit Bose Committee (Government of India, 2016). The rest of the households (about 19.4 lakh), who were hitherto covered by RSBY, were also covered by ABPMJAY-KASP, with the same benefit packages of ABPMJAY beneficiaries, through the full funding by the state government. KBF was also integrated into ABPMJAY-KASP, through which medical expenditures even above ₹5 lakh were covered.

Initially, between April 2019 to July 2020, ABPMJAY-KASP was implemented through an insurance company (Government of Kerala, 2023). Since July 2020, the scheme migrated from the insurance mode to the assurance/trust mode (under trust mode, the state government directly implements the scheme with the help of state health agencies and third-party administrators (TPAs), without involving insurance companies), managed by State Health Agency (equivalent of CHIAK).

ABPMJAY-KASP was introduced to solve the drawbacks of RSBY-CHIS like yearly renewal. In Kerala, an inter-district study (Joy,2019) found that one of the major reasons for eligible households to be excluded from the scheme was the failure to renew cards (due to lack of knowledge about renewal dates, difficulties in travelling to the renewal centre etc). Even apart from yearly renewal, ABPMJAY-KASP was a quantum improvement over RSBY-CHIS in major aspects such as maximum sum

assured, benefits packages, population coverage, restrictions on household size and registration fees.

The above discussion hints at two targeting regimes in Kerala. For a quick reference, a comparison of these targeting regimes has been summarized in Table 3.2.

Table 3.2: A comparison of two targeting regimes for GSHI in Kerala

Dimensions	Old Regime (2008-2019)	New Regime – ABPMJAY-KASP (2019-22)
Targeting mechanisms	Dual lists for targeting • BPL Census 2002 (Based on Deprivation Scores) • State list of eligible beneficiaries (State criteria)	Dual lists for targeting (union and state lists) + integration with the list of other GSHI schemes. • SECC 2011 (Based on Deprivation and Occupational Scores) • Old RSBY households left out of SECC 2011 • Karunya Benevolent Fund (KBF)
	Unified List – RSBY URN	Unified List -Beneficiary Identification System 2.0
Mode of implementation	Insurance mode (for RSBY-CHIS), assurance mode (for CHIS-Plus, Karunya Benevolent Fund).	Insurance mode (between 2019 and June 2021) and trust/assurance mode (since July 2021).
Methods of enrolment	Enrolment drives conducted by local government bodies and Akshaya centres (CSC).	No need for additional enrolment. Kerala entered the scheme with 100% enrolment on Day 1 with a card for all identified households. Individual cards are being issued from a wide variety of centres including hospitals.
Role of technology	Smart cards for each household with a chip, storing details of	Golden cards are issued for each household which are seeded with

	the demographic details of the household members and previous treatment history under RSBY.	Aadhar. The central government is also developing a unique health ID called ABHA (Ayushman Bharat Health Account) to incorporate the treatment details into a wider system called National Health Stack.
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Source: Compiled from the yearly reports of Economic Review between 2007 and 2023, published by Kerala State Planning Board.

3.9 The rapidly deteriorating fiscal health of Kerala and the financing of GSHI

The theoretical framework proposed by Coady et al. (2004) dealt with the challenge of channeling a limited budget to the most deserving beneficiaries, without any leakage to the non-deserving population. In this section, the fiscal health of the state government in Kerala and how it could impact the financing of GSHI is examined.

Although in terms of per-capita GSDP, Kerala is one of the richest states in India, its fiscal health has been on the decline for years. According to Mukherjee et al. (2022)³¹, in the 20 years between 2000-2021, Kerala witnessed a fall in own-tax revenue along with Madhya Pradesh, Punjab and Kerala. The state's non-tax revenues too were volatile. Further, Kerala topped the list in the 5-year (2017-22) average of revenue expenditure, the same being 90.8 per cent. The analysis of the ratio of revenue expenditure to total capital outlay in the same period further revealed that Kerala with a ratio of 12.1 was only next to Punjab with a ratio of 16.1. The quality of expenditure in Kerala was also in question as after Punjab, the average share of committed expenditure (interest payments, pensions and administrative expenses) in the 2017-22 period, was the highest in Kerala at 38.8 per cent, while Kerala's developmental expenditure in the same period was the second-lowest in the country at 51.1 per cent.

The public debt to GSDP ratio for Kerala was also projected to grow from 31.3 per cent in 2019-20 to 38.2 per cent in 2026-27, the highest change in the ratio among all

³¹ Published by the Department of Economic and Policy Research, Reserve Bank of India.

the states (Mukherjee et al., 2022). Added to this, the GST compensation to states would end by 2022-23, another bad news for the already troubled state finances. The mismanagement of state finances had become so bad that when the Kerala model of development was revisited by Kannan (2023), one of the sore points that stuck out in the developmental model was “the declining tax collection efficiency, an increased net loss of state-owned public enterprises and a massive waste of resources in implementing capital projects”.

On top of its fiscal woes, as per the recommendations of the 15th Finance Commission, the share of Kerala in the divisible pool of taxes reduced to 1.94 per cent from 2.5 in 14th Finance Commission. However, to ease the fiscal constraints, especially relating to revenue deficit, Kerala was the largest recipient of the revenue deficit grant of the 15th Finance Commission (50,000 crores between 2020 and 2025, working out to be 16 per cent of the entire revenue deficit grant).

Now, the important question is: How do the above-mentioned fiscal pressures relate to centrally sponsored schemes (CSS) and GSHI in Kerala?

As mentioned before, targeting mechanisms like SECC 2011 and in particular, rights-based acts like the National Food Security Act 2013 imposed caps on every state government, on the percentage of households covered under each scheme. These caps/quotas were based on how rich/poor the state was. Kerala being a ‘rich state’ was allocated a lower number. Accordingly, the state government could cover only 1.54 crore population with BPL cards and only around 22 lakh households identified through SECC 2011, with GSHI. On top of it, as mentioned earlier, the union government, following the generous award of the 14th Finance Commission to the state governments³²³³, increased the cost share of the state governments in CSS from 25 to 40 per cent (the share of north-eastern and Himalayan states is just 10 per cent,

³² The share of state governments in the divisible pool of taxes was increased by 14th Finance Commission (2015-20) to 42 per cent from the 32 per cent set by the 13th Finance Commission (2010-15).

³³ In November 2015, the sub-group of Chief Ministers on rationalisation of Centrally Sponsored Schemes (CSSs) submitted its report to NITI Aayog. It restructured the then existing 66 schemes into a maximum of 30 schemes, which were again divided into three: (i) Core of the core schemes (ii) Core schemes (iii) Optional. It was that both core and optional schemes would have a 60:40 sharing of costs (union: state) while for the core of the core, it would remain at 75:25.

while the union government bears the entire cost for union territories) (Press Information Bureau, 2015).

In the case of GSHI, the costs would be shared (in a 60:40 ratio between the union and state governments respectively), only for 22 lakh households identified through SECC 2011 in Kerala. On top of this restriction, the sharing ratio would be applied only at a rate that could climb up to ₹1500 per household (the ceiling rate)³⁴, which was again fixed by the union government. The forthcoming analysis would prove that the costs per household covered by GSHI in Kerala are climbing. Also, the state government is covering another 20 lakh households through its own funds. This additional burden by the state government could seriously affect the real cost-sharing ratio, which includes all 22+20 lakh households in the state.

Besides this, many poor and deserving households could still be excluded from GSHI. How will the sharing ratios change, when they are extended the GSHI coverage?

3.10 Research Gaps and Research Questions

Kerala has followed a very complex system of dual targeting (by both union and state governments) for beneficiary identification under GSHI. The list of the union government was based on SECC, 2011, the most evolved example of proxy-means targeting (PMT) in India. The list of the state government was prepared separately using state governments' criteria (mainly targeting BPL households). None of the schemes (BPL cards, old age pension, etc.) for which targeting was studied in the literature review, dealt with this complex system of dual targeting.

More importantly, the literature never gave room for more pragmatic questions. Assuming mistargeting errors and deficiencies in the administrative capacity of the government for perfect targeting., the more practical questions that should be raised are: (i) Is there a larger concentration of the poor in the coverage of an anti-poverty scheme like GSHI, compared to the non-poor? (ii) Is there a simple way to improve beneficiary targeting without elaborate PMT exercises?

Erreygers index (EI)³⁵ is a better tool to investigate the concentration of poor or rich (or even no concentration), which can capture the essence of the first question. Again,

³⁴ This ceiling rate (see G3.6 in Glossary) was ₹1,052 in the beginning of ABPMJAY in India/KASP in Kerala (Ghosh, 2019). Due to the larger claim payouts in various states, the per family claim payout easily surpassed this ceiling rate, due to which it had to be revised to ₹1,500 (Chandna, 2022).

³⁵ EI and its application would be discussed in the methodology section.

no study mentioned above has used this tool. While answering the second question, attention should also be devoted to the fiscal capacity of the state government. Very few studies have analyzed the fiscal impact of beneficiary targeting and none of them studied the dual targeting systems in India and the impact on cost-sharing ratios (between the union and state governments).

The literature also revealed that no study on beneficiary targeting within GSHI has been conducted in Kerala. Large-scale and representative surveys like DLHS-IV, NFHS-4 and NFHS-5 could be used to investigate the concentration of poor/rich households and this could remedy this research gap.

In the light of these research gaps, the following research questions could be framed:

1. How did GSHI schemes in Kerala generally fare in terms of population coverage and utilization (hospitalizations using GSHI) during 2008-2022?
2. Since the primary focus of GSHI schemes like RSBY has been the coverage of BPL households, did the GSHI schemes in Kerala adequately cover BPL households?
3. How did the top 10 states with the highest coverage of GSHI fare in terms of covering BPL households?
4. Given the precarious situation of fiscal health in Kerala, what are the fiscal implications of improved targeting of GSHI beneficiaries?

3.11 Research Objectives

1. To understand various phases of growth/degrowth in key performance indicators (KPIs) related to the main GSHI schemes in Kerala between 2008 and 2022 and their contemporary significance.
2. To compare the extent to which BPL households have been integrated into the GSHI net in Kerala, compared to other states in which GSHI coverage is higher.
3. To analyse the disaggregated impact of the complete/incomplete integration of BPL households into GSHI, across socio-economic categories, between 2016 and 2019 in Kerala.
4. To examine the implications on cost-sharing ratios of GSHI between the union and state governments, after the complete integration of BPL households into GSHI in Kerala.

3.12 Data and Methodology

3.12.1 Data

3.12.1.1 For the first objective

For the first objective, the time-series records, compiled from various government bodies were used. These included the statistical appendices of Kerala Economic Review between 2008 and 2023 as well as the Comptroller and Auditor General's (CAG) audit report on the General and Social sector of Kerala in 2015. Additionally, the data regarding the premiums of private health insurance was taken from PolicyX.com, which calculated a Health Insurance Price Index (HIPI) based on the health insurance premiums of five health insurance companies (Star Health and Allied Insurance Co. Ltd, ICICI General Lombard Insurance Co. Ltd, Bajaj Allianz General Insurance Co. Ltd, HDFC ERGO General Insurance Co. Ltd and Care Health Insurance Co. Ltd).

3.12.1.2 For the second and third objectives: Sample size, sampling design and justification for using three large-scale sample surveys to study beneficiary targeting of GSHI in Kerala.

For the second and third objectives, the unit-level records of District-level Household Survey-4 (DLHS-4) and National Family Health Surveys (NFHS-4 and NFHS-5) were used. Data collection of DLHS-4 was conducted in Kerala from April 2013 to February 2014, covering 20,089 households, one of the largest sample sizes for a large-scale survey in Kerala. The corresponding duration of data collection and sample size for NFHS-4 and NFHS-5 in Kerala were 8 March 2016 to 3 October 2016, covering 11,555 households and 20 July 2019 to 2 December 2019 covering 12,330 households respectively. All these surveys followed stratified multi-stage sampling.

Apart from their large sample sizes and timing of these surveys (all surveys were conducted between 2008 and 2020, coinciding with the introduction and maturation of GSHI schemes), these datasets collected information on various forms of household assets and about whether a household possessed a BPL card or not. Such information was not collected in other large-scale surveys like various rounds of National Sample surveys.

3.12.1.2.1 Sample design of District Level Household Survey (DLHS) – Round 4 (2012-2014)

The Ministry of Health and Family Welfare (MoHFW), Government of India, carried out the fourth round (DLHS-4) in 26 States and Union Territories of India during 2012-2014 excluding the 9 states covered under the Annual Health Survey (AHS). Previous to this, three rounds of DLHS were conducted (Round-I in 1998-99, Round-II in 2002-04, and Round-III in 2007-08). DLHS-4 utilized a multi-stage, stratified, probability proportional to size sample with replacement design. Each district was categorized into rural and urban areas. Villages were the primary sampling units (PSU) for rural areas, using the Census of India 2001 as the sampling frame. In urban areas, the PSUs were NSSO Urban Frame Survey (UFS) blocks, stratified into million-class cities and non-million class cities, with sample allocation based on relative sizes. Finally, 25 households were selected from each rural and urban PSU (Singh et al., 2018).

3.12.1.2.2 Sample design of National Family Health Surveys- Rounds 4 (2015-16) and 5 (2019-21)

Both NFHS-4 and NFHS-5 followed the same sampling design i.e., a stratified two stage sample. Each district was divided into a rural and urban stratum. While the villages and Census Enumeration Blocks (CEBs) in Census 2011 formed the primary sampling units (PSUs), the sampling strategy in rural and urban strata were different.

In the rural stratum, villages were selected using probability proportional to size (PPS). First, three substrata were created based on the estimated number of households in each village. Within each of these sub-strata two substrata were created based on the percentage of scheduled castes and scheduled tribes (SCs/STs). So, in total 6 substrata of equal size were created. Thereafter, within each substratum, PSUs were sorted according to the prevalence of literacy of females above 6 years of age.

In the urban stratum, CEBs were sorted according to the percentage of the SC/ST population in each CEB, and sample CEBs were selected with PPS sampling and the formed the PSUs in urban areas.

Following the selection of rural and urban PSUs, household mapping and listing was performed. PSUs containing around 300 households were divided into segments of approximately 100-150 households each. For the survey, two segments were chosen randomly using systematic sampling, with the probability of selection proportional to

the segment size. Consequently, an NFHS-4 cluster could be either a complete PSU or a segment of a PSU. In the subsequent stage, within each chosen rural and urban cluster, 22 households were randomly selected using systematic sampling (International Institute of Population Sciences, 2017; International Institute of Population Sciences, 2022).

3.12.1.3 For the last objective

For the last objective, the claims payout per household (CPPH) in 2020-21 and 2021-22, calculated as part of the first objective, along with data obtained from various government bodies (used for the first objective) were used.

3.12.2 Methodology-construction of variables and detailed plan of analysis

For the first objective, four key performance indicators (KPI) related to the population coverage of GSHI in Kerala were calculated. They were:

1. **Population coverage (PC)**³⁶: The ratio of total households enrolled in GSHI to the total households in the population of the state, expressed as a percentage (the total households in Kerala were taken as 87 lakh households, as per the data uploaded by the state government in the website of National Health Authority, India).
2. **Enrolment ratio (ER)**³⁷: The number of households covered by GSHI, expressed as a percentage of the targeted eligible households.
3. **Claims ratio**³⁸ (CR): The ratio of claims paid, to the premiums collected under RSBY-CHIS, multiplied by 100. CR above 100 implies loss for the insurance company and below 100 implies profit for the insurance company.
4. **Hospitalization ratio (HR)**³⁹: The ratio of total hospitalizations under RSBY-CHIS to the total number of insured individuals, multiplied by 100. The total number of insured individuals was calculated as the number of insured households multiplied by 4.2 (According to Census 2011, the average household size in Kerala was 4.2)

³⁶ See G3.27 in Glossary.

³⁷ See G3.14 in Glossary.

³⁸ See G3.10 in Glossary.

³⁹ See G3.22 in Glossary.

5. **Claims payout per household⁴⁰ (CPPH):** The total claim amount divided by number of households enrolled. The total claims paid included the claims under RSBY-CHIS and CHIS Plus. To analyze the significance of GSHI, the HIPI, calculated from the premiums of private insurance companies was compared to the CPPH in 2021-22.

For the second objective, the percentage coverage of GSHI and BPL households in 2013-14, 2016 and 2019 was estimated, along with the percentage of BPL households excluded from the GSHI net. Households who responded as being either covered by RSBY or state government schemes in the household questionnaire of DLHS-4, NFHS-4 and NFHS-5 were considered to be GSHI-covered.

Similarly, households responding as possessing a BPL card in the household questionnaire of DLHS-4, NFHS-4 and NFHS-5 were considered to be BPL households. However, in 2019, after the implementation of NFSA in Kerala in 2016, the earlier classification of BPL households was replaced by priority households (pink ration cards) and Antyodaya Anna Yojana households (yellow ration cards). Even then, the household questionnaire of NFHS-5 asked only whether a household possess a BPL card and did not include a question on the colour/type of ration card.

Following this, an inter-state analysis (selecting 10 states with the highest GSHI coverage in NFHS-5) of the concentration of poor households across GSHI and BPL status was estimated using the Erreygers Index (EI).

Before understanding EI, it is important to understand the concentration index (CI). According to Kakwani (1980) and O'Donnell et al. (2008), CI could be mathematically expressed as:

$$CI(h|y) = \frac{2 * cov(h_i, R_i)}{\bar{h}} \dots \dots \dots (3.3)$$

Where $\bar{h}$ is the average of the health variable and $cov(h_i, R_i)$ is the covariance between h_i , the health variable and R_i , the fractional rank of the socio-economic variable (income/consumption expenditure/wealth). In other words, CI is used to study the concentration of a continuous health variable (like health expenditures) across the distribution of a ranking variable (usually variables denoting socio-economic status like income, consumption expenditure or assets-based wealth scores).

⁴⁰ See G3.11 in Glossary.

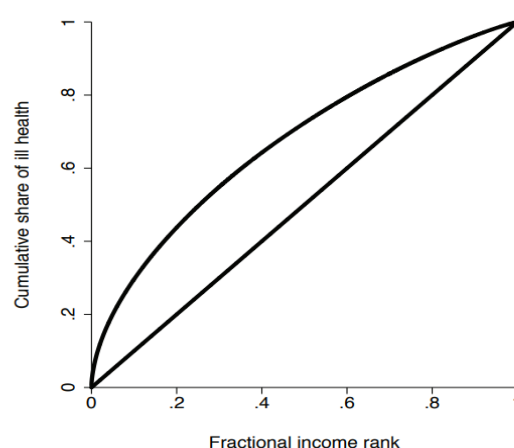
CI could lie between -1 and +1, the former indicating perfect pro-poor concentration of the health variable and the latter indicating perfect pro-rich concentration of the health variable.

“A concentration index of 0 can arise either because health does not vary with income rank or because the concentration curve crosses the 45° line and pro-poor inequality in one part of the income distribution is exactly offset by pro-rich inequality in another part of the distribution⁴¹” (O’Donnell et al., 2016).

Visually, CI could be defined as twice the area between the concentration curve (CC) and the 45-degree line (line of equality), as shown in Figure 3.2. When CI is between 0 and -1, the CC could lie below the line of equality and when CI is between 0 and +1, CC could lie above the line of equality⁴².

CI is used for estimate the concentration of poor or rich households in the distribution of a continuous variable like body mass index (BMI, height, weight, health expenditures etc. However, for binary variables like whether a household is covered by GSHI or not, more advanced tools like Wagstaff index or Erreygers index could be used (both are modifications on the CI, adjusting CI to accommodate the upper and lower limits of bounded/binary variables).

Figure 3.2: Concentration curve and the line of equality



Source: O’Donnell et al (2016).

⁴¹ See G3.9 in Glossary

⁴² Sometimes CC could also cut the line of equality, where a portion of CC would lie above the line of equality, while the other portion lies below the line of equality.

Also known as the modified/corrected concentration index, EI is a bivariate-rank dependent index that is used to study the concentration of a binary variable (bounded variable with lower and upper limits like ‘0’ and ‘1’) across the distribution of a ranking variable (usually variables denoting socio-economic status like income, consumption expenditure or assets-based wealth scores). The value of the index lies between -1 and +1, with the former signifying a perfect pro-poor distribution and the latter indicating a perfect pro-rich distribution. An index value of 0 indicates no concentration of the binary variable among either the poor or the rich. Mathematically, EI is defined as⁴³ (Erreygers, 2009):

$$EI = \frac{8}{n^2(b_h - a_h)} \sum_{i=1}^n z_i h_i \dots \dots (3.4)$$

Where $b_h - a_h$ is the difference between the maximum (b_h) and minimum limits (a_h) which are 1 (GSHI covered) and 0 (non-GSHI) in this case. n^2 is the square of the sample size, $z_i h_i$ is the health variable h_i of an individual (GSHI coverage) weighted with z_i . $z_i = \frac{n+1}{2} - \lambda_i$, where λ_i is the socio-economic rank of the individual. The socio-economic rank is based on the state-level wealth index position of a household in NFHS 4 and NFHS 5, constructed using principal components analysis (PCA)⁴⁴ (Rutstein & Johnson, 2004).

Estimation of CI could be done using a simple regression approach, by regressing the transformation of the variable on the ranking variable (O’Donnell et al., 2008; O’Donnell et al., 2016).

$$\frac{2\sigma_R^2}{\bar{h}} h_i = \alpha_0 + \alpha_1 R_i + \varepsilon_i \dots \dots (3.5)$$

Where R_i is the ranking variable, σ_R^2 is the variance of the ranking variable, h_i is the health variable and $\bar{h}$ is the mean of the health variable, α_0 is the intercept, α_1 is the slope coefficient of the ranking variable and ε_i is the error term. The transformation of the health variable is performed by multiplying the health variable by the ratio of twice the variance of the ranking variable by the mean of the health variable.

⁴³ See G3.15 in Glossary.

⁴⁴ See G3.28 in Glossary.

The CI estimated from equation (3) is called the standard concentration index.

Further, EI could also be estimated through the same equation by replacing $\frac{2\sigma^2_R}{\bar{h}}$ by $\frac{8\sigma^2_R}{\bar{a}-a^{min}}$, where $\bar{a}$ is the mean of the bounded health variable and a^{min} is the lower bound of the bounded health variable (O'Donnell et al., 2016). Further, the statistical significance of the estimated EI could be tested using the t/z-statistic, emerging from the regression.

Even though EI was chosen to investigate the distribution of GSHI status across wealth indices, there has been a debate (Kjellson & Gerdtham, 2013) on the suitability of EI compared to the Wagstaff index (WI). So, for comparison, WI was also constructed and included in Table 3C and Table 3D (in the appendix to this chapter).

The inter-state analysis also included a comparison of the 'current scenario⁴⁵,' i.e., the population coverage of GSHI in NFHS-5 as of 2019 and the 'simulated scenario⁴⁶,' i.e., a hypothetical situation (population coverage of GSHI) that may prevail in 2019, if the excluded BPL households were extended coverage.

Further, for a more detailed analysis, three measures were constructed:

1. The odds for a BPL household to have GSHI coverage.

Factor A or Odds(A)⁴⁷ = Percentage of BPL households covered by GSHI/
Percentage of BPL households not covered by GSHI.

2. The odds for a non-BPL household to have GSHI coverage.

Factor B or Odds(B)⁴⁸ = Percentage of non-BPL households covered by GSHI/
Percentage of non-BPL households not covered by GSHI.

3. Odds ratio (OR) or the transmission coefficient.

Odds(A)/Odds(B)⁴⁹ – It could be interpreted as the transmission coefficient, signifying a measure responsible for transmitting pro-poor concentration in BPL

⁴⁵ See G3.12 in Glossary.

⁴⁶ See G3.37 in Glossary.

⁴⁷ See G3.18 in Glossary.

⁴⁸ See G3.19 in Glossary.

households towards GSHI. The statistical significance of the OR was assessed using the t-test, built into the logistic command in STATA 15.

After the inter-state analysis, the disaggregated impact of the incomplete integration of BPL households into GSHI was studied by analysing the coverage changes, through estimating percentage change in the population coverage of GSHI, between 2019 and 2016 and between simulated and current scenarios, across various socio-economic variables (given in Table 3.3). The two sample proportions test was used to test whether these changes in coverage were statistically significant. For example, was the change in population coverage among OBC households between 2016 and 2019 and between simulated and current scenarios, statistically significant?

Table 3.3: List of socio-economic variables used to study the coverage and distributional changes

Variables	Categories
Type of residence	Rural or urban
Social group	Scheduled Tribes (ST), Scheduled Castes (SC), Other Backward Caste (OBCs) and General
Household size	Below and equal to 4 members, above 4 members
Education level of household head	No education/pre-school, primary education, secondary education, higher education
Religion of household head	Hindu, Muslim or Christian
BPL status	BPL, non-BPL households
Districts	Kasargode, Kannur, Wayanad, Kozhikode, Malappuram, Palakkad, Thrissur, Ernakulam, Idukki, Kottayam, Alappuzha, Pathanamthitta, Kollam and Thiruvananthapuram

Source: Categorical variables recoded from NFHS 4 and NFHS 5.

In the same manner, to study the distributional changes (changes in the Erreygers Index) between 2019 and 2016 and between simulated and current scenarios, the z-statistic was used (O'Donnell et al., 2016).

⁴⁹ See G3.26 in Glossary.

For example, was there any rise in pro-poor concentration (when the change in EI is negative) or pro-rich concentration (when the change in EI is positive) among OBC households between 2016 and 2019 and between simulated and current scenarios?

Studying the distributional changes is justified, since the period 2016-2019 covered only 3 years due to which a dramatic improvement in the asset portfolio within each socio-economic group should not be expected. If anything, between 2016 and 2019, Kerala witnessed Cyclone Ockhi (2017) and 2 monsoon-related floods (2018 and 2019), which may have led to the destruction of household assets in the disaster-affected areas.

Together the coverage and distributional changes in GSHI, across each socio-economic group will inform about the trends of GSHI coverage and its nature, under each scenario.

All the hypotheses testing in this chapter were performed using the `svyset` package in STATA, incorporating state-level household weights and clustering at the ‘DHS cluster’ level (to adjust for standard errors).

For the final objective, the share of GSHI costs, borne by the union and state governments (cost-sharing ratios) in 2020-21 and 2021-22 were calculated for both current and simulated scenarios, for which, two cost-sharing ratios were calculated for both scenarios:

- a. **The effective cost-sharing ratio⁵⁰:** The ratio at which costs were shared between the governments for only the households that the union government deemed eligible to be beneficiaries in Kerala, based on SECC 2011, without considering the ceiling rate.
- b. **The final cost-sharing ratio⁵¹:** The ratio at which costs were shared between the governments for all the GSHI-covered households in Kerala (identified by both union and state governments), without considering the ceiling rate.

Additionally, when the simulated scenario was considered for the final objective, an assumption was added to the definition of simulated scenario. Earlier simulated scenario was defined as a hypothetical situation (population coverage of GSHI and

⁵⁰ See G3.13 in Glossary.

⁵¹ See G3.21 in Glossary.

concentration of poor across GSHI status) that may prevail in 2019, if the excluded BPL households were extended coverage. Now, additionally it is assumed that the union government would shift the basis of beneficiary targeting from SECC 2011 to BPL households. So, the union government would cover the BPL households. Consequently, it will also follow that the state government would cover the non-BPL households.

3.13 Results and Discussion

3.13.1 Trends and phases in the performance of KPIs related to GSHI in Kerala between 2008-2022

Between 2008-2022, generally, all the KPIs showcased robust growth. Table 3.4 shows that in this period, PC more than tripled, rising from 13.5 per cent in 2008-10 to about 48 per cent in 2021-22 (with the inclusion of 2.16 lakh additional beneficiaries of KBF, the GSHI coverage in Kerala would rise to 50 per cent), and achieved 100 per cent ER by 2019, coinciding with the roll-out of ABPMJAY-KASP. This was also accompanied by a tripling of HR, from 2.9 per cent to 8.7 per cent in the corresponding period. (This should be compared to the growth of PC and ER of RSBY at the all-India level. RSBY, which started with a district-level approach for expansion, only covered 204 districts even in 2018-19. Also, even in 2018-19, it had only achieved an ER of just 65 per cent (Rao, 2018).

But upon close introspection, it becomes evident that even this stellar performance of GSHI in Kerala was comprised of periods of strong growth, stagnation, degrowth and revival in various KPIs. Based on the growth phases of the KPIs, the entire period of 2008-2022 could be divided into four parts.

Within the first five years of launching RSBY-CHIS (2008-12), the growth in the PC was about 138 per cent and the number of enrolled households grew from 12 lakh to 28 lakh households. This corresponded to the growth in ER from 75 per cent to 86 per cent, a growth of about 11 percentage points. This enthusiastic welcome of the GSHI schemes by the beneficiaries could be attributed to better awareness (brought about by high literacy rates) and the huge unmet need for policy interventions to tackle the sky-high medical expenditures in Kerala.

Table 3.4: KPIs of GSHI and its components in Kerala (RSBY-CHIS, CHIS-PLUS and ABPMJAY-KASP)

Year (1)	HHs enrolled (lakhs) (2)	Targetted HHs (lakhs) (3)	RSBY- CHIS/KASP Hospitalisations (lakhs) (4)	RSBY-CHIS/KASP Premium amount (₹ crore) (5)	RSBY- CHIS/KASP claims amount (₹ crore) (6)	CHIS-Plus claims amount (₹ crore) (7)	PC (%) (8)	ER (%) (9)	HR (%) (10)	CR (%) (11)	CPPH (₹) (12)
2008-10	11.78	15.7	1.43	51	45	0.28	13.5	75.0	2.89	88.2	384
2010-11	18.75	23.39	3.6	80	113	26.08	21.6	80.2	4.57	141.3	742
2011-12	28.01	32.69	6.98	205	212	56.94	32.2	85.7	5.93	103.4	960
2012-13	28.28	33.35	7	310	181	53.08	32.5	84.8	5.89	58.4	828
2013-14	29.73	34.62	5.57	219.5	199	68.02	34.2	85.9	4.46	90.7	898
2014-15	31.94	35.29	5.87	236	228	73.42	36.7	90.5	4.38	96.6	944
2015-16	31.94	NA	5.24	216	205.6	83.59	36.7	--	3.91	95.2	905
2016-17	32.53	NA	5.86	167	267.4	73.09	37.4	--	4.29	160.1	1047
2017-18	34.85	NA	7.08	268	314	80.58	40.1	--	4.84	117.2	1132
2018-19	40.96	NA	8.08	303	368	8.84	47.1	--	4.70	121.5	920
2019-20	41.40	NA	9.35	619.6	620.4	NA	47.6	100.0	5.38	100.1	1499
2020-21 (April-June)	41.42	NA	2.05	155.85	112.87	NA	47.6	--	1.17	72.4	272
2020-21 (July 2020-March 31, 2021)	41.52	NA	7.67	NA	552.91	NA	47.7	--	4.39	NA	1332
2021-22	41.62	NA	15.2	NA	1383.80	NA	47.8	--	8.69	NA	3324

Note: The enrolment ratio in 2019-20 (the rollout of ABABPMJAY-KASP) is taken as 100 per cent as the Government of Kerala declared subsuming of all beneficiary households covered hitherto by various GSHI schemes into the new scheme. Later, enrolment drives were conducted to identify more eligible beneficiaries.

Source: Calculated from various sources of data (mentioned in data) published by the Government of Kerala.

This could also be a shining example of the success of power decentralization in Kerala, as the enrolment drives for RSBY-CHIS were organized at the gram-panchayat/municipality/municipal corporation level. The rollout of the top-up scheme of CHIS-PLUS in 2010 (within just 2 years of rolling out RSBY-CHIS) would also have contributed, to keeping alive, the momentum in PC and ER. Not surprisingly, the HR as well as CPPH, more than doubled in the same period.

The CR, however, underwent rapid fluctuations in the period. It rose from a subdued 88 per cent in 2008-10 to 141 per cent in 2010-11, before coming down to 103 per cent in 2011-12, signifying a loss of ₹34 crores for insurance companies in the period.

In the second phase spanning 2012-15, while the PC grew at a snail's pace and even stagnated, ER improved from 85 per cent to about 90 per cent. The period also witnessed a fall in HR by about 34 percentage points (from 5.9 per cent to 4.4 per cent). The CPPH also dropped by about 14 per cent. The insurance companies were paid higher premiums in 2012-13, following which the CR dropped to about 59 per cent, allowing the companies to recover the losses in the previous period. Following this, the premium amount always remained higher than the claim amount, in the rest of the period, maintaining the CR between 91 to 95 per cent. The profit of the insurance companies in the period was about ₹168 crore.

In the third phase, ranging between 2016-2020, PC rose 10 percentage points, registering a growth of around 27 per cent. This could be attributed to the implementation of NFSA 2013, from November 2016 onwards, in Kerala, which dramatically increased the combined number of AAY and PHH households. (As per Kerala Economic Review 2016 and 2017, as of October 31, 2016, before the implementation of NFSA, the combined number of AAY and BPL households was about 20.65 lakhs out of 83.1 lakh ration cards. Thus, the combined share of the poor households was about 25 per cent.

After the implementation of NFSA, the combined number of AAY and PHH households increased to 35.1 lakhs out of 80.2 lakh ration cards. Consequently, the combined share of the poor households increased to about 43.6 per cent). This period also witnessed the rollout of SCHIS for senior citizens in 2016 and ABPMJAY-KASP in 2019.

By the end of 2020, the enrolment also reached 100 per cent. The hospitalization ratio strongly recovered, growing from 3.91 per cent to 5.4 per cent in the period, a growth of about 38 per cent. It was also accompanied by a robust growth in CPPH of about 66

per cent. Another interesting feature was that the majority of the growth in the above KPIs happened in just 2 years, between 2018-19 and 2019-20. However, this period was also marked by persistently high CR. It shot from a low of 95 per cent in 2015-16 to an all-time high of 160 per cent in 2016-17. It was brought down to 100 per cent by the end of the period, but the accumulated losses to insurance companies in the period reached ₹212 crores.

The fourth and the most transformational phase of GSHI in Kerala has been the one since the implementation of ABPMJAY-KASP (since 2019). Even with the population coverage being fixed at 48 per cent, this period saw a boom in HR and CPPH, wherein the former almost doubled from 5.38 per cent in 2018-19 to 8.72 per cent in 2021-22. The increase in the sum assured, to 5 lakh per household, the expanded health benefits packages along with the financial vulnerability during COVID-19 might have fuelled this growth in hospitalization. The rise in HR may also be signalling greater intra-household reliance on GSHI for hospitalization, as a study done in the Thiruvananthapuram district of Kerala in 2011 had shown that households rely on CHIS only for 40 per cent of all hospitalizations (Philip et al., 2016).

Table 3.5 provides an insight into the significance of GSHI for poor households in Kerala. While the corporate premiums increased as the age of household head progressed from 26 to 56 years, from ₹14,383 to ₹37,789, the effective GSHI premium (CPPH) remained fixed at ₹3,538. When the ratio of corporate premiums to the CPPH was calculated, it was obvious that even for the youngest household, the CPPH was almost 4 times smaller than the corresponding corporate premium.

There are two reasons which make the above finding significant. a. Unlike corporate premiums, CPPH is not directly paid from the pocket of the insured households. It is financed indirectly through the taxes collected by the government.

So, the GSHI-covered households need not even worry about timely payment of premiums (which is a huge issue with private insurance) as the governments (both at the union and state levels) collect the CPPH through taxes and become a single-payer (instead of multiple insurance companies, in the case of private insurance). This implies scale efficiencies in CPPH collection and claim payment. b. Secondly, unlike corporate premiums, CPPH did not consider, how young the insured household was and did not place any restriction on the household size and still was significantly lower than corporate premiums.

Table 3.5: Comparison of premiums in private insurance to the CPPH in ABPMJAY-KASP during 2021-22

Type of Insurance	Type of household	Premium/CPPH (₹)	Ratio of corporate premium to CPPH	Size of the risk pool (% of total population)
Private Insurance	Average premium for 5 lakhs with 2 adults and 2 children with the adults aged 26 years	14,383	$14,383/3,538 = 4$	4.3
	Average premium for 5 lakhs with 2 adults and 2 children with the adults aged 36 years	16,587	$16,587/3,538 = 4.68$	
	Average premium for 5 lakhs with 2 adults and 2 children with the adults aged 46 years	24,004	$24,004/3,538 = 6.78$	
	Average premium for 5 lakhs with 2 adults and 2 children with the adults aged 56 years	37,789	$37,789/3,538 = 10.68$	
ABPMJAY-KASP	CPPH for 5 lakhs with 4 members	3,538		48

Note: The percentage share of private insurance in Kerala's population was estimated as the weighted percentage of households covered either by employer-paid private insurance or by privately purchased commercial health insurance, using the unit -level records in NFHS-5 (2019-21).

Source: Data about private insurance was obtained from the Health Insurance Price Index from PolicyX.com and CPPH was taken from Table 3.4.

One of the primary reasons for such a wide gap in corporate premiums and CPPH of GSHI was the size of the risk pool. While the size of GSHI was about 42 lakh households, constituting about 48 per cent of Kerala's population, private health insurance covered only 4.3 per cent of Kerala's population.

So, in effect, GSHI acts as a huge group insurance, effectively cross-subsidizing the elderly population with the young population, the sick with the healthy, etc., within the pool of beneficiaries. In comparison, private insurance itself consists of group insurance schemes, family floater schemes and individual schemes. Further, general insurance companies and standalone health insurance companies compete for this tiny share of private insurance.

All these imply fragmentation of the risk pool, open to private health insurance- a diametrically opposite situation compared to GSHI. Another reason for higher corporate premiums would be the costs incurred by private insurers in marketing (advertising costs), policy renewal, etc., and above all the profit margins added to the premiums. Due to 100 per cent enrolment in Kerala and the non-requirement of yearly renewals, GSHI eliminates the need for such costs and hence could be lower than corporate premiums.

3.13.2 The core structural issue in the beneficiary targeting of GSHI in Kerala: The persistent exclusion of BPL households from the GSHI net

Even with the stellar performance of the KPIs from population coverage to hospitalization ratio in the 2008-2022 period and the benefits of lower CPPH due to the bigger risk pool and lower costs of GSHI, this story of success still masks a gargantuan policy failure. This policy failure is regarding the lapses in the targeting of GSHI beneficiaries.

RSBY was the first major pan-Indian GSHI scheme that was designed for 'BPL' households and unorganized sector workers. As mentioned in the background, it was also extended to various other vulnerable groups. But what if all these measures, aimed at ensuring that the most vulnerable households had GSHI coverage in Kerala, fell short by a wide margin? This is exactly what happened and in the ensuing explanation, this study argues that the main reason for the same has been the incomplete integration of BPL card-holding households into the GSHI net.

This incomplete integration has been a core structural issue and has persisted right from the commencement of RSBY-CHIS in Kerala. Table 3.6 provides evidence for the same. In 2013-14, 2016 and 2019, throughout various stages of GSHI in Kerala, a

substantial percentage of BPL households (above 35 per cent) have always remained outside of the GSHI net.

From Table 3.4 showed that the ER in 2013-14 was just 86 per cent while the ER in 2015-16 or 2017-17 was not available. So, the exclusion of BPL households from GSHI in 2013-14 and 2016 as shown in Table 3.6 may not have come as a surprise. But Table 3.4 showed that the ER reached 100 per cent in 2019-20. So, the exclusion of 36 per cent of BPL households in spite of 100 per cent ER should be viewed as a structural issue in the targeting of GSHI beneficiaries.

However, it is also noteworthy that between 2016 and 2019, the exclusion reduced by about 9 percentage points. Nevertheless, even with this impressive catch-up (mainly triggered by the increase in BPL households, post the implementation of NFSA 2013, from 2016 onwards), a sizeable chunk of 35.4 per cent of BPL households still remained excluded.

Table 3.6: The extent of exclusion of BPL cardholders from GSHI between 2013 and 2019 in Kerala

Percentage distribution	DLHS-IV (2013-14)	NFHS-4 (2016)	NFHS-5 (2019)
GSHI (RSBY& State scheme) (%)	32.62	38.48	47.78
BPL households (%)	30.3	30.3	43.5
BPL households excluded from GSHI coverage (%)	40.7	44.2	35.4

Note: State-level household weights have been used to estimate the percentages.

Source: Estimated using unit-level records of DLHS-IV, NFHS-4 and NFHS-5.

3.13.3 Why should one be concerned about the exclusion of BPL households from GSHI in Kerala?

The previous sub-section analysed the extent of exclusion of BPL households from GSHI between 2013 and 2019. Table 3.7 explains the reason why this should be a cause for concern, in the current scenario (2019). In Table 3.7, assets with serial numbers from 1-7 indicate affluence and from serial numbers 8-9 indicate deprivation/vulnerability. The difference in the ownership of these assets/facilities between BPL and non-BPL households would be clear once columns 3 and 4 are compared. While non-BPL households possessed more affluent assets/facilities (like computer, truck, refrigerator, washing machine, air conditioner etc.), BPL households used wood for cooking and asbestos for roofing, both signifying deprivations.

Further, the comparison between columns 5 and 3 of Table 3.7 would show that the asset ownership of BPL households was almost the same as the BPL households excluded from GSHI. On the other hand, comparison between columns between 5 and 6 would show the difference between the excluded BPL households and non-BPL households which are included. It could be seen that there is a stark difference between these two groups. This signifies the importance of extending GSHI coverage to the excluded BPL households.

The above 10 assets along with about 20 other assets have been used to generate wealth quintiles, using principal components analysis (please see sub-section 3.12.2 for the discussion on how to generate wealth quintiles from household assets). Due to this, the combined influence of a wide variety of assets could be classified as wealth quintiles as shown in Table 3.8.

Further, while Table 3.7 gave an idea of the current state of affairs in 2019, Table 3.8 pointed towards the what if scenario: What if the excluded BPL households were extended GSHI coverage? It could be seen that in the simulated scenario (the what if scenario), 9 out of 10 households in the poorest, poor and middle quintiles and 7 out

Table 3.7: A comparison of the ownership of household assets and access to facilities between various household groups in Kerala in 2019 (current scenario)

Sl.no (1)	Household assets and access to facilities (2)	BPL households (3)	Non-BPL households (4)	BPL households excluded by GSHI (5)	Non-BPL households covered by GSHI (6)
1	Owns Computer (%)	5.92	27.45	8.08	19.07
2	Has access to the internet (%)	17.57	34.64	20.20	27.10
3	Owns Car/Truck (%)	6.82	37.50	8.60	26.81
4	Owns Refrigerator (%)	59.46	88.27	60.64	84.85
5	Owns Washing machine (%)	15.93	56.27	20.91	42.97
6	Owns Air conditioner/cooler (%)	3.25	21.25	5.47	10.72
7	Uses LPG for cooking (%)	60.59	79.57	63.89	73.14
8	Uses wood for cooking (%)	37.57	19	34.41	25.57
9	Uses asbestos for roofing (%)	11.02	3.64	10.01	5.17

Source: Estimated from unit-level records of NFHS-5 (2019-21).

of 10 households in the rich quintile would be covered. This implied near universal coverage of poor and middle-class households in Kerala. Simultaneously, this also ensured that the lowest rise in coverage was in the richest quintile.

Table 3.8: A comparison of how households belonging to various wealth quintiles would be covered under current and simulated scenarios in Kerala

Wealth Quintiles	Current Scenario		Simulated Scenario	
	Non-GSHI	GSHI-covered	Non-GSHI	GSHI-covered
Poorest (%)	53.84	46.16	9.21	90.79
Poor (%)	39.85	60.15	9.97	90.03
Middle (%)	36.10	63.90	13.57	86.43
Rich (%)	44.59	55.41	28.47	71.53
Richest (%)	68.46	31.54	60.25	39.75

Source: Estimated using unit-level records of NFHS-5 (2019-21).

3.13.4 The stalled transmission of pro-poor concentration from BPL-covered households to GSHI-covered households: Where does Kerala figure among the 10 states with the higher GSHI coverage?

Table 3.9 further builds on the data in Tables 3.7 and 3.8 and reveals the real potential of extending GSHI to the excluded BPL households in Kerala, compared to other states.

At the all-India level, in the current scenario, GSHI coverage was 25 per cent with almost no concentration of poor households. The situation improved dramatically in the simulated scenario (when the excluded BPL households were extended GSHI coverage). In the simulated scenario, while the GSHI coverage rose to about 56 per cent, the EI across GSHI status improved to -0.25. In Kerala, under the current scenario, there was a difference of only 4.4 percentage points in the population coverage of BPL cards and GSHI. However, there existed a wide gap in the concentration of poor households in both schemes. From Table 3.9, with an EI of -0.31, it was clear that compared to 10 states with higher coverage of GSHI in NFHS-5, Kerala had the highest concentration of poor households across GSHI status. The more surprising finding was that the EI across BPL status in Kerala was much higher at -0.54, again ranking the highest among all the 10 states.

Table 3.9: The relationship in pro-poor targeting between BPL and GSHI-covered households in 2019-21

States (1)	Population Coverage of GSHI (%) Current Scenario (2)	EI (GSHI status) Current Scenario (3)	Population Coverage of GSHI (%) Simulated Scenario (4)	EI (GSHI status) Simulated Scenario (5)	Population Coverage of BPL (%) (6)	EI (BPL status) (7)	Percentage of BPL population covered by GSHI schemes (8)	Odds for a BPL household to have GSHI coverage (Factor A) (9)	Odds for a non-BPL household to have GSHI coverage (Factor B) (10)	Odds ratio (Transmission coefficient) (Factor A)/ (Factor B) (11)
Andhra Pradesh	76.4	-0.16***	92.30	-0.15***	89.79	-0.18***	82.33	4.65	0.32	14.23***
Telangana	64.3	-0.23***	88.4	-0.27***	85	-0.22***	72	2.53	0.3	8.55***
Kerala	47.9	-0.31***	63.1	-0.47***	43.5	-0.54***	64.67	1.83	0.54	3.40***
Rajasthan	85.5	-0.11***	87	-0.12**	23.6	-0.24***	93.5	14.43	4.9	2.94***
Chhattisgarh	60.7	-0.02	91.95	-0.11***	86.74	-0.18***	64	1.77	0.65	2.74***
Odisha	43.7	-0.10***	66.8	-0.25***	48.9	-0.30***	52.8	1.12	0.54	2.07***
Meghalaya	58	0.04	78.8	-0.06**	56.3	-0.17***	37.1	1.69	1.07	1.58***
Goa	59.46	-0.01	67.8	-0.07*	26	-0.21***	67.33	2.06	1.32	1.56***
Tamil Nadu	56.7	-0.15***	64.8	-0.18***	22.74	-0.15***	64.1	1.78	1.19	1.49***
Mizoram	43.7	-0.05*	56.8	-0.31***	25.2	-0.47***	52.1	0.91	0.73	1.25**
India	25	0.0145	56.1	-0.25***	45.1	-0.31***	30.95	0.45	0.25	1.79***

Note: 1. The table has been sorted based on odds ratio (OR).

2. The population coverage of GSHI and BPL cards is based on the responses of the households at the time of NFHS-5. In the case of GSHI, the coverage would have increased in 2023. In the case of BPL cards, the respondents in particular states may be beneficiaries of the state-level schemes apart from NFSA, 2013, which could result in the estimated BPL coverage being higher than the state-level quota decided for each state under NFSA, 2013. The estimated BPL coverage could also be lower than NFSA quotas in some states, due to non-sampling errors like lack of correct information on the part of the respondent or due to poor understanding of the question, etc.

3. *p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01

Source: Estimated using unit-level records of NFHS-5.

Also, most of the states had a larger concentration of poor households in the BPL group, compared to the GSHI group. Observing from this angle, while increasing the number of BPL households in GSHI could enhance the concentration of poor households, increasing the number of non-BPL households could have the opposite effect of reducing the concentration of poor households.

Hence, analyzing the EI of GSHI through the interplay of Factor A (odds for a BPL household to have GSHI coverage) and Factor B (odds for a non-BPL household to have GSHI coverage) makes sense. Further, the ratio of Factor A to Factor B or the odds ratio could act as a measure to gauge the transmission of concentration of poor households from the BPL households to GSHI.

Kerala was ranked third in this transmission ratio, after Andhra Pradesh and Telangana. But it stood out among the other states, regarding the extent to which pro-poor concentration in GSHI would increase, with 100 per cent integration of BPL households into GSHI (simulated scenario). Column 4 of Table 3.9 provides an insight regarding this. After the integration, Kerala would have emerged as the state with the highest concentration of poor households in GSHI.

3.13.5 The disaggregated impact of the incomplete integration of BPL households with GSHI in Kerala: Coverage and distributional changes under current and simulated scenarios

The first glimpse at Table 3.10 provides a deep insight that carries forward even into the disaggregated analysis. The changes between 2016 and 2019 were accompanied by a rise in GSHI coverage of 9.3 percentage points with no change in the pro-poor concentration. Compared to this, in the simulated scenario, the GSHI coverage increased by 15.3 percentage points with a significant increase in the pro-poor concentration.

At a disaggregated level, between 2016 and 2019, the same pattern of growth (growth in GSHI coverage with no change in pro-poor concentration) continued in rural and urban areas, across all religions, and in BPL and APL households. The pattern continued among various social groups except for the SC community (growth with decline in pro-poor concentration) and in all districts except Kannur, Thrissur, Pathanamthitta (growth with improvement in pro-poor concentration) and Palakkad (growth with deterioration in pro-poor concentration).

Table 3.10: Change in GSHI coverage and distribution in Kerala between 2016, 2019 (current scenario) and simulated scenarios

	Percentage coverage of GSHI in the total population.			Distribution of GSHI in the total population.			Changes between 2016 and 2019		Expected changes due to 100% integration of GSHI with BPL cards.	
	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario)	Simulated Scenario (2019)	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	Change in GSHI coverage	Change in GSHI distribution	Change in GSHI coverage	Change in GSHI distribution
	(%)			EI			% change	EI ((2019)-EI (2016))	% change	EI (Simulated Scenario-Current Scenario)
				(Std.error)			(Std.error)	(Std.error)	(Std.error)	(Std.error)
Kerala	38.48	47.78	63.09	-0.300*** (0.014)	-0.311*** (0.013)	-0.47*** (0.011)	9.3*** (0.01)	-0.010 (0.019)	15.31*** (0.00)	-0.158*** (0.017)
Socio-economic subgroups.										
Type of Residence										
Rural	42.99	54.34	69.35	-0.269*** (0.018)	-0.251*** (0.164)	-0.419*** (0.013)	11.35*** (0.01)	0.017 (0.024)	15.01** (0.01)	-0.168*** (0.021)
Urban	33.30	40.48	56.13	-0.301*** (0.021)	-0.30*** (0.02)	-0.465*** (0.164)	7.18*** (0.02)	0 (0.029)	15.65** (0.01)	-0.164*** (0.026)
Social Groups										
SC	54.12	62.89	85.55	-0.186*** (0.036)	-0.076** (0.035)	-0.214*** (0.027)	8.77*** (0.03)	0.11** (0.05)	22.66** (0.02)	-0.138*** (0.044)
ST	54.44	65.15	88.70	-0.134* (0.080)	-0.12** (0.055)	-0.214*** (0.05)	10.71** (0.05)	0.013 (0.097)	23.55*** (0.02)	-0.09 (0.075)

	Percentage coverage of GSHI in the total population.			Distribution of GSHI in the total population.			Changes between 2016 and 2019		Expected changes due to 100% integration of GSHI with BPL cards.	
	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario)	Simulated Scenario (2019)	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	Change in GSHI coverage	Change in GSHI distribution	Change in GSHI coverage	Change in GSHI distribution
	(%)			EI			% change	EI ((2019)-EI (2016))	% change	EI (Simulated Scenario-Current Scenario)
				(Std.error)			(Std.error)		(Std.error)	
OBC	41.40	49.29	64.52	-0.255*** (0.019)	-0.281*** (0.018)	-0.42*** (0.015)	7.89*** (0.02)	-0.026 (0.026)	15.23*** (0.01)	-0.138*** (0.024)
None of them (General)	29.48	41.00	53.15	-0.30*** (0.020)	-0.339*** (0.018)	-0.48*** (0.017)	11.52*** (0.02)	-0.038 (0.027)	12.15*** (0.01)	-0.141*** (0.025)
Household size										
Below and equal to 4 members	37.34	46.01	61.21	-0.276*** (0.016)	-0.322*** (0.015)	-0.486*** (0.012)	8.67*** (0.01)	-0.04** (0.022)	15.20*** (0.01)	-0.163*** (0.019)
Above 4 members	40.96	51.88	67.45	-0.354*** (0.020)	-0.292*** (0.021)	-0.438*** (0.183)	10.92*** (0.01)	0.06** (0.029)	15.57*** (0.01)	-0.145*** (0.027)
Education level of household head										
No Education, preschool	51.12	59.10	86.44	-0.156*** (0.050)	-0.034 (0.043)	-0.146*** (0.034)	7.98*** (0.04)	0.12* (0.066)	27.34*** (0.02)	-0.111*** (0.056)
Primary Education	48.56	60.52	81.21	-0.199*** (0.026)	-0.129*** (0.025)	-0.232*** (0.02)	11.96*** (0.02)	0.07* (0.069)	20.69*** (0.01)	-0.102*** (0.032)

	Percentage coverage of GSHI in the total population.			Distribution of GSHI in the total population.			Changes between 2016 and 2019		Expected changes due to 100% integration of GSHI with BPL cards.	
	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario)	Simulated Scenario (2019)	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	Change in GSHI coverage	Change in GSHI distribution	Change in GSHI coverage	Change in GSHI distribution
	(%)			EI			% change	EI ((2019)-EI (2016))	% change	EI (Simulated Scenario-Current Scenario)
				(Std.error)			(Std.error)		(Std.error)	
Secondary Education	38.03	47.33	61.69	-0.247*** (0.017)	-0.276*** (0.015)	-0.416*** (0.013)	9.3*** (0.01)	-0.028 (0.022)	14.36*** (0.01)	-0.14*** (0.020)
Higher Education	16.65	21.80	26.99	-0.199*** (0.024)	-0.187*** (0.026)	-0.221*** (0.028)	5.15*** (0.02)	0.011 (0.036)	5.19*** (0.01)	-0.033 (0.038)
Religion of household head										
Hindu	43.52	53.48	68.88	-0.302*** (0.018)	-0.305*** (0.017)	-0.466*** (0.014)	9.96*** (0.02)	0 (0.025)	15.4*** (0.01)	-0.162*** (0.022)
Muslim	32.05	39.73	56.42	-0.194*** (0.028)	-0.197*** (0.027)	-0.357*** (0.024)	7.68*** (0.02)	0 (0.039)	16.69*** (0.01)	-0.16*** (0.036)
Christian	30.44	40.83	54.19	-0.312*** (0.024)	-0.357*** (0.024)	-0.508*** (0.022)	10.39*** (0.02)	-0.044 (0.034)	13.36*** (0.01)	-0.151*** (0.033)
BPL status										
No	31.12	34.98	34.98	-0.253*** (0.015)	-0.233*** (0.15)	-0.233*** (0.015)	3.86*** (0.01)	0.012 (0.02)	0	0

	Percentage coverage of GSHI in the total population.			Distribution of GSHI in the total population.			Changes between 2016 and 2019		Expected changes due to 100% integration of GSHI with BPL cards.	
	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario)	Simulated Scenario (2019)	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	Change in GSHI coverage	Change in GSHI distribution	Change in GSHI coverage	Change in GSHI distribution
	(%)			EI			% change	EI ((2019)-EI (2016))	% change	EI (Simulated Scenario-Current Scenario)
				(Std.error)			(Std.error)		(Std.error)	
Yes	55.75	64.67	100	-0.111*** (0.022)	-0.073*** (0.176)	0	8.92*** (0.02)	0.038 (0.028)	35.33*** (0.01)	0.073*** (0.017)
Districts										
Kasargode	32.84	44.40	65.89	-0.236*** (0.040)	-0.243*** (0.043)	-0.372*** (0.038)	11.56*** (0.04)	0 (0.059)	21.49*** (0.02)	-0.129** (0.057)
Kannur	33.51	45.60	56.69	-0.285*** (0.038)	-0.381*** (0.033)	-0.468*** (0.026)	12.09*** (0.04)	-0.1* (0.05)	11.09*** (0.01)	-0.09** (0.042)
Wayanad	57.03	63.82	79.63	-0.187*** (0.053)	-0.105** (0.043)	-0.299*** (0.033)	6.79** (0.03)	0.082 (0.068)	15.81*** (0.02)	-0.193*** (0.054)
Kozhikode	50.95	60.77	69.49	-0.326*** (0.048)	-0.293*** (0.039)	-0.371*** (0.035)	9.82** (0.04)	0.033 (0.062)	8.72*** (0.01)	-0.077 (0.052)
Malappuram	31.85	43.58	60.03	-0.208*** (0.054)	-0.19*** (0.05)	-0.369*** (0.049)	11.73*** (0.04)	0.017 (0.074)	16.45*** (0.01)	-0.178** (0.070)
Palakkad	43.77	55.03	72.84	-0.388*** (0.032)	-0.241*** (0.040)	-0.393*** (0.032)	11.26*** (0.04)	0.15*** (0.05)	17.81*** (0.02)	-0.15*** (0.05)

	Percentage coverage of GSHI in the total population.			Distribution of GSHI in the total population.			Changes between 2016 and 2019		Expected changes due to 100% integration of GSHI with BPL cards.	
	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario)	Simulated Scenario (2019)	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	Change in GSHI coverage	Change in GSHI distribution	Change in GSHI coverage	Change in GSHI distribution
	(%)			EI			% change	EI ((2019)-EI (2016))	% change	EI (Simulated Scenario-Current Scenario)
				(Std.error)			(Std.error)		(Std.error)	
Thrissur	28.62	42.20	58.22	-0.289*** (0.045)	-0.401*** (0.033)	-0.551*** (0.031)	13.58*** (0.04)	-0.11** (0.056)	16.02*** (0.02)	-0.15*** (0.045)
Ernakulam	25.12	36.57	52.69	-0.282*** (0.031)	-0.258*** (0.04)	-0.434*** (0.004)	11.45*** (0.04)	0.024 (0.051)	16.12*** (0.02)	-0.175*** (0.056)
Idukki	48.69	60.66	76.09	-0.185*** (0.058)	-0.254*** (0.043)	-0.39*** (0.037)	11.97** (0.05)	-0.07 (0.072)	15.43*** (0.02)	-0.135*** (0.057)
Kottayam	44.93	46.24	58.62	-0.299*** (0.043)	-0.367*** (0.036)	-0.535*** (0.034)	1.31 (0.04)	-0.067 (0.056)	12.38*** (0.01)	-0.168*** (0.049)
Alappuzha	48.43	56.21	69.51	-0.337*** (0.047)	-0.305*** (0.042)	-0.431*** (0.032)	7.78** (0.04)	0.031 (0.063)	13.3*** (0.01)	-0.125** (0.053)
Pathanamthitta	33.34	48.55	60.92	-0.273*** (0.040)	-0.376*** (0.038)	-0.527*** (0.03)	15.21*** (0.03)	-0.102* (0.055)	12.37*** (0.01)	-0.151*** (0.048)
Kollam	38.63	50.80	67.05	-0.127*** (0.042)	-0.23*** (0.05)	-0.451*** (0.034)	12.17*** (0.03)	-0.103 (0.066)	16.25*** (0.01)	-0.221*** (0.061)

	Percentage coverage of GSHI in the total population.			Distribution of GSHI in the total population.			Changes between 2016 and 2019		Expected changes due to 100% integration of GSHI with BPL cards.	
	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	Change in GSHI coverage	Change in GSHI distribution	Change in GSHI coverage	Change in GSHI distribution
	(%)			EI			% change	EI ((2019)-EI (2016))	% change	EI (Simulated Scenario-Current Scenario)
				(Std.error)			(Std.error)		(Std.error)	
Thiruvananthapuram	41.21	38.51	58.81	-0.308*** (0.051)	-0.333*** (0.044)	-0.547*** (0.034)	-2.7 (0.05)	-0.025 (0.067)	20.3*** (0.02)	-0.213*** (0.056)

Note: *p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01.

Source: Estimated using unit-level records of NFHS-4 and NFHS-5 for Kerala.

Among both large and small households, between 2016 and 2019, GSHI coverage increased. However, among the former while the rise in GSHI coverage came with a rise in the concentration of poor households, in the latter it came with a decline in the concentration of poor households. Further, even though there was a rise in GSHI coverage for ST households along with Wayand and Idukki districts (districts where ST population is high) between 2016 and 2019, it was accompanied by almost no change in the concentration of poor households in ST households and these districts.

In the simulated scenario, apart from the obvious growth in coverage, significant improvement in pro-poor concentration was guaranteed, irrespective of socio-economic groups. Now that the question of improving pro-poor concentration is settled, a closer assessment of the rise in population coverage will indicate the groups that will benefit in the simulated scenario.

Although all socio-economic groups gain statistically significant coverage in the simulated scenario, considering a growth in coverage of more or equal to 20 percentage points, it is revealed that households belonging to SC and ST communities, households with poorly educated heads (no education, preschool and primary education), along with households residing in Kasargode, Palakkad and Trivandrum stand to gain the most⁵².

Interestingly, this growth, even while favouring the socially and economically backward groups in Kerala, did not discriminate between rural and urban areas or between various household sizes (Across rural/urban area and various household sizes, the rise in GSHI coverage as well as rise in concentration of poor households was almost the same). This is a testament to the effectiveness of BPL targeting in Kerala and highlights the need for fully integrating the excluded BPL households into GSHI.

⁵² Table 3D in the appendix showed that even when considering a growth of 20 percentage points and above, Wagstaff index (WI) showed that compared to EI, the rise in pro-poor concentration across GSHI status was higher among SC and ST households and households with poorly educated household heads in the simulated scenario (compared to the current scenario).

3.13.6 The fiscal implication of covering the excluded BPL households- Will the cost-sharing ratio of GSHI in Kerala between the union and state governments be different under the current and simulated scenarios?

Having examined the benefits of the simulated scenario, in terms of rise in population coverage and concentration of poor households, it would be important to examine the fiscal implications of the simulated scenario. Table 6 presents information regarding the same. From Table 6, it could be seen that compared to the standard cost-sharing ratio, the effective and final sharing ratios substantially change based on two factors: 1. The scenario (current/simulated) and 2. The cost of GSHI per household/CPPH.

To understand this better, consider the years 2020-21 and 2021-22 (Table 3.11). In 2020-21, under the current scenario and a ceiling rate of ₹1,500 the effective cost-sharing ratio was 53:47 and not 60:40. This further deteriorated to 28:72, when the final cost-sharing ratio was considered. This completely overturned the principle of the cost-sharing ratio at 60:40, between the union and state governments under centrally sponsored schemes. Even in the simulated scenario, the effective cost-sharing remained at 53:47, but in the final cost-sharing ratio, the share of the union government rose to 36 per cent compared to 27 per cent in the current scenario. In 2021-22, the share of the union government decreased further in both effective and final cost sharing ratio under both current and simulated scenario. This was due to the rise in CPPH in 2021-22 which was almost twice the cost of GSHI per household in 2020-21.

3.13.7 The deterrents in public policy in the way of complete integration of BPL households into GSHI and possible solutions

The complete integration of BPL households into GSHI would ensure more coverage as well as a higher concentration of poor households. However, two main deterrents for the same could be identified from the results in 3.13.6.

1. As discussed in the fiscal implications of the simulated scenario, ABPMJAY-KASP, being the state-level version of ABPMJAY (section 3.9), is being implemented as a centrally sponsored scheme (CSS), involving cost sharing between the union and state governments.

Table 3.11: Cost-sharing ratios of ABPMJAY-KASP in Kerala under current and simulated scenarios

Particulars	Current Scenario	Simulated Scenario (Projected)	Current Scenario	Simulated Scenario (Projected)
Cost of GSHI per household (₹) – (1)	1708 (2020-21)		3324 (2021-22)	
Percentage of households covered by GSHI (%) – (2) (From Table 4)	48	63.1	48	63.1
Number of GSHI-covered households (lakhs) – (3) (Based on a total of 87 lakh households in Kerala- ((2)x 87 lakh households)	41.52	54.8	41.52	54.8
Number of households covered by the union government – (4) (Based on SECC in current scenario and BPL list in simulated scenario)	22,03,589	37,84,500	22,03,589	37,84,500
Total cost for GSHI (₹) - (5) (Based on (1) x (3))	709.2 crores	936 crores	1380.1 crores.	1821.6 crores.
Union government's share in total costs of 22.03/37.84 lakh households (based on 60% of ₹1,500= ₹900) (₹) – (6)	22,03,589 x 900 = 198.3 crores	37,84,500 x 900 = 340.6 crores	22,03,589 x 900 = 198.3 crores	37,84,500 x 900 = 340.6 crores.
State government's share in total costs of 22.03/37.84 lakh households (based on 40% of ₹1,500= ₹600) (₹) – (7)	22,03,589 x 600 = 132.2 crores	37,84,500 x 600 = 227 crores	22,03,589 x 600 = 132.2 crores	37,84,500 x 600 = 227 crores.
The additional share of state government in total costs of	22,03,589 x 208	37,84,500 x 208	22,03,589 x 1,824	37,84,500 x 1,824

22.03/37.84 lakh households (based on ₹1,708- ₹1,500=₹208 in 2020-21 and ₹3,324-₹1,500=₹1,824 in 2021-22) (₹)– (8)	= 45.83 crores	= 78.71 crores	= 401.9 crores	= 690.3 crores
Total payout for households covered by the union government, had the costs been shared on the basis of cost of GSHI per household (₹)– (9)	22,03,589 x 1708 = 376.37 crores	37,84,500 x 1708 = 646.39 crores	22,03,589 x 3324 = 732.47 crores	37,84,500 x 3324 =1258 crores
Total net cost borne by state government (₹) – (10) (5)-(6)	709.2-198.3 = 510.9 crores	936-340.6 = 595.4 crores	1380.1-198.3 = 1181 crores	1821.6-340.6 =1481 crores
Effective cost-sharing ratio (union: state) for households covered by the union government – (11) (Based on the ratio of (6) to the sum of (7) and (8))	53:47	53:47	27:73	27:73
Final cost-sharing ratio (union: state) for all covered households – (12) (Based on the ratio of (6) to (10))	28:72	36:64	14:86	19:81

Notes: 1. Cost of GSHI per household in 2020-21 is calculated based on premiums paid between April to June 2020 and CPPH between July 2020 to March 2021. Cost of GSHI per household in 2021-22 is calculated based on CPPH in 2021-22.

2. Number of BPL households in Kerala has been calculated as 43.5 % of 87 lakh households. However, Economic Review of 2022, published by Kerala State Planning Board reported the total number of BPL households to be 39, 00, 049 (5,94,591 AAY households and 33,05,458 priority households). Also, the total number of ration cards/households was 90,21,229. But National Health Authority relied on the figure of 87 lakh households as the total number of households in Kerala. Due to this, this study too relied on 87 lakh households.

Source: Calculated using data from Kerala Economic Review 2022 and State Health Agency, Kerala.

However, the stipulation on the part of the union government that the costs would be shared only for the households identified by SECC 2011 (and not BPL households) could be re-considered. This is because NFSA 2013, based on rigorous exclusion and inclusion criteria, similar to SECC 2011, has already identified the BPL households (PHH and AAY households), selected by the state government, as being 'poor'. The union government is also contributing towards the food subsidy for the BPL households, along with the state government. Thus, the union government is already relying on BPL list rather than SECC for National Food Security Act. In spite of these facts, the impediment to covering the excluded BPL households with GSHI would be the reliance on SECC 2011.

2. Secondly, under the current ceiling rate and cost-sharing arrangements, the additional outflow of costs from the part of the union government for covering the excluded BPL households would only be ₹142.3 crores (₹340.6-198.3 crores) in both 2020-21 and 2021-22. However, due to the sky-high hospitalization rate and the subsequent rise in CPPH, the cost-sharing would still be skewed toward the state government. In 2021-22, the state government will have to bear ₹300 crores (₹1481-1181 crores), which is more than double the additional costs borne by the union government. This would be the second deterrent, this time, on the part of the state government to extend GSHI coverage to the excluded BPL households.

The solution to the first deterrent would be to migrate towards the BPL list as the basis of inter-governmental cost sharing for GSHI, which can automatically extend coverage to the excluded BPL households. The solution to the second deterrent could be for the state government to strongly appeal to the union government to raise the ceiling rate per household from the current rate of ₹1,500, which could result in a more balanced effective and final cost-sharing ratios.

As per the seventh schedule of the Indian Constitution, health is an item under the remit of the state government. But as noted in section 3.9, the state finances are very strained. Although the increase in the ceiling rate by the union government could provide a respite/encouragement to the state government, it may still not incentivize the state government enough to extend the GSHI coverage. But the solutions mentioned above are surely the first steps towards the same. In the short term, these solutions, would provide the excluded BPL households with much-needed healthcare protection. Moreover, even in the long term, the shift towards BPL households could

avoid the costs of large-scale surveys to identify eligible households and incentivize the state government to sharpen NFSA targeting when the BPL list would be updated using future population censuses.

3.13.8 A possible solution to cover the missing middle in Kerala (uninsured households other than the GSHI-covered households)

Apart from BPL households, it is equally important to extend either GSHI or affordable private health insurance to the ‘uninsured’ households in India and Kerala, in particular, the vulnerable groups among them. To further explore this aspect, in 2021, NITI Aayog released a study on the ‘missing middle⁵³’, i.e., the number of households in India not covered by any health protection scheme (Sarwal & Kumar, 2021). The study had proposed affordably priced versions of the Aarogya Sanjeevani (premium ranging between ₹4,000 to ₹6,000 for hospitalizations and ₹5,000 for outpatient care, per household), a standardized health insurance product, promoted by the Insurance Regulatory and Development Authority of India (IRDAI) in 2020, as a solution towards extending insurance coverage for about 30 per cent (‘missing middle’) of the Indian population.

In light of the findings of this chapter, it is suggested to first address the structural issues associated with GSHI targeting i.e., extending GSHI coverage to lakhs of people in the excluded BPL households in Kerala. After solving these issues, affordably priced products like Aarogya Sanjeevani could be offered by insurance companies, for the remaining non-BPL households.

3.14 Conclusions and Policy Suggestions

Kerala’s GSHI schemes were successful, when it comes to increasing population coverage, enrolment ratio, hospitalization ratio and claims payout per household, with these key performance indicators growing multiple folds, although with four distinct growth phases, between 2008-2022. But paradoxically, this very success story of UHC in Kerala has left behind a significant chunk of BPL households, right from the early days of GSHI. At last count, in 2019, this exclusion was estimated at 35.4 per cent of BPL households. Further, even with the rise in GSHI coverage between 2016-2019, there was no change at all, in the concentration of poor households, again due to the exclusion of BPL households.

⁵³ See G3.25 in Glossary.

Further, compared to other states, Kerala had a high concentration of poor households among its BPL households which was not translating to an equally higher concentration of poor households in the GSHI, due to the rigidities in the targeting regimes, which excluded 35.4 per cent of BPL households.

The complete integration of all the excluded households into the GSHI net is akin to catching two birds with one stone. It would result in higher GSHI coverage among all vulnerable socio-economic groups (SC/ST households, households with poorly educated heads) while simultaneously ensuring impressive improvement in the concentration of poor households within each socio-economic group. This is due to the very high concentration of poor households among the BPL households in Kerala.

However, for a smooth and stable integration of BPL households into GSHI, it should also be accompanied by a change in the basis of cost sharing of GSHI schemes, from SECC 2011 to the total BPL households in Kerala. Along with this, due to the explosion in hospitalization ratio and consequently, higher claims payout per household after 2019-20 (due to the introduction of ABPMJAY-KASP), the current ceiling rate at which costs are shared between the union and state governments could be increased.

3.15 Limitations of the study

Finally, this study has many limitations too. Firstly, many other KPIs related to GSHI like the distribution of claims between public and private hospitals, claim turnaround time, etc. could not be analyzed. Since this study mainly dealt with population coverage, KPIs relevant to only that aspect was analyzed. Secondly, yearly data on population coverage and claims related to the Karunya Benevolent Fund, a prominent GSHI scheme in Kerala was not publicly available. Similarly, the SCHIS scheme, introduced in 2016, was implemented only for 3 years in Kerala, before it was subsumed in ABPMJAY-KASP. The data related to SCHIS is also not publicly available. This led to excluding these schemes from the analysis of KPIs.

Finally, the rural-urban stratification in DLHS-4, NFHS-4 and NFHS-5 is based on Censuses 2001 and 2011. In light of the rapid urbanization in Kerala (Lal & Nair, 2017), estimates based on rural-urban proportions in previous censuses might affect estimates from these surveys.

Appendix to Chapter 3

3A. To what extent could income, consumption and household assets be substitutes for each other in Kerala?

3A.1 Data and Methodology

To examine this question, data from the Kerala Migration Survey (KMS) 2018 was used. KMS 2018, with a 20-year history, starting in 1998, was the eighth in the series of an ongoing migration monitoring study being conducted by the Centre for Development Studies (CDS), Thiruvananthapuram. KMS 2018, was financed by the Government of Kerala: Department of NORKA, Research and Empirical Analysis of Labour Migration of Interdisciplinary Centre for Innovation Theory and Empirics of Columbia University, United States of America, World Bank, and the World Economy Programme of the CDS.

The survey followed a stratified multi-stage random sampling. Each of the fourteen districts of Kerala was divided into 2 strata each- a rural and urban strata. Rural areas constituted gram-panchayats and urban areas constituted municipalities and corporations as defined by Kerala Panchayat Raj Act 1994 and Kerala Municipal Corporations Act, 1994 respectively. Proportional to each district's rural-urban households in Census 2011, households were distributed in these 28 strata. Next, in the rural and urban strata, after randomly selecting a locality, a fixed number was added to the serial number of this locality. Following this systematic sampling method, a fixed number of localities were selected, with 30 households being earmarked to be selected in each locality. After arriving at the locality, one ward from rural and urban localities was selected using a proportional sampling method.

To select the final sampling unit i.e., the households from each selected ward, systematic random sampling was used. The random number used to select households in the systematic sampling was generated by dividing the total number of households in the ward by 30 (the targeted number of households in each locality). In this manner, 15,000 households were selected from 500 localities.

Although KMS 2018 was a survey that largely dealt with the in-migration and out-migration of Keralites, it was first and foremost, a household survey. It was not a survey of just migrants. It was a household survey, embedding the issue of migration. What made KMS 2018, the ideal source of data to investigate the first objective was that it was the largest household survey in Kerala coinciding with a major milestone year (2017-18) in the evaluation period of this study.

To examine the substitutability of income, consumption expenditure and assets-based wealth scores, the monthly estimates of income and consumption expenditure were used. Following the DHS (Demographic and Health Survey) methodology used for NFHS-5 (2019-21), the assets-based wealth scores were constructed based on a principal components analysis (PCA).

The PCA was run separately on the total, rural and urban areas. Then a combined wealth score (CS) was calculated by using the coefficients from regressing the rural and urban scores on the total scores separately. To assess the reliability of income, consumption and assets-based wealth scores, pair-wise correlations between monthly income, consumption expenditure and assets within the taluks in Kerala were examined.

3A.2 Results and Discussion

From Table 3A, it was clear that income and consumption expenditure did not display a high correlation in Kerala. While income and consumption expenditure had a correlation of only 14 per cent, the correlation of combined asset score with income was 23 per cent and consumption expenditure was 27 per cent.

The significance of the above results from Table 3A was that it provided strong evidence in favour of using the asset score instead of income and consumption expenditure. In BPL targeting, along with income limits, possession of certain assets was also grounds for exclusion or inclusion into the BPL list. However, in NFHS-4 (2015-16) and NFHS 5 (2019-21), the only available indicator for standard of living (which was used as a ranking variable in the Erreygers index) was the assets-based wealth index. So, the pertinent question was whether these wealth indices were a good proxy for income and consumption expenditure and if yes, then to what extent. KMS 2018, by collecting data on all three indicators, provided a rare opportunity to answer this question. The above analysis using correlation coefficients proved that the wealth indices were indeed a good proxy and reliable indicator of standard of living/socio-economic status.

Table 3B, further explored the pair-wise correlations between income, consumption expenditure and assets-based wealth score among 61 taluks in Kerala. From Table 3B, it could be observed that 86 per cent of all taluks in Kerala reported a correlation below 50 per cent, between monthly income and monthly consumption expenditure. Within the taluks reporting an IC (Income and Consumption) correlation below 20 per cent, the minimum correlation of either income or consumption expenditure

$\text{corr}(\text{CS}, \text{I/C})$ with the combined score was 26 per cent, and the highest of such correlations was 73 per cent. Similarly, in the second category of taluks with an IC correlation between 20 and 50 per cent, 43 per cent of the taluks had a $\text{corr}(\text{CS}, \text{I/C})$ above 40 per cent. Again, in the third category of taluks with an IC correlation above 50 per cent, 50 per cent of taluks had a $\text{corr}(\text{CS}, \text{I/C})$ above 50 per cent.

Table 3A: Pair-wise correlation between income, consumption and combined asset score

	Income	Consumption	Combined Asset Score (CS)
Income	1		
Consumption	0.14	1	
Combined Asset Score (CS)	0.23	0.27	1

Source: Estimated from Kerala Migration Survey 2018.

Table 3B: A summary table of pair-wise correlations between income, consumption and assets-based wealth across 61 Taluks in Kerala (2018)

Corr(C, I)	Number of Taluks	Percentage of Taluks (%)	Minimum Correlation of CS with either I or C (%)	Maximum Correlation of CS with either I or C (%)	Levels of Correlation between CS and either I or C	% of Taluks
Low correlation ($\leq 20\%$)	21	34	26	73	Taluku with a correlation above 20%	100%
Moderate Correlation (Above 20% and Below 50%)	32	52	18	56	Taluku with a correlation above 40%	43%
High Correlation (Above 50%)	8	16	19	70	Taluku with a correlation above 50%	50%
Total taluku	61	100%				

Source: Estimated from Kerala Migration Survey 2018.

Table 3C: An inter-state comparison between Erreygers and Wagstaff indices related to GSHI and BPL status

States	Mean Wealth Index (Non-GSHI)	Mean Wealth Index (GSHI)	Difference (Non-GSHI – GSHI)	Wagstaff Index (GSHI status)	Erreygers Index (GSHI status)	Mean Wealth Index (Non-BPL)	Mean Wealth Index (BPL)	Difference (Non-BPL– BPL)	Wagstaff Index (BPL status)	Erreygers Index (BPL status)
Andhra Pradesh	3.37	2.78	0.59***	-0.22***	-0.16***	4.05	2.79	1.26***	-0.49***	-0.18***
Telangana	3.29	2.62	0.67***	-0.25***	-0.23***	3.83	2.69	1.14***	-0.44***	-0.22***
Kerala	3.33	2.54	0.79***	-0.31***	-0.31***	3.56	2.16	1.40***	-0.55***	-0.54***
Rajasthan	3.42	2.87	0.55***	-0.21***	-0.11***	3.15	2.31	0.83***	-0.33***	-0.24***
Chhattisgarh	2.93	2.87	0.05	-0.02	-0.02	3.79	2.76	1.03***	-0.40***	-0.18***
Odisha	3.05	2.78	0.27***	-0.10***	-0.10***	3.31	2.54	0.78***	-0.30***	-0.30***
Meghalaya	2.99	3.10	-0.08	0.04	0.04	3.30	2.86	0.43***	-0.17***	-0.17***
Goa	3.00	2.97	0.03	0	-0.01	3.16	2.47	0.70***	-0.27***	-0.21***
Tamil Nadu	3.11	2.71	0.40	-0.15***	-0.15***	3.00	2.46	0.54***	-0.21***	-0.15***
Mizoram	2.98	2.85	0.14*	-0.05*	-0.05*	3.31	1.77	1.54***	-0.62***	-0.47***
India	2.96	3.01	0.05***	0.0194	0.145	3.33	2.54	-0.78***	-0.32***	-0.31***

Notes: 1 The table has been sorted, based on the odds ratio (OR).

2. The population coverage of GSHI and BPL cards is based on the responses of the households at the time of NFHS-5. In the case of GSHI, the coverage would have increased in 2023. In the case of BPL cards, the respondents in particular states may be beneficiaries of the state-level schemes apart from NFSA, 2013, which could result in the estimated BPL coverage being higher than the state-level quota decided for each state under NFSA, 2013. The estimated BPL coverage could also be lower than NFSA quotas in some states, due to non-sampling errors like lack of correct information on the part of the respondent or due to poor understanding of the question, etc.

3. * p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, *** p-value below 0.01

Source: Estimated using unit-level records of NFHS-5 (2019-21).

Table 3D: Change in GSHI coverage and distribution in Kerala between 2016, 2019 (current scenario) and simulated scenarios

	Percentage coverage of GSHI in the total population.			Distribution of GSHI in the total population.			Changes between 2016 and 2019		Expected changes due to 100% integration of GSHI with BPL cards.	
	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario)	Simulated Scenario (2019)	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	Change in GSHI coverage	Change in GSHI distribution	Change in GSHI coverage	Change in GSHI distribution
	(%)			Wagstaff Index (WI)			% change	WI (2019)- WI (2016)	% change	WI (Simulated Scenario)- WI (Current Scenario)
				(Std.error)			(Std.error)	(Std.error)	(Std.error)	(Std.error)
Kerala	38.48	47.78	63.09	-0.317*** (0.014)	-0.311*** (0.013)	-0.503*** (0.011)	9.3*** (0.01)	0.005 (0.020)	15.31*** (0.00)	-0.192*** (0.017)
Socio-economic subgroups.										
Type of Residence										
Rural	42.99	54.34	69.35	-0.274*** (0.018)	-0.253*** (0.165)	-0.493*** (0.016)	11.35*** (0.01)	0.021 (0.024)	15.01** (0.01)	-0.240*** (0.023)
Urban	33.30	40.48	56.13	-0.339*** (0.023)	-0.312*** (0.021)	-0.472*** (0.016)	7.18*** (0.02)	0.02 (0.031)	15.65** (0.01)	-0.16*** (0.027)
Social Groups										
SC	54.12	62.89	85.55	-0.187*** (0.036)	-0.081** (0.038)	-0.433*** (0.055)	8.77*** (0.03)	0.10** (0.052)	22.66** (0.02)	-0.351*** (0.067)
ST	54.44	65.15	88.70	-0.135* (0.080)	-0.132** (0.055)	-0.533*** (0.126)	10.71** (0.05)	0.002 (0.101)	23.55*** (0.02)	-0.40*** (0.14)

	Percentage coverage of GSHI in the total population.			Distribution of GSHI in the total population.			Changes between 2016 and 2019		Expected changes due to 100% integration of GSHI with BPL cards.	
	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario)	Simulated Scenario (2019)	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	Change in GSHI coverage	Change in GSHI distribution	Change in GSHI coverage	Change in GSHI distribution
	(%)			WI			% change	WI (2019)-WI (2016)	% change	WI (Simulated Scenario)- WI (Current Scenario)
				(Std.error)			(Std.error)		(Std.error)	
OBC	41.40	49.29	64.52	-0.263*** (0.020)	-0.281*** (0.018)	-0.459*** (0.016)	7.89*** (0.02)	-0.018 (0.027)	15.23*** (0.01)	-0.177*** (0.024)
None of them (General)	29.48	41.00	53.15	-0.36*** (0.025)	-0.350*** (0.018)	-0.482*** (0.017)	11.52*** (0.02)	0.011 (0.031)	12.15*** (0.01)	-0.132*** (0.025)
Household size										
Below and equal to 4 members	37.34	46.01	61.21	-0.295*** (0.017)	-0.324*** (0.015)	-0.512*** (0.014)	8.67*** (0.01)	-0.028 (0.023)	15.20*** (0.01)	-0.187*** (0.019)
Above 4 members	40.96	51.88	67.45	-0.366*** (0.021)	-0.292*** (0.021)	-0.498*** (0.020)	10.92*** (0.01)	0.079** (0.030)	15.57*** (0.01)	-0.20*** (0.03)
Education level of household head										
No Education, preschool	51.12	59.10	86.44	-0.156*** (0.050)	-0.035 (0.045)	-0.311*** (0.074)	7.98*** (0.04)	0.12* (0.067)	27.34*** (0.02)	-0.275*** (0.087)
Primary Education	48.56	60.52	81.21	-0.199*** (0.026)	-0.135*** (0.026)	-0.38*** (0.033)	11.96*** (0.02)	0.064* (0.037)	20.69*** (0.01)	-0.245*** (0.043)

	Percentage coverage of GSHI in the total population.			Distribution of GSHI in the total population.			Changes between 2016 and 2019		Expected changes due to 100% integration of GSHI with BPL cards.	
	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario)	Simulated Scenario (2019)	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	Change in GSHI coverage	Change in GSHI distribution	Change in GSHI coverage	Change in GSHI distribution
	(%)			WI			% change	WI (2019)-WI (2016)	% change	WI (Simulated Scenario)-WI (Current Scenario)
				(Std.error)			(Std.error)		(Std.error)	
Secondary Education	38.03	47.33	61.69	-0.262*** (0.017)	-0.277*** (0.015)	-0.44*** (0.014)	9.3*** (0.01)	-0.014 (0.023)	14.36*** (0.01)	-0.163*** (0.021)
Higher Education	16.65	21.80	26.99	-0.358*** (0.044)	-0.274*** (0.038)	-0.28*** (0.035)	5.15*** (0.02)	0.08 (0.058)	5.19*** (0.01)	-0.005 (0.052)
Religion of household head										
Hindu	43.52	53.48	68.88	-0.308*** (0.018)	-0.307*** (0.017)	-0.543*** (0.016)	9.96*** (0.02)	0.0006 (0.025)	15.4*** (0.01)	-0.236*** (0.024)
Muslim	32.05	39.73	56.42	-0.223*** (0.032)	-0.205*** (0.028)	-0.363*** (0.025)	7.68*** (0.02)	0.017 (0.043)	16.69*** (0.01)	-0.157*** (0.038)
Christian	30.44	40.83	54.19	-0.369*** (0.028)	-0.369*** (0.025)	-0.511*** (0.022)	10.39*** (0.02)	-0.0002 (0.038)	13.36*** (0.01)	-0.142*** (0.034)
BPL status										
No	31.12	34.98	34.98	-0.295*** (0.017)	-0.256*** (0.016)	-0.256*** (0.016)	3.86*** (0.01)	0.038 (0.024)	0	0

	Percentage coverage of GSHI in the total population.			Distribution of GSHI in the total population.			Changes between 2016 and 2019		Expected changes due to 100% integration of GSHI with BPL cards.	
	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario)	Simulated Scenario (2019)	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	Change in GSHI coverage	Change in GSHI distribution	Change in GSHI coverage	Change in GSHI distribution
	(%)			WI			% change	WI (2019)-WI (2016)	% change	WI (Simulated Scenario)-WI (Current Scenario)
				(Std.error)			(Std.error)		(Std.error)	
Yes	55.75	64.67	100	-0.113*** (0.022)	-0.080*** (0.0193)	0.035 (0.029)	8.92*** (0.02)	0.032 (0.029)	35.33*** (0.01)	0.073*** (0.017)
Districts										
Kasargode	32.84	44.40	65.89	-0.268*** (0.046)	-0.246*** (0.043)	-0.414*** (0.042)	11.56*** (0.04)	0.02 (0.063)	21.49*** (0.02)	-0.168** (0.061)
Kannur	33.51	45.60	56.69	-0.320*** (0.042)	-0.384*** (0.033)	-0.477*** (0.027)	12.09*** (0.04)	-0.063 (0.054)	11.09*** (0.01)	-0.092** (0.042)
Wayanad	57.03	63.82	79.63	-0.191** (0.053)	-0.113** (0.046)	-0.46*** (0.051)	6.79** (0.03)	0.077 (0.071)	15.81*** (0.02)	-0.347*** (0.069)
Kozhikode	50.95	60.77	69.49	-0.327*** (0.048)	-0.308*** (0.040)	-0.437*** (0.041)	9.82** (0.04)	0.018 (0.063)	8.72*** (0.01)	-0.129** (0.058)
Malappuram	31.85	43.58	60.03	-0.239*** (0.063)	-0.193*** (0.05)	-0.384*** (0.051)	11.73*** (0.04)	0.046 (0.080)	16.45*** (0.01)	-0.191** (0.072)
Palakkad	43.77	55.03	72.84	-0.394*** (0.032)	-0.244*** (0.040)	-0.496*** (0.040)	11.26*** (0.04)	0.15*** (0.051)	17.81*** (0.02)	-0.252*** (0.056)

	Percentage coverage of GSHI in the total population.			Distribution of GSHI in the total population.			Changes between 2016 and 2019		Expected changes due to 100% integration of GSHI with BPL cards.	
	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario)	Simulated Scenario (2019)	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	Change in GSHI coverage	Change in GSHI distribution	Change in GSHI coverage	Change in GSHI distribution
	(%)			WI			% change	WI (2019)-WI (2016))	% change	WI (Simulated Scenario)- WI (Current Scenario)
				(Std.error)			(Std.error)		(Std.error)	
Thrissur	28.62	42.20	58.22	-0.354*** (0.055)	-0.411*** (0.034)	-0.567*** (0.031)	13.58*** (0.04)	-0.057** (0.065)	16.02*** (0.02)	-0.155*** (0.046)
Ernakulam	25.12	36.57	52.69	-0.375*** (0.041)	-0.278*** (0.043)	-0.435*** (0.04)	11.45*** (0.04)	0.096 (0.060)	16.12*** (0.02)	-0.157*** (0.058)
Idukki	48.69	60.66	76.09	-0.184*** (0.058)	-0.266*** (0.045)	-0.536*** (0.050)	11.97** (0.05)	-0.08 (0.073)	15.43*** (0.02)	-0.269*** (0.067)
Kottayam	44.93	46.24	58.62	-0.302*** (0.043)	-0.369*** (0.036)	-0.555*** (0.034)	1.31 (0.04)	-0.067 (0.056)	12.38*** (0.01)	-0.182*** (0.050)
Alappuzha	48.43	56.21	69.51	-0.337*** (0.047)	-0.310*** (0.043)	-0.508*** (0.038)	7.78** (0.04)	0.027 (0.063)	13.3*** (0.01)	-0.198*** (0.057)
Pathanamthitta	33.34	48.55	60.92	-0.307*** (0.045)	-0.376*** (0.038)	-0.553*** (0.032)	15.21*** (0.03)	-0.068 (0.059)	12.37*** (0.01)	-0.177*** (0.049)
Kollam	38.63	50.80	67.05	-0.134*** (0.044)	-0.23*** (0.05)	-0.511*** (0.039)	12.17*** (0.03)	-0.096 (0.067)	16.25*** (0.01)	-0.280*** (0.064)

	Percentage coverage of GSHI in the total population.			Distribution of GSHI in the total population.			Changes between 2016 and 2019		Expected changes due to 100% integration of GSHI with BPL cards.	
	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	NFHS 4 (2016)	NFHS 5 (2019) Current Scenario	Simulated Scenario (2019)	Change in GSHI coverage	Change in GSHI distribution	Change in GSHI coverage	Change in GSHI distribution
	(%)			WI			% change	WI (2019)-WI (2016)	% change	WI (Simulated Scenario)- WI (Current Scenario)
				(Std.error)			(Std.error)		(Std.error)	
Thiruvananthapuram	41.21	38.51	58.81	-0.317*** (0.053)	-0.352*** (0.047)	-0.564*** (0.035)	-2.7 (0.05)	-0.034 (0.070)	20.3*** (0.02)	-0.212*** (0.059)

Note: *p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01.

Source: Estimated using unit-level records of NFHS-4 and NFHS-5 for Kerala.

Chapter 4 - Polarization in the Utilization of Public Hospitals and GSHI: The Unique Case of Kerala

Summary

Background: The divergences in various data sources suggested that GSHI schemes could have created a polarization in the utilization of public hospitals in Kerala, based on GSHI coverage, in the period between 2008-2020.

Data and Methods: However, as a prelude to exploring the polarization hypothesis, the first objective was set, to study whether GSHI schemes resulted in increase/decrease of GSHI-related hospitalisations in 2018-2022, across all states. The period 2018-2022 was chosen due to the uniform availability of data across all states, which were fragmented before this period. Next, the second and main objective was pursued, in which a comparison of the difference in the utilization of public hospitals (both for inpatient admissions and outpatient visits) between the GSHI-covered and non-covered households was analysed among the top 10 states with higher GSHI coverage (including Kerala), as estimated from the 75th round of National Sample Survey (NSS), conducted in the year 2017-18. This survey was used because it fell in the 2008-2020 period, during which the polarization in the use of public hospitals might have happened in Kerala. The second objective was followed by the third objective which was an execution of the second objective, across various socio-economic groups in only Kerala.

Results: The results suggested that most of the states, including Kerala, recorded impressive rise in GSHI-hospitalisations in the 2018-2022 period. Further, the interstate analysis, based on NSS 75th round, proved that Kerala could potentially be creating a polarization in the utilization of public hospitals and the disaggregated analysis showed that the polarization could be stronger among socially and economically well-off households, as opposed to poorer households. This again lent credence to the polarization hypothesis. However, among the 14 districts, Wayanad exhibited an opposite polarization in favour of private hospitals.

Conclusions: The policies of the state government could have created a polarization in the utilization of public hospitals, based on GSHI coverage.

Keywords: GSHI, polarization, utilization pattern, public hospitals, private hospitals, inpatient admissions, outpatient visits.

JEL codes: I13, I18

4.1 Introduction

According to the report of NSS 75th round (National Statistical Office, 2019), Kerala is an outlier in hospitalization rate and proportion of people responding as suffering from ailments (PPRA), which implied high demand for healthcare services, compared to other states. Further, from Chapter 2, it could be observed that Kerala has a high proportion of elderly population and a very high share of non-communicable diseases in the total disease burden. All these factors along with the reliance on private hospitals make Kerala, a state with prohibitively high medical expenditures (Mohanty & Dwivedi, 2021). However, for the poor and vulnerable households, GSHI could act as a hedge against these impoverishing health expenditure and encourage/enable healthcare utilization (Andersen, 1968).

Along with GSHI, one of the best possible answers to tackle exorbitant medical expenditures, without denying treatment to the patients, would be shifting the treatment of beneficiary households from private hospitals to public hospitals. There is a chance that this may have happened in Kerala. The magnitude of the difference in public hospital utilization between beneficiary households and non-beneficiary households has widened so much that this has to be studied as a phenomenon- not just any phenomenon, but a ‘polarizing’ phenomenon. So, this chapter analyses this polarization in the utilization of public hospitals¹, based on GSHI coverage and more importantly, explores the role of the state government in creating this polarization.

4.2 The role of health insurance in Andersen’s behavioural model of healthcare utilization²

Before understanding the utilization of public hospitals by the beneficiary households in Kerala, it is important to explore the factors that influence healthcare utilization. Andersen’s behavioural model of healthcare utilization originally proposed by Dr. Ronald M. Andersen (1968), which was later developed by Andersen and Newman (1973) is a suitable model to analyse the role of these factors.

According to the original model, three main factors influence the utilization of healthcare. They are:

¹ See G4.7 in Glossary

² See G4.2 in Glossary.

Pre-disposing factors: These factors include socio-cultural and economic characteristics that enable/disable individuals to seek healthcare. It will include social networks, culture, education, occupation, etc., factors related to individuals' knowledge and attitude, and demographic factors like age and gender.

Enabling factors: Community factors like the total availability of health infrastructure i.e., doctors, nurses, hospitals etc. and personal factors like income, regular source of care, travel arrangements and the extent and quality of social relationships enable individuals to access healthcare. More importantly, health insurance could be categorized as an enabling factor.

Need factors: Utilization of healthcare also depends on 'perceived' as well as 'evaluated' needs. A perceived need could arise from the personal feelings of the patients, like sudden fever, dizziness and uneasiness which could encourage the individual to seek healthcare. The evaluated need on the other hand arises after the studied/evaluated need. For example, the biopsy results of an individual may push him/her for further treatment. Here, the evaluated need is based on diagnostics, doctor's advice, etc., leading to an informed choice.

In the case of Kerala, the spread of literacy, education and the positive role played by various institutions and movements as explained in Chapter 2 along with a widespread network of public hospitals and urban-centered private hospitals would reduce the impact of pre-disposing factors in reducing healthcare utilization. However, marginalized communities like the tribal community in Kerala continue to face many hurdles in the way of accessing healthcare, despite many schemes to promote financial protection and universal health coverage (George et al., 2020). Based on evidence from various NSS rounds (from 52nd to 75th rounds), utilization has improved (as evidenced by rising hospitalization rate and PPRA) along with rising incomes in Kerala. The evidence on the hospitalization rate of the beneficiary households from Chapter 3 also suggests that health insurance may have been an enabling factor in encouraging utilization in the 2008-2022 period. However, does there exist widespread evidence for the positive impact of GSHI schemes on healthcare utilization across various regions and time- periods? The discussion in section 4.3 suggests that strong evidence for the same exists.

4.3 Does GSHI/public-funded/social/community health insurance increase healthcare utilization? Exploring evidence for the enabling power of health insurance in increasing healthcare utilization

In the light of the Andersen model, there is evidence from various countries to show that health insurance and especially social insurance or government-sponsored schemes do increase the utilization of both inpatient and outpatient services, especially by poorer communities. The evidence of the same emerges from various developing countries like Vietnam (Jowett et al., 2004; Wagstaff and Pradhan, 2005; Sepehri et al., 2006; Thuong, 2020), Taiwan (Hsia, 1997), Tanzania (Chomi et al., 2014) and Indonesia (Erlangga et al., 2019). In Spaan et al. (2012), based on a systematic review of Community Based Health Insurance (CBHI) and Social Health Insurance (SHI) in various Asian and African countries, it was concluded that both CBHI and SHI had a strong and positive effect in improving healthcare utilization. Perhaps the strongest evidence for the positive impact of GSHI on healthcare utilization emerged from China (Mao et al., 2020; Zhang et al., 2020; Shi et al., 2022; Yan et al., 2022; Zhang et al., 2023). There was also evidence for the favourable impact of universalizing/expanding health insurance on healthcare utilization in developed economies like Japan (Kondo and Shigeoka, 2013) and the US (Baicker et al., 2014). However, there is also evidence as cited in Malani et al. (2021), to show that GSHI schemes may not have an impact on healthcare utilization, from randomized control trials (RCTs), conducted in Mexico (King et al., 2009), Nicaragua (Thornton et al., 2010) and Kenya (Haushofer et al., 2020).

In India too, a systematic review of GSHI schemes (Prinja et al., 2017), comparing the healthcare utilization between the insured and non-insured in various states (in erstwhile/unified Andhra Pradesh, Karnataka, Kerala and Maharashtra) noted that GSHI schemes increased healthcare utilization in the range of 12.3 to 244 per cent. Specifically for Kerala, based on Philip et al. (2016), there was a statistically significant difference in the utilization of inpatient services, between the insured and non-insured groups. Prinja et al. (2017) also noted that healthcare utilization, in the initial years of implementing GSHI, was higher, compared to the utilization after 5 years. Similar to the findings of Prinja et al. (2017), another systematic review (Reshmi et al., 2021), which included the evaluation studies of RSBY, Vajpayee Arogyashree Scheme (VAS) in Karnataka and Rajiv Arogyashree Scheme (RAS) in erstwhile/unified Andhra Pradesh, also concluded that these public-funded health insurance (PFHI) increased access and utilization of healthcare services.

However, Malani et al. (2021) added further nuance to the above-mentioned positive effect of GSHI schemes on healthcare utilization. This particular study, called the India Health Insurance Experiment (IHIE), conducted in Karnataka using a randomized control trial (RCT) concluded that access to free insurance (RSBY) did increase utilization compared to the treated group in the first 6 months. However, due to barriers to using RSBY (like forgetting to carry the RSBY card or approaching non-empanelled hospitals for care) this utilization effect fizzled out after 3.5 years. This highlighted the need for complete awareness about GSHI schemes for the same to positively and sustainably impact healthcare utilization.

Lack of awareness and consequently, the lower utilization of GSHI has been a major issue of GSHI (Rathi et al., 2012; Thakur, 2016) in India, especially in the commencement of these schemes. For example, using the data from the management information system (MIS) of RSBY, Sun (2011), found that of the total even when the enrolment was rising in the initial months of RSBY-rollout, only one-third of the villages enrolled reported any claims in the first year of RSBY. Further, Puri and Sun (2021) in their review of literature, found two effects, linking the utilization of GSHI and the awareness levels of beneficiaries, in the initial years of GSHI implementation. The first one identified by Platteau and Ontiveros (2013), similar to the pre-disposing factors in the Andersen model, stems from the inability of the beneficiaries to grasp the concept of insurance and the functioning of GSHI. This decreases the utilization of GSHI. However, the second effect, identified by Hou and Palacios (2011), called the demonstration effect had the potential to increase utilization, wherein “the probability of an individual using RSBY is strongly related to the number of people in the same village that have already done so.”

The above-mentioned studies were conducted soon after 2008, following the introduction of RSBY in India. Unfortunately, even the recent evidence suggests that there are considerable gaps in the awareness levels among beneficiaries. For example, Parisi et al. (2022) estimated that the awareness level of ABPMJAY among its beneficiaries was the highest in Uttar Pradesh (31.1 per cent), followed by Gujarat (22.4 per cent), Bihar (21.7 per cent), Chhattisgarh (12 per cent), Tamil Nadu (9.3 per cent) and Meghalaya (3.5 per cent).

4.4 Utilization pattern of healthcare in Kerala: Evidence from secondary and primary studies

In the context of this chapter, utilization pattern³ of healthcare refers to the percentage shares of private and public hospitals in healthcare utilization for inpatient and outpatient care. The following studies based on secondary data from the unit-level records of various NSS rounds establish the dominance of private hospitals in the utilization pattern in Kerala.

Levesque et al. (2007) analysed the unit-level records pertaining to Kerala in the NSS 52nd round (1995-1996) to “identify individual and urban unit characteristics associated with access to inpatient care in public and private sectors in urban Kerala.” (Levesque et al., 2007). Apart from observing the dominance of the private sector in urban hospitalizations, the study made two findings- (i) “There is segmentation between the public and private sectors based on outpatient care prior to hospitalization, hospitalization period and post-discharge outpatient care”. (ii) “Cities from districts with better economic indicators and dominance of private services have a higher proportion of private hospitalizations”

Dilip (2010) studied the utilization pattern of inpatient care in the period 1986-2005, using the 42nd (1986-87), 52nd (1995-96) and 60th rounds (2004-05) and found that the estimated annual hospitalization rate (expressed per 1000 persons) rose from 69 in 42nd round to 126 in 60th round. The utilization of private hospitals rose from 55 per cent in 1986-87 to 65 per cent by 2004-05. Another major finding was that even though the rich-poor difference in the utilization of private hospitals had narrowed in the 1986-2004 period, the burden of out-of-pocket expenditure was still higher among the poor.

Other studies based on NSS (Levesque et al., 2006) and NFHS data (Dilip, 2002) further confirmed the greater reliance on private facilities for outpatient care in urban areas and reproductive and child care, respectively.

Apart from the evidence from secondary studies, many primary studies have also more or less confirmed the results of these secondary studies, again across various time periods. Even with limitations in sampling, primary surveys done by Kerala Sastra Sahitya Parishath (Kunjikannan & Aravindan, 2000) in 1987 and 1996 also confirmed the above trend of the dominance of private hospitals (in hospitalizations), whose share remained above 60 per cent in both periods. A recent study (Nair and Varma, 2021),

³ See G4.8 in Glossary

again based on primary data, found that the share of private hospitals in hospitalization episodes (with a reference period of 365 days) in Kerala was 55.5 per cent.

4.5 The greater reliance of GSHI schemes on public hospitals in Kerala and the role of the state government

The majority of the above studies (except Nair & Varma, 2021) which studied the utilization pattern and various nuances associated with it belonged to an era before 2008, before the introduction of GSHI. Even Nair and Varma (2021), a study funded by the Kerala State Planning Board and that too with a large sample size of 1,200 households, analyzing 447 hospitalization episodes and 696 episodes of acute illness (with a reference period of 15 days), spread across the districts of Kannur, Thrissur, Idukki, Alappuzha, Pathanamthitta and Thiruvananthapuram, did not analyse the reliance of public hospitals by splitting the sample into GSHI and non-GSHI households. This was particularly important given the rising role of public hospitals in the GSHI schemes of Kerala.

Figure 4.1 shows the share of public hospitals in the total claims volume and claims value in RSBY-CHIS and ABPMJAY- KASP, the two main GSHI schemes in Kerala.

Figure 4.1: Share of public hospitals in total claims volumes and value of RSBY-CHIS and ABPMJAY- KASP claims in Kerala (2008-23)



Source: Comprehensive Health Insurance Agency of Kerala (CHIAK), Government of Kerala

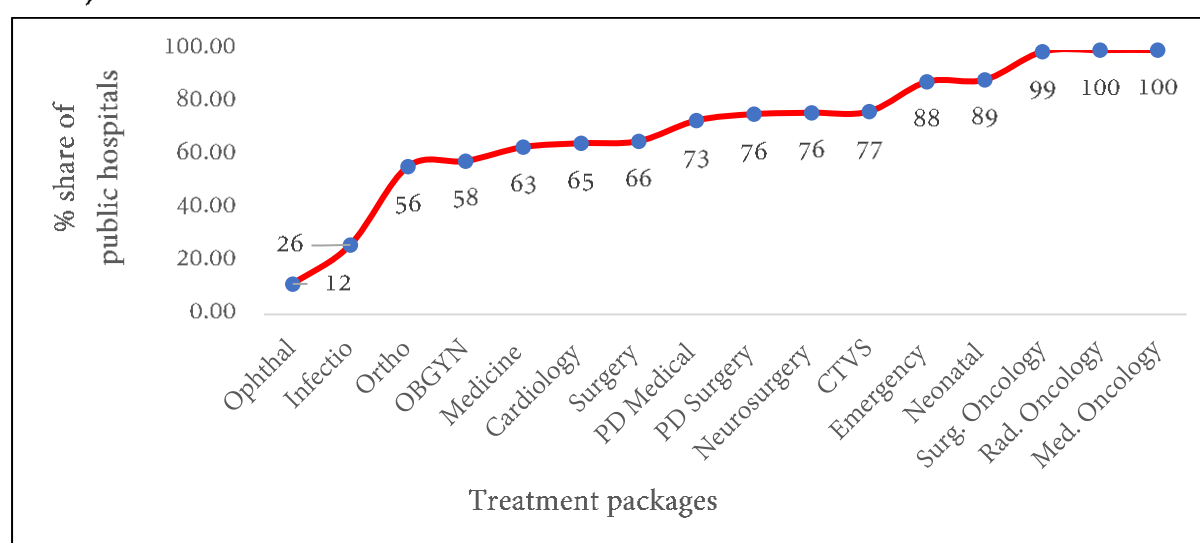
It could be observed that in 2008 when the scheme started, the share of public hospitals in the total claims volume and value was just 40 per cent respectively. But within two

years, by 2011-12, the share of public hospitals rose to 56 per cent in claim volumes and value respectively. Again, within one year, the share of public hospitals shot up to 72 per cent in 2013-14. This share hovered around 70 per cent between 2014-2016. In 2016-17, the year before the NSS 75th round (2017-18), the government share of claims volume and value was 64.5 per cent respectively. In the survey year, 2017-18, these shares did not change much. Thereafter, the share of public hospitals picked up, reaching an all-time high of 78 per cent. The share of public hospitals in claims volume and value declined to 52.1 and 47.2 per cent respectively in 2021-22, after which the share of public hospitals improved to 59 per cent in 2022-23.

In short, in the case of GSHI in Kerala, the public hospitals evolved from a minor player to a monopoly player in 1.5 decades (2008-2023). This was nothing short of a revolution, given that since 1990s, the total utilization pattern of the state has been geared towards private hospitals.

Delving even deeper into the reasons for such a high share of public hospitals, one encounters the invisible hand of the state government, which reserved certain treatment packages, exclusively for public hospitals. It was evident from Figure 4.2, that barring ophthalmology and infectious disease packages, the public hospitals enjoyed a majority share of claims in the rest of the treatment packages and in the case of ‘high-value’ packages such as surgical, radiation and medical oncology, there was an absolute monopoly of public hospitals.

Figure 4.2: Share of public hospitals in various treatment packages in Kerala (2020-2021)



Source: Claims data of State Health Agency, Kerala

This was due to the state government's policy of reserving these high-value packages for public hospitals. The documents from the State Health Agency (SHA) proved that in ABPMJAY- KASP, almost 25 per cent of all treatment/benefits packages were reserved for public hospitals under Health Benefits Package 1.0 in Kerala. This could also be because of the reluctance of private hospitals to join the scheme due to lower-priced benefit packages.

More importantly, the number of empanelled public hospitals was lower than private hospitals. In the commencement of the scheme, 140 public hospitals and 165 private hospitals were empanelled in the RSBY-CHIS scheme⁴. By the time ABPMJAY- KASP was implemented, the number of private hospitals grew even further to 413 while the number of public hospitals grew to 202⁵. These figures along with the rising share of public hospitals in GSHI claims volumes and value, imply over-reliance and over-crowding in Kerala's public hospitals.

Given the fiscal crisis of the state government and the greater fiscal burden of GSHI that the state government is forced to bear (discussed in the third chapter), relying more on public hospitals could allow the state government to provide treatment to the poor beneficiary households, as well as manage fiscal issues. This could be done by postponing the payment of dues to public hospitals, compared to private hospitals (Table 4.1). Table 4.1 shows that while the state government tried to reduce the percentage of claims overdue in private hospitals from September 2021 to June 2023, the experience in the case of public hospitals has been the opposite.

Table 4.1: Percentage of claims overdue as a percentage of total claims in public and private hospitals in Kerala

Month and Year	Public hospitals (%)	Private hospitals (%)
September 2021	34	16
October 2021	32	25
November 2021	39	20
December 2021	47	10
January 2022	43	10
March 2022	44	14

Contd....

⁴ As per the website of Aarogya Keralam, Government of Kerala.

<https://aaryakeralam.gov.in/2020/03/23/rsby-rashtriya-swasthya-bima-yojna/>

⁵ As per the Setu dashboard, National Health Authority.

<https://dashboard.pmjay.gov.in/publicdashboard/#/>

May 2022	43	12
June 2022	49	15
July 2022	53	10
August 2022	52	6
March 2023	44	7
May 2023	44.6	8.3
June 2023	50	12

Source: Compiled from monthly factsheets published by the State Health Agency (SHA), Kerala

4.5.1 The uniqueness of the Kerala model in the context of drawbacks associated with private hospitals

Studies have criticized GSHI schemes for their reliance on private hospitals (Reddy & Mary, 2013) and lamented that only a few private hospitals with quality accreditation were empanelled with GSHI schemes (Furtado et al., 2022) and that too with wide variations in the district-wide availability. More importantly, apart from quality issues, this reliance on private hospitals could also lead to distancing vulnerable populations from healthcare access. For example, Dubey et al. (2023) found that 44 per cent of empanelled hospitals in aspirational districts⁶ were private compared to 49 per cent in non-aspirational districts.

4.5.2 A potential anomaly and a solution: Developing the polarization hypothesis

The above discussion throws up a potential anomaly- how is it that while among the total households there was a larger reliance on private hospitals for inpatient care (based on literature review in Section 4.4, especially Nair & Varma (2021)), the claims data of GSHI indicated a larger reliance on public hospitals by the beneficiary households? A possible answer reconciling both these facts may be a polarization in the utilization pattern, with a high reliance on public hospitals by the beneficiary households and a high reliance on private hospitals by the non-beneficiary households.

⁶ Aspirational districts are 112 high-focus/backward districts in India, where the union and state government concentrate on ensuring last-mile delivery of essential services associated with health and nutrition, agriculture and water resources, financial inclusion, skill development and infrastructural development (See G4.3 in Glossary)

4.6 Research Gap and Research Questions

Based on the evidence from the literature review and the anomalies in utilization pattern in the total households and GSHI households for Kerala, there is a need to investigate the role of health insurance in increasing healthcare utilization, influencing utilization pattern and the effect the same could have on the financial protection of the beneficiary households. The following discussion explains why this is the case.

Firstly, in the light of the Andersen model, it is imperative to analyse the impact of GSHI schemes on healthcare utilization. However, no pan-India has analysed the impact of the GSHI scheme on healthcare utilization. The evidence available hitherto is fragmented across different GSHI schemes in specific states or GSHI schemes in a group of states. Even the India Health Insurance Experiment (IHIE) which found a positive relationship between healthcare utilization and RSBY using randomized control trial (RCT) was limited to the state of Karnataka.

However, the ABPMJAY component of the Ayushman Bharat scheme has for the first time brought most of the states together, in implementing state-level versions of ABPMJAY, for the first time in the history of GSHI in India. Due to this, the records of hospitalization across all these states that happened between 2018 and 2022, using PMJJAY and state-level GSHI have been collected by the National Health Authority (NHA). Due to these reasons, this lack of a pan-Indian study analyzing the impact of health insurance on healthcare utilization is a research gap.

Secondly, no pan-Kerala study (covering all 14 districts) has analysed the role of GSHI, its influence on the utilization pattern and consequently its impact on healthcare expenditures in one single study. This is clear from the literature review. Studies like Levesque et al. (2007) and Dilip (2010) in the literature review, focussed on the utilization pattern in Kerala, using NSS datasets, which covered all districts. However, the field studies on financial protection offered by GSHI like Joy (2019) and Philip et al. (2016) concentrated on selected districts and even though with large sample sizes, were unable to match the sample size of the NSS 75th round (2017-18) with regard to hospitalization episodes or outpatient visits. So, while studies on utilization patterns covered all districts, studies on the financial protection of GSHI focussed only on a few districts. This is a research gap.

Thirdly, even though the NSS 75th round (2017-18) provided information on the utilization pattern, and medical expenditures on every hospitalization episode and outpatient visit in one single survey and that too in the evaluation period 2008-2022,

studies from Kerala failed to see the need for testing the polarization hypothesis (discussed in sub-section 4.5.2) and its impact on the financial protection of the beneficiary households, using NSS data. Also, apart from the simultaneous capture of the variables discussed above, NSS data could have provided a huge advantage in terms of sample size, particularly relating to hospitalizations. This is because apart from a state-wise stratification based on rural and urban proportions in Census 2011 and Urban Frame Survey 2007-2012 respectively, the NSS 75th round also included a second stage stratification (SSS) based on hospitalizations. Due to this, more cases of hospitalizations could be identified, compared to any field-based study. Due to these reasons, this lack of GSHI evaluation studies based on NSS data is also another research gap.

Finally, skimming through the research gaps mentioned above, the following research questions could be posed:

- (i) Did various GSHI schemes help in increasing hospitalizations/healthcare utilization between 2018 and 2022, in Kerala, when compared to other states?
- (ii) Did the policies of the state government regarding the role of public hospitals in GSHI in Kerala lead to a potential polarization in the utilization pattern, compared to other states?

4.7 Research Objectives

1. To compare the population coverage and growth in hospitalization claims under various GSHI schemes implemented in Kerala with other Indian states.
2. To compare the difference in utilization of public hospitals, between GSHI-covered and non-covered households, among both inpatient admissions and outpatient visits, across Indian states with the highest GSHI coverage in 2017-18.
3. To study the difference in the utilization of public hospitals, between GSHI covered and non-covered households, in both inpatient admissions and outpatient visits, in each socio-economic, demographic and geographic groups in Kerala.

4.8 Data and Methodology

4.8.1 Data: NSS 75th round (2017-18) and administrative records from the Government of Kerala

4.8.1.1 Factsheets of National Health Authority

For the first objective, the data on population coverage and hospitalization claims for all states implementing Ayushman Bharat, for the period 2018-2022, were collected from the factsheets disseminated by the National Health Authority (NHA).

4.8.1.2 75th Round of National Sample Survey- Sample size, sampling design and justification for using the same to study the polarization in utilization of public hospitals in Kerala

For the second, third and fourth objectives, the study used the unit-level records of inpatient admissions and outpatient visits in Kerala, captured by the 75th round (2017-18) of the National Sample Survey (NSS). The survey covered 1,13,823 households, 5,55,115 individuals, 93,924 inpatient admissions/hospitalization episodes⁷ (with a reference period of 365 days) and 43,239 outpatient visits⁸ (with a reference period of 15 days), at the all-India level. The corresponding sample size for Kerala was 4,467 households, 19,815 individuals, 4,986 hospitalization episodes (inpatient admissions) and 6,070 outpatient visits.

The 75th round of NSS had a stratified multi-stage design (National Statistical Office, 2019). The design began with stratifying every district in India into rural and urban parts. While the sampling frame of the rural sample was the list of villages in Census 2011, the urban sample was drawn using the Urban Frame Survey (2007-12). Both the rural and urban strata underwent further sub-stratification. Next, using the method of Probability Proportional to Size with Replacement (PPSWR), the final stage unit (FSUs) were selected from the rural and urban sub-stratums.

After the list of FSUs was prepared, in the case of FSUs with more than 1200 households, they were sub-divided into parts with more or less equal population. While in the case of rural sample, these sub-parts of FSUs were called hamlet-groups (HGs), in the case of urban sample, these were called sub-blocks (SBs). Further, from these HGs or SBs, the one with the largest was purposively selected. Then, from the remaining units, using

⁷ See G4.4 in Glossary

⁸ See G4.6 in Glossary

simple random sampling, further HGs and SBs were selected. After household listing in the selected FSUs and sub-units, the final households for the survey were selected using three second-stage strata (Table 4.2).

Table 4.2: The three second stage strata and allocation of households into them in NSS 75th Round

SSS	composition of SSS	number of households surveyed	
		in an FSU without hg/sb formation	in each sub-FSU where sub-FSUs were formed
SSS 1	households having at least one child of age less than 1 year	2	1
SSS 2	from the remaining, households with at least one member (including deceased former member) hospitalised during last 365 days	4	2
SSS 3	other households	2	1

Source: Key Indicators of Social Consumption in India: Health (2019)

The 75th round of NSS was chosen for this chapter because it was the largest pan-Kerala sample survey that was conducted in the 2008-2020 period (the period of GSHI introduction and maturation in Kerala), which had the potential to capture large-scale shifts/changes in the utilization pattern of public hospitals in Kerala. More importantly, while the 75th round captured information on GSHI for the general public separately, in the 71st round, the same was clubbed with government insurance for union and state government employees.

4.8.2 Methodology

For the first objective, the total growth in the hospitalization claims under various GSHI schemes associated with ABPMJAY for various Indian states was calculated from the commencement of the scheme (various states joined ABPMJAY in various years) until 2021-22.

For the second objective, first, the percentage of GSHI-covered households was estimated (a household was considered to be GSHI-covered if the household head was covered by GSHI). Following this, the top 10 states with the highest GSHI coverage were selected for the analysis at the inpatient and outpatient levels. Then, the difference in the utilization of public hospitals between GSHI-covered and non-covered households was estimated.

Next, for each state, the unadjusted and adjusted odds ratios for the utilization of public hospitals were estimated, based on whether the household was covered by GSHI or not. For this purpose, a set of logistic regressions⁹ was employed, first with only the ‘GSHI’ variable apart from the intercept (unadjusted models¹⁰), which was followed by adjusting the unadjusted model for other significant variables (adjusted model¹¹). This adjustment was important as other relevant factors could also influence healthcare utilization as suggested by the Andersen model (section 4.2). However, in the above analysis, states with less than 100 outpatient visits were omitted. All the variables, except districts, given in Table 4.3 were used in the fully adjusted models.

Table 4.3: Table of socio-economic, demographic, disease and geographic (SEDDG) variables

SEDDG variables	Groups	Description
Type of residence	(i)Rural (ii) Urban	The rural/urban difference was brought in to analyse to capture the effect of higher living standards in the urban area compared to the rural area.
Social group	(i)ST & SC (ii)OBC (iii) General	ST and SC households were grouped due to the limited sample size of ST households which formed only about 1.5 per cent of Kerala’s population (according to Census 2011).
Household size	(i)1-4 (ii) 5 and above	The average household size in Kerala, as per Census 2011 is 4.2. Hence households with up to 4 members were classified as small households and those having 5 or more members were classified as large households.

Contd....

⁹ See G4.5 in Glossary,

¹⁰ See G4.9 in Glossary.

¹¹ See G4.1 in Glossary.

Household type	(i)Self-Employed (ii) Regular (iii) Casual labour (iv) Others	The classification for the type of household, separately for rural and urban areas in schedule 25.0 of NSS 75 th round was clubbed together to produce only four categories.
Education level of the household head	(i)Illiterate and literate only (ii)Below primary to upper primary (iii)Secondary and higher secondary (iv) Graduate and above	Education categories were created from the NSS variable on general education to capture the effect of higher living standards and awareness brought about by higher education.
Age of the patients	(i)0-24 (ii) 25-35 (iii) 36-45 (iv) 46-59 (v) 60-69 (vi) over 70	The age of the patients was classified to capture the effects in the youth, working age group and elderly members.
Consumption quintiles	(i)Poorest (ii) Poor (iii) Middle (iv) Rich (v) Richest	Keeping in line with the NSS report, the monthly consumption expenditure of the households in Kerala was divided into quintiles separately for rural and urban areas to arrive at the state-specific consumption quintiles.
Disease groups	(i)Infections (ii)Cancers (iii)Blood diseases (iv)Endocrine, metabolic and nutritional disorders (v) Psychiatric & neurological (vi) Diseases and disorders related to eye (vii) Diseases and disorders related to ear (viii)Cardiovascular diseases (ix) Respiratory diseases	The disease groups followed the same grouping of ailments, followed in schedule 25.0 of the 75 th round of NSS. However, ailments having less than 100 inpatient admissions or outpatient visits were excluded.

	(x)Gastro-intestinal diseases (xi) Skin diseases (xii) Musculoskeletal diseases (xiii) Genito-urinary diseases (xiv)Obstetrics (xv) Childbirth (xvi) Injuries, accidents & self-harm (xvii) Other diseases	
Districts	(i)Kasaragod (ii)Kannur (iii) Wayanad (iv) Kozhikode (v) Malappuram (vi) Palakkad (vii) Thrissur (viii) Ernakulam (ix) Idukki (x) Kottayam (xi)Alappuzha (xii)Pathanamthitta (xiii)Kollam (xiv)Thiruvananthapuram	All the 14 districts of Kerala.

Source: Constructed from the categorical variables in schedule 25.0 of NSS 75th Round.

The empirical specification of the logistic regression model (Gujarati, 2015) is:

$$\frac{p_i}{1-p_i} = \frac{1+e^{z_i}}{1+e^{-z_i}} = e^{z_i} \dots\dots (4.1)$$

Where, p_i is the probability of a household to be enrolled in a GSHI scheme and $1 - p_i$ is the probability of a household to be not enrolled in a GSHI scheme.

Also, $z_i = B'X + u_i$, B being the matrix of coefficients, X being the vector of the covariates and u_i being the error term. The ratio, $\frac{p_i}{1-p_i}$ is called the 'odds ratio'.

Usually, the maximum likelihood method is used for estimating the model. However, the estimation requires linearizing the model, by taking the logarithm on both sides to yield the log odds.

$$L_i = \ln\left(\frac{p_i}{1-p_i}\right) = z_i = B'X + u_i \dots\dots (4.2)$$

After estimation, the log odds of each covariate could be exponentiated to obtain the original odds ratio. The statistical significance of the unadjusted and adjusted odds ratios calculated in this manner was assessed using the t-test, inbuilt in the logistic command of STATA 15.

For the third objective, two-sample proportions test was conducted to test whether the difference in the utilization of public hospitals, between GSHI-covered and non-covered households, across groups of SEDDG variables (Table 4.3) was statistically significant or not. This was done separately for both inpatient and outpatient records in Kerala.

Throughout the analysis, for inpatients, hospitalizations outside the state were excluded. For both inpatients and outpatients, unlike the report of NSS 75th round (National Statistical Office, 2019) childbirths were also included in the estimation of percentage share of public hospitals¹². Also, only the hospitalizations and outpatient visits sought for allopathic treatment were included.

4.9 Results and Discussion

4.9.1 An analysis of the growth in GSHI coverage and hospitalizations, as part of the Ayushman Bharat scheme in India, in the context of Anderson's model

Based on the GSHI coverage in Table 4.4, all the states could be divided into three: (i) states with 100 per cent coverage of GSHI (Meghalaya, Jharkhand and Arunachal Pradesh) (ii) states with GSHI coverage between 61-99 per cent (Nagaland, Madhya Pradesh, Tamil Nadu, Karnataka, Uttarakhand, Andhra Pradesh, Himachal Pradesh, Assam, Chhattisgarh, Punjab, Mizoram, Gujarat, Maharashtra) (iii) and states with GSHI coverage between 30-59 per cent. (Sikkim, Manipur, Uttar Pradesh, Bihar, Tripura, Kerala).

¹² Due to this, there were differences in the estimates of percentage share of public hospitals in the total households between the report of NSS 75th round and the same estimates in this chapter.

Table 4.4: Inter-state comparison of GSHI schemes related to Ayushman Bharat between 2018 and 2022

State	Name of the Scheme(s)	ABPMJ AY coverage (%)	Non- ABPMJ AY coverage (%)	Total GSHI coverage (%)	Hospitalizations under various GSHI schemes.				
					2018-19	2019-20	2020-21	2021-22	Growth between commencement of the scheme and 2021-22 (%)
Sikkim	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	33	0	33	9	1213	2,022	2,872	31,811.11
Meghalaya	Megha Health Insurance Scheme (MHIS) Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	100	0	100	1,122	1,24,434	1,23,734	1,45,304	12,850.45
Nagaland	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM- JAY)	62	0	62	262	10,384	7,357	5,653	2,057.63
Madhya Pradesh	Ayushman Bharat-Madhya Pradesh 'Niramayam' Yojana	74	0	74	42,615	2,69,618	3,84,022	7,15,230	1,578.35
Manipur	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	47	10	57	1,482	12,615	16,361	24,062	1,523.62
Tamil Nadu	Pradhan Mantri Jan Arogya Yojana- Chief Minister's Comprehensive Health Insurance Scheme (ABPMJAY-CMCHIS)	71	0	71	3,80,070	8,15,779	18,94,993	44,94,389	1,082.52

State	Name of the Scheme(s)	ABPMJ AY coverage (%)	Non- ABPMJ AY coverage (%)	Total GSHI coverage (%)	Hospitalizations under various GSHI schemes.				
					2018-19	2019-20	2020-21	2021-22	Growth between commencement of the scheme and 2021-22 (%)
Karnataka	AB-ArK (Ayushman Bharat-Arogya Karnataka)	66	0	66	1,14,516	5,52,697	6,36,562	10,63,880	829.02
Uttarakhand	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY) Atal Ayushman Uttarakhand Yojana	62	0	62	20,321	1,29,949	1,21,623	1,82,188	796.55
Uttar Pradesh	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY) and Mukhiya Mantri Jan Arogya Abhiyan (MMJAA)	39	0	39	65,290	2,83,485	3,18,757	5,01,760	668.51
Andhra Pradesh	Ayushman Bharat-Dr. YSR Arogyasri Healthcare Scheme	89	0	89	1,39,931	6,54,945	6,92,361	9,75,461	597.10
Bihar	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	54	0	54	18,498	1,54,950	88,753	1,16,379	529.14
Himachal Pradesh	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	32	37	69	8,282	46,844	29,222	47,479	473.28

State	Name of the Scheme(s)	ABPMJ AY coverage (%)	Non- ABPMJ AY coverage (%)	Total GSHI coverage (%)	Hospitalizations under various GSHI schemes.				
					2018-19	2019-20	2020-21	2021-22	Growth between commencement of the scheme and 2021-22 (%)
Assam	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY); Atal Amrit Abhiyan	42	52	94	32,702	90,174	92,713	1,75,893	437.87
Chhattisgarh	Ayushman Bharat PM-JAY Dr. Khubchand Baghel Swasthya Bima Yojana (ABPMJAY - DKBSSY)	85	13	98	2,30,982	6,36,071	4,97,190	8,97,215	288.44
Jharkhand	Ayushman Bharat- Mukhyamantri Jan Arogya Yojana (AB- MJAY)	100	0	100	1,07,125	4,07,535	2,98,083	3,26,644	204.92
Punjab	Ayushman Bharat Mukhya Mantri Sehat Bima Yojana	72	0	72	0	1,96,593	4,22,815	5,35,541	172.41
Mizoram	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY)	86	0	86	7,061	27,621	16,985	13,860	96.29
Gujarat	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY);	62	0	62	3,14,087	11,40,092	8,25,700	5,66,808	80.46

	Mukhyamantri Amrutam & Mukhyamantri Vatsalya								
State	Name of the Scheme(s)	ABPMJ AY coverage (%)	Non- ABPMJ AY coverage (%)	Total GSHI coverage (%)	Hospitalizations under various GSHI schemes.				
					2018-19	2019-20	2020-21	2021-22	Growth between commencement of the scheme and 2021-22 (%)
Kerala	Pradhan Mantri Jan Arogya Yojana - Karunya Arogya Suraksha Paddhati (ABPMJAY- KASP)	48	0	48	0	9,74,821	10,43,544	16,98,379	74.22
Maharashtra	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY); Mahatma Jyotiba Phule Jan Arogya Yojana (MPJAY)	31	52	83	1,08,067	2,14,343	1,50,023	1,36,646	26.45
Arunachal Pradesh	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY); Chief Minister Arogya Arunachal Yojana	100	0	100	375	1,345	84	189	-49.60

Note: The states have been sorted on the basis of growth in GSHI hospitalizations (calculated in the last column).

Source: Compiled and calculated from the state-level factsheets, made publicly available by the National Health Authority.

Even though Kerala qualifies in the third category of states, covering only about 48 per cent of the state's population, the share of Kerala in total hospitalization claims across India accounted for 13-14 per cent in the 2019-2022 period (Table 4.4).

This has been one of the highest in the country, for which Kerala has been receiving awards at Arogya Manthan, organized by NHA, for three years in a row, from 2020 to 2022 (The Hindu Bureau, 2023). Although the third lowest in the country, in this period, Kerala has also recorded a growth of about 74 per cent in hospitalizations (Table 4.4). Given that Kerala achieved 100 per cent enrolment way back in 2020, at the very commencement of ABPMJAY- KASP, the growth in hospitalizations indicated percolation of GSHI utilization into the beneficiary households.

4.9.2 Did the utilization of public hospitals in Kerala become polarized, based on GSHI coverage? An inter-state analysis

Historically, Keralites have relied less on public hospitals. Tables 4.5 and 4.6 show the utilization of public hospitals in Kerala from 1995 to 2018. It can be seen that the lower reliance on public hospitals has been a feature of the utilization pattern in Kerala even from 1995 (Table 4.5). Moreover, between 1995-2005, the reliance on public hospitals reduced further in inpatient care. While the share of in public hospitals inpatient care and outpatient care was 40 and 29.4 per cent respectively in 1995-96, in 2004-05, the share of public hospitals in inpatients dropped to 35.4 per cent, and rose to 34.5 per cent in outpatients. These shares in 2004-05 remained almost the same in 2014 and showed a revival in 2017-18. In 2017-18, the share of public hospitals in inpatient care rose to 38 per cent among the total households, while in outpatient care, it recorded an even more impressive rise to 44 per cent.

However, once the total households were split into GSHI and non-GSHI households (Table 4.6), it could be immediately noticed that the GSHI households had an unusually high reliance on public hospitals, compared to the non-GSHI households, the difference being almost 23 percentage points, both in inpatient and outpatient care in 2017-18. There is evidence from field surveys too, for such a large magnitude of difference in public hospital utilization between GSHI-covered and non-covered households. In a 2019 study, conducted in 4 districts of Kerala, using field survey, a similar difference of about 26 percentage points was observed in the use of public facilities between households covered by public-funded health insurance (PFHI) and non-covered households (Sharma et al., 2023).

Table 4.5: Percentage share of public hospitals in inpatient (IP) care and outpatient (OP) care between 1995-2005

Type of care	52 nd Round (1995-96)		60 th Round (2004-05)	
IP/OP	IP	OP	IP	OP
%	40	29	35.4	34.5

Notes: 1. The percentage share of OP in NSS 52nd and 60th rounds did not exclude hospitalizations in the past 15 days from the day of the survey. This was because Block 5 of Schedule 25.0 in 52nd round and Block 9 of Schedule 25.0 in NSS 60th round did not include a question on hospitalization to filter out the hospitalization cases.

2. In both 52nd and 60th rounds, childbirths were excluded in the estimation of percentage shares of public hospitals.

3. Percentage share of private hospitals is 100- the percentage share of public hospitals.

Source: Estimated from the unit-level records of 52nd and 60th NSS rounds for Kerala, applying household weights.

Table 4.6: Percentage share of public hospitals in inpatient (IP) care and outpatient (OP) care between 2014-18

Type of Care (1)	Total households (%) (2)	GSHI households (%) (3)	Non-GSHI households (%) (4)	Difference between GSHI and non-GSHI households (%) (5) = (3-4)
71 st Round (2014)				
IP	34	48.3	24.1	24.2
OP	34	43	27.5	15.5
75 th Round (2017-18)				
IP	38.2	52	29.5	22.5
OP	44	58.2	35.6	22.6

Notes: 1. The GSHI-covered households in 71st Round comprises of families of central and state government employees too as the Schedule 25.0 clubbed the health insurance for government employees, financed by the government as an employer with the GSHI for vulnerable households.

2. In both 71st and 75th rounds, childbirths were excluded in the estimation of percentage shares of public hospitals. This was to make comparison with 52nd and 60th rounds possible.

3. Percentage share of private hospitals is 100- the percentage share of public hospitals.

Source: Estimated from the unit-level records of NSS 71st and 75th rounds for Kerala, applying household weights.

To understand the significance of such large differences in the use of public hospitals between GSHI-covered and non-covered households in Kerala, a comparison with the country-level situation must be done. At the all-India level, there was no statistically significant difference in the utilization of public hospitals between GSHI-covered and non-covered households in case of inpatient admissions (Table 4.7). However, in the case of outpatient visits, the utilization of public hospitals by GSHI-covered households was almost 11 percentage points higher compared to non-covered households (Table 4.8).

Further, the inter-state comparison in Table 4.7 showed that this difference of 23 percentage points in inpatient admissions for the beneficiary households in Kerala, was a full 10 percentage points higher than the beneficiary households in Chhattisgarh, the state with the next highest difference.

In outpatient visits care, the corresponding difference of nearly 23 percentage points (Table 4.7) was almost 7 percentage points higher than Chhattisgarh. The same story translated into the language of odds ratio (odds for a GSHI household to rely on public hospitals, compared to a non-GSHI household) too. In inpatient admissions (Table 4.7), the odds ratio for Kerala was the highest and statistically significant among the selected states, both in the unadjusted and adjusted models (Table 4A in the appendix to this chapter).

Again, in outpatient visits (Table 4.8), Kerala had the highest and statistically significant unadjusted odds ratio, while in the adjusted model (Table 4B in the appendix chapter), it had the highest odds ratio which was statistically significant. Both these pieces of evidence, in inpatient admissions and outpatient visits, pointed towards polarization in the utilization of public hospitals in Kerala, based on whether a household was covered by GSHI.

Other than Chhattisgarh, the odds ratio for public hospitalization if covered by GSHI was high and statistically significant for Telangana and Mizoram, in the inpatient admissions (Table 4.7). However, Goa threw up a surprise. Unlike the polarization in favour of public hospitals that was seen among the beneficiary households in Kerala, the beneficiary households in Goa exhibited a potential polarization in the opposite direction, in favour of private hospitals.

Table 4.7: Inter-state comparison of polarization in public hospital utilization (inpatient admissions)

State (1)	GSHI PC (%) (2)	Share of public hospitals in utilization within the GSHI households (%) (3)	Share of public hospitals in utilization within the non-GSHI households (%) (4)	Share of public hospitals in utilization within the total households (%) (5)	Difference in the utilization of public hospitals between GSHI and non-GSHI households (%) (6) = (3)-(4)	Unadjusted OR for public hospital utilization for the GSHI households. (7)	Adjusted OR for public hospital utilization for the GSHI households. (8)
Kerala	34	51.67	28.72	37.63	23***	2.65***	2.22***
Chhattisgarh	64	71.45	58.35	66.8	13.1***	1.79***	1.55**
Andhra Pradesh	71.3	34.88	27.83	33.08	7.05	1.39	1.50**
Telangana	59	36.59	24.72	31.62	11.87***	1.76**	1.30
Rajasthan	32.6	64.14	64.74	64.53	-0.60	0.97	0.93
Tripura	15.4	96.82	95.87	96.06	0.95	1.31	0.72
Odisha	14.4	79.77	77.58	77.92	2.19	1.14	1.04
Meghalaya	35	85.89	89.77	88.39	-3.88	0.69	0.67
Mizoram	61	86.62	75.45	82.12	11.17***	2.25***	0.83
Goa	37.4	54.44	75.76	66.41	-21.32**	0.38**	0.20**
India	13.3	52.25	50.76	51	1.5	1.06	1.06

Note: 1. PC stands for population coverage. However, the GSHI PC in this table was estimated using NSS 75th round for 2017-18. This cannot be compared to inter-state GSHI PC in Chapter 3 as there it was estimated using NFHS-5 for 2019-21.

2. Childbirths were included in the estimation of percentage shares of public hospitals.

3. *p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01

Source: Estimated from the unit-level records of NSS 75th round.

Table 4.8: Inter-state comparison of polarization in public hospital utilization (outpatient visits)

State (1)	GSHI PC (%) (2)	Share of public hospitals in utilization within GSHI households (%) (3)	Share of public hospitals in utilization within the non-GSHI households (%) (4)	Share of public hospitals in utilization within the total households (%) (5)	Difference in the utilization of public hospitals between GSHI and non-GSHI households (%) (6) = (3)-(4)	Unadjusted OR for public hospital utilization for the GSHI households. (7)	Adjusted OR for public hospital utilization for the GSHI households. (8)
Kerala	34	61.6	39.0	47.9	22.6***	2.50***	1.88***
Chhattisgarh	64	48.9	33	36.97	15.9	1.95	1.51
Andhra Pradesh	71.3	23	18.4	21.9	4.6	1.32	1.96*
Telangana	59	25.1	12.2	20.6	12.9	2.41	0.17**
Rajasthan	32.6	46.2	35.6	39.43	10.6	1.56	1.49
Odisha	14.4	62.4	55.8	57.23	6.6	1.31	1.18
India	13.3	39.24	28.5	30.52	10.7***	1.62***	1.35***

Notes: 1. PC stands for population coverage. However, the GSHI PC in this table was estimated using NSS 75th round for 2017-18. This cannot be compared to inter-state GSHI PC in Chapter 3 as there it was estimated using NFHS-5 for 2019-21.

2. Childbirths were included in the estimation of percentage shares of public hospitals.

3. * p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, *** p-value below 0.01

Source: Estimated from the unit-level records of NSS 75th round.

4.9.3 The disaggregated analysis of polarization in the utilization pattern across age groups and disease groups in Kerala

Table 4.9 shows that in the case of inpatient admissions, across age groups, the polarization among older age groups, especially above 45 years was stronger compared to younger age groups. For outpatient visits, however, this pattern was not very clear. For both inpatient admissions and outpatient visits, across disease groups, except for three groups (psychiatric & neurological, genito-urinary diseases and obstetrics), all the other groups exhibited various degrees of polarization, the minimum being in infections (20 per cent) and the maximum being in cancers (54 per cent). This impact of polarization in inpatient admissions, for cancers, cardiovascular diseases and childbirth could be linked to the package reservation policy of the state government discussed in section 4.5¹³.

4.9.4 Reinforcing the hypothesis of GSHI-influenced polarization in the utilization pattern: higher degree of polarization in the well-off groups compared to poorer communities in Kerala

One of the striking features of the polarization in the utilization pattern (Table 4.9) was regarding how it was higher among the more well-off sections in the society like beneficiary households residing in urban areas (compared to rural areas), belonging to OBC and general categories (as opposed to ST and SC communities), engaged in self-employment and regular jobs (compared to casual labour) and having household heads with better education levels (compared to poorly educated household heads who were either illiterate or literate only).

Surprisingly, in inpatient admissions, such a clear pattern in polarization among higher consumption quintiles could not be observed, although it was very evident among the rich and richest consumption quintiles, in the case of outpatient visits (Table 4.9). The poorer sections could be expected to rely on public hospitals, whether covered by GSHI or not.

¹³ However, the data in Section 4.5 pertained to 2020-21, whereas the data used for testing the polarization hypothesis emerged from the 75th round of NSS, conducted in 2017-18. Nevertheless, looking at the massive difference in the utilization of public hospitals between GSHI-covered and non-covered households, one could safely assume certain preferences/reservation for public hospitals regarding the treatment packages which cover these diseases, even in 2017-18.

Table 4.9: Polarization in public hospital utilization in Kerala across SEDG groups

SEDG groups (1)	Inpatient admissions				Outpatient visits			
	Number of Hospitalization episodes (2)	Utilization of public hospitals by GSHI- covered households (3)	Utilization of public hospitals by non-GSHI households (4)	Difference in public hospital utilization (5) = (3- 4)	Number of outpatient visits (6)	Utilization of public hospitals by GSHI- covered households (7)	Utilization of public hospitals by non-GSHI households (8)	Difference in public hospital utilization (9) = (7-8)
Type of residence								
Rural	2,675	0.50	0.31	0.19***	3198	0.62	0.44	0.18***
Urban	2,123	0.54	0.26	0.28***	2507	0.56	0.35	0.21***
Social groups								
ST and SC	418	0.61	0.59	0.01	435	0.66	0.69	-0.03
OBC	2,988	0.54	0.31	0.23***	3,381	0.62	0.45	0.17***
General	1,398	0.37	0.19	0.18***	1,889	0.50	0.29	0.22***
Household size								
1-4	2,159	0.58	0.28	0.30***	2,664	0.59	0.37	0.22***
5 and above	2,639	0.46	0.29	0.16***	2,559	0.63	0.45	0.18***
Household type								
Self-employed	1,435	0.54	0.22	0.32***	1,884	0.49	0.37	0.12**
Regular	1,089	0.43	0.24	0.19***	1,186	0.50	0.38	0.12
Casual labour	1,454	0.55	0.51	0.05	1,563	0.70	0.58	0.12**
Others	820	0.45	0.16	0.29***	1,072	0.66	0.29	0.37***

SEDG groups (1)	Inpatient admissions				Outpatient visits			
	Number of Hospitalization episodes (2)	Utilization of public hospitals by GSHI- covered households (3)	Utilization of public hospitals by non-GSHI households (4)	Difference in public hospital utilization (5) = (3- 4)	Number of outpatient visits (6)	Utilization of public hospitals by GSHI- covered households (7)	Utilization of public hospitals by non-GSHI households (8)	Difference in public hospital utilization (9) = (7-8)
Education level of the household head								
Illiterate and literate only	424	0.59	0.44	0.15	454	0.70	0.58	0.12
Below primary to upper primary	2,781	0.53	0.33	0.20***	3,366	0.61	0.50	0.12***
Secondary and higher secondary	1,239	0.42	0.23	0.19***	1,451	0.51	0.30	0.21***
Graduate and above	358	0.33	0.12	0.21**	434	0.40	0.20	0.20
Age of the patients								
0-24	1,261	0.44	0.31	0.13*	804	0.61	0.37	0.24***
25-35	1,003	0.50	0.25	0.25***	278	0.57	0.27	0.30***
36-45	470	0.52	0.33	0.19**	457	0.57	0.42	0.15*
46-59	767	0.61	0.32	0.28***	1,533	0.53	0.41	0.12**
60-69	659	0.55	0.24	0.31***	1,520	0.69	0.40	0.29***
Above 70	636	0.50	0.25	0.25***	1,113	0.62	0.40	0.23***

SEDG groups (1)	Inpatient admissions				Outpatient visits			
	Number of Hospitalization episodes (2)	Utilization of public hospitals by GSHI- covered households (3)	Utilization of public hospitals by non-GSHI households (4)	Difference in public hospital utilization (5) = (3- 4)	Number of outpatient visits (6)	Utilization of public hospitals by GSHI- covered households (7)	Utilization of public hospitals by non-GSHI households (8)	Difference in public hospital utilization (9) = (7-8)
Consumption Quintiles								
Poorest	649	0.61	0.41	0.20***	407	0.70	0.53	0.17***
Poor	827	0.62	0.28	0.34***	666	0.52	0.37	0.14
Middle	880	0.51	0.26	0.25***	834	0.59	0.46	0.13*
Rich	1,261	0.44	0.31	0.13**	1,310	0.63	0.43	0.20***
Richest	1,181	0.41	0.22	0.20**	2,488	0.59	0.32	0.27***
Diseases								
Infections	1,046	0.51	0.31	0.20***	728	0.65	0.39	0.26***
Cancers	120	0.86	0.42	0.44***	52	0.92	0.39	0.54***
Endocrine, metabolic and nutritional disorders	185	0.49	0.26	0.24*	1,502	0.63	0.36	0.25***
Psychiatric and neurological diseases	181	0.43	0.32	0.11	255	0.54	0.36	0.17
Cardiovascular diseases	492	0.54	0.28	0.25***	1,595	0.63	0.43	0.19***
Respiratory diseases	273	0.69	0.38	0.31***	496	0.65	0.40	0.25***

SEDG groups (1)	Inpatient admissions				Outpatient visits			
	Number of Hospitalization episodes (2)	Utilization of public hospitals by GSHI- covered households (3)	Utilization of public hospitals by non-GSHI households (4)	Difference in public hospital utilization (5) = (3- 4)	Number of outpatient visits (6)	Utilization of public hospitals by GSHI- covered households (7)	Utilization of public hospitals by non-GSHI households (8)	Difference in public hospital utilization (9) = (7-8)
Gastro-Intestinal diseases	221	0.49	0.26	0.24**	114	0.53	0.27	0.26*
Musculo-skeletal diseases	183	0.51	0.16	0.34***	454	0.53	0.44	0.09
Genito-urinary diseases	229	0.29	0.21	0.08	--	--	--	--
Obstetrics	175	0.41	0.24	0.17	NA	NA	NA	NA
Childbirth	1,051	0.45	0.22	0.23***	NA	NA	NA	NA
Injuries, accidents and self-harm	349	0.52	0.26	0.25***	54	0.56	0.14	0.42***
Districts								
Kasaragod	135	0.27	0.11	0.16**	149	0.59	0.44	0.15
Kannur	364	0.34	0.25	0.09	377	0.56	0.30	0.26**
Wayanad	147	0.83	0.42	-0.40**	143	0.68	0.60	-0.08
Kozhikode	420	0.58	0.41	0.17**	456	0.53	0.36	0.16
Malappuram	601	0.53	0.16	0.37***	721	0.44	0.34	0.10
Palakkad	375	0.54	0.30	0.23	217	0.56	0.43	0.13

SEDG groups (1)	Inpatient admissions				Outpatient visits			
	Number of Hospitalization episodes (2)	Utilization of public hospitals by GSHI- covered households (3)	Utilization of public hospitals by non-GSHI households (4)	Difference in public hospital utilization (5) = (3- 4)	Number of outpatient visits (6)	Utilization of public hospitals by GSHI- covered households (7)	Utilization of public hospitals by non-GSHI households (8)	Difference in public hospital utilization (9) = (7-8)
Thrissur	473	0.38	0.22	0.16*	814	0.45	0.28	0.17
Ernakulam	387	0.44	0.22	0.21	303	0.53	0.26	0.23**
Idukki	272	0.40	0.23	0.17**	373	0.49	0.52	-0.02
Kottayam	363	0.61	0.25	0.36***	573	0.61	0.46	0.16
Alappuzha	283	0.47	0.32	0.15	379	0.71	0.39	0.32**
Pathanamthitta	170	0.50	0.39	0.11	191	0.57	0.15	0.42
Kollam	338	0.41	0.33	0.08	284	0.74	0.62	0.12
Thiruvananthapuram	470	0.67	0.38	0.29***	725	0.71	0.49	0.22*

Notes: 1. Disease groups with less than 100 observations were omitted.

2. Childbirths were included in the estimation of percentage shares of public hospitals.

3. *p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01

Source: Estimated from unit-level records of NSS 75th round for Kerala.

However, the higher utilization of public hospitals in the socially and economically well-off households, who were covered by GSHI, strengthened the evidence for the polarizing dimension of GSHI in the utilization of public hospitals in Kerala.

4.9.5 An interesting case of opposite polarization: the case of Wayanad district in Kerala

Out of the 14 districts in Kerala, 7 districts showed statistically significant polarization in the utilization of public hospitals, based on GSHI coverage, in the case of inpatient admissions. Interestingly among these 7 (Kasaragod, Wayanad, Kozhikode, Malappuram, Idukki, Kottayam, Thiruvananthapuram) districts, instead of a polarization in favour of greater utilization of public hospitals, Wayanad showed the opposite pattern of polarization, favouring private hospitals (Table 4.9).

One of the reasons behind this could be the historically lower investments in public health that northern Kerala, to which Wayanad belongs, has witnessed (Jacob, 2014; Jose and Kumar, 2023). In 2017-18, out of 18 general hospitals (GH), 18 district hospitals (DH), 46 taluk headquarters hospitals (THQH) and 40 taluk hospitals (TH), Wayanad had only 1 GH, 1 DH and 2 THQH (Directorate of Health Services, 2019), forming just 3.8 per cent of the total institutions under Directorate of Health Services.

To fully understand the regional disparity in the public health investment in Wayanad district, it should be compared with Thiruvananthapuram district, the southernmost district in Kerala. The latter accounts for 10 per cent of all secondary and tertiary-level hospitals in the state (Directorate of Health Services, 2019). Apart from being in north Kerala, Wayanad is also home to 50 per cent of the tribal population in Kerala and has a forest cover on about 74 per cent of its total geographic area, all potential reasons for lower investment in public health infrastructure.

4.9.6 Why could the utilization of public hospitals, increase in the future? The role of rising investments in the public health infrastructure of Kerala

The rising share of public hospitals in the claims volume and value of GSHI definitely contributed to the polarization in the healthcare utilization pattern. However, based on the schemes of the government (both centrally sponsored and state-government funded schemes) at improving the physical, financial and human infrastructure of public hospitals in Kerala, one has reason to believe that the role of public hospitals will even strengthen in the future.

One such key mission is the Pradhan Mantri Swasthya Suraksha Yojana (PMSSY), a centrally sponsored scheme (CSS), through which the union and state governments share the costs to enhance the physical infrastructure in key tertiary-level hospitals (Press Information Bureau, 2023). Under this scheme, the union government mainly aims to establish/upgrade the infrastructure in government medical colleges (GMCs) and set up an All-India Institute of Medical Sciences (AIIMS) to usher in regional equity. As part of this, GMCs in Thiruvanthapuram, Kozhikode and Alappuzha districts have been upgraded (Press Information Bureau, 2023) and a new AIIMS is awaiting final approval from the union government (The Hindu Bureau, 2023).

Another mission to upgrade the infrastructure at the secondary level is the Aardram Mission (Government of Kerala, 2018), which is fully funded by the state government, through the Kerala Infrastructure Investment Fund Board (KIIFB) (Government of Kerala, 2018). The development of outpatient services, bringing specialty and super-specialty treatments down to the taluk, district and general hospitals and developing primary health centres as family health centres (FHCs) to deliver comprehensive primary health care (CPHC) are some of the objectives of Aardram mission. The main purpose of this mission is to transform government hospitals to provide ‘patient-friendly services’ (Government of Kerala, 2018). Additionally, apart from PMSSY, using funds from KIIFB, the state government has built new GMCs in under-served districts like Wayanad, Kasaragod and Palakkad.

4.10 Conclusions and Policy Suggestions

The dominant share of Kerala in the total GSHI hospitalization claims in the country and a 75 per cent growth in hospitalizations between 2019-22, even after a decade of implementing GSHI schemes, itself accords Kerala a unique status in the history of GSHI in India.

However, the official data of the state government showed the ever-rising share of public hospitals in the total hospitalization claims (growing from about 40 per cent in 2008 to 78 per cent in 2020) in the state, which was at odds with the NSS report which indicated higher reliance on private hospitals for the total population in the state. The polarization in the utilization of public hospitals, based on GSHI coverage offered the best possible explanation to solve this puzzle. Using the 75th round of NSS, this hypothesis was tested and it yielded many results which supported the polarization hypothesis. To begin with, in both inpatient and outpatient records, the reliance on public hospitals was 23 percentage points higher among GSHI-covered households

compared to the non-covered households in Kerala– the highest difference in the top 10 states with the highest GSHI coverage in India.

Further, the disaggregated analysis revealed that the difference in the utilization pattern was higher among socially and economically well-off households. This again lent credence to the polarization hypothesis, as opposed to the poorer communities (who could use public hospitals, irrespective of whether covered by GSHI), the polarization was observed in the well-off households (who could be expected to use private hospitals in the absence of GSHI coverage).

From the above discussion, it would be clear that Kerala presents a model to other states which has the potential to reduce the medical expenditures of the beneficiary households, due to the very high reliance on public hospitals. However, the downside of the same could be congestion, scarcity of medicines, under-developed diagnostic capabilities etc. in public hospitals. The combined efforts of the union and state governments will definitely solve many of these issues. For the same model to be replicated in the rest of the country, the respective state governments and union governments must develop the public health infrastructure in each state. This could result in substantial financial gains later in terms of GSHI revenues to the public hospitals (Prinja et al., 2023). Analyzing the changes between the 71st and 75th rounds of NSS, Muraleedharan et al. (2020) observed that already there was a shift from private to public hospitals by poorer sections of society. Along with this, the implementation of GSHI through public hospitals could further provide an impetus to the development of public hospitals across Indian states.

4.11 Limitations of the study

The current study has many limitations too. Firstly, for studying whether GSHI schemes had an impact on increasing healthcare utilization, although the time series did paint a fairly good picture, a more rigorous approach comparing GSHI-covered and non-covered groups (a treatment-control group approach) could have been used for the inter-state analysis. However, there existed no large-scale survey data in the period 2018-2022, coinciding with the introduction of Ayushman Bharat, to assess the impact of GSHI using a treated-control design.

Secondly, the use of the 75th round of NSS in the inter-state comparison of the difference in the utilization of public hospitals may present an issue, due to certain biases regarding urbanization that might have crept into the survey design. A comparison of population censuses of 2011 and 2011 would reveal that India is a rapidly urbanization nation,

which could be expected to continue during 2017-18. However, the NSS 75th round which relied on a rural-urban stratification as a starting point of the survey design, used Urban Frame Survey 2007-2012 as the sampling frame for urban areas (National Statistical Office, 2019), thus ignoring the expected advances in urbanization, between 2012 and 2017-18. Thirdly, a panel data study and a difference-in-difference (DID) model would have yielded more insights into the polarization in utilization pattern and financial impact of the same, before and after the introduction of GSHI schemes in Kerala in 2008. However, such datasets were not available.

Fourthly, even though the polarization in the utilization pattern was observed on the basis of GSHI coverage, there could be other confounding factors too which might be influencing the polarization like the selection of eligible households in Kerala. The eligible households were mainly comprised of below poverty line (BPL) households and they might be utilizing more public hospitals. However, the NSS 75th round did not capture any information on the BPL status of the households, due to which an investigation into the same was also not feasible. Fifthly, the study conducted in 2011 in the Thiruvananthapuram district of Kerala (Philip et al., 2016) found that the GSHI only covered 40 per cent of all hospitalizations by the GSHI-covered households. The study was conducted in just one district, more than a decade ago. However, if these conditions persisted even in 2017-18, this dimension may become significant when studying the polarization in the utilization pattern and its financial impact. Unfortunately, schedule 25.0 of NSS 75th round did not include a specific question, to partition the hospitalizations of GSHI-covered households, on whether they used GSHI for the hospitalizations or not. This could have also influenced the results.

However, there existed a quick fix for increasing the sample size, and that too by preserving the sampling design of the NSS 75th round. This was through using the unit-level records of the state-level matched survey of NSS, that the Directorate of Economics and Statistics (a part of the Government of Kerala) collects. However, even though such datasets were requested multiple times, it was not provided by the state government for this study. This limitation, although, stemming from the part of the state government, could have affected the results. But the likely impact of the same on the aggregate results could be minimal, because of the large-scale effects that polarization in the utilization pattern created in Kerala. However, larger sample sizes would have increased the sample size of micro-minorities like the ST community (which only formed 1.5 per cent of Kerala's population), which again could have been helpful in studying the disaggregated impact of GSHI on financial protection.

Appendix to Chapter 4

Table 4A: Fully adjusted logistic models of 10 states (inpatient admissions)

Independent variables	Odds ratio (Std.error)										
	Kerala	Chhattisgarh	Andhra Pradesh	Telangana	Rajasthan	Tripura	Odisha	Meghalaya	Mizoram	Goa	India
GSHI-Covered											
Yes	2.22*** (0.28)	1.55** (0.28)	1.50** (0.29)	1.30 (0.32)	0.93 (0.12)	0.72 (0.41)	1.04 (0.16)	0.67 (0.27)	0.83 (0.25)	0.20*** (0.10)	1.06 (0.06)
Ref: No											
Sector											
Urban	0.99 (0.13)	0.31*** (0.08)	1.41* (0.25)	0.49*** (0.11)	0.88 (0.13)	0.46* (0.18)	0.41*** (0.07)	0.07*** (0.03)	0.22*** (0.08)	0.18*** (0.10)	0.62*** (0.03)
Ref: Rural											
Gender											
Female	1.41** (0.19)	1.82** (0.44)	1.11 (0.27)	1.04 (0.24)	0.94 (0.18)	2.95* (1.85)	1.05 (0.25)	2.13* (0.82)	1.97** (0.63)	1.02 (0.39)	1.04 (0.06)
Ref: Male											
Social Group											
ST	2.90* (1.64)	0.73 (0.28)	3.21*** (1.35)	2.62** (1.12)	2.38*** (0.56)	2.35 (1.60)	4.99*** (1.27)	5.43* (5.38)	6.94 (10.01)	0.56 (0.60)	2.79*** (0.26)
SC	2.28*** (0.60)	0.50* (0.19)	1.95** (0.59)	3.87*** (1.33)	2.25*** (0.46)	1.36 (0.56)	2.66*** (0.57)	73.80*** (91.51)	1 (empty)	1 (empty)	1.78*** (0.11)
OBC	1.65*** (0.29)	0.39*** (0.13)	1.41 (0.41)	2.64*** (0.69)	1.34* (0.23)	1.68 (0.81)	1.83*** (0.34)	0.50 (0.33)	1 (omitted)	0.93 (0.66)	1.02 (0.05)
Ref: General											

Independent variables	Odds ratio (Std.error)										
	Kerala	Chhattisgarh	Andhra Pradesh	Telangana	Rajasthan	Tripura	Odisha	Meghalaya	Mizoram	Goa	India
Household size											
Above 5	0.98 (0.14)	0.98 (0.19)	1.63 (0.27)	1.70** (0.37)	1.04 (0.15)	1.21 (0.43)	1.23 (0.19)	1.10 (0.40)	2.05*** (0.54)	2.21* (1.01)	1.16*** (0.05)
Ref: Below 5											
Age of the patients											
25-35	1.23 (0.20)	1.01 (0.19)	0.91 (0.15)	1.08 (0.23)	0.95 (0.14)	0.54 (0.27)	0.84 (0.15)	1.46 (0.82)	0.80 (0.21)	0.56 (0.50)	0.95 (0.04)
36-45	1.23 (0.28)	0.73 (0.21)	0.80 (0.19)	0.79 (0.26)	0.88 (0.22)	0.18*** (0.10)	0.89 (0.22)	1.84 (1.03)	0.65 (0.23)	1.75 (1.19)	1.07 (0.06)
46-59	1.53** (0.29)	0.94 (0.22)	0.84 (0.26)	1.31 (0.48)	1.41* (0.26)	0.66 (0.40)	1.18 (0.28)	1.87 (1.23)	0.68 (0.26)	1.75 (1.32)	1.13** (0.07)
60-69	1.22 (0.24)	0.77 (0.27)	1.31 (0.39)	1.79 (0.80)	1.04 (0.24)	0.44 (0.30)	0.89 (0.27)	2.44 (1.55)	1.09 (0.57)	12.39*** (11.06)	1.18** (0.08)
Over 70	1.05 (0.22)	0.90 (0.34)	1.36 (0.53)	0.94 (0.47)	1.29 (0.36)	1.09 (0.96)	1.04 (0.33)	0.96 (0.75)	1.08 (0.76)	1.67 (1.29)	1.22** (0.12)
Ref: 0-24											
Religion											
Muslim	0.57*** (0.09)	0.88 (0.70)	0.76 (0.21)	1.93** (0.53)	1.32 (0.28)	4.32** (3.12)	1.17 (0.56)	2.14 (1.76)	1 (empty)	0.94 (0.52)	1.42*** (0.08)
Christian	0.52*** (0.10)	0.35* (0.21)	1.67 (0.43)	0.38 (0.25)	2.46 (2.52)	1 (empty)	0.50 (0.34)	0.14** (0.13)	1.50 (1.01)	0.31** (0.16)	0.74*** (0.07)
Ref: Hindu											

Independent variables	Odds ratio (Std.error)										
	Kerala	Chhattisgarh	Andhra Pradesh	Telangana	Rajasthan	Tripura	Odisha	Meghalaya	Mizoram	Goa	India
Household type											
Self-employed	1.17 (0.20)	1.57* (0.38)	0.78 (0.18)	0.98 (0.24)	1.37* (0.23)	1.93 (0.89)	1.30 (0.25)	2.53** (1.02)	2.95*** (1.04)	1.65 (0.75)	1.10* (0.05)
Casual labour	1.90*** (0.30)	1.73* (0.53)	1.03 (0.24)	2.20*** (0.57)	1.57** (0.34)	9.24*** (6.58)	1.39 (0.32)	6.08*** (2.67)	8.26*** (4.65)	0.95 (1.12)	1.59*** (0.09)
Others	0.67* (0.14)	1.55 (0.87)	0.66 (0.28)	1.07 (0.46)	0.79 (0.23)	0.95 (0.61)	1.42 (0.43)	0.91 (0.78)	1.07 (0.58)	0.47 (0.28)	0.79*** (0.07)
Ref: Regular											
Consumption Quintiles											
Poorest	2.25*** (0.51)	3.96*** (1.57)	3.25*** (0.89)	3.31** (1.66)	3.04*** (0.68)	2.87* (1.58)	1.94** (0.51)	1.24 (0.76)	1.88 (0.94)	14.78*** (9.66)	3.03*** (0.21)
Poor	1.67** (0.36)	3.06*** (0.83)	2.53*** (0.74)	3.06** (1.37)	2.01*** (0.42)	8.16*** (6.07)	1.84*** (0.41)	1.62 (0.98)	1.69 (0.60)	61.19*** (60.70)	2.31*** (0.13)
Middle	1.46* (0.28)	2.52*** (0.71)	1.59** (0.32)	1.60 (0.65)	1.58** (0.32)	15.42*** (8.12)	1.52** (0.30)	0.71 (0.28)	0.86 (0.27)	8.24*** (5.59)	1.76*** (0.10)
Rich	1.59** (0.32)	2.18*** (0.50)	1.49* (0.31)	1.11 (0.41)	1.30* (0.21)	2.54** (0.95)	1.26 (0.26)	0.57 (0.31)	0.93 (0.30)	5.24*** (3.00)	1.46*** (0.08)
Ref: Richest											
Disease Types											
Cancers	2.65*** (0.79)	0.51 (0.32)	0.37 (0.25)	0.25* (0.20)	3.75** (2.47)	0.05** (0.06)	0.14*** (0.05)	0.72 (0.90)	0.28 (0.29)	3.93 (4.10)	0.99 (0.22)
Blood diseases	10.92** (11.74)	0.43 (0.23)	0.47 (0.34)	0.74 (0.66)	1.12 (0.53)	1 (empty)	0.61 (0.35)	0.57 (0.31)	1 (empty)	0.06* (0.11)	1.38 (0.29)

Independent variables	Odds ratio (Std.error)										
	Kerala	Chhattisgarh	Andhra Pradesh	Telangana	Rajasthan	Tripura	Odisha	Meghalaya	Mizoram	Goa	India
Endocrine, metabolic and nutritional disorders	0.82 (0.24)	0.51 (0.30)	1.00 (0.68)	1.61 (0.82)	0.92 (0.38)	0.15* (0.15)	0.43* (0.18)	0.13** (0.13)	0.31 (0.45)	0.39* (0.21)	0.73** (0.09)
Psychiatric & Neurological	0.85 (0.34)	0.68 (0.31)	1.04 (0.39)	0.37** (0.15)	1.08 (0.29)	0.11** (0.10)	0.30*** (0.10)	0.40 (0.28)	0.43 (0.28)	0.22* (0.19)	0.82** (0.07)
Diseases and disorders related to eye	1.13 (0.46)	0.51 (0.22)	0.29*** (0.12)	0.80 (0.54)	0.18*** (0.08)	0.20 (0.23)	0.23*** (0.10)	---	0.21** (0.15)	1.41 (1.03)	0.70** (0.12)
Diseases and disorders related to ear	0.83 (0.55)	173.6*** (223.2)	0.90 (0.72)	1.00 (empty)	0.91 (0.76)	1 (empty)	0.31 (0.33)	1 (empty)	0.12 (0.17)	1 (empty)	0.88 (0.20)
Cardiovascular diseases	0.94 (0.21)	0.65 (0.32)	0.53 (0.24)	0.64 (0.25)	1.34 (0.38)	0.08*** (0.07)	0.41*** (0.13)	0.07*** (0.07)	0.61 (0.55)	0.03*** (0.03)	0.83** (0.07)
Respiratory diseases	1.76** (0.38)	0.83 (0.43)	1.28 (0.56)	0.47 (0.31)	1.25 (0.47)	0.19 (0.23)	0.60 (0.26)	0.17** (0.13)	0.80 (0.61)	0.12** (0.12)	1.15 (0.13)
Gastro-Intestinal diseases	0.75 (0.20)	0.32*** (0.11)	0.41** (0.14)	0.25** (0.16)	1.04 (0.23)	0.33 (0.23)	0.45** (0.14)	0.17*** (0.08)	0.36** (0.14)	0.20** (0.15)	0.72*** (0.06)
Skin diseases	0.41 (0.26)	0.66 (0.49)	0.93 (0.54)	1.96 (1.02)	0.83 (0.68)	1 (empty)	0.66 (0.43)	0.07** (0.07)	1.08 (1.08)	0.09** (0.11)	0.99 (0.16)
Musculoskeletal diseases	0.58** (0.16)	0.38** (0.15)	0.53 (0.21)	0.77 (0.36)	0.77 (0.26)	1 (empty)	0.40** (0.14)	1 (empty)	8.10* (8.92)	1.08 (1.33)	0.58*** (0.06)

Genito-urinary diseases	0.39*** (0.10)	0.22*** (0.10)	0.49* (0.20)	0.60 (0.27)	0.88 (0.24)	0.03*** (0.03)	0.12*** (0.03)	0.22* (0.17)	0.92 (0.57)	0.74 (0.70)	0.49*** (0.04)
Obstetrics	0.77 (0.23)	1.79 (1.04)	1.81 (1.16)	0.44 (0.36)	1.51 (0.61)	0.05*** (0.06)	1 (0.55)	0.02*** (0.02)	1.14 (0.68)	--- (0.17)	1.22 (0.17)
Childbirth	0.75 (0.15)	3.00*** (0.75)	1.57* (0.41)	4.07*** (1.29)	4.67*** (0.86)	0.05*** (0.04)	1.08 (0.22)	0.59 (0.33)	1.04 (0.32)	1.49 (1.28)	2.80*** (0.15)
Injuries, accidents and self-harm	0.87 (0.21)	0.54** (0.14)	0.69 (0.25)	0.63 (0.23)	0.80 (0.22)	0.12* (0.13)	0.35*** (0.09)	0.26** (0.16)	0.63 (0.34)	1.49 (1.28)	0.76*** (0.05)
Other diseases	0.87 (0.32)	0.48 (0.28)	0.39** (0.16)	1.84 (1.15)	0.61 (0.24)	0.05*** (0.06)	0.31*** (0.12)	1 (empty)	0.29** (0.15)	3.35 (3.19)	0.76** (0.10)
Ref: Infections											
Constant	0.17*** (0.05)	1.17 (0.55)	0.13*** (0.05)	0.05*** (0.04)	0.33*** (0.08)	37.81*** (29.18)	2.06*** (0.67)	18.14*** (12.94)	0.53 (0.75)	1.74 (1.98)	0.34*** (0.03)
N	4,796	2,319	3,604	2,839	4,100	1,524	3,542	808	1,101	346	93,209

Notes: 1. Childbirths were included in the estimation of percentage shares of public hospitals.

2. The logistic regressions were estimated after adjusting the data for clustered errors (clustered at FSU level) and household weights, using the svyset package in STATA 15. However, due to this, STATA did not report any pseudo-R square measures.

3. *p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01

Source: Estimated from NSS 75th round for Kerala.

Table 4B: Fully adjusted logistic models of 6 states (outpatient visits)

Independent variables	Odds ratio (Std.error)						
	Kerala	Chhattisgarh	Andhra Pradesh	Telangana	Rajasthan	Odisha	India
GSHI-Covered							
Yes	1.88*** (0.30)	1.51 (0.67)	1.96* (0.73)	0.17** (0.14)	1.49 (0.45)	1.18 (0.43)	1.35*** (0.12)
Ref: No							
Sector							
Urban	0.73* (0.12)	0.23*** (0.12)	2.55*** (0.73)	0.26 (0.22)	0.63 (0.20)	2.37** (1.00)	0.81*** (0.06)
Ref: Rural							
Gender							
Female	1.02 (0.19)	3.23* (1.98)	1.07 (0.41)	6.43** (5.30)	0.97 (0.47)	1.08 (0.40)	1.12 (0.10)
Ref: Male							
Social Group							
ST	3.18 (3.00)	0.21* (0.18)	4.24** (2.46)	54.87*** (65.36)	0.87 (0.61)	2.47* (1.16)	1.98*** (0.28)
SC	2.61*** (0.94)	1.67 (1.39)	1.41 (0.67)	7.85** (7.27)	1.08 (0.53)	1.75 (0.75)	1.54*** (0.17)
OBC	2.13*** (0.41)	0.15** (0.11)	1.65 (0.61)	3.56 (3.39)	1.12 (0.42)	2.07** (0.72)	1.37*** (0.11)
Ref: General							
Household size							
Above 5	1.25 (0.20)	0.94 (0.40)	1.66 (0.64)	10.34*** (7.66)	1.02 (0.39)	1.34 (0.41)	1.12 (0.09)
Ref: Below 5							
Age of the patients							
25-35	0.93 (0.27)	0.60 (0.47)	3.56** (2.27)	14.98** (19.31)	0.79 (0.33)	0.82 (0.36)	1.02 (0.12)
36-45	1.24 (0.28)	0.27 (0.22)	3.15** (1.70)	2.24 (1.92)	0.66 (0.26)	1.40 (0.59)	1.15 (0.13)
46-59	1.14 (0.24)	0.40 (0.23)	2.08 (1.14)	1.71 (1.32)	1.77 (0.70)	0.81 (0.33)	1.26** (0.12)
60-69	1.37 (0.30)	0.81 (0.53)	3.25** (1.72)	10.96*** (8.72)	1.33 (0.62)	0.70 (0.32)	1.41*** (0.14)
Over 70	1.30 (0.32)	1.09 (1.13)	4.87*** (2.95)	57.94*** (53.60)	1.26 (0.59)	1.56 (0.75)	1.49*** (0.17)

Ref: 0-24							
Independent variables	Odds ratio (Std.error)						
	Kerala	Chhattisgarh	Andhra Pradesh	Telangana	Rajasthan	Odisha	India
Religion							
Muslim	0.78 (0.16)	1.53 (1.14)	0.51 (0.30)	0.11* (0.13)	1.30 (0.60)	0.39 (0.35)	1.24** (0.12)
Christian	0.96 (0.18)	0.03*** (0.03)	1.48 (0.90)	1.29 (2.32)	1.55 (2.39)	2.48 (2.79)	1.42** (0.20)
Ref: Hindu							
Household type							
Self-employed	0.91 (0.18)	0.94 (0.63)	0.94 (0.40)	3.82* (2.85)	0.99 (0.37)	2.04* (0.86)	0.98 (0.09)
Casual labourers	1.83*** (0.41)	1.32 (1.14)	0.81 (0.35)	7.80** (7.68)	1.19 (0.60)	1.39 (0.67)	1.26** (0.13)
Others	0.92 (0.21)	0.34 (0.36)	0.96 (0.50)	1.59 (2.10)	1.10 (0.85)	0.75 (0.43)	0.86 (0.11)
Ref: Regular							
Consumption Quintiles							
Poorest	1.80** (0.49)	2.26 (1.87)	1.62 (0.93)	89.82*** (134.66)	0.54 (0.29)	1.18 (0.55)	1.69*** (0.20)
Poor	1.23 (0.30)	0.41 (0.27)	0.90 (0.47)	411.37*** (567.86)	1.20 (0.51)	0.99 (0.46)	1.43*** (0.16)
Middle	1.60** (0.35)	0.39 (0.21)	0.72 (0.35)	12.03* (16.09)	1.04 (0.41)	1.28 (0.54)	1.23* (0.13)
Rich	1.26 (0.28)	0.68 (0.34)	0.53 (0.25)	96.39*** (123.11)	0.57 (0.23)	1.44 (0.58)	1.24** (0.13)
Ref: Richest							
Disease Types							
Cancers	1.72 (0.70)	1.61 (1.72)	1.20 (1.09)	0.07* (0.10)	6.86** (5.91)	0.39 (0.39)	2.95*** (0.89)
Blood Diseases	1.06 (0.54)	0.15* (0.16)	4.12 (3.77)	1 (empty)	0.74 (0.79)	0.54 (0.38)	1.10 (0.41)
Endocrine, Metabolic and Nutritional Disorders	0.89 (0.20)	1.08 (0.80)	1.79 (0.83)	0.48 (0.35)	1.56 (0.89)	0.67 (0.30)	1.30** (0.13)
Psychiatric & Neurological	0.76 (0.24)	0.62 (0.53)	2.28 (1.40)	2.73 (3.23)	0.15*** (0.09)	1.98 (1.16)	1.39** (0.20)

Independent variables	Odds ratio (Std.error)						
	Kerala	Chhattisgarh	Andhra Pradesh	Telangana	Rajasthan	Odisha	India
Diseases and Disorders related to Eye	0.44* (0.20)	20.62*** (22.26)	137.56*** (212.37)	0.04** (0.06)	1.12 (1.08)	0.23* (0.19)	1.30 (0.35)
Diseases and Disorders related to Ear	0.47 (0.30)	0.05 (0.09)	0.50 (0.70)	0 (0.00)	6.78 (7.87)	1 (empty)	0.86 (0.30)
Cardiovascular diseases	0.97 (0.23)	2.26 (1.50)	1.88 (0.85)	0.56 (0.39)	1.30 (0.55)	0.94 (0.38)	1.23** (0.13)
Respiratory Diseases	0.87 (0.21)	0.48 (0.26)	2.72 (2.28)	0.05** (0.06)	0.78 (0.28)	1.90 (1.21)	1.12 (0.13)
Gastro-Intestinal diseases	0.45* (0.19)	0.16** (0.14)	0.48 (0.30)	0 (0.00)	1.77 (1.02)	1.25 (0.77)	0.92 (0.13)
Skin Diseases	0.16*** (0.08)	0.01** (0.02)	0.12** (0.12)	1 (empty)	0.15*** (0.10)	0.20** (0.16)	0.74 (0.21)
Musculoskeletal Diseases	0.73 (0.20)	0.70 (0.74)	2.11 (1.07)	2.62 (2.34)	0.61 (0.34)	1.01 (0.50)	1.06 (0.14)
Genito-Urinary Diseases	0.55 (0.26)	0 (0.00)	8*** (5.37)	3.57 (6.33)	0.16** (0.14)	1.52 (1.25)	1.05 (0.25)
Obstetrics	1.14 (2.39)	1 (empty)	0.25 (0.42)	0.18 (0.21)	7.55** (7.48)	4.22 (6.06)	1.55 (0.70)
Childbirth	--	1 (empty)	--	1 (empty)	--	--	0.88 (0.68)
Injuries, accidents & self-harm	0.30** (0.15)	0.26 (0.27)	1.76 (1.16)	0.06** (0.08)	0.66 (0.53)	4.68** (3.55)	0.94 (0.23)
Other diseases	0.36** (0.18)	17.09* (26.60)	1.70 (1.89)	0.05** (0.06)	0.06** (0.07)	0.47 (0.41)	0.79 (0.23)
Ref: Infections							
Constant	0.32*** (0.11)	6.96* (7.77)	0.02*** (0.01)	0.00 (0.00)	0.73 (0.44)	0.34** (0.17)	0.18*** (0.03)
N	5,249	629	2,676	789	1,267	1,199	36,689

Notes: 1. Childbirths were included in the estimation of percentage shares of public hospitals.

2. The logistic regressions were estimated after adjusting the data for clustered errors (clustered at FSU level) and household weights, using the svyset package in STATA 15. However, due to this, STATA did not report any pseudo-R square measures.

3. *p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01

Source: Estimated from the NSS 75th round for Kerala.

Chapter-5

Did the Polarization in the Utilization of Public Hospitals Translate into Deep and Meaningful Financial Protection for GSHI-covered households in Kerala?

Summary

Background: The results in the previous chapter indicated that a polarization in the utilization of public hospitals based on GSHI coverage could have happened in Kerala. Given the lack of conclusive evidence regarding financial protection offered by GSHI in India, this chapter explores whether the results from Chapter 4 resulted in extending deep and meaningful financial protection for GSHI-covered households.

Data and Methods: The first objective of this chapter was to analyze the aggregate impact of GSHI on the financial protection of the beneficiary households in Kerala. The second objective was to analyze the disaggregated impact of GSHI on the financial protection of the beneficiary households in Kerala who sought inpatient care.

For both objectives, data from unit-level records of the 75th round of NSS was used. The unit of analysis was households. For the first objective, outcome variables related to out-of-pocket expenditures (OOPE), catastrophic expenditures (CHE), distress financing and healthcare utilization were calculated for inpatient admissions, outpatient visits and the combination of inpatient admissions and outpatient visits. Then using coarsened exact matching (CEM), the imbalances in the socio-economic variables between GSHI and non-GSHI groups were reduced. The estimates of differences in the mean values of the outcome variables between GSHI and non-GSHI groups, obtained from CEM, were compared to the corresponding differences obtained from the unmatched sample (evaluated using two-sample t-tests). The aggregate analysis also included an analysis of distributional equity in the outcome variables using the concentration index (CI) and Erreygers index (EI). Further, using z-statistic, it was tested whether the difference in CI/EI between GSHI-covered and non-covered households was statistically significant. For the disaggregated analysis, only inpatient admissions were considered. Within the inpatient admissions, the mean difference between GSHI and non-GSHI groups across various socio-economic, demographic and geographic variables, regarding three variables were considered. They were inpatient out-of-pocket expenditures (IP OOPE), the ratio of IP OOPE to household consumption expenditure called IPO-H and frequency of distress

financing. Further, using the concentration index (CI) and Erreygers index (EI), the distribution of IP OOPE and IPO-H was analyzed, respectively, in both GSHI-covered and non-covered households. Further, using z-statistic, it was tested whether the difference in CI/EI between GSHI-covered and non-covered households in each socio-economic, demographic and geographic subgroup was statistically significant.

Results: The aggregate analysis revealed that in inpatient admissions and the combination of inpatient admissions and outpatient visits, GSHI beneficiaries had lower out-of-pocket and catastrophic expenditures. Further, the financial protection for inpatient admissions came with no increase in hospitalization episodes or duration of hospitalization. However, it was unclear whether the outpatient expenditures and outpatient visits were higher/lower for GSHI beneficiaries. More importantly, for inpatient expenditures, it was found that there was no decrease in the reliance on distress financing by GSHI beneficiaries compared to non-beneficiaries and that there was a concentration of poor households among GSHI-covered households when it came to catastrophic expenditures.

The disaggregated results showed that the polarization in the utilization of public hospitals observed among the socially and economically well-off groups in the beneficiary households did not translate into deep and meaningful protection. This is because even though GSHI resulted in reductions in out-of-pocket and catastrophic expenditures for the well-off groups, it either came with increases in distress financing and/or concentration of poor households in the IPO-H ratio among the beneficiary households. Similarly, beneficiary households with 1-4 and 5-7 members as well as those with no elderly members and those with 1 elderly member had no deep and meaningful financial protection. Across districts, Wayanad, Kozhikode, Thrissur and Thiruvananthapuram stood out.

Conclusions: GSHI provided only modest financial protection to beneficiaries in Kerala, especially in inpatient care. In inpatient care, while GSHI beneficiaries in Kerala had lower out-of-pocket expenditures and catastrophic expenditures, it did not translate into lower reliance on distress financing. Further there was also a concentration of poor households in the catastrophic expenditures and IPO-H ratio.

Keywords: GSHI, financial protection, public hospitals, out-of-pocket expenditures (OOPE), catastrophic expenditures (CHE), distress financing, coarsened exact matching (CEM)

JEL codes: I13, I18

5.1 Introduction

The core message of the previous chapter hovered around the wide gap in the utilization of public hospitals based on GSHI coverage in Kerala, wherein the utilization of public hospitals by GSHI beneficiaries was 23 percentage points higher than the non-beneficiaries, in both inpatient and outpatient care. This difference between GSHI and non-GSHI groups in Kerala was the widest among states with the highest GSHI coverage, as captured by the 75th round of NSS (2017-18). The disaggregated analysis across various socio-economic groups in Kerala further revealed that the difference in the utilization of public hospitals was sharper among socially and economically forward groups compared to backward groups, further lending credence to the polarization hypothesis.

The conclusions and policy suggestions of the previous chapter (section 4.10) hinted at the benefits that such polarization in the utilization of public hospitals might bring about for GSHI beneficiaries in terms of medical expenditures. This chapter explores this concept further through an aggregate and disaggregate evaluation of the differences in medical expenditures between the GSHI-covered and non-covered households in Kerala using rigorous methodologies.

Before delving into the analysis, it would be worthwhile to understand the evidence regarding financial protection offered by GSHI in various states of India and the methodologies used to evaluate the same.

5.2 The impact of GSHI schemes on financial protection and related aspects: A review of methodologies and evidence from various Indian states between 2011 and 2020

Two systematic reviews (Prinja et al. 2017; Reshmi et al., 2021) more or less concluded that public-funded health insurance (PFHI)/government-sponsored health insurance (GSHI) implemented across various parts of the country did not bring about conclusive financial protection for the beneficiaries.

Prinja et al. (2017) studied the impact of PFHI schemes in India on utilization, OOP expenditure and health indicators, in studies published till September 2015. From about 1,265 articles screened after the initial search, 14 studies were selected, which performed impact evaluation of PFHI, using treated and comparison groups. The study concluded that while there was evidence to show that utilization rose for the

PFHI beneficiaries, there was no conclusive evidence for a decline in out-of-pocket expenditures of the beneficiaries.

Reshmi et al. (2021) used studies on the impact evaluation done in various states, published between 2010 and 2020. From about 572 studies found during the initial search, the study narrowed down to 25 studies for narrative analysis, using certain inclusion and exclusion criteria. The study found that there was no conclusive evidence to suggest that the PFHI schemes had any impact on financial protection. However, "the impact of PFHIs such as Rashtriya Swasthya Bima Yojana (implemented by the union government), Vajpayee Arogyashree (implemented by the state government of Karnataka) and Pradhan Mantri Jan Arogya Yojana (implemented by the union government) showed increased access and utilization of healthcare services."

Selvaraj and Karan (2012) studied the impact of three GSHI schemes introduced between 2004 and 2009 in India– (i) RSBY (ii) Rajiv Aarogyasri Scheme (RAS) and (iii) Tamil Nadu Health Insurance Schemes (formerly Kalaaignar's Insurance Scheme). The data used in the study were quinquennial rounds (thick rounds) of consumption expenditure surveys (CES) of NSSO conducted in 2004-5 and 2009-10 respectively. Taking into account the fact that these schemes were launched district-wise in different periods, the study used a case-control (treated-controlled) to assess the impact of these schemes. The treated units were the districts in which the schemes were introduced (called the intervention districts-IDs) and the control units were the districts in which the scheme was not implemented (called the 'non-intervention districts'-NIDs). The major finding of the study was that the (i) mean per capita real OOP expenditure (ii) percentage share of OOP expenditure in overall household expenditure (iii) catastrophic headcount of OOP expenditure were all higher in the IDs when the difference between NID and ID was calculated adjusting for the time period (2009 minus 2004 figures of NID and ID respectively). The drawbacks of the study were that (i) it stopped short of testing whether the difference-in-difference estimates were statistically significant and (ii) More than a decade has passed since the study, due to which it could only be treated as evidence for poor financial protection in the nascent stage of GSHI in India.

Fan et al. (2012) was one of the first evaluations of the Aarogyasri scheme (RAS) rolled out by erstwhile (united) Andhra Pradesh in 2007. This study relied on the secondary data collected through three Consumption Expenditure Surveys (CES) conducted by NSS between 1999-2008 in the 55th, 61st and 64th rounds respectively.

Exploiting the fact that Aarogyasri was introduced district-wise at different times, the study used the difference-in-difference (DID) method (which included hypothesis testing of the DID- going one step beyond the methodology in Selvaraj and Karan, 2012) to evaluate whether the scheme lowered medical expenditures. It was found that in the first nine months of implementing the scheme, the inpatient expenditures were reduced to a large extent and a lesser extent, the outpatient expenditures. More importantly, the scheme did not benefit either the scheduled tribes (ST) or the scheduled castes (SC). Again, similar to the previous study, the main drawback of the study was that it was conducted in the initial stages of Aarogyasri and may not be relevant anymore.

Sood et al. (2014) studied the immediate impact of the phased introduction of the Vajpayee Arogyashree scheme (VAS) in Karnataka in September 2012 using a large primary survey and geographic regression discontinuity design. Just like RSBY and RAS, VAS was also introduced phase-wise in selected districts, being introduced in the northern districts of Karnataka in February 2010, eventually covering all the districts by August 2012. Using Census 2001, the authors conducted a study comparing data of 300 households in three districts (Shimoga, Davangere, and Chitradurga districts) which did not rollout VAS (called ineligible districts) to the data of 272 households in three adjoining districts (Uttara Kannada, Haveri, and Bellary), north of the eligibility border, which rolled out the scheme (called the eligible districts). The outcome variables that were compared between the ineligible and eligible districts were out-of-pocket expenditures, hospital use and mortality. The villages included in IDs and NIDs were selected using 'nearest neighbour matching', constructed from propensity which was generated from census information. The study reported a statistically significant difference of 0.58 percentage points in the mortality due to conditions covered by VAS in the eligible households. More importantly, although not statistically significant, the study observed a rise in the utilization of services for eligible households. The increase in utilization also coincided with a statistically significant reduction of 64 percentage points in the out-of-pocket expenditure for the eligible households for conditions likely to be covered by VAS.

Raza et al. (2016) studied the impact of RSBY in northern states like Uttar Pradesh and Bihar using household-level panel data. Households with members enrolled in self-help groups in Kanpur and Pratapgarh districts in Uttar Pradesh and Vaishali district in Bihar were selected for the study. The study was conducted in a baseline and follow-up format. The baseline survey was conducted between March and May 2010,

covering 3,686 households while the follow-up survey was conducted between March and April 2012 in which 3318 households were revisited. The main foci of the study were twofold: (i) Examine the determinants of enrolment and drop-out of households and (ii) Whether RSBY increased inpatient utilization and provided financial protection. Lower socio-economic status, SC/ST status, having members suffering from chronic ailments, awareness about RSBY and proximity to healthcare facilities were the reasons for enrolment while SC/ST status and presence of chronic conditions deterred households from dropping out. Regarding financial protection, out of UP and Bihar, the insured households in Bihar incurred lower out-of-pocket expenditures and debt.

Karan et al. (2017) studied the nationwide impact of RSBY, again taking advantage of the staggered and district-wise rollout of the scheme. Similar to the previous studies, this study also employed the ‘difference-in-difference’ estimation on ‘outcome variables’ like (i) per household member monthly OOP spending (inflation-adjusted) (ii) OOP spending as a share of household spending and (iii) whether a household reported catastrophic healthcare payments (OOP spending greater than 10 per cent of household consumption expenditure) (iv) monthly household non-medical expenditure (households’ total spending e total OOP) per member.

The study used the data from the three quinquennial rounds of consumption expenditure surveys (CES) conducted by NSSO in 1999-2000, 2004-05 and 2011-12. Using the last two quintiles as a proxy for poor households, the study considered poor households in RSBY-implementing districts as the treatment group and non-implementing districts as the control group. For the reason that all the households in treatment and control districts, irrespective of whether enrolled in RSBY or not were treated as either RSBY-covered or non-covered, the estimated effect was not the average treatment effect on the treated (ATT), but instead, intention to treat (ITT). To comply with the parallel trends assumption of the DID model, the districts were matched based on propensity scores generated from a logit model. In the DID regression specification, the study introduced two treatment dummies:- “i) poor households living in districts which began participating in RSBY on or before March 2010 (‘treat1’- early treatment) and ii) those living in districts which began participating between April 2010 and March 2012 (‘treat2’- late treatment).”

The study found that RSBY did not have any statistically significant effect on the probability of inpatient expenditures, level of inpatient expenditures, catastrophic

inpatient spending, level of out-patient expenditures or the probability of incurring outpatient expenditures.

Ghosh and Gupta (2017) evaluated whether RSBY provided sufficient protection to insured households when compared to uninsured households, based on the 6-month NSS 71st round. The study only considered 18 states and a sample of 37,343 households at the national level, as these were the only states implementing the centrally sponsored scheme of RSBY. It was found that only 11.5 per cent of the total households were enrolled, dividing the total households into 4,112 households who were insured ('treated group') and 31,636 households who were uninsured ('control group').

When out-of-pocket expenditures were compared between the treated and the control groups, it was found that even though for inpatient care, there was little evidence for financial protection for RSBY-covered households, no evidence existed for financial protection in the case of outpatients. Moreover, when deeper measures like catastrophic expenditures and impoverishment were considered, there was no evidence that RSBY impacted them at all. The only favourable outcome for the covered households was that it was found that RSBY-covered households had higher inpatient admissions, suggesting a favourable impact of RSBY on utilization. Further, the study noted that a major reason for the ineffective financial protection might have been the higher utilization of private hospitals.

The main highlight of the study was the methodology of coarsened exact matching (CEM) that was used to match the characteristics/covariates of RSBY-covered and non-covered households, which was used to overcome the issues of bias and model dependence that propensity-score matching (PSM), a more widely used technique presented. The limitation of the study was that the 71st round did not distinguish between various types of government-sponsored health insurance. It clubbed government insurance for the general public with government insurance for government employees.

Sinha (2018) studied the impact of RSBY in two selected blocks of the Ranchi district of Jharkhand with a sample size of 1,643 below-poverty-line (BPL) households. These households were then divided into enrolled (into RSBY) and unenrolled households. In line with much of the literature, it was found that RSBY neither increased hospitalization nor reduced the likelihood of catastrophic health expenditures among the enrolled households.

Prinja et al. (2019) conducted a field study on the effectiveness of state-level GSHI schemes, particularly RSBY, in three states (Haryana, Gujarat and Uttar Pradesh) with a combined sample of 12,134 households and 62,335 individuals in the period between April and September, 2014. Across these three states, three districts were selected, 2 of which had predominantly rural/urban populations and one having a good mix of both. Further, 10 per cent of the rural sub-centres and 10 per cent of urban centres (that were enumerated for Intensified Pulse Polio Immunization (IPPI)) were selected as primary sampling units (PSU). In each PSU, villages/colonies were sampled according to probability proportional to size (PPS) method. Further in each of these villages/colonies, a household enumeration survey was conducted which served as the sampling frame, from which households were selected using systematic random sampling. The study found that there was no significant impact of insurance schemes, in particular RSBY, on hospitalization rate (with a reference period of 365 days before the survey) or choice of healthcare provider (choice between public or private hospitals). More importantly, the study found that catastrophic expenditure (defined as occurring when out-of-pocket expenditures exceeded 40 per cent of non-food consumption expenditure) was higher among the insured population compared to the non-insured population.

Apart from the aforementioned studies, the lack of adequate financial protection for GSHI beneficiaries is also evident in other all-India (Ravi & Bergkvist, 2015; Sriram & Khan, 2020) and state-specific studies (Ghosh, 2014; Nandi et al., 2017; Garg et al., 2020).

5.3 The influence of GSHI on the financial protection of beneficiaries in Kerala

Philip et al. (2016) was one of the first field-based assessments of the Comprehensive Health Insurance Scheme (CHIS), conducted in the Thiruvananthapuram district of Kerala between 2011-12. Designed as a comparative cross-sectional study, comparing the medical expenditures between the insured and uninsured, a sample of 300 households was selected using a 3-stage sampling technique (selecting first gram panchayats, then wards and finally households) and grouped into 149 insured and 147 uninsured households.

The main findings of the study were that the mean out-of-pocket expenditures for inpatient care (hospitalization) of the insured were higher than the uninsured, suggesting the ineffectiveness of Government Sponsored Health Insurance (GSHI).

Further, when it was found that the insured households used CHIS only for 40 per cent of hospitalizations, it suggested a lack of awareness and lack of access to empanelled hospitals and provided a compelling reason for the above finding of higher medical expenditures among the insured households. As the study was undertaken in the nascent stage of GSHI in Kerala, these results were not surprising. However, the study also found evidence of adverse selection, when it found that households with higher household size, more elderly members and members with chronic conditions had higher odds to get enrolled in GSHI. Most notably, the study found that even though the main target group of GSHI was BPL households, the coverage of BPL households under GSHI was not 100 per cent. However, the limitation of the study was that it only focused on the southernmost district of Thiruvananthapuram, one among the 14 districts in Kerala.

Joy (2019) evaluated the effectiveness of RSBY-CHIS when RSBY-CHIS completed 10 years of implementation in Kerala. Three districts of Kollam, Thrissur and Wayanad were selected using the pre-enrolment database provided by the Comprehensive Health Insurance Agency of Kerala (CHIAK). In each district, 8 primary sampling units were selected, ensuring a good mix of corporations, municipalities and gram panchayats by using probability proportional to population size (PPS) method. In each PSU, 45 households were selected using systematic random sampling without replacement. In total, after adjusting for non-response and difficulties in tracing households, a final sample of 815 households was selected. A primary survey was conducted among the selected households between 30-11-2018 and 07-02-2019.

One of the biggest revelations was the differences in enrolment in the RSBY-CHIS scheme across social groups. While the enrolment was almost 90 per cent among Scheduled castes (SC) and other backward classes (OBC) households, it was just 63 per cent among ST households and 79 per cent among the Antyodaya Anna Yojana (AAY) households.

Even among the RSBY-CHIS enrolled households, 68 per cent of the households did not benefit from the scheme. When the hospitalization expenditures between the enrolled households who benefitted from the scheme were compared with enrolled households who did not benefit from the scheme, significant reductions in out-of-pocket expenditures were observed for the former. However, no statistically significant difference was observed in OOPEx between enrolled and unenrolled households.

One of the drawbacks of this study was that it only studied households who were either eligible for RSBY or CHIS and did not study the distribution of the same in the total population, comprising of non-RSBY households as well.

Panikkassery (2021) conducted a primary survey conducted among 408 poor households in the Palakkad district of Kerala from January 2018 to January 2019, to investigate whether GSHI lowered the reliance of GSHI-insured households on borrowings and sale of assets, using probit and log-linear regressions. The study found that compared to the uninsured households, for insured households, both the amount and probability of borrowing were significantly lower for inpatient care. However, the drawback of this study was that it was limited to the district of Palakkad in Kerala.

5.4 Research Gaps and Research Questions

Evidence from Chapter 3 indicated that Kerala's GSHI scheme had the highest concentration of poor households in the country in 2019, hinting at how different the GSHI and non-GSHI households were in terms of wealth distribution. However, the main studies analyzing the financial impact of GSHI in Kerala like Joy (2019) and Philip et al. (2016) did not use a rigorous methodology like a treated-control design to adjust for these differences between the beneficiary and non-beneficiary households, to unravel the real impact of GSHI on financial protection. This is important as many studies in the aforementioned literature review on financial protection by GSHI across various Indian states followed rigorous methodologies for assessing the financial protection of GSHI. For example, Ghosh and Gupta (2017) used coarsened exact matching (CEM) to balance the socio-economic characteristics between RSBY-covered and non-covered households, captured in a single time point using the NSS 71st round. More rigorous studies, while maintaining a treated-control design, have also balanced the impact of both time and space. Studies like Sood et al. (2014) which used a geographic regression continuity design with the basic evaluation unit of households or Fan et al. (2012) and Karan et al. (2017), both of which used a difference-in-difference (DID) with districts as the basic evaluation unit, are good examples of the same. So, the lack of such GSHI evaluation studies in Kerala with a rigorous methodology is a research gap.

Further, even Kerala-specific studies mentioned above only considered certain districts and not the whole state. This is important given that the evidence on utilisation pattern from Chapter 4 showed how polarization in the utilization of public hospitals based on GSHI coverage, varied across districts. This implied that the scope

for reducing medical expenditures varied across districts, based on the extent to which GSHI beneficiaries utilized public hospitals in each district. Hence a pan-Kerala, rather than district-specific study was required to study the impact of GSHI on the financial protection of the beneficiaries. This was another research gap.

Further, in the light of disaggregated results on polarization of public hospitals, the disaggregated impact of GSHI on financial protection for inpatient care, across socio-economic, demographic and geographic groups using a large-scale survey was warranted. So, part of the research gap in this chapter also flowed from the results in Chapter 4.

From the aforementioned discussion, two research questions could be framed:

1. What was the aggregate impact of GSHI on the financial protection of beneficiary households, compared to non-beneficiary households in Kerala?
2. In the light of polarisation in the utilization of public hospitals by socially and economically forward groups in Kerala, observed in Chapter 4, what was the disaggregated impact of GSHI on the financial protection of beneficiary households across various socio-economic, demographic and geographic groups?

5.5 Research Objectives

1. To analyze the aggregate impact of GSHI on the financial protection of beneficiary households in Kerala.
2. To analyze the disaggregated impact of GSHI on the financial protection of beneficiary households in Kerala seeking inpatient care.

5.6 Data and Methodology

5.6.1 Data

The Kerala subsample of the 75th round of NSS (2017-18), considered for analysis in Chapter 4 was used here too. However, unlike Chapter 4 in which the unit of analysis was inpatient/hospitalization episodes and outpatient visits, the unit of analysis in this chapter was households including 3,224 households for inpatients and 2,825 households for outpatients. The sampling methodology and other relevant aspects of the survey are discussed in the counterpart section in Chapter 4.

5.6.2 Methodology

5.6.2.1 For the first objective: For evaluating the aggregate impact of GSHI on the financial protection of beneficiaries

5.6.2.1.1 The construction and logic behind the ‘outcome variables’

To study the aggregate impact of GSHI schemes in preventing financial vulnerability/providing financial protection, one needs to calculate two important indicators of the same viz. out-of-pocket expenditures (OOPE) for inpatients (due to hospitalization) outpatients and total (inpatients and outpatients).

The OOPE for households that had inpatients in the last 365 days, called IP OOPE¹, was calculated in the following way:

1. The reimbursements for each member, if any, were deducted from the total expenditure (sum of direct² and indirect³ expenditures) for each member. 2. This amount was aggregated for each member and calculated at the household level. 3. To this amount, the insurance premium paid by the household as a whole was added back to arrive at the total out-of-pocket expenditure (OOPE) in a year. 4. The sum calculated in 3 was divided by 12 to finally arrive at the monthly OOPE resulting from inpatient expenditures for a household.

Patients reporting outpatient visits (excluding hospitalization) in the reference period of 15 days were considered outpatients and since the state government paid no reimbursements for outpatients, the direct and indirect expenditures for outpatient care were considered to be borne from the pocket of the household and as such, taken

¹ See G5.5 in Glossary

² Direct expenditures include the expenditures consultation fees of doctors, fees for surgeries, expenditures on drugs and diagnostics etc. For inpatients, direct expenditure is the sum of expenditure items 6-10 in Block 7 of Schedule 25.0 in NSS 75th round. For outpatients, direct expenditure is the sum of expenditure items 10-14 in Block 9 of Schedule 25.0 in NSS 75th round (see G5.3 in Glossary).

³ Indirect expenditures include the expenditures for transportation, food and lodging etc. For inpatients, indirect expenditure is the sum of expenditure items 12 and 13 in Block 7 of Schedule 25.0 in NSS 75th round. For outpatients, indirect expenditure is the sum of expenditure items 16 and 17 in Block 9 of Schedule 25.0 in NSS 75th round (see G5.4 in Glossary).

as the 15-day OOPE of the households. These expenditures were then multiplied by 2 to arrive at the monthly estimates of OOPE, called the OP OOPE⁴.

Since the expenditure on drugs and medicines and diagnostic expenditures were a major component of the OP OOPE, non-AYUSH medicine/drug expenditures and diagnostic expenditures were also considered after aggregating the same across outpatient visits for each household and thereafter being multiplied by 2. The IP OOPE and OP OOPE were then added to arrive at the total monthly OOPE of each household.

From the OOPE of inpatients and outpatients, one could move forward to deeper measures of financial vulnerability like catastrophic health expenditures (CHE). CHE could be calculated separately for the inpatient admissions (hospitalization), the combined expenditures of the household from hospitalizations and outpatient visits.

A household was classified as experiencing catastrophic health expenditure (CHE)⁵ due to hospitalization/hospitalization and outpatient visits, if IP OOPE/OP OOPE/Total OOPE exceeded 10 per cent or 25 per cent of the total monthly consumption expenditure of the household, respectively.

This was in contrast to the approach of defining catastrophic healthcare expenditures using per-capita household income (Wagstaff et al., 2008). The working definition in this study was adopted with the thinking that out-of-pocket expenditures were not borne by the individual alone but by the entire household. Moreover, considering a household as a unit of analysis was also in line with the definition of out-of-pocket expenditure by the World Health Organization (WHO, 2021) and National Health Policy 2017 (Government of India, 2017). So, this study considered the thresholds of 10 per cent and 25 per cent, based on the total monthly consumption expenditure of a household and studied the incidence of a household falling below these thresholds.

Since the 2017–18 consumption expenditure survey was not released by the Government of India, the monetary poverty lines that were last calculated using the Consumption Expenditure Survey in 2011–12 were not updated. Since the period between 2011 and 2018 witnessed serious macroeconomic challenges like high inflation, demonetization and GST implementation, it may have impacted household-level consumption too, and hence even using the inflation-adjusted poverty lines of

⁴ See G5.7 in Glossary

⁵ See G5.1 in Glossary.

2011–12 might be erroneous. So, rather than focusing on an impoverishment analysis that required poverty lines, this study considered another related indicator of impoverishment, viz., the frequency with which a household resorted to distress financing in the form of borrowings or the sale of assets to cover hospitalization expenditure.

Finally, the indicators of financial vulnerability that were used to assess the impact of GSHI schemes in Kerala were: total OOPe, IP OOPe, OP OOPe, non-AYUSH medicine expenditure (OP), incidence of CHE at 10 per cent and 25 per cent thresholds (for IP OOPe, OP OOPe and total OOPe) and frequency of distress financing for hospitalization.

Along with this, the transportation expenditure due to hospitalization was also considered to examine whether GSHI-covered households travel longer distances to access care. Among these, this study accorded more importance to the IP OOPe than the OP OOPe, as it was the main target of GSHI schemes. Additionally, the household-level incidences of hospitalization as well as the duration of hospital stays were considered. Together, the above variables of financial vulnerability and utilization constitute the 'outcome' variables and are summarized in Table 5.1.

Table 5.1: List and construction of outcome variables

Outcome Variables	Formula/Description
IP (Inpatients)	
IP OOPe (H) (Monthly) (₹) =	$[\sum_{n=1}^H (\text{Total expenditure} - \text{Reimbursements}) + \text{Insurance Premium Paid}] / 12$
CHE 10 (due to hospitalization) = 1	If IP OOPe > 10% of MHCE (Monthly Household Consumption Expenditure)
CHE 10 (due to hospitalization) = 0	If IP OOPe ≤ 10% of MHCE
CHE 25 (due to hospitalization) = 1	If IP OOPe > 25% of MHCE
CHE 25 (due to hospitalization) = 0	If IP OOPe ≤ 25% of MHCE
Incidence of distress financing (due to hospitalization) (H) =	$\sum_{n=1}^H (\text{Borrowings or Sale of Assets})$
Transportation Expenditure (due to hospitalization) (₹)	$\sum_{n=1}^H (\text{Transportation Expenditure})$
Number of hospitalizations =	Total number of hospitalizations by all members of the household.
Duration of hospitalization =	Total number of days the household members were

	hospitalised
OP (Outpatients)	
OP OOPE (H) (₹) =	$\left(\sum_{n=1}^O (\text{Total expenditure}) \right) * 2$
Non-Ayush Medicine Expenditure for OP (₹) (Monthly)	$\left(\sum_{n=1}^O (\text{Non-Ayush Medicine Expenditure}) \right) * 2$
Diagnostic Expenditure (Monthly) (₹)	$\left(\sum_{n=1}^O (\text{Diagnostic Expenditure}) \right) * 2$
Non-Medical Expenditure (Monthly) (₹)	$\left(\sum_{n=1}^O (\text{Non-Medical Expenditure}) \right) * 2$
Total (Inpatients and Outpatient care)	
Total OOPE =	IP OOPE + OP OOPE
CHE 10 = 1	If Total OOPE >10% of HUCE
CHE 10 = 0	If Total OOPE ≤ 10% of HUCE
CHE 25 = 1	If Total OOPE >25% of HUCE
CHE 25 = 0	If Total OOPE ≤ 25% of HUCE
Note: H=maximum number of hospitalizations in the household, O=maximum number of outpatient visits in the household. Total expenditure (for both inpatients and outpatients) is the sum of direct and indirect expenses.	

Source: Constructed from unit-level data in the NSS 75th round.

5.6.2.1.2 The need for coarsened exact matching (CEM) in the impact evaluation of GSHI through outcome variables

To analyze whether GSHI schemes had an impact on these outcome variables, the simplest method would be to analyze the differences in the means of the outcome variables between the GSHI-covered and non-covered households and assess their statistical significance using a t-test.

However, the GSHI and non-GSHI households may have different compositions of socio-economic variables due to the enrolment criteria of GSHI, which target poorer sections of society (as implied by the findings in Chapter 3). A fairer and more rigorous evaluation of the GSHI schemes would be studying the differences in the outcome variables after adjusting for these imbalances in the socio-economic variables. There

are many statistical and econometric methods to implement the same in the ‘program evaluation’ literature. For this study, the method of coarsened exact matching (CEM)⁶ was used for covariate balancing as suggested by Ghosh and Gupta (2017) to study the impact of RSBY in India along with the two-sample t-tests.

CEM was developed by Stefano M. Iacus, Gary King and Giuseppe Porro (Iacus et al., 2012) to primarily address the disadvantages of using propensity score matching (PSM)⁷. PSM is a covariate-balancing/matching method that estimates a logit or probit model in the first step and then matches observations based on the propensity scores generated from the first model. Further, the measures of covariate imbalance would be revealed only after running the PSM (ex-post approach). The above two features of PSM induce model dependence and bias, two issues that CEM avoids. CEM does not entail a first step of logit or probit modeling and the covariate imbalance is revealed before the matching (ex-ante approach).

The idea of CEM is to temporarily classify/coarsen each covariate (X_i) into substantively meaningful groups, exactly match these coarsened data and then only retain the original (uncoarsened) values of the matched data (Blackwell et al., 2010). In other words, CEM would ensure that the treated (GSHI-covered households) and controlled groups (non-covered households) are similar concerning the classifications of the covariates in Table 5.2. The only difference between the treated and controlled groups would be the treatment itself (GSHI enrolment). In an additional step, in this matched data, after creating various strata of similar covariates, for calculating the treatment effect, each household would be assigned a weight specific to that stratum and representative of the proportion of all households present in the stratum (Ghosh & Gupta, 2017).

CEM reports a global measure of multivariate imbalance (MIM)⁸ called the $\mathcal{L}_1$ statistic to assess the multidimensional balance of covariates before and after running the CEM algorithm. $\mathcal{L}_1$ is the difference between the multidimensional histogram of all pre-treatment covariates in the treated group and that in the control group. The value of $\mathcal{L}_1$ lies between 0 and 1, implying perfect balance and perfect imbalance, respectively. Ideally, the $\mathcal{L}_1$ after running the CEM should be lower than the $\mathcal{L}_1$ before the CEM.

⁶ See G5.2 in Glossary.

⁷ See G5.8 in Glossary.

⁸ See G5.6 in Glossary.

The difference in $\mathcal{L}_1$ after running CEM can be a gauge to measure the success of CEM.

The treatment effect (TE_i)⁹ of an intervention between the treated and controlled units is then evaluated on this matched data as follows:

$$TE_i = Y_i(1) - Y_i(0) \dots\dots\dots (5.1)$$

where $Y_i(0)$ is the potential outcome for observation i if the unit does not receive treatment ($T_i=0$) and $Y_i(1)$ is the potential outcome if the same unit received treatment ($T_i=1$).

Based on the TE_i calculated above, CEM estimates the sample average treatment effect on the treated (SATT)¹⁰ to measure the treatment effect as:

$$SATT = \frac{1}{n_T} \sum TE_i, \text{ where } n_T = \sum_{i=1}^n T_i \text{ and } T = \{1 \leq i \leq n : T_i = 1\} \dots\dots (5.2)$$

Based on the results from the socio-economic and demographic composition of GSHI and non-GSHI households (analyzed in Chapter 3), this study considered eight main variables that have the potential to influence the selection into GSHI and coarsened them into various categories to correct the imbalances in these covariates between the GSHI and non-GSHI households. These eight variables and their coarsening are summarized in Table 5.2.

The study relied on the cem package in STATA 15, developed by Blackwell et al. (2010) to implement the CEM algorithm.

Table 5.2: Covariates and their coarsening used in CEM

Covariates	Classification/Coarsening
Gender of the household head.	Male, Female
Place of Residence	Rural, Urban
Household Size	1-3, 4-6, 7-9 and above 10
Age of the household head.	0-24, 25-35, 36-45, 46-59, 60-69, Above 70
Presence of Elderly	No Presence, 1 elderly member, 2 elderly members, above 2 members.

Contd....

⁹ See G5.10 in Glossary.

¹⁰ See G5.9 in Glossary.

Education level of the household head.	Illiterate, Literate, Below Primary to Upper Primary, Secondary and Higher Secondary, Graduate and Post Graduate
Household Type	Self-employed, Casual labour, Regular and Others.
Consumption Quintiles	Poorest, Poor, Middle, Rich, Richest

Source: Constructed from the categorical variables in schedule 25.0 of NSS 75th round.

The aggregate impact evaluation would be incomplete without studying the distributional equity of the outcome variables between the GSHI and non-GSHI households. For this, well-known measures of health inequality like the concentration index (CI) and the more recent Erreygers index (Erreygers, 2009) were used, the former for continuous variables like out-of-pocket expenditures and the latter for binary variables like the incidence of catastrophic expenditures (please see section 3.12.2 of Chapter 3 for a detailed discussion on CI and EI). The values of both concentration and Erreygers indices ranged between -1 and +1, with -1 indicating a pro-poor distribution and +1 indicating a pro-rich distribution. Further, using z-statistic (O'Donnell et al., 2016), it was tested whether the difference in CI/EI between GSHI-covered and non-covered households was statistically significant.

5.6.2.2 For the second objective: the disaggregated impact of GSHI on financial protection

Since hospitalization expenses are the main mandate of GSHI schemes, it would be interesting to analyze various indicators of financial protection related to hospitalization expenditures across various socio-economic groups.

For this, the yearly IP OOPE (IP OOPE multiplied by 12) has been constructed along with a ratio of IP OOPE to Household Usual Consumption Expenditure called IPO-H ratio.

Further, the frequency of distress financing following the methodology above was also considered. These indicators of financial protection were compared between the GSHI-covered and non-covered households using two-sample t-tests in each socio-economic, demographic and geographic (SEDG) subgroup (Table 5.3).

Following these analyses, similar to the analysis of distributional equity for the aggregate analysis, concentration index (CI) and EI were estimated for the above-mentioned indicators of financial protection, across the GSHI-covered and non-

covered households in each SEDG subgroup. Further, using the z-statistic (O'Donnell et al., 2016), it was tested whether the difference in CI/EI between GSHI-covered and non-covered households in each SEDG subgroup was statistically significant.

Table 5.3: List of socio-economic, demographic and geographic (SEDG) variables	
SEDG variables	Groups
Type of Residence	(i) Rural (ii) Urban
Social Groups	(i) ST (ii) SC (iii) OBC (iv) General
Household size	(i) 1-4 members (ii) 5-7 members (iii) 8 and above
Household type	(i) Self-Employed (ii) Regular (iii) Casual Labour (iv) Others
Education level of the household head	(i) Illiterate and Literate only (ii) Below Primary to Upper Primary (iii) Secondary and Higher Secondary (iv) Graduate and above
Number of elderly members	(i) No elderly members (ii) 1 elderly member (iii) 2 elderly members
Consumption Quintiles	(i) Poorest (ii) Poor (iii) Middle (iv) Rich (v) Richest
Districts	(i) Kasargode (ii) Kannur (iii) Wayanad (iv) Kozhikode (v) Malappuram (vi) Palakkad (vii) Thrissur (viii) Ernakulam (ix) Idukki (x) Kottayam (xi) Alappuzha (xii) Pathanamthitta (xiii) Kollam (xiv) Thiruvananthapuram

Source: Constructed from the categorical variables in schedule 25.0 of NSS 75th round.

Throughout the analysis, for inpatient expenditures, hospitalizations outside the state were excluded. For both inpatients and outpatients, unlike the report of NSS 75th round (National Statistical Office, 2019) childbirths were also included in the estimation of outcome variables. Also, only the hospitalizations and outpatient visits covered by allopathic treatment were included.

Further, the estimates in this study were weighted by household survey weights or CEM strata weights (for SATTs) and further, the standard errors have been adjusted for the clustering at the FSU level (for hypothesis testing).

5.7 Results and Discussion

5.7.1 The implication of polarization in the utilization pattern on medical expenditures

The most profound implication of the results in Chapter 4 (regarding the polarization in the utilization of public hospitals based on GSHI coverage) would be concerning the medical expenditures of GSHI beneficiaries in Kerala. There is no clear evidence to show that GSHI schemes provided sufficient financial protection to the beneficiaries in all the states of India (Prinja et al., 2017; Reshmi et al., 2021).

However, heavy reliance on public hospitals by the GSHI beneficiary households in Kerala may suggest significant reductions in out-of-pocket expenditures and related measures of medical expenditures for GSHI-covered households compared to the non-covered households.

Table 5.4 provides an idea of the extent to which hospitalization expenditures could be reduced by relying on public hospitals. At the all-India level, among the GSHI households, while the ratio of private to public hospital expenditures was 5.8, it was 7.43, in the non-GSHI households. In Kerala, the corresponding ratios were 3.30 and 5.10.

Table 5.4: Mean of total hospitalization expenditure (₹) in public and private hospitals across GSHI-covered and non-covered households in India and Kerala

Type of hospital	India			Kerala		
	GSHI-covered households	Non-covered households	Total households	GSHI-covered households	Non-covered households	Total households
Public Hospitals (1)	4,596	4,454	4,476	6,775	6,276	6,539
Private Hospitals (2)	26,575	33,134	32,147	22,379	31,963	29,096
(2) ÷ (1)	5.78	7.43	7.18	3.30	5.10	4.44

Notes: Childbirths are included in the estimations

Source: Estimated from unit-level records of NSS 75th round for Kerala.

Given that the difference in the average hospitalization expenditure between GSHI and non-GSHI households in the case of public hospitals was about ₹150 at the national level and ₹500 in Kerala, the benefits for GSHI households (compared to non-covered households) would stem from the difference in expenditures in private hospitals. From Table 5.4, it was clear that the difference in average hospitalization expenditures in private hospitals was lower by about ₹6,600 for the GSHI households at the national level and ₹9,500 in Kerala, compared to the non-GSHI households.

From Chapter 4, it was clear that there was only a difference of 1.5 percentage points between GSHI-covered and non-covered households at the national level for inpatient care. For Kerala, however, the utilization of public hospitals for inpatient care by GSHI-covered households was about 23 percentage points higher than the non-covered households.

So, even though the ratio of private to public hospitalization expenditures was lower for GSHI beneficiaries in Kerala, a higher reliance on public hospitals by GSHI-covered households (as suggested in Chapter 4) could result in a wide difference in the medical expenditures between GSHI-covered and non-covered households. The subsequent sub-sections explore this further.

5.7.2 An aggregate assessment of the impact of polarization on indicators of financial vulnerability/financial protection of GSHI-covered households in Kerala

5.7.2.1 Covariate balancing through CEM and sacrifices in sample size

Before analyzing the financial impact of GSHI on the beneficiaries in Kerala, it was important to understand to what extent CEM succeeded in reducing the covariate imbalance, as all the sample average treated effects on the treated (SATT) estimates on which financial protection depended were based on the robustness of the covariate balance.

In this context, Table 5.5 showed that the covariate imbalance (MIM) reduced substantially after conducting CEM, even though it came at the cost of trimming the sample size. While for the inpatient care, MIM dropped from 0.53 before CEM to 0.29 after CEM, at the cost of trimming 1126 households (3224-2098 households), for the outpatient care, MIM dropped from 0.54 before CEM to 0.29 after CEM, at the cost of trimming 1038 households (2825-1787 households). These statistics indicated more reliability to the results based on the post-CEM exercise.

Table 5.5: Covariate balancing and sample size before and after CEM

Groups of outcome variables	Sample size (Households) before CEM	MIM* Before CEM	Sample size (Households) after CEM	MIM* after CEM
Inpatient and outpatient care	3,952	0.51	2719	0.29
Inpatient care	3,224	0.53	2098	0.29
Outpatient care	2,825	0.54	1787	0.29

MIM* - Multivariate Imbalance Measure

Source: Estimated from the unit-level records of NSS 75th round for Kerala.

5.7.2.2 The impact of GSHI on outcome variables

Moving on to the financial impact of GSHI (Table 5.6), in the combined expenditures due to inpatient care and outpatient care, based on sample average treated effects on the treated (SATT), it was revealed that GSHI-covered households had a lower total OOPE (a difference of ₹724) and incidence of catastrophic expenditures at both 10 per cent and 25 per cent levels (a difference of 0.06 and 0.07 respectively). Similarly, among inpatients, GSHI-covered households had lower IP OOPE (a difference of ₹724) and incidence of catastrophic expenditures at both 10 and 25 per cent levels (due to hospitalization). This revealed that GSHI had a significant impact on reducing hospitalization expenditures and turning it into a lower incidence of catastrophic expenditure.

However, regarding distress financing in inpatient care, the findings were not very encouraging (Table 5.6). The difference in means for frequency of distress financing was higher and statistically significant for the GSHI-covered households compared to the non-covered households, in case of inpatient care. The SATT for the same was positive, even though it was not statistically significant. This showed how hard it was to convert a real impact on medical expenditures into a lower reliance on distress financing, even in a state where GSHI could have created the largest polarization in the country in terms of public hospital utilization.

From Table 5.6, it was also clear that the transport expenditure was higher for the GSHI-covered households than the non-covered households, suggesting that the beneficiary households could be traveling longer distances than the non-beneficiary households. This might be because of the dominance of public hospitals in the

utilization mix of GSHI beneficiaries. Since there were only around 200 empanelled public hospitals in the whole state (Chapter 4), the policy of reserving packages might have pushed the beneficiary households to travel longer distances.

Table 5.6: Comparison of the difference in means and SATT between GSHI-covered and non-covered households among the outcome variables in Kerala

Outcome variables	Difference in means (t-test)	SATT (CEM)
Combined (Inpatient and Outpatient care)		
Total OOPE (₹)	-1152***	-724***
Incidence of CHE at 10 per cent level	-0.06*	-0.06***
Incidence of CHE at 25 per cent level	-0.05**	-0.07***
Inpatient care		
IP OOPE (₹)	-1292***	-724***
Incidence of CHE at 10 per cent level (due to hospitalization)	-0.15***	-0.10***
Incidence of CHE at 25 per cent level (due to hospitalization)	-0.09***	-0.08***
Frequency of distress financing due to hospitalization	0.09***	0.03
Transport Expenditure due to hospitalization (₹)	220***	218**
Mean hospitalization episodes	0.03	0.01
Duration of hospitalization (Days)	0.80	0.91
Outpatient care		
OP OOPE (₹)	-786***	-170
Non-Ayush Medicine Expenditure for OP (₹)	-378***	-138
Diagnostic Expenditure (₹)	-51**	-0.64
Non-Medical Expenditure (₹)	-28*	-16
Mean outpatient visits	0.07	0.06

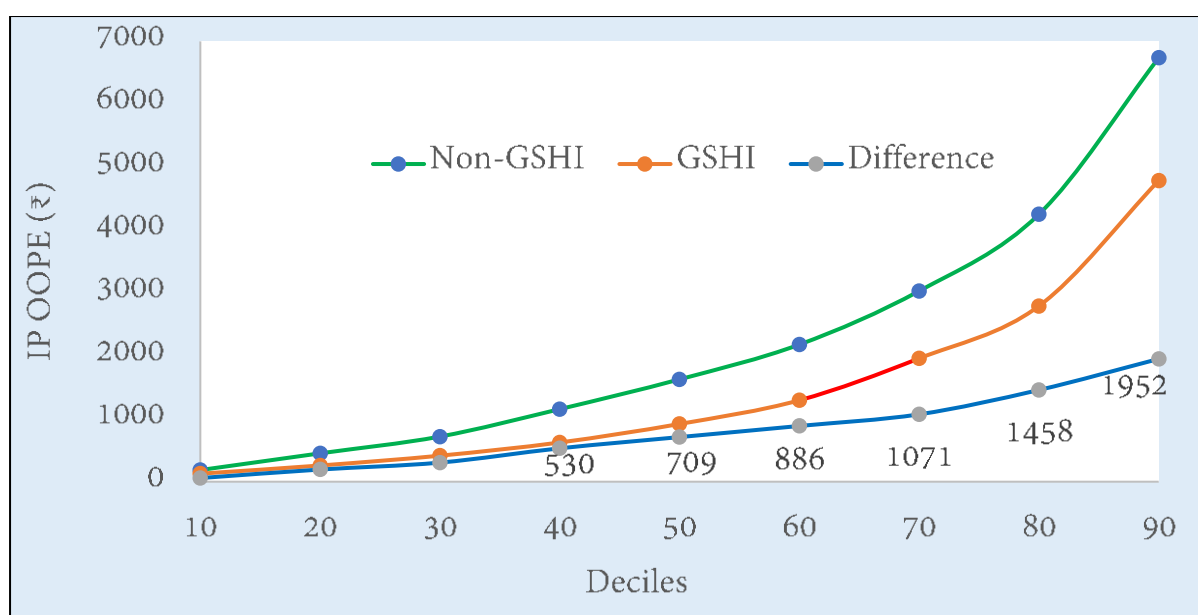
Notes 1: * p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, *** p-value below 0.01

2: The SATTs are estimated using cem weights for strata

3: The descriptive statistics of the outcome variables have been included in the appendix to this chapter (Table 5A).

Source: Estimated from the unit-level records of NSS 75th round for Kerala.

Figure 5.1: Deciles of IP OOPE



Source: Estimated from the unit-level records of NSS 75th round for Kerala.

Since IP OOPE was the main variable of interest, a deeper analysis of the difference in the distribution of IP OOPE between GSHI-covered and non-covered households revealed that the impact of GSHI might be stronger in higher deciles of IP OOPE (Figure 5.1).

Interestingly, the SATT of both hospitalization episodes and duration of hospitalized stay of households, even though higher (positive), were minuscule in size and not statistically significant, implying that the utilization of GSHI-covered households was not higher than the non-covered households (Table 5.6).

In the case of outpatients, the non-Ayush medicine expenditure was lower among GSHI-covered households compared to non-covered households (Table 5.6). This did not, however, translate into a reduction in the SATT of OP OOPE, due to the reduced impact in diagnostic expenditures and other non-medical expenditures. Moreover, there was no statistically significant difference in mean outpatient visits between GSHI-covered and non-covered households.

5.7.2.3 Distributional Equity and GSHI

Regarding distributional equity, it was observed that total OOPE, IP OOPE and OP OOPE had a concentration of rich households among GSHI-covered households (Table 5.7). However, the evidence regarding catastrophic expenditures revealed that the incidence of CHE at 10 per cent and 25 per cent in inpatient care and the total of

inpatient and outpatient care was concentrated among the poorer quintiles among the GSHI households.

However, the frequency of distress financing was concentrated among richer quintiles in the GSHI households (Table 5.7). Further, there was no statistically significant difference in the EI between GSHI-covered and non-covered households among the outcome variables, except in the frequency of distress financing due to hospitalization.

The evidence in sub-section 5.7.2.2 gave hope when it was found that GSHI-covered households had lower out-patient expenditures and catastrophic expenditures. However, these positive results began waning when it was found that the aforementioned reductions in medical expenditures came with no statistically significant reduction in the reliance on distress financing for hospitalization expenditures. Added to this, the evidence regarding the concentration of poor households suggested a mixed bag of evidence. The following sub-section lists two key insights that could emerge from the combined results in sub-sections 5.7.2.2 and 5.7.2.3

Table 5.7: Distributional inequality in the outcome variables across GSHI and non-GSHI households in Kerala

Outcome variables (1)	GSHI households (Std.error) (2)	Non-GSHI households (Std.error) (3)	Difference (4) (2)-(3)
Total (Inpatients and Outpatients)			
Total OOPE (₹)	0.150*** (0.05)	0.165*** (0.036)	-0.015 (0.062)
Incidence of CHE at 10 per cent level	-0.080*** (0.025)	-0.052*** (0.018)	-0.027 (0.031)
Incidence of CHE at 25 per cent level	-0.172*** (0.043)	-0.101*** (0.030)	-0.071 (0.053)
Inpatients			
IP OOPE (₹)	0.07** (0.034)	0.11*** (0.031)	-0.042 (0.046)
Incidence of CHE at 10 per cent level (Hospitalization)	-0.119*** (0.033)	-0.084*** (0.019)	-0.034 (0.038)
Incidence of CHE at 25 per cent level (Hospitalization)	-0.17*** (0.046)	-0.21*** (0.032)	0.044 (0.056)
Frequency of distress financing due to hospitalization	0.0004 (.053)	-0.167*** (.062)	0.168** (0.082)
Transport Expenditure due to hospitalization (₹)	0.038 (0.035)	0.0135 (0.024)	0.025 (0.043)

Mean hospitalization episodes	0.008 (0.015)	0.021 (0.017)	-0.013 (0.023)
Duration of hospitalization	-0.022 (0.032)	0.006 (0.020)	-0.03 (0.038)
Outpatients			
OP OOPE (₹)	0.139** (0.07)	0.133** (0.053)	0.0059 (0.087)
Non-Ayush Medicine Expenditure for OP (₹)	0.143*** (0.053)	0.093** (0.043)	0.05 (0.069)
Diagnostic Expenditure (₹)	0.166* (0.085)	0.179** (0.079)	-0.013 (0.116)
Non-Medical Expenditure (₹)	0.185 (0.199)	-0.164 (0.208)	0.349 (0.288)
Mean outpatient visits	0.057*** (0.017)	0.09*** (0.16)	-0.04 (0.023)

Note: *p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01

Source: Estimated from the unit-level records of NSS 75th Round for Kerala.

5.7.2.4 Two key insights from the aggregate assessment of GSHI

1. GSHI imparted only modest and peripheral financial protection in terms of reductions in out-of-pocket expenditures and catastrophic expenditures for the beneficiary households. This is because GSHI failed to reduce distress financing of beneficiary households and more importantly, because, a concentration of poor beneficiary households was observed for catastrophic expenditures within the beneficiary households. Thus, GSHI failed to provide deeper and more meaningful financial protection to the beneficiary households.

Even more shockingly, the failure to deeply entrench financial protection in Kerala happened, in spite of the largest polarization towards public hospitals in India, which was influenced by GSHI.

2. Even when offering modest financial protection, the results indicated that this limited impact on financial protection did not come on the back of increased utilization of hospitalizations (neither the number of hospitalization episodes nor the duration of hospitalization) or outpatient visits. This was unique, given that the international and national studies provided plenty of evidence for the positive impact of GSHI schemes on healthcare utilization (please see Chapter 4).

However, the results of the India Health Insurance Experiment (IHIE) had given evidence that a lack of awareness about free insurance could eventually dissipate the positive impact of GSHI on healthcare utilization among the beneficiaries (Malani et al., 2021).

Although unlikely in a state like Kerala (due to high literacy and awareness levels), there is evidence in the literature about gaps in beneficiary awareness regarding various nuances of GSHI schemes in Kerala (Joy,2019). However, there is more evidence to understand the lack of higher utilization in 2017-18 from Chapter 3. In Chapter 3, it was observed that Kerala had recorded an impressive rise in hospitalization ratio (HR) throughout the 2008-2022 period, although with growth/degrowth phases. Between 2016-17 and 2018-2019, one year before and after the year in question (2017-18), it could be observed that there was only modest growth in HR between 2016-17 and 2017-2018 and decline between 2017-18 and 2018-19.

So, this ineffective impact of GSHI on healthcare utilization, especially inpatient care could be because of the combined effect of stagnant growth in HR between 2016 and 2019 and the comparison with non-GSHI households using a rigorous methodology like CEM.

5.7.3 The disaggregated impact of GSHI on the financial protection of beneficiary households, across various socio-economic, demographic and geographic groups, in inpatient care

5.7.3.1 Failure to translate the polarization in the utilization of public hospitals among socially and economically well-off beneficiaries to meaningful financial protection

The disaggregated impact of GSHI on the financial protection of beneficiary households across socio-economic, demographic and geographic groups, especially in inpatient care, would provide more insights regarding the true impact of the aggregate results analysed in the above sub-section. Of particular interest would be to check whether the higher degree of polarization in the utilization of public hospitals in the socially and economically well-off groups (urban households, belonging to OBC and general categories, engaged in self-employment, regular or other occupations, having

better-educated household heads and belonging to wealthier consumption quintiles), covered by GSHI, also translated into financial protection for these groups.

If the aggregate results are anything to go by, one can only expect peripheral financial protection and not deep and meaningful financial protection. The juxtaposition of the results in Tables 5.8 and 5.9 indicated that this was indeed the case.

Firstly, even though compared to the rural area, beneficiary households in urban areas had similar negative differences in IP OOPE and IPO-H ratio (suggesting more financial protection in urban areas), distress financing was high among the beneficiary households in urban areas. Further, there was still a fairly large concentration of poor households in the IPO-H ratio, both in rural and urban areas among the GSHI households.

Secondly, even though beneficiary households belonging to OBC and general categories exhibited more financial protection in the form of lower IP OOPE and IPO-H ratio, similar to the case with urban households, it did not translate into lower distress financing. In fact, distress financing was high for beneficiary households in both groups and IPO-H ratio had a high concentration of poor households, in the case of OBC beneficiary households.

Thirdly, even though beneficiary households engaged in self-employment, regular and other occupations had lower IP OOPE and consequently financial protection to some extent, again similar to the cases mentioned above, this financial protection fizzled out when it was observed that these beneficiary households also had a significant concentration of poor households in in IPO-H ratio.

Fourthly, even though beneficiary households having household heads with better education (below primary to upper primary, secondary and higher secondary, graduate and above) had higher financial protection due to lower IP OOPE and IPO-H ratio, for beneficiary households with heads having secondary and higher secondary education, high distress financing was noticed.

Further, the same households also had a high concentration of poor households in in IPO-H ratio. Fifthly, even though across consumption quintiles, beneficiary households in the middle to richest quintiles had some financial protection in the form of lower IP OOPE and IPO-H ratio, it came with higher reliance on distress financing among these groups.

Table 5.8: Difference in the indicators of financial protection between GSHI and non-GSHI groups across various socio-economic, demographic and geographic (SEDG) groups in Kerala

SEDG Groups	Number of Households	Difference in IP OOPE (Yearly)	Difference in IPO-H ratio (Monthly)	Difference in the frequency of distress financing
Type of Residence				
Rural	1751	-15621***	-0.09***	0.06
Urban	1473	-15194***	-0.09***	0.10**
Social Groups				
ST	42	-5307.39*	-0.04**	0.01
SC	237	-835.08	0.05	-0.12
OBC	1979	-11937***	-0.06***	0.09**
General	966	-22366*	-0.15***	0.12**
Household Size				
1-4 members	1576	-17055***	-0.10***	0.09***
5-7 members	1391	-13732***	-0.06***	0.09***
8 and above	257	-12698*	-0.05	0.10
Household Type				
Self-Employed	960	-25900***	-0.16***	0.07
Regular	723	-9577.16**	-0.06*	0.11*
Casual Labourers	965	-1697	0.00	0.05
Others	576	-18980***	-0.07	0.05
Education level of the household head				
Illiterate and Literate only	269	-9872	-0.04	0.11
Below Primary to Upper Primary	1798	-13270***	-0.09**	0.03
Secondary and Higher Secondary	888	-13927***	-0.09***	0.12**
Graduate and above	269	-22574.3**	-0.06*	0.03
Number of elderly members				
No elderly members	1495	-8969***	-0.05**	0.08*
1 elderly member	1094	-17389***	-0.09***	0.13*
2 elderly members	613	-28014***	-0.17***	0.03
Consumption Quintiles				

Poorest	469	-10368.08***	-0.13*	0.01
Poor	592	-11337**	-0.11**	0.02
Middle	600	-16117.3***	-0.12**	0.19*
Rich	824	-11426.1***	-0.06***	0.03
Richest	739	-22729***	-0.07***	0.15***
Districts				
Kasargode	98	-26250*	-0.16**	-0.04*
Kannur	244	-15514**	-0.12**	0.09
Wayanad	93	5071	0.05	0.29**
Kozhikode	282	-19294***	-0.08*	0.08
Malappuram	408	-9319***	-0.05**	-0.02
Palakkad	257	-9791	-0.12**	-0.10
Thrissur	303	-28079.52***	-0.22***	0.06
Ernakulam	293	570	0.06	0.05
Idukki	139	-9797	0.08	0.00
Kottayam	182	-23199***	-0.14**	-0.04
Alappuzha	209	-12030.70	-0.10*	0.03
Pathanamthitta	139	-586.32	0.03	-0.15
Kollam	260	-1503.29	0.06	0.20
Thiruvananthapuram	317	-11220***	-0.03***	0.30**

Notes: 1. The differences in each column are calculated as figures of GSHI-covered households-non-GSHI households.

2.*p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01

Source: Estimated from the unit-level records of NSS 75th Round for Kerala.

5.7.3.2 Disaggregated impact of GSHI across households with elderly members, household size and districts

Apart from observing that the polarization in utilization pattern brought about by GSHI did not translate into adequate financial protection, a few other important results could also be culled out from Tables 5.8 and 5.9. Primary among these results would be the observation regarding the financial protection experienced by beneficiary households having various numbers of elderly members. In this regard, it could be observed that all beneficiary households, irrespective of whether they had elderly members or not, experienced some financial protection, in the form of the reduced IP OOPE and in IPO-H ratio.

Table 5.9: Distributional inequality in indicators of financial protection across GSHI and non-GSHI households in Kerala for hospitalization

SEDG groups (1)	Concentration index (CI) of IP OOPE (Yearly)			CI of IPO-H ratio		
	GSHI-covered Households (2)	Non-GSHI Households (3)	Difference (4) (2)-(3)	GSHI-covered Households (5)	Non-GSHI Households (6)	Difference (7) (5)-(6)
Type of Residence						
Rural	0.06	0.12***	-0.066	-0.22***	-0.14***	-0.078
Urban	0.09	0.11**	-0.02	-0.22***	-0.24***	0.019
Social Groups						
ST	--	0.30	--	0	0	--
SC	-0.01	0.08	-0.10	-0.42	-0.13	-0.29
OBC	0.04	0.10**	-0.061	-0.22***	-0.19***	-0.028
General	0.18***	0.10**	0.076	-0.09*	-0.21***	0.123
Household size						
1-4 members	0.07	0.12***	-0.047	-0.21**	-0.16***	-0.049
5-7 members	0.07*	0.14***	-0.072	-0.17***	-0.12**	-0.043
8 and above	0.19**	0.12	0.075	0.01	-0.17**	0.184
Household Type						
Self-Employed	0.10*	0.06	0.019	-0.12**	-0.19***	0.054
Regular	0.07	0.02	0.086	-0.17**	-0.22***	0.084
Casual Labourers	0.05	0.11**	-0.083	-0.17***	-0.14***	-0.062
Others	0.07	0.15***	-0.033	-0.25	-0.17**	-0.034

Education level of the household head						
Illiterate and Literate only	-0.025	0.063	-0.088	-0.368	-0.144	-0.22
Below Primary to Upper Primary	0.058	0.10*	-0.041	-0.217***	-0.215***	-0.001
Secondary and Higher Secondary	0.09*	0.06	0.032	-0.135**	-0.20***	0.070
Graduate and Post Graduate	0.41**	0.24**	0.172	0	-0.058	0.06
Number of elderly members						
No elderly members	0.04	0.14***	-0.10	-0.21***	-0.15***	-0.061
1 elderly member	0.07	0.10*	-0.028	-0.20***	-0.18***	-0.023
2 elderly members	0.09	0.04	0.054	-0.30	-0.30***	0
Districts						
Kasargode	0.10	0.35	-0.25	-0.09	0.01	-0.10
Kannur	0.07	0.05	0.021	-0.18	-0.25**	0.074
Wayanad	0.12	-0.16	0.273	0.03	-0.43	0.40
Kozhikode	0.23***	0.33**	-0.096	-0.11	0.01	-0.12
Malappuram	0.10	0.14**	-0.036	-0.15*	-0.10**	-0.046
Palakkad	0.19*	0.16**	0.036	-0.03	-0.04	0.012
Thrissur	0.07	-0.08	0.155	-0.19**	-0.40**	0.21
Ernakulam	0.05	0.07	-0.021	-0.20**	-0.20**	0.003
Idukki	-0.18	0.05	-0.24***	-0.52	-0.19	-0.34***
Kottayam	0.18*	0.02	0.162	-0.14	-0.22**	0.076

Alappuzha	0.13	0.02	0.099	-0.08	-0.16**	0.087
Pathanamthitta	0.23**	0.35**	-0.108	-0.06	0	-0.067
Kollam	-0.08	0.28**	-0.36*	-0.40	-0.10	-0.292
Thiruvananthapuram	0.01	0.17***	-0.158*	-0.25***	-0.06	-0.181**

Note: *p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01.

Source: Estimated from the unit-level records of the NSS 75th Round for Kerala.

However, beneficiary households with 1 elderly member had a higher reliance on distress financing than beneficiary households with no elderly members. Moreover, beneficiary households with no elderly members and 1 elderly member had a large concentration of poor households in in IPO-H ratio. These results are important given that the medical expenditures of elderly are very high in Kerala (Prasad, 2007).

With regard to household size, even though beneficiary households with 1-4 and 5-7 members had lower IPO-H ratio, reliance on distress financing as well as concentration of poor households in the IPO-H ratio existed among these households.

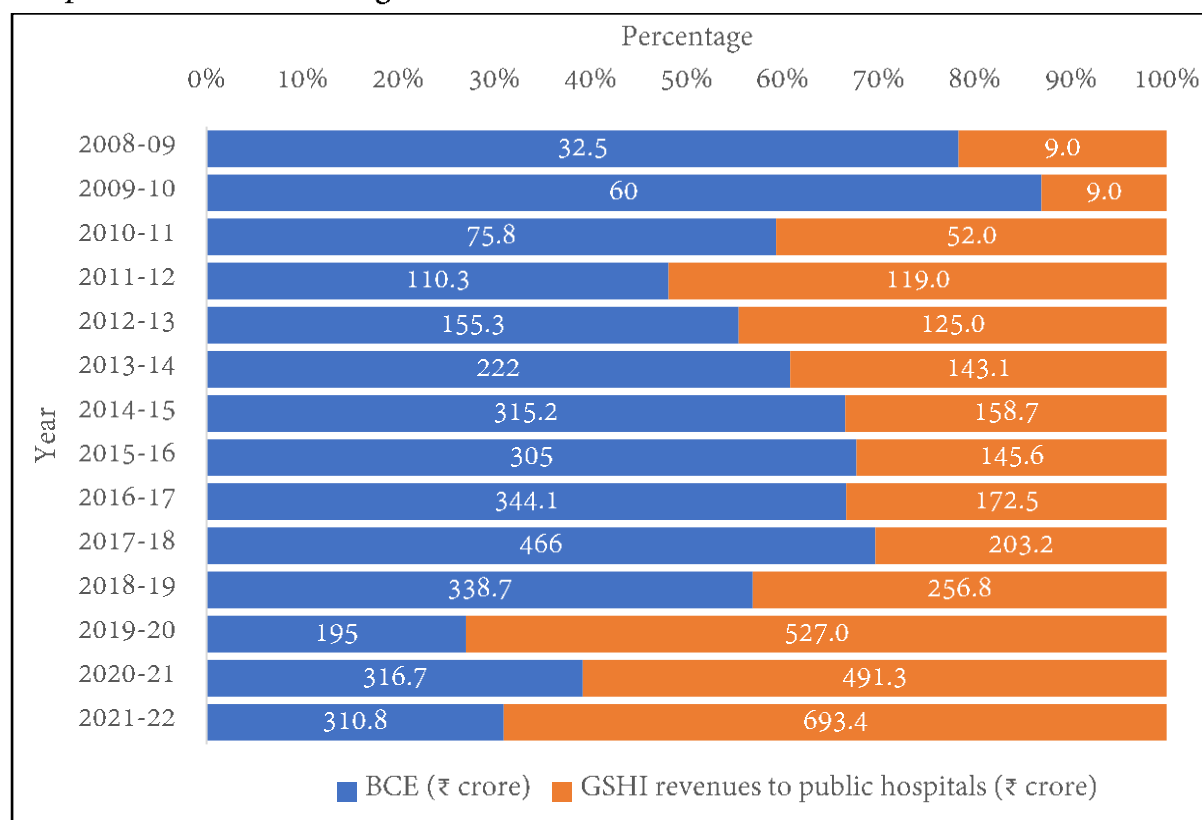
Across districts, unsurprisingly (due to the opposite polarization in utilization pattern), again Wayand stood out. Apart from having no financial protection in terms of IP OOPE and in IPO-H ratio, the beneficiary households in this district relied heavily on distress financing. Even more surprisingly, although the beneficiary households in Thiruvananthapuram experienced lower IP OOPE and IPO-H ratio, the reliance on distress financing was very strong and along with it the beneficiary households in the district also had a high concentration of poor households in in IPO-H ratio. Further, two more districts (Kozhikode and Thrissur) qualify for having a high concentration of poor households in in IPO-H ratio despite having lower IP OOPE and in IPO-H ratio.

In any of the SEDG subgroups that were examined, there was no statistically significant difference in the EI between GSHI-covered and non-covered households for either IP OOPE or IPO-H ratio, except in Idukki, Kollam and Thiruvananthapuram districts.

5.7.4 The potential role of GSHI revenues accruing to public hospitals in the upgradation of public hospitals

This diversion of claims to public hospitals might also result in the upgradation of infrastructure in public hospitals. In particular, in Kerala, this has been the policy of the state government (Forgia & Nagpal, 2012). The state government decided that the RSBY-CHIS claim revenues in public hospitals would be classified as an untied fund and made available to the hospital development for human resource development, equipment purchase and for providing incentives to staff to provide patient-friendly services (Swarup, 2021). Although not directly visible, the impact of the same could be gauged when the GSHI revenues accruing to public hospitals and capital outlay in the Kerala budget are compared (Fig 5.2).

Fig 5.2: Share of budgeted capital expenditure (BCE) and GSHI revenues to public hospitals in Kerala during 2008-2022



Source: Kerala Budget (2008-20) & Kerala Economic Review 2020.

Between 2008 and 2022, around ₹3106 crore of RSBY-CHIS/ABPMJAY-KASP revenues were diverted towards public hospitals. In the same period, the total capital outlay for the health sector (actuals) in the Kerala budget had been ₹3247 crore. This implied that the share of RSBY-CHIS revenues was as high as 48.8 per cent in the total pooled funds available for the upgradation of public health facilities in Kerala, in the same period.

Furthermore, the disaggregated impact of RSBY-CHIS revenues on empanelled hospitals might have been much stronger as the capital outlay included expenditures on all public health institutions in Kerala whereas the RSBY-CHIS revenue accrued only to a selected and empanelled tertiary and secondary public hospitals. Considering these facts, it is easy to observe that RSBY-CHIS revenues might have acted as a 'twin engine' to the infrastructure development in the public health sector in Kerala.

5.8 Conclusions and Policy Suggestions

Regarding financial protection, two key insights emerged from the analysis. They were:

1. The aggregate assessment of the financial impact of GSHI: Expenditure on GSHI schemes by the central and state governments showed signs of reducing the total and inpatient out-of-pocket expenditures, along with the catastrophic expenditures of households in Kerala, compared to the non-GSHI households in Kerala. Also, this favourable financial impact of GSHI did not coincide with the rising utilization of either inpatient or outpatient care.

However, the distribution of catastrophic expenditures continued to be concentrated among poorer households among the beneficiary households. Also, the aforementioned reductions in out-of-pocket expenditures were insufficient to prevent distress financing by the beneficiary households. So, the financial impact of GSHI schemes in Kerala has largely been peripheral and subdued, without deep and meaningful percolation into the beneficiary population.

2. The disaggregated impact of GSHI across socio-economic, demographic and geographic groups: The polarization in the utilization of public hospitals among the socially and economically well-off groups in the beneficiary households (observed in Chapter 4) did not translate into deep and meaningful financial protection in the case of inpatient care, with most of these groups resorting to distress financing to finance their IP OOPE. Also, there was a concentration of poor households within most of these well-off groups when it came to the IPO-H ratio.

Apart from these impacts of GSHI on financial protection of beneficiaries, GSHI could have impacted the infrastructural development of secondary and tertiary level hospitals too. In short, the state government used GSHI schemes to influence the beneficiaries to utilize public hospitals and transformed the transfer payment/subsidy to the beneficiaries into a capital expenditure on public hospitals. Cumulated over a decade and more, the above residual effect of GSHI would have an enormous impact on the infrastructure upgradation of the empanelled hospitals. This demonstrates the larger welfare effects of implementing GSHI through public hospitals rather than engaging in the strategic purchase of services from the private sector.

Regarding policy suggestions, given the subdued financial impact of GSHI in Kerala, the main suggestion could be to increase the maximum limit of the GSHI schemes for inpatient care. In this context, ABPMJAY and ABPMJAY-KASP, a part of the Ayushman Bharat mission, introduced in 2019, could be a step in the right direction. This also opens a future line of research to reevaluate the financial impact of GSHI in the post-ABPMJAY-KASP era in Kerala. Further, since outpatient expenditures weigh more heavily on a household's medical expenditures, it is important to address that as well. The evidence regarding GSHI's impact on OP OOPE and non-AYUSH medicine expenditures from CEM was not conclusive. The companion schemes of Ayushman Bharat, discussed in Chapter 2, like Pradhan Mantri Bharatiya Janaushadhi Pariyojana (PMBJP), which helps to sell deeply discounted generic medicines through PMBJP retail outlets, could help reduce the medicine expenditures of GSHI beneficiaries, if a preference is given to GSHI beneficiaries in such outlets. The evidence from CEM also indicated the subdued impact of GSHI on diagnostic expenditures, a solution for which could be to develop diagnostic facilities within public hospitals.

5.9 Limitations of the study

The primary limitation of the data used in this chapter (regarding medical expenditures, household consumption expenditures, ailments etc.) were all self-reported by the respondents of NSS 75th round and therefore not verified. Secondly, since the study used CEM, a very data-hungry algorithm to reduce covariate imbalance, more sample size could have been useful to detect and statistically prove even smaller changes between GSHI and non-GSHI households. Ghosh and Gupta (2017) used CEM on the sample of a group of states, rather than a single state. However, Ghosh and Gupta (2017) was based on the 71st round of NSS, a six-month round. Contrary to this, this chapter was based on the 75th round of NSS contained more observations, at the state level, on account of it being a year-round survey. However, even after a year-long survey, for a single state like Kerala, more unit-level observations would have further strengthened this study, which was only based on the central sample of the NSS 75th round. For the same, the author tried to contact the state-matched sample of the NSS 75th round with the Directorate of Economics and Statistics, Government of Kerala. However, due to data processing and validation issues, the state-matched sample could not be accessed.

Thirdly, the limitations in Chapter 3 regarding rural-urban stratification (in DLHS-4 NFHS-4 and NFHS-5) applied to the data in the 75th round of NSS too (please see corresponding section in Chapter 3).

Appendix to Chapter 5

Table 5A: Descriptive statistics of various outcome variables in Kerala

Outcome variables	Mean		Standard deviation		Minimum		Maximum	
	GSHI-covered	Non-covered	GSHI-covered	Non-covered	GSHI-covered	Non-covered	GSHI-covered	Non-covered
Inpatients and outpatients								
Total OOPE	2,190	3,375	4,880	6,553	0	0	1,09,568	1,36,166
Incidence of CHE at 10 per cent level	0.51	0.57	0.499	0.494	0	0	1	1
Incidence of CHE at 25 per cent level	0.25	0.31	0.432	0.460	0	0	1	1
Inpatients								
IP OOPE (₹) (Monthly)	1,537	2,829	2,605	5,615	0	3.5	30,960	87,575
Incidence of CHE at 10 per cent level (due to hospitalization)	0.36	0.51	0.48	0.50	0	0	1	1
Incidence of CHE at 25 per cent level (due to hospitalization)	0.15	0.24	0.36	0.43	0	0	1	1
Frequency of distress financing due to hospitalization	0.22	0.13	0.59	0.50	0	0	5	10
Transport Expenditure due to hospitalization (₹)	1,066	845	1,595	1,309	0	0	15,000	24,000
Mean hospitalization episodes	1.48	1.45	0.94	1.31	1	1	10	32
Duration of hospitalization (Days)	10.53	9.73	12.8	12	1	1	390	181

Outpatients								
OP OOPE (₹)	1,623	2,409	4,029	5,011	0	0	1,02,460	1,08,000
Non-Ayush Medicine Expenditure for OP (₹)	1,265	887	1,596	2,683	0	0	18,300	72,000
Diagnostic Expenditure (₹)	124	72	354	454	0	0	6,500	8,030
Non-Medical Expenditure (₹)	46	18	115	372	0	0	2,500	6,850
Mean outpatient visits	2.06	2	1.33	1.47	1	1	10	17

Source: Estimated from the unit-level records of NSS 75th round.

An inter-state analysis of the financial protection offered by GSHI in inpatient care

In light of the findings in this chapter regarding peripheral vs. deep and meaningful financial protection for GSHI beneficiary households, especially for hospitalizations/inpatients, it would be interesting to analyze the financial protection in various states analyzed in Chapter 4, based on certain financial indicators summarized in Tables 5B and Table 5C.

In the main text of the chapter, it was found that in Kerala, GSHI-covered households had lower inpatient out-of-pocket expenditures (IP OOPe) and catastrophic expenditures (CHE), compared to non-covered households. However, it did not result in statistically significant reduction in the frequency of distress financing by GSHI-covered households (Based on SATT in Table 5.6). Further, there was a statistically significant concentration of poor households (analyzed using concentration index) in the distribution of the ratio of inpatient out-of-pocket expenditures to household consumption expenditure (IPO-H ratio) among GSHI-covered households. Further, there was no statistically difference in this concentration index between GSHI-covered and non-covered households. Due to all these results, it was concluded that the GSHI schemes in Kerala could only provide peripheral financial protection to its beneficiary households instead of a deeper and meaningful financial protection.

The same line of analysis could be extended across India and various states with high GSHI coverage. Table 5B showed that at the all-India level, while the IP OOPe of GSHI-covered households is lower by a statistically significant amount of ₹3,417, it did not translate into lower IPO-H ratio. Further, this reduction in IP OOPe among GSHI-covered households came with a rise in the reliance on distress financing. Table 5C showed that for IP OOPe, the concentration of rich households was comparatively less in GSHI-covered households than the non-covered households. Further, for IPO-H ratio, the concentration of poor households was higher among GSHI-covered households than non-covered households.

Compared to Kerala, Chhattisgarh fared much better when the reductions in IP OOPe and IPO-H ratio among GSHI-covered households (compared to non-covered households) were considered. These reductions also came with no rise in distress financing. However, the CI of IPO-H ratio suggested that the ratio was still concentrated among poorer households in GSHI-covered households than the non-

covered households (with a statistically significant difference in CI between the two groups).

Among other states, Andhra Pradesh and Mizoram showed statistically significant reductions in IP OOPE for GSHI-covered households, compared to non-covered households. However, for both states, it did not translate into reductions in IPO-H ratio. In the case of Andhra Pradesh, the reduction in IP OOPE was followed by a rise in distress financing for the GSHI-covered households. Further, for Andhra Pradesh, there was a lower concentration of rich households in IP OOPE in GSHI-covered households compared to non-covered households. In Mizoram, the opposite was true. In both the states, there was statistically significant concentration of poor households in GSHI-covered households in the case of IPO-H ratio. However, the difference in the CI of IPO-H ratio between GSHI-covered and non-covered states was not significant.

In the case of Tripura and Telangana, there was no statistically significant and lower IP OOPE for the beneficiary households, which translated into higher reliance on distress financing. In the case of IP OOPE, compared to non-covered households, the concentration of rich households was lower among GSHI-covered households in Tripura. Further, in both states, the concentration of poor households in IPO-H ratio was high among GSHI-covered households.

In Odisha, even though statistically insignificant, the IP OOPE was high for GSHI beneficiary households. Further, there was no impact of GSHI on IPO-H ratio and there was a statistically significant rise in the reliance of distress financing. GSHI did not have an impact in the concentration of poor households either in IP OOPE or IPO-H ratio.

The rest of the states (Rajasthan, Meghalaya and Goa) showed no statistically significant reductions in IP OOPE for GSHI-covered households. Further, it did not impact the IPO-H ratio or distress financing. Further in IPO-H ratio, Rajasthan had a concentration of poor households among the beneficiary households, while Goa had a concentration of rich households among the beneficiary households.

Table 5B: Inter-state comparison of difference in the utilization of public hospitals and the difference in the financial outcomes between GSHI and non-GSHI households

State (1)	GSHI PC (%) (2)	Difference in the utilization of public hospitals between GSHI and non-GSHI households (%) (3)	Difference in IP OOPE (Yearly) (₹) (4)	Difference in IPO-H ratio (Monthly) (5)	Difference in the frequency of distress financing (6)
Kerala	34	23***	-15,506***	-0.09***	0.09***
Chhattisgarh	64	13.1***	-27,555***	-0.18***	0
Andhra Pradesh	71.3	7.05	-4,730**	-0.01	0.14***
Telangana	59	11.87***	-4,605	0.03	0.09***
Rajasthan	32.6	-0.60	-1,701	0	0.04
Tripura	15.4	0.95	-685	0	0.29***
Odisha	14.4	2.19	137	0.02	0.11***
Meghalaya	35	-3.88	-354	0	-0.01
Mizoram	61	11.17***	-2,310**	0	0
Goa	37.4	-21.32**	-8,126	0	0
India	13.3	1.5	-3,417***	-0.01	0.10***

Note: PC stands for population coverage. However, the GSHI PC in this table was estimated using NSS 75th round for 2017-18. This cannot be compared to inter-state GSHI PC in Chapter 3 as there it was estimated using NFHS-5 for 2019-21.

*p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01

Source: Estimated from the unit-level records of NSS 75th round.

Table 5C: Inter-state comparison of the difference in concentration index between GSHI-covered and non-covered households

State (1)	GSHI PC (%) (2)	Difference in the utilization of public hospitals between GSHI and non-GSHI households (%) (3)	Concentration index (CI) of IP OOPE (Yearly)			CI of IPO-H ratio (Monthly)		
			GSHI-covered households (4)	Non-covered households (5)	Difference (4)-(5) (6)	GSHI-covered households (7)	Non-covered households (8)	Difference (7)-(8) (9)
Kerala	34	23***	0.07**	0.11***	0.04	-0.22***	-0.19***	-0.03
Chhattisgarh	64	13.1***	0.17***	0.53**	-0.36	-0.165***	0.32	-0.49**
Andhra Pradesh	71.3	7.05	0.07**	0.19***	-0.12***	-0.187***	-0.12*	-0.06
Telangana	59	11.87***	0.035	0.12**	-0.08	-21***	-0.26***	0.058
Rajasthan	32.6	-0.60	0.165**	0.18***	-0.02	-0.166**	-0.172***	0.0
Tripura	15.4	0.95	0.09	0.26***	-0.17*	-0.13**	-0.10	-0.02
Odisha	14.4	2.19	0.21***	0.22***	-0.01	-0.096	-0.13***	0.03
Meghalaya	35	-3.88	0.25**	0.27***	-0.017	-0.04	-0.01	-0.035
Mizoram	61	11.17***	0.09	-0.04	0.13*	-0.27***	-0.34***	0.07
Goa	37.4	-21.32**	0.37***	0.22**	0.14	0.16*	0.015	0.14
India	13.3	1.5	0.09***	0.23***	-0.13***	-0.21***	-0.15***	-0.06**

Note: PC stands for population coverage. However, the GSHI PC in this table was estimated using NSS 75th round for 2017-18. This cannot be compared to inter-state GSHI PC in Chapter 3 as there it was estimated using NFHS-5 for 2019-21.

*p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01

Source: Estimated from the unit-level records of NSS 75th round.

Chapter 6

Summary, Major Findings, Policy Suggestions and Scope for Future Research

6.1 Introduction

The previous chapters revolved around setting the context and finding answers to two sets of research problems: (i) Did GSHI sufficiently cover deprived/vulnerable households in Kerala? (ii) Did GSHI provide sufficient financial protection to the beneficiary households in Kerala. This chapter provides a summary and the major findings of the previous chapters, along with the strength, general limitations of the thesis and more importantly, the scope for future research.

6.2 Summary of Chapter 1: An Overview of the Thesis

Chapter 1 provides an overview of the thesis. It began with the background and motivation for the thesis, followed by some major theories and factors which explains the purchase of health insurance. Following this, two sets of research problems are discussed. The first set of research problems dealt with the targeting of GSHI-covered households in Kerala and other Indian states, while the second set of research problems dealt with the utilization of public hospitals by the beneficiary households in Kerala and the financial protection of GSHI-covered households in Kerala. This is followed by the statement of the research objectives and a brief overview of the data and methodology used to examine the research objectives. Finally, the chapter briefly discusses the contents of the six chapters into which the thesis has been divided.

6.3 Summary of Chapter 2: Setting the Context for Government Sponsored Health Insurance (GSHI) in India with a special focus on Kerala

Chapter 2 discussed the need for GSHI in Kerala from a very broad perspective. The first part of the chapter started with the state of Universal Health Coverage (UHC) in the world and examined the major public health issues that India had to deal with. Further, it also discussed the failures of community health insurance schemes, the subdued insurance penetration and density in India, as well as the current progress of CGHS and ESIS, two of the oldest health protection schemes in India. Further, the effect of rising GSHI coverage and expenditures on National Health Accounts (NHA) was discussed.

The second part of the chapter dealt with Kerala, the study area for this thesis. It started with a profile of Kerala, including a discussion on its geography, demography and economy. Next, the historical reasons behind the famous Kerala model of health were explored. This was followed by a brief discussion of the current challenges that Kerala faces, including catastrophic and impoverishing health expenditures.

6.4 Summary, Main Findings and Policy Implications in Chapter 3: Inequalities and Paradoxes in Beneficiary Targeting within Government Sponsored Health Insurance in Kerala during 2008-2022

6.4.1 A brief overview of the theoretical framework, objectives and methodology of Chapter 3

Chapter 3 began with a discussion on a theoretical framework by Coady et al. (2004), which analyzed why governments, especially in developing countries with a limited budget, must try to target pro-poor transfers instead of making uniform transfers to the entire population. Further, it discussed various methods of targeting as well as targeting errors. Following this, a few major studies on beneficiary targeting and its effectiveness, conducted in India and around the world, were discussed. The literature review also included studies on the effectiveness of beneficiary targeting in GSHI in India and Kerala. Further, the measures to sharpen beneficiary targeting were traced through the evolution of BPL censuses in 1992, 1997 and 2002, which finally culminated in the Socio-Economic Caste Census (SECC) of 2011. Next, the beneficiary targeting of GSHI in Kerala was discussed, starting with the introduction of RSBY in 2008. Following this, the deteriorating fiscal capacity of the state government and how the GSHI costs are shared between the union and state governments were discussed.

After setting the background to beneficiary targeting, four objectives were set for the chapter, beginning with an analysis of the growth phases of GSHI in Kerala (in terms of key performance indicators (KPIs) like population coverage (PC), enrolment ratio (ER), hospitalization ratio (HR), claims ratio (CR) and claims payout per household (CPPH)). This was followed by examining the extent to which BPL households were excluded in Kerala and other states with high GSHI coverage and its effect on the concentration of poor households in GSHI (using the Erreygers Index).

Next, the disaggregated impact of the complete/incomplete integration of BPL households into GSHI was studied by analysing the changes in coverage (using the two-sample proportions test to test whether the changes in proportions were

statistically significant) and distributional changes in GSHI (using z-statistic to test whether the changes in EI was statistically significant) across various socio-economic, demographic and geographic variables, between 2016 and 2019.

Lastly, the fiscal impact of extending GSHI coverage to the excluded BPL families, in terms of changes in costs-sharing ratios between the union and state governments, was analysed.

6.4.2 Main Findings of Chapter 3

The results of the first objective, regarding the KPIs, indicated that there were four phases of GSHI growth in Kerala. The first extended between 2008 and 2012, which saw the introduction of RSBY-CHIS as well as CHIS-Plus. This phase exhibited rapid growth in all the KPIs (except claims ratio (CR) which deteriorated), reflecting the unmet need for GSHI schemes in Kerala in this period.

The second phase which extended between 2012 and 2015, was that of stagnation and downturns in several KPIs. While PC and ER grew very slowly, the hospitalization ratio (HR) and claims payout per household (CPPH) fell in this period. However, the CR improved, implying that insurance companies were compensated for the losses they suffered in the first growth phase.

The third phase which extended between 2016 and 2019 (just before the rollout of ABPMJAY-KASP) again witnessed growth in population coverage and enrolment along with the growth in HR and CPPH. This could largely be attributed to the rise in BPL (priority) families, following the implementation of the National Food Security Act (NFSA) in 2013. The rollout of the Senior Citizens Health Insurance Scheme (a top-up scheme over the upper limit of RSBY for senior citizens) was also introduced in this third phase. This could have contributed to the growth in KPIs during this period.

The fourth phase which started in 2019, with the rollout of ABPMJAY-KASP extends till 2022 and beyond. In this phase, even while the population coverage reached 48 per cent along with 100 per cent enrolment, HR and CPPH grew impressively. The increase in the sum assured, to 5 lakh per family, the expanded health benefits packages along with the financial vulnerability during COVID-19 might have fuelled this growth in hospitalization.

The results of the second objective revealed that right from 2013-14 and through 2016 and 2019, a minimum of 35.4 per cent of BPL households were always excluded from GSHI in Kerala. While it could be argued that the exclusions in 2013-14 and 2016

could have been due to lower enrolment ratios, the exclusion of 35.4 per cent of BPL households in 2019, despite 100 per cent enrolment, indicated that the BPL exclusion was a structural issue.

Further, across 10 states with high GSHI coverage in 2019, Kerala had the highest concentration of poor households in both the distribution of GSHI as well as BPL cards. After the integration of BPL households into GSHI, apart from the rise in coverage (from 48 per cent in 2019 to 63 per cent), again Kerala would have emerged as the state with the highest concentration of poor households in GSHI, followed by Andhra Pradesh and Telangana.

The results of the third objective revealed the disaggregated effects of what could happen after extending GSHI coverage to the excluded BPL families. When a growth in coverage of more or equal to 20 percentage points along with a rise in concentration of poor households was considered, it was revealed that households belonging to SC and ST communities, households with poorly educated heads (no education, preschool and primary education), along with households residing in Kasargode, Palakkad and Trivandrum stood to gain the most. Interestingly, this growth, even while favouring the socially and economically backward groups in Kerala, did not discriminate between rural and urban areas or between various household sizes. This was a testament to the effectiveness of BPL targeting in Kerala and highlighted the need for fully integrating the excluded BPL households into GSHI.

The results of the fourth objective showed that given that cost of GSHI per household/CPPH almost doubled between 2021-2022, under the current ceiling rate fixed by the union government, even the complete integration of BPL households would not result in a balanced distribution of GSHI costs between the union and state governments.

6.4.3 Policy Suggestions from Chapter 3

The policy suggestions emerging from Chapter 3 are full integration of BPL households into GSHI, upward revision in ceiling rate and adoption of BPL households in Kerala as the basis for inter-governmental cost sharing.

6.5 Summary, Main Findings and Policy Implications in Chapter 4: Polarization in the Utilization of Public Hospitals and GSHI: The Unique Case of Kerala

6.5.1 A brief overview of the background, objectives and methodology of Chapter 4

Chapter 4 focussed on how the policies of the state government regarding GSHI might have created a polarization in the utilization of public hospitals, based on GSHI coverage in Kerala. As per the records of the state government, the share of public hospitals in total claims volume and value rose from about 34-40 per cent in 2008 to 76-78 per cent in 2020. However, the estimation from the NSS 75th round (2017-18), which fell between 2008 and 2020 showed that the share of public hospitals in hospitalizations was just 38 per cent, just 4-5 per cent above the corresponding share in NSS 60th (2004-05) and 71st rounds (2014). A possible answer reconciling both these facts may be a polarization in the utilization pattern, with a high reliance on public hospitals by GSHI beneficiaries and a high reliance on private hospitals by the non-GSHI population.

However, as a prelude to exploring the polarization hypothesis, the first objective was set, to study whether GSHI schemes increased/decreased GSHI-related hospitalisations in 2018-2022, across all states. The period 2018-2022 was chosen due to the uniform availability of data across all states, which were fragmented before this period. Next, the second and main objective was pursued, in which a comparison of the difference in the utilization of public hospitals (both for inpatient admissions and outpatient visits) between the GSHI-covered and non-covered households was analysed among the top 10 states with higher GSHI coverage (including Kerala), as estimated from the 75th round of National Sample Survey (NSS), conducted in the year 2017-18. This survey was used because it fell in the 2008-2020 period, during which the polarization in the use of public hospitals might have happened in Kerala. Two sample proportions test along with unadjusted and adjusted odds ratios from logistic regressions were used for the inter-state analysis.

The second objective was followed by the third objective which was an execution of the second objective in each socio-economic, demographic and geographic group, in only Kerala. For this objective, two-sample proportions test was used to analyse whether these differences were statistically significant.

6.5.2 Main Findings of Chapter 4

The results of the first objective suggested that most of the states, including Kerala, recorded an impressive rise in GSHI-hospitalizations in the 2018-2022 period. With just a population coverage of 48 per cent, Kerala recorded a 74 per cent growth in hospitalizations between 2019 and 2022. Compared to other states, even though this growth was only the third highest, Kerala's share in the total hospitalizations under ABPMJAY was between 13-14 per cent in the 2019–2022 period.

Turning towards the second objective, between 1995-2005, the reliance on public hospitals reduced further in inpatient care. While the share of public hospitals in inpatient care and outpatient care was 40 and 29.4 per cent respectively in 1995-96, in 2004-05, the share of public hospitals in inpatients dropped to 35.4 per cent, and rose to 34.5 per cent in outpatients. These shares in 2004-05 remained almost the same in 2014 and showed a revival in 2017-18. In 2017-18, the share of public hospitals in inpatient care rose to 38 per cent among the total households, while in outpatient care, it recorded an even more impressive rise to 44 per cent. However, once the total households were split into GSHI-covered and non-covered households, it could be immediately noticed that the GSHI-covered households had an unusually high reliance on public hospitals compared to the non-covered households, the difference being 23 percentage points, both in inpatient and outpatient care in 2017-18.

In the inter-state analysis, the same story of huge differences between GSHI-covered and non-covered households regarding the use of public hospitals in Kerala, translated into the language of odds ratio (odds for a GSHI household to rely on public hospitals compared to a non-GSHI household) too. In inpatient admissions, the odds ratio for Kerala was the highest and statistically significant among the selected states, both in the unadjusted and adjusted models. Similarly, in outpatient visits, Kerala had the highest and statistically significant unadjusted odds ratio, while in the adjusted model, it had the highest odds ratio which was statistically significant. Both these pieces of evidence, in inpatient admissions and outpatient visits, pointed towards polarization in the utilization of public hospitals in Kerala, based on whether a household was covered by GSHI.

The results of the third objective revealed that the polarization in the utilization of public hospitals was higher among the more well-off sections in society, like households, residing in urban areas (compared to rural areas), belonging to OBC and general categories (as opposed to ST and SC communities), engaged in self-employment and regular jobs (compared to casual labour) and having household

heads with better education levels (compared to poorly educated household heads who are either illiterate or literate only).

Surprisingly, in inpatient admissions, such a clear pattern in polarization among higher consumption quintiles could not be observed, although it was very evident among the rich and richest consumption quintiles, in the case of outpatient visits. Along with the evidence from the inter-state analysis, this behaviour among the socially and economically well-off sections further buttressed the polarization hypothesis.

However, among the 14 districts, Wayanad exhibited an opposite polarization in favour of private hospitals.

Further, in the case of inpatient admissions, across age groups, the polarization in the utilization of public hospitals among older age groups, especially above 45 years was stronger compared to younger age groups. For outpatient visits, however, this pattern was not very clear.

For both inpatient admissions and outpatient visits, across disease groups, except for three groups (psychiatric & neurological, genito-urinary diseases and obstetrics), all the other groups exhibited various degrees of polarization in the utilization of public hospitals, the minimum being in infections (20 per cent) and the maximum being in cancers (54 per cent). This impact of polarization in inpatient admissions, for cancers, cardiovascular diseases and childbirth could be linked to the package reservation policy of the state government.

6.5.3 Policy Implication of Chapter 4

The policy implication of the findings in Chapter 4 would be whether the greater utilization of public hospitals by GSHI-covered households resulted in higher financial protection for the beneficiary households. This is explored in Chapter 5.

6.6 Summary, Main Findings and Policy Implications in Chapter 5: Did the Polarization in the Utilization of Public Hospitals Translate into Deep and Meaningful Financial Protection for GSHI-covered households in Kerala?

6.6.1 A brief overview of the background, objectives and methodology of Chapter 5

The first objective of this chapter was to analyse the aggregate impact of GSHI on the financial protection of GSHI beneficiaries in Kerala. The second objective was to analyse the disaggregated impact of GSHI on the financial protection of GSHI beneficiaries in Kerala, availing inpatient care.

For both objectives, data from unit-level records of the 75th round of NSS was used. The unit of analysis was households. For the first objective, outcome variables related to out-of-pocket expenditures (OOPE), catastrophic expenditures (CHE), distress financing and utilization were calculated for inpatient care, outpatient care and a combination of inpatient and outpatient care. Then using coarsened exact matching (CEM), the imbalances in the socio-economic variables between GSHI and non-GSHI groups were reduced. The estimates of differences in the mean values of the outcome variables between GSHI and non-GSHI groups, obtained from CEM, were compared to the corresponding differences obtained from the unmatched sample (evaluated using two-sample t-tests). The aggregate analysis also included an analysis of distributional equity in the outcome variables, using the concentration index (CI) and Erreygers Index (EI). Further, using z-statistic, it was tested whether the difference in CI/EI between GSHI-covered and non-covered households was statistically significant.

For the disaggregated analysis, only the inpatient admissions were considered. Within the inpatient admissions, the mean difference between GSHI and non-GSHI groups, across various socio-economic, demographic and geographic (SEDG) variables, regarding three variables were considered. They were inpatient out-of-pocket expenditures (IP OOPE), the ratio of IP OOPE to household consumption expenditure called IPO-H and distress financing. Further, using the concentration index (CI) and Erreygers index (EI), the distribution of IP OOPE and IPO-H were analysed respectively, in both GSHI-covered and non-covered households. Further, using z-statistic, it was tested whether the difference in CI/EI between GSHI-covered

and non-covered households in each socio-economic, demographic and geographic subgroup was statistically significant.

6.6.2 Main Findings of Chapter 5

The results of the first objective revealed that in the combined expenditures (sum of inpatient and outpatient expenditures) as well as the inpatient expenditures, GSHI beneficiaries had lower out-of-pocket and catastrophic expenditures. Further, the financial protection for inpatient care came with no increase in hospitalization episodes or duration of hospitalization. However, it was unclear whether the outpatient expenditures and outpatient visits were higher/lower for GSHI beneficiaries. More importantly, for inpatient expenditures, it was found that there was no decrease in the reliance on distress financing by GSHI beneficiaries, compared to non-beneficiaries and that there was a concentration of poor households among GSHI-covered households when it came to catastrophic expenditures.

The results of the second objective showed that the polarization in the utilization of public hospitals, observed among the socially and economically well-off groups did not translate into deep and meaningful protection. This is because even though GSHI resulted in reductions in out-of-pocket and catastrophic expenditures for the well-off groups, it either came with increases in distress financing and/or concentration of poor households in the IPO-H ratio.

Further, it could be observed that all beneficiary households, irrespective of whether they had elderly members or not, experienced some financial protection, in the form of the reduced IP OOPE and in IPO-H ratio. However, beneficiary households with 1 elderly member had a higher reliance on distress financing than beneficiary households with no elderly members. Moreover, beneficiary households with no elderly members and 1 elderly member had a large concentration of poor households in in IPO-H ratio.

With regard to household size, even though beneficiary households with 1-4 and 5-7 members had lower IPO-H ratio, reliance on distress financing as well as concentration of poor households in the IPO-H ratio existed among these households.

Across districts, unsurprisingly (due to the opposite polarization in utilization pattern), again Wayand stood out. Apart from having no financial protection in terms of IP OOPE and in IPO-H ratio, the beneficiary households in this district relied heavily on distress financing. Even more surprisingly, although the beneficiary households in Thiruvananthapuram experienced lower IP OOPE and IPO-H ratio, the

reliance on distress financing was very strong and along with it the beneficiary households in the district also had a high concentration of poor households in in IPO-H ratio. Further, two more districts (Kozhikode and Thrissur) qualify for having a high concentration of poor households in in IPO-H ratio despite having lower IP OOPE and in IPO-H ratio.

In any of the SEDG subgroups that were examined, there was no statistically significant difference in the EI between GSHI-covered and non-covered households for either IP OOPE or IPO-H ratio, except in Idukki, Kollam and Thiruvananthapuram districts.

6.6.3 Policy Suggestions of Chapter 5

The policy suggestions stemming from the findings in Chapter 5 would be to increase the financial protection accorded to GSHI-covered households for inpatient expenditures. This could be primarily through raising the upper limit of GSHI schemes, which is already underway, through ABPMJAY-KASP in Kerala.

Secondly, since the study found inconclusive evidence that the outpatient expenditures of the beneficiaries were lower compared to non-beneficiaries, it would be advisable for GSHI beneficiaries to be given preference in schemes like Pradhan Mantri Bharatiya Janaushadhi Pariyojana (PMBJP), which helps to sell deeply discounted generic medicines through PMBJP retail outlets.

6.7 Strength of the thesis

Identification of large-scale patterns in key concepts related to GSHI in Kerala using large-scale datasets: Even though large-scale datasets like District level Household Surveys and National Family Health Surveys (which captured data on various kinds of health insurance) were publicly available, to the best of the authors' knowledge, there was a lack of a large-scale study, focussing on the beneficiary targeting in GSHI in Kerala.

The results from Chapter 3 show that at least 36 per cent of BPL households remained excluded from the GSHI net in 2019, despite more than a decade of implementation. Further Chapter 3 argued that the reason for the above exclusion could be the anomalies in the dual targeting mechanisms of both union and state governments. The reason for such a gargantuan issue to remain under-researched for such a long time, could be due to the under-utilization of large-scale datasets like DLHS and NFHS for studying beneficiary targeting, even though the targeting literature reveals that these

datasets have been previously used to study the issues in the targeting of BPL households (Ram et al., 2009; Dreze & Khera, 2010).

Similarly, the anomalies in various data sources regarding the share of public hospitals were not investigated further, even though it was very obvious. This again could have happened due to neglecting large-scale datasets like the 75th round of the National Sample Survey. For example, even though financial risk protection was studied by Joy (2019) and Sharma et al. (2023), a background to financial protection of beneficiary households, stemming from the polarization in the use of public hospitals by GSHI beneficiaries was not explored. This could again be due to the under-utilization of the NSS 75th round.

Additionally, the sampling design of the NSS 75th round, which included a second-stage stratum helped to identify more cases of hospitalization. Therefore NSS 75th round could capture 4,986 hospitalizations in Kerala in 2017-18, out of 19,815 individuals surveyed. This could be contrasted to another large-scale study in Kerala, Sharma et al. (2023) which was conducted in 2019, which, even with a sample size of 13,054 individuals could only cover 1,078 hospitalizations.

Hence the primary strength of this thesis is the use of large-scale studies, to identify patterns in beneficiary targeting, polarisation in the use of public hospitals and financial protection of GSHI beneficiary households.

6.8 General limitations of the thesis and scope for future research

Although chapter-specific limitations were mentioned in each chapter, the study as a whole had many limitations.

1. **COVID-19 and lack of field survey:** The major studies on the impact of GSHI schemes in Kerala like Sharma et al (2023), Joy (2019) and Philip et al (2016) relied on field surveys, conducted before January 2020 (the onset of COVID-19) in Kerala. In Kerala, the COVID-19 pandemic might have affected the treatment-seeking behaviour of patients, as all the hospitals were focused on the control of COVID-19. Hence, a field survey was not conducted.

However, field surveys are more capable to capture the qualitative aspects of GSHI like awareness levels, ease of accessing healthcare services etc. Even concerning distress financing, the NSS 75th round did not capture the share of out-of-pocket

expenditures that were financed from the savings of the household or through distress financing. Regarding utilization as Philip et al. (2016) have shown, it will be important to analyse the share of hospitalisations in a beneficiary household being financed by GSHI. Again, the NSS 75th round did not capture this information.

2. **Omitting the disease profile of GSHI beneficiaries:** Secondly, in the context of the triple burden of diseases (communicable diseases, non-communicable diseases and injuries), the disease profile of the beneficiaries covered by GSHI could have been developed. As noted in Chapter 2, Kerala is undergoing an epidemiological transition¹, in which the share of non-communicable diseases dominates in the total disease burden. But it does not mean that there is a dearth of communicable diseases. The state also dominates in road accidents and suicides. Since the targeting of beneficiaries showed a very strong concentration of poor households, one could also investigate to what extent wealth and other socio-economic conditions influence the prevalence of various diseases and their risk factors among the beneficiaries. However, this thesis did not focus on the same.
3. **Omitting supply-side dimensions:** Thirdly, this thesis omitted the supply side of GSHI i.e., a study on the infrastructure availability, quality of care in empanelled hospitals, the geographical clustering of health services in the empanelled hospitals etc. For example, one of the most utilised packages of ABPMJAY-KASP is hemodialysis. Both government and private facilities (mainly not-for-profit institutions) provide hemodialysis services. However, it would be interesting to analyse the geographical clustering of these facilities. For example: Are private hemodialysis facilities concentrated in urban areas? Do all empanelled public hospitals offer hemodialysis services, especially in hilly districts like Wayanad, Palakkad and Idukki?

¹ Please see section 2.15 for a discussion on the disease burden of Kerala.

A glossary of terms, concepts and definitions used in the thesis

Common terms, concepts and definitions appearing throughout the thesis

G(A): GSHI (Operational definition): Government Sponsored Health Insurance (GSHI) could be defined as a financial protection scheme, mainly for secondary and tertiary level of curative care, implemented universally or in a targeted manner for identified vulnerable populations, financed by the government (single-payer), through taxes/hybrid sources and implemented through government or strategically purchased from private healthcare providers. In Kerala's context, GSHI will include schemes like RSBY-CHIS, CHIS Plus, Karunya Benevolent Fund and SCHIS before July 2019 and ABPMJAY-KASP after July 2019.

G(B): GSHI-covered household/beneficiary household (Operational definition): ¹ In Chapter 3, a household was considered to be GSHI-covered/beneficiary household if any usual member of the household was being covered by GSHI as recorded in the household questionnaire/schedule of DLHS-4, NFHS-4 and NFHS-5. In Chapters 4 and 5, a household was defined as GSHI-covered/ beneficiary household if the household head was covered by GSHI, as per the data in the demographic block of NSS 75th round.

G(C): Kerala: Kerala is the study area of this thesis. It is one of the southern-most states in India, lying between the latitudes 8°.17'.30"¹ N and 12°. 47'.40" N and longitudes 74°.27'.47" E and 77°.37'.12" E, with a total area of 38,863 sq. km, constituting 1.18 per cent of India's landmass. Generally, Kerala has a tropical monsoon with seasonally excessive rainfall and hot summer. Further around 55 per cent of Kerala's landmass is covered by forests (which forms part of the Western Ghats). Combined with a population of about 3.5 crore, this makes Kerala one of the densely populated states in India.

Unlike India in which the percentage shares of ST and SC population are about 8.6 per cent and 16.6 per cent respectively, in Kerala, the corresponding shares are 1.5 per cent and 9.1 per cent respectively. Similarly, while the percentage shares of Hindu, Muslim and Christian population in India are 79.8 per cent, 14.2 per cent and 2.3 per cent

¹ 8°.17'.30" should be read as 8 degrees (°), 17 minutes (') and 30 seconds (").

respectively, the corresponding shares in Kerala are 54.7 per cent, 26.5 per cent and 18.4 per cent respectively.

The per-capita income (per capita net state domestic product (NSDP), at current prices) of Kerala in 2021-22 was about 2.3 lakhs compared to the corresponding national figure of about 1.5 lakhs, implying that the former was about 53 per cent higher than the national average. Along with a consumption-led growth in the domestic economy, remittances of about ₹90,000 crores between 2015 and 2020 (14.3 per cent of NSDP), play a role in raising the per-capita income of the state.

G(D): National Family Health Survey (NFHS): NFHS is a nation-wide health survey being conducted in India since 1992 (NFHS-1) by International Institute of Population Sciences and primarily deals with reproductive and health issues of women along with the health of newborns, infants and children. NFHS has adopted a stratified multistage sample design, in which every district in the country is first divided into rural and urban strata, from which final primary sampling units (PSUs) and finally households are selected using techniques like population proportional to size (PPS) sampling and systematic sampling.

Till 2023, 5 rounds of NFHS have been conducted, the latest being NFHS-5 (2019-21) and during the time of authoring this thesis, the 6th round of NFHS (2023-24) is underway. Over the years NFHS has expanded its scope from reproductive and child health to include bio-chemical and clinical measures like blood glucose, blood pressure, anemia and qualitative aspects like domestic violence against women.

NFHS-4 (2015-16) and NFHS-5 (2019-21), with a sample size of 601,509 and 636,699 households in India respectively and 11,555 households and 12,330 households in Kerala respectively, have been used to investigate the effectiveness of beneficiary targeting in GSHI schemes in Kerala (Chapter 3).

G(E): National Sample Survey (NSS): National Sample Surveys are one of the most popular surveys conducted in India, since 1950, dealing with issues like household consumption patterns, employment and unemployment, agriculture, household indebtedness, healthcare and education. More specifically, in healthcare, various sample surveys have been conducted although the unit-level data were only available

for 42nd (1986-87) round, 52nd round (1995-96), 60th round (2004-05), 71st round (2014) and 75th round (2017-18).

The healthcare rounds mainly dealt with the inpatient (with a recall/reference period of 365 days) and outpatient care (with a recall/reference period of 15 days). These aspects included the diseases for which treatment was sought, whether public or private hospitals were relied on, what were the direct and indirect medical expenditures for availing inpatient and outpatient care, whether borrowings or sale of assets was involved to finance the treatment etc.). Apart from these issues, mortality (details of death of family members), child immunization, socio-economic and healthcare conditions of the elderly.

These rounds followed a stratified multi-stage sampling design in which the rural and urban areas in each district of India formed the first strata, following which using PPS, final sampling units of villages and cities and finally households were selected.

NSS 75th round (2017-18) with a sample size of 1,13,822 households in India and 4,467 household in Kerala is the dataset used to analyze the polarization in the utilization of public hospitals (Chapter 4) and financial protection of GSHI beneficiaries (Chapter 5).

G(F): Scheduled Caste (SC): According to Article 341 of the Indian constitution, any castes, races or tribes or parts of or groups within castes, races or tribes in a state or union territory could be defined as scheduled caste by the President of India after consultation with the respective Governors.

G(G): Scheduled Tribe (ST): According to Article 342 of the Indian constitution, the tribes or tribal communities or parts of or groups within tribes or tribal communities in a state or union territory could be defined as scheduled caste by the President of India after consultation with the respective Governors.

G(H): Concentration of poor/rich households across a health variable: The Concentration Index (CI) or Erreygers Index (EI) measures whether a continuous variable (in case of CI) or a binary variable (in case of EI) is concentrated among the rich or poor households. For example, higher concentration of poor households implies that although every wealth/income/consumption group would have some presence of

the health variable, it would be concentrated among poorer groups compared to the richer groups.

Chapter 1

G1.1: Actuarially fair premium: It is that amount of premium which is equal to the expected value of loss (expected value of loss is the amount of loss multiplied/weighted by the probability of loss).

G1.2: Cumulative prospect theory (CPT): Prospect theory (PT) was updated by incorporating a cumulative weighting function in which the decision weights are defined separately for gains and losses using cumulative probabilities. This updated version of prospect theory came to be known as cumulative prospect theory (CPT) (Tversky & Kahneman, 1992)². Specifically, “a cumulative probability describes the probability for receiving an outcome or anything better than that outcome. Decision weights for gains are obtained as differences between transformed values³ of cumulative probabilities. Similarly, for losses, decision weights are obtained as differences between transformed values of consecutive decumulative probabilities, i.e. probabilities describing the receipt of an outcome or anything worse than that outcome” (Fennema & Wakker, 1997). One of the consequences of CPT is that unlike PT, only extreme and not small probabilities are overweighted. So, the application of PT to health insurance may work as well in CPT, only if the probabilities are very small

G1.3: Expected utility function: Neumann and Morgenstern showed that when the 5 preference axioms of preference viz., completeness, transitivity, continuity, monotonicity and substitution are satisfied, a utility function would exist which could be specified as the sum of utilities (which is again a function of a payoff/outcome) weighted by respective probabilities. This was called as the expected utility function.

² Tversky, A., & Kahneman, D. (1992). Advances in Prospect Theory: Cumulative Representation of Uncertainty. *Journal of Risk and Uncertainty*, 5(4), 297–323.

³ To know about the transformed values of cumulative or decumulative probabilities, please refer page 55 of (Fennema & Wakker, 1997).

G1.4: Negative state dependence (NSU): In NSU, the marginal utility (MU) of non-medical consumption is positively correlated with the state of health i.e. MU declines when health deteriorates. This could happen as many non-medical goods such as travel etc act as complement goods to good health.

G1.5: Optimal amount of insurance: Optimal amount of insurance (health insurance in this case) could be analyzed using the theory of state-dependent/contingent utility. In this theory, one could construct an indifference curve and budget constraint between consumption in good state (C_g) and consumption in bad state (C_h). Both the indifference curve and budget constraint show a trade-off, with the former having a constant trade-off (constant slope) and the latter having diminishing trade-off (diminishing slope). The slope of the budget line is $(\gamma/(1 - \gamma))$, where γ is the price of consumption in the bad state (bad health), and $1 - \gamma$ is the price of consumption in the good state (good health). The slope of the indifference curve at any given point is the marginal rate of substitution between the two states of utility. Optimal level of insurance would be obtained at the tangency point of the indifference curve and the budget curve i.e., when $(\gamma/(1 - \gamma))$ equals the marginal rate of substitution.

G1.6: Positive state dependence (PSU): In PSU, the marginal utility of non-medical consumption increases as health declines. Examples for PSU includes increase in expenditures on medicines and nursing assistants. This is because certain non-medical goods act as substitutes to good health.

G1.7: Prospect Theory: One of the central ideas in prospect theory (PT) is how people perceive losses and gains from the viewpoint of a reference point. This reference point would be measure of status quo (like current wealth, current income etc.). To further understand how gains and losses are assessed, the theory introduces the concept of value function, which describes the relationship between the subjective values that a person assigns to losses and gains⁴ (negative or positive changes in status quo (like current wealth), based on a reference point. Mathematically, the value function could be denoted by v , which will be a function of changes in outcomes with respect to a reference point.

⁴ The value function places importance not on the final state (for example final stock of assets) but on positive or negative changes from a reference point (current wealth/income etc.).

In the value function, relative to a reference point (current wealth), gains (positive changes in current wealth) have diminishing sensitivity and losses (negative changes in current wealth) have increasing sensitivity. Assuming a graph with four quadrants (with value on the y-axis, gains on the right-hand side of the x-axis and losses on the left-hand side of the x-axis) and the origin as the reference point, gains would exhibit a concave function (lying in the first quadrant⁵) and losses would exhibit a convex function (lying in the third quadrant). This will result in an almost S-shaped value function (Kahneman & Tversky, 1979)⁶. Further, the value function is steeper in the third-quadrant than in the first quadrant, implying that individuals suffer more in case of losses, compared to gains of an equivalent amount. This concept is known as loss-version.

Next, the theory introduces the concept of weighting function which explains how people subjectively evaluates the probability of events. Mathematically, the weighting function could be denoted as π , in which the decision weights $\pi(p)$ would be a function of probability p . According to prospect theory, people overweight small probabilities and underweight larger probabilities, explaining why rare events could have a larger bearing on a person's decision under uncertainty. "Hence the weighting function is relatively sensitive to changes in probability near the end points 0 and 1, but is relatively insensitive to changes in probability in the middle region" (Fennema & Wakker, 1997)⁷. This leads to a non-linear weighting function.

The risk attitude of an individual is jointly determined by attitude towards outcomes (value function) and attitude towards probability (weighting function) rather than expected utility alone (Kahneman & Tversky, 1979). Thus, according to prospect theory, in the case of health insurance, when potential losses ($x < 0$) are considered (payment of insurance premium), the overweighting of small probabilities (in this case, say the

⁵ The naming of the quadrants from first to fourth is counter-clockwise, beginning with the upper right-hand quadrant (positive values of both x and y axes).

⁶ Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 47(2), 263–291. <https://doi.org/10.2307/1914185>

⁷ Fennema, Hein & Wakker, Peter. (1997). Original and Cumulative Prospect Theory: A Discussion of Empirical Differences. *Journal of Behavioral Decision Making*, 10, 53-64.

probability of a disease) would make a person risk-averse and lead to the purchase of health insurance⁸.

G1.8: St. Petersburg paradox: Discovered by Nicholas Bernoulli, and later partly solved by his cousin, Daniel Bernoulli, in 1738, St. Petersburg Paradox was a situation in which participants were willing to enter a gamble which offered infinite expected value (expected value is the sum of payoffs from each draw of the game/gamble, weighted by corresponding probabilities) for a very small entry fee. The solution of Bernoulli was based on the principle that people value different sums of payoff/ wealth (wealth was used by Bernoulli) differently, giving rise to the concept of utility.

Specifically, instead of expected value, he introduced the concept of expected utility, in which the utility defined as the natural logarithm of an individual's payoff from the game at each draw would be weighted by the corresponding probability of winning. He showed that unlike expected value, the sum of expected utility was finite (based on log specification) and converged to a specific value.

The anti-log of this sum yielded a very small sum, which could be considered as the entry fee for the gamble, thus explaining why the entry fee of such gambles with infinite expected value could be very small.

Chapter 2

G2.1: Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY): One of the major milestones in the GSHI story of India happened in 2018 when the Government of India introduced the Ayushman Bharat scheme with two pillars Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY) and health and wellness centres (HWCs). ABPMJAY aimed to provide financial protection to the bottom 40 per cent of the Indian population, including all other vulnerable groups who were previously covered by RSBY, by covering hospitalization expenditures, including diagnostics and medicines, for 3 days before and 15 days after hospitalization.

⁸ Please refer page 285 of Kahneman and Tversky (1979) for a detailed description of this result. This is to understand how weighting function supersedes the value function (which encourages risk-seeking when faced with losses, inhibiting the purchase of health insurance).

ABPMJAY extended insurance coverage of 5 lakhs on a family floater basis with no restrictions on family size, the age of family members, or pre-existing conditions.

Similar to RSBY, ABPMJAY was also implemented as a centrally sponsored scheme (CSS), implying the participation of state governments. The state governments implemented ABPMJAY by merging with state-level schemes (which were funded by state governments) and branding the schemes (by giving the scheme's elements like state-level names, logos, etc.) along with ABPMJAY.

G2.2: Central Government Health Scheme (CGHS): “Central Government Health Scheme (CGHS)⁹ is a health scheme for serving / retired central Government employees and their families. The scheme was started in 1954 in Delhi. The scheme was intended to be only for serving Central Government employees who had difficulty in getting reimbursement on account of OPD medicines (today CGHS dispensaries are giving OPD medicines). The fact that there were not many private hospitals at that point of time was also one of the reasons for starting the scheme.”

As per the data in the National Health Profile of 2021 (Government of India, 2021)¹⁰, as of 2021, CGHS covered about 37.5 lakh beneficiaries through 12.83 lakh primary cardholders and its services were available in 72 cities through a wide network of diagnostic centres, hospitals, wellness centres, dental clinics, eye care clinics, under allopathy and AYUSH systems of medicine. Between 2010-11 and 2020-21, the aggregate expenditure¹¹ by the central government on CGHS more than doubled, from ₹1,296 crores in 2010-11 to ₹4,204 crores in 2020-21. The per-capita expenditure also more than doubled, from ₹4,050 in 2010-11 to ₹11,063 in 2020-21 (Government of India, 2021).

⁹ <https://main.mohfw.gov.in/sites/default/files/CHAPTER%2013.pdf>

¹⁰ Government of India. (2021). National Health Profile 2021:16th Issue. Central Bureau of Health Intelligence.

¹¹The expenditure refers to reimbursements and the total outflow due to the healthcare utilization by beneficiaries.

G2.3: Community-based Health Insurance (CBHI): According to WHO¹², “CBHI is a form of micro health insurance, which is an overarching term for health insurance targeted to low-income people. The specific feature of CBHIs is the community involvement in driving its setup and in its management. Small, voluntary CBHI schemes are generally characterized by the following institutional design features. (i) Pooling of health risks and of funds occurs within a community or a group of people who share common characteristics, such as geographical location or occupation. (ii) Membership premiums are often a flat rate and independent of individual health risks. (iii) Entitlements to benefits are linked to contributions in most cases. (iv) Affiliation is voluntary. (v) The scheme operates on a non-profit basis.”

G2.4: Disability-Adjusted Life Years (DALY): DALY is a composite measure of both mortality (Years of Life Lost due to Death – YLL) and morbidity (Years of Life Lost due to Disability – YLD). According to WHO¹³, “one DALY represents the loss of the equivalent of one year of full health. DALYs for a disease or health condition are the sum of the years of life lost to due to premature mortality (YLLs) and the years lived with a disability (YLDs) due to prevalent cases of the disease or health condition in a population.”

G2.5: Employees' State Insurance Scheme (ESIS): According to the Government of India¹⁴, “the Employees' State Insurance Scheme is an integrated measure of social insurance embodied in the Employees' State Insurance Act and it is designed to accomplish the task of protecting 'employees' as defined in the Employees' State Insurance Act, 1948 against the impact of incidences of sickness, maternity, disablement and death due to employment injury and to provide medical care to insured persons and their families. The ESI scheme applies to factories and other establishment's viz. road transport, hotels, restaurants, cinemas, newspaper, shops, and educational/medical institutions wherein 10 or more persons are employed. However, in some states, the threshold limit for coverage of establishments is still 20. Employees of the aforesaid categories of factories and establishments, drawing wages up to ₹15,000 a month, are entitled to social security cover under the ESI Act. ESI Corporation has also decided to

¹² <https://www.who.int/news-room/fact-sheets/detail/community-based-health-insurance-2020>

¹³ <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/158>

¹⁴ <https://www.india.gov.in/spotlight/employees-state-insurance-scheme#tab=tab-1>

enhance wage ceiling for coverage of employees under the ESI Act from ₹15,000- to ₹21,000. The ESI is financed by contributions from employers and employees. The rate of contribution by employer is 4.75% of the wages payable to employees. The employees' contribution is at the rate of 1.75% of the wages payable to an employee. Employees, earning less than ₹137 a day as daily wages, are exempted from payment of their share of contribution.”

ESIS has grown to become a scheme with a very large beneficiary pool of 13.25 crores in 2020, covering 3.41 crore insured persons/family units. Unlike CGHS, this beneficiary pool has more than doubled from about 5 crore beneficiaries in 2009 to the current level in 2020. The aggregate expenditure on medical benefits under ESIS increased manifold. It rose from ₹1,273 crores in 2009 to ₹9,368 crores in 2020 (Government of India, 2021)¹⁵.

G2.6: Epidemiological transition: As developed and expanded by Abdel Omran in 1971, the concept of epidemiological transition originally referred to the shifts in the mortality and disease patterns in a population, away from communicable and infectious diseases and towards man-made/degenerative diseases (non-communicable diseases). Omran proposed three stages of epidemiological transition: 1. The Age of Pestilence and Famine 2. The Age of Receding Pandemics 3. The Age of Degenerative and Man-made Diseases. In 1986, Ault and Olshansky further developed the theory and proposed the fourth stage of ‘The Age of Delayed Degenerative Diseases’.

The current version of epidemiological transition, that has gained traction in India stems from the Global Burden of Disease (GBD) study, pioneered by Christopher Murray of the Institute of Health Metrics and Evaluation (IHME), building on the concept of DALY (Disability Adjusted Life Years). To analyse the epidemiological transition in India, IHME partnered with the Indian Council for Medical Research (ICMR) and the Public Health Foundation of India (PHFI) and began the initiative of producing sub-regional or state-level estimates of disease burden called the ‘**India State-Level Disease Burden Initiative**’. Most notably, this study proposed a measure called epidemiological transition level (ETL), which was the ratio of DALYs attributable to communicable, maternal, neonatal and nutritional diseases (CMNNDs) to DALYs attributable to non-communicable diseases, to study epidemiological transition in India.

¹⁵ Government of India. (2021). *National Health Profile 2021:16th Issue*. Central Bureau of Health Intelligence. Ministry of Health and Family Welfare.

On the basis of ETL in 2016, Indian states were grouped into 4: 1. Low ETL states (ETL ratio between 0.56–0.75): Bihar, Jharkhand, Uttar Pradesh, Rajasthan, Meghalaya, Assam, Chhattisgarh, Madhya Pradesh, and Odisha. 2. Lower-middle ETL states (ETL ratio between 0.41–0.55): Arunachal Pradesh, Mizoram, Nagaland, Uttarakhand, Gujarat, Tripura, Sikkim, and Manipur. 3. Higher-middle ETL states (ETL ratio between 0.31–0.40): Haryana, Delhi, Telangana, Andhra Pradesh, Jammu and Kashmir, Karnataka, West Bengal, Maharashtra, and union territories other than Delhi. 4. High ETL states (ETL ratio below 0.31): Himachal Pradesh, Punjab, Tamil Nadu, Goa, and Kerala.

G2.7: Full Immunization: Full immunization refers to the percentage of children aged between 12 and 23 months who are vaccinated with BCG, measles-containing vaccine - (MCV)/MR/MMR/Measles, and 3 doses each of polio (excluding polio vaccine given at birth) and DPT or penta-vaccine (NFHS-5).

G2.8: Headcount ratio/Incidence of Poverty: It is the proportion of multidimensionally poor individuals in the total population.

G2.9: Insurance penetration: Ratio of insurance premiums to GDP.

G2.10: Insurance density: Ratio of insurance premiums to population.

G2.11: Latitude: According to Merriam Webster dictionary¹⁶, “latitude is the angular distance north or south from the earth's equator measured through 90 degrees.”

G2.12: Life expectancy: According to World Health Organization (WHO)¹⁷, “life expectancy is the average number of years that a newborn could expect to live, if he or she were to pass through life exposed to the sex- and age-specific death rates prevailing at the time of his or her birth, for a specific year, in a given country, territory, or geographic area.”

¹⁶ <https://www.merriam-webster.com/dictionary/latitude>

¹⁷ <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/65>

G2.13: Longitude: According to Merriam Webster dictionary¹⁸, “longitude is the arc or portion of the earth's equator that intersects between the meridian of a given place and the prime meridian. It is expressed either in degrees or in time.”

G2.14: Modes of implementing GSHI: 1. **Insurance mode:** Implemented through an insurance company. 2. **Assurance/Trust mode:** Implemented through a trust/body managed by the state government, without involving insurance companies. 3. **Mixed/Hybrid mode:** A part of the insurance scheme is implemented through insurance companies, while the other part is implemented through government-managed trust.

G2.15: Multi-dimensional Poverty Index: According to NITI Aayog¹⁹, “Global Multidimensional Poverty Index (MPI), based on the Alkire-Foster (AF) methodology, captures overlapping deprivations in health, education, and living standards. It complements income poverty measurements because it measures and compares deprivations directly. The global MPI Report is jointly published by the Oxford Poverty and Human Development Initiative (OPHI) and the United Nations Development Programme (UNDP).”

The indices of the national MPI comprise: i) Headcount ratio (H): How many are poor? Proportion of multidimensionally poor in the population, which is arrived at by dividing number of multidimensionally poor persons by total population. ii) Intensity of poverty (A): How poor are the poor? Average proportion of deprivations which is experienced by multidimensionally poor individuals. To compute intensity, the weighted deprivation scores of all poor people are summed and then divided by the total number of poor people. MPI value is arrived at by multiplying the headcount ratio (H) and the intensity of poverty (A), reflecting both the share of people in poverty and the degree to which they are deprived. $MPI = H \times A$.

According to the AF methodology, an individual is considered MPI poor if their deprivation score equals or exceeds the poverty cutoff of 33.33%”.

¹⁸ <https://www.merriam-webster.com/dictionary/longitude>

¹⁹ <https://niti.gov.in/sites/default/files/2023-08/India-National-Multidimensional-Poverty-Index-2023.pdf>

G2.16: Net State Domestic Product (NSDP) at current prices: According to Government of India²⁰, “the estimate of net state domestic product is arrived at by deducting the consumption of fixed capital from the gross state domestic product for each sector.”

G2.17: Non-communicable diseases (NCDs): According to World Health Organization²¹, “noncommunicable diseases (NCDs), also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors. The main types of NCD are cardiovascular diseases (such as heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and diabetes. NCDs disproportionately affect people in low- and middle-income countries, where more than three quarters of global NCD deaths (31.4 million) occur.”

G2.18: Old-age dependency ratio (OADR), defined by National Statistical Office (2021)²²: Old age dependency ratio is defined as the number of persons in the age-group 60 or more per 100 persons in the age-group 15-59 years.

G2.19: Population density: According to the World Bank²³, “population density is the midyear population divided by land area in square kilometres. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship--except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin. Land area is a country's total area, excluding area under inland water bodies, national claims to continental shelf, and exclusive economic zones. In most cases the definition of inland water bodies includes major rivers and lakes.”

²⁰ <https://data.gov.in/keywords/NSDP>

²¹ <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>

²² National Statistical Office. (2021). *Elderly in India*. National Statistical Office, Ministry of Statistics & Programme Implementation, Government of Kerala.

²³ <https://databank.worldbank.org/metadataglossary/world-development-indicators/series/EN.POP.DNST>

G2.20: Pradhan Mantri Bharatiya Janaushadhi Pariyojana (PMBJP): Jan Aushadhi scheme was originally launched in 2008 (relaunched as Pradhan Mantri Bharatiya Janaushadhi Pariyojana (PMBJP) to provide generic drugs at affordable rates (discounts ranging between 10 to 90 per cent of market price). In 2023, with a network of 9303 Janaushadhi Kendras (most of which joined post-2014) and a product basket of 1800 drugs (most of which are procured from pharmaceutical companies in the public sector) and 285 surgical items, PMBJP has resulted in savings of approximately ₹20,000 crore between 2015 and 2023.

G2.21: Sustainable Development Goal (SDG) No.3: Ensure healthy lives and promote well-being for all at all ages.

G2.22: Target 3.8 of SDG 3: Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.

G2.23: Theory of demographic transition: According to Dudley Kirk (1996)²⁴, “it is the theory that societies progress from a pre-modern regime of high fertility and high mortality to a post-modern regime of low fertility and low mortality. The cause of the transition has been sought in the reduction of the death rate by controlling epidemic and contagious diseases. Then, with modernization, children become more costly. Cultural changes weaken the importance of children. The increasing empowerment of women to make their own reproductive decisions leads to smaller families. Thus, there is a change in values, emphasizing the quality of children rather than their quantity. In short, the fertility transition is becoming universal phenomenon, in which every country may be placed on a continuum of progress in the transition.”

Demographic transition has four stages²⁵: (i) Stage 1 – high mortality and high birth rates (ii) Stage 2 – mortality falls, but birth rates are still high (iii) Stage 3 – mortality is low and birth rates begin to fall (iv) Stage 4 – mortality and birth rates are low.

²⁴ Kirk, D. (1996). Demographic Transition Theory. *Population Studies*, 50(3), 361–387. <https://doi.org/10.1080/0032472031000149536>

²⁵ Roser, M. (2023, June 30). Demographic transition: Why is rapid population growth a temporary phenomenon? Our World in Data. <https://ourworldindata.org/demographic-transition>

G2.24: Total fertility rate (TFR): WHO defines TFR as “the average number of children a hypothetical cohort of women would have at the end of their reproductive period if (i) they were subject during their whole lives to the fertility rates of a given period and (ii) they were not subject to mortality. It is expressed as children per woman.”

G2.25: Universal Health Coverage: According to WHO²⁶, “universal health coverage means that all people have access to the full range of quality health services they need, when and where they need them, without financial hardship. It covers the full continuum of essential health services, from health promotion to prevention, treatment, rehabilitation and palliative care.”

G2.26: Universal Health Coverage (Definition by High-Level Expert Group Report (HLEG) on UHC, set up by the erstwhile Planning Commission, India in 2012): Ensuring equitable access for all Indian citizens, resident in any part of the country, regardless of income level, social status, gender, caste or religion, to affordable, accountable, appropriate health services of assured quality (promotive, preventive, curative and rehabilitative) as well as public health services, addressing the wider determinants of health, delivered to individuals and populations, with the government being the guarantor and enabler, although not necessarily the only provider, of health and related services.

G2.27: UHC Service Coverage Index (UHC SCI): UHC SCI by World Bank is constructed using four dimensions: a. reproductive, maternal, newborn and child health (RMNCH) b. infectious diseases c. non-communicable diseases and d. service capacity and access.

Chapter 3

G3.1 Antyodaya Anna Yojana (AAY): AAY was a scheme that was introduced in 2000 to target the poorest of the poor and the most vulnerable households in India. This scheme would cover tribals, landless laborers, poor households with a terminally ill member etc. The identification of AAY households is entrusted with the respective state governments. As per the provisions of NFSA (2013), an AAY household is entitled to 35 kg of foodgrains per month at subsidized rates.

²⁶ [https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-\(uhc\)](https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc))

G3.2: Above-Poverty Line (APL) Households: Percentage of households who fall above the state-specific poverty line (or identified by the state government as non-BPL based on certain criteria like size of the landholding owned, size of the residence, government employee etc.) and qualify for lower subsidies on foodgrains distributed through public distribution system (PDS). This classification came into existence after the introduction of Targeted Public Distribution System in 1997.

G3.3: Ayushman Bharat Pradhan Mantri Jan Aarogya Yojana- Karunya Arogya Suraksha Padhati (ABPMJAY-KASP): In April 2019, following the nationwide rollout of Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY) in September 2018, the state launched Ayushman Bharat Pradhan Mantri Jan Aarogya Yojana- Karunya Arogya Suraksha Padhati (ABPMJAY-KASP), subsuming all the hitherto fragmented GSHI schemes (RSBY-CHIS, CHIS PLUS and SCHIS) into it. Under ABPMJAY-KASP, which was implemented as a cashless scheme, the maximum sum assured was raised to ₹5 lakh with no restrictions on household size (although like RSBY-CHIS, ABPMJAY-KASP was a family floater scheme), age of members or pre-existing conditions. There was also no need for any registration fees or yearly renewal. The state government also offered to cover pre-hospitalization expenditures of 3 days and post-hospitalization expenditures of up to 15 days. ABPMJAY-KASP currently offers 1635 benefit packages under Health Benefit Package 2.1. Also, under ABPMJAY-KASP, the smart card was replaced by a golden card which was seeded with Aadhar.

G3.4: Below-Poverty Line (BPL) Households: Percentage of households who fall below the state-specific poverty line (or identified by the state government as BPL, based on certain criteria like size of the landholding owned, size of the residence, government employee etc.) and qualify for higher subsidies on foodgrains distributed through public distribution system (PDS). This classification came into existence after the introduction of Targeted Public Distribution System in 1997.

G3.5: Categorical targeting or statistical targeting/group targeting: As the name suggests, this is a targeting method, that involves selecting a particular group, category, or region with high clusters/concentration of poverty and deprivation, with almost uniform intra-group characteristics.

G3.6: Ceiling rate: This is the rate (calculated per insured family/household) at which union and state governments divide the costs of GSHI based on certain ratios. For

example, in the beginning of ABPMJAY in India in 2018, the ceiling rate was ₹1,052 which was raised to ₹1,500 in 2022. The current cost sharing between the union and state governments is 60:40. So in 2022, based on the ceiling rate of ₹1500, the union government would pay ₹900 and the balance of ₹600 would be borne by the state government.

G3.7: Community targeting: This method involves assessment at the local levels by local authorities/officials with deep knowledge of their respective language, history, culture and policy environment. The best example of this method would be a committee consisting of gram sarpanch/village elders, local government officials, etc. who could decide the eligibility of the beneficiary households.

G3.8: Centrally Sponsored Schemes (CSS): CSS are schemes aimed at social and economic development in Indian states, implemented by the state governments and funded by union and state governments in a certain ratio. Currently, the sharing ratio between union and state governments is 60:40, except for 8 north-eastern and 3 Himalayan states.

G3.9: Concentration Index (CI): According to Kakwani (1980)²⁷ and O'Donnell et al. (2008)²⁸, CI could be mathematically expressed as:

$$CI(h|y) = \frac{2 * cov(h_i, R_i)}{\bar{h}}$$

Where $\bar{h}$ is the average of the health variable and $cov(h_i, R_i)$ is the covariance between h_i , the health variable and R_i , the fractional rank of the socio-economic variable (income/consumption expenditure/wealth).

In other words, CI is used to study the concentration of a continuous health variable (like health expenditures) across the distribution of a ranking variable (usually variables denoting socio-economic status like income, consumption expenditure or assets-based wealth scores).

²⁷ Kakwani N.C. (1980). *Income Inequality and Poverty: Methods of Estimation and Policy Applications*. World Bank.

²⁸ O'Donnell, O., Van Doorslaer, E., Wagstaff, A., & Lindelöw, M. (2008). *Analyzing health equity using household survey data*. In The World Bank eBooks. <https://doi.org/10.1596/978-0-8213-6933-3>

CI could lie between -1 and +1, the former indicating perfect pro-poor concentration of the health variable and the latter indicating perfect pro-rich concentration of the health variable.

G3.10: Claims ratio (CR) (Operational definition): The ratio of claims paid, to the premiums collected under RSBY-CHIS, multiplied by 100. CR above 100 implies loss for the insurance company and below 100 implies profit for the insurance company.

G3.11: Claim payout per household (CPPH) (Operational definition): The total claim amount divided by number of households enrolled. The total claims paid included the claims under RSBY-CHIS and CHIS Plus. To analyze the significance of GSHI, the HIPI, calculated from the premiums of private insurance companies was compared to the CPPH in 2021-22.

G3.12: Current scenario (Operational definition): The population coverage of GSHI in NFHS-5 as of 2019.

G3.13: Effective cost-sharing ratio (Operational definition): The ratio at which costs were shared between the governments for only the households that the union government deemed eligible to be beneficiaries in Kerala, based on SECC 2011, without considering the ceiling rate.

G3.14: Enrolment ratio (ER) (Operational definition): The number of households covered by GSHI, expressed as a percentage of the targeted eligible households.

G3.15: Erreygers Index (EI): EI is a bivariate-rank dependent index that is used to study the concentration of a binary variable (bounded variable with lower and upper limits like '0' and '1') across the distribution of a ranking variable (usually variables denoting socio-economic status like income, consumption expenditure or assets-based wealth scores). The value of the index lies between -1 and +1, with the former signifying a perfect pro-poor distribution and the latter indicating a perfect pro-rich distribution. An index value of 0 indicates no concentration of the binary variable among either the poor or the rich.

G3.16: Errors of exclusion or under-coverage (U): This error happens when the eligible beneficiaries are left out of the scheme. More formally, it could be defined as the percentage of poor households that are not included in the program. Mathematically,

$$U = \frac{N_{(p,o)}}{N_p} * 100$$

where $N_{(p,o)}$ is the number of poor households who are left out of the program and N_p is the total number of poor households. In Table 3.1, the same is $(10/40) * 100 = 25\%$.

G3.17: Errors of inclusion or Leakage (L): As the name indicates, it is the percentage of ineligible (non-poor) households receiving the benefits. Mathematically,

$$L = \frac{N_{(np,i)}}{N_i} * 100$$

where $N_{(np,i)}$ is the number of non-poor households in the program and N_i is the total number of households in the program. In Table 3.1, the same is $(10/40) * 100 = 25\%$.

G3.18: Factor A or Odds (A) (Operational definition): Percentage of BPL households covered by GSHI/ Percentage of BPL households not covered by GSHI.

G3.19: Factor B or Odds(B) (Operational definition): Percentage of non-BPL households covered by GSHI/ Percentage of non-BPL households not covered by GSHI.

G3.20: Family Floater scheme: In the family floater insurance scheme, the maximum sum assured would be jointly available for all family members and not each member individually.

G3.21: Final cost-sharing ratio (Operational definition): The ratio at which costs were shared between the governments for all the GSHI-covered households in Kerala (identified by both union and state governments), without considering the ceiling rate.

G3.22: Hospitalization ratio (HR): The ratio of total hospitalizations under RSBY-CHIS to the total number of insured individuals, multiplied by 100. The total number of insured individuals was calculated as the number of insured households multiplied by 4.2 (According to Census 2011, the average household size in Kerala was 4.2)

G3.23: Individual/Household Assessment: In this method an official/social worker, verifies the eligibility of every household, based on exhaustive field visits. The gold standard for this type of assessment is the verified means test, in which the official collects information, along with credible sources for verification. The best example is verification of the income reported by a household, using pay stubs, income tax records,

etc. This method of beneficiary targeting includes three targeting methods: (i) Simple Means Test (ii) Proxy-Means Test (iii) Community Targeting.

G3.24: Karunya Benevolent Fund (KBF): In 2012, another GSHI scheme called the Karunya Benevolent Fund (KBF) was implemented by the state governments to financially assist households with members suffering from chronic diseases. It involved one-time assistance of up to ₹3 lakhs for the treatment of kidney diseases and ₹2 lakhs for other prescribed diseases, for households having an annual income (annual income as per the ration card) below ₹3 lakhs. However, haemophilia patients had no such restrictions on financial assistance. KBF was funded through the proceeds from the sale of the '*Karunya lottery*,' managed by the Department of State Lotteries, Government of Kerala.

G3.25: Missing middle: According to NITI Aayog, missing middle is the number of households in India not covered by any health protection scheme. Using NSS 75th round (2017-18), the missing middle was estimated as 30 per cent of the Indian population.

G3.26: Odds(A)/Odds(B): It could be interpreted as the transmission coefficient, signifying a measure responsible for transmitting pro-poor concentration in BPL households towards GSHI.

G3.27: Population coverage (PC): The ratio of total households enrolled in GSHI to the total households in the population of the state, expressed as a percentage (the total households in Kerala were taken as 87 lakh households, as per the data uploaded by the state government in the website of National Health Authority, India).

G3.28: Principal Components Analysis (PCA): According to AFIT Data Science Lab R Programming Guide²⁹ "Principal Component Analysis (PCA) involves the process by which principal components are computed, and their role in understanding the data. PCA is an unsupervised approach, which means that it is performed on a set of variables $X_1, X_2, \dots, X_p$ with no associated response Y . PCA reduces the dimensionality of the data set, allowing most of the variability to be explained using fewer variables. PCA is commonly used as one step in a series of analyses. PCA could be used to reduce the number of variables and avoid multicollinearity."

²⁹ <https://afit-r.github.io/pca>

G3.29: Priority households (PHH): This classification came into being after National Food Security Act (2013), replacing the older classification of BPL households (defined under TPDS). In Kerala, the color of the ration-cards held by PHH is pink. PHH are entitled to 5kg per head per month at subsidized rates.

G3.30: Proxy means test (PMT): This is a more objective and quantitative version of the simple means test, wherein instead of a qualitative judgment, a beneficiary household is identified, based on certain proxies (suitable alternatives/substitutes) in lieu of income. This could be the households' consumption expenditure and mainly the possession of assets (luxury goods like multi-room houses, cars, refrigerators, washing machines, etc. and non-luxurious goods like single-room houses, radio, bullock carts, etc.), demographic structure of the household (to identify dependents such as children and elderly), occupation and education of the household members, etc.

G3.31: RSBY: Rashtriya Swasthya Bima Yojana (RSBY) was launched in October 2008, as a centrally sponsored scheme (CSS) for BPL households and unorganized workers as part of the Unorganized Workers' Social Security Act 2008. RSBY had a maximum sum assured of ₹30,000 per household (covering only 5 members) and was implemented as a cashless and family floater scheme. The benefits also included a travel allowance of a maximum of ₹1,000 per year. There was no age limit for the registration of members and pre-existing conditions were allowed. However, RSBY also included an annual renewal with a registration fee of ₹30.

G3.32: RSBY-CHIS: Following the rollout of RSBY at national level in 2008, the union government stipulated that RSBY being a CSS, the premium costs of the scheme would be shared only for about 11.79 lakh households, identified through the BPL census of 2002 in Kerala. However, the state government found that an additional 10 lakh households qualified as eligible (those households who were BPL according to the estimation of the state government, but were excluded from the central list) and extended the benefits of RSBY to these households, agreeing to bear the entire premium costs of the additional households. A state-government-sponsored scheme called the Comprehensive Health Insurance Scheme (CHIS) was introduced to cover all the additional households. CHIS also allowed APL families to join the scheme upon the payment of premium and the cost of smart card³⁰. Together the centrally sponsored scheme of RSBY and state-sponsored scheme was called RSBY-CHIS.

³⁰ The payment of premiums by APL families was later discontinued.

G3.33: Self-selection/self-targeting: This is a method which by its very design will only be chosen by the targeted (poor) beneficiaries. For example, job schemes in rural areas usually involving manual labour with a payment in cash/kind (only after the completion of work), would only be chosen by individuals with low opportunity costs of the time invested in the scheme.

G3.34: Senior Citizens Health Insurance Scheme (SCHIS): Under SCHIS which was introduced in 2016, elderly above the age of 60 members in households covered by RSBY-CHIS could avail an additional coverage of up to ₹30,000 per member over and above the RSBY entitlement. This scheme was later subsumed by Pradhan Mantri Jan Aarogya Yojana (PMJAY).

G3.35: Simple means test: This is largely a qualitative assessment of a household's eligibility, conducted by an official/social worker, through visually examining its overall standard of living, possession of assets, etc. This method relies on the judgment and potential bias of the inspecting authority, which is a significant drawback. Usually, this method could be viewed as a quick, cost-effective and preliminary assessment of the eligibility of a household to be a beneficiary, acting as a precursor to more rigorous and objective targeting methods.

G3.36: Simulated scenario (Operational definition): A hypothetical situation (population coverage of GSHI) that may prevail in 2019, if the excluded BPL households were extended coverage.

G3.37: Third-Party Administrators (TPAs): TPAs are private entities that help insurance companies in claim processing, empanellment of hospitals, etc.

G3.38: Two modes of claim settlement in insurance: Cashless and reimbursement are two modes of claim settlement in insurance. While in reimbursement mode, the individual is reimbursed for the hospitalization expenditure, in cashless mode, the insurance companies settle the hospital bills directly with the empanelled hospital.

Chapter 4

G4.1: Adjusted model (Operational definition): Logistic regression model in which all the socio-economic, demographic and geographic variables, apart from GSHI status, capable of influencing healthcare utilization is included as independent variables.

G4.2: Andersen's behavioural model of healthcare utilization: Proposed by Ronald M. Andersen in 1968, the model lists 3 sets of factors influencing healthcare utilization. These 3 factors were: (i) Pre-disposing factors: socio-cultural and economic characteristics that enable/disable individuals to seek healthcare (ex: social networks, culture, education, occupation) (ii) Enabling factors: Community factors like the total availability of health infrastructure i.e., doctors, nurses, hospitals etc. and personal factors like income, regular source of care, travel arrangements and the extent and quality of social relationships enable individuals to access healthcare. More importantly, health insurance could be categorized as an enabling factor (iii) Need factors: Utilization of healthcare also depends on 'perceived' as well as 'evaluated' needs. A perceived need could arise from the personal feelings of the patients, like sudden fever, dizziness and uneasiness which could encourage the individual to seek healthcare. The evaluated need on the other hand arises after the studied/evaluated need. For example, the biopsy results of an individual may push him/her for further treatment. Here, the evaluated need is based on diagnostics, doctor's advice, etc., leading to an informed choice.

G4.3: Aspirational districts: Aspirational districts are 112 high-focus/backward districts in India, where the union and state government concentrate on ensuring last-mile delivery of essential services associated with health and nutrition, agriculture and water resources, financial inclusion, skill development and infrastructural development.

G4.4: Inpatient admissions/hospitalizations: According to National Statistics Office, in NSS 75th round, to be hospitalised means to be admitted as an in-patient in a medical institution in 365 days prior to the survey. A person who underwent surgery in a temporary camp or day care centre was also considered to have been hospitalised. Each admission to hospital was counted as a separate hospitalisation case for the purpose of this survey.

G4.5: Logistic Regression (Britannica Encyclopaedia³¹): “Logistic regression, in statistics, is a method for modelling conditional probabilities with discrete (usually binary) outcomes. In a logistic model (sometimes called a logit model), the probability of a discrete, categorical outcome variable (e.g., “yes/no” or “pass/fail/incomplete”) is modelled on the basis of one or more predictor variables, which are typically continuous rather than discrete. There are several reasons that logistic regression is favoured over the more common linear regression when dealing with discrete outcomes. Most notably, when linear regression is applied to find the probability of discrete variables, the result can be probabilities greater than 1 or less than 0.”

G4.6: Outpatient visits: Outpatient visits refer to visits to a hospital which does not involve hospitalization during 15 days prior to the survey.

G4.7: Polarization hypothesis: This hypothesis was formulated (and later tested in the chapter) to describe the situation in Kerala with a high reliance on public hospitals by GSHI beneficiary households and a high reliance on private hospitals by the non-GSHI households.

G4.8: Utilization pattern of healthcare: Utilization pattern of healthcare refers to the percentage shares of private and public hospitals in healthcare utilization for inpatient and outpatient care.

G4.9: Unadjusted model (Operational definition): Logistic regression model in which only GSHI status is included as an independent variable.

³¹ <https://www.britannica.com/science/logistic-regression>

Chapter 5

G5.1: Catastrophic expenditures (Operational definition): A household was classified as experiencing catastrophic health expenditure (CHE) due to hospitalization/hospitalization and outpatient visits, if IP OOOPE/OP OOOPE/Total OOOPE exceeded 10 per cent or 25 per cent of the total monthly consumption expenditure of the household, respectively.

G5.2: Coarsened Exact Matching (CEM): The idea of CEM is to temporarily classify/coarsen each covariate (X_i) into substantively meaningful groups, exactly match these coarsened data and then only retain the original (uncoarsened) values of the matched data. In other words, CEM would ensure that the treated (GSHI-covered) and controlled groups (GSHI non-covered) are similar concerning the classifications of the covariates. The only difference between the treated and controlled groups would be the treatment itself (GSHI enrolment). In an additional step, in this matched data, after creating various strata of similar covariates, for calculating the treatment effect, each household would be assigned a weight specific to that stratum and representative of the proportion of all households present in the stratum.

G5.3: Direct expenditures: Direct expenditures include the expenditures consultation fees of doctors, fees for surgeries, expenditures on drugs and diagnostics etc. For inpatients, direct expenditure is the sum of expenditure items 6-10 in Block 7 of Schedule 25.0 in NSS 75th round. For outpatients, direct expenditure is the sum of expenditure items 10-14 in Block 9 of Schedule 25.0 in NSS 75th round.

G5.4: Indirect expenditures: Indirect expenditures include the expenditures for transportation, food and lodging etc. For inpatients, indirect expenditure is the sum of expenditure items 12 and 13 in Block 7 of Schedule 25.0 in NSS 75th round. For outpatients, indirect expenditure is the sum of expenditure items 16 and 17 in Block 9 of Schedule 25.0 in NSS 75th round.

G5.5: IP OOOPE (Operational definition): IP OOOPE is obtained after the sum of direct and indirect expenditures for hospitalization has been deducted for reimbursements and added by insurance premiums. The IP OOOPE thus obtained is yearly IP OOOPE. Yearly IP OOOPE could be divided by 12 to obtain the monthly average.

G5.6: **Multivariate Imbalance (MIM):** MIM is the difference between the multidimensional histogram of all pre-treatment covariates in the treated group and that in the control group.

G5.7: **OP OOPE (Operational definition):** The direct and indirect expenditures for outpatient care were considered to be borne from the pocket of the household and as such, taken as the 15-day OOPE of the households.

G5.8: **Propensity Score Matching (PSM):** PSM is a covariate-balancing/matching method that estimates a logit or probit model in the first step and then matches observations based on the propensity scores generated from the first model.

G5.9: **Sample Average Treatment effect on the Treated (SATT):** This is the sum of treatment effect (TE_i) of all the matched pairs (treated and controlled) of observations divided by the number of matched observations. Mathematically, it could be expressed as:

$$SATT = \frac{1}{n_T} \sum TE_i, \text{ where } n_T = \sum_{i=1}^n T_i \text{ and } T = \{1 \leq i \leq n : T_i = 1\}$$

G5.10: **Treatment effect:** The treatment effect (TE_i) of an intervention between the treated and controlled units is evaluated on the matched data, post CEM as follows:

$$TE_i = Y_i(1) - Y_i(0)$$

where $Y_i(0)$ is the potential outcome for observation i if the unit does not receive treatment ($T_i=0$) and $Y_i(1)$ is the potential outcome if the same unit received treatment ($T_i=1$).

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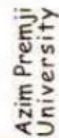
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Organising Secretary

Polarization in the Utilization of Public Hospitals and Government-Sponsored Health Insurance (GSHI): The Unique Case of Kerala

Cyril Philip* and S Sandhya**

This paper examines three objectives. The first objective was to study whether GSHI schemes had an impact on GSHI-related hospitalisations during 2018-2022 only (inter-state analysis), as there was uniform availability of data across all the states during this period. The second objective was to analyse the difference in the utilization of public hospitals for inpatients and outpatient visits between the GSHI-covered and non-covered households, among the top 10 states only, whose GSHI coverage was high (estimated from 75th round of National Sample Survey (NSS), 2017-18). This data was used as it coincides with 2008-2020 period, during which the polarization in the use of public hospitals might have happened in Kerala. The third objective examined whether polarization in the utilization of public hospitals in Kerala varied across various socio-economic sections of the sample population. The results suggested that most of the states, including Kerala, recorded impressive rise in GSHI-hospitalisations during 2018-2022. The interstate analysis, from 75th NSS round proved that Kerala has shown polarization in the utilization of public hospitals and further, the disaggregated analysis has shown that the polarization was stronger among socially and economically well-off households compared to poorer households. This again lent credence to the polarization hypothesis. However, among the 14 districts, Wayanad exhibited an opposite polarization in favour of private hospitals. The analysis suggested that GSHI schemes could have created a polarization in the utilization of public hospitals in Kerala during 2008-2020.

Key Words: GSHI, Polarization, Utilization pattern, Public hospitals, Inpatients, Outpatient visits

1. INTRODUCTION: THE NEED FOR GSHI IN KERALA AND ITS EVOLUTION IN THE 2008-2022 PERIOD

Kerala's healthcare system has been silently transitioning from 'good health at low cost' to 'poor health at exorbitant cost'. The successes of the state in controlling

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population growth, infant and maternal mortality rates and communicable diseases through large-scale public health interventions in the early days of the state has given way to rising shares of elderly members (National Statistical Office, 2021) and non-communicable diseases (Dandona, Dandona, Kumar, Shukla, Paul, Balakrishnan, Prabhakaran, Tandon, 2017; Sarma, Sadanandan, Thulaseedharan, Soman, Srinivasan, Varma, Nair, Pradeepkumar, Jeemon, PThankappan and Kutty, 2019; Muraleedharan and Chandak, 2021). Combined with very large presence of private medical institutions and reliance on them (Directorate of Economics and Statistics, 2019), Kerala easily qualifies as one of the Indian states having sky-high medical expenditures (Mohanty and Dwivedi, 2021).

To cushion the effect of high medical expenditures, GSHI schemes were launched in Kerala from 2008 onwards, starting with the Rashtriya Swasthya Bima Yojana (RSBY), a centrally sponsored scheme, covering 12 lakh families, identified through the BPL Census, 2002. The benefits of RSBY included an annual coverage of a maximum sum of 30,000 for a family of five members. Realising that the families covered by the union government through RSBY was insufficient, the state government decided to cover an additional 10 lakh families, fully funded by the state government and having the same benefit packages as RSBY. Accordingly, along with RSBY, the state government rolled out the Comprehensive Health Insurance Scheme (CHIS). However, in 2011, understanding that the amount covered by RSBY-CHIS was insufficient for treating certain diseases related to kidney, heart etc, the state government launched CHIS Plus, increasing the coverage to 70,000 for RSBY-CHIS beneficiaries for selected treatments.

In 2012, another GSHI scheme called Karunya Benevolent Fund (KBF) was implemented which was followed by Senior Citizens Health Insurance Scheme (SCHIS) in 2016, as part of the latter's nation-wide rollout. In April 2019, these fragmented schemes were merged into a single scheme called the Karunya Arogya Suraksha Paddhati- Pradhan Mantri Jan Arogya Yojana (KASP-PMJAY), as part of the Ayushman Bharat mission of the union government. With no restrictions on family size, age limits of members, and pre-existing conditions, KASP- PMJAY currently offers a coverage of 5 lakh per annum per eligible family, which automatically renews every year.

2. MOTIVATION FOR THE STUDY

The motivation of this study stem from an anomaly that was noticed from two observations, the latter relating to GSHI. The first observation came from the healthcare utilization pattern (the choice of public or private hospitals for inpatient and outpatient care) in the 75th round of National Sample Survey (2017-18) for the total population in Kerala and the second one emerged from the insurance claims records of RSBY-CHIS, a major GSHI scheme in Kerala for the period 2008-2022. While the authors estimated the share of public hospitals to be about 38 percent in the overall population

from NSS 75th round, the claims records of RSBY-CHIS, compiled by the Kerala State Planning Board in 2021, suggested that the share of public hospitals in the total claim volume for RSBY-CHIS increased from about 40% in 2008 to 78% in 2020. Specifically, in the financial year 2017-18, coinciding with the 75th round of NSS, the share of public hospitals in the claims volume of RSBY-CHIS was 65% (Kerala State Planning Board, 2021). This anomaly/divergence in the share of public hospitals for the overall population and GSHI beneficiaries could be reconciled by developing a hypothesis of a potential polarization in the utilization pattern, wherein GSHI beneficiaries relied heavily on public hospitals while the non-beneficiaries relied heavily on private hospitals.

However, before addressing this hypothesis, it is important to examine the evidence regarding the world-wide influence of GSHI on healthcare utilization (including in India) and the historical trends in healthcare utilization in Kerala.

3. LITERATURE REVIEW

3.1 DOES GSHI/PUBLIC-FUNDED/SOCIAL/COMMUNITY HEALTH INSURANCE INCREASE HEALTHCARE UTILIZATION?

There is evidence from various countries to show that health insurance and especially social insurance or government sponsored schemes does increase utilization of both inpatient and outpatient services, especially by poorer communities. The evidence of the same emerges from various developing countries like Vietnam (Jowett, Deolalikar, and Martinsson, 2004; Wagstaff and Pradhan, 2005; Sepehri, Sarma and Simpson, 2006; Thuong, 2020), Taiwan (Cheng and Chiang, 1997), Tanzania (Chomi, Mujinja, Enemark, Hansen and Kiwara, 2014) and Indonesia (Erlangga, Ali and Bloor, 2019). In Spain, Mathijssen, Tromp, McBain, ten Have and Baltussen (2012), based on a systematic review of Community Based Health Insurance (CBHI) and Social Health Insurance (SHI) in various Asian and African countries, it was concluded that both CBHI and SHI had a strong and positive effect in improving healthcare utilization. Perhaps the strongest evidence for the positive impact of GSHI on healthcare utilization emerged from China (Mao, Zhang, Xu, Miao, Dong and Tang, 2020; Zhang, Shi and Zhou, 2020; Shi, He, Zhu, Lu and Meng, 2022; Yan, Liu, Cai, Liu, Xie and Rao, 2022; Zhang, Chen and Fang, 2023). There was also evidence for the favorable impact of universalisation/expansion of health insurance on healthcare utilization in developed economies like Japan (Kondo and Shigeoka, 2013) and US (Baicker, Taubman, Allen, Bernstein, Gruber, Newhouse, Schneider, Wright, Zaslavsky and Finkelstein, 2014) too.

In India too, a systematic review of GSHI schemes (Prinja, Chauhan, Karan, Kaur and Kumar, 2017), comparing the healthcare utilization between the insured and

non-insured in various states (in erstwhile/unified Andhra Pradesh, Karnataka, Kerala and Maharashtra) noted that GSHI schemes increased healthcare utilization in the range of 12.3 to 244%. Specifically for Kerala, based on Philip, Kannan and Sarma (2016), there was a statistically significant difference in the utilization of inpatient services, between the insured and non-insured groups. Prinja, Chauhan, Karan, Kaur and Kumar (2017) also noted that, healthcare utilization, in the initial years of implementing GSHI, was higher, compared to the utilization after 5 years. Similar to the findings of Prinja, Chauhan, Karan, Kaur and Kumar (2017), another systematic review (Reshmi, Unnikrishnan, Rajwar, Parsekar, Vijayamma and Venkatesh 2021), which included the evaluation studies of RSBY, Vajpayee Arogyashree Scheme (VAS) in Karnataka and Rajiv Arogyashree Scheme (RAS) in erstwhile/unified Andhra Pradesh, also concluded that these Public-funded Health Insurance (PFHI) increased access and utilization of healthcare services.

3.2 THE UNIQUENESS OF THE KERALA MODEL IN THE CONTEXT OF DRAWBACKS ASSOCIATED WITH PRIVATE HOSPITALS

In the case of Kerala, apart from investigating the favourable impact of GSHI on healthcare utilization, as discussed in the motivation for the study, there is also a scope for investigating the rising role of public hospitals in GSHI in the period between 2008-2020, which was quite unique. In fact, studies have criticised GSHI schemes for its reliance on private hospitals (Reddy and Mary, 2013) and lamented that only few private hospitals with quality-accreditation were empanelled with GSHI schemes (Furtado, Raza, Mathur, Vaz, Agrawal and Shroff, 2022) and that too with wide variations in the district-wide availability. More importantly, apart from quality issues, this reliance on private hospitals could also lead to distancing vulnerable populations from healthcare access. For example, Dubey, Deshpande, Krishna and Zadey (2023) finds that 44% of empanelled hospitals in aspirational districts (aspirational districts are 112 high-focus/backward districts in India, where the union and state government concentrate on ensuring last mile delivery of essential services associated health and nutrition, agriculture and water resources, financial inclusion, skill development and infrastructural development) were private compared to 49% in non-aspirational districts.

3.3 THE HISTORICAL TRENDS IN THE HEALTHCARE UTILIZATION PATTERN IN KERALA AND THE INFLUENCE OF GSHI ON THE SAME

After understanding the role of GSHI in increasing healthcare utilization, the drawbacks of relying on private hospitals and the unique case of public hospitals in Kerala, it is also important to analyse the historical trends in healthcare utilization and the influence of GSHI on the same in Kerala.

Historically, the share of private hospitals has been dominant in the healthcare utilization pattern of Kerala for the total population. Studies based on previous rounds

of National Sample Survey Organization (Levesque, Haddad, Narayana and Fournier, 2007; Dilip, 2010) suggested that the share of private hospitals in both inpatient and outpatient care in Kerala has remained very high in the period between 1986-2004 (around 55-60 percent). Even with limitations in sampling, primary surveys done by Kerala Sastra Sahitya Parishath (Kunjikannan and Aravindan, 2000) in 1987 and 1996 also confirmed the above trend of utilization of private hospitals (in hospitalizations) remaining around 60 percent. A more recent study (Nair and Varma, 2021), again based on primary data, pegged the share of private hospitals in hospitalisation episodes (with a reference period of 365 days) in Kerala at 55%.

Regarding the influence of GSHI on utilization pattern, an inter-district study in Kerala (spanning Wayanad, Thrissur and Kollam districts) found that while nearly 65% percent of the GSHI-insured households that experienced hospitalisation, took treatment from private hospitals, only 55.6% households without insurance went to private hospitals for in-patient treatment (Joy, 2019). Interestingly, even this inter-district study was at odds with the data from Kerala State Planning Board (KPSB), regarding the share of public hospitals in the total hospitalization claims of GSHI.

4. RESEARCH GAP

On the basis of the anomaly/divergence in various data sources regarding the utilization of public hospitals, obviously, there is a need to investigate whether any polarization in the utilization of public hospitals has happened in Kerala due to the influence of GSHI, compare it with other states and analyse this polarization across various levels of socio-economic variables. But even before that, there is a need to analyse whether GSHI schemes resulted in an increase in healthcare utilization, focussing on inpatient records (as the major focus of GSHI schemes have been hospitalisations). Further, there is also a need for a pan-Kerala study, covering all 14 districts, instead of studies in selected districts. Accordingly, the objectives are set below:

5. OBJECTIVES

1. Compare the population coverage and growth in hospitalisation claims under various GSHI schemes implemented in Kerala with other Indian states in the period between 2018-2022.
2. Compare the difference in utilization of public hospitals, between GSHI-covered and non-covered households, among both inpatient admissions and outpatient visits, across Indian states with the highest GSHI coverage in 2017-18.
3. Study the polarization in utilization of public hospitals, among both inpatient admissions and outpatient visits in Kerala, across various levels of socio-economic characteristics.

6. DATA AND METHODOLOGY

6.1 DATA

For the first objective, the data on population coverage and hospitalization claims for all states implementing Ayushman Bharat, for the period 2018-2022, were collected from the factsheets disseminated by the National Health Authority (NHA). The period 2018-2022 was selected for the first objective, as prior to this period, the GSHI schemes in various states had been fragmented with no uniform records.

For the second and third objectives, the study used the unit level records of inpatient admissions and outpatient visits in Kerala, captured by the 75th round (2017-18) of National Sample Survey (NSS). The survey covered 113,823 households, 555,115 individuals, 93,924 inpatient admissions/hospitalisation episodes (with a reference period of 365 days) and 43,239 outpatient visits (with a reference period of 15 days), at the all-India level. The corresponding sample size for Kerala was 4,467 households, 19,815 individuals, 4,986 hospitalization episodes (inpatient admissions) and 6,070 outpatient visits.

The 75th round of NSS was chosen because it was the largest pan-Kerala sample survey that was conducted in the 2008-2020 period (the period of GSHI introduction and maturation in Kerala), which had the potential to capture large scale shifts/changes in the healthcare utilization pattern in Kerala.

6.2 METHODOLOGY

For the first objective, the total growth in the hospitalisation claims under various GSHI schemes associated with PMJAY was calculated from the commencement of the scheme (various states joined PM-JAY in various years) until 2021-22.

For the second objective, first the percentage of GSHI covered households was estimated (a household was considered to be GSHI-covered if the household head was covered by GSHI). Following this, the top 10 states with the highest GSHI coverage were selected for the analysis at inpatient and outpatient levels. Then for each state, the unadjusted and adjusted odds ratios for the utilization of public hospitals were estimated, based on whether the household was covered by GSHI or not. For this purpose, a set of logistic regressions were employed, first with only the 'GSHI' variable (unadjusted models) which was followed by adjusting the unadjusted model for other significant variables (adjusted model). However, in the above analysis, states with less than 100 outpatient visits were omitted. All the variables, except districts, given in Table 1 were used in the fully adjusted models.

The empirical specification of the logistic model (Gujarati, 2015) is:

$$\frac{p_i}{1-p_i} = \frac{1+e^{z_i}}{1+e^{-z_i}} = e^{z_i} \quad \dots(1)$$

Table 1: Table of Socio-Economic Variables		
Socio-Economic Variables	Levels	Description
Type of residence	(i) Rural (ii) Urban	The rural/urban difference was brought in to analyse the effect of higher living standards in the urban area compared to the rural area.
Social group	(i) ST and SC (ii) OBC (iii) General	ST and SC households were grouped together due to the limited sample size of ST households which formed only about 1.5 percent of Kerala's population (Census 2011).
Household size	(i) 1-4 (ii) 5 and above	The average household size in Kerala, as per Census 2011 was 4.2. Hence households up to 4 members were classified as small households and those having 5 or more members were classified as large households.
Household type	(i) Self-Employed (ii) Regular (iii) Casual labour (iv) Others	The classification for the type of household, separately for rural and urban areas, in Schedule 25.0 of NSS 75 th round was clubbed together to produce only four categories.
Education level of the household head	(i) Illiterate and literate only (ii) Below primary to upper primary (iii) Secondary and higher secondary (iv) Graduate and above	Education categories were created from the NSS variable on general education to capture the effect of higher living standards and awareness brought about by higher education.
Age of the patients	(i) 0-24 (ii) 25-35 (iii) 36-45 (iv) 46-59 (v) 60-69 (vi) over 70	The age of the patients was classified to capture the effects in the youth, working age group and elderly members.
Consumption quintiles	(i) Poorest (ii) Poor (iii) Middle	Keeping in line with the NSS report, the monthly consumption expenditure of the households in Kerala was divided into quintiles separately for rural and urban areas to arrive at the state-specific consumption quintiles.

Table 1 (Cont.)

Socio-Economic Variables	Levels	Description
	(iv) Rich (v) Richest	
Disease groups	(i) Infections (ii) Cancers (iii) Blood diseases (iv) Endocrine, metabolic and nutritional disorders (v) Psychiatric & neurological (vi) Diseases and disorders related to eye (vii) Diseases and disorders related to ear (viii) Cardio-vascular diseases (ix) Respiratory diseases (x) Gastro-intestinal diseases (xi) Skin diseases (xii) Musculo-skeletal diseases (xiii) Genito-urinary diseases (xiv) Obstetrics (xv) Childbirth (xvi) Injuries, accidents & self-harm (xvii) Other diseases	The disease groups followed the same grouping of ailments, followed in schedule 25.0 of the 75 th round of NSS. However, ailments having less than 100 inpatient admissions or outpatient visits were excluded.
Districts	(i) Kasaragod (ii) Kannur (iii) Wayanad (iv) Kozhikode (v) Malappuram (vi) Palakkad (vii) Thrissur	All the 14 districts of Kerala classified from north to south.

Table 1 (Cont.)

Socio-Economic Variables	Levels	Description
	(viii) Emakulam (ix) Idukki (x) Kottayam (xi) Alappuzha (xii) Pathanamthitta (xiii) Kollam (xiv) Thiruvananthapuram	

Source: Constructed by authors using Schedule 25.0 of NSS 75th Round

where, p_i is the probability of a household to be enrolled in a GSHI scheme and $1-p_i$ is the probability of a household to be not enrolled in a GSHI scheme.

Also, $z_i = B'X + u_i$, B being the matrix of coefficients, X being the vector of the covariates

and u_i being the error term. The ratio $\frac{p_i}{1-p_i}$ is called the 'odds ratio'.

Usually, the maximum likelihood method is used for estimating the model. However, the estimation requires linearizing the model, by taking the logarithm on both sides, to yield the log odds.

$$L_i = \ln\left(\frac{p_i}{1-p_i}\right) = z_i = B'X + u_i \quad \dots(2)$$

After estimation, the log odds of each covariate could be exponentiated to obtain the original odds ratio. The statistical significance of the unadjusted and adjusted odds ratios calculated in this manner was assessed using the t-test, inbuilt in the logistic command of STATA 15.

For the third objective, z-proportions test was conducted to test whether the difference in the utilization of public hospitals, between GSHI-covered and non-covered households, across each level of socio-economic variables (Table 1) was statistically significant or not. This was done separately for both inpatient and outpatient records in Kerala.

While all estimations used sampling weights used in the NSS report of 75th round, hypothesis testing took into consideration the rural and urban stratification as well as clustering at the First Stage Unit (FSU) level too. These adjustments were implemented through the svyset package in STATA 15.

Table 2: Inter-State Comparison of GSHI Schemes related to Ayushman Bharat in the Period 2018-2022									
State	Name of the Scheme(s)	PM-JAY Coverage (%)	Non-PMJAY Coverage (%)	Total GSHI Coverage (%)	Hospitalisations Under Various GSHI Schemes				Growth between commencement of the scheme and 2021-22 (%)
					2018-19	2019-20	2020-21	2021-22	
Sikkim	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY)	33	0	33	9	1213	2,022	2,872	31811.11
Meghalaya	Megha Health Insurance Scheme (MHIS) Pradhan Mantri Jan Arogya Yojana (PM-JAY)	100	0	100	1,122	1,24,434	1,23,734	1,45,304	12,850.45
Nagaland	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY)	62	0	62	262	10,384	7,357	5,653	2,057.63
Madhya Pradesh	Ayushman Bharat-Madhya Pradesh 'Niramayam' Yojana	74	0	74	42,615	2,69,618	3,84,022	7,15,230	1,578.35
Manipur	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY)	47	10	57	1,482	12,615	16,361	24,062	1,523.62
Tamil Nadu	Pradhan Mantri Jan Arogya Yojana-Chief Minister's Comprehensive Health Insurance Scheme (PMJAY-CMCHIS)	71	0	71	3,80,070	8,15,779	18,94,993	44,94,389	1,082.52
Karnataka	AB-Ark (Ayushman Bharat-ArogyaKarnataka)	66	0	66	1,14,516	5,52,697	6,36,562	10,63,880	829.02
Uttarakhand	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY) Aral Ayushman Uttarakhand Yojana	62	0	62	20,321	1,29,949	1,21,623	1,82,188	796.55

Table 2 (Cont.)

State	Name of the Scheme(s)	PM-JAY Coverage (%)	Non-PMJAY Coverage (%)	Total GSHI Coverage (%)	Hospitalisations Under Various GSHI Schemes				Growth between commencement of the scheme and 2021-22 (%)
					2018-19	2019-20	2020-21	2021-22	
Uttar Pradesh	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY) and Mukhya Mantri Jan Arogya Abhiyan (MMJAA)	39	0	39	65,290	2,83,485	3,18,757	5,01,760	668.51
Andhra Pradesh	Ayushman Bharat-Dr. YSR Arogyasri Healthcare Scheme	89	0	89	1,39,931	6,54,945	6,92,361	9,75,461	597.10
Bihar	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY)	54	0	54	18,498	1,54,950	88,753	1,16,379	529.14
Tripura	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY)	56	0	56	7763	50967	30105	46117	494.06
Himachal Pradesh	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY)	32	37	69	8,282	46,844	29,222	47,479	473.28
Assam	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY); Atal Amrit Abhiyan	42	52	94	32,702	90,174	92,713	1,75,893	437.87
Chhattisgarh	Ayushman Bharat PM-JAY Dr. Khubchand Baghel Swasthya Bima Yojana (AB PM-JAY- DKBSSY)	85	13	98	2,30,982	6,36,071	4,97,190	8,97,215	288.44
Jharkhand	Ayushman Bharat-Mukhyamantri Jan Arogya Yojana (AB- MJAY)	100	0	100	1,07,125	4,07,535	2,98,083	3,26,644	204.92

Table 2 (Cont.)

State	Name of the Scheme(s)	PM-JAY Coverage (%)	Non-PMJAY Coverage (%)	Total GSHI Coverage (%)	Hospitalisations Under Various GSHI Schemes				
					2018-19	2019-20	2020-21	2021-22	Growth between commencement of the scheme and 2021-22 (%)
Punjab	Ayushman Bharat Mukhya Mantri Sehat Bima Yojana	72	0	72	0	1,96,593	4,22,815	5,35,541	172.41
Mizoram	Ayushman BharatPradhan Mantri Jan Arogya Yojana (PM- JAY)	86	0	86	7,061	27,621	16,985	13,860	96.29
Gujarat	Ayushman BharatPradhan Mantri Jan Arogya Yojana (PM- JAY); Mukhyamantri Amrutam & Mukhyamantri Vatsalya	62	0	62	3,14,087	11,40,092	8,25,700	5,66,808	80.46
Kerala	Pradhan Mantri Jan Arogya Yojana - Karunya Arogya Suraksha Paddhati (PMJAY- KASP)	48	0	48	0	9,74,821	10,43,544	16,98,379	74.22
Maharashtra	Ayushman BharatPradhan Mantri Jan Arogya Yojana (PM- JAY);Mahatma Jyotiba Phule Jan Arogya Yojana (MPJAY)	31	52	83	1,08,067	2,14,343	1,50,023	1,36,646	26.45
Arunachal Pradesh	Ayushman BharatPradhan Mantri Jan Arogya Yojana (PM- JAY);Chief Minister Arogya Arunachal Yojana	100	0	100	375	1,345	84	189	-49.60
Note: The states have been sorted on the basis of growth (calculated in the last column)									
<i>Source: Compiled and calculated by the authors from the state-level factsheets provided by the National Health Authority, Ministry of Health and Family Welfare, Government of India</i>									

7. RESULTS AND DISCUSSION

7.1. WHERE DOES KERALA FEATURE AMONG INDIAN STATES IN TERMS OF POPULATION COVERAGE AND GROWTH IN HOSPITALIZATION CLAIMS IN THE 2018-2022 PERIOD?

Based on the GSHI coverage in Table 2, all the states could be divided into three: (i) states with 100% coverage of GSHI (Meghalaya, Jharkhand and Arunachal Pradesh); (ii) states with GSHI coverage between 61-99% (Nagaland, Madhya Pradesh, Tamil Nadu, Karnataka, Uttarakhand, Andhra Pradesh, Himachal Pradesh, Assam, Chhattisgarh, Punjab, Mizoram, Gujarat, Maharashtra); (iii) and states with GSHI coverage between 30-59%. (Sikkim, Manipur, Uttar Pradesh, Bihar, Tripura, Kerala). Even though Kerala qualifies in the third category of states, covering only about 48% of the state's population, the share of Kerala in total hospitalisation claims across India accounted for 13-14% in 2019-2022 period. This has been one of the highest in the country, for which Kerala has been receiving awards at Arogya Manthan, organized by NHA, for four years in a row, from 2019 to 2022. Although the third lowest in the country, in this period, Kerala has also recorded a growth of about 74% in hospitalisations (Table 2). Given that Kerala achieved 100% enrolment way back in 2020 (KSPB, 2021), at the very commencement of KASP-PMJAY, the growth in hospitalizations indicated percolation of GSHI utilization into the beneficiary households. Table 2: Inter-state comparison of GSHI schemes related to Ayushman Bharat in the period 2018-2022.

But could this impressive performance of GSHI be masking a growing polarization in the utilization pattern, between GSHI-covered and non-covered groups in Kerala? Tables 3 and 4 suggests the same.

7.2 DID THE UTILIZATION OF PUBLIC HOSPITALS IN KERALA BECOME POLARIZED, BASED ON GSHI COVERAGE?

Table 3 shows that, within inpatient admissions, the difference in the utilization of public hospitals between GSHI-covered and non-covered samples was about 23%, a full 10 percentage points higher than Chhattisgarh, the state with the next highest difference. In outpatient care, again a corresponding difference of nearly 23% was observed (Table 4), almost 8 percentage points higher than Chhattisgarh. The same story translated into the language of odds ratio too. In inpatient admissions (Table 3), the odds ratio for Kerala was the highest and statistically significant among the selected states, both in the unadjusted and adjusted models. Again, in outpatient visits too (Table 4), Kerala had the highest and statistically significant unadjusted odds ratio, while in the adjusted model, it had the highest odds ratio which was statistically significant. Both these pieces of evidence, in inpatient admissions and outpatient visits, pointed towards polarization in the utilization of public hospitals in Kerala, based on whether a household was covered by GSHI.

Table 3: Inter-State Comparison of Polarization in Public Hospital Utilization (Inpatient Admissions)								
State	GSHI PC (%)	Share of Public Hospitals in Utilization within GSHI Sample (%)	Share of Public Hospitals in Utilization within the Non-GSHI Sample (%)	Share of Public Hospitals in Utilization within the Total Sample (%)	Difference in Utilization of Public Hospitals between GSHI and Non-GSHI Samples (%)	Unadjusted OR for Public Hospital for the GSHI Sample	Adjusted OR for Public Hospital for the GSHI Sample	
Kerala	34	51.67	28.72	37.63	23	2.65***	2.22***	
Chhattisgarh	64	71.45	58.35	66.8	13.1	1.79***	1.55**	
Andhra Pradesh	71.3	34.88	27.83	33.08	7.05	1.39	1.50**	
Telangana	59	36.59	24.72	31.62	11.87	1.76**	1.30	
Rajasthan	32.6	64.14	64.74	64.53	-0.60	0.97	0.93	
Tripura	15.4	96.82	95.87	96.06	0.95	1.31	0.72	
Odisha	14.4	79.77	77.58	77.92	2.19	1.14	1.04	
Meghalaya	35	85.89	89.77	88.39	-3.88	0.69	0.67	
Mizoram	61	86.62	75.45	82.12	11.17	2.25***	0.83	
Goa	37.4	54.44	75.76	66.41	-21.32	0.38***	0.20**	
Note: *p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01.								
Source: Estimated by authors from NSS 75 th round								

Table 4: Inter-State Comparison of Polarization in Public Hospital Utilization (Outpatient Visits)							
State	GSHI PC (%)	Share of Public Hospitals in Utilization within GSHI Sample (%)	Share of Public Hospitals in Utilization within the Non-GSHI Sample (%)	Share of Public Hospitals in Utilization within the Total Sample (%)	Difference in Utilization of Public Hospitals between GSHI and Non-GSHI Samples (%)	Unadjusted OR for Public Hospital for the GSHI Sample	Adjusted OR for Public Hospital for the GSHI Sample
Kerala	34	60.30	37.70	46.52	22.6	2.50***	1.88***
Chhattisgarh	64	43.30	28.93	36.97	14.37	1.95	1.51
Andhra Pradesh	71.3	21.04	16.80	20.01	4.24	1.32	1.96*
Telangana	59	23.75	11.82	19.67	11.93	2.41	0.17**
Rajasthan	32.6	43.93	32.52	36.54	11.41	1.56	1.49
Odisha	14.4	51.25	40.39	42.46	10.86	1.31	1.18
Note: *p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, ***p-value below 0.01.							
Source: Estimated by authors from NSS 75 th round							

7.3 THE DISAGGREGATED ANALYSIS OF POLARIZATION IN THE UTILIZATION PATTERN ACROSS AGE GROUPS AND DISEASE GROUPS

Table 5 shows that in the case of inpatient admissions, across age groups, the polarization among older age groups, especially above 45 years was stronger compared to younger age groups. For outpatient visits, however, this pattern was not very clear. For both inpatient admissions and outpatient visits, across disease groups, except for three groups (psychiatric and neurological, genito-urinary diseases and obstetrics), all the other groups exhibited various degrees of polarization, the minimum being in infections (20%) and the maximum being in cancers (54%).

7.4 REINFORCING THE HYPOTHESIS OF GSHI-INFLUENCED POLARIZATION IN THE UTILIZATION PATTERN: HIGHER DEGREE OF POLARIZATION IN

THE WELL-OFF GROUPS COMPARED TO POORER COMMUNITIES

One of the striking features about the polarization in the utilization pattern (Table 5) was regarding how it was higher among the more well-off sections in the society like households, residing in urban areas (compared to rural areas), belonging to OBC and general categories (as opposed to ST and SC communities), engaged in self-employment and regular jobs (compared to casual labor) and having household heads with better education levels (compared to poorly educated household heads who are either illiterate or literate only).

Surprisingly, in inpatient admissions, such a clear pattern in polarization among higher consumption quintiles could not be observed, although it was very evident among the rich and richest consumption quintiles, in the case of outpatient visits. This behavior among the socially and economically well-off sections, was the biggest evidence for polarization that GSHI coverage brought about. The poorer sections could be expected to rely on public hospitals, whether covered by GSHI or not. However, the greater utilization of public hospitals in the socially and economically well-off households, who were covered by GSHI, was the real evidence for the polarizing dimension of GSHI.

7.5 AN INTERESTING CASE OF OPPOSITE POLARIZATION: THE CASE OF WAYANAD DISTRICT

Out of the 14 districts in Kerala, 7 districts showed statistically significant polarization, in the case of inpatient admissions. Interestingly among these 7 (Kasaragod, Wayanad, Kozhikode, Malappuram, Idukki, Kottayam, Thiruvanthapuram) districts, instead of a polarization in favour of greater utilization of public hospitals, Wayanad showed the opposite pattern of polarization, favouring private hospitals (Table 5). One of the reasons behind this could be the historically lower investments in public health that northern Kerala, to which Wayanad belongs, has witnessed (Jacob, 2014). In 2017-18, out of 18 General Hospitals (GH), 18 District Hospitals (DH), 46 taluk headquarters hospitals (THQH) and 40 Taluk Hospitals (TH), Wayanad had only 1 GH, 1 DH and 2 THQH (Directorate of Health Services, 2019), forming just 3.8% of the total institutions under Directorate of Health Services.

To fully understand the regional disparity in the public health investment in Wayand district, it should be compared with Thiruvanthapuram district, the southernmost district in Kerala. The latter accounts for 10% of all secondary and tertiary level hospitals in the state. Apart from being in north Kerala, Wayanad is also home to 50% of the tribal population in Kerala and has a forest cover on about 74% of its total geographic area, all potential reasons for lower investment in public health infrastructure.

7.6 THE IMPLICATION OF POLARIZATION IN THE UTILIZATION PATTERN ON MEDICAL EXPENDITURES

The most profound implication of the above results would be regarding medical expenditures of GSHI beneficiaries in Kerala. There is no clear evidence to show that

Table 5: Polarization in Public Hospital Utilization in Kerala Across Socio-Economic Covariates								
Socio-Economic Variables (1)	Inpatient Admissions			Outpatient Visits				
	(2) Number of Hospitalisation Episodes	(3) Utilization of Public Hospitals by GSHI- Covered Households	(4) Utilization of Public Hospitals by Non-GSHI Households	(5) Difference in Public Hospital Utilization (3-4)	(6) Number of Outpatient Visits	(7) Utilization of Public Hospitals by GSHI- Covered Households	(8) Utilization of Public Hospitals by Non-GSHI Households	(9) Difference in Public Hospital Utilization (7-8)
Type of residence								
Rural	2,675	0.50	0.31	0.19***	3198	0.62	0.44	0.18***
Urban	2,123	0.54	0.26	0.28***	2507	0.56	0.35	0.21***
Social groups								
ST and SC	418	0.61	0.59	0.01	435	0.66	0.69	-0.03
OBC	2,988	0.54	0.31	0.23***	3,381	0.62	0.45	0.17***
General	1,398	0.37	0.19	0.18***	1,889	0.50	0.29	0.22***
Household size								
1-4	2,159	0.58	0.28	0.30***	2,664	0.59	0.37	0.22***
5 and above	2,639	0.46	0.29	0.16***	2,559	0.63	0.45	0.18***
Household type								
Self-employed	1,435	0.54	0.22	0.32***	1,884	0.49	0.37	0.12**
Regular	1,089	0.43	0.24	0.19***	1,186	0.50	0.38	0.12
Casual labour	1,454	0.55	0.51	0.05	1,563	0.70	0.58	0.12**
Others	820	0.45	0.16	0.29***	1,072	0.66	0.29	0.37***

Table 5 (Cont.)

Socio-Economic Variables (1)	Inpatient Admissions				Outpatient Visits			
	(2) Number of Hospitalisation Episodes	(3) Utilization of Public Hospitals by GSHI- Covered Households	(4) Utilization of Public Hospitals by Non-GSHI Households	(5) Difference in Public Hospital Utilization (3-4)	(6) Number of Outpatient Visits	(7) Utilization of Public Hospitals by GSHI- Covered Households	(8) Utilization of Public Hospitals by Non-GSHI Households	(9) Difference in Public Hospital Utilization (7-8)
Education level of the household head								
Illiterate and literate only	424	0.59	0.44	0.15	454	0.70	0.58	0.12
Below primary to upper primary	2,781	0.53	0.33	0.20***	3,366	0.61	0.50	0.12***
Secondary and higher secondary	1,239	0.42	0.23	0.19***	1,451	0.51	0.30	0.21***
Graduate and above	358	0.33	0.12	0.21**	434	0.40	0.20	0.20
Age of the patients								
0-24	1,261	0.44	0.31	0.13*	804	0.61	0.37	0.24***
25-35	1,003	0.50	0.25	0.25***	278	0.57	0.27	0.30***
36-45	470	0.52	0.33	0.19**	457	0.57	0.42	0.15*
46-59	767	0.61	0.32	0.28***	1,533	0.53	0.41	0.12**
60-69	659	0.55	0.24	0.31***	1,520	0.69	0.40	0.29***
Above 70	636	0.50	0.25	0.25***	1,113	0.62	0.40	0.23***
Consumption Quintiles								
Poorest	649	0.61	0.41	0.20***	407	0.70	0.53	0.17***
Poor	827	0.62	0.28	0.34***	666	0.52	0.37	0.14

Table 5 (Cont.)

Socio-Economic Variables (1)	Inpatient Admissions				Outpatient Visits			
	(2) Number of Hospitalisation Episodes	(3) Utilization of Public Hospitals by GSHI- Covered Households	(4) Utilization of Public Hospitals by Non-GSHI Households	(5) Difference in Public Hospital Utilization (3-4)	(6) Number of Outpatient Visits	(7) Utilization of Public Hospitals by GSHI- Covered Households	(8) Utilization of Public Hospitals by Non-GSHI Households	(9) Difference in Public Hospital Utilization (7-8)
Middle	880	0.51	0.26	0.25***	834	0.59	0.46	0.13*
Rich	1,261	0.44	0.31	0.13***	1,310	0.63	0.43	0.20***
Richest	1,181	0.41	0.22	0.20**	2,488	0.59	0.32	0.27***
Diseases								
Infections	1,046	0.51	0.31	0.20***	728	0.65	0.39	0.26***
Cancers	120	0.86	0.42	0.44***	52	0.92	0.39	0.54***
Endocrine, metabolic and nutritional disorders	185	0.49	0.26	0.24*	1,502	0.63	0.36	0.25***
Psychiatric and neurological diseases	181	0.43	0.32	0.11	255	0.54	0.36	0.17
Cardio-vascular diseases	492	0.54	0.28	0.25***	1,595	0.63	0.43	0.19***
Respiratory diseases	273	0.69	0.38	0.31***	496	0.65	0.40	0.25***
Gastro-Intestinal diseases	221	0.49	0.26	0.24**	114	0.53	0.27	0.26*
Musculo-skeletal diseases	183	0.51	0.16	0.34***	454	0.53	0.44	0.09
Genito-urinary diseases	229	0.29	0.21	0.08	—	—	—	—

Table 5 (Cont.)

Socio-Economic Variables (1)	Inpatient Admissions				Outpatient Visits			
	(2) Number of Hospitalisation Episodes	(3) Utilization of Public Hospitals by GSHI- Covered Households	(4) Utilization of Public Hospitals by Non-GSHI Households	(5) Difference in Public Hospital Utilization (3-4)	(6) Number of Outpatient Visits	(7) Utilization of Public Hospitals by GSHI- Covered Households	(8) Utilization of Public Hospitals by Non-GSHI Households	(9) Difference in Public Hospital Utilization (7-8)
Obstetrics	175	0.41	0.24	0.17	NA	NA	NA	NA
Childbirth	1,051	0.45	0.22	0.23***	NA	NA	NA	NA
Injuries, accidents and self-harm	349	0.52	0.26	0.25***	54	0.56	0.14	0.42***
Districts								
Kasaragod	135	0.27	0.11	0.16**	149	0.59	0.44	0.15
Kannur	364	0.34	0.25	0.09	377	0.56	0.30	0.26**
Wayanad	147	0.83	0.42	-0.40**	143	0.68	0.60	-0.08
Kozhikode	420	0.58	0.41	0.17**	456	0.53	0.36	0.16
Malappuram	601	0.53	0.16	0.37***	721	0.44	0.34	0.10
Palakkad	375	0.54	0.30	0.23	217	0.56	0.43	0.13
Thrissur	473	0.38	0.22	0.16*	814	0.45	0.28	0.17
Ernakulam	387	0.44	0.22	0.21	303	0.53	0.26	0.23**
Idukki	272	0.40	0.23	0.17**	373	0.49	0.52	-0.02
Kottayam	363	0.61	0.25	0.36***	573	0.61	0.46	0.16
Alappuzha	283	0.47	0.32	0.15	379	0.71	0.39	0.32**

Table 5 (Cont.)

Socio-Economic Variables (1)	Inpatient Admissions				Outpatient Visits			
	(2) Number of Hospitalisation Episodes	(3) Utilization of Public Hospitals by GSHI- Covered Households	(4) Utilization of Public Hospitals by Non-GSHI Households	(5) Difference in Public Hospital Utilization (3-4)	(6) Number of Outpatient Visits	(7) Utilization of Public Hospitals by GSHI- Covered Households	(8) Utilization of Public Hospitals by Non-GSHI Households	(9) Difference in Public Hospital Utilization (7-8)
Pathanamthitta	170	0.50	0.39	0.11	191	0.57	0.15	0.42
Kollam	338	0.41	0.33	0.08	284	0.74	0.62	0.12
Thiruvananthapuram	470	0.67	0.38	0.29***	725	0.71	0.49	0.22*
Note: 1. Disease groups with less than 100 observations were omitted. 2. * p-value between 0.10 and 0.05, ** p-value between 0.05 and 0.01, *** p-value below 0.01								

Source: Estimated by authors from the NSS 75th round for Kerala

GSHI schemes provided sufficient financial protection to the beneficiaries, in all the states of India (Prinja, Chauhan, Karan, Kaur and Kumar, 2017; Reshmi, Unnikrishnan, Rajwar, Parsekar, Vijayamma and Venkatesh, 2021). However, heavy reliance on public hospitals by the GSHI beneficiary households in Kerala may suggest significant reductions in the out-of-pocket expenditures and related measures of medical expenditures for GSHI-covered households compared to the non-covered households. However, as the investigation of medical expenditures was beyond the scope of this paper, it was not analysed here.

7.7 WHY COULD THE UTILIZATION OF PUBLIC HOSPITALS, INCREASE IN THE FUTURE? THE ROLE OF RISING INVESTMENTS IN THE PUBLIC HEALTH INFRASTRUCTURE OF KERALA

The rising share of public hospitals in the claims volume and value of GSHI definitely contributed to the polarization in the healthcare utilization pattern. However, based on the schemes of the government (both centrally sponsored and

state-government funded schemes) at improving the physical, financial and human infrastructure of public hospitals in Kerala, one has reason to believe that the role of public hospitals will even strengthen in the future.

One such key mission is the Pradhan Mantri Swasthya Suraksha Yojana (PMSSY), a Centrally Sponsored Scheme (CSS), through which the union and state governments share the costs to enhance the physical infrastructure in key tertiary level hospitals. Under this scheme, the union government mainly aims to establish/upgrade the infrastructure in Government Medical Colleges (GMCs) and set up an All-India Institute of Medical Sciences (AIIMS) to usher in regional equity. As part of this, GMCs in Thiruvananthapuram, Kozhikode and Alappuzha districts have been upgraded and a new AIIMS is awaiting final approval from the union government.

Another mission to upgrade the infrastructure at the secondary level is the Aardram Mission, which is fully funded by the state government, through the Kerala Infrastructure Investment Fund Board (KIIFB). The development of outpatient services, bringing specialty and super-specialty treatments down to the taluk, district and general hospitals, developing primary health centres as Family Health Centers (FHCs) to deliver Comprehensive Primary Health Care (CPHC) are some of the objectives of Aardram mission. The main purpose of this mission is to transform government hospitals to provide 'patient-friendly services.' Additionally, apart from PMSSY, using from funds from KIIFB, the state government has built new GMCs in under-served districts like Wayanad, Kasaragod and Palakkad.

Along with these missions to upgrade the public health infrastructure, additional schemes like Arogyakiranam (the modified version of Rashtriya Bal Swasthya Karyakram (RBSK) in Kerala), a scheme which provides free treatment for children aged 0-18, are implemented through public hospitals in Kerala. This could also increase the utilization of public hospitals in the future.

8. CONCLUSION

The dominant share of Kerala in the total GSHI hospitalisation claims in the country and a 74% growth in hospitalisations, between 2019-22, even after a decade of implementing GSHI schemes, itself accords Kerala a unique status in the history of GSHI in India. However, the official data of the state government showed the ever-rising share of public hospitals in the total hospitalisation claims (growing from about 40% in 2008 to 78% in 2020), which was at odds with the report of the 75th round of NSS which indicated higher reliance on private hospitals in the total population. The polarization in the utilization of public hospitals, based on GSHI coverage, offered the best possible explanation to solve this puzzle. Using the 75th round of NSS, this hypothesis was tested and was proven correct. In both inpatient and outpatient records, the reliance on public hospitals was 23 percentage points higher among GSHI covered

households compared to the non-covered households in Kerala– the highest difference in top 10 states with the highest GSHI coverage in India.

Further, the disaggregated analysis revealed that the difference in the utilization pattern was higher among socially and economically well-off households. This again lent credence to the polarization hypothesis, as opposed to the poorer communities (who could use public hospitals, irrespective of whether covered by GSHI), the polarization was observed in the well-off households (who could be expected to use private hospitals in the absence of GSHI coverage). Interestingly, Wayanad stood out as an outlier, as it exhibited reverse/opposite polarization (in favor of private hospitals) among GSHI-covered households.

The results clearly indicate a Kerala model to other states, which has the potential to reduce the medical expenditures of GSHI beneficiaries due to very high reliance on public hospitals. However, the downside of the same could be congestion and scarcity of medicines etc. in public hospitals. The combined efforts of the union and state government will definitely solve many of these issues. For the same model to replicate in the rest of the country, the respective state governments and union government must develop the public health infrastructure in each state.

The current study has many limitations too. Firstly, for studying whether GSHI schemes have an impact on increasing healthcare utilization, although the time series does paint a fairly good picture, a more rigorous approach comparing GSHI-covered and non-covered groups (a treatment-control group approach) could have been used. Secondly, the use of the 75th round of NSS in the inter-state comparison of the difference in the utilization of public hospitals may present an issue, due to certain biases regarding urbanization that might have crept into the survey design. A comparison of population censuses of 2011 and 2011 would reveal that India is a rapidly urbanization nation, which could be expected to continue during 2017-18. However, NSS 75th round which relies on a rural-urban stratification as a starting point of the survey design, uses Urban Frame Survey 2007-2012 as the sampling frame for urban areas, thus ignoring the changes in urbanization between 2012 and 2017-18.

Thirdly, a panel data study and a difference-in-difference (DID) model would have yielded more insights into the polarization in utilization pattern before and after the introduction of GSHI schemes in Kerala in 2008. However, such datasets are not available. Fourthly, even though the polarization in the utilization pattern was observed on the basis of GSHI coverage, there could be other confounding factors too which might be influencing the polarization like selection of eligible households in Kerala. The eligible households mainly comprised of Below Poverty Line (BPL) households and BPL households might be utilizing more of public hospitals. However, NSS 75th round did not capture any information on the BPL status of the households, due to which an investigation into the same was also not feasible.

Fifthly, a study conducted in 2011 in the Thiruvanthapuram district of Kerala (Philip, Kannan and Sarma, 2016) had found that the GSHI only covered 40% of all hospitalisation by the GSHI covered households. This study was conducted in just one district, more than a decade ago. However, if these conditions persisted even in 2017-18, this dimension may become significant when studying the polarization in the utilization pattern, which is influenced by GSHI. Unfortunately, schedule 25.0 of NSS 75th round did not include a specific question, to partition the hospitalisations of GSHI-covered households, on the basis of whether they used GSHI for the hospitalisations or not. This could have also influenced the results.

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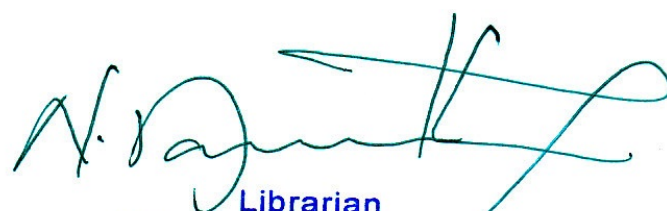
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