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Complete List of Authors:	B, Reshmi; Manipal Academy of Higher Education (MAHE), Health Information Management, Manipal College of Health Professionals Unnikrishnan, B.; MAHE, Department of Community Medicine, Kasturba Medical College, Mangaluru Rajwar, Eti; MAHE, PHESA, Department of Health informatics, Prasanna School of Public Health, Manipal Academy of Higher Education, Manipal Parsekar, Shradha; MAHE, PHESA, Department of Health informatics, Prasanna School of Public Health, Manipal Academy of Higher Education, Manipal Vijayamma, Ratheebhai; MAHE, Manipal Institute of Communication VENKATESH, BHUMIKA; Manipal Academy of Higher Education, PHESA, PRASANNA SCHOOL OF PUBLIC HEALTH, Department of Health Informatics
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Impact of public funded health insurances in India on health care utilization and financial risk protection: a systematic review

Reshmi B.[1], Unnikrishnan B.[2], Eti Rajwar[3], Shradha S. Parsekar[3], Ratheebhai Vijayamma[4], Bhumika Tumkur Venkatesh[3*]

Affiliations:

[1] Health Information Management, Manipal College of Health Professionals, Manipal Academy of Higher Education (MAHE), Manipal, India

[2] Department of Community Medicine, Kasturba Medical College, MAHE, Mangaluru, India

[3] Public Health Evidence South Asia, Prasanna School of Public Health, MAHE, Manipal, India

[4] Manipal Institute of Communication, MAHE, Manipal, India

Email IDs: Reshmi B: reshmi.b@manipal.edu; Unnikrishnan B: unnikrishnan.b@manipal.edu; Eti Rajwar: eti.rajwar@manipal.edu; Shradha S Parsekar: shradha.parsekar@manipal.edu; Ratheebhai V: rathee63@gmail.com; Bhumika TV: bhumika.tv@manipal.edu

***Corresponding author:**

Room No. 35, Public Health Evidence South Asia, Prasanna School of Public Health, MAHE, Manipal 576104, Karnataka, India; Telephone: 08202923449; Email: bhumika.tv@manipal.edu

Abstract

Objective: The Universal Health Coverage aims to address the challenges posed by the healthcare inequalities and inequities by increasing the accessibility and affordability of healthcare for the entire population. This review provides information related to impact of public funded health insurance (PFHI) on financial risk protection and utilization of healthcare.

Design: Systematic review

Data Sources: Medline (via PubMed, Web of Science), Scopus, Social Science Research Network and 3ie impact evaluation repository were searched from their inception until 15 July 2020, for English language publications.

Eligibility criteria: Studies giving information about the different PFHI in India, irrespective of population groups (above 18 years) were included. Cross-sectional studies with comparison, impact evaluations, difference-in-difference design based on before and after implementation of the scheme, pre-post, experimental trials, and quasi-randomized trials were eligible for inclusion.

Data extraction and synthesis: Data extraction was performed by three reviewers independently. Due to heterogeneity in population and study design statistical pooling was not possible, therefore narrative synthesis was performed.

Outcomes: Utilization of healthcare, willingness-to-pay (WTP), OOPE (including outpatient and inpatient), CHE, and impoverishment

Results: The impact of PFHI on financial risk protection reports no conclusive evidence to suggest that the schemes had any impact on the financial protection. The impact of PFHIs such as Rastriya Swasthy Bima Yojana, Vajpayee Arogyashree and PMJAY showed increased access and

utilization of healthcare services. There is lack of evidence to conclude on WTP an additional amount to the existing monthly financial contribution.

Conclusion: The different central and state PFHIs increased the utilization of health care or health care services by the beneficiaries of the scheme but there was no conclusive evidence for reduction in financial risk protection of the beneficiaries.

Registration: Not registered

Keywords: Catastrophic Health Expenditure; Financial protection; India; Out-of-pocket health expenditure; Public funded health insurance; Willingness-to-pay.

Strengths and Limitations of this study

1) Inclusion of all kinds of empirical evidence to answer the research question about impact of PFHI schemes in India.
2) Choice of quality appraisal tool, due to unavailability of other tools for this kind of study, was a limitation.
3) Due to heterogeneity in data could not provide the pooled estimate via meta-analysis. However results very explained via a narrative synthesis.

1. Introduction

India has a complex and mixed healthcare framework with presence of parallel public and private healthcare systems.[1 2] There is a stark difference, in the government spending on both public and private healthcare.[3] Additionally, in India, healthcare access is driven by the difference in equalities or inequities. Health policies in India have been guided by the principle of equity with prioritizing the needs of the poor and underprivileged.[4] The inequality in health is a multidimensional concept that refers to the difference in health status of various population subgroups. Inequity in health is the inequalities that are judged as unfair as they are created because of socially derived processes. The different reasons for inequalities and inequity in healthcare are the (a) socio-economic inequalities due to difference in education, gender, awareness, income etc., (b) inequalities due to difference in public spending and difference in resource allocation, and (c) increase in private healthcare expenditure leading to high out-of-pocket (OOP) expenses that leads to high inequities in health financing.[4]

Out-of-pocket expenditure (OOPE) for health is one of the important factors while addressing the inequities in healthcare, and in India it is an important source of healthcare financing. It is estimated that in India around 71% of the healthcare spending is met by OOP expenditure. This not only is an immediate financial burden to the poor households but also pushes the households into a never-ending poverty trap.[5] Health related OOPE poses a threat to the principle of financial risk protection and adds to the unaffordability and inaccessibility of healthcare for the poor. High OOPE also leads to catastrophic health expenditure (CHE), which is the increase in healthcare payment by a household, beyond the threshold, where the threshold is defined as the household's income or capacity to pay. This is further divided into catastrophe 1 where healthcare

OOPE exceeds by 10% of the household's consumption expenditure, and catastrophe 2, if OOPE exceeds to more than 40% of the household's non-food expenditure. The increase in OOPE affects the rural population marginally more than the urban population and the effect of OOPE is more pronounced among the people living below the poverty line (BPL) than those above the poverty line (APL). As the BPL people are pushed more into poverty than the APL, due to the high OOPE, when measured via the increase in poverty head counts.[5]

To address the above-mentioned health inequities, over the years, government of India has rolled out different initiatives. The public healthcare system was revised and reframed as the National Rural Health Mission (NRHM) in 2005, later restructured as National Health Mission in 2014.[5] [6] Other initiatives like *Janani Suraksha Yojana* and the public funded health insurance (PFHI) schemes such as *Rashtriya Swasthya Beema Yojana* (RSBY) were also introduced to address the health inequalities, improve health outcomes and provide financial risk protection.[6] Many state sponsored health insurance (HI) schemes viz. the *Vajpayee Arogyashree Scheme* (VAS) by Karnataka, *Comprehensive Health Insurance Scheme* (CHIS) by Kerala, and *Chief Minister Health Insurance Scheme* (CMHIS) by Tamil Nadu; have been introduced for ensuring financial protection of the vulnerable population.

Challenges posed by the healthcare inequalities and inequities like OOPE can also be addressed via the Universal Health Coverage (UHC). The UHC, as defined by the World Health Organization (WHO), "means that all people and communities can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship". The UHC aims towards increasing the accessibility and affordability of healthcare for the entire

population. The definition of UHC is embodied in its three objectives i.e. equity, quality, and financial protection.[7]

The twelfth five-year plan of the government of India acknowledges the importance of UHC as it introduces a work plan for achieving UHC for the 1.3 billion population of the country. The agenda for this plan is based on the principle of providing affordable, accessible and good quality healthcare with financial protection to the people of the country.[8] The provision of UHC has been included in the National Health Policy of India (2017). To achieve the UHC, government of India announced the *'Ayushman Bharat'* programme in 2018 with two initiatives i.e. (a) Health and Wellness center, and (b) National health protection scheme- *Pradhan Mantri Jan Arogya Yojana* (PMJAY) that is intended to cover around 500 million beneficiaries (from vulnerable families) and is intended to cover up to Indian National Rupees (INR) 500,000 per family, per year, for secondary and tertiary hospitalization.[9]

The addition of PMJAY scheme to the various existing government (central and state) funded HI schemes, aim to increase the UHC, by increasing the affordability and accessibility of good quality healthcare. It is important to assess whether these schemes (including PMJAY) have been proven to be effective in improving health outcomes and providing financial protection to the vulnerable population. The previous systematic review[10] on assessing the effectiveness of PFHI schemes in India was conducted before complete rolling out of the PMJAY and therefore, did not include findings on the effectiveness of the scheme. The present review will therefore aim to provide information related to effectiveness and impact of the central and state funded HI schemes along with the PMJAY scheme. After the introduction of PMJAY, the change in functioning of the other central and state funded HI is not very clear, therefore, this review will also identify and map the currently operational PFHIs and if there has been any difference in the

guidelines of these insurance schemes after the advent of the PMJAY scheme. This review was planned to answer the following research question:

a) What is the impact of PFHI schemes on access and utilization of healthcare, willingness-to-pay and financial risk protection in India?

2. Methods

This systematic review follows the methodology by Cochrane handbook of interventions[11] and the PRISMA checklist was used to report this review (*supplementary file 1*).[12]

2.1. Criteria for including studies in the review

a. Population: Population group above 18 years of age, enrolled in a PFHI scheme in India.

b. Intervention: HI schemes funded by either central or state government, and that covers, range of services such as hospitalization, out-patient charges, medicine costs, treatment procedures etc. Different PFHI schemes in India, for example, RSBY, VAS, CMHIS, and PMJAY were eligible to be included. Private or community-based HIs were not eligible to be included. Mixture of HIs were excluded provided a study carried out sub-group analysis for PFHIs.

c. Comparison: comparison group comprises of people who do not receive any PFHI services.

d. Outcomes: This review includes the following outcomes; (a) Utilization of healthcare, (b) WTP, (c) financial risk protection measured in terms of OOPE, CHE and impoverishment.

e. Study design: cross-sectional studies with comparison, impact evaluations, difference-in-differences (DID) design based on before and after implementation of the scheme, pre-post design, experimental trials, and quasi-randomized trials were eligible to be included.

2.2. Search methods for identification of studies

The following electronic databases were searched for the review, Medline (via PubMed, Web of Science), SCOPUS, Social Science Research Network and International Initiative for impact evaluation (3ie) repository. Databases were searched from their inception until 15 July 2020, however only English publications, published in the last 10 years were considered. References and forward citations of the included studies were scanned through for any additional eligible studies. Keywords were identified before the initiation of the search. The initial search was carried out in PubMed (*supplementary file 2*) and was replicated in other databases. Search was conducted by a designated information scientist.

2.3. Data collection

Result of search strategy was imported to Endnote X7 reference manager software. Duplicates were removed and the unique citations were exported to Microsoft Excel spreadsheet for screening.

2.3.1. Selection of studies: Unique citations were subjected to title and abstract screening independently by two reviewers. Eligible abstracts of all the relevant studies as per the inclusion criteria were included for full text screening (by BTV, ER and SSP) and relevant ones from these were included for analysis. Before initiating full text screening, we tried to retrieve the full text articles. For all the non-available articles, we tried to retrieve by contacting authors of the respective articles and the full texts that were not retrieved were excluded. Disagreements were resolved by discussion or by a third reviewer.

2.3.2. Data extraction: Data extraction was (done by ER, BTV, SSP) using a pre-designed data extraction form. Information on variables such as bibliographic details (author names, publication

year, journal name); study details (information about the objectives of the study and research question addressed); study setting (name of the state, rural/urban); participant characteristics (age, gender, socio-economic status, occupation); intervention details (name and type of HI, mode of delivery of the HI, incentives given, healthcare services covered, time duration of seeking HI, any additional HIs); comparison details; outcome details (information about changes in accessibility of healthcare, utilization of healthcare services, OOPE, WTP, health outcomes like morbidity and mortality, measurement of the outcomes, method used for measurement, time at which the outcome was measured); and study design details (type of study design and analysis) was extracted.

After pilot testing of the data extraction form, it was revised according to the modifications suggested by the team. Disagreements among the reviewers, during data extraction were resolved by consensus, if still not resolved, third reviewer was approached for resolving the disagreements. Extracted data from all the included studies was cross-checked and independent extraction was done for one third randomly selected studies.

2.4. Methodological Quality

The methodological quality of the included studies was assessed using Effective Public Health Practice Project Quality Assessment Tool (EPHPP).[13] This tool assesses methodological quality of the quantitative studies based on questions under the following seven domains i.e., a) selection bias; b) study design; c) confounders; d) blinding; e) data collection method; f) withdrawals and dropouts; g) intervention integrity; h) analysis. Quality assessment using this scale, was performed independently by reviewers in groups of two. After discussion, global rating for the scale was followed and studies were marked as 1) methodologically strong if none of the domains had any weak rating; 2) moderate, if at least one domain was marked as weak; and 3) weak, if two or more

domains were marked as weak. Quality assessment was performed using Microsoft excel spreadsheet.

2.5. Data analysis

Due to heterogeneity in data, narrative synthesis was performed to answer research question. The results are summarized based on outcomes and types of PFHIs. The effect measures of included studies such as mean difference or correlation coefficients with appropriate confidence interval and/or p values are reported.

2.6. Patient and Public involvement

We did not involve public or patient during the process of this review.

3. Results

The literature search on electronic databases generated 555 citation yield, out of which 179 were duplicates. Additionally, 17 records were identified from forward and backward reference checking. After title and abstract screening of 393 citations, 157 were included for full text screening, of which finally 25 articles were included for data synthesis. Schematic representation of the selection process is shown in figure 1.

3.1. Characteristics of included studies

The summary of study characteristics is given in table 1 and the detailed characteristics of included studies is given in *the supplementary file 3.*

3.2. Impact of PFHI on financial risk protection, utilization of healthcare and WTP

Summary of the impact findings is given in table 2 and the detailed synthesis is provided in *supplementary file 4.*

3.2.1. Financial risk protection:

Around 21 studies measured financial risk protection, of which 17 were of strong methodologically quality,[14-30] three of moderate methodological quality[31-33] and one weak methodological quality.[34] Nine studies[14 16 18 19 23 25 30 32 34] reported the impact of RSBY alone on financial protection. Thirteen studies[15 17 20-22 24 26-29 31-33] provided information on the effect of different PFHI schemes (including state insurance schemes) on financial risk protection.

Overall, there is inconclusive evidence on the impact of PFHIs schemes on financial risk protection i.e. OOPE, CHE and impoverishment.

3.2.2. Access and utilization of health services:

Overall, 16 studies assessed the impact of PFHI on access and utilization of health services (table 2). The HI programs were RSBY,[14 16 23 26 27 30 32 35] VAS[36 37] RAS,[17 27 32] CHIS[20 21 24 26 33] and PMJAY.[29] Of the 16 studies, thirteen studies[14 16 17 20 21 23 24 26 27 29 30 36 37] were assessed to be of strong methodological quality, two[32 33] were assessed as of moderate quality and one[35] was rated as weak quality. The analysis that was carried out majorly to look at the impact were logistic regression, profit models and other types. The outcomes that were reported includes reporting of illness or morbidity, hospitalization rate, outpatient care and inpatient care utilization, duration of hospitalization and utilization of hospital services. Findings demonstrated increased access and utilization of healthcare (both in rural and urban areas) for RSBY, VAS and PMJAY health insurance programs. The uptake of inpatient services was relatively higher than utilization of outpatient services.

3.2.3. Willingness-to-pay:

A high methodological study[38] reported WTP for the insurance scheme. The CGHS beneficiaries from low employment grade were more willing to pay an additional amount to the existing monthly financial contribution than the higher employment grade.

4. Discussion

This review identified and provided information on the impact of different PFHI schemes operational in India on healthcare utilization, WTP and financial risk protection of the beneficiaries. It was observed that although the utilization of healthcare services via inpatient and outpatient visits increased for insured beneficiaries, there was no effect of the PFHI schemes on financial risk protection of the insured households.

Our findings report that there is no conclusive evidence to suggest that RSBY reduced the OOPE and CHE or had an impact on the financial risk protection. For other PFHIs including the state sponsored PFHIs *viz.* RAS, VAS and CHIS, the findings suggest a mixed impact of these schemes on OOPE, CHE and impoverishment, leading to inconclusive evidence for financial risk protection. Our findings are similar to another systematic review,[10] which reported lack of substantial evidence for reduction in OOPE or improvement in financial risk protection by PFHI schemes in India.

One of the reasons for no substantial impact of RSBY on financial risk protection can be the limited coverage insurances e.g., INR 30,000 annually under RSBY. As the utilization of healthcare and hospitalization under RSBY has increased over the years[10] it is possible that beneficiaries would have been hospitalized for hospital services of more than INR 30,000, leading to additional OOP payment. Hospitalization for services not offered by the RSBY package and denial of hospitalization by the empaneled hospitals has also led to increase in OOPE.[39] Another

reason for the negligible impact of RSBY in reducing OOPE can be the operational or functional error of the scheme. An important component of the scheme are the insurance companies, which are responsible for enrolling beneficiaries, empaneling hospitals, processing claims and reimbursing money. Delayed reimbursement from the insurance companies, leads to hospitals asking beneficiaries to buy medicines and other consumables from outside, which results in high OOPE. Additionally, as there is no incentive for the insurance companies to keep a check on the OOPE payments, hospitals might charge patients or deny reimbursement of money on trivial grounds, leading to high OOPE.[39]

The impact of PFHIs (other than RSBY) including the state sponsored schemes was reported to be mixed and inconclusive, similar to another systematic review that reported lack of substantial evidence of impact on OOPE for PFHI operational in low- and middle-income countries (LMICs).[40] Additionally, as the functioning of any PFHI scheme depends on the governance, different governance structures and demographic profiles of the states would have led to heterogeneity in results. Poor impact of different PFHIs on financial risk protection can be attributed to similar factors that affect RSBY i.e., low coverage or benefits offered by the schemes leading to OOPE and CHE even for insured beneficiaries and interference or reimbursement issues due to functioning of insurance companies or 'trusts'.

Our systematic review is the first one that has focused on the impact of PMJAY. Out findings suggest, there is lack of evidence related to impact of PMJAY, as only one study reported poor impact of PMJAY on reduction in OOPE and financial risk protection. The reasons for poor impact can be similar as experienced by the earlier PFHIs schemes i.e., problem of 'double billing', private providers monopoly and administrative problems. As PMJAY is a relatively new scheme, more evidence is needed to conclude its impact. Additionally, as the only study included

in the review was specifically for the state of Chhattisgarh, availability of evidence from other states is needed to summarize the impact of this scheme.

In our review, most of the evidence comes from the studies that assessed impact of RSBY program in India and the data from the studies were analyzed from the National Sample Survey Office, the evidence from only two studies are results from quasi-randomized study design. Overall, there was increase in incidence of outpatient and inpatient visits and the utilization of medical services, the healthcare utilization rate differed between states. The utilization rate increased both among rural and urban areas for the RSBY and VAS. However, there was one study that assessed healthcare utilization for PMJAY and the results were insignificant for the same. The reasons for the results to be insignificant could be due to the lack of awareness regarding PMJAY, as it is a relatively new scheme. But, not justified to conclude based on a single study at the same time. It is important to look into various other aspects due to which the results of the PMJAY are insignificant in increasing healthcare utilization. The healthcare utilization rate was assessed in terms of reporting morbidity, hospitalization, utilization of inpatient and outpatient services.

Overall, majority of the evidence suggests that implementation of PFHI has increased hospitalization and the utilization of outpatient care. Our findings are consistent with other systematic reviews[10 40] i.e., PFHIs had a positive influence on utilization of healthcare and hospitalization in India and other LMICs. Although there is substantial evidence on the impact of PFHI on healthcare utilization, more rigorous evaluation studies are required to evaluate the impact of health insurance schemes and especially the newly launched PMJAY.

The findings for Willingness to Pay (WTP) is inconclusive, although the participants were willing to pay more, because the evidence is generated from a single study and the focus of the insurance was limited.

Strengths and limitations:

Our review is the first comprehensive review, which has summarized the impact of PFHI schemes in India, including the new scheme of PMJAY under the Ayushman Bharat, on utilization of healthcare and financial risk protection. One of the limitations of the review is the choice of quality assessment tool used for critical appraisal of included studies due to absence of any other valid tool for secondary data analysis. Responses to some of the questions and individual domain ratings for the EPHPP tool were subjective, although we had a substantial discussion between the authors before finalizing the rating. Secondly, the tool is used to assess quality of all the quantitative studies, which makes it very vague. Due to heterogeneity in methods, population and types of insurances, we could not perform meta-analysis.

Implications of practice and research:

Our systematic review has vast policy and practice implications. Since UHC is one of the important components to achieve the sustainable development goal, the role of PFHI becomes even more important in providing equitable and affordable healthcare access to everyone. Financial risk protection is one of the key components of any PFHI scheme that ensures affordable healthcare for everyone. Poor impact of PFHIs on financial risk protection also indicates failure of the PFHI schemes. More research on PFHIs especially PMJAY and its effect on financial risk protection and healthcare utilization is needed as this scheme is an important component of the Ayushman Bharat scheme under the UHC. Similarly, future studies can consider studying the effect of some of the state funded insurances such as

by the government of Goa and West Bengal, which also includes APL households, for which currently there is no evidence.

State and central governments could consider including APL households especially middle-income group under the purview of PMJAY. There should be mechanisms to check corruption in the process of PFHI enrolment and focus could be provided to ease out the administrative difficulties faced by people at the time of claiming the insurance. Future research should be directed towards the reasons for the failure of different PFHIs in improving financial risk protection of the beneficiaries and demand- and supply-side barriers to implementation and uptake of PFHI, by conducting rigorous qualitative research and process evaluations. Research reporting reasons for failure of the PFHIs, in improving financial protection, will help in revising and modifying the functioning and implementation of the PFHI schemes for benefit of the consumers.

5. Conclusion

PFHI schemes *viz.* RSBY, VAS, RAS, and CHIS have been operational in India since 2008. These schemes have been impactful in increasing healthcare utilization in terms of outpatient and inpatient care in both rural and urban areas. However, none of these schemes have been successful in improving the financial protection of the beneficiaries. The new scheme of Pradhan Mantri Jan Arogya Yojana or PMJAY has incorporated administrative and strategic changes, which were based on the shortcomings of earlier PFHIs viz. provision of a 24 hours inquiry helpline and increased coverage of healthcare services and benefit package. However, limited evidence available on the impact of PMJAY suggests no improvement in healthcare utilization and financial risk protection of the beneficiaries. Future research on the impact of PMJAY and reasons for failure of other PFHIs on financial risk protection need to be explored.

List of Abbreviations:

APL: Above poverty line; ATT: Average Treatment of Treated; BPL: Below poverty line; CBHI: Community Based Health Insurance; CGHS: Central Government Health Scheme; CHE: Catastrophic Health Expenditure; CHIS: Comprehensive Health Insurance Scheme; CI: Confidence Interval; CMHIS: Chief Minister Health Insurance Scheme; DID: Difference-in-Differences; ECHS: Ex-servicemen Contributory Health Scheme ; ESIS: Employee State Insurance Scheme; HI: Health Insurance; IV: Instrumental Variable; LMICs: Low- and middle-income countries; MD: Mean Difference; NRHM: National Rural Health Mission; NSSO: National Sample Survey Office; OLS: Ordinary Least Square; OOP: Out-of-pocket; OOPE: Out-of-pocket health expenditure; OR: Odds Ratio; PFHI: Public Funded Health Insurance; PMJAY: Pradhan Mantri Jan Arogya Yojana; PSM: Propensity Score Matching; RAS: Rajiv Arogya Shree; RSBY: Rashtriya Swasthya Beema Yojana; SMD: Standard Mean Difference; UHC: Universal Health Coverage; UP: Uttar Pradesh; VAS: Vajpayee Arogyashree Scheme; WHO: World Health Organization

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Conflict of interest: None declared

Author contribution: RB is the guarantor of the review. BTV, ER, RB and SSP conceptualized the topic. RV developed search strategy and conducted the search. SSP carried out title/abstract screening and BTV, ER, SSP carried out full text screening. BTV, ER and SSP extracted first round of data extraction, analyzed and synthesized the data for the review. Extracted data from all the included studies was cross-checked and independent extraction was done for one third randomly selected studies by BTV, ER, SSP. Quality assessment was performed by BTV, ER, SSP. BTV, ER, SSP drafted the first version of report, which was further edited by RB, BTV, ER, RV, UB and SSP. All the authors read, provided feedback and approved the final report.

Information about supplementary files

Supplementary file 1: PRISMA checklist (Microsoft word or doc.)

This file consists of information about the research based on PRSIMA checklist 2009.

Supplementary file 2: Search Strategy (Microsoft word or doc.)

This file gives information about the search strategy used for searching for primary studies included in the systematic review.

Supplementary file 3: Characteristics of included studies (Microsoft word or doc)

This file provides information about the population, intervention (name and type of health insurance), outcome and study designs used in the included primary studies.

Supplementary file 4: Detailed synthesis of the results (Microsoft word or doc)

This file provided detailed synthesis of the study findings.

Image 1: PRISMA FLOW DIAGRAM

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Table 1: Summary characteristics of included studies

Sl. No.	Study characteristic	Summary
1.	Geographical location	Out of the 25 included studies, 10 studies were conducted nationally,[14 16 18-22 24 28 3 twelve cities - Bhubaneshwar, Thiruvananthapuram, Ahmedabad, Chandigarh Lucknow, Hyderabad, Kolkata, Mumbai and Delhi.[38] Other studies were conducted i Studies covering northern region of India were conducted in Uttar Pradesh (UP),[23 Studies covering southern region of India were undertaken in Karnataka,[17 31 36 37 Kerala[33] and Tamil Nadu.[17] Remaining studies were carried out in eastern regio Chhattisgarh,[26 29] and western region *viz.* Maharashtra.[27 30 32]

2.	Population	Population among the included studies differed in characteristics. General population studies.[14-16 20 25-27 29 31] Around seven studies comprised of below poverty line (BPL) mixed population from rural and urban households were considered in three studies.[2 of patients selected from RSBY empaneled hospitals and key stakeholders.[34] One stu help group (SHG) members or head of the households.[23] One study comprised of soc excluded households focusing on Scheduled Castes (SC), Muslims and upper caste p comprised of a mix population of BPL and above poverty line (APL) households.[36 3 Central Government Health Scheme (CGHS) and Ex-servicemen Contributory Healt (ECHS) principal beneficiaries, empaneled private healthcare providers and officials Indian cities.[38]

3.	Type of Insurance	Central government funded health insurance (HI): About 14 studies were conducted funded HI schemes i.e., RSBY.[14 18 19 22-28 30 32 34 35] One study was conducted on PMJ conducted on CGHS.[16 24 38] Two studies were conducted on Employee State Insuranc State government funded HI: Three studies each were conducted on VAS in Karnata Shree (RAS) in Andhra Pradesh.[15 27 32] One study each reported on CHIS[33] (Philip, Kannan & Sharma, 2016) and ECHS.[38] Any government funded HI: Remaining other studies were generally all PFHI.[17 20-22
4.	Study design	Impact evaluation including quasi-randomized designs was used in eight studies.[15 16 study design was used in five studies.[23 25 31 33 38] Secondary data analysis was perform [20-22 24 26-28 35]. Mixed method approach was used in one study.[34]

5.	Outcomes	a. Financial risk protection: The impact of RSBY on financial protection was reporte [25 30 32 34]. The impact of different PFHI schemes (including state insurance schemes) were reported by thirteen studies.[15 17 20-22 24 26-29 31-33] b. Access and utilization of healthcare: The impact of PFHI on healthcare utilization out of these eight studies assessed the impact of RSBY on healthcare utilization.[14 16 was assessed by single study.[32] Five studies assessed the impact of CHIS on utiliza [33] One study evaluated the impact of PMJAY on healthcare utilization.[29] Hospitalizat studies with the implementation of RAS.[17 27] Two studies reported hospital utilizatio of VAS.[36 37] c. Willingness to pay: WTP and reduction of financial burden was reported in one stu
6.	Methodological quality	Out of 25 studies, three were of moderate quality[31-33], two weak methodological qual were of high quality.

Table 2: Impact of PFHI schemes on financial risk protection and healthcare utilization

	Financial Risk Protection		
I Scheme	**Outcome**		
	Out of Pocket health Expenditure (OOPE)	**Catastrophic Health Expenditure (CHE)**	**Impoverishment**

triya thya Bima na (RSBY)	a. **Inpatient OOPE:** RSBY influenced reduction in inpatient OOPE. The evidence is generated from three high methodological studies.[14 18 30] The per-capita inpatient expenditure for RSBY treated households, decreased in both rural and urban areas.[14] The impact of RSBY on inpatient expenditure was reduced for unmatched and matched samples, when RSBY was implemented for a minimum of two months duration. After removing Uttar Pradesh (UP) and Haryana from the analysis, the triple difference findings (i.e. with a second control of non-BPL households) showed a reduction in inpatient expenditure but the double difference analysis showed an increase in inpatient expenditure due to RSBY. However, none of these findings were statistically significant.[18] Both the studies included National Sample Survey Office (NSSO) data from Andhra Pradesh, Karnataka and Tamil Nadu, and used matching and DID methodology for analysis. Sabharwal et	Four studies[14 16 19 25] provided information on the effect of RSBY on CHE, the RSBY households were less likely to incur CHE for outpatient care, inpatient care and overall CHE. It was observed that beneficiaries of the scheme reported a reduction in CHE, however, one study[25] reported that there was no effect of RSBY on CHE. According to Azam,[14] the effect was same for both rural and urban households. RSBY increased the likelihood of CHE 25.[14] All these findings about the impact of RSBY on CHE were not significant. However, incidence of CHE was significantly reduced for RSBY households with childbirth in last one year of data collection.[25] Two studies[14 19] performed matching and analyzed using DID analysis, and other studies[16 25] performed matching and linear and logistic regression.	The effect of RSBY or impoverishment was n clear. One study[16] repo that RSBY had no effe on impoverishment du OOP on inpatient care on the total overall probability of impoverishment. However, in another study[25] among RSBY enrolled APL househo the incidence of health expenditure induced poverty was significan increased i.e., APL households were push BPL because of health expenditure. Both the studies performed matching and used regression analysis, lir and logistic regression

	al.,[30] used PSM impact analysis to report that average annual household expenditure on inpatient care was significantly less for RSBY beneficiary households when compared with non-beneficiary households. This study also reported that average annual household expenditure spent on inpatient was higher for RSBY beneficiaries who used the smart card for inpatient expenses than the RSBY beneficiaries who did not use the RSBY smart card. However, a low methodological study[32] reported a significant increase in inpatient expenditure for both public and private healthcare, in the state of Maharashtra. This difference was calculated using DID method for the year 2004 and 2012 (after implementation of RSBY in the state). The scheme did not have a significant effect on the OOPE expenditure for inpatient visits.[16 19] A good methodological study[16] applied the coarsened exact matching and linear and logit regression to report the impact of RSBY on OOPE for inpatient visits, among insured	The cost of medicines was significantly reduced by 22 INR for RSBY households in the rural areas, however it increased for the urban households by 28 INR, but this result was not significant.[14]	

households. No statistically significant difference was reported between RSBY insured and uninsured households. Another good methodological study,[19] applied Propensity Score Matching (PSM) and DID approach, to find the impact of RSBY on inpatient OOPE in total household expenditure, by dividing treatment districts into Treatment 1 (TT1) i.e., March 2010 and Treatment 2 (TT2) group i.e., April 2010-March 2012. No impact of RSBY on the inpatient OOPE as share of total household expenditure was observed. The probability of incurring zero OOPE inpatient expenditure was not significantly different for RSBY and non-RSBY families. RSBY increased the probability of incurring inpatient OOPE by 22% (TT1) and 28% (TT2) respectively. However, these findings were not significant.[19]

b. Outpatient OOPE

Five studies[14 16 18 19 30] provided inconclusive information on the effect of RSBY on outpatient OOPE. RSBY had a negative

impact on the outpatient expenditure.[14 18] According to Azam,[14] implementation of RSBY reduced the per capita outpatient expenditure for both rural and urban areas. The outpatient expenditure reduced for RSBY households for the overall matched sample and for the matched sample minus UP and Haryana.[18] There was no statistically significant difference between RSBY insured and uninsured households in terms of OOPE on outpatient visits.[16 30] RSBY increased the probability of incurring outpatient OOPE for households participating in RSBY before March 2010, by 23%; however, there was no significant effect on the scheme on outpatient OOPE for the RSBY households between April 2010 and March 2012.[19]

c. Total OOPE spending

Four studies provided information on total OOPE spending after RSBY implementation.[14 16 19 23] RSBY resulted in reduction of total OOPE of the households. The findings of these

	studies were mostly not significant. Two studies used matching and DID for analysis and two used matching and regression.		

r PFHI mes	The PFHI households were less likely to entail OOPE and there was a significant reduction in OOP for these households.[20 21 26] All the studies used regression analysis, both bivariate and multivariate, linear and logit model for analysis. However, using Tobit regression it was found that there was no effect of PFHI schemes on OOPE of the households.[24] For VAS, the OOPE was less for the insured households, when compared to un-insured households, however the two stage least squares (2sls) regression model reported no association between VAS enrolment and size of OOPE.[17] According to Barnes et al.,[31] reduction in OOPE increased with increase in quantiles of spending. At the 75th quantile, the reduction in OOPE for VAS households was INR 4485 and at 95th quantile it was INR 23548.19, both these findings were statistically significant and were calculated using conditional quantile regression. For the effect of RAS (Andhra Pradesh) there was no association between RAS	Six studies[15 17 21 22 28 31] reported the effect of PFHI schemes on CHE. The PFHIs led to reduction in CHE, however the effect was very small.[21 28] For PSM matched Households, the PFHI enrolled Households were 13 % less likely to experience CHE 10 and 6% less likely to experience CHE 25. For the lowest three quintiles, this effect was even less pronounced as only 0.4% of PFHI households and 1% of PFHI Households were likely to experience CHE10 and CHE 25.[21] There was a consistent increase in the catastrophic headcount threshold 40% of non-food expenditure for treatment, outpatient, inpatient and drugs.[22] This increase was even reported in a long-term sample i.e. households that have been enrolled in the PFHI schemes for a year. Two studies[22 28] used DID for	The PFHIs had a marg effect on the reduction impoverishment of households.[21 22] For th overall sample, the PF led to marginal reducti in overall impoverishm and OOP impoverishment,[22] for short term and long-te samples (more than a year). However, in the state fixed effect mode overall impoverishmer was reported that the PFHI schemes had no effect on impoverishm The state fixed effect model was used becau the assumption that presence of different s HI schemes alter the findings, and this was

	enrolment and size of OOPE, by using 2sls regression model.[17] By using DID, among phase 1 (2007), for Arogyashree enrolled households in Andhra Pradesh, significant reduction in per capital monthly OOP inpatient expenditure and inpatient drug expenditure were observed;[15] and an increase in inpatient expenditure for RAS households.[27] For RAS, in AP, Katyal et al.,[32] reported a significant increase in both public and private inpatient expenditure, when calculated for the year 2004 and 2012 via DID analysis. Enrolment in CHIS of Tamil Nadu was not significantly associated with size of OOPE.[17] For the CHIS operational in Kerala, the mean OOP expenses for inpatient services among insured participants (INR 448.95) was significantly higher than that of the uninsured households (INR 159.93), using Mann-Whitney U test.[33] There was one study[29] that reported findings on the effect of PMJAY on OOPE and CHE. It was	analysis, whereas another used logistic regression[21] for analysis. The VAS scheme had a limited effect on CHE; there was no association between enrolment in VAS and CHE 25, CHE 40 and CHE10, using two-step IV Probit model.[17] In another study[31] it was found that percentage of VAS households borrowing money for health reasons in the past one year was lower than non-VAS households. This was a statistically significant finding. According to Barnes et al.,[31] there was a marginal reduction in % of CHE (both as % of non-food expenditure and total expenditure) for VAS Households than non-VAS households. The statistical significance of this finding was mixed as it consists of both non-significant and significant results, however, reduction for 40% and 80% of CHE of the total non-food expenditure was significant	analyzed using regress analysis.[22] There was no significant differen seen among Arogyashree enrolled households in Andhra Pradesh, compared to south India and all Ind sample on impoverish and impoverishment d OOPE.[15]

	reported that enrolment in PMJAY did not decrease the OOPE or CHE. According to this study, more reduction in OOPE for PMJAY enrolled households than other PFHI enrolled households, but this finding was not significant. Reduction in log of OOPE was marginally more for PMJAY enrolled households than other PFHIs, this was a significant finding. OLS model was used for calculation of the abovementioned continuous outcome variable. As per the Probit model, there was a significant increase in CHE25 and CHE40 of PMJAY enrolled Households. But this does not hold true for PSM model, according to this model reduction in OOPE for PMJAY and other PFHI was significant and CHE10 was not associated with PMJAY and PFHI enrolment according to any of the models. The naïve OLS model showed no association between the size of OOPE and enrolment under PMJAY or any of the PFHI schemes, these findings did not change under	and reduction in 40% of CHE of the total expenditure was also a significant finding. Additionally, money spent by VAS Households on CHE was lesser than non-VAS Households. This was statistically significant. For RAS in Andhra Pradesh, there was no association between RAS enrolment and CHE25, CHE40, CHE10, by using two-step IV Probit model.[17] There was no clear effect of Arogyashree enrolment on CHE.[15] Enrolment in CHIS of Tamil Nadu was not significantly associated with CHE25, CHE40 and CHE10.[17]	

	propensity score matching and Instrumental Variable (IV) models		

Utilization of healthcare

I scheme	Outcome
trīya thya Bima na (RSBY)	Around eight studies[14 16 23 26 27 30 32 35] looked at the impact of RSBY on healthcare utilization. The outcomes assesse by these studies include reporting of illness, hospitalization rate, outpatient care and inpatient care utilization and utilization of hospital services. The impact of RSBY on hospitalization was assessed by six studies;[14 23 26 27 32 35] all studies showed increase in the hospitalization, of which three studies showed significant increase in hospitalization among female heads, scheduled tribes and for poorest.[27] For women seeking treatment in obstetri department.[26] The studies[16 30] suggested increase in both, inpatient and outpatient services. However, the results were significant for inpatient care for one of the studies.[16] A study[14] assessed the impact of HI reporting morbidity and seeking treatment for illness in both rural and urban areas. The ATT analysis suggested increase in reporting of morbidity, seeking treatment for short term and long-term illnesses and long-term morbidit rural India compared to urban India. The increased value ranges from 0.7% to 3.2%. In urban India, the increase in reporting illness by RSBY holders varied from 2.3%-2.4%, which was not statistically significant.[14]

r PFHI
mes

Two studies[36 37] exclusively assessed hospital utilization rate with respect to implementation VAS. The results suggested significant increase in utilization of healthcare for all tertiary care facilities. The quasi-randomized study suggested significant increase in healthcare utilization with respect to accessing healthcare for any symptoms with adjusted difference of 4.96%. The increase in rate of hospitalization in primary and tertiary care varied from 4.3% t 12.3%, showing the significant change in healthcare utilization after the implementation of VAS. The quasi-randon study[37] found significant increase in treatment seeking behavior for symptoms associated with cardiac conditions th for non-cardiac symptoms. Eligible households for VAS were 4.4% more likely to seek treatment than non-eligible households.

The RAS was assessed by Katyal et al.[32]

The DID analysis suggested increase in healthcare utilization in Andhra Pradesh and study by[27] suggested increase in hospitalization.

The five studies,[20 21 24 26 33] assessed the impact of CHIS and other PFHIs and suggests increase in inpatient and outpatient services. The matched cross-sectional study[33] suggests significant increase in overall utilization of inpati services and non-significant results with respect to outpatient services among CHIS insured compared to uninsured multivariate analysis[24] showed increased hospitalization, increase in hospitalization for chronic conditions, increase hospitalization among all age groups for PFHI households. It was also observed, via Tobit regression model, being enrolled in PFHI was not significantly associated with length of stay during hospitalization, however, people with chronic illness reported significantly increased length of stay in the hospitals. Though the association of HI with healthcare utilization was high, inequality in accessing healthcare was higher among the higher economic people.

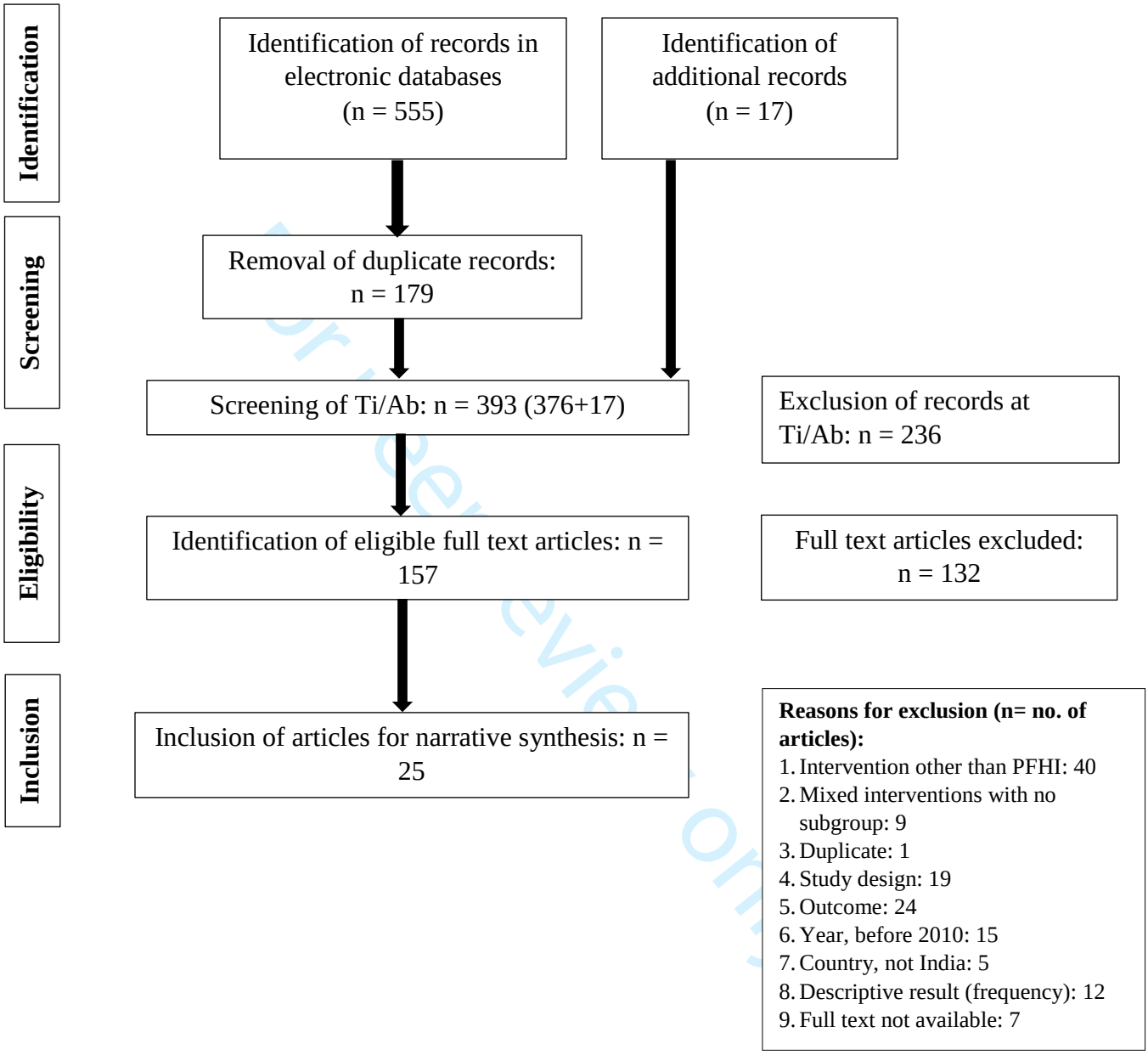
The naive profit model analysis by a study[17] which assessed VAS, RAS and CHIS suggested significant increase in hospitalization in Karnataka after the implementation of VAS.

The only study[29] that evaluated PMJAY; the data analysis from NSS data based on PSM and naive models on the hospitalization did not show any significant difference in hospital care utilization among both enrolled and non-enr population for insurance.

Willingness-to-pay (WTP)

II scheme	Outcomes
S and S	There was one study[38] that reported WTP for the insurance scheme. A majority (71 per cent) of CGHS beneficiarie considered that their current contribution was low, and they were willing to contribute more. Only 28 per cent ECH beneficiaries were willing to pay an additional monthly financial contribution for better quality healthcare under th schemes. The CGHS beneficiaries from low employment grade were more willing to pay an additional amount to t existing monthly financial contribution than the higher employment grade.

Figure 1: PRISMA flow diagram



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1-2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	6
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	6
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	-
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	7
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	7-8
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	7-8
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	8
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	8
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	8-9
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	9
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	10
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	10

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	-
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	-
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	10
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	31-37
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	36-37
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	37-53
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	-
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	-
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	-
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	13-16
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	16
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	17
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	19

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: **www.prisma-statement.org**.

Supplementary file 1: Search Strategy

(("Health Insurance"[Title/Abstract] OR "Community health insurance"[Title/Abstract] OR "Social health insurance"[Title/Abstract] OR "Group health insurance"[Title/Abstract] OR "Karunya health scheme"[Title/Abstract] OR Yeshasvini[Title/Abstract] OR "Ayushman Bharat" [Title/Abstract] OR "Universal health insurance scheme"[Title/Abstract] OR "Rashtriya swasthya bima yojana"[Title/Abstract] OR "Medical Insurance"[Title/Abstract] OR "Public health insurance" [Title/Abstract] OR "Universal health care"[Title/Abstract] OR PMJAY[Title/Abstract] OR MSBY[Title/Abstract] OR RSBY[Title/Abstract] OR Aarogyasri[Title/Abstract] OR "Vajpayee Arogyashree"[Title/Abstract] OR “Kalaignar State Health Insurance Scheme”[Title/Abstract] OR ESIS[Title/Abstract] OR Mediclaim[Title/Abstract] OR CGHS[Title/Abstract] OR BKKY[Title/Abstract]) AND ("Health care utilisation"[Title/Abstract] OR "Healthcare utilization"[Title/Abstract] OR "Healthcare utilisation"[Title/Abstract] OR "Health status"[Title/Abstract] OR "Better Health"[Title/Abstract] OR "Willingness to pay"[Title/Abstract] OR WTP[Title/Abstract] OR "Readiness to pay"[Title/Abstract] OR "Financial protection"[Title/Abstract] OR "Medical service utilization"[Title/Abstract] OR enrolment[Title/Abstract] OR impact[Title/Abstract])) AND (India OR "South Asia" OR LMIC OR Indian OR "Indian states") 124 filter humans

Supplementary file 3: Characteristics of included studies

Study ID	Objective	Location	Population (n, Age, Gender, Contextual factors)	Name and type of insurance and year	Intervention/Exposure Details of insurance Incentives/benefits Time duration of insurance, Comparator	Outcomes	Study design
Azam, 2017	To evaluate the impact of Rastriya Swasthya Bima Yojana (RSBY)-on-RSBY beneficiary	National	Data from 2011-12: n= 29755 HHs (21489 rural and 8257 urban) from 260 RSBY districts in India.	RSBY Scheme	-Intervention group consists of HHs that were enrolled in RSBY and had an RSBY smart card. The beneficiary HHs were entitled to a hospital coverage of Indian National Rupees (INR) 30000 per annum	Average treatment impact on treated (ATT), utilization of health services, per capita out-of-pocket expenditure (OOPE), and per patient OOPE on major morbidities	Impact evaluation (secondary data) from two waves of India Human Development survey conducted in 2011-12 and 2004–05 and Human

	households (HHs)		Three states viz. Andhra Pradesh, Karnataka and Tamil Nadu were not included		-Control group were the HHs in the same district but not enrolled in RSBY or not having the RSBY cards		Development Profile of India conducted in 1993-94
Barnes et al., 2017	To estimate the impact of social health insurance (HI) on financial risk by utilizing data from a	Sample villages from Shimoga, Da vengere and Chitradurga d istricts of Southern Karnataka.	272 villages from the northern part of Karnataka and 300 villages from the southern	Vajpayee Arogya Shree (VAS)	Intervention: Households that had access to the VAS schemes Control: HHs south of the eligibility border that did not have access to the VAS scheme	Catastrophic health expenditure (CHE) and OOPE	Cross-sectional household survey

	natural experiment created by the phased roll-out of a social HI program for the poor in India	Villages from Uttar Kannada, Haveri and Bellari districts of northern part of Karnataka were included	part of Karnataka Total sample was 6964 HHs with BPL cards				
Dror and Vellakkal, 2012	To find if RSBY is India's flagship platform for the	National	Adults and children	RSBY	RSBY scheme	1. Coverage, enrolment and cost for providing RSBY to the beneficiaries 2. Access to hospitalizations/	Secondary data analysis from RSBY data available on website, 2011

	introduction of Universal Hospital Insurance.					health care for the poor people	
Fan, Karan and Mahal, 2012	To assess the impact of Arogyashree on household OOPE	Andhra Pradesh, India	Households in all the districts of the state	Arogyashree scheme	Intervention group: people living in the districts under Phase 1 (2007-2008) and Phase 2 (only 2008) of the NSSO survey Control group: People living in the districts that are not covered by with Phase 1 or Phase 2 of the NSSO survey	1.Per capita OOPE 2. CHE 3. Impoverishment	Impact evaluation-Analysis of NSSO and consumer health expenditure data

					Treatment groups (Andhra Pradesh) Phase 1: Activities started in April 2007 and renewal in April 2008. Phase I districts were Ananthapur, Mahabubnagar, and Srikakulam. n: 2004-05=1702 and 2007-08 =448 Phase 2: Activities started in December 2007 and renewed in December 2008. Phase II districts were East Godavari, West Godavari,		

					Nalgonda, Rangareddy, and Chittoor n: 2004-05 = 2057 and 2007-08= 863 **Control Group (Andhra Pradesh)** that were not covered by Phases 1 and 2. 2004-2005 (n)= 5269 2007-2008 (n)= 2172 **Control Groups (All India)** n= 2004-05: 116,136 and 2007-08: 46,814		
Garg, Bebarta &	To find out the effect of enrolment	Chhattisgarh, India	NSS survey in 2004 and 2014 and	Pradha Mantri Jan Arogya	Beneficiaries of PMJAY scheme	Enrolment, utilization of hospital-care in	Impact evaluation from NSSO data and

Tripathi, 2020	under Prime Minister Jan Arogya Yojana (PMJAY) in improving utilization of hospital services and financial protection in Chhattisgarh		primary household survey in 2019 (for comparison) NSS in 2004: 6375 individuals NSS in 2014= 7651 individuals Primary survey in 2019= 15361 individuals covered	Yojana (PMJAY) Mukhyamantri Swasthya Bima Yojana (MSBY) for non-poor in Chhattisgarh		OOPE and incidence of CHE	primary survey in 2019

Garg, Chowdhury & Sundararaman, 2019	To evaluate the PFHI in three states (Andhra Pradesh, Karnataka and Tamil Nadu) in improving utilization of hospital services and financial protection against expenses of	Andhra Pradesh, Karnataka and Tamil Nadu	Below Poverty Line (BPL) HHs	PFHI	Enrolment PFHI schemes	-CHE and OOPE -Hospitalization rate	Secondary data analysis of the two rounds of NSSO cross-sectional survey, 60th round: 2004 and 71st round: 2014.

	hospitalization.						
Ghosh & Gupta, 2017	To assess the impact of the scheme on access to healthcare and financial protection by utilizing the latest NSSO data on morbidity and healthcare	National States that did not have any PFHI schemes other than RSBY Andhra Pradesh, Tamil Nadu, Maharashtra, Goa, Karnataka, Andaman and	18 states, covering 35,748 HHs. Out of these 4112 HHs i.e., 11.5% were treated and 31636 HHs i.e., 88.5% of HHs were control.	RSBY	Enrolment in RSBY scheme	1) Utilization of health care 2) Financial risk protection	An impact evaluation from NSSO data

		Nicobar Islands, Daman and Diu Dadar and Nagar Haveli were excluded. Arunachal Pradesh, Puducherry, Delhi and Jammu Kashmir were not selected					

Johnson & Krishnaswamy, 2012	To estimate the impact of RSBY on hospitalization and OOP health spending using data from the NSSO from 2004-05 and 2009-10	All India except Andhra Pradesh, Karnataka and Tamil Nadu	n= 297 control and 204 treatment districts with a total of 186,065 HHs.	RSBY	Out of the total 186,065 HHs, 102,810 were from the Pre-intervention round and 83,255 from the post round Out of the 83,255 HHs in the post round observations, 25,548 HHs were surveyed two months after RSBY was introduced (this was fixed as the minimum duration to be considered as treated) and hence treated. Out of these, 12,995 were predicted to be	1. Impact of RSBY (in INR per capita per month) -OP expenditure -IP expenditure -Total medical expenditure - IP drug + tests - IP fees -IP hosp. fees. - Was hospitalized - Has OP visit - IP > Rs. 5000 (INR) - IP > Rs. 10,000 (INR)	Secondary data analysis of NSSO data Used NSSO round 61 (conducted in 2004-05) and round 66 (conducted in 2009-10), as the pre and post surveys for measuring the potential impact of RSBY.

					a BPL card holder and hence in effect the treated sub-sample RSBY in reducing OOP	-Ratio IP/ HHD Exp > 10% -Ratio IP/ HHD Exp > 20% - Ratio IP/ HHD Exp > 40% Small decrease in out-of-pocket household outpatient expenditure and subsequently total medical expenditure	

Karan, Yip, Mahal, 2017	To assess, at the national level, the impact of RSBY on financial risk protection of HHs using data from 3 waves of cross-sectional HH surveys of the NSSO and district level enrolment	National	The study used data from three waves of HH CES: 1999 to 2000 (T1 pre-intervention), 2004-05 (T2: pre-intervention) and 2011-12 (post-intervention), conducted by the NSSO.	RSBY implementation began in 2008-09.	**Treatment group**: Poor HHs in RSBY implementing districts. Further divided into districts, which began participating in RSBY on or before March 2010 and between April 2010 & March 2012. **Control**: Poor in non-RSBY districts. Poor: belonging to the two poorest expenditure quintiles as a proxy for BPL HHs	OOPE: in terms of inpatient, outpatient & total OOP. Each of these three further includes Probability of any OOP, OOP Level (INR), OOP Share and probability of catastrophic Outcome measured for the time periods 2000, 2005 and 2012	Impact evaluation using repeated measures cross sectional surveys- Analysis of NSSO data

	information from RSBY records		Sample sizes in each of the three rounds was between 100,000 and 125,000 households.				
Katyal et al., 2015	To assess changes in accessibility, affordability and perceptions of efficiency of private health care IP	Andhra Pradesh and Maharashtra	Used two rounds of NSSO data: 2004 and 2012. Total HHs surveyed (urban): Andhra	RSBY in Maharashtra and Rajiv Arogya Shree (RAS) in Andhra Pradesh.	Intervention 1: RAS in Andhra Pradesh Intervention 2: RSBY in Maharashtra	-Access to IP care [Hospitalization rate: no. of people hospitalized during the previous year per 1000 population] -Expenditure on hospitalization	A retrospective, longitudinal, controlled quasi-experimental Study (Two large surveys)

	treatment across the states of Maharashtra and Andhra Pradesh from 2004–05 to 2012.		Pradesh = 2004: 1824, 2012: 3715; Maharashtra= 2004: 2664, 2012: 5038. Total HHs surveyed (rural): Andhra Pradesh = 2004: 3235, 2012: 4908; Maharashtra= 2004: 2650, 2012: 5035			[average OOPE for IP care per individual within 1 year of the survey] - Expenditure on high-cost treatments [average OOPE for IP care within 1 year of the survey for both public and private hospitals per episode of cardiac & nephrology treatments, which were used as	

						proxies for high-cost treatments.] -Efficiency: duration of hospital stay in days	
Khetrapal and Acharya, 2019	To examine the scheme design and the incentive structure under RSBY and its implications for delivering health services	Patiala and Yamunan agar districts in the states of Punjab and Haryana	**Quantitative:** Total sample participants n=751 selected from RSBY empaneled hospitals	RSBY Introduced in 2008 by the Ministry of Labour and Employment, Government of India; to provide HI coverage	Enrolment in health insurance via RSBY scheme	A) Gaps in the scheme categorized by: 1. Allocation of roles and responsibilities 2. Enrolment of beneficiaries 3. Empanelment of facilities	Mixed method study Quantitative (Exit interviews) Qualitative (in depth interviews of stakeholders) Secondary data analysis

	to the intended beneficiaries.		-RSBY participants=387 -Non RSBY participants=364 **Qualitative**: 20 Key stakeholders' interviews of RSBY i.e., policy makers, representatives from insurance	to people living BPL.		4. Monitoring and supervision, 5. Package rates. B) OOPE of RSBY and non-RSBY participants	

			companies, state representatives, public and private providers				
Mahapatro, Singh and Singh, 2018	To understand the impact of HI schemes on tackling the economic burden of OOPE and its effectiveness in reducing economic	National	NSSO 2014 data	Government HI schemes	Enrolment in PFHI scheme	Healthcare utilization and OOPE	NSSO data, 71st round in 2014, secondary data analysis

	inequalities in healthcare spending						
Nandi, Schneider & Dixit, 2017	To examine enrolment, utilization (public and private) and OOPE for the insured and uninsured, in Chhattisgarh	Chhattisgarh, India	Included 1205 HHs and 6026 individuals (HH members), HHs as the second-stage units.	Government Health insurance schemes	Enrolment in RSBY scheme	-Determinants of enrolment -Healthcare utilization -OOPE -Increased hospitalization rate	Secondary analysis of 25th Schedule of the71st round of the cross-sectional Indian NSSO data between January and June 2014.
Philip, Kannan & Sharma, 2016	1. To compare the sociodemograp	Trivandrum district of Kerala	n= 149 insured and 147 uninsured BPL HHs	CHIS	Enrolment in CHIS	1. Coverage of CHIS 2. Healthcare utilization,	Cross-sectional survey in 2011

	hic & health utilization pattern (OP and IP services) of BPL HHs insured in comprehensive health insurance scheme (CHIS). 2. To find the correlates of insurance status and IP		with 667 and 578 members, respectively. Age: 33.0 ± 18.2 years; HH size was 4.2 ± 1.8 members			3. OOPE associated with IP service 4. Factors: Socio-demographics, understanding regarding insurance, type of insurance aware of, information on RSBY	

	service utilization. 3. To examine the OOPE for IP services						
Ranjan et al., 2018	To discuss a) the coverage & effectiveness of both governments purchasing through insurance and government provision of tax-funded	National	A total of 65,932 HHs (rural: 36480, urban: 29452) were surveyed for the entire Indian Union, which included a total of 333,104	PFHI	PFHI schemes	1. OOPE, CHE 2. Choice of provider. 3. HI coverage, type. 3. Equity in PFHI coverage 4. Impoverishment effect of OOPE on hospitalization	Unit records of the "Social Consumption: Health" survey (71st round) conducted by the NSSO in January to June 2014

	free or subsidized care as strategies of financial protection; b) the contribution that PFHI makes to the reduction in CHE due to hospitalization ; and c) the equity dimensions of		individuals (rural: 189573, urban: 143531; male: 168697 females: 164407).			5. Factors: Socio-economic 6. Increased hospitalization rates	

	both financial protection strategies.						
Rao et al., 2014	To compare the effects of health innovations over time on access to and OOPE on IP care in Andhra Pradesh & Maharashtra and to assess whether the Andhra	Andhra Pradesh and Maharashtra	Survey of 18 696 HHs across 2 states and 1871	i. RAS Health Insurance Scheme of Andhra Pradesh ii. RSBY in Maharashtra	Enrolment in RAS or RSBY Effect of i. RAS HI Scheme of Andhra Pradesh launched in 2007 to provide treatment for serious and life threatening illnesses. Families with BPL card are automatically enrolled. Enrollees make no contribution, the annual benefit is a maximum of (INR 200	1. Average IP expenditure per HH per year, 2. Large OOP IP expenditure, 3. Large borrowing 4. Hospitalization rate 5. Factors: Setting, socio-economic	Secondary data analysis: Repeated measures survey (Pre-post) using difference-in-difference (DID). Baseline: NSSO 60th decennial round HH survey undertaken in 2004. Follow up survey: in 2012

	Pradesh initiatives had larger or smaller beneficial effects than those found in Maharashtra.				000) per family per year and there is no limit on the size of the family. ii. RSBY in Maharashtra launched in 2008 (enrolment began in 2009) and provides access to free IP hospital care up to (INR 30 000) per family per year. HHs pay contribution of INR 30 for registration and annual renewal. Up to five family members are covered.		

Ravi & Bergkvist, 2014	To analyze the impact of PFHI viz. RSBY and different state-sponsored health insurance schemes	National	Districts where the PFHI schemes were implemented For RSBY impact: The districts were divided into two samples (1) where the scheme was implemented before July 2010 (end of	Different PFHI schemes including RSBY and state level schemes	Different PFHI schemes	Financial protection 1) Overall impoverishment -hospitalization -OOPE -Outpatient -Drugs 2) CHE-40% 3) Poverty gap index	Secondary data Analysis of a cross-sectional survey (NSSO)

			NSSO survey) and (2) where the scheme was implemented before July 2009 (beginning of NSSO survey)				
Raza, van de Poel, Panda, 2016	1. To analyze HH level determinants of RSBY enrolment using HH level	Kanpur Dehat & Pratapgarh districts in Uttar Pradesh and Vaishali in Bihar	Self-help group (SHG) members or head of the HHs. Baseline survey: March	RSBY	Enrolment in RSBY	1. Determinants of enrolment in health insurance 2. Determinants of re-enrolment in HI	Secondary data analysis of the data collected in 2012-2013 as a part of an evaluation of CBHI schemes

	panel data collected in 2012 & 2013 2. To investigate the determinants of dropping out of the scheme. 3. To investigate whether RSBY membership is associated with increased use of hospital		and May 2010 (3,686 HHs) and follow-up survey: March and April in 2012 (3,318 HHs) and 2013 (3307 HHs).			3. Hospital care and financial protection	

	care and financial protection.						
Sabharwal et al., 2014	To analyze the effects of RSBY on socially excluded HHs (focusing on Scheduled Castes (SC), Muslims and upper caste poor) in two states in India: Uttar Pradesh	Uttar Pradesh and Maharashtra	Sample size was 1500,750 from each state	RSBY	**Target group**: SC, Muslim and upper caste poor HHs who were beneficiaries of RSBY (whether they have used the smart card or not) **Control group**: SC, Muslim and upper caste poor HHs who were eligible for RSBY but not enrolled.	OOPE	Quasi experimental mixed methods study, April to July 2012

	and Maharashtra						
Selvaraj, Karan, 2012	To capture the impact, if any, of the PFHI programmes o n financial risk protection in India.	National	NSSO data of 2003-04 as pre-intervention and 2009-10 as post intervention. HHs in 2004-05 were 1,24,644 (79,298 rural and 45,346 urban)	RSBY and state health insurance schemes	RSBY and other state insurances implemented in gradually from 2007 to 2009. **RSBY**: 247 districts; **State insurance**: 74 districts (Andhra Pradesh n=23, Karnataka n=22 and Tamil Nadu n=29); and **control**: 291 districts	-OOP spending (IP, OP, total OOP and drug expenditure), its trends and patters. -Change in OOP expenditure due to HI -Trends in catastrophic payments Recall period: non institutional	Pre (2003-04)-post (2009-10) study and Case-control approach based on secondary data analysis of NSSO data

			and 1,00,855 HHs (59,119 rural and 41,736 urban) during 2009-10.			medical expenses: 30 day. Institutional health spending: 365 days recall. Total OOP: summation of IP and OP expenses. Catastrophic headcount: No. of HHs making OOPE greater than 10% of total HH expenditure	

Sinha, 2018	To assess whether RSBY had improved care- seeking and reduced incidences of CHE and health expenditure-induced poverty among the insured population. To explore whether the	Jharkhand	A matched controlled cross-sectional study was conducted in two purposively selected administrative blocks, namely Silli and Bundu of Ranchi district in Jharkhand	RSBY	Enrolment in RSBY Total 1643 HHs 873 RSBY, 770 Non-RSBY	Healthcare utilization and CHE	A matched controlled cross-sectional study

	benefits were equitable.		between April to June 2014				
Sood & Wagner, 2016	To evaluate the effects of a government insurance programme covering tertiary care for the poor in Karnataka, India—VAS—on treatment seeking and postoperative outcomes.	Karnataka, India	572 villages in Karnataka, India	A government insurance program: VAS	31 476 HHs (22796 BPL and 8680 above poverty line (APL) in 300 villages where the scheme was implemented and 28 633 HHs (21767 BPL and 6866 APL) in 272 neighboring matched villages ineligible for the scheme.	1) Treatment seeking behavior 2) Post-operative wellbeing 3) Post-operative infections and re-admissions	A quasi- experimental design February 2010 to August 2012.

Sood et al., 2014	To evaluate the effects of a government insurance program covering tertiary care for people BPL in Karnataka, India, on OOPE, hospital use, and mortality.	Karnataka, India	572 villages in Karnataka, India	A government insurance program: VAS	31 476 HHs (22 796 BPL and 8680 APL) in 300 villages where the scheme was implemented and 28 633 HHs (21 767 BPL and 6866 APL) in 272 neighboring matched villages ineligible for the scheme.	OOPE, hospital use, and mortality.	Quasi- randomized trial February 2010 to August 2012.

Sriram & Khan, 2020	To estimate the effect of public HI programs for the poor on hospitalizations and OOP IP care costs.	National	NSS 71st round data was used n= 64270 poor individuals. -9.55% were enrolled in any PFHI - 41.3% of the poor were illiterate - 80.6% belonged to Hindu;	PFHI such as RSBY, ESIS, CGHS, and other state insurances	Treatment=enrolled HHs Control=non-enrolled HHs	Incidence of hospitalizations, length of hospitalization, and OOP payments for IP care	Cross sectional study (NSSO data 2014)

			-85.1% were from the disadvantaged classes; -64.2% belonged to medium sized HHs (5 to 8 members) -2.5% suffering from chronic diseases				

			- mean age of the poor population was 25.3 years.				
Vellakkal, Juyal and Mehdi, 2012	To assess the overall satisfaction of beneficiaries with the schemes based on self - reported patient satisfaction, willingness to	Twelve cities=Bhubaneshwar, Thiruvananthapuram, Ahmedabad, Chandigarh, Meerut, Patna, Jabalpur, Lucknow,	n= 1,204 principal beneficiaries of CGHS and 640 of ECHS, 100 empaneled private healthcare providers and 100 CGHS-ECHS	CGHS and Ex-service men Contributory Health Scheme (ECHS)	Enrolment in RSBY	1.Self-reported patient satisfaction - Accessibility -Environment -Behavior of doctors -Behavior of other staff 2. WTP for better quality healthcare	Cross-sectional survey

	pay (WTP) for better healthcare services and measuring the comprehensiveness of the schemes in terms of its ability to reduce the financial burden of healthcare expenditure on beneficiaries	Hyderabad, Kolkata, Mumbai and Delhi	officials consisting of city and dispensary level heads of CGHS and ECHS across the 12 cities			3.Ability of the scheme to reduce financial burden of healthcare expenditure 4. Factors affecting level of satisfaction, and WTP	

APL: Above Poverty Line; ATT: Average Treatment impact of Treatment on Treated; BPL: Below Poverty Line; CHE: Catastrophic Health Expenditure; CHIS: Comprehensive Health Insurance Scheme; CGHS: Central Government Health Scheme; DID: Difference-in-difference; ESIS: Employee State Insurance Scheme; HHs: Households; HI: Health Insurance; INR: Indian National Rupees; IP: Inpatient; NA: Not Applicable; NSSO: National Sample Survey Office; OOP: Out-of-Pocket; OOPE: Out-of-Pocket expenditure; OP: Out Patient; PFHI: Public Funded Health Insurance; PMJAY: Prime Minister Jan Arogya Yojana; RSBY: Rasthriya Swasthy Bima Yojana; RAS: Rajiv Arogya Shree; SHG: Self-Help Group; SPEC: Social, Political, Economic and Cultural; SC: Scheduled Caste; ST: Schedule Tribe; VAS: Vajpayee Arogya Shree; WTP: Willingness to Pay

Supplementary file 4: Detailed synthesis of findings

Table 1: Impact of government funded health insurance on access and utilization of healthcare, financial risk protection and willingness to pay

Study author & year	Study design and analysis	Data source and methods	Details of health insurances	Results
Access and utilization of healthcare				
Azam, 2017	Three large- scaled household (HH) surveys: Matching difference-in-difference analysis (MDID) of longitudinal data	Two waves of India Human Development Survey (2011-12) and (2004-2005) and Human Development Profile of India (HDPI) collected in 1993-94. Data from three states I.e. Andhra Pradesh, Karnataka and Tamil Nadu was not considered.	PFHI covered: RSBY The households having RSBY cards were considered as treatment groups and household not having RSBY cards were control groups in an RSBY implemented district	**Rural India** A) RSBY HHs were 3.2% points ($p<0.05$; SE=0.014) more likely to report any morbidity. The ATT estimates for percentage change for pre RSBY averages on RSBY household for this variable was reported as 4.84. B) The difference in reporting of morbidity was more defined for long term illnesses as RSBY HHs were 5% points more likely to report any long- term morbidity ($p<0.01$; SE=0.015). ATT as % change of RSBY HHs was 17.70.

				C) RSBY HHs were 3.1% points (p<0.05; SE=0.015) more likely to seek treatment for illnesses. ATT as % change of RSBY HHs was 4.93. D) RSBY HHs were 5.0% points (p<0.05; SE=0.0013) more likely to seek treatment for long term illness than for short term morbidity I.e. 2.3% points (p>0.05; SE=0.013) E) RSBY HHs were 0.7% points (p>0.05; SE 0.007) more likely to report hospitalization in case of long-term morbidity. **Urban India:** **A)** RSBY HHs were 2.4% points (p>0.05; SE=0.026) more likely to report an illness. ATT as % change for RSBY HHs was 0.033. B) RSBY HHs were 2.3% points (p>0.05; SE=0.0028) more likely to report a long-term illness. ATT as % change for RSBY HHs was 7.86.

				C) RSBY HHs were 2.3% points (p>0.05; SE=0.026) more likely to report any treatment. ATT as % change for RSBY HHs was 3.93. D) RSBY HHs were 1.5% points (p.0.05; SE= 5.13) more likely to report treatment for long-term morbidity. ATT as %change for RSBY HHs was 5.13) E) RSBY HHs were 1.6% points (p>0.05; SE=0.014) more likely to report hospitalization for a long-term morbidity. ATT as % change for RSBY HHs was 35.80)
Dror & Vellakkal, 2012	Analysis of the cross sectional RSBY 2011 data	Main data sources were RSBY website and the planning commission of India official documents	PFHI covered: RSBY RSBY health insurance Comparison with the 2004 utilization indicators	Hospitalization rate for the lowest income group in the country was 1.24 percent in 2004 (according to the NSSO survey), this was juxtaposed with the utilization rate of 2.09 % for RSBY beneficiaries in 2011. On comparison it was a growth rate of 69% was observed, which suggests beneficial results of the RSBY scheme**.**

Garg, Chowdhury & Sundararaman, 2019	Secondary data analysis of the two rounds of NSS cross- sectional survey	The 60th round of NSSO (2004) and 71st round of NSSO (2014) in three states of Andhra Pradesh, Karnataka and Tamil Nadu. Instrument Variable (IV) method was used in the multivariate analysis. Two-step least square (2sls) for OOPE and Two-step IV Probit model for utilization and CHE	PFHI covered: The three Public Funded Health Insurance (PFHI) Schemes operational in Andhra Pradesh (Rajiv Arogya Shree or the NTR Vaidya Seva); Karnataka (Vajpayee Arogya Shree); Tamil Nadu (Tamil Nadu Chief Minister's Comprehensive Health Insurance Scheme) The pre PFHI in 2004 and post PFHI (2014) comparisons were made	**A) Proportion of people being hospitalized increased from 2004 to 2014, among both enrolled and non-enrolled members, in all the three states:** **Proportion (%) of individuals who utilized hospital care:** **Andhra Pradesh** 2004: All the people 2.29 (95% CI=2.09–2.49) 2014: All the people 5.58 (95% CI=5.14–6.01); non-insured individuals 5.86 (95%CI=5.18–6.53); PFHI enrolled individuals 5.41 (95%CI=4.84–5.99) **Karnataka** 2004: All the people 2.23 (95%CI=2.01–2.46) 2014: All the people 4.93 (95%CI=4.58–5.28); non-insured individuals 4.88 (95%CI=4.53–5.24); PFHI enrolled individuals 5.76 (95%CI=4.08–7.43) **Tamil Nadu** 2004: All the people 3.58 (95%CI=3.33–3.83)

				2014: All the people 5.68 (95% CI=5.32–6.04); non-insured individuals 5.55 (95% CI=5.16–5.94); PFHI enrolled individuals 6.27 (95%CI=5.38–7.17) **B) Proportion (%) of hospitalization episodes in private hospitals** **Andhra Pradesh** 2004**:** PFHI enrolled (NA); not enrolled 70 (95% CI=68-72) 2014: PFHI enrolled 71 (95%CI=68–73); not enrolled 80 (95%CI=77–82) **Karnataka** 2004**:** PFHI enrolled (NA); not enrolled 65 (95%CI=62–67) 2014: PFHI enrolled 70 (95%CI=63–76); not enrolled 68 (95%CI=66–70) **Tamil Nadu** 2004: PFHI enrolled (NA); not enrolled 61 (95% CI=59–63)

				2014: PFHI enrolled 67 (95%CI=63–70); not enrolled 61 (95% CI=59–62) **C) Association of PFHI enrolment and increase in hospitalization (utilization) using** **IV Probit regression** **Andhra Pradesh**: coef. -0.085 (SE= 0.526; 95%CI= -1.116 to 0.947) **Karnataka**: coef. 1.378 (SE= 1.336; 95%CI= -1.242 to 3.997) **Tamil Nadu**: coef. -0.130(SE= 1.398; 95%CI= -2.871 to 2.611) Enrolment under PFHI was not associated with increase in utilization in any of the three states **D) Association between PFHI enrolment and hospitalization or utilization using** **naive Probit model** **Andhra Pradesh**= −0.025 (p>0.05) **Karnataka**: 0.191 (p<0.001)

				Tamil Nadu: −0.022 (p>0.05) Significant association between PFHI enrolment and hospitalizations seen only in Karnataka
Garg 2020	Impact evaluation using NSS survey 2004 when there was no PFHI, and 2014 data (for older PFHI scheme) and primary household survey in 2019 (for data related to the effect of first year of implementing PMJAY) in the state of Chhattisgarh, India	NSS survey data Multivariate analysis to see the effect of PMJAY on utilization CHE and OOPE OLS model for continuous outcome available and Probit model for binary outcome variable. Compared with ATT under Propensity Score Matching or PSM Multivariate analysis was repeated for OOPE and CHE using IV approach. For OOPE 2sls was applied	PFHI covered: PMJAY scheme introduced in the year 2018. The study also mentions other PFHI schemes like MSBY and RSBY operational in Chhattisgarh	The utilization of hospital care did not increase with enrolment under PMJAY or other PFHI schemes in Chhattisgarh. **Proportion (%) of individuals in Chhattisgarh who utilized hospital care** In 2019, PFHI-enrolled= 6.0 (95% CI 5.6–6.5) and PFHI not enrolled 5.7 (95% CI 5.1–6.4) In 2014, PFHI-enrolled 3.3 (95% CI 2.6–4.0) and PFHI not enrolled 2.9 (95%CI 2.3–3.4)

		as IV model, and for CHE two step IV Probit was applied		
Ghosh & Gupta, 2017	Impact evaluation: Coarsened exact matching and, linear and logit regression.	National Sample Survey data: 18 states, which do not have additional state funded insurance (round not reported). States having specific PFHIs, union territories not exposed to RSBY and states not having functional RSBY in the year 2014-15 were excluded	PFHI covered: RSBY Treated group: Household having at least one person enrolled in RSBY. Control: households with no RSBY	1) The effect of the RSBY on **number of outpatient (OP) care** was statistically insignificant i.e. sample average treatment effect for the treated (SATT)= -0.012 (p= 0.852). 2) Impact of RSBY on **number of inpatient (IP) care** utilization was significant i.e., SATT= 0.109 (p= 0.023). This was approximated as 59% increase when compared to mean inpatient utilization by the uninsured families I.e. (0.186) 3) No significant impact of RSBY on l**ength of stay at hospitals** (in days) i.e., SATT=0.071 (p=0.952)

Katyal et al., 2015	A retrospective, longitudinal, controlled quasi-experimental Study (Two large surveys): Difference-in-differences	Pre-post intervention effect: Pre-intervention NSSO 2004 survey and post intervention NSSO 2012 survey.	PFHI covered: RAS and RSBY No. Of HHs: **Intervention 1**: RAS of AP in 2004: 0559 and 2012: 8623. **Intervention 2**: RSBY of MH in 2004: 5314 & in 2012: 10073	**1) Access to IP care** (DID mean (95% CI), p) RAS of AP compared to RSBY of MH**:** **In Private hospitals:** a) **Overall**: [Mean DID: 0.076 (-0.012:0.14) p=0.02] AP as compared to MH. Utilization of private hospitals has increased in AP [0.065 (0.018:0.11)] and decreased in MH [-0.011(-0.032:0.053)] b) **Place of residence**: Urban: The likelihood of admission to a private hospital was significant for hospitalizations among urban households [0.21 (0.095:0.31) p=0.0002] in AP as compared to MH. Rural: DID=-0.0019 (-0.080:0.076) p=0.96 AP compared to MH. **In Public hospitals**:

				a) The overall utilization of public facilities has reduced in both the states and more so in AP [-0.075 (-0.14:0.0125), p= 0.019] b) **Place of residence**: Urban: There was an increase in utilization of public facilities in MH [0.067 (-0.062:0.12)] and a reduction in AP [-0.14 (-0.23:-0.047)] for urban HHs and the DID of AP to that of MH is [-0.2 (-0.31:-0.095) p=0.0002]. Rural: DID: 0.0019 (-0.076:0.08) p=0.96] AP compared to MH. **2) Duration (days) of hospital stay:** **In Private hospitals:** DID analysis: an average reduction of 3.2 (-5.4, -1.2) days in AP compared to MH Place of residence: rural HHs [-3.7 (-6.3 :-1) p=0.007]and urban: -1.8 (-4.4:0.8) p=0.17 **In Public hospitals:**

				Overall: DID: -2 (-5.1:1.1) p=0.2 AP compared to MH Rural: average of reduction of 4.2 days [(-9:0.6) p=0.09] in AP compared to MH. Urban: 0.7 (-1.8:3.2) p=0.59 in AP compared to MH.
Mahapatro, Singh & Singh, 2018	Analysis of the 71st round of cross- sectional household NSS 2014 survey Bivariate and multivariate analysis was done	-71 st round National Sample Survey, 2014, 'Social Consumption: Health' Schedule 25.0 -To examine the impact of health insurance on OOP payment, two-part model was used (part 1 logit and part 2 linear)	PFHI covered: Any PFHI scheme Information of hospitalization during 365 days was used for the analysis. For association comparisons were made between insured and uninsured	**1) Inpatient rate by type of health insurance** Government health insurance: lowest economic class: 4% and High economic class 9% Other health insurance: lowest economic class: 4.4% and High economic class 6.4% No health insurance: lowest economic class: 3.8% and High economic class 6.2%

Nandi, Schneider & Dixit, 2017	Secondary data, multi variate logistic regression	NSSO, the Chhattisgarh State data used in this study were extracted from the 25th schedule of the 71st round of the cross-sectional Indian National Sample Survey, conducted between January and June 2014 The Chhattisgarh sample included 1205 house- holds and 6026 individuals (household members)	PFHI covered: Government funded health insurance schemes in Chhattisgarh viz. RSBY, MSBY, ESIS, CGHS	**Hospitalization**: AOR (95%CI), N= 5977 -A person with insurance was significantly more likely to be hospitalized compared to a person with no insurance (AOR 1.388; 95% CI: 1.190–1.620). -Women (AOR1.80;95%CI:1.252.58), Scheduled Tribes and the poorest(Q1) were significantly more likely to be hospitalized in the public sector than men, other social groups and other UMPCE groups respectively. -Taking infection as the reference group, conditions like cancer (AOR0.11;95%CI:0.01–0.94) and respiratory conditions (AOR0.30;95%CI:0.09–0.97) were significantly less likely causes of admission in the public sector,

				obstetric and childbirth-related conditions were significantly more likely in the public sector (AOR1.63;95%CI:1.03–2.57). -Enrolment in government insurance was associated with hospitalization in the public sector at 90% Confidence Levels (AOR1.32;90%CI:1.01–1.72)
Philip, Kannan, Sarma, 2017	A comparative cross-sectional survey The demographic and socioeconomic characteristics and health care utilization of insured and uninsured households were compared using Pearson's $\chi 2$ test. Multivariate logistic regression analysis was	Using generalized estimating equations, the correlates of inpatient service utilization of individuals were estimated. The models were built by the method of iterative backward elimination and forward selection because the study did not use any conceptual framework, and it aimed at exploration. The	PFHI covered: CHIS of Kerala A total of 149 insured and 147 uninsured households, with 667 and 578 members, respectively, were included in the study conducted in Trivandrum district of Kerala.	-Overall Outpatient service utilization: 29.1% and -Overall Inpatient service utilization: 38.5%. -The utilization of outpatient services among insured (31.5%) and uninsured (26.5%) households; $P = 0.342$, statistically not significant at 95% CI. -The inpatient service utilization (insured, 44.3%; uninsured, 32.7%) with a P value of .04, statistically significant difference at 95% CI. -Inpatient service utilization among insured participants compared to noninsured (OR = 1.57; 95% CI = 1.05-2.34)

	used to derive the predictors of insurance status.	Mann-Whitney *U* test was used to compare the expenditure associated with inpatient care between the 2 groups		-Insurance status was found to be a significant correlate for inpatient service utilization after adjusting for age, sex, and chronic diseases -Generalized estimating equations for inpatient services (95% CI) o Age (0-5 reference category): o 6-15 y: OR 4.0 (0.5-30.4), p=0.176 o 16-45 y: OR: 2.0 (1.0-4.2), p=0.060 o >45 y: OR: 1.9 (1.3-3.0), p=.002 o Gender (Male/female): OR 1.5 (0.9-2.4) p=0.084 o Preexisting chronic disease: OR (0.5 0.3-0.7), p= <.001
Ranjan et. al., 2018	Analysis of a cross-sectional survey	-Data from the 71st round of NSSO survey I.e. 'Social Consumption: Health' survey	PFHI covered: Public Funded Health Insurance (PFHI) schemes e.g. RSBY	**1) Percentage of total hospitalization cases according to insurance coverage** A) Rural With government insurance

		-Propensity score matching (PSM) for the effectiveness of PFHIs and multiple logistic regression for association		All=49.8%; Poorest= 79.0%; Poor= 62.7%; Middle= 56.8%; Rich= 40.2%; Richest= 34.3% Without government insurance All= 50.8%; Poorest= 67.7%; Poor= 61.7%; Middle= 52.6 %; Rich= 47.4%; Richest= 29.1% B) Urban With government insurance All= 40.4%; Poorest= 57.6%; Poor= 47.8%; Middle= 38.6%; Rich= 35.5%; Richest= 24.4% Without government insurance All= 36.1%; Poorest= 51.6%; Poor= 42.0%; Middle= 33.6%; Rich= 23.3%; Richest= 16.2% **2) Hospitalization rate per 100 population** For government insurance= 5.4%; No insurance=4.2% **3) Factors effecting likelihood of hospitalization**

				Insurance (irrespective of the type of insurance) OR= 1.06 (95% CI= 0.98 to 1.14)
Rao et al., 2014	A difference-in-differences (DID) using repeated cross-sectional surveys with parallel control.	NSSO 2004 survey, A total of 5314 and 5059 households from Maharashtra (MH) and And hra Pradesh (AP) were surveyed by the NSSO in 2004 and Survey in 2012 included 10073 (MH) and 8623 (AP) households.	PFHI covered: RSBY and Arogyashree Two cross-sectional surveys: as a baseline, the data from the NSSO 2004 survey collected before the Aarogyasri and RSBY schemes were launched; and as post-intervention, a survey using the same methodology conducted in 2012. A survey of 18 696 HHs across 2 states and 1871 locations	**Hospitalization rates** (inpatient care): (number of individuals hospitalized during the previous year, per 1000 population): DID mean (95% CI) for both the states, Adjusted for co-variates 0.7 (-8.6 to 10.2), p value: 0.8685. 1.Gender: Hospitalization rates increased for both genders but statistically significant for female headed HHs (DID mean=27.6, 95% CI 1.1 to 54.1, p=0.0415) 2.Social class: Schedule tribe: DID mean: −19.8 (95% CI: −37.3 to −2.3) p=0.0272, for other social groups (SC, other excluded groups and all groups) it was not significant 3.Quintile: Poorest: DID mean: −14.4 (95% CI: −28 to −0.31) p=0.0451, for other quintiles it was not significant.

Raza, van de Poel, Panda, 2016	Two cross sectional surveys among SHG members themselves or the head of the (households) HHs	Primary study: Baseline survey: March and May 2010 (3,686 HHs) and follow-up survey: March and April in 2012 (3,318 HHs) and 2013 (3307 HHs). Location: Kanpur Dehat and Pratapgarh districts in Uttar Pradesh and Vaishali in Bihar	PFHI covered: RSBY	**Probability of hospitalizations**: RSBY membership is not significantly associated with the likelihood of hospitalization [**Pooled:** 0.000 (SE:0.010) n=10,125, **UP:** -0.010 (0.013), n= 6359; **Bihar:** 0.015 (0.017), n=3766] or the likelihood of positive spending within a HH, the latter most likely related to high likelihood of having expenses at baseline. **Sensitivity analysis** by restricting the sample to households in the bottom two asset tertiles: Not significant for polled, UP and Bihar.
Sood and Wagner et al, 2016	Quasi experimental design Logistic regression	3478 households in 300 villages where VAS was implemented and 3486 households in 272 neighboring matched villages ineligible for VAS. Total 572 villages	PFHI covered: VAS A government insurance programme that provided free tertiary care to households below the poverty line in half of villages in Karnataka from February 2010 to August	1) Treatment-seeking behavior: Households eligible for VAS were 4.4 percentage points (95% CI 0.7 to 8.2; 6.76% increase; p=0.022) more likely to seek treatment for their symptoms For symptoms associated with cardiac conditions, the increase in treatment seeking was more pronounced and more statistically significant at 4.38 percentage points (95% CI 0.1 to 8.7; 7.04% increase;

			2012. VAS eligible villages and VAS non-eligible villages	p=0.046); non-cardiac symptoms at 3.92 percentage points (6.4%, p=0.085). A) Any symptoms/ Symptoms-cardiac conditions/Symptoms of non-cardiac condition - VAS eligible HHs, n=2250, 69.73% /62.32/ 58.2 - VAS non-eligible HHs n=2209, 65.31%/ 66.71/ 62.16 - Difference: 4.42 (0.7 to 8.2), P < 0.01)/ 4.37** (0.1 to 8.7) / 3.92* (−0.6 to 8.4) - Adjusted difference: 4.96 (1.0 to 8.9), P < 0.01)/ 5.41** (0.9 to 9.9)/ 3.87* (−0.6 to 8.4) 2) Post operation well-being: Respondents from VAS-eligible villages reported greater improvements in well-being after the hospitalization in all categories which were statistically significant in three of the six categories

				No controls (N=173)/ Controls for illness composition (N=173)/ Controls for illness composition/ demographic characteristics†(N=173) • Walking ability 0.765*** (0.248)0.700*** (0.261)0.605** (0.273) • Pain 0.778*** (0.228)0.660*** (0.244)0.559** (0.246) • Anxiety0.464* (0.242)0.451* (0.261)0.387 (0.272
Sood et al, 2014	Quasi experimental design Multi variate models were used for analysis	All households in sampled villages of Karnataka were asked to participate in a door-to-door survey, and 81% of them completed the survey.	PFHI covered= VAS 31 476 households (22 796 below poverty line and 8680 above poverty line) in 300 villages where the scheme was implemented and 28 633 households (21 767 below poverty line and 6866 above poverty line) in	**Utilization of healthcare** **1. Households using tertiary care facility for potentially covered conditions** A) All facilities Unadjusted= −4.3% (p=0.52) Adjusted= −5.4% (p=0.64) B) All tertiary care facilities Unadjusted= 12.3% (p=0.46) Adjusted= 19.9% (p=0.26)

			272 neighboring matched villages ineligible for the scheme. A government insurance program (Vajpayee Arogyashree scheme) that provided free tertiary care to households BPL in about half of villages in Karnataka from February 2010 to August 2012.	C) Excluding emergency department admissions and stays of 4 ≤days Unadjusted= 44.2% (p=0.06) Adjusted= 42.7% (p=0.08) **Households reporting forgone need for care for VAS condition** Reported forgone need Unadjusted= −35.5% (p=0.07) Adjusted=−33.4% (p=0.09)
Sriram & Khan, 2020	Survey among poor individuals: Propensity score matching, logistic regression and Tobit regression.	NSSO survey 2014. N=64270 poor individuals	PFHI covered: Any PFHI scheme PFHI (n= 5917) were matched with control group (n=5917).	**Effect of PFHI on hospitalization (Multivariate analysis):** People enrolled in PFHI program have 1.23 (1.06-1.44) higher odds of incidence of hospitalization compared to poor people without HI.

			Average Treatment on Treated (ATT) Propensity Score Testing of Two Groups: Treated=0.1407, Control= 0.1191, Difference= 0.0216, T statistic= 2.89, SE: 0.0074. Matched with age, individual consumption expenditure, HH size, location and education.	-Individuals with **chronic illnesses** have 3.55 (2.87–4.45) higher probability of hospitalization compared to individuals without any chronic conditions. -All the **age groups** show higher probability of hospitalization compared to the reference age group of less than 18 years. [19-40: 1.06 (0.82–1.36), 41 to 60 years 2.44 (1.89–3.15), 61 to 80 years 2.99 (2.14–4.17), Older than 80 years 4.85 (1.71–13.69)] -Individuals belonging to the medium i.e. 5-8 [0.77 (0.66–0.89)] and large I.e. more than 8 [0.47 (0.39–0.58)] **HHs size** had lower probability of incidence of hospitalization compared to individuals from small HHs. -Social group, religion, urban/rural location, household type, marital status, education, number of hospital beds in the state were not significant in explaining variability in the incidence of hospitalizations.

				- state of residence of the individual using fixed effects had no significant effects. **Effect of PFHI on the duration or length of hospitalization (Tobit model):** Being enrolled in PFHI had no significant effect [0.44 (−0.47 - 1.35)] on the duration of hospitalization. -People who had **chronic illnesses** [3.15 (1.96–4.33)] had significantly higher duration of hospitalization compared to people with no chronic illnesses. -Other covariates such as HH type, religion, age, urban/ rural location, HH size, marital status, education, and number of hospital beds had no significant effect on the duration of hospitalization - Rajasthan, Uttar Pradesh, and Gujarat were the only three state showing significant results in fixed effects for the state of residence

Sabharwal et.al, 2014	Quasi experimental mixed methods study design	Two districts were selected for this study: Moradabad district in Uttar Pradesh and Aurangabad district in Maharashtra. At the block level (district sub-division), sites were selected where blocks had proportions of SC and Muslim population equal to the district average, and villages were selected with mixed social group populations. Altogether, the study was conducted in 30 villages (14 villages in Moradabad and 16 villages in Aurangabad).	PFHI covered: RSBY 1.Target group: SC, Muslim and upper caste poor households who are beneficiaries of RSBY (whether they have used the smart card or not) 2.Control group: SC, Muslim and upper caste poor households who are eligible for RSBY but who are not enrolled.	**Health care utilization:** In-patient care: Non-beneficiary: Any member of the household ever hospitalized, 1.65 (n=78), Beneficiary but not used RSBY, 1.85 (n=134) and beneficiary but used RSBY, 1.80(n=203) Between group F value: 0.60, not significant Outpatient care: Non-beneficiary: Any member of the household never hospitalized, 2.71(n=361) Any member of the household ever hospitalized, 2.87(n=70), Beneficiary but not used RSBY, 2.67(n=772) and beneficiary but used RSBY, 2.45(n=249) Between group F value: 1.76, not significant

		The households were randomly selected from each village based on RSBY beneficiary lists and BPL lists. The households in each location were stratified into beneficiary ('treatment') households and non-beneficiary or ('control') households. We included a control group in order to allow measurement of impact, given that this survey does not have a baseline		
Financial risk protection				

Azam, 2017	Three large scaled household surveys Matching difference-in-difference analysis (MDID) of longitudinal data	Two waves of India Human Development Survey (2011-12) and (2004-2005) and Human Development Profile of India (HDPI) collected in 1993-94. Data from three states I.e. Andhra Pradesh, Karnataka and Tamil Nadu was not considered.	PFHI covered: RSBY The households having RSBY cards were considered as treatment groups and household not having RSBY cards were control groups in an RSBY implemented district	**OOPE** **Rural India:** **A)** RSBY HHs were 1.1% points (p>0.05; SE=0.013) more likely to report OOPE expenditure. ATT as % change for RSBY HHs was 1.56. B) Per capita in-patient expenditure (in INR) for RSBY HHs was –11.567 (SE=12.897). ATT as % change for RSBY HHs was –19.46. C) Per capita out-patient expenditure (in INR) for RSBY HHs was 11.257 (SE=11.200). ATT as % change for RSBY HHs was –11.89 D) Per capita total OOP in INR for RSBY HHs was -22.717 (SE=20.156). ATT as % change for RSBY HHs was -14.76. E) RSBY HHs were –0.5% points (p>0.05; SE=0.014) more likely to incur Catastrophic medical expenditure (10% of consumption exp)

				F) RSBY HHS were 1.1% points (p>0.05; SE=0.010) more likely to incur Catastrophic medical expenditure (25% of consumption exp.) G) RSBY HHs were 0.8% points (p>0.05; SE=0.008) more likely to take loan for meeting medical expenses. H) Per capita expenditure on long-term morbidity, for RSBY HHs, was –13.450 (p>0.05; SE=12.531) I) Per capita expenditure on medicines, for RSBY households was -21. 782 (p<0.05; SE=9.492) (This means reduction by 22 INR) **Urban India:** **A)** RSBY HHs were –3.7% points (p<0.1; SE=0.020) more likely to incur OOPE. ATT as % change for RSBY HHs was –5.56. B) For RSBY HHs, per capita inpatient expenditure in INR was - 3.786 (p>0.05; SE=38.906).

				C) For RSBY HHs, per capita outpatient expenditure in INR was -10.574 (p>0.05; SE=11.390) D) Per capita total OOP in INR was - 14.540 (p>0.05; SE=35.198) E) RSBY HHs were –3.3% points (p>0.05; SE= 0.022) more likely to incur catastrophic medical expenditure (10% of consumption exp.) F) RSBY HHs were –2.2% points (p>0.05; SE= 0.014) more likely to incur catastrophic medical expenditure (25% of consumption exp.) G) RSBY HHs were 3.0% points (p<0.05; SE=0.013) more likely to take loan for meeting medical expenses H) Per capita expenditure on long-term morbidity, for RSBY HHs, was 40.978 (p>0.05; SE=31.105) I) Per capita expenditure on medicines, for RSBY households was 28.763 (p>0.05; SE=31.492)

Barnes et al., 2017	Cross sectional household Survey (nature experiment) Models used for analysis: Empirical model Stylized utility model	Survey was carried out in total of 572 village 272 villages from the northern part of Karnataka and 300 villages from the southern part of Karnataka Total sample was 6964 HHs with BPL cards	PFHI covered: Vajpayee Arogya Shree Scheme Intervention group: northern district village that had access to VAS: 272 Villages Control group: Southern district villages that did not have an access to VAS: 300 Villages	**1) Money borrowed for health reasons in past one year** VAS households= 20.7% Non-VAS households= 24.2% Difference= -3.5% ($p<0.01$) **2) Catastrophic health care expenditures** Percentage of non-food expenditure limit A) Percentage reaching catastrophic limit: a. 40% of non- food expenditure limit VAS= 2.70% Non-VAS= 3.41 % Difference= -0.71% ($p<0.1$) b. 50% of non- food expenditure limit VAS= 2.22% Non-VAS= 2.6 1% Difference= −0.39% (non-significant) c.60% of non- food expenditure limit VAS= 1.68%

				Non-VAS= 2.08% Difference= −0.40% (not significant) d. 70% of non- food expenditure limit VAS= 1.34% Non-VAS= 1.80% Difference= −0.46 % (non-significant) e.80% of non- food expenditure limit VAS= 0.91% Non-VAS= 1.54% Difference= −0.6 3% (p<0.05) B) Mean amount over catastrophic limit (INR) a. 40% of non- food expenditure limit VAS= 36 ,822.19 Non-VAS= 56 ,700.92 Difference= −19,878.73 (p<0.05) b. 50% of non- food expenditure limit VAS= 36,862.71 Non-VAS= 66,307.45

				Difference= −29,444.75 (p<0.05) c.60% of non- food expenditure limit VAS= 40,356.36 Non-VAS= 75, 415.93 Difference= −35, 05 9.58 (p<0.05) d. 70% of non- food expenditure limit VAS= 43,215.88 Non-VAS= 80,362.84 Difference= −37,146.96 (p<0.05) e.80% of non- food expenditure limit VAS= 56,292.79 Non-VAS= 86,913.19 Difference= −30,620.40 (non-significant) Percentage of total expenditure limit A) Percentage reaching catastrophic limit: a. 10% of total expenditure limit VAS= 10.03% Non-VAS= 10.09%

				Difference= −0.05 % (non-significant) b. 20% of total expenditure limit VAS= 5 .92% Non-VAS= 6.38% Difference= −0.46 % (non-significant) c. 30% of total expenditure limit VAS= 3.89% Non-VAS= 4.49% Difference= −0.60% (non-significant) d. 40% of total expenditure limit VAS= 2.58% Non-VAS= 3.34% Difference= −0.76 % (p<0.1) e. 50% of total expenditure limit VAS= 2.09% Non-VAS= 2.55 % Difference= −0.45 % (non-significant) B) Mean amount over catastrophic limit (INR)

				a. 10% of total expenditure limit VAS= 21,313.18 Non-VAS= 31,983.49 Difference= −10,670.31 (p<0.01) b. 20% of total expenditure limit VAS= 26,232.83 Non-VAS= 40,554.01 Difference= −14,321.17 (p<0.05) c. 30% of total expenditure limit VAS= 30,760.43 Non-VAS= 48,536.53 Difference= −17,776.10 (p<0.05) d. 40% of total expenditure limit VAS= 37,489.47 Non-VAS= 56,974.87 Difference= −19,485.41 (p<0.05) e. 50% of total expenditure limit VAS= 37,6 90.21

				Non-VAS= 66,712.53 Difference= −29,022.32 (p<0.05) **3) Distributional effects of access to insurance on out-of-pocket spending** **Using conditional quantile regression and censored quantile regression** Conditional VAS Estimates Using Koenker & Basset Estimator 5th Quantile: VAS estimate= −529.99 (SE=215.56, p<0.05) 10th Quantile: VAS estimate= −711.76 (SE=243.99, p<0.01) 15th Quantile: VAS estimate= −876 .6 2 (SE=343.74, p<0.05) 25th Quantile: VAS estimate= −1,485.29 (SE=459.92, p<0.01) 40th Quantile: VAS estimate= −2,197.19 (SE=495.55, p<0.01)

				50th Quantile: VAS estimate= −2,878.92 (SE=706.33, p<0.01) 60th Quantile: VAS estimate= −2,589.79 (SE=1,242.94, p<0.05) 75th Quantile: VAS estimate= −4,484.71 (SE=1,340.32, p<0.01) 85th Quantile: VAS estimate= −6,408.61 (SE=3,600.68, p<0.1) 90th Quantile: VAS estimate= −4,941.37 (SE=5,196.11, p>0.1) 95th Quantile: VAS estimate= −23,548.1 (SE=8,199.09, p<0.01) Unconditional VAS Estimates Using Chernozhukov & Hong Estimator For unconditional distribution effect on OOPE was not seen for initial lower quantiles 85th Quantile: VAS estimate= 802.20 (SE=365.61, p<0.05)

				90th Quantile: VAS estimate= −1,026.96 (SE=705.06, p>0.1) 95th Quantile: VAS estimate= −3,906.08 (SE=1,748.25, p<0.05)
Fan, Karan and Mahal, 2012	Secondary data analysis Difference in difference (DID) method; regression	Data from Consumer Expenditure Surveys for 1999-2000, 2004-2005, 2007-2008 i.e., The 55th, 61st and 64th round of the NSSO surveys	PFHI covered: Arogyashree in AP **Treatment groups (Andhra Pradesh)** Phase 1: Activities started in April 2007 and renewal in April 2008. Phase I districts were Ananthapur, Mahabubnagar, and Srikakulam. n: 2004-05=1702 and 2007-08 =448	**The impact of Aarogyasri on per capita monthly OOP spending**: (Only statistically significant DID results are extracted here, **p<0.01, *p<0.05) **A. Andhra Pradesh sample** *1.Inpatient expenditure*: a. Region and state fixed effects: Phase 1: −12.177 (SE: 0.352)**, Phase 2: Not significant result b. With HH covariates in addition to region and state fixed effects Phase 1: −11.822 (SE: 0.425)**, Phase 2: Not significant result *2.Inpatient drug expenditure*

			Phase 2: Activities started in December 2007 and renewed in December 2008. Phase II districts were East Godavari, West Godavari, Nalgonda, Rangareddy, and Chittoor n: 2004-05 = 2057 and 2007-08= 863 **Control Group (Andhra Pradesh)** that were not covered by Phases 1 and 2. 2004-2005 (n)= 5269 2007-2008 (n)= 2172	a. Region and state fixed effects: Phase 1: −5.325 (SE: 1.017)**, Phase 2: Not significant result b. With HH covariates in addition to region and state fixed effect: Phase 1: −5.111 (SE: 0.926)**, Phase 2: Not significant result *1.Outpatient, outpatient drug and total expenditure* result was not significant for both, Phase 1 and 2 **B) South India sample** *1.Inpatient expenditure*: a. Region and state fixed effects: Phase 1: −14.350 (SE: 4.005)**, Phase 2: Not significant result b. With HH covariates in addition to region and state fixed effect:

			Control Groups (All India) n= 2004-05: 116,136 and 2007-08: 46,814	Phase 1: −13.430 (SE: 3.791)**, Phase 2: Not significant result *1.Inpatient drug expenditure* a. Region and state fixed effects:: Phase 1: −4.617 (SE: 1.143)**, Phase 2: Not significant result b. With HH covariates in addition to region and state fixed effect Phase 1: −4.310 (SE: 1.067)**, Phase 2: Not significant result *1.Outpatient drug expenditure* a. Region and state fixed effect: Phase 2: −7.120 (SE: 3.055)*, Phase 1: Not significant result b. With HH covariates in addition to region and state fixed effect: Phase 2: −7.211(SE: 3.201)*, Phase 1: Not significant result

				1.Outpatient and total expenditure: Result was not significant for both phases **C) All India sample** *1.Inpatient expenditure*: a. Region and state fixed effects: Phase 1: −11.304 (SE: 1.717)**, Phase 2: Not significant result b. With HH covariates in addition to region and state fixed effects Phase 1: −10.606 (SE: 1.787)**, Phase 2: Not significant result *1.Inpatient drug expenditure* a. Region and state fixed effects: Phase 1: −3.669 (SE: 0.664)**, Phase 2: Not significant result b. With HH covariates in addition to region and state fixed effects

				Phase 1: −3.517 (SE: 0.606)**, Phase 2: Not significant result *1.Outpatient drug expenditure* a. Region and state fixed effects: Phase 2: −6.417 (SE: 2.747)*, Phase 1: Not significant result b. With HH covariates in addition to region and state fixed effects Phase 2: −6.973 (SE: 2.837)*, Phase 1: Not significant result *1.Outpatient and total expenditure*: Result was not significant for both phases **Effect of Aarogyasri on impoverishment and CHE over 2004–2008** A. **Impoverishment:** Results of intervention, South India and All India locations for both Phases (1 &2) were statistically not significant, irrespective of using region and state fixed

				effects or using HH covariates in addition to region and state fixed effect models. B. **Impoverishment from OOPE:** Results of intervention, South India and All India locations for both Phases (1 &2) were statistically not significant, irrespective of using region and state fixed effects or using HH covariates in addition to region and state fixed effect models. A. **Total health expenditure ≥ 15% of total household expenditure:** Phase 2 using region and state fixed effect model, DID for all India sample was: −0.041 (SE: 0.020)*. Results of intervention and South India for both Phases (1 &2) were statistically not significant, irrespective of using region and state fixed effects or using HH covariates in addition to region and state fixed effect models. Result was not significant for phase 1 of All India locations using both models and

				for phase 2 using HH covariates in addition to region and state fixed effect model. B. **Total health expend. ≥25% of non-food household expenditure** Phase 2 using region and state fixed effect model, DID for all India sample was: −0.043 (SE: 0.020)*and using HH covariates in addition to region and state fixed effect model was −0.042 (SE: 0.020)*. Results of intervention and South India for both Phases (1 &2) were statistically not significant, irrespective of using region and state fixed effects or using HH covariates in addition to region and state fixed effect models. C. **Total health expend. ≥ 15% of total expend. and inpatient expend. ≥ 7.5%** a. **Andhra Pradesh sample** Phase 1: region and state fixed effect model: −0.025 (SE: 0.010)* and using HH covariates in addition to

				region and state fixed effect models −0.025 (SE: 0.010)*. For Phase 2 it was not significant. b. **South India sample** Phase 1: region and state fixed effect model: −0.029 (SE: 0.013)* and using HH covariates in addition to region and state fixed effect models −0.027 (SE: 0.018)*. For Phase 2 it was not significant. c. **All India sample** Phase 1: region and state fixed effect model: −0.030 (SE: 0.012)* and using HH covariates in addition to region and state fixed effect models −0.029 (SE: 0.011)*. Phase 2: region and state fixed effect model: −0.014 (SE: 0.005)* and using HH covariates in addition to region and state fixed effect models −0.014 (SE: 0.000)*. **Effect of Aarogyasri on prevalence of any health expenditure in household over 2004–2008**

				A. **Any health expenditure** a. **Andhra Pradesh sample** Phase 1: region and state fixed effect model: −0.180 (SE: 0.021)** and using HH covariates in addition to region and state fixed effect models −0.164 (SE: 0.020)*. For Phase 2 it was not significant. b. **South India sample** Phase 1: region and state fixed effect model: −0.163 (SE: 0.068)* and using HH covariates in addition to region and state fixed effect models −0.150 (SE: 0.066)*. For Phase 2 it was not significant. c. **All India sample** Phase 1: region and state fixed effect model: −0.176 (SE: 0.060)* and using HH covariates in addition to region and state fixed effect models −0.167 (SE: 0.057)*. For Phase 2 it was not significant.

				B. **Any inpatient expenditure** a. **Andhra Pradesh sample** For both Phases and using both model the result was not significant. b. **South India sample** Phase 1: region and state fixed effect model: −0.061 (SE: 0.022)* and using HH covariates in addition to region and state fixed effect models −0.059 (SE: 0.023)*. For Phase 2 it was not significant. c. **All India sample** Phase 1: region and state fixed effect model: −0.065 (SE: 0.020)* and using HH covariates in addition to region and state fixed effect models −0.063 (SE: 0.020)*. For Phase 2 it was not significant. C. **Any outpatient expenditure** a. **Andhra Pradesh sample**

				Phase 1: region and state fixed effect model: −0.132 (SE: 0.017)** and using HH covariates in addition to region and state fixed effect models −0.116 (SE: 0.013)*. For Phase 2 it was not significant. b. **South India sample** Phase 1: region and state fixed effect model: −0.138 (SE: 0.063)* and using HH covariates in addition to region and state fixed effect models −0.125 (SE: 0.061)*. For Phase 2 it was not significant. c. **All India sample** Phase 1: region and state fixed effect model: −0.149 (SE: 0.059)* and using HH covariates in addition to region and state fixed effect models −0.140 (SE: 0.056)*. For Phase 2 it was not significant. D. **Any inpatient drug expenditure** a. **Andhra Pradesh and South India sample**

				The result for both phases and using both models, was not statistically significant b. **All India sample** Phase 1: region and state fixed effect model: −0.048 (SE: 0.021)* and using HH covariates in addition to region and state fixed effect models −0.046 (SE: 0.021)*. For Phase 2 it was not significant. E. **Any outpatient drug expenditure** **a. Andhra Pradesh sample** Phase 1: region and state fixed effect model: −0.100 (SE: 0.029)** and using HH covariates in addition to region and state fixed effect models −0.084 (SE: 0.026)*. For Phase 2 it was not significant. **b. South India sample** Result for both phases and both models was not significant. c. **All India sample**

				Phase 1: region and state fixed effect model: −0.125 (SE: 0.056)* and using HH covariates in addition to region and state fixed effect models −0.116 (SE: 0.053)*. For Phase 2 it was not significant.
Ghosh & Gupta, 2017	Impact evaluation: Coarsened exact matching and, linear and logit regression	National Sample Survey data: 18 states, which do not have additional state funded insurance (round not reported). States having specific PFHIs, union territories not exposed to RSBY and states not having functional RSBY in the year 2014-15 were excluded	PFHI covered: RSBY **Treated group**: Household having at least one person enrolled in RSBY. **Control**: no RSBY	**1) OOPs on all OP visits:** no statistically significant difference between RSBY insured & uninsured households in terms of OOP expenditure on OP visits i.e. SATT=-1014.12 (p=0.097) 2) Incidence of **catastrophic expenditure for OP care**: OR= 0.64 (p=0.23) 3) **OOPs on all IP visits**: no statistically significant difference between RSBY insured & uninsured households in terms of OOP expenditure on inpatient visits I.e. SATT=-6122.37 (p=0.063) 4) the probability of **incurring zero OOP expenditure on IP care** is not statistically different

				between the RSBY-insured and uninsured families i.e. OR= 1.75 (p=0.127) 5) Incidence of **catastrophic expenditure for IP care:** OR= 0.86 (p=0.5). 6) **Impoverishment due to OOP on IP car**e: SATT= 0.83 (p=0.663) 7) **Total OOP spendin**g: SATT= -550.47 (p=0.067) 8) Incidence of catastrophic expenditure: OR= 0.76 (p=0.130) 9) **Impoverishment**: SATT= 0.96 (p=0.896)
Garg, 2020	Impact evaluation using NSS survey 2004 when there was no PFHI, and 2014 data (for older PFHI scheme) and primary household survey in 2019 (for data related to the effect of	NSS survey data Multivariate analysis to see the effect of PMJAY on CHE and OOPE OLS model for continuous outcome available	PFHI covered: PMJAY scheme introduced in the year 2018. The study also mentions other PFHI schemes like MSBY and RSBY operational in Chhattisgarh	**1) OOPE and financial protection** A) Mean OOPE for Hospitalization Episodes (in INR) Public= 3078 (95% CI1928–4228) Private= 19,375 (95% CI11305–27,447) B) Median OOPE for Hospitalization Episodes (in INR) Public= 530 (95% CI 379–758) Private= 7299 (95% CI 3788–9032)

	first year of implementing PMJAY) in the state of Chhattisgarh, India	and Probit model for binary outcome variable. Compared with ATT under Propensity Score Matching or PSM Multivariate analysis was repeated for OOPE and CHE using IV approach. For OOPE 2sls was applied as IV model, and for CHE two step IV Probit was applied		C) Proportion of incurred CHE25 for Hospitalization Episode (%) Public= 7.6 (95% CI 4.5–11.0) Private= 43.6 (95% CI 36.3–51.4) **2) Effect of enrolment in PMJAY and other PFHI on OOPE and CHE** A) OLS model (for continuous outcome variable) OOPE (PMJAY)= coeff − 4287 (p=0.09) OOPE (PFHI)= coeff. −87 (p=0.97) Log of OOPE (PMJAY)= coeff. −0.45 (p< 0.01) Log of OOPE (PFHI)= coeff. −0.34 (p < 0.01) B) Probit Model (for binary outcome variable) CHE 10 (PMJAY)= coeff. 0.08 (p=0.35) CHE10 (PFHI)= coeff. −0.07 (p=0.29) CHE25 (PMJAY) =coeff. 0.22 (p= 0.01) CHE25 (PFHI)= coeff. 0.04 (p= 0.56) CHE40 (PMJAY)= coeff. 0.26 (p=0.01) CHE40 (PFHI)= coeff. 0.05 (p=0.55)

				C) PSM model (ATT) OOPE (PMJAY)= coeff. − 4614 (p=0.20) OOPE (PFHI)= coeff. − 1066 (p=0.73) Log of OOPE (PMJAY)= coeff. −0.37 (p< 0.01) Log of OOPE (PFHI)= coeff. − 0.50 (p< 0.01) CHE10 (PMJAY)= coeff. 0.02 (p=0.52) CHE10 (PFHI)= coeff. 0.003 (p=0.90) CHE25 (PMJAY)= coeff. 0.05 (p=0.08) CHE25 (PFHI)= coeff. 0.02 (p=0.33) CHE40 (PMJAY)= coeff. 0.04 (p=0.14) CHE40 (PFHI)= coeff. 0.01 (p=0.36) D) IV model OOPE (PMJAY)= coeff. 48,734 (p=0.59) OOPE (PFHI)= coeff. 17,315 (p=0.72) Log of OOPE (PMJAY)= coeff. −0.48 (p=0.86) Log of OOPE (PFHI)= coeff. 1.01 (p=0.53) CHE10 (PMJAY)= coeff. −4.39 (p=0.28) CHE10 (PFHI)= coeff. −2.23 (p=0.23)

				CHE25 (PMJAY)= coeff. −2.03 (p=0.54) CHE25 (PFHI)= coeff. −1.28 (p=0.48) CHE40 (PMJAY)= coeff. −0.67 (p=0.85) CHE40 (PFHI)= coeff. −0.68 (p=0.74)
Garg, Chowdhury & Sundararaman, 2019	Secondary data analysis of the two rounds of NSS cross- sectional survey	The 60th round of NSSO (2004) and 71st round of NSSO (2014) in three states of Andhra Pradesh, Karnataka and Tamil Nadu. Instrument Variable (IV) method was used in the multivariate analysis Two-step least square (2sls) for OOPE and Two-step IV Probit model for Utilization and CHE	PFHI covered: The three Public Funded Health Insurance (PFHI) Schemes operational in Andhra Pradesh (Rajiv Arogyashree or the NTR Vaidya Seva); Karnataka (Vajpayee Arogya Shree); Tamil Nadu (Tamil Nadu Chief Minister's Comprehensive Health Insurance Scheme)	A) **Mean OOPE for hospitalization episodes (in INR)** **Andhra Pradesh** 2004: Public Hospital 5042 (95% CI=4110–5976); Private hospital 19,657 (95% CI=17302–22,013) 2014: PFHI enrolled: Public hospital 2864 (95%CI=1725–4004); Private hospital 15,827 (95%CI=14570–17,084) Non enrolled: Public hospital 2355 (95% CI=1714–2998); Private hospital 17,934 (15676–20,194) **Karnataka:** 2004: Public hospital 4511 (95% CI=3794–5229); Private hospital 18,085 (95%CI=16111–20,058)

			The pre PFHI in 2004 and post PFHI (2014) comparisons were made	2014: PFHI enrolled: Public hospital 2888 (95%CI=1551–4226); Private hospital 16,121 (95%CI=12482–19,760) Non enrolled: Public hospital 3556 (95%CI=3030–4082); Private hospital 17,873 (95%CI=16489–19,258) **Tamil Nadu** 2004: Public hospital 3291 (95% CI=1873–4710); private hospital 24,637 (95% CI=20752–28,522) 2014: PFHI enrolled: Public hospital 802 (95%CI=611–993); Private hospital 23,966 (95%CI=21060–26,872) Non enrolled: Public hospital 954 (95%CI=788–1120); private hospital 26,425 (95%CI=24140–28,711) **B) Median OOPE for hospitalization episode (in INR)**

				Andhra Pradesh 2004: Public Hospital 1660 (95%CI=1461–1853); Private hospital 9900 (95%CI=9020–10,719) 2014: PFHI enrolled: Public Hospital 600 (95%CI=500–850); Private hospital 10,493 (95%CI=9894–11,303) Non enrolled: Public hospital 925 (95%CI=600–1140); Private hospital 12,130 (95%CI=10990–13,500) **Karnataka** 2004: Public hospital 2027 (95%CI=1667–2437; private hospital 8800 (95%CI=7700–9612) 2014 PFHI enrolled: Public hospital 1140 (95%CI=817–1914); private hospital 8800 (95%CI=7239–10,835) Non-enrolled: Public Hospital 1975 (95%CI=1700–2250; private hospital 10,625 (95%CI=10000–11,400)

				Tamil Nadu 2004: Public Hospital 535 (95%CI=466–629); private hospital 10,718 (95%CI=9602–11,271) 2014 PFHI enrolled: Public hospital 370 (95%CI=300–500); private hospital 15,450 (95%CI=13900–17,584) Non-enrolled: Public hospital 350 (95%CI=300–400); private hospital 15,095 (95%CI=14000–15,771) **C) Proportion of individuals incurred CHE25 (Catastrophic Health expenditure 25% of annual household consumption expenditure) for Hospitalization Episode (%)** **Andhra Pradesh** 2004: Public 6.4 (95%CI=4.6–8.2); private 24.7 (95%CI=22.6–26.8) 2014: For PFHI enrolled: Public 2.7 (95% CI=1.1–4.4); Private 17.7 (95%CI=15.3–20.1)

				Non enrolled: Public 1.7 (95% CI=0–3.5); private 17.1 (95% CI=14.5–19.8) **Karnataka** 2004: public 5.1 (95%CI=3.2–7.0); private 23.9 (95% CI=21.2–26.6) 2014 For PFHI enrolled: Public 2.2 (95%CI=0–5.8); private 20.0 (95%CI=13.1–26.9) Non enrolled: Public 3.1 (95%CI=1.9–4.4); 22.6 (95%CI=20.6–24.5) **Tamil Nadu** 2004: Public 2.4 (95% CI=1.5–3.4); private 27.4 (95% CI=25.2–29.7) 2014 For PFHI enrolled: Public 0 (95%CI=0–0); private 27.2 (95%CI=23.1–31.4) Non-enrolled: Public 0.3 (95%CI=0–0.6); private 29.3 (95%CI=27.2–31.5)

				D) Proportion of individuals incurred CHE40 for hospitalization episode (%) **Andhra Pradesh** 2004: Public 3 (95%CI=1.7–4.2; private 13.7 (95%CI=12.0–15.4) 2014 For PFHI enrolled: Public 0.2 (95%CI=0–0.7); private 9.4 (95%CI=7.6–11.3) Non-enrolled: Public 0 (95%CI=0–0); private 8.7 (95%CI=6.7–10.7) **Karnataka** 2004: Public 2.6 (95%CI=1.2–4.0); private 12.5 (95%CI=10.3–14.6) 2014: For PFHI enrolled: Public 0.8 (95%CI=0–3); private 11.3 (95%CI=5.8–16.8) Non-enrolled: Public 1.7 (95%CI=0.8–2.6); private 11.8 (95%CI=10.3–13.3)

				Tamil Nadu 2004: Public 1.5 (95%CI=0.7–2.2); private 17 (95%CI=15.1–18.9) 2014 For PFHI enrolled: Public 0 (95%CI=0–0); private 14.7 (95%CI=11.4–18.0) Non-enrolled: Public 0 (95%CI=0–0); 14.4 (95% CI=12.7–16.0) **E) Proportion of individuals incurred CHE10 for hospitalization episode (%)** **Andhra Pradesh** 2004: Public 17.9 (95%CI=15.1-20.7); private 53.6 (95%CI=51.2 – 56.1) 2014 For PFHI enrolled: Public 8.7 (95% CI=5.8-11.6); private 51 (95%CI=47.8-54.2) Non-enrolled: Public 7.3 (95%CI=3.5-11.2); private 50.9 (95%CI=47.4-54.4)

				Karnataka 2004: Public 20.3 (95%CI=16.8-23.8); private 49.6 (95%CI=46.5-52.8) 2014 For PFHI enrolled: Public 8 (95%CI=1.4-14.5); private 43.1 (95%CI=34.5-51.7) Non-enrolled: Public 11.5 (95%CI=9.3-13.9); private 53.2 (95%CI=50.9-55.5) **Tamil Nadu** 2004: Public 8 (95%CI=6.3-9.7); private 50 (95%CI=47.4-52.5) 2014 For PFHI enrolled: Public 0.7 (95%CI=0-1.9); Private 59.3 (95%CI=54.7-63.9) Non enrolled: Public 1.2 (95%CI=0.6-1.8); private 58.3 (95%CI=55.9-60.6) **F) 2sls regression for size of OOPE for hospitalization**

				PFHI enrolment was not associated with the size of OOPE in any of the three states Andhra Pradesh Government insurance(yes)= coeff 2944.541 (SE= 35372.290, 95%CI= -66383.880 to 72272.960) Karnataka Government insurance (yes)= coeff 45744.550 (SE= 34789.840; 95%CI= -22442.280 to 113931.400) Tamil Nadu Government insurance (yes)= coef 63942.380(SE= 49332.880; 95%CI= - 32748.280 to 160633.000) **G) Association between government insurance and CHE25** Enrolment in PFHI schemes was not significantly associated with incidence of CH25 Andhra Pradesh: coef 1.407(SE= 0.881; 95%CI= -0.319 TO 3.134)

				Karnataka: coef 2.463 (SE= 2.279; 95%CI= -2.003 to 6.929) Tamil Nadu: coef 1.58(SE= 1.859; 95%CI= -2.063 to 5.223) **H) Association between government insurance and CHE40** Enrolment in PFHI schemes was not significantly associated with incidence of CHE40 in all the three states Andhra Pradesh: coef -1.788 (SE= 1.171; 95%CI= -4.084 to 0.508) Karnataka: coef. 0.788 (SE= 2.668; 95%CI= -4.440 to 6.016) Tamil Nadu: coef. 1.653 (SE= 2.099; 95%CI= -2.462 to 5.768) **I) Association between government insurance and CHE10**

				Enrolment in PFHI schemes was not significantly associated with incidence of CHE10 in all the three states Andhra Pradesh: coef. -1.35178 (SE= 0.8440585; 95%CI= -3.006104 to 0.3025442) Karnataka= coef. 3.546654 (SE= 6.232684; 95%CI= -8.669182 to 15.76249) Tamil Nadu: coef. 1.039547(SE= 1.048903; 95%CI= -1.016266 to 3.09536) **J) Association between PFHI enrolment and OOPE** Andhra Pradesh: coef. − 5374 ($p<0.001$) Karnataka: coef. -4064 ($p<0.05$) Tamil Nadu: coef. 2665 ($p>0.05$) **K) Association between PFHI enrolment and CHE 10** Andhra Pradesh: −0.235 ($p<0.001$) Karnataka: −0.153 ($p>0.05$)

				Tamil Nadu: −0.085 (p>0.05) **L) Association between PFHI enrolment and CHE 25** Andhra Pradesh: −0.210 (p<0.001) Karnataka: −0.083 (p>0.05) Tamil Nadu: −0.031 (p>0.05) **M) Association between PFHI enrolment and CHE 40** Andhra Pradesh: −0.255 (p<0.001) Karnataka: −0.118 (p>0.05) Tamil Nadu: 0.090 (p>0.05)
Johnson, & Krishnaswamy, 2012	Secondary data analysis of the two rounds of NSSO data	NSSO round 61 (conducted in 2004-05) and round 66 (conducted in 2009-10) as pre and post surveys Excluding Andhra Pradesh, Karnataka and Tamil Nadu	PFHI covered: RSBY **Treatment group**= RSBY treated districts *A household is deemed treated if the policy start	**1) Impact of RSBY (without household matching)** **A)** OP expenditure (in Rs) Triple diff= - 4.478 (p<0.05) DID= -4.716(p<0.01) B) IP expenditure (in Rs) Triple diff.= -8.938 (p>0.1 i.e. 0.104) DID= 1.106 (P>0.1 I.e. p=0.461)

		-Difference in differences analysis -Triple difference analysis (non BPL households as a second control) -Coarsened exact matching approach	date in that district was two month prior to the date of the interview in order to give the household sufficient time to undergo a procedure **Control 1=** those districts where RSBY was planned (and an insurer identified), but not launched at the time of the survey **Control 2=** districts where RSBY was not planned at the time.	C) Total Medical Exp. (in Rs.) Triple diff.= -13.42 (p<0.05 i.e. p= 0.046) DID= -3.610 (P<0.05 I.e. p= 0.025) D) Was hospitalized Triple diff.= 0.0249 (p<0.05 i.e. p= (0.018) DID= 0.0157 (P>0.1 I.e. p= 0.473) **2) For duration of treatment model (without household matching)** **A)** OP expenditure (in Rs) Triple diff.= -0.230 (p>0.1 i.e. p= 0.357) DID= -0.280 (P<0.05 I.e. p= 0.033) B) IP expenditure (in Rs) Triple diff.= -0.811 (p<0.1 i.e. 0.066) DID= - 0.00277 (P>0.1 I.e. p= (0.984) C) Total Medical Exp. (in Rs.) Triple diff.= - 1.041 (p<0.1 i.e. p= (0.075) DID= -0.282 (P<0.1 I.e. p= 0.076) D) Was hospitalized

			297 control and 204 treatment districts with a total of 186,065 households. Out of these, 102,810 are from the PRE intervention round and 83,255 from the POST round	Triple diff.= 0.00299 (p<0.01 i.e. p= 0.006) DID= 0.000672 (P>0.1 I.e. p= 0.720) **3) Impact of RSBY (for matched districts and households)** **A)** OP expenditure (in Rs) Triple diff.= -3.767 (p<0.1 i.e. p= 0.071) DID= - 4.934 (P<0.01 I.e. p= 0.001) B) IP expenditure (in Rs) Triple diff.= -7.683 (p>0.1 i.e. 0.143) DID= 1.183 (P>0.1 I.e. p= 0.413) C) Total Medical Exp. (in Rs.) Triple diff.= -11.45 (p<0.1 i.e. p= 0.053) DID= -3.751 (P<0.05 I.e. p= 0.015) D) Was hospitalized Triple diff.= 0.0259 (p<0.05 i.e. p= 0.019) DID= 0.0171 (P>0.1 I.e. p= 0.437) **4) For duration of treatment model (matched districts and households)**

				A) OP expenditure (in Rs) Triple diff.= -0.136 (p>0.05 i.e. p= (0.511) DID= - 0.312 (P<0.05 I.e. p= 0.025) B) IP expenditure (in Rs) Triple diff.= -0.677 (p>0.1 i.e. p= 0.117) DID= - 0.00457 (P>0.1 I.e. p= 0.972) C) Total Medical Exp. (in Rs.) Triple diff.= -0.813 (p>0.1 i.e. p= 0.109) DID= - 0.316 (P<0.05 I.e. p= 0.041) D) Was hospitalized Triple diff.= 0.00311 (p<0.01 i.e. p= 0.005) DID= 0.000715 (P>0.1 I.e. p= 0.706) **5) Impact of RSBY (matched districts and households) – No Uttar Pradesh and Haryana** **A)** OP expenditure (in Rs) Triple diff.= -3.650 (p>0.05 i.e. p= (0.511) DID= - 2.878 (P<0.01 I.e. p= 0.010) B) IP expenditure (in Rs)

				Triple diff.= -10.52 (p>0.1 i.e. p= 0.153) DID= 1.734 (p>0.1 I.e. p= 0.346) C) Total Medical Exp. (in Rs.) Triple diff.= -14.17 (p>0.1 i.e. p= 0.096) DID= -1.144 (P>0.1 I.e. p= 0.403) D) Was hospitalized Triple diff.= 0.0269 (p<0.05 i.e. p= 0.042) DID= 0.0543 (P<0.1 I.e. p= 0.005) **6) For duration of treatment model (Matched districts and households) (No Uttar Pradesh and Haryana)** **A)** OP expenditure (in Rs) Triple diff.= -0.186 (p>0.1 i.e. p= 0.496) DID= -0.122 (P>0.1 I.e. p= 0.314) B) IP expenditure (in Rs) Triple diff.= -0.679 (p>0.1 i.e. p= 0.292) DID= 0.0322 (p>0.1 I.e. p= 0.834) C) Total Medical Exp. (in Rs.)

				Triple diff.= -0.865 (p>0.1 i.e. p= 0.241) DID= -0.0895 (P>0.1 I.e. p= 0.560) D) Was hospitalized Triple diff.= 0.00419 (p<0.01 i.e. p= 0.000) DID= 0.00349 (P<0.1 I.e. p= 0.076) Note: OP exp, IP Exp and Total exp. are per capita per month
Karan, Yip, Mahal, 2017	-Three repeated cross section HH Surveys -Difference-in-differences (DID) methods were used to evaluate the causal impacts of RSBY -'intention to treat' (ITT) effect -propensity-score matching, to create	Three waves of HH 'Consumer Expenditure Surveys' (CES): 1999-2000 (pre-intervention= T1), 2004-5 (T2) & 2011-2 (post-intervention= T3), conducted by the NSSO. Sample size in three rounds ranged from: 100,000 and 125,000 HHs.	PFHI covered: RSBY implementation began in 2008-09. **Treatment group**: Poor HHs in RSBY implementing districts. **Control**: Poor in non-RSBY districts. Poor: belonging to the two poorest expenditure	**Districts which began participating in RSBY on or before March 2010 (treat 1)** **1) IP OOP:** Pre-intervention DID coefficient estimates are not statistically significant for all outcomes of interest. A) RSBY increased statistically insignificant likelihood of incurring any inpatient OOP in the treatment group 'treat1' by 22% relative to Controls (OR: 1.223, SE: 0.2777). B) Conditional on having positive IP OOP, the HH OOP spending per person remained unchanged for the

	comparable treatment and control districts using pooled data from the two pre-intervention years (2000 and 2005).		quintiles as a proxy for BPL HHs.	treatment compared to controls (Difference in pre-post: 0.005, SE: 0.212). C) No effect of the scheme on the share of IP OOP spending in total HH expenditures for the 'treat1' group (DID coefficients: -0.007, SE: 0.0079). D) RSBY lowers the likelihood of experiencing catastrophic IP OOP spending by 26%, the effect is not statistically significant (OR: 0.743, SE: 0.2272). 2) **OP OOP:** A) RSBY increased the likelihood of incurring OP OOP in treatment HHs by 23% (OR: 1.226, SE: 0.1806); B) Per person OP OOP (conditional on reporting any OP OOP) declined by 5% in 2012 and these impacts were statistically significant (Difference: -0.049, SE: 0.0580). C) RSBY did not affect the share of OP OOP in total spending (DID coefficient: - 0.004, SE: 0.0028).

				D) The probability of catastrophic OP OOP among treat1 HHs was lower by 11% (OR: 0.891, SE: 0.1425) but remained statistically insignificant. **3) Total OOP:** Total OOP spending showed mostly statistically insignificant differences in the changes in all the four OOP indicators between treatment and control groups, excepting 30% (OR: 1.298, SE: 0.2013) increase in probability of any OOP payments in treat1 **4) Nonmedical expenditure of households:** RSBY increased nonmedical expenditure of HHs in the treat1 group by 5% **5) Drug and non-drug expenditure:** RSBY did not affect the likelihood of incurring both drug and non-drug IP OOP. However, conditional on positive non-drug OOP, the level of OOP was 27% higher among treat1 households after RSBY was introduced, and this difference was statistically significant.

				Districts which began participating between April 2010 and March 2012 (treat 2) **1) IP OOP:** A) RSBY increased the probability of incurring any IP OOP by 28% (OR: 1.281, SE: 0.3201) and B) lowered per member OOP IP expenditure (conditional on reporting any IP OOP) by 16% (Difference: - 0.164, SE: 0.2175), but were statistically insignificant. C) No impact of RSBY on IP OOP as a share of total HH spending in 'treat2' HHs (DID coefficient: -0.008, SE: 0.0081). D) RSBY lowered the probability of incurring any catastrophic inpatient OOP by almost 9% (OR: 0.911, SE: 0.3162) in 'treat2' HHs, but this was statistically insignificant. 2) **OP OOP:**

				No statistically significant effect of the scheme in the treat2 households (Probability of any OOP OR: 1.093, SE: 0.1737; OOP Share DID –0.004, SE: 0.0033; Probability of Catastrophic OR 1.003, SE 0.1972), except for per person monthly OP OOP spending, which declined by 19% (Difference: -0.151, SE: 0.0735). 3) **Total OOP:** Insignificant result in all OOP indicators except 11% (OR: -0.113, SE: 0.0738) decline in OOP level **4) Nonmedical expenditure of households:** No difference. **5) Drug and non-drug expenditure:** mostly small and Insignificant **Subgroup analysis using only data for treated districts with "high enrolment rates," defined as enrolment exceeding 50% of eligible families:** Did not find evidence of larger effects in

				high-enrolment districts. The direction of change of all the outcome indicators remained largely similar to the findings for the broader set of intervention districts
Katyal et al., 2015	A retrospective, longitudinal, controlled quasi-experimental Study (Two large surveys): Difference-in-differences	Pre-post intervention effect: Pre-intervention NSSO 2004 survey and post intervention NSSO 2012 survey.	PFHI covered:RAS and RSBY No. Of HHs: **Intervention 1**: RAS of AP in 2004: 0559 and 2012: 8623. **Intervention 2**: RSBY of MH in 2004: 5314 & in 2012: 10073	1) **Changes in average IP expenditure—public vs private** (the real terms change (deflated to 2004 prices) in these outcomes at follow-up and the DID estimate comparing AP with MH) **Private:** The overall expenditure on IP care per episode in private facilities has increased in both states and the DID is -2076.5 (-3996:-157) p=0.04 INR in AP compared to MH. **Public:** The average expenditure on public facilities has also increased in both states, and DID is -1605.3 (-2628.6:-582.1) p=0.002 INR in AP compared to MH
Khetrapal &	Cross sectional survey (bivariate analysis and Student's t test)	Districts of Patiala, Punjab & Yamunanagar, Haryana in 2011-13. Participants	PFHI covered: RSBY RSBY had completed at least two years of	RSBY beneficiaries had incurred OOP expenditure of mean: ₹5748 (±9211) though it was lesser than for

Acharya, 2019		chosen from 12 empaneled hospitals (3 public and 3 private each from both the districts)	implementation in these districts at the time of data collection. Participants who were enrolled in RSBY (n=751) and non RSBY (n=364)	non-RSBY (mean: ₹10667 ±16990.9) and less at public facilities when compared to private
Mahapatro, Singh & Singh, 2018	Analysis of the 71st round of cross- sectional household NSS 2014 survey Bi variate and multivariate analysis was done	-71 st round National Sample Survey, 2014, 'Social Consumption: Health' Schedule 25.0 -To examine the impact of health insurance on OOP payment, two-part model was used (part 1 logit and part 2 linear)	PFHI covered: Government funded health insurance schemes like RSBY, Arogyashree, CGHS, ESIS Information of hospitalization during 365 days was used for the analysis. For association comparisons were made	**1) Average OOP Expenditure per hospitalization** For government funded health insurance (RSBY, Arogyasri, CGHS, ESIS): Public provider Mean= Rs 3987 (47%); Private provider Mean= Rs 19737 (53%); Total Mean= 12408 (100%) For other HI: Public provider Mean= 7934 (18%); private provider Mean= 20764 (72%); Total Mean= 18510 (100 %) Not Health insured: Public provider Mean= 5437 (46%); Private provider Mean= 24341 (54%); Total= 15647 (100 %)

			between insured and uninsured	**2) Extent of OOP expenditure (Monthly) by insurance status** For Government health insurance=Rs 1034 For Private (other) HI= Rs 1542 For non-insured= Rs 1304 Therefore, OOP expenditure was lower for government insurance holder than those not having any of government Insurance schemes **3) Association of OOPE with health insurance** For PFHI insurance= - 2.47 ($p<0.01$) (part 1 Logit model) For PFHI insurance= -0.34 ($p<0.01$) (part 2 Linear model)
Nandi, Schneider & Dixit, 2017	Secondary data, multi variate logistic regression	NSSO, the Chhattisgarh State data used in this study were extracted from the 25th schedule of the 71st round of the cross-sectional	PFHI covered: Government funded health insurance schemes in Chhattisgarh viz. RSBY, MSBY, ESIS, CGHS	**Out of pocket expenditure:** -Government insurance coverage (AOR 0.265; 95% CI: 0.174–0.405) and childbirth conditions (AOR 0.516; 95% CI: 0.290–0.918) were significantly less

		Indian National Sample Survey, conducted between January and June 2014 The Chhattisgarh sample included 1205 house- holds and 6026 individuals (household members) Out of pocket expenditure on hospitalization was calculated per episode as medical expenditure minus reimbursements. Weighted medians of OOP expenditure were calculated		likely to entail OOP expenditure than no insurance and other ailments respectively -Women (AOR 1.700; 95% CI: 1.012–2.858) more likely to incur OOP expenditure than men and hospitalization in private hospital had a significantly higher possibility of incurring OOP expenditure than any other type of facility.
Philip, Kannan and	A comparative cross-sectional survey of 149 insured and 147	Using generalized estimating equations, the correlates of inpatient	PFHI covered: CHIS of Kerala	OOPE: The mean OOP expenses for inpatient services among insured participants (INR 448.95) was

Sarma, 2016	uninsured BPL households was conducted in Trivandrum district of Kerala. Pearson's $\chi 2$ test comparison. Multivariate logistic regression analysis was used to derive the predictors of insurance status.	service utilization of individuals were estimated. The models were built by the method of iterative backward elimination and forward selection because the study did not use any conceptual framework, and it aimed at exploration. The Mann-Whitney *U* test was used to compare the expenditure associated with inpatient care between the 2 group	A total of 149 insured and 147 uninsured households, with 667 and 578 members, respectively, were included in the study	significantly higher than that of the uninsured households (INR 159.93); p = .003 at 95% CI.
Ranjan et. al 2018	Analysis of a cross-sectional study	-Data from the 71st round of NSSO survey I.e. 'Social Consumption: Health' survey	PFHI covered: Public Funded Health Insurance (PFHI) schemes e.g. RSBY	**1) Average OOPE (the median) with PFHI coverage and no insurance** A) Rural

		-Propensity score matching (PSM) for the effectiveness of PFHIs and multiple logistic regression for association		People having government insurance: Average OOPE in public= Rs 2848; Average OOPE in private= Rs. 17,493 People with no insurance: Average OOPE in public =Rs 3994; Average OOPE in private= Rs 20,445 B) Urban People having government insurance: Average OOPE in public= Rs 2738; Average OOPE in private= Rs. 19,111 People with no insurance: Average OOPE in public =Rs 6322; Average OOPE in private= Rs 27,102 **2) Impact Assessment of PFHI on CHE at 10% and 25% threshold using Propensity Score Matching (PSM)** For 10%CHE Public insurance v/s no insurance (unmatched)= -0.05 (SE=0.01)

				Public insurance v/s no insurance (ATT)= −0.13 (SE=0.02; 95%CI= −0.16, −0.10) For 25%CHE Public insurance v/s no insurance (unmatched)= −0.02 (SE=0.01) Public insurance v/s no insurance (ATT)= −0.06 (SE= 0.01; 95%CI= −0.09, − 0.04) **3) Impact Assessment of PFHI on CHE at 10% and 25% threshold using Propensity Score Matching (PSM) for below three quintiles** For 10%CHE Public v/s no insurance (unmatched)= −0.02 (SE= 0.009) Public insurance v/s no insurance (ATT)= −0.004 (SE=0.03; 95%CI=−0.04 to − 0.001) For 25%CHE Public v/s no insurance (unmatched)= −0.008(SE= 0.007)

				Public insurance vs no insurance (ATT)= −0.01(SE= 0.027; 95%CI= −0.022 to 0.005) **4) Impoverishment effect of OOPE on hospitalization** For Government funded HI schemes a) Percentage of household below poverty line pre-payment= 21.85 B) Percentage of household below poverty line post-payment= 33.51 For Employer supported scheme A) Percentage of household below poverty line pre-payment= 11.04 B) Percentage of household below poverty line post-payment= 17.33 For Arranged by household A) Percentage of household below poverty line pre-payment= 3.53

				B) Percentage of household below poverty line post-payment= 10.33 Not covered A) Percentage of household below poverty line pre-payment= 28.83 B) Percentage of household below poverty line post-payment= 42.01 **5) Financial protection and PFHI** A) Private provider without any insurance Mean OOPE per hospitalization= Rs 22,604 Median OOPE per hospitalization= Rs 11,300 Incidence of CHE-10= 62.4 Incidence of CHE-25 30.0 Impoverishment= 19.1 B) Private provider with PFHI Mean OOPE per hospitalization= Rs 17,741 Median OOPE per hospitalization= Rs 10,120 Incidence of CHE-10= 60.0

				Incidence of CHE-25= 29.2 Impoverishment= 18.2 C) Public provider without any insurance Mean OOPE per hospitalization= Rs 4919 Median OOPE per hospitalization= Rs 1451 Incidence of CHE-10= 16.1 Incidence of CHE-25= 6.0 Impoverishment= 6.8 D) Public provider with PFHI Mean OOPE per hospitalization= Rs 3204 Median OOPE per hospitalization= Rs 950 Incidence of CHE-10= 14.8 Incidence of CHE-25= 5.6 Impoverishment= 4.6

Rao et al., 2014	A difference-in-differences (DID) study using repeated cross-sectional surveys with parallel control.	NSSO 2004 survey, A total of 5314 and 5059 households from MH and AP were surveyed by the NSSO in 2004 and Survey in 2012 included 10 073 (MH) and 8623 (AP) households.	PFHI covered: Arogyashree Two cross-sectional surveys: as a baseline, the data from the NSSO 2004 survey collected before the Aarogyasri and RSBY schemes were launched; and as postintervention, a survey using the same methodology conducted in 2012. A survey of 18 696 households across 2 states and 1871 locations	1) **Inpatient OOPE** (In INR) 2012 compared to 2004: 1 year prior to survey after deducting reimbursement from total expenditure, if any. Both the states: unadjusted DID=−498.2, 95% CI −792.9 to −203.5, p=0.0009 and adjusted: −565.8 (862.9 to −268.6) 0.0002 **Subgroup analysis based on HH head characteristics:** a) Gender Male: Mean DID: −513.7 (−843.9 to −183.4) p=0.0023, female it was not significant. b) Social group: SC: Mean DID −708.7 (−1234.3 to −183.2) p=0.0082 All other groups: Mean DID −1110.46 (−1868 to −352.9) p=0.0041 For ST and other excluded groups, it was not significant. c) Location

				Rural: Mean DID −504 (−801.9 to −206.0) p=0.0009, for Urban it was not significant d) Quintile Poorest: Mean DID −1001.3 (−1751 to −251.7) p=0.0089 Middle: Mean DID −798.1 (−1362.9 to −233.3) p= 0.0056 For second, fourth and fifth quintile it was not significant. 2) **Large inpatient OOPE** (A HH with OOPE for inpatient care was equal to or greater than INR 23,000 (USD419)). Adjusted for both states, Mean DID=−1.8, 95% CI −3 to −0.7, p=0.0009 **Subgroup analysis based on HH head characteristics:** Quintile: Poorest: Mean DID −0.2 (−3.8 to −0.19) p=0.0307

				For other quintile variables, gender, social groups, location it was not significant. 3) **Large borrowing** (if the borrowing was equal to or exceeded the BPL threshold set by the Government of AP: INR 70 000 for urban families and 65000 for rural HHs) In both states: Unadjusted Mean DID: −3.7 (−6.4 to −0.908) p=0.0100 and adjusted DID=−4, 95% CI −6.6 to −1.4, p=0.0032 **Subgroup analysis based on HH head characteristics:** a) Gender Male: Mean DID −3.6 (−6.6 to −0.62) p=0.0187 Female: Mean DID −4.7 (−8.3 to −1) p=0.0137 b) Social group ST: Mean DID −5.5 (−9.3 to −1.8) p=0.0048 All other groups: Mean DID −4.1 (−7.9 to −0.4.0) p=0.0302

				For SC and Other excluded groups, it was not significant. c) Location Rural: Mean DID −4.7 (−7.3 to −2.1) p=0.0007, for urban it was not significant d) Quintile Poorest: Mean DID −9 (−14 to −4.4) p=0.0002 For others quintile groups it was not significant.

Ravi & Bergkvist, 2014	Analysis of a cross sectional survey	NSSO data for consumption expenditure Difference-in-differences method and regression analysis	PFHI covered: Different PFHI schemes Pre and post analysis of the effects of different schemes	**1) Means of outcome: Impoverishment** **For overall sample** A) Overall impoverishment Treatment: Pre: 0.281 (–0.003); Post: 0.207 (–0.004); Diff: –0.074 (–0.005) Control: Pre: 0.357(–0.003); Post: 0.276(–0.004); Diff: –0.081(–0.005) Difference: Pre: –0.076(–0.004); Post: –0.069(–0.006); Diff: 0.007(–0.007) B) OOP impoverishment Treatment: Pre: 0.321(–0.003); Post: 0.24 (–0.004); Diff: –0.081 (–0.005) Control: Pre: 0.401 (–0.003); Post: 0.312 (–0.004); Diff: –0.089 (–0.005) Difference: Pre: –0.08 (–0.004); Post: –0.072 (–0.006); Diff: 0.008 (–0.007) **For long term sample**

				A) Overall impoverishment Treatment: Pre: 0.273 (–0.004); Post: 0.169 (–0.005); Diff: –0.104 (–0.007) Control: Pre: 0.335 (–0.002); Post: 0.266 (–0.003); Diff: –0.069 (–0.004) Difference: Pre: –0.062 (–0.005); Post: –0.097 (–0.006); Diff: –0.035 (–0.008) B) OOP impoverishment Treatment: Pre: 0.306 (–0.004); Post: 0.193 (–0.006); Diff: –0.113 (–0.007) Control: Pre: 0.38 (–0.002); Post: 0.303 (–0.003); Diff: –0.077 (–0.004) Difference: Pre: –0.074 (–0.005); Post: –0.11 (–0.007); Diff: –0.036 (–0.008) **2) Means of Outcomes, Catastrophic Headcount Threshold—40% of Non-food Expenditure** **For overall sample:** A) OOP

				Treatment: Pre: 0.0466 (–0.0013); Post: 0.0448 (–0.0018); Diff: –0.0018 (–0.0022) Control: Pre: 0.0453 (–0.0013); Post: 0.036 (–0.0017); Diff: –0.0093 (–0.0021) Difference: Pre: 0.0013 (–0.0018); Post: 0.0088 (–0.0025); Diff: 0.0075 (–0.0031) B) Outpatient Treatment: Pre: 0.0397 (–0.0012); Post: 0.0309 (–0.0016); Diff: –0.0089 (–0.002) Control: Pre: 0.0439 (–0.0013); Post: 0.0254 (–0.0015); Diff: –0.0185 (–0.002) Difference: Pre: –0.0042 (–0.0018); Post: 0.0054 (–0.0022); Diff: 0.0096 (–0.0028) C) Drugs Treatment: Pre: 0.0179 (–0.0008); Post: 0.0167 (–0.0011); Diff: –0.0012 (–0.0014) Control: Pre: 0.0231 (–0.0009); Post: 0.0151 (–0.0012); Diff: –0.008 (–0.0015)

				Difference: Pre: –0.0052 (–0.0012); Post: 0.0016 (–0.0016); Diff: 0.0068 (–0.002) **Long term sample** A) OOP Treatment: Pre: 0.0389 (–0.0018); Post: 0.0367 (–0.0026); Diff: –0.0022 (–0.0032) Control: Pre: 0.0479 (–0.001); Post: 0.0411 (–0.0014); Diff: –0.0067 (–0.0018) Difference: Pre: —0.009 (–0.0021); Post: –0.0044 (–0.003); Diff: 0.0046 (–0.0037) B) Outpatient Treatment: Pre: 0.0332 (–0.0017); Post: 0.0282 (–0.0025); Diff: –0.005 (–0.003) Control: Pre: 0.0444 (–0.001); Post: 0.0279 (–0.0012); Diff: –0.0165 (–0.0016) Difference: Pre: –0.0112 (–0.002); Post: 0.0003 (–0.0027); Diff: 0.0115 (–0.0034) C) Drugs

				Treatment: Pre: 0.011 (–0.001); Post: 0.0095 (–0.0013); Diff: –0.0015 (–0.0016) Control: Pre: 0.0234 (–0.0007); Post: 0.0176 (–0.001); Diff: –0.0058 (–0.0012) Difference: Pre: –0.0124 (–0.0012); Post: –0.0082 (–0.0016); Diff: 0.0042 (—0.002) **3) Changes in poverty gap index overtime** **For overall sample** A) Overall PGI Treatment: Pre: 0.059 (–0.0009); Post: 0.04 (–0.001); Diff: –0.019 (–0.0013) :Control: Pre: 0.079 (–0.0008); Post: 0.056 (–0.0011); Diff: –0.023 (–0.0013) Difference: Pre: –0.02 (–0.001); Post: –0.016 (–0.001); Diff: 0.004 (–0.002) B) OOP PGI Treatment: Pre: 0.07(–0.0009); Post: 0.048 (–0.001); Diff: –0.022 (—0.0014)

				Control: Pre: 0.091 (–0.0009); Post: 0.066 (–0.0011); Diff: –0.025 (–0.0014) Difference: Pre: –0.021(–0.001); Post: –0.018 (–0.002); Diff: 0.003 (–0.002) For Long term sample A) Overall PGI Treatment: Pre: 0.058 (–0.0014); Post: 0.032 (–0.0013); Diff: –0.026 (–0.0019) Control: Pre: 0.073 (–0.0007); Post: 0.053 (–0.0008); Diff: –0.02 (–0.0011) Difference: Pre: –0.015(–0.002); Post: –0.021 (–0.002); Diff: –0.006 (–0.002) B) OOP PGI Treatment: Pre: 0.065 (–0.0014); Post: 0.038 (–0.0014); Diff: –0.027 (–0.002) Control: Pre: 0.086 (–0.0007); Post: 0.063 (–0.0009); Diff: –0.023 (–0.0012)

				Difference: Pre: –0.021(–0.002); Post: –0.025 (–0.002); Diff: –0.004 (–0.002) **After regression analysis with fixed state effects** **Short term impact** **1) Impoverishment Effects in Overall Sample** A) Overall impoverishment: Treatment*Post: 0.0082(–0.0065; p>0.1) B) Impoverishment net of OOP: Treatment*Post: 0.0089(–0.0067; p>0.1) C) Impoverishment net of hospitalization: Treatment *Post: 0.0063 (–0.0065; p>0.1) D) Impoverishment net of outpatient: Treatment *Post: 0.0107 (–0.0067; p>0.1) E) Impoverishment net of drugs: Treatment *Post: 0.0094 (–0.0067; p>0.1) **2) Catastrophic Headcount, Overall sample—Threshold 40% of Non-food Expenditure**

				A) Due to OOP: Treatment *Post: 0.0075 (–0.003; p<0.05) B) Due to hospitalization: Treatment *Post: 0.0004(–0.0014; p>0.1) C) Due to outpatient: Treatment *Post: 0.0096 (–0.0028; p<0.01) D) Due to drugs: Treatment *Post: 0.0069(–0.002; p<0.01) **3) Poverty Gap Index, Overall Sample** A) Poverty gap index: Treatment *Post: 0.0037(–0.0018; p<0.05) B) PGI net of OOP: Treatment *Post: 0.0047(–0.0019; p<0.05) C) PGI net of hospitalization: Treatment *Post: 0.0036(–0.0018; p<0.05) D) PGI net of outpatient: Treatment *Post: 0.0049(–0.0019; p<0.01)

				E) PGI net of drugs: Treatment *Post: 0.0048(–0.0019; p<0.05) **Long term impact of PFHIS** **1) Impoverishment, Long-term Sample** A) Overall impoverishment: Treatment *Post: –0.0308 (–0.0077; p<0.01) B) Impoverishment net of OOP: Treatment *Post: –0.0316(–0.008; p<0.01) C) Impoverishment net of hospitalization: Treatment *Post: –0.0313(–0.0077; p<0.01) D) Impoverishment net of outpatient: Treatment *Post: –0.0293(–0.0079; p<0.01) E) Impoverishment net of drugs: Treatment *Post: –0.0275(–0.0079; p<0.01) **2) Catastrophic Headcount, Long-term Sample—Threshold 40% of Non-food Expenditure** A) Due to OOP: Treatment *Post: 0.0048(–0.0036; p>0.1)

				B) Due to hospitalization: Treatment *Post: –0.0006(–0.0017; p>0.1) C) Due to outpatient: Treatment *Post: 0.0120(–0.0033; p<0.01) D) Due to drugs: Treatment *Post: 0.0045(–0.002; p<0.05) **3) Poverty Gap Index, Long-term Sample** A) Poverty gap index: Treatment *Post: –0.0047(–0.0021; p<0.05) B) PGI net of OOP: Treatment *Post: –0.0035(–0.0022; p>0.1) C) PGI net of hospitalization: Treatment *Post: –0.0047(–0.0021; p<0.05) D) PGI net of outpatient: Treatment *Post: –0.0035(–0.0022; p>0.1) E) PGI net of drugs: Treatment *Post: –0.0032(–0.0022; p>0.1)

Raza, van de Poel & Panda, 2016	Two cross sectional surveys among SHG members themselves or the head of the (households) HHs: Regression	Primary study: Baseline survey: March and May 2010 (3,686 HHs) and follow-up survey: March and April in 2012 (3,318 HHs) and 2013 (3307 HHs). Location: Kanpur Dehat and Pratapgarh districts in Uttar Pradesh and Vaishali in Bihar	PFHI covered: RSBY membership	**1)) OOP Spending (Log of healthcare expenses conditional on spending (INR)**: RSBY membership to be associated with a reduction in OOP spending in Bihar (36%) [-0.361* (0.190), n=577]. Pooled: -0.056 (0.170), n=1361 and UP: 0.224 (0.296), n=804 are not significant. **Sensitivity analysis** by restricting the sample to HHs in the bottom two asset tertiles: Bihar it is significant -0.675 (0.234), n=403, while pooled and UP it is not. **2) Log of the amount of debt conditional on borrowing (INR)**: RSBY HHs in Bihar concurrently experience a 55% [-0.547 (0.232), n=457] reduction in the amount of debt incurred in dealing with the cost of hospitalization. Pooled: -0.078 (0.206), n=1100 and UP: 0.251 (0.353), n=643 are not significant. **Sensitivity analysis** by restricting the sample to HHs in the bottom two asset tertiles: Bihar it is significant -

				0.611 (0.277), n=355, however not for pooled and UP. 3) **Probability of having healthcare expenses conditional on use:** not significant irrespective of sensitivity analysis 4) **Probability of debt conditional on use were not significant:** not significant sensitivity analysis
Sabharwal et al., 2014	Quasi experimental mixed methods study design	Two districts were selected for this study: Moradabad district in Uttar Pradesh and Aurangabad district in Maharashtra. At the block level (district sub-division), sites were selected where blocks had proportions of SC and Muslim population equal to the district average, and	PFHI covered: RSBY • Target group: SC, Muslim and upper caste poor households who are beneficiaries of RSBY (whether they have used the smart card or not) • Control group: SC, Muslim and upper caste poor households who are	Expenditure as inpatient in Treated INR (US$) 6366.7/ (US$ 1012) and in controls INR 8444.6/ (US$ 135) and average treatment effect (ATT) -2077.8 (US$ -33) and T Stat, -0.87 amongst the total observations of 451- Radius matching Expenditure as inpatient in Treated 6350.4 (/US$10 2) and in controls 9970.0 (US$ 160) and average treatment effect of - 3619.6*** (US$ -58) and T stat, -2.44 amongst the total observations of 91- nearest neighborhood matching

		villages were selected with mixed social group populations. Altogether, the study was conducted in 30 villages (14 villages in Moradabad and 16 villages in Aurangabad). The households were randomly selected from each village based on RSBY beneficiary lists and BPL lists. The households in each location were stratified into beneficiary ('treatment') households and non-beneficiary or ('control') households. We included a control group in	eligible for RSBY but who are not enrolled.	Average expenditure as outpatient in INR (US$) of total observations 882, Expenditure as inpatient in Treated 701 (US$ 11) in controls 710 (US$ 11) and ATT -9.3 and a T stat -0.13- Radius matching Average expenditure as outpatient in INR (US$) of total observations 385 observations, Expenditure as inpatient in Treated 695 (US$ 11) in controls 710 (US$ 11) and ATT of 14 with a T stat of 0.29- nearest neighborhood matching Monthly per capita expenditure accounts to 74.0 (US$ 1) in treated and 66.2 (US$ 1) in controls and ATT of 7.7 (US$ 0.12) with a T stat of 0.52- Radius matching Monthly per capita expenditure accounts to 73.1 (US$ 1) in treated and 63.4 (US$ 1) in controls and ATT of 9.7 (US$ 0.16) with a T stat of 0.95- nearest neighborhood matching

		order to allow measurement of impact, given that this survey does not have a baseline.		
Selvaraj & Karan, 2012	Two cross sectional surveys (Authors considered as case control approach and Pre-post approach): difference in difference	Secondary data based on two rounds of NSSO data 2003-04 Pre-intervention and 2009-10 as post intervention.	PFHI covered: RSBY and state insurances implemented in 2007-09. **RSBY**: 247 districts; **State insurance**: 74 districts (Andhra Pradesh n=23, Karnataka n=22 and Tamil Nadu n=29); and **control**: 291 districts	**Changes in average real per capita OOP expenditure of HHs in pre- (2004-05) and post-insurance (2009-10) years** **A) Case control findings**: **1) 2004-05 (pre-insurance period) (Rs)** *a. Non-intervention districts (NID)*= OOP total expenditure: 34.01, IP expenditure: 8.05, OP expenditure: 25.96, Medicine expenditure: 24.53 *b. Intervention districts (ID)*= Expenditure in terms of OOP: 45.56, IP: 12.70, OP: 32.86 and Medicine: 32.27

				c. Difference between ID and NID= Total: 11.55, IP: 4.65, OP: 6.90, Medicine: 7.74. **2) 2009-10 (post-insurance period) (Rs)** *a. NID*= Expenditure in terms of OOP: 39.70, IP: 13.48, OP: 26.22 & Medicine: 26.90 *b. ID*= Expenditure in terms of OOP: 48.97, IP: 15.81, OP: 33.16 and Medicine: 33.56. c. *Difference between ID and NID*=Total: 9.27, IP: 2.33, OP: 6.94, Medicine: 6.63. **B) Difference between pre- and post-insurance period (Rs)** *a. NID*=Total: 5.69, IP: 5.43, OP: 0.26, Medicine: 2.37. *b. ID*=Total: 3.41, IP: 3.11, OP: 0.30, Medicine: 1.26. *c. Difference between ID and NID*= Total: -2.28, IP: -2.32, OP: 0.04, Medicine: -1.11

				Percentage Share of OOP Expenditure in Overall Household Expenditure **A) Case control findings**: **1) 2004-05 (pre-insurance period)** *a. Non-intervention districts (NID)*= OOP total expenditure: 4.88, IP expenditure: 1.16, OP expenditure: 3.73, Medicine expenditure: 3.52 *b. Intervention districts (ID)*= Expenditure in terms of OOP: 6.33, IP: 1.76, OP: 4.57 and Medicine: 4.48 *c. Difference between ID and NID*= Total: 1.45, IP: 0.61, OP: 0.84, Medicine: 0.96. **2) 2009-10 (post-insurance period)** *a. NID*= Expenditure in terms of OOP: 5.21, IP: 1.77, OP: 3.44 & Medicine: 3.53 *b. ID*= Expenditure in terms of OOP: 5.96, IP: 1.92, OP: 4.04 and Medicine: 4.08.

				c. *Difference between ID and NID*=Total: 0.75, IP: 0.16, OP: 0.60, Medicine: 0.55. **B) Difference between pre- and post-insurance period** *a. NID*= Total: 0.33, IP: 0.61, OP: -0.29, Medicine: 0.01. *b. ID*= Total: -0.37, IP: 0.16, OP: -0.53, Medicine: -0.40. *c. Difference between ID and NID*= Total: -0.70, IP: -0.45, OP: -0.24, Medicine: -0.41 **Catastrophic Headcount of OOP Expenditure (% of HHs)** **A) Case control findings**: **1) 2004-05 (pre-insurance period)**

				a. Non-intervention districts (NID)= OOP total expenditure: 11.65, IP expenditure: 2.37, OP expenditure: 9.71, Medicine expenditure: 8.45 *b. Intervention districts (ID)*= Expenditure in terms of OOP: 15.89, IP: 3.53, OP: 13.23 and Medicine: 11.06. *c. Difference between ID and NID*= Total: 4.24, IP: 1.16, OP: 3.52, Medicine: 2.61. **2) 2009-10 (post-insurance period)** *a. NID*= Expenditure in terms of OOP: 11.01, IP: 2.76, OP: 7.99 & Medicine: 6.75 *b. ID*= Expenditure in terms of OOP: 14.90, IP: 4.06, OP: 10.84 and Medicine: 09.26. c. *Difference between ID and NID*= Total: 3.90, IP: 1.30, OP: 2.86, Medicine: 2.51. **B) Difference between pre- and post-insurance period** *a. NID*= Total: -0.65, IP: 0.39, OP: -1.72 Medicine: -1.70.

				b. ID= Total: -0.99, IP: 0.53, OP: -2.38, Medicine: -1.81. *c. Difference between ID and NID*= Total: -0.34, IP: 0.14, OP: -0.66, Medicine: -0.10 **Catastrophic Headcount (%) due to** **of Hospitalization Expenditure** **1) Pre-insurance years (2004-05)** *a. Poorest:* NID= 0.88, ID= 0.72, difference (Diff)= -0.16 *b. Second poorest:* NID= 1.42, ID= 1.96, Diff= 0.53 *c. Middle*: NID=2.14, ID= 2.61, Diff= 0.47 *d. Second richest*: NID= 2.74, ID= 3.87, Diff= 1.13 *e. Richest*: NID=5.15, ID= 8.14, Diff= 2.99 **2) Post-insurance years (2009-10)** *a. Poorest:* NID= 0.87, ID= 1.20, Diff= 0.33 *b. Second poorest:* NID= 1.20, ID= 2.36, Diff= 1.16 *c. Middle*: NID=2.20, ID= 3.03, Diff= 0.83 *d. Second richest*: NID= 3.54, ID= 4.93, Diff= 1.39

				e. Richest: NID=7.05, ID= 8.27, Diff= 1.22. **3) Difference between pre- and post-insurance years** *a. Poorest:* NID= -0.01, ID= 0.48, Diff= 0.50 *b. Second poorest:* NID= -0.22, ID= 0.40, Diff= 0.62 *c. Middle*: NID=0.06, ID= 0.42, Diff= 0.36 *d. Second richest*: NID= 0.80, ID= 1.06, Diff= 0.26 *e. Richest*: NID=1.90, ID= 0.13, Diff= -1.77.
Sinha, 2018	A matched controlled cross-sectional study	In order to see whether different characteristics of enrolled and non-enrolled households were matching, *z*-test was performed comparing the proportion of the characteristics of two sets of households.	PFHI covered: RSBY a sample size of 425 households was estimated with 80 per cent power to detect the change in CHE between insured and non-insured households' arm for each block Duration of 3 months	1.The determinant of incidence of Catastrophic Health Expenditure (CHE) Among the Studied Households, households enrolled in RSBY co-efficient–0.077, SE 0.181 and odds ratio of 0.925 2. The Determinant of Incidence of Health Expenditure-Induced Poverty Among the Studied Households Which Are at Risk of Becoming Poor, households enrolled in RSBY co-efficient—0.422, SE 0.195, Odds ratio of 1.524

		two purposively selected administrative blocks, namely Silli and Bundu of Ranchi district in Jharkhand between April to June 2014		3. The Determinants of Hospitalization Among the Studied Households; households enrolled in RSBY, co-efficient 0.884, SE 0.571, Odds ratio of 2.421
Sood et al, 2014	Quasi experimental design Multi variate models were used for analysis	All households in sampled villages were asked to participate in a door to door survey, and 81% of them completed the survey.	PFHI covered: VAS 31 476 households (22 796 below poverty line and 8680 above poverty line) in 300 villages where the scheme was implemented and 28 633 households (21 767 below poverty line and 6866 above poverty line) in 272 neighboring matched villages ineligible for the scheme.	Eligible households had significantly reduced OOPE for admissions to hospitals with tertiary care facilities likely to be covered by the scheme (64% reduction, 35% to 97%; P<0.001).

			A government insurance program (Vajpayee Arogyashree scheme) that provided free tertiary care to households below the poverty line in about half of villages in Karnataka from February 2010 to August 2012.	
Sriram & Khan, 2020	Survey among poor individuals: Propensity score matching, logistic regression and Tobit regression.	NSSO survey 2014. N=64270 poor individuals	PFHI covered: any PFHI scheme PFHI (n= 5917) were matched with control group (n=5917). Average Treatment on Treated (ATT) Propensity Score Testing of Two	**Effect of PFHI on inpatient out-of-pocket health expenditures (Tobit regression coefficient and 95% CI)** Enrolment did not have any effect on inpatient OOP health expenditures [−950.36 (− 2501.5 – 600.8)]. -Duration of stay in hospital [521.40 (435.3–607.5)], -Graduate level education [7634.86 (2798.5–12,471.3)],

			Groups: Treated=0.1407, Control= 0.1191, Difference= 0.0216, T statistic= 2.89, SE: 0.0074. Matched with age, individual consumption expenditure, HH size, location and education.	-Age groups of 19 to 60 years [19 to 40 years 1857.13 (−68.3, - 3782.6) and 41 to 60 years 2231.96 (234.3–4229.6)], -Using a private hospital for treatment [3772.82 (1004.0–6541.6)], -Admission in paying ward [Paying General 9095.49 (6978.9–11,212.1), and Paying Special 13,642.31 (9856.4–17,428.3)], and -Having ailments and injuries (significant) -Utilization of AYUSH type of treatment had significant negative effect [− 9020.48 (−16,224.0 - -1817.0)] on OOP health expenditures compared to individuals using allopathic treatment. -Factors such as location, social group, HH type, HH size, and number of hospital beds in states had no statistically significant effect on OOP health expenditures.

				-Gujarat and Kerala states show significantly lower OOP expenses, keeping all other factors contact, than other states of India in the state fixed effects model.
Willingness to pay				
Vellakkal, Juyal, & Mehedi, 2014	Cross sectional study; contingent valuation method, applied a bidding game method	n=1846, Mean Age: 54.55 (12.23) Proportion of CGHS beneficiary in the sample: 65% and remaining were ECHS beneficiary additional monthly financial contribution towards the scheme beneficiaries was willing to pay for better quality of healthcare services" WTP Version 1: WTP base amount is INR 100 and the	PFHI covered: CGHS and ECHS schemes	-WTP for better quality healthcare under the schemes -Among willing people: how much per month would pay in addition to their current contribution -About 71% of CGHS beneficiaries, 28% of ECHS beneficiaries were willing to pay additionally every month for health insurance schemes. -The amount of WTP by CGHS beneficiaries was 64% higher than their current contribution

		bid amount was INR 10 (10% of the base amount). WTP Version 2: WTP base amount was INR 150 and the bid amount was INR 15 (10% of the base amount). WTP Version 3: WTP base amount is INR 200 and the bid amount was INR 20 (10% of the base amount).		

AOR: Adjusted Odds Ratio; AP: Andhra Pradesh; ATT: Average Treatment on Treated; BPL: Below Poverty Line; CGHS; Central Government Health Scheme; CHE: Catastrophic Health Expenditure; CHIS: Comprehensive Health Insurance Scheme; CI: Confidence Interval; DID; Difference-in-Differences; ECHS: Ex-serviceman Contributary Health Scheme; ESIS: Employee State Insurance Scheme; HHs: Households; INR: Indian National Rupee; IP: In-Patient; IV: Instrumental Variable; MSBY: Mukhyamantri Swasthya Bima Yojana; NA: Not Applicable; NSSO: National Sample Survey Office; OLS: Ordinary Least Square; OOP: Out of pocket payment; OOPE: Out Of Pocket Expenditure; OR: Odds Ratio; PMJAY: Pradhan Mantri Jan Arogya Yojana; PSM: Propensity Score Matching; RAS: Rajiv Arogya Shree; RSBY: Rashtriya Swasthya Bima Yojana; SC: Scheduled Castes; SE: Standard Error; SHG: Self Help Groups; UMPCE: Usual Monthly Per Capita Expenditure; VAS: Vajpayee Arogya Shree; WTP: Willingness to Pay

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Impact of public funded health insurances in India on health care utilization and financial risk protection: a systematic review

Reshmi B.[1], B. Unnikrishnan[2], Eti Rajwar[3], Shradha S. Parsekar[3], Ratheebhai Vijayamma[4], Bhumika Tumkur Venkatesh[3*]

Affiliations:

[1] Health Information Management, Manipal College of Health Professionals, Manipal Academy of Higher Education (MAHE), Manipal, India

[2] Department of Community Medicine, Kasturba Medical College, MAHE, Mangaluru, India

[3] Public Health Evidence South Asia, Prasanna School of Public Health, MAHE, Manipal, India

[4] Manipal Institute of Communication, MAHE, Manipal, India

Email IDs: Reshmi B: reshmi.b@manipal.edu; B. Unnikrishnan: unnikrishnan.b@manipal.edu; Eti Rajwar: eti.rajwar@manipal.edu; Shradha S Parsekar: shradha.parsekar@manipal.edu; Ratheebhai Vijayamma: rathee63@gmail.com; Bhumika Tumkur Venkatesh: bhumika.tv@manipal.edu

***Corresponding author:**

Room No. 35, Public Health Evidence South Asia, Prasanna School of Public Health, MAHE, Manipal 576104, Karnataka, India; Telephone: 08202923449; Email: bhumika.tv@manipal.edu

Abstract

Objective Universal Health Coverage aims to address the challenges posed by healthcare inequalities and inequities by increasing the accessibility and affordability of healthcare for the entire population. This review provides information related to impact of public funded health insurance (PFHI) on financial risk protection and utilization of healthcare.

Design: Systematic review

Data Sources: Medline (via PubMed, Web of Science), Scopus, Social Science Research Network and 3ie impact evaluation repository were searched from their inception until 15 July 2020, for English language publications.

Eligibility criteria: Studies giving information about the different PFHI in India, irrespective of population groups (above 18 years) were included. Cross-sectional studies with comparison, impact evaluations, difference-in-difference design based on before and after implementation of the scheme, pre-post, experimental trials, and quasi-randomized trials were eligible for inclusion.

Data extraction and synthesis: Data extraction was performed by three reviewers independently. Due to heterogeneity in population and study design statistical pooling was not possible, therefore narrative synthesis was performed.

Outcomes: Utilization of healthcare, willingness-to-pay (WTP), out-of-pocket expenditure (OOPE) (including outpatient and inpatient), catastrophic health expenditure (CHE), and impoverishment.

Results: The impact of PFHI on financial risk protection reports no conclusive evidence to suggest that the schemes had any impact on financial protection. The impact of PFHIs such as Rashtriya

Swasthy Bima Yojana, Vajpayee Arogyashree and PMJAY showed increased access and utilization of healthcare services. There is a lack of evidence to conclude on WTP an additional amount to the existing monthly financial contribution.

Conclusion: Different central and state PFHIs increased the utilization of health care services by the beneficiaries but there was no conclusive evidence for reduction in financial risk protection of the beneficiaries.

Registration: Not registered

Keywords: Catastrophic Health Expenditure; Financial protection; India; Out-of-pocket health expenditure; Public funded health insurance; Willingness-to-pay.

Strengths and Limitations of this study

1) Inclusion of all kinds of empirical evidence to answer the research question about impact of PFHI schemes in India.
2) This is one of the very few reviews that has used a systematic methodology to provide latest evidence on the impact of the newly launched PMJAY scheme in India
3) Choice of quality appraisal tool, due to unavailability of other tools for this kind of study, was a limitation.
4) Multiple PFHI (state-specific and central) schemes in India (with different benefit packages), and modifications in the schemes due to changes in central/state governments, led to high data heterogeneity.
5) Due to heterogeneity in data, we could not provide the pooled estimate via meta-analysis. However, results were explained via a narrative synthesis.

1. Introduction

India has a complex and mixed healthcare framework with presence of parallel public and private healthcare systems.[1 2] There is a stark difference in government spending on both public and private healthcare.[3] Health policies in India have been guided by the principle of equity with prioritizing the needs of the poor and underprivileged.[4] Out-of-pocket expenditure (OOPE) for health is one of the important factors while addressing the inequities in healthcare, and in India it is an important source of healthcare financing. It is estimated that in India around 71% of the healthcare spending is met by OOPE. This not only is an immediate financial burden to the poor households but also pushes the households into a never-ending poverty trap.[5] Health related OOPE poses a threat to the principle of financial risk protection and adds to the unaffordability and inaccessibility of healthcare for the poor. High OOPE also leads to catastrophic health expenditure (CHE), which is the increase in healthcare payment by a household, beyond the threshold, where the threshold is defined as the household's income or capacity to pay. This is further divided into catastrophe 1 where healthcare OOPE exceeds by 10% of the household's consumption expenditure, and catastrophe 2, if OOPE exceeds to more than 40% of the household's non-food expenditure. The increase in OOPE affects the rural population marginally more than the urban population and the effect of OOPE is more pronounced among the people living below the poverty line (BPL) than those above the poverty line (APL), as BPL people are pushed more into poverty than APL, due to the high OOPE, when measured via the increase in poverty head counts.[5]

Over the years, government of India has rolled out different initiatives to address the healthcare related inequities in India. The public healthcare system was revised and reframed as the National Rural Health Mission (NRHM) in 2005, later restructured as National Health Mission in 2014.[5] [6] Other initiatives like *Janani Suraksha Yojana* and the public funded health

insurance (PFHI) schemes such as *Rashtriya Swasthya Beema Yojana* (RSBY) were also introduced to address the health inequalities, improve health outcomes and provide financial risk protection.[6] Many states sponsored health insurance (HI) schemes, viz. the *Vajpayee Arogyashree Scheme* (VAS) by Karnataka, *Comprehensive Health Insurance Scheme* (CHIS) by Kerala, and *Chief Minister Health Insurance Scheme* (CMHIS) by Tamil Nadu, have been introduced for ensuring financial protection of the vulnerable population.

Challenges posed by healthcare inequalities and inequities like OOPE can also be addressed via the Universal Health Coverage (UHC). The UHC, as defined by the World Health Organization (WHO), "means that all people and communities can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship". The UHC aims towards increasing the accessibility and affordability of healthcare for the entire population. The definition of UHC is embodied in its three objectives i.e. equity, quality, and financial protection.[7]

The twelfth five-year plan of the government of India acknowledges the importance of UHC as it introduces a work plan for achieving UHC for the 1.3 billion population of the country. The agenda for this plan is based on the principle of providing affordable, accessible and good quality healthcare with financial protection to the people of the country.[8] The provision of UHC has been included in the National Health Policy of India (2017). To achieve the UHC, government of India announced the *'Ayushman Bharat'* programme in 2018 with two initiatives i.e. (a) Health and Wellness center, and (b) National health protection scheme- *Pradhan Mantri Jan Arogya Yojana* (PMJAY) that is intended to cover around 500 million beneficiaries (from vulnerable

families) and is intended to cover up to Indian National Rupees (INR) 500,000 per family, per year, for secondary and tertiary hospitalization.[9]

The addition of PMJAY scheme to the various existing PFHI (central and state) schemes, aim to increase the UHC, by increasing the affordability and accessibility of good quality healthcare. It is important to assess whether these schemes (including PMJAY) have been proven to be effective in improving health outcomes and providing financial protection to the vulnerable population. Following the principles of UHC, Willingness to Pay (WTP) for a particular HI scheme can also be used as an indicator to assess the affordability and effectiveness of a scheme in providing good quality health care. Additionally, data on beneficiaries willing to pay more or contribute more for a HI scheme (viz. CGHS), indirectly provides information on their satisfaction with the services provided by the scheme, therefore, making it an indicator to assess effectiveness of the scheme. The previous systematic review[10] on assessing the effectiveness of PFHI schemes in India was conducted before complete rolling out of the PMJAY and therefore, did not include findings on the effectiveness of the scheme (PMJAY). Also, this review[10] did not provide information on the WTP component of assessing impact of the HI schemes. The present review was therefore, conducted with an aim to provide information related to effectiveness of the central and state funded HI schemes (including the PMJAY scheme) via health care utilization, WTP, and financial risk protection of the beneficiaries. This review was planned to answer the following research question:

a) What is the impact of PFHI schemes on access and utilization of healthcare, willingness-to-pay and financial risk protection in India?

2. Methods

This systematic review follows the methodology by Cochrane handbook for systematic review of interventions[11] and the PRISMA checklist was used to report the review.[12]

2.1. Criteria for including studies in the review

a. Population: Population group above 18 years of age, enrolled in a PFHI scheme in India.
b. Intervention: HI schemes funded by either central or state government, and that covers, range of services such as hospitalization, out-patient charges, medicine costs, treatment procedures etc. Different PFHI schemes in India, for example, RSBY, VAS, CMHIS, and PMJAY were eligible to be included. Private or community-based HIs were not eligible to be included. Mixture of HIs were excluded provided a study carried out sub-group analysis for PFHIs.
c. Comparison: comparison group comprises of people who did not receive any PFHI services.
d. Outcomes: This review includes the following outcomes; (a) Utilization of healthcare, (b) WTP, (c) Financial risk protection measured in terms of OOPE, CHE and impoverishment.
e. Study design: cross-sectional studies with comparison, impact evaluations, difference-in-differences (DID) design based on before and after implementation of the scheme, pre-post design, experimental trials, and quasi-randomized trials were eligible to be included.

2.2. Search methods for identification of studies

Electronic databases such as Medline (via PubMed, Web of Science), SCOPUS, Social Science Research Network and International Initiative for impact evaluation (3ie) repository were searched from their inception until 15 July 2020, however only English publications, published in the last 10 years were considered. References and forward citations of the included studies were

scanned through for any additional eligible studies. Keywords were identified before the initiation of the search. The initial search was carried out in PubMed (*supplementary file*) and was replicated in other databases. Search was conducted by a designated information scientist.

2.3. Data collection

Result of search strategy was imported to Endnote X7 reference manager software. Duplicates were removed and the unique citations were exported to Microsoft Excel spreadsheet for screening.

2.3.1. Selection of studies: Unique citations were subjected to title and abstract screening independently by two reviewers. Eligible abstracts of all the relevant studies as per the inclusion criteria were included for full text screening (by BTV, ER and SSP) and relevant ones from these were included for analysis. Before initiating full text screening, we tried to retrieve the full text articles by contacting authors of the respective articles and the full texts that were not retrieved were excluded. Disagreements were resolved by discussion or by a third reviewer.

2.3.2. Data extraction: Data extraction was done (by ER, BTV, SSP) using a pre-designed data extraction form. Information on variables such as bibliographic details (author names, publication year, journal name); study details (information about the objectives of the study and research question addressed); study setting (name of the state, rural/urban); participant characteristics (age, gender, socio-economic status, occupation); intervention details (name and type of HI, mode of delivery of the HI, incentives given, healthcare services covered, time duration of seeking HI, any additional HIs); comparison details; outcome details (information about changes in accessibility of healthcare, utilization of healthcare services, OOPE, WTP, health outcomes like morbidity and mortality, measurement of the outcomes, method used for measurement, time at which the

outcome was measured); and study design details (type of study design and analysis) was extracted.

After pilot testing of the data extraction form, it was revised according to the modifications suggested by the team. Disagreements among the reviewers, during data extraction were resolved by consensus, if still not resolved, third reviewer was approached for resolving the disagreements. Extracted data from all the included studies was cross-checked and independent extraction was done for one third randomly selected studies.

2.4. Methodological Quality

The methodological quality of the included studies was assessed using Effective Public Health Practice Project Quality Assessment Tool (EPHPP).[13] This tool assesses methodological quality of the quantitative studies based on questions under the following seven domains i.e., a) selection bias; b) study design; c) confounders; d) blinding; e) data collection method; f) withdrawals and dropouts; g) intervention integrity; h) analysis. Quality assessment using this scale, was performed independently by reviewers in groups of two. After discussion, global rating for the scale was followed and studies were marked as 1) methodologically strong, if none of the domains had any weak rating; 2) moderate, if at least one domain was marked as weak; and 3) weak, if two or more domains were marked as weak. Quality assessment was performed using Microsoft excel spreadsheet.

2.5. Data analysis

Due to heterogeneity in data, narrative synthesis was performed to answer the research question. The results are summarized based on outcomes and types of PFHIs. The effect measures of

included studies such as mean difference or correlation coefficients with appropriate confidence interval and/or p values are reported.

2.6. Public-Patient involvement

We did not involve public or patient during the process of this review.

3. Results

The literature search on electronic databases generated 555 citation yield, out of which 179 were duplicates. Additionally, 17 records were identified from forward and backward reference checking. After title and abstract screening of 393 citations, 157 were included for full text screening, of which finally 25 articles were included for data synthesis. Schematic representation of the selection process is shown in figure 1.

3.1. Characteristics of included studies

The summary of study characteristics is given in table 1 and the detailed characteristics of included studies is given in *the supplementary file.*

3.2. Impact of PFHI on financial risk protection, utilization of healthcare and WTP

This systematic review provides evidence on the impact of different PFHI schemes that have been operational in India. These schemes are funded by the central government viz. RSBY, CGHS, ESIS, Swavlamban, Nirmaya-Disability Health Insurance Scheme and PMJAY; and by the state governments like VAS (Karnataka), RAS (Andhra Pradesh), and CHIS (Tamil Nadu). The eligibility criteria and benefits offered under each scheme varies according to different state governments. More information on these PFHI schemes is given in table 2.

Summary of the impact findings of RSBY and other PFHIs is given in table 3 & 4, respectively and the detailed synthesis is provided in *supplementary file.*

3.2.1. Financial risk protection:

Twenty-one studies measured financial risk protection, of which 17 were of strong methodological quality,[14-30] three of moderate methodological quality[31-33] and one weak methodological quality.[34] Nine studies[14 16 18 19 23 25 30 32 34] reported the impact of RSBY alone on financial protection. Thirteen studies[15 17 20-22 24 26-29 31-33] provided information on the effect of different PFHI schemes (including state insurance schemes) on financial risk protection.

Three high methodological quality studies reported a reduction in in-patient OOPE for RSBY households[14 18 30], however the findings were not significant. One low methodological study stated that after implementation of RSBY in Maharashtra state, there was a significant increase in in-patient expenditure for both public and private healthcare[32]. RSBY did not have a significant effect on in-patient OOPE as a share of total health expenditure, this was reported by two good methodological studies[16 19]. The findings for the impact of RSBY on outpatient OOPE were mixed as out of five good methodological quality studies, two studies mentioned that RSBY led to a reduction in outpatient OOPE[14 18], two studies reported that RSBY did not have any impact on the outpatient OOPE[16 30] and one study reported that the probability of incurring increased after implementation of RSBY[19]. It was reported that the RSBY households were less likely to incur CHE for outpatient care, in-patient care and overall CHE[14 16 19], however one high methodological quality study reported that there was no impact of RSBY on CHE[25]. All these findings were non-significant. The effect of RSBY on impoverishment was not clear as one study reported that RSBY had no effect on impoversihment[16], whereas another study reported an increase in impoverishment among the APY housholds[25].

For other PFHI schemes, the findings for effect of HI schemes on financial risk protection were mixed. Three studies reported a reduction in OOPE for insured households[20 21 26], whereas another

study reported no effect on OOPE[24]. For households insured under VAS and RAS, no effect of these schemes was seen on OOPE[17]. One study reported a reduction in in-patient drug expenditure for RAS households[15], however, other studies reported an increase in in-patient household expenditure[27 32]. For CHIS in Tamil Nadu, one study reported no association of CHIS with size of OOPE[17] and another study reported an increase in OOPE in-patient expenditure[33]. It was reported that CHE was reduced for households enrolled under different PFHI schemes[21 28], however, specifically for VAS, one study reported reduction in CHE[31], and another study reported no association between CHE and insurance[17]. For CHIS and RAS, no association was reported for CHE and insurance schemes[15 17]. Enrollment in PMJAY did not decrease the OOPE or CHE of the enrolled households[29].

Due to mixed evidence reported for the impact of PFHI schemes on different financial risk protection parameters, it is not possible to conclude whether these schemes have proven to be beneficial in reducing financial risk of the beneficiaries. A summary of these findings is given in table 3&4.

3.2.2. Access and utilization of health services:

Overall, 16 studies assessed the impact of PFHI on access and utilization of health services (table 3 & 4). The HI programs were RSBY,[14 16 23 26 27 30 32 35] VAS[36 37] RAS,[17 27 32] CHIS[20 21 24 26 33] and PMJAY.[29] Of the 16 studies, thirteen studies[14 16 17 20 21 23 24 26 27 29 30 36 37] were assessed to be of strong methodological quality, two[32 33] were assessed as of moderate quality and one[35] was rated as weak quality. The analysis that was carried out majorly to look at the impact was logistic regression, profit models and other types. The outcomes that were reported include reporting of illness or morbidity, hospitalization rate, outpatient care and in-patient care utilization, duration of hospitalization and utilization of hospital services. Findings demonstrated increased access,

utilization of healthcare (both in rural and urban areas) and hospitalization for RSBY[14 16 23 26 27 30 32 35]. For other PFHI schemes like VAS, RAS and CHIS an increase in utilization of health care and in-patient outpatient services was reported [20 21 24 26 32 33 36 37]. No significant difference in healthcare utilization was reported for PMJAY beneficiaries[29].

3.2.3. Willingness-to-pay:

A high methodological study[38] reported WTP for the insurance scheme. A majority (71 per cent) of CGHS beneficiaries considered that their current contribution was low, and were willing to contribute more. Only 28 per cent ECHS beneficiaries were willing to pay an additional monthly financial contribution for better quality healthcare under the schemes. In comparison to higher employment grade beneficiaries, the CGHS beneficiaries from low employment grade were more willing to pay an additional amount to the existing monthly financial contribution.

4. Discussion

This review identified and provided information on the impact of different PFHI schemes (operational in India) on healthcare utilization, WTP and financial risk protection of the beneficiaries. It was observed that although the utilization of healthcare services via in-patient and outpatient visits increased for insured beneficiaries, there was inconclusive evidence on the impact of different PFHII schemes on financial risk protection.

Our findings report that there is no conclusive evidence to suggest that RSBY reduced the OOPE and CHE or had an impact on financial risk protection. For other PFHIs including the state sponsored PFHIs *viz.* RAS, VAS and CHIS, the findings suggest a mixed impact of these schemes on OOPE, CHE and impoverishment, leading to inconclusive evidence for financial risk protection. Our findings are similar to another systematic review,[10] which reported lack of

substantial evidence for reduction in OOPE or improvement in financial risk protection by PFHI schemes in India.

For financial risk protection, varying results from different studies for the same PFHI scheme, resulted in mixed findings for this outcome. Therefore, it was a challenge to pool evidence together and conclude on the impact of PFHI schemes on financial risk protection. One of the plausible reasons for this can be the different study designs and analysis methods used by different studies to assess the impact of financial risk protection. Also, difference in benefits packages and implementation of the scheme by various successive governments, might have resulted in these mixed findings for this outcome.

One of the reasons for studies reporting no substantial impact of RSBY on financial risk protection can be the limited insurance cover e.g., INR 30,000 annually under RSBY. As the utilization of healthcare and hospitalization under RSBY has increased over the years[10], it is possible that beneficiaries would have been hospitalized for hospital services of more than INR 30,000, leading to additional OOP payment. Hospitalization for services not offered by the RSBY package and denial of hospitalization by the empaneled hospitals has also led to an increase in OOPE.[39] Another reason for the negligible impact of RSBY in reducing OOPE, as reported in some of the studies, can be the operational or functional error of the scheme. An important component of the scheme are the insurance companies, which are responsible for enrolling beneficiaries, empaneling hospitals, processing claims and reimbursing money. Delayed reimbursement from the insurance companies leads to hospitals asking beneficiaries to buy medicines and other consumables from outside, which results in high OOPE. Additionally, as there is no incentive for the insurance companies to keep a check on the OOPE payments, hospitals might charge patients or deny reimbursement of money on trivial grounds, leading to high OOPE[39].

Another reasons could be, (which is based on personal expereince of authors) to get an appointment for the surgery in empenelled hospitals, beneficiaries of the PFHIs usually wait for a longer period of time. Therefore, to avoid the delay in treatment, beneficiaries have to resort to OOP.

The impact of PFHIs (other than RSBY) including the state sponsored schemes was reported to be mixed and inconclusive, similar to another systematic review that reported lack of substantial evidence of impact on OOPE for PFHI operational in low- and middle-income countries (LMICs).[40] Additionally, as the functioning of any PFHI scheme depends on the governance, different governance structures and demographic profiles of the states would have led to heterogeneity in results. Poor impact of different PFHIs on financial risk protection (reported in some of the studies) can be attributed to similar factors that affect RSBY i.e., low coverage or benefits offered by the schemes leading to OOPE and CHE even for insured beneficiaries and interference or reimbursement issues due to functioning of insurance companies or 'trusts'.

This systematic review is the first one that has focused on the impact of PMJAY. Our findings suggest that there is a lack of evidence related to the impact of PMJAY, as only one study reported the poor impact of PMJAY on reduction in OOPE and financial risk protection. The reasons for poor impact can be similar as experienced by the earlier PFHIs schemes i.e., problem of 'double billing', private providers monopoly and administrative problems. As PMJAY is a relatively new scheme, more evidence is needed to conclude on its impact. Additionally, as the only study included in the review was specifically for the state of Chhattisgarh, availability of evidence from other states is needed to summarize the impact of this scheme.

According to our review, there was an increase in incidence of outpatient and in-patient visits and the utilization of medical services, however, the healthcare utilization rate differed between states. The utilization rate increased both among rural and urban areas for the RSBY

and VAS. However, there was one study that assessed healthcare utilization for PMJAY, and the results reported no significant increase in utilization of health care by the PMJAY enrollees. One plausible reason for these results could be the lack of awareness regarding PMJAY, as it is a relatively new scheme. It is not justified to conclude based on a single study and at the same time it is important to look into various other aspects, due to which the results of the PMJAY are insignificant in increasing healthcare utilization. The healthcare utilization rate was assessed in terms of reporting morbidity, hospitalization, utilization of inpatient and outpatient services.

Overall, majority of the evidence suggests that implementation of PFHI has increased hospitalization and the utilization of outpatient care. Our findings are consistent with other systematic reviews[10 40] i.e., PFHIs had a positive influence on utilization of healthcare and hospitalization in India and other LMICs. Although there is substantial evidence on the impact of PFHI on healthcare utilization, more rigorous evaluation studies are required to evaluate the impact of health insurance schemes and especially the newly launched PMJAY.

It was reported that although the participants were willing to pay more, the findings for WTP are inconclusive, because the evidence is generated from a single study and the focus of the insurance was limited.

Strengths and limitations:

Our review is the first comprehensive review, which has summarized the impact of PFHI schemes in India (including the new scheme of PMJAY under the Ayushman Bharat) on utilization of healthcare and financial risk protection. One of the limitations of the review is the choice of quality assessment tool used for critical appraisal of included studies due to absence of any other valid tool for secondary data analysis. Responses to some of the questions and individual domain ratings for the EPHPP tool were subjective, although, before finalizing the rating, we had a substantial

discussion on every domain rating score. Additionally, the tool is used to assess quality of all the quantitative studies, which makes it very vague. Also, due to heterogeneity in methods, population and types of insurances, we could not perform meta-analysis.

Implications of practice and research:

Our systematic review has vast policy and practice implications. Since UHC is one of the important components to achieve the sustainable development goals, the role of PFHI becomes even more important in providing equitable and affordable healthcare access to everyone. Financial risk protection is one of the key components of any PFHI scheme that ensures affordable healthcare for everyone. Poor impact of PFHIs on financial risk protection also indicates failure of the PFHI schemes. More research on PFHIs especially PMJAY and its effect on financial risk protection and healthcare utilization is needed as this scheme is an important component of the Ayushman Bharat scheme under the UHC. Similarly, future studies can consider studying the effect of some of the state funded insurances such as by the government of Goa and West Bengal, which also includes APL households, for which currently there is no evidence.

State and central governments could consider including APL households especially middle-income group under the purview of PMJAY. There should be mechanisms to check corruption in the process of PFHI enrolment and focus could be provided to ease out the administrative difficulties faced by people at the time of claiming insurance. Future research in form of rigorous qualitative research, formative evaluations and process evaluations, should be directed towards the reasons for the failure of different PFHIs in improving financial risk protection of the beneficiaries and demand- and supply-side barriers to implementation and uptake of PFHI. Research reporting reasons for failure of the PFHIs, in improving financial

protection, will help in revising and modifying the functioning and implementation of the PFHI schemes for benefit of the consumers.

5. Conclusion

PFHI schemes *viz.* RSBY, VAS, RAS, and CHIS have been operational in India since 2008. These schemes have been impactful in increasing healthcare utilization in terms of outpatient and in-patient care in both rural and urban areas. However, evidence related to financial risk protection was mixed and inconclusive. The new scheme of Pradhan Mantri Jan Arogya Yojana or PMJAY has incorporated administrative and strategic changes, which were based on the shortcomings of earlier PFHIs viz. provision of a 24-hours inquiry helpline and increased coverage of healthcare services and benefit package. However, limited evidence available on the impact of PMJAY suggests no improvement in healthcare utilization and financial risk protection of the beneficiaries. Future research on the impact of PMJAY and reasons for failure of other PFHIs on financial risk protection need to be explored.

List of Abbreviations:

APL: Above poverty line; ATT: Average Treatment of Treated; BPL: Below poverty line; CBHI: Community Based Health Insurance; CGHS: Central Government Health Scheme; CHE: Catastrophic Health Expenditure; CHIS: Comprehensive Health Insurance Scheme; CI: Confidence Interval; CMHIS: Chief Minister Health Insurance Scheme; DID: Difference-in-Differences; ECHS: Ex-servicemen Contributory Health Scheme ; ESIS: Employee State Insurance Scheme; HI: Health Insurance; IV: Instrumental Variable; LMICs: Low- and middle-income countries; MD: Mean Difference; NRHM: National Rural Health Mission; NSSO: National Sample Survey Office; OLS: Ordinary Least Square; OOP: Out-of-pocket; OOPE: Out-of-pocket health expenditure; OR: Odds Ratio; PFHI: Public Funded Health Insurance; PMJAY:

Pradhan Mantri Jan Arogya Yojana; PSM: Propensity Score Matching; RAS: Rajiv Arogya Shree; RSBY: Rashtriya Swasthya Beema Yojana; SMD: Standard Mean Difference; UHC: Universal Health Coverage; UP: Uttar Pradesh; VAS: Vajpayee Arogyashree Scheme; WHO: World Health Organization

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Author contribution: RB is the guarantor of the review. BTV, ER, RB and SSP conceptualized the topic. RV developed search strategy and conducted the search. SSP carried out title/abstract

screening and BTV, ER, SSP carried out full text screening. BTV, ER and SSP extracted first round of data extraction, analyzed and synthesized the data for the review. Extracted data from all the included studies was cross-checked and independent extraction was done for one third randomly selected studies by BTV, ER, SSP. Quality assessment was performed by BTV, ER, SSP. BTV, ER, SSP drafted the first version of report, which was further edited by RB, BTV, ER, RV, BU and SSP. All the authors read, provided feedback and approved the final report.

Information about supplementary files

Supplementary file: This file gives information about the 1) search strategy used for searching for primary studies included in the systematic review, 2) table of characteristics of included studies and 3) detailed synthesis of the results (PDF)

Research checklist: PRISMA checklist (Microsoft word or doc.). This file consists of information about the research based on PRISMA checklist 2009

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Table 1: Summary characteristics of included studies

Sl. No.	Study characteristic	Summary
1.	Geographical location	Out of the 25 included studies, 10 studies were conducted nationally,[14 16 18-22 24 28 35] and one was conducted in twelve cities - Bhubaneshwar, Thiruvananthapuram, Ahmedabad, Chandigarh, Meerut, Patna, Jabalpur, Lucknow, Hyderabad, Kolkata, Mumbai and Delhi.[38] Other studies were conducted in different states. Studies covering northern region of India were conducted in Uttar Pradesh (UP),[23 30] Haryana,[34] and Punjab.[34] Studies covering southern region of India were undertaken in Karnataka,[17 31 36 37] Andhra Pradesh,[15 17 27 32], Kerala[33] and Tamil Nadu.[17] Remaining studies were carried out in eastern region *viz.* Jharkhand,[25] Bihar,[23] Chhattisgarh,[26 29] and western region *viz.* Maharashtra.[27 30 32]
2.	Population	Population among the included studies differed in characteristics. General population were included in nine studies.[14-16 20 25-27 29 31] Around seven studies comprised of below poverty line (BPL) households.[17-19 22 24 33 35] A mixed population from rural and urban households were considered in three studies.[21 28 32] One study comprised of patients selected from RSBY empaneled hospitals and key stakeholders.[34] One study included Self-help group (SHG) members or head of the households.[23] One study comprised of socially excluded households focusing on Scheduled Castes (SC), Muslims and upper caste poor.[30] Two studies comprised of a mix population of BPL and above poverty line (APL) households.[36 37] One study comprised of Central Government Health Scheme (CGHS) and Ex-servicemen Contributory Health Scheme (ECHS) principal beneficiaries, empaneled private healthcare providers and officials of the schemes across 12 Indian cities.[38]

3.	Type of Insurance	Central government funded health insurance (HI): About 14 studies were conducted on central government funded HI schemes i.e., RSBY.[14 18 19 22-28 30 32 34 35] One study was conducted on PMJAY.[29] Three studies were conducted on CGHS.[16 24 38] Two studies were conducted on Employee State Insurance Scheme (ESIS).[16 24] State government funded HI: Three studies each were conducted on VAS in Karnataka[31 36 37] and Rajiv Arogya Shree (RAS) in Andhra Pradesh.[15 27 32] One study each reported on CHIS[33] (Philip, Kannan & Sharma, 2016) and ECHS.[38] Any government funded HI: Remaining other studies were generally all PFHI.[17 20-22 24 28]
4.	Study design	Impact evaluation including quasi-randomized designs was used in eight studies.[15 16 19 29 30 32 36 37] Observational study design was used in five studies.[23 25 31 33 38] Secondary data analysis was performed in eleven studies.[14 17 18 20-22 24 26-28 35]. Mixed method approach was used in one study.[34]
5.	Outcomes	a. Financial risk protection: The impact of RSBY on financial protection was reported by nine studies.[14 16 18 19 23 25 30 32 34]. The impact of different PFHI schemes (including state insurance schemes) on financial risk protection were reported by thirteen studies.[15 17 20-22 24 26-29 31-33] b. Access and utilization of healthcare: The impact of PFHI on healthcare utilization was reported by 16 studies, out of these eight studies assessed the impact of RSBY on healthcare utilization.[14 16 23 26 27 30 32 35] Impact of RAS was assessed by single study.[32] Five studies assessed the impact of CHIS on utilization of healthcare.[20 21 24 26 33] One study evaluated the impact of PMJAY on healthcare utilization.[29] Hospitalization rate was reported in two studies with the implementation of RAS.[17 27] Two studies reported hospital utilization rate with implementation of VAS.[36 37] c. Willingness to pay: WTP and reduction of financial burden was reported in one study.[38]
6.	Methodological quality	Out of 25 studies, three were of moderate quality[31-33], two weak methodological quality[34 35] and remaining others were of high quality.

Table 2: Central and state sponsored PFHI schemes in India

Central funded health insurance schemes
1. Rashtriya Swasthya Bima Yojana-RSBY (2008) is a central funded health insurance scheme in which 75% of the annual premium is provided by the central government and rest 25% by the state governments. In-patient expenditure of upto INR 30,000 per family per annum is insured for below poverty line families. Unorganized sector is also covered under this scheme.
2. Prime Minister's Jan Arogya Yojana-PMJAY (2018), this is a fully government sponsored scheme, which provides a cover of INR 5,00,000 per family per year in government empanelled public and private hospitals of India, for secondary and tertiary level hospitalization. Vulnerable and BPL families are eligible to avail the services under this scheme
3. Central Government Health Scheme-CGHS (1954), is eligible for central government employees and pensioners enrolled under the scheme. According to this scheme, inpatient services at the government empanelled hospitals, outpatient services including medicines, consultation by experts, maternity and child health services (family welfare), and medical consultation for alternative system of medicines is covered.
4. Swavlamban (2015), this is a central funded health insurance scheme for people with disabilities. Eligible population includes BPL and differently-abled people with blindness, hearing impairment, leprosy-cured, locomotor disability, mental illness etc. A sum of INR 200,000 per annum is covered and treatment of pre-existing illness is covered under the scheme.
5. Nirmaya-Disability Health Insurance Scheme (2008), this central funded health insurance scheme is specifically for people with Cerebral Palsy, autism, multiple disabilities and mental retardation. Services of upto INR 100,000 are covered under this scheme.
6. Employee State insurance Scheme-ESIS (1952), this scheme is funded by the employers and staff contributions and is applicable to employees of factories and establishments drawing wages upto INR 15,000 a month. Under this scheme a number of benefits to protect the employees or workers from illness, disability and death are paid to the beneficiaries. Benefits such as sickness benefit (70% of wages), temporary disablement benefit (90% of last wage), permanent disability benefit (90% of wage), maternity benefit (100% of wage), dependent benefit (90% of wage), INR 10000 to dependents for funeral expenses in case of death of the employees, and other benefits like vocational and physical rehabilitation is given to the beneficiaries.
State government funded health insurance schemes
1. Aarogyasri Scheme (2007), this scheme is by the Telangana state and BPL families belonging to the state are eligible. Benefits include cashless transactions for treatment of extreme illness, for upto INR200, 000 per year, covered under the scheme.
2. Ayushman Bharat – Mahatma Gandhi Rajasthan Swasthya Bima Yojana-MGRSBY (2019), this scheme is by the government of Rajasthan and is formed by merging PMJAY scheme and Bhamashah Swasthya Bima Yojana. All the Rajasthani families belonging to BPL category are covered under this scheme. Under this scheme an insured amount

of INR 50,000and INR 450,000 are provided for secondary and tertiary illness respectively.

3. Chief Minister's Comprehensive Health Insurance Scheme-CHIS (2012), this is state funded HI scheme by government of Tamil Nadu. People belonging to families of less than INR 72,000 is annual earning or less and members of unorganized labour welfare boards, including their families are eligible. Services and benefits of upto INR 500,000 per family per year are covered under the scheme.
4. Deen Dayal Swasthaya Seva Yojana -DDSSY (2016), by Goa government, for residents of Goa (residing for at least five years), central and state government employees already covered under other government health insurance benefits are eligible. Benefits include cashless inpatient services under government empanelled services. Annual coverage of upto INR 250,000 for a family of three and INR 400,000 for a family of four or more is given. Beneficiaries have to provide an annual premium of INR 200-300 to avail the benefits of the scheme.
5. Dr. YSR Aarogyasri Scheme (Formerly called Rajiv Arogyasri Community Health Insurance Scheme)-2007, by the Andhra Pradesh government, this scheme covers BPL families from Andhra Pradesh. Under this scheme free end to end cashless services are provided for patients undergoing treatment for therapies listed by the network hospitals. Free outpatient assessments is done for patients not undergoing treatment under the sited therapies.
6. Vajpayee Arogaya Shree-VAS (2009), this scheme is funded by the government of Karnataka and is applicable for BPL families from rural and urban areas of Karnataka. A total of INR 150,000 is re-imbursed for services provided to 5 members of the beneficiary family, an extra sum of INR 50,000 per annum is provided in case to case basis.
7. West Bengal Health for All Employees and Pensioners Cashless Medical Treatment Scheme (2014), previously known as 'West Bengal Health Scheme', by the government of West Bengal, this scheme is for West Bengal government employees, pensioners and their family members. Benefits include re-imbursement for in-patient services in the state empaneled hospitals and outpatient services for fifteen diseases mentioned in the scheme. Cashless medical treatment for upto INR 100,000 is provided for inpatient treatment.
8. Yeshasvini co-operative farmer's health care scheme (2003), by government of Karnataka, this scheme is for farmers who are members of the cooperative societies. According to this scheme, beneficiaries from the rural areas have to contribute INR 250 (for general category) and INR 50 (for SC/ST families) per annum. Beneficiaries from the urban areas have to contribute INR 710 (for general category) and INR 110 (for SC/ST) per annum. Benefits include inpatient services, discount rates for lab investigations, tests, outpatient services and medical emergency services due to mishaps during farming or any other agriculture related work.

Table 3: Impact of RSBY on financial risk protection and healthcare utilization

Outcome	Findings
Out of Pocket health Expenditure (OOPE)	**a) Inpatient OOPE:** RSBY influenced reduction in inpatient OOPE. The evidence is generated from three high methodological studies.[14 18 30] The per-capita inpatient expenditure for RSBY treated households, decreased in both rural and urban areas.[14] The impact of RSBY on inpatient expenditure was reduced for unmatched and matched samples, when RSBY was implemented for a minimum of two months duration. After removing Uttar Pradesh (UP) and Haryana from the analysis, the triple difference findings (i.e. with a second control of non-BPL households) showed a reduction in inpatient expenditure but the double difference analysis showed an increase in inpatient expenditure due to RSBY. However, none of these findings were statistically significant.[18] Both the studies included National Sample Survey Office (NSSO) data from Andhra Pradesh, Karnataka and Tamil Nadu, and used matching and DID methodology for analysis. Sabharwal et al.,[30] used PSM impact analysis to report that average annual household expenditure on inpatient care was significantly less for RSBY beneficiary households when compared with non-beneficiary households. This study also reported that average annual household expenditure spent on inpatient was higher for RSBY beneficiaries who used the smart card for inpatient expenses than the RSBY beneficiaries who did not use the RSBY smart card. However, a low methodological study[32] reported a significant increase in inpatient expenditure for both public and private healthcare, in the state of Maharashtra. This difference was calculated using DID method for the year 2004 and 2012 (after implementation of RSBY in the state). The scheme did not have a significant effect on the OOPE expenditure for inpatient visits.[16 19] A good methodological study[16] applied the coarsened exact matching and linear and logit regression to report the impact of RSBY on OOPE for inpatient visits, among insured households. No statistically significant difference was reported between RSBY insured and uninsured households. Another good methodological study,[19] applied Propensity Score Matching (PSM) and DID approach, to find the impact of RSBY on inpatient OOPE in total household expenditure, by dividing treatment districts into Treatment 1 (TT1) i.e., March 2010 and Treatment 2 (TT2) group i.e., April 2010-March 2012. No impact of RSBY on the inpatient OOPE as share of total household expenditure was observed. The probability of incurring zero OOPE inpatient expenditure was not significantly different for RSBY and non-RSBY families. RSBY increased the probability of incurring inpatient OOPE by 22% (TT1) and 28% (TT2) respectively. However, these findings were not significant.[19] **b) Outpatient OOPE:** Five studies[14 16 18 19 30] provided inconclusive information on the effect of RSBY on outpatient OOPE. RSBY had a negative impact on the outpatient expenditure.[14 18] According to Azam,[14] implementation of RSBY reduced the per capita outpatient expenditure for both rural and urban areas. The outpatient expenditure reduced for RSBY households for the overall matched sample and for the matched sample minus UP and Haryana.[18] There was no statistically significant difference between RSBY insured and uninsured households in terms of OOPE on outpatient visits.[16 30] RSBY

	increased the probability of incurring outpatient OOPE for households participating in RSBY before March 2010, by 23%; however, there was no significant effect on the scheme on outpatient OOPE for the RSBY households between April 2010 and March 2012.[19] c) **Total OOPE spending:** Four studies provided information on total OOPE spending after RSBY implementation.[14 16 19 23] RSBY resulted in reduction of total OOPE of the households. The findings of these studies were mostly not significant. Two studies used matching and DID for analysis and two used matching and regression.
Catastrophic Health Expenditure (CHE)	Four studies[14 16 19 25] provided information on the effect of RSBY on CHE, the RSBY households were less likely to incur CHE for outpatient care, inpatient care and overall CHE. It was observed that beneficiaries of the scheme reported a reduction in CHE, however, one study[25] reported that there was no effect of RSBY on CHE. According to Azam,[14] the effect was same for both rural and urban households. RSBY increased the likelihood of CHE 25.[14] All these findings about the impact of RSBY on CHE were not significant. However, incidence of CHE was significantly reduced for RSBY households with childbirth in last one year of data collection.[25] Two studies[14 19] performed matching and analyzed using DID analysis, and other studies[16 25] performed matching and linear and logistic regression. The cost of medicines was significantly reduced by 22 INR for RSBY households in the rural areas, however it increased for the urban households by 28 INR, but this result was not significant.[14]
Impoverishment	The effect of RSBY on impoverishment was not clear. One study[16] reported that RSBY had no effect on impoverishment due to OOP on inpatient care and on the total overall probability of impoverishment. However, in another study[25] among RSBY enrolled APL households, the incidence of health expenditure induced poverty was significantly increased i.e., APL households were pushed to BPL because of health care expenditure. Both the studies performed matching and used regression analysis, linear and logistic regression.
Utilization of health care	Around eight studies[14 16 23 26 27 30 32 35] looked at the impact of RSBY on healthcare utilization. The outcomes assessed by these studies include reporting of illness, hospitalization rate, outpatient care and inpatient care utilization and utilization of hospital services. The impact of RSBY on hospitalization was assessed by six studies;[14 23 26 27 32 35] all the studies showed increase in the hospitalization, of which three studies showed significant increase in hospitalization among female heads, scheduled tribes and for poorest.[27] For women seeking treatment in obstetrics department.[26] The studies[16 30] suggested increase in both, inpatient and outpatient services. However, the results were significant for inpatient care for one of the studies.[16] A study[14] assessed the impact of HI on reporting morbidity and seeking treatment for illness in both rural and urban areas. The ATT analysis suggested increase in reporting of morbidity, seeking treatment for short term and long-term illnesses and long-term morbidity in rural India compared to urban India. The increased value ranges from 0.7% to 3.2%. In urban India, the increase in reporting illness by RSBY holders varied from 2.3%-2.4%, which was not statistically significant.[14]

Table 4: Impact of other PFHI schemes on financial risk protection and health care utilization

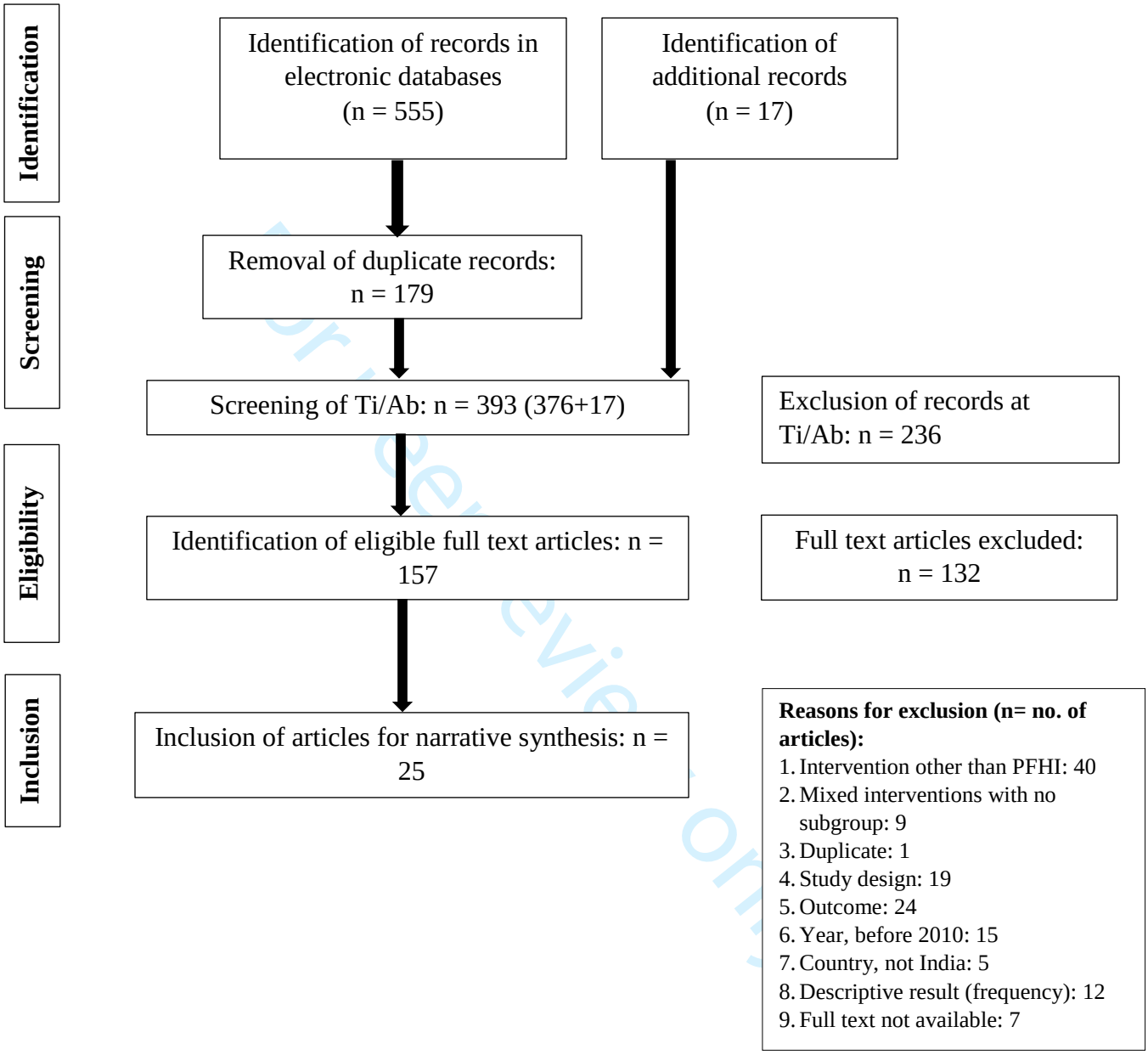
Outcome	Findings
Out of Pocket health Expenditure (OOPE)	The PFHI households were less likely to entail OOPE and there was a significant reduction in OOP for these households.[20 21 26] All the studies used regression analysis, linear and logit model for analysis. However, using Tobit regression it was found that there was no effect of PFHI schemes on OOPE of the households.[24] For VAS, the OOPE was less for the insured households, when compared to uninsured households, however the two-stage least squares (2sls) regression model reported no association between VAS enrolment and size of OOPE.[17] According to Barnes et al.,[31] reduction in OOPE increased with increase in quantiles of spending. At the 75th quantile, the significant reduction in OOPE for VAS households was INR 4485 and at 95th quantile it was INR 23548.19. There was no association between RAS (Andhra Pradesh- AP) enrolment and size of OOPE, by using 2sls regression model.[17] By using DID, among phase 1 (2007), for Arogyashree enrolled households (AP), significant reduction in per capital monthly OOP inpatient expenditure and inpatient drug expenditure were observed;[15] and an increase in inpatient expenditure for RAS households.[27] For RAS (AP), Katyal et al.,[32] reported a significant increase in both public and private inpatient expenditure, when calculated for the year 2004 and 2012 via DID analysis. Enrolment in CHIS of Tamil Nadu was not significantly associated with size of OOPE.[17] For the CHIS operational in Kerala, the mean OOP expenses for inpatient services among insured participants (INR 448.95) was significantly higher than that of the uninsured households (INR 159.93), using Mann-Whitney U test.[33] There was one study[29] that reported findings on the effect of PMJAY on OOPE and CHE. It was reported that enrolment in PMJAY did not decrease the OOPE or CHE. There was statistically insignificant more reduction in OOPE for PMJAY enrolled households than other PFHI enrolled households. Statistical significant reduction in log of OOPE was marginally more for PMJAY enrolled households than other PFHIs. OLS model was used for calculation of the abovementioned continuous outcome variable. As per the Probit model, there was a significant increase in CHE25 and CHE40 of PMJAY enrolled households. But not for PSM model, wherein reduction in OOPE for PMJAY and other PFHI was significant and CHE10 was not associated with PMJAY and PFHI enrolment according to any of the models. The naïve OLS model showed no association between the size of OOPE and enrolment under PMJAY or any PFHI schemes, these findings did not change under propensity score matching and Instrumental Variable (IV) models.
Catastrophic Health Expenditure (CHE)	Six studies[15 17 21 22 28 31] reported the effect of PFHI schemes on CHE. The PFHIs led to reduction in CHE, however the effect was very small.[21 28] With PSM, the PFHI enrolled households were 13 % less likely to experience CHE10 and 6% less likely to experience CHE25. For the lowest three quintiles, this effect was even less pronounced as only 0.4% of PFHI households and 1% of PFHI households were likely to experience CHE10 and CHE25.[21] There was a consistent increase in the catastrophic headcount threshold 40% of non-food expenditure for treatment, outpatient, inpatient and drugs.[22] This increase was even reported in a long-term sample i.e. households that have been enrolled in the PFHI schemes for a year. Two studies[22 28] used DID for analysis, whereas another used logistic regression[21] for analysis. The VAS scheme had a limited effect on CHE; there was no association between enrolment in VAS and

	CHE25, CHE40 and CHE10, using two-step IV Probit model.[17] In another study[31], the percentage of VAS households borrowing money for health reasons in the past one year was significantly lower than non-VAS households. According to Barnes et al.,[31] there was a marginal reduction in % of CHE (both as % of non-food expenditure and total expenditure) for VAS households than non-VAS households. This finding consists of both non-significant and significant results, however, reduction for 40% and 80% of CHE of the total non-food expenditure and 40% of CHE of the total expenditure was a significant finding. Additionally, money spent by VAS households on CHE was significantly lesser than non-VAS households. For RAS in Andhra Pradesh, there was no association between RAS enrolment and CHE25, CHE40, CHE10, by using two-step IV Probit model.[17] There was no clear effect of Arogyashree enrolment on CHE.[15] Enrolment in CHIS of Tamil Nadu was not significantly associated with CHE25, CHE40 and CHE10.[17]
Impoverishment	The PFHIs had a marginal effect on the reduction of impoverishment of households.[21 22] For the overall sample, the PFHIs led to marginal reduction in overall impoverishment and OOP impoverishment,[22] for both short term and long-term samples (more than a year). However, in the state fixed effect model for overall impoverishment, it was reported that the PFHI schemes had no effect on impoverishment. The state fixed effect model was used because of the assumption that presence of different state HI schemes alter the findings, and this was analyzed using regression analysis.[22] There was no significant difference seen among Arogyashree enrolled households in AP, compared to south India and all India sample on impoverishment and impoverishment due to OOPE.[15]
Utilization of health care	Two studies[36 37] exclusively assessed impact of VAS on hospital utilization rate. There was significant increase in utilization of healthcare for all tertiary care facilities. The quasi-randomized study[36] suggested significant increase in healthcare utilization with respect to accessing healthcare for any symptoms with adjusted difference of 4.96%. The increase in rate of hospitalization in primary and tertiary care varied from 4.3% to 12.3%, showing the significant change in healthcare utilization after the implementation of VAS. The quasi-randomized study[37] found significant increase in treatment seeking behavior for symptoms associated with cardiac conditions than for non-cardiac symptoms. Eligible households for VAS were 4.4% more likely to seek treatment than non-eligible households. The RAS was assessed by Katyal et al.[32] The DID analysis suggested increase in healthcare utilization in Andhra Pradesh and hospitalization[27]. The five studies,[20 21 24 26 33] assessed the impact of CHIS and other PFHIs and suggested an increase in inpatient and outpatient services. The matched cross-sectional study[33] suggests significant increase in overall utilization of inpatient services and non-significant results with respect to outpatient services among CHIS insured compared to uninsured. The multivariate analysis[24] showed increased hospitalization, hospitalization for chronic conditions, hospitalization among all age groups for PFHI households. It was also observed via Tobit regression model, being enrolled in PFHI was not significantly associated with length of stay during hospitalization, contradictory to people with chronic illness. Though the association of HI with healthcare utilization was high, inequality in accessing healthcare was higher among the higher economic people. The naive profit model analysis[17] that assessed VAS, RAS and CHIS suggested significant increase in hospitalization in Karnataka after the implementation of VAS. The only study[29] that evaluated PMJAY; the data analysis from NSS data based on PSM and naive models on the hospitalization did not show any significant difference in hospital care utilization among both enrolled and non-enrolled population for insurance.

Figure Legend:

Figure 1: PRISMA flow diagram

Figure 1: PRISMA flow diagram



Supplementary file

Contents

1) Search Strategy

(("Health Insurance"[Title/Abstract] OR "Community health insurance"[Title/Abstract] OR "Social health insurance"[Title/Abstract] OR "Group health insurance"[Title/Abstract] OR "Karunya health scheme"[Title/Abstract] OR Yeshasvini[Title/Abstract] OR "Ayushman Bharat" [Title/Abstract] OR "Universal health insurance scheme"[Title/Abstract] OR "Rashtriya swasthya bima yojana"[Title/Abstract] OR "Medical Insurance"[Title/Abstract] OR "Public health insurance" [Title/Abstract] OR "Universal health care"[Title/Abstract] OR PMJAY[Title/Abstract] OR MSBY[Title/Abstract] OR RSBY[Title/Abstract] OR Aarogyasri[Title/Abstract] OR "Vajpayee Arogyashree"[Title/Abstract] OR “Kalaignar State Health Insurance Scheme”[Title/Abstract] OR ESIS[Title/Abstract] OR Mediclaim[Title/Abstract] OR CGHS[Title/Abstract] OR BKKY[Title/Abstract]) AND ("Health care utilisation"[Title/Abstract] OR "Healthcare utilization"[Title/Abstract] OR "Healthcare utilisation"[Title/Abstract] OR "Health status"[Title/Abstract] OR "Better Health"[Title/Abstract] OR "Willingness to pay"[Title/Abstract] OR WTP[Title/Abstract] OR "Readiness to pay"[Title/Abstract] OR "Financial protection"[Title/Abstract] OR "Medical service utilization"[Title/Abstract] OR enrolment[Title/Abstract] OR impact[Title/Abstract])) AND (India OR "South Asia" OR LMIC OR Indian OR "Indian states") 124 filter humans

2) Table of characteristics of included studies

Study ID	Objective	Location	Population (n, Age, Gender, Contextual factors)	Name and type of insurance and year	Intervention/Exposure Details of insurance Incentives/benefits Time duration of insurance, Comparator	Outcomes	Study design
Azam, 2017	To evaluate the impact of Rastriya Swasthya Bima Yojana (RSBY)-on-RSBY beneficiary	National	Data from 2011-12: n= 29755 HHs (21489 rural and 8257 urban) from 260 RSBY districts in India.	RSBY Scheme	-Intervention group consists of HHs that were enrolled in RSBY and had an RSBY smart card. The beneficiary HHs were entitled to a hospital coverage of Indian National Rupees (INR) 30000 per annum	Average treatment impact on treated (ATT), utilization of health services, per capita out-of-pocket expenditure (OOPE), and per patient OOPE on major morbidities	Impact evaluation (secondary data) from two waves of India Human Development survey conducted in 2011-12 and 2004–05 and Human

	households (HHs)		Three states viz. Andhra Pradesh, Karnataka and Tamil Nadu were not included		-Control group were the HHs in the same district but not enrolled in RSBY or not having the RSBY cards		Development Profile of India conducted in 1993-94
Barnes et al., 2017	To estimate the impact of social health insurance (HI) on financial risk by utilizing data from a	Sample villages from Shimoga, Da vengere and Chitradurga d istricts of Southern Karnataka.	272 villages from the northern part of Karnataka and 300 villages from the southern	Vajpayee Arogya Shree (VAS)	Intervention: Households that had access to the VAS schemes Control: HHs south of the eligibility border that did not have access to the VAS scheme	Catastrophic health expenditure (CHE) and OOPE	Cross-sectional household survey

	natural experiment created by the phased roll-out of a social HI program for the poor in India	Villages from Uttar Kannada, Haveri and Bellari districts of northern part of Karnataka were included	part of Karnataka Total sample was 6964 HHs with BPL cards				
Dror and Vellakkal, 2012	To find if RSBY is India's flagship platform for the	National	Adults and children	RSBY	RSBY scheme	1. Coverage, enrolment and cost for providing RSBY to the beneficiaries 2. Access to hospitalizations/	Secondary data analysis from RSBY data available on website, 2011

	introduction of Universal Hospital Insurance.					health care for the poor people	
Fan, Karan and Mahal, 2012	To assess the impact of Arogyashree on household OOPE	Andhra Pradesh, India	Households in all the districts of the state	Arogyashree scheme	Intervention group: people living in the districts under Phase 1 (2007-2008) and Phase 2 (only 2008) of the NSSO survey Control group: People living in the districts that are not covered by with Phase 1 or Phase 2 of the NSSO survey	1.Per capita OOPE 2. CHE 3. Impoverishment	Impact evaluation-Analysis of NSSO and consumer health expenditure data

					Treatment groups (Andhra Pradesh) Phase 1: Activities started in April 2007 and renewal in April 2008. Phase I districts were Ananthapur, Mahabubnagar, and Srikakulam. n: 2004-05=1702 and 2007-08 =448 Phase 2: Activities started in December 2007 and renewed in December 2008. Phase II districts were East Godavari, West Godavari,		

					Nalgonda, Rangareddy, and Chittoor n: 2004-05 = 2057 and 2007-08= 863 **Control Group (Andhra Pradesh)** that were not covered by Phases 1 and 2. 2004-2005 (n)= 5269 2007-2008 (n)= 2172 **Control Groups (All India)** n= 2004-05: 116,136 and 2007-08: 46,814		
Garg, Bebarta &	To find out the effect of enrolment	Chhattisgarh, India	NSS survey in 2004 and 2014 and	Pradha Mantri Jan Arogya	Beneficiaries of PMJAY scheme	Enrolment, utilization of hospital-care in	Impact evaluation from NSSO data and

Tripathi, 2020	under Prime Minister Jan Arogya Yojana (PMJAY) in improving utilization of hospital services and financial protection in Chhattisgarh		primary household survey in 2019 (for comparison) NSS in 2004: 6375 individuals NSS in 2014= 7651 individuals Primary survey in 2019= 15361 individuals covered	Yojana (PMJAY) Mukhyamantri Swasthya Bima Yojana (MSBY) for non-poor in Chhattisgarh		OOPE and incidence of CHE	primary survey in 2019

Garg, Chowdhury & Sundararaman, 2019	To evaluate the PFHI in three states (Andhra Pradesh, Karnataka and Tamil Nadu) in improving utilization of hospital services and financial protection against expenses of	Andhra Pradesh, Karnataka and Tamil Nadu	Below Poverty Line (BPL) HHs	PFHI	Enrolment PFHI schemes	-CHE and OOPE -Hospitalization rate	Secondary data analysis of the two rounds of NSSO cross-sectional survey, 60th round: 2004 and 71st round: 2014.

	hospitalization.						
Ghosh & Gupta, 2017	To assess the impact of the scheme on access to healthcare and financial protection by utilizing the latest NSSO data on morbidity and healthcare	National States that did not have any PFHI schemes other than RSBY Andhra Pradesh, Tamil Nadu, Maharashtra, Goa, Karnataka, Andaman and	18 states, covering 35,748 HHs. Out of these 4112 HHs i.e., 11.5% were treated and 31636 HHs i.e., 88.5% of HHs were control.	RSBY	Enrolment in RSBY scheme	1) Utilization of health care 2) Financial risk protection	An impact evaluation from NSSO data

		Nicobar Islands, Daman and Diu Dadar and Nagar Haveli were excluded. Arunachal Pradesh, Puducherry, Delhi and Jammu Kashmir were not selected					

Johnson & Krishnaswamy, 2012	To estimate the impact of RSBY on hospitalization and OOP health spending using data from the NSSO from 2004-05 and 2009-10	All India except Andhra Pradesh, Karnataka and Tamil Nadu	n= 297 control and 204 treatment districts with a total of 186,065 HHs.	RSBY	Out of the total 186,065 HHs, 102,810 were from the Pre-intervention round and 83,255 from the post round Out of the 83,255 HHs in the post round observations, 25,548 HHs were surveyed two months after RSBY was introduced (this was fixed as the minimum duration to be considered as treated) and hence treated. Out of these, 12,995 were predicted to be	1. Impact of RSBY (in INR per capita per month) -OP expenditure -IP expenditure -Total medical expenditure - IP drug + tests - IP fees -IP hosp. fees. - Was hospitalized - Has OP visit - IP > Rs. 5000 (INR) - IP > Rs. 10,000 (INR)	Secondary data analysis of NSSO data Used NSSO round 61 (conducted in 2004-05) and round 66 (conducted in 2009-10), as the pre and post surveys for measuring the potential impact of RSBY.

					a BPL card holder and hence in effect the treated sub-sample RSBY in reducing OOP	-Ratio IP/ HHD Exp > 10% -Ratio IP/ HHD Exp > 20% - Ratio IP/ HHD Exp > 40% Small decrease in out-of-pocket household outpatient expenditure and subsequently total medical expenditure	

Karan, Yip, Mahal, 2017	To assess, at the national level, the impact of RSBY on financial risk protection of HHs using data from 3 waves of cross-sectional HH surveys of the NSSO and district level enrolment	National	The study used data from three waves of HH CES: 1999 to 2000 (T1 pre-intervention), 2004-05 (T2: pre-intervention) and 2011-12 (post-intervention), conducted by the NSSO.	RSBY implementation began in 2008-09.	**Treatment group**: Poor HHs in RSBY implementing districts. Further divided into districts, which began participating in RSBY on or before March 2010 and between April 2010 & March 2012. **Control**: Poor in non-RSBY districts. Poor: belonging to the two poorest expenditure quintiles as a proxy for BPL HHs	OOPE: in terms of inpatient, outpatient & total OOP. Each of these three further includes Probability of any OOP, OOP Level (INR), OOP Share and probability of catastrophic Outcome measured for the time periods 2000, 2005 and 2012	Impact evaluation using repeated measures cross sectional surveys- Analysis of NSSO data

	information from RSBY records		Sample sizes in each of the three rounds was between 100,000 and 125,000 households.				
Katyal et al., 2015	To assess changes in accessibility, affordability and perceptions of efficiency of private health care IP	Andhra Pradesh and Maharashtra	Used two rounds of NSSO data: 2004 and 2012. Total HHs surveyed (urban): Andhra	RSBY in Maharashtra and Rajiv Arogya Shree (RAS) in Andhra Pradesh.	Intervention 1: RAS in Andhra Pradesh Intervention 2: RSBY in Maharashtra	-Access to IP care [Hospitalization rate: no. of people hospitalized during the previous year per 1000 population] -Expenditure on hospitalization	A retrospective, longitudinal, controlled quasi-experimental Study (Two large surveys)

	treatment across the states of Maharashtra and Andhra Pradesh from 2004–05 to 2012.		Pradesh = 2004: 1824, 2012: 3715; Maharashtra= 2004: 2664, 2012: 5038. Total HHs surveyed (rural): Andhra Pradesh = 2004: 3235, 2012: 4908; Maharashtra= 2004: 2650, 2012: 5035			[average OOPE for IP care per individual within 1 year of the survey] - Expenditure on high-cost treatments [average OOPE for IP care within 1 year of the survey for both public and private hospitals per episode of cardiac & nephrology treatments, which were used as	

						proxies for high-cost treatments.] -Efficiency: duration of hospital stay in days	
Khetrapal and Acharya, 2019	To examine the scheme design and the incentive structure under RSBY and its implications for delivering health services	Patiala and Yamunan agar districts in the states of Punjab and Haryana	**Quantitative:** Total sample participants n=751 selected from RSBY empaneled hospitals	RSBY Introduced in 2008 by the Ministry of Labour and Employment, Government of India; to provide HI coverage	Enrolment in health insurance via RSBY scheme	A) Gaps in the scheme categorized by: 1. Allocation of roles and responsibilities 2. Enrolment of beneficiaries 3. Empanelment of facilities	Mixed method study Quantitative (Exit interviews) Qualitative (in depth interviews of stakeholders) Secondary data analysis

	to the intended beneficiaries.		-RSBY participants=387 -Non RSBY participants=364 **Qualitative**: 20 Key stakeholders' interviews of RSBY i.e., policy makers, representatives from insurance	to people living BPL.		4. Monitoring and supervision, 5. Package rates. B) OOPE of RSBY and non-RSBY participants	

			companies, state representatives, public and private providers				
Mahapatro, Singh and Singh, 2018	To understand the impact of HI schemes on tackling the economic burden of OOPE and its effectiveness in reducing economic	National	NSSO 2014 data	Government HI schemes	Enrolment in PFHI scheme	Healthcare utilization and OOPE	NSSO data, 71st round in 2014, secondary data analysis

	inequalities in healthcare spending						
Nandi, Schneider & Dixit, 2017	To examine enrolment, utilization (public and private) and OOPE for the insured and uninsured, in Chhattisgarh	Chhattisgarh, India	Included 1205 HHs and 6026 individuals (HH members), HHs as the second-stage units.	Government Health insurance schemes	Enrolment in RSBY scheme	-Determinants of enrolment -Healthcare utilization -OOPE -Increased hospitalization rate	Secondary analysis of 25th Schedule of the71st round of the cross-sectional Indian NSSO data between January and June 2014.
Philip, Kannan & Sharma, 2016	1. To compare the sociodemograp	Trivandrum district of Kerala	n= 149 insured and 147 uninsured BPL HHs	CHIS	Enrolment in CHIS	1. Coverage of CHIS 2. Healthcare utilization,	Cross-sectional survey in 2011

	hic & health utilization pattern (OP and IP services) of BPL HHs insured in comprehensive health insurance scheme (CHIS). 2. To find the correlates of insurance status and IP		with 667 and 578 members, respectively. Age: 33.0 ± 18.2 years; HH size was 4.2 ± 1.8 members			3. OOPE associated with IP service 4. Factors: Socio-demographics, understanding regarding insurance, type of insurance aware of, information on RSBY	

	service utilization. 3. To examine the OOPE for IP services						
Ranjan et al., 2018	To discuss a) the coverage & effectiveness of both governments purchasing through insurance and government provision of tax-funded	National	A total of 65,932 HHs (rural: 36480, urban: 29452) were surveyed for the entire Indian Union, which included a total of 333,104	PFHI	PFHI schemes	1. OOPE, CHE 2. Choice of provider. 3. HI coverage, type. 3. Equity in PFHI coverage 4. Impoverishment effect of OOPE on hospitalization	Unit records of the "Social Consumption: Health" survey (71st round) conducted by the NSSO in January to June 2014

	free or subsidized care as strategies of financial protection; b) the contribution that PFHI makes to the reduction in CHE due to hospitalization ; and c) the equity dimensions of		individuals (rural: 189573, urban: 143531; male: 168697 females: 164407).			5. Factors: Socio-economic 6. Increased hospitalization rates	

	both financial protection strategies.						
Rao et al., 2014	To compare the effects of health innovations over time on access to and OOPE on IP care in Andhra Pradesh & Maharashtra and to assess whether the Andhra	Andhra Pradesh and Maharashtra	Survey of 18 696 HHs across 2 states and 1871	i. RAS Health Insurance Scheme of Andhra Pradesh ii. RSBY in Maharashtra	Enrolment in RAS or RSBY Effect of i. RAS HI Scheme of Andhra Pradesh launched in 2007 to provide treatment for serious and life threatening illnesses. Families with BPL card are automatically enrolled. Enrollees make no contribution, the annual benefit is a maximum of (INR 200	1. Average IP expenditure per HH per year, 2. Large OOP IP expenditure, 3. Large borrowing 4. Hospitalization rate 5. Factors: Setting, socio-economic	Secondary data analysis: Repeated measures survey (Pre-post) using difference-in-difference (DID). Baseline: NSSO 60th decennial round HH survey undertaken in 2004. Follow up survey: in 2012

	Pradesh initiatives had larger or smaller beneficial effects than those found in Maharashtra.				000) per family per year and there is no limit on the size of the family. ii. RSBY in Maharashtra launched in 2008 (enrolment began in 2009) and provides access to free IP hospital care up to (INR 30 000) per family per year. HHs pay contribution of INR 30 for registration and annual renewal. Up to five family members are covered.		

Ravi & Bergkvist, 2014	To analyze the impact of PFHI viz. RSBY and different state-sponsored health insurance schemes	National	Districts where the PFHI schemes were implemented For RSBY impact: The districts were divided into two samples (1) where the scheme was implemented before July 2010 (end of	Different PFHI schemes including RSBY and state level schemes	Different PFHI schemes	Financial protection 1) Overall impoverishment -hospitalization -OOPE -Outpatient -Drugs 2) CHE-40% 3) Poverty gap index	Secondary data Analysis of a cross-sectional survey (NSSO)

			NSSO survey) and (2) where the scheme was implemented before July 2009 (beginning of NSSO survey)				
Raza, van de Poel, Panda, 2016	1. To analyze HH level determinants of RSBY enrolment using HH level	Kanpur Dehat & Pratapgarh districts in Uttar Pradesh and Vaishali in Bihar	Self-help group (SHG) members or head of the HHs. Baseline survey: March	RSBY	Enrolment in RSBY	1. Determinants of enrolment in health insurance 2. Determinants of re-enrolment in HI	Secondary data analysis of the data collected in 2012-2013 as a part of an evaluation of CBHI schemes

	panel data collected in 2012 & 2013 2. To investigate the determinants of dropping out of the scheme. 3. To investigate whether RSBY membership is associated with increased use of hospital		and May 2010 (3,686 HHs) and follow-up survey: March and April in 2012 (3,318 HHs) and 2013 (3307 HHs).			3. Hospital care and financial protection	

	care and financial protection.						
Sabharwal et al., 2014	To analyze the effects of RSBY on socially excluded HHs (focusing on Scheduled Castes (SC), Muslims and upper caste poor) in two states in India: Uttar Pradesh	Uttar Pradesh and Maharashtra	Sample size was 1500,750 from each state	RSBY	**Target group**: SC, Muslim and upper caste poor HHs who were beneficiaries of RSBY (whether they have used the smart card or not) **Control group**: SC, Muslim and upper caste poor HHs who were eligible for RSBY but not enrolled.	OOPE	Quasi experimental mixed methods study, April to July 2012

	and Maharashtra						
Selvaraj, Karan, 2012	To capture the impact, if any, of the PFHI programmes o n financial risk protection in India.	National	NSSO data of 2003-04 as pre-intervention and 2009-10 as post intervention. HHs in 2004-05 were 1,24,644 (79,298 rural and 45,346 urban)	RSBY and state health insurance schemes	RSBY and other state insurances implemented in gradually from 2007 to 2009. **RSBY**: 247 districts; **State insurance**: 74 districts (Andhra Pradesh n=23, Karnataka n=22 and Tamil Nadu n=29); and **control**: 291 districts	-OOP spending (IP, OP, total OOP and drug expenditure), its trends and patters. -Change in OOP expenditure due to HI -Trends in catastrophic payments Recall period: non institutional	Pre (2003-04)-post (2009-10) study and Case-control approach based on secondary data analysis of NSSO data

			and 1,00,855 HHs (59,119 rural and 41,736 urban) during 2009-10.			medical expenses: 30 day. Institutional health spending: 365 days recall. Total OOP: summation of IP and OP expenses. Catastrophic headcount: No. of HHs making OOPE greater than 10% of total HH expenditure	

Sinha, 2018	To assess whether RSBY had improved care- seeking and reduced incidences of CHE and health expenditure-induced poverty among the insured population. To explore whether the	Jharkhand	A matched controlled cross-sectional study was conducted in two purposively selected administrative blocks, namely Silli and Bundu of Ranchi district in Jharkhand	RSBY	Enrolment in RSBY Total 1643 HHs 873 RSBY, 770 Non-RSBY	Healthcare utilization and CHE	A matched controlled cross-sectional study

	benefits were equitable.		between April to June 2014				
Sood & Wagner, 2016	To evaluate the effects of a government insurance programme covering tertiary care for the poor in Karnataka, India—VAS—on treatment seeking and postoperative outcomes.	Karnataka, India	572 villages in Karnataka, India	A government insurance program: VAS	31 476 HHs (22796 BPL and 8680 above poverty line (APL) in 300 villages where the scheme was implemented and 28 633 HHs (21767 BPL and 6866 APL) in 272 neighboring matched villages ineligible for the scheme.	1) Treatment seeking behavior 2) Post-operative wellbeing 3) Post-operative infections and re-admissions	A quasi- experimental design February 2010 to August 2012.

Sood et al., 2014	To evaluate the effects of a government insurance program covering tertiary care for people BPL in Karnataka, India, on OOPE, hospital use, and mortality.	Karnataka, India	572 villages in Karnataka, India	A government insurance program: VAS	31 476 HHs (22 796 BPL and 8680 APL) in 300 villages where the scheme was implemented and 28 633 HHs (21 767 BPL and 6866 APL) in 272 neighboring matched villages ineligible for the scheme.	OOPE, hospital use, and mortality.	Quasi- randomized trial February 2010 to August 2012.

Sriram & Khan, 2020	To estimate the effect of public HI programs for the poor on hospitalizations and OOP IP care costs.	National	NSS 71st round data was used n= 64270 poor individuals. -9.55% were enrolled in any PFHI - 41.3% of the poor were illiterate - 80.6% belonged to Hindu;	PFHI such as RSBY, ESIS, CGHS, and other state insurances	Treatment=enrolled HHs Control=non-enrolled HHs	Incidence of hospitalizations, length of hospitalization, and OOP payments for IP care	Cross sectional study (NSSO data 2014)

			-85.1% were from the disadvantaged classes; -64.2% belonged to medium sized HHs (5 to 8 members) -2.5% suffering from chronic diseases				

			- mean age of the poor population was 25.3 years.				
Vellakkal, Juyal and Mehdi, 2012	To assess the overall satisfaction of beneficiaries with the schemes based on self - reported patient satisfaction, willingness to	Twelve cities=Bhubaneshwar, Thiruvananthapuram, Ahmedabad, Chandigarh, Meerut, Patna, Jabalpur, Lucknow,	n= 1,204 principal beneficiaries of CGHS and 640 of ECHS, 100 empaneled private healthcare providers and 100 CGHS-ECHS	CGHS and Ex-service men Contributory Health Scheme (ECHS)	Enrolment in RSBY	1.Self-reported patient satisfaction - Accessibility -Environment -Behavior of doctors -Behavior of other staff 2. WTP for better quality healthcare	Cross-sectional survey

	pay (WTP) for better healthcare services and measuring the comprehensive ness of the schemes in terms of its ability to reduce the financial burden of healthcare expenditure on beneficiaries	Hyderabad, Kolkata, Mumbai and Delhi	officials consisting of city and dispensary level heads of CGHS and ECHS across the 12 cities			3.Ability of the scheme to reduce financial burden of healthcare expenditure 4. Factors affecting level of satisfaction, and WTP	

APL: Above Poverty Line; ATT: Average Treatment impact of Treatment on Treated; BPL: Below Poverty Line; CHE: Catastrophic Health Expenditure; CHIS: Comprehensive Health Insurance Scheme; CGHS: Central Government Health Scheme; DID: Difference-in-difference; ESIS: Employee State Insurance Scheme; HHs: Households; HI: Health Insurance; INR: Indian National Rupees; IP: Inpatient; NA: Not Applicable; NSSO: National Sample Survey Office; OOP: Out-of-Pocket; OOPE: Out-of-Pocket expenditure; OP: Out Patient; PFHI: Public Funded Health Insurance; PMJAY: Prime Minister Jan Arogya Yojana; RSBY: Rasthriya Swasthy Bima Yojana; RAS: Rajiv Arogya Shree; SHG: Self-Help Group; SPEC: Social, Political, Economic and Cultural; SC: Scheduled Caste; ST: Schedule Tribe; VAS: Vajpayee Arogya Shree; WTP: Willingness to Pay

3) Detailed synthesis of findings

Table 1: Impact of government funded health insurance on access and utilization of healthcare, financial risk protection and willingness to pay

Study author & year	Study design and analysis	Data source and methods	Details of health insurances	Results
Access and utilization of healthcare				
Azam, 2017	Three large- scaled household (HH) surveys: Matching difference-in-difference analysis (MDID) of longitudinal data	Two waves of India Human Development Survey (2011-12) and (2004-2005) and Human Development Profile of India (HDPI) collected in 1993-94. Data from three states I.e. Andhra Pradesh, Karnataka and Tamil Nadu was not considered.	PFHI covered: RSBY The households having RSBY cards were considered as treatment groups and household not having RSBY cards were control groups in an RSBY implemented district	**Rural India** A) RSBY HHs were 3.2% points ($p<0.05$; SE=0.014) more likely to report any morbidity. The ATT estimates for percentage change for pre RSBY averages on RSBY household for this variable was reported as 4.84. B) The difference in reporting of morbidity was more defined for long term illnesses as RSBY HHs were 5% points more likely to report any long- term morbidity ($p<0.01$; SE=0.015). ATT as % change of RSBY HHs was 17.70.

				C) RSBY HHs were 3.1% points (p<0.05; SE=0.015) more likely to seek treatment for illnesses. ATT as % change of RSBY HHs was 4.93. D) RSBY HHs were 5.0% points (p<0.05; SE=0.0013) more likely to seek treatment for long term illness than for short term morbidity I.e. 2.3% points (p>0.05; SE=0.013) E) RSBY HHs were 0.7% points (p>0.05; SE 0.007) more likely to report hospitalization in case of long-term morbidity. **Urban India:** **A)** RSBY HHs were 2.4% points (p>0.05; SE=0.026) more likely to report an illness. ATT as % change for RSBY HHs was 0.033. B) RSBY HHs were 2.3% points (p>0.05; SE=0.0028) more likely to report a long-term illness. ATT as % change for RSBY HHs was 7.86.

				C) RSBY HHs were 2.3% points (p>0.05; SE=0.026) more likely to report any treatment. ATT as % change for RSBY HHs was 3.93. D) RSBY HHs were 1.5% points (p.0.05; SE= 5.13) more likely to report treatment for long-term morbidity. ATT as %change for RSBY HHs was 5.13) E) RSBY HHs were 1.6% points (p>0.05; SE=0.014) more likely to report hospitalization for a long-term morbidity. ATT as % change for RSBY HHs was 35.80)
Dror & Vellakkal, 2012	Analysis of the cross sectional RSBY 2011 data	Main data sources were RSBY website and the planning commission of India official documents	PFHI covered: RSBY RSBY health insurance Comparison with the 2004 utilization indicators	Hospitalization rate for the lowest income group in the country was 1.24 percent in 2004 (according to the NSSO survey), this was juxtaposed with the utilization rate of 2.09 % for RSBY beneficiaries in 2011. On comparison it was a growth rate of 69% was observed, which suggests beneficial results of the RSBY scheme**.**

Garg, Chowdhury & Sundararaman, 2019	Secondary data analysis of the two rounds of NSS cross- sectional survey	The 60th round of NSSO (2004) and 71st round of NSSO (2014) in three states of Andhra Pradesh, Karnataka and Tamil Nadu. Instrument Variable (IV) method was used in the multivariate analysis. Two-step least square (2sls) for OOPE and Two-step IV Probit model for utilization and CHE	PFHI covered: The three Public Funded Health Insurance (PFHI) Schemes operational in Andhra Pradesh (Rajiv Arogya Shree or the NTR Vaidya Seva); Karnataka (Vajpayee Arogya Shree); Tamil Nadu (Tamil Nadu Chief Minister's Comprehensive Health Insurance Scheme) The pre PFHI in 2004 and post PFHI (2014) comparisons were made	**A) Proportion of people being hospitalized increased from 2004 to 2014, among both enrolled and non-enrolled members, in all the three states:** **Proportion (%) of individuals who utilized hospital care:** **Andhra Pradesh** 2004: All the people 2.29 (95% CI=2.09–2.49) 2014: All the people 5.58 (95% CI=5.14–6.01); non-insured individuals 5.86 (95%CI=5.18–6.53); PFHI enrolled individuals 5.41 (95%CI=4.84–5.99) **Karnataka** 2004: All the people 2.23 (95%CI=2.01–2.46) 2014: All the people 4.93 (95%CI=4.58–5.28); non-insured individuals 4.88 (95%CI=4.53–5.24); PFHI enrolled individuals 5.76 (95%CI=4.08–7.43) **Tamil Nadu** 2004: All the people 3.58 (95%CI=3.33–3.83)

				2014: All the people 5.68 (95% CI=5.32–6.04); non-insured individuals 5.55 (95% CI=5.16–5.94); PFHI enrolled individuals 6.27 (95%CI=5.38–7.17) **B) Proportion (%) of hospitalization episodes in private hospitals** **Andhra Pradesh** 2004**:** PFHI enrolled (NA); not enrolled 70 (95% CI=68-72) 2014: PFHI enrolled 71 (95%CI=68–73); not enrolled 80 (95%CI=77–82) **Karnataka** 2004**:** PFHI enrolled (NA); not enrolled 65 (95%CI=62–67) 2014: PFHI enrolled 70 (95%CI=63–76); not enrolled 68 (95%CI=66–70) **Tamil Nadu** 2004: PFHI enrolled (NA); not enrolled 61 (95% CI=59–63)

				2014: PFHI enrolled 67 (95%CI=63–70); not enrolled 61 (95% CI=59–62) **C) Association of PFHI enrolment and increase in hospitalization (utilization) using** **IV Probit regression** **Andhra Pradesh**: coef. -0.085 (SE= 0.526; 95%CI= -1.116 to 0.947) **Karnataka**: coef. 1.378 (SE= 1.336; 95%CI= -1.242 to 3.997) **Tamil Nadu**: coef. -0.130(SE= 1.398; 95%CI= -2.871 to 2.611) Enrolment under PFHI was not associated with increase in utilization in any of the three states **D) Association between PFHI enrolment and hospitalization or utilization using** **naive Probit model** **Andhra Pradesh**= −0.025 (p>0.05) **Karnataka**: 0.191 (p<0.001)

				Tamil Nadu: −0.022 (p>0.05) Significant association between PFHI enrolment and hospitalizations seen only in Karnataka
Garg 2020	Impact evaluation using NSS survey 2004 when there was no PFHI, and 2014 data (for older PFHI scheme) and primary household survey in 2019 (for data related to the effect of first year of implementing PMJAY) in the state of Chhattisgarh, India	NSS survey data Multivariate analysis to see the effect of PMJAY on utilization CHE and OOPE OLS model for continuous outcome available and Probit model for binary outcome variable. Compared with ATT under Propensity Score Matching or PSM Multivariate analysis was repeated for OOPE and CHE using IV approach. For OOPE 2sls was applied	PFHI covered: PMJAY scheme introduced in the year 2018. The study also mentions other PFHI schemes like MSBY and RSBY operational in Chhattisgarh	The utilization of hospital care did not increase with enrolment under PMJAY or other PFHI schemes in Chhattisgarh. **Proportion (%) of individuals in Chhattisgarh who utilized hospital care** In 2019, PFHI-enrolled= 6.0 (95% CI 5.6–6.5) and PFHI not enrolled 5.7 (95% CI 5.1–6.4) In 2014, PFHI-enrolled 3.3 (95% CI 2.6–4.0) and PFHI not enrolled 2.9 (95%CI 2.3–3.4)

		as IV model, and for CHE two step IV Probit was applied		
Ghosh & Gupta, 2017	Impact evaluation: Coarsened exact matching and, linear and logit regression.	National Sample Survey data: 18 states, which do not have additional state funded insurance (round not reported). States having specific PFHIs, union territories not exposed to RSBY and states not having functional RSBY in the year 2014-15 were excluded	PFHI covered: RSBY Treated group: Household having at least one person enrolled in RSBY. Control: households with no RSBY	1) The effect of the RSBY on **number of outpatient (OP) care** was statistically insignificant i.e. sample average treatment effect for the treated (SATT)= -0.012 (p= 0.852). 2) Impact of RSBY on **number of inpatient (IP) care** utilization was significant i.e., SATT= 0.109 (p= 0.023). This was approximated as 59% increase when compared to mean inpatient utilization by the uninsured families I.e. (0.186) 3) No significant impact of RSBY on l**ength of stay at hospitals** (in days) i.e., SATT=0.071 (p=0.952)

Katyal et al., 2015	A retrospective, longitudinal, controlled quasi-experimental Study (Two large surveys): Difference-in-differences	Pre-post intervention effect: Pre-intervention NSSO 2004 survey and post intervention NSSO 2012 survey.	PFHI covered: RAS and RSBY No. Of HHs: **Intervention 1**: RAS of AP in 2004: 0559 and 2012: 8623. **Intervention 2**: RSBY of MH in 2004: 5314 & in 2012: 10073	**1) Access to IP care** (DID mean (95% CI), p) RAS of AP compared to RSBY of MH**:** **In Private hospitals:** a) **Overall**: [Mean DID: 0.076 (-0.012:0.14) p=0.02] AP as compared to MH. Utilization of private hospitals has increased in AP [0.065 (0.018:0.11)] and decreased in MH [-0.011(-0.032:0.053)] b) **Place of residence**: Urban: The likelihood of admission to a private hospital was significant for hospitalizations among urban households [0.21 (0.095:0.31) p=0.0002] in AP as compared to MH. Rural: DID=-0.0019 (-0.080:0.076) p=0.96 AP compared to MH. **In Public hospitals**:

				a) The overall utilization of public facilities has reduced in both the states and more so in AP [-0.075 (-0.14:0.0125), p= 0.019] b) **Place of residence**: Urban: There was an increase in utilization of public facilities in MH [0.067 (-0.062:0.12)] and a reduction in AP [-0.14 (-0.23:-0.047)] for urban HHs and the DID of AP to that of MH is [-0.2 (-0.31:-0.095) p=0.0002]. Rural: DID: 0.0019 (-0.076:0.08) p=0.96] AP compared to MH. **2) Duration (days) of hospital stay:** **In Private hospitals:** DID analysis: an average reduction of 3.2 (-5.4, -1.2) days in AP compared to MH Place of residence: rural HHs [-3.7 (-6.3 :-1) p=0.007]and urban: -1.8 (-4.4:0.8) p=0.17 **In Public hospitals:**

				Overall: DID: -2 (-5.1:1.1) p=0.2 AP compared to MH Rural: average of reduction of 4.2 days [(-9:0.6) p=0.09] in AP compared to MH. Urban: 0.7 (-1.8:3.2) p=0.59 in AP compared to MH.
Mahapatro, Singh & Singh, 2018	Analysis of the 71st round of cross- sectional household NSS 2014 survey Bivariate and multivariate analysis was done	-71 st round National Sample Survey, 2014, 'Social Consumption: Health' Schedule 25.0 -To examine the impact of health insurance on OOP payment, two-part model was used (part 1 logit and part 2 linear)	PFHI covered: Any PFHI scheme Information of hospitalization during 365 days was used for the analysis. For association comparisons were made between insured and uninsured	**1) Inpatient rate by type of health insurance** Government health insurance: lowest economic class: 4% and High economic class 9% Other health insurance: lowest economic class: 4.4% and High economic class 6.4% No health insurance: lowest economic class: 3.8% and High economic class 6.2%

Nandi, Schneider & Dixit, 2017	Secondary data, multi variate logistic regression	NSSO, the Chhattisgarh State data used in this study were extracted from the 25th schedule of the 71st round of the cross-sectional Indian National Sample Survey, conducted between January and June 2014 The Chhattisgarh sample included 1205 house- holds and 6026 individuals (household members)	PFHI covered: Government funded health insurance schemes in Chhattisgarh viz. RSBY, MSBY, ESIS, CGHS	**Hospitalization**: AOR (95%CI), N= 5977 -A person with insurance was significantly more likely to be hospitalized compared to a person with no insurance (AOR 1.388; 95% CI: 1.190–1.620). -Women (AOR1.80;95%CI:1.252.58), Scheduled Tribes and the poorest(Q1) were significantly more likely to be hospitalized in the public sector than men, other social groups and other UMPCE groups respectively. -Taking infection as the reference group, conditions like cancer (AOR0.11;95%CI:0.01–0.94) and respiratory conditions (AOR0.30;95%CI:0.09–0.97) were significantly less likely causes of admission in the public sector,

				obstetric and childbirth-related conditions were significantly more likely in the public sector (AOR1.63;95%CI:1.03–2.57). -Enrolment in government insurance was associated with hospitalization in the public sector at 90% Confidence Levels (AOR1.32;90%CI:1.01–1.72)
Philip, Kannan, Sarma, 2017	A comparative cross-sectional survey The demographic and socioeconomic characteristics and health care utilization of insured and uninsured households were compared using Pearson's $\chi 2$ test. Multivariate logistic regression analysis was	Using generalized estimating equations, the correlates of inpatient service utilization of individuals were estimated. The models were built by the method of iterative backward elimination and forward selection because the study did not use any conceptual framework, and it aimed at exploration. The	PFHI covered: CHIS of Kerala A total of 149 insured and 147 uninsured households, with 667 and 578 members, respectively, were included in the study conducted in Trivandrum district of Kerala.	-Overall Outpatient service utilization: 29.1% and -Overall Inpatient service utilization: 38.5%. -The utilization of outpatient services among insured (31.5%) and uninsured (26.5%) households; $P = 0.342$, statistically not significant at 95% CI. -The inpatient service utilization (insured, 44.3%; uninsured, 32.7%) with a P value of .04, statistically significant difference at 95% CI. -Inpatient service utilization among insured participants compared to noninsured (OR = 1.57; 95% CI = 1.05-2.34)

	used to derive the predictors of insurance status.	Mann-Whitney *U* test was used to compare the expenditure associated with inpatient care between the 2 groups		-Insurance status was found to be a significant correlate for inpatient service utilization after adjusting for age, sex, and chronic diseases -Generalized estimating equations for inpatient services (95% CI) o Age (0-5 reference category): o 6-15 y: OR 4.0 (0.5-30.4), p=0.176 o 16-45 y: OR: 2.0 (1.0-4.2), p=0.060 o >45 y: OR: 1.9 (1.3-3.0), p=.002 o Gender (Male/female): OR 1.5 (0.9-2.4) p=0.084 o Preexisting chronic disease: OR (0.5 0.3-0.7), p= <.001
Ranjan et. al., 2018	Analysis of a cross-sectional survey	-Data from the 71st round of NSSO survey I.e. 'Social Consumption: Health' survey	PFHI covered: Public Funded Health Insurance (PFHI) schemes e.g. RSBY	**1) Percentage of total hospitalization cases according to insurance coverage** A) Rural With government insurance

		-Propensity score matching (PSM) for the effectiveness of PFHIs and multiple logistic regression for association		All=49.8%; Poorest= 79.0%; Poor= 62.7%; Middle= 56.8%; Rich= 40.2%; Richest= 34.3% Without government insurance All= 50.8%; Poorest= 67.7%; Poor= 61.7%; Middle= 52.6 %; Rich= 47.4%; Richest= 29.1% B) Urban With government insurance All= 40.4%; Poorest= 57.6%; Poor= 47.8%; Middle= 38.6%; Rich= 35.5%; Richest= 24.4% Without government insurance All= 36.1%; Poorest= 51.6%; Poor= 42.0%; Middle= 33.6%; Rich= 23.3%; Richest= 16.2% **2) Hospitalization rate per 100 population** For government insurance= 5.4%; No insurance=4.2% **3) Factors effecting likelihood of hospitalization**

				Insurance (irrespective of the type of insurance) OR= 1.06 (95% CI= 0.98 to 1.14)
Rao et al., 2014	A difference-in-differences (DID) using repeated cross-sectional surveys with parallel control.	NSSO 2004 survey, A total of 5314 and 5059 households from Maharashtra (MH) and And hra Pradesh (AP) were surveyed by the NSSO in 2004 and Survey in 2012 included 10073 (MH) and 8623 (AP) households.	PFHI covered: RSBY and Arogyashree Two cross-sectional surveys: as a baseline, the data from the NSSO 2004 survey collected before the Aarogyasri and RSBY schemes were launched; and as post-intervention, a survey using the same methodology conducted in 2012. A survey of 18 696 HHs across 2 states and 1871 locations	**Hospitalization rates** (inpatient care): (number of individuals hospitalized during the previous year, per 1000 population): DID mean (95% CI) for both the states, Adjusted for co-variates 0.7 (-8.6 to 10.2), p value: 0.8685. 1.Gender: Hospitalization rates increased for both genders but statistically significant for female headed HHs (DID mean=27.6, 95% CI 1.1 to 54.1, p=0.0415) 2.Social class: Schedule tribe: DID mean: −19.8 (95% CI: −37.3 to −2.3) p=0.0272, for other social groups (SC, other excluded groups and all groups) it was not significant 3.Quintile: Poorest: DID mean: −14.4 (95% CI: −28 to −0.31) p=0.0451, for other quintiles it was not significant.

Raza, van de Poel, Panda, 2016	Two cross sectional surveys among SHG members themselves or the head of the (households) HHs	Primary study: Baseline survey: March and May 2010 (3,686 HHs) and follow-up survey: March and April in 2012 (3,318 HHs) and 2013 (3307 HHs). Location: Kanpur Dehat and Pratapgarh districts in Uttar Pradesh and Vaishali in Bihar	PFHI covered: RSBY	**Probability of hospitalizations**: RSBY membership is not significantly associated with the likelihood of hospitalization [**Pooled:** 0.000 (SE:0.010) n=10,125, **UP:** -0.010 (0.013), n= 6359; **Bihar:** 0.015 (0.017), n=3766] or the likelihood of positive spending within a HH, the latter most likely related to high likelihood of having expenses at baseline. **Sensitivity analysis** by restricting the sample to households in the bottom two asset tertiles: Not significant for polled, UP and Bihar.
Sood and Wagner et al, 2016	Quasi experimental design Logistic regression	3478 households in 300 villages where VAS was implemented and 3486 households in 272 neighboring matched villages ineligible for VAS. Total 572 villages	PFHI covered: VAS A government insurance programme that provided free tertiary care to households below the poverty line in half of villages in Karnataka from February 2010 to August	1) Treatment-seeking behavior: Households eligible for VAS were 4.4 percentage points (95% CI 0.7 to 8.2; 6.76% increase; p=0.022) more likely to seek treatment for their symptoms For symptoms associated with cardiac conditions, the increase in treatment seeking was more pronounced and more statistically significant at 4.38 percentage points (95% CI 0.1 to 8.7; 7.04% increase;

			2012. VAS eligible villages and VAS non-eligible villages	p=0.046); non-cardiac symptoms at 3.92 percentage points (6.4%, p=0.085). A) Any symptoms/ Symptoms-cardiac conditions/Symptoms of non-cardiac condition - VAS eligible HHs, n=2250, 69.73% /62.32/ 58.2 - VAS non-eligible HHs n=2209, 65.31%/ 66.71/ 62.16 - Difference: 4.42 (0.7 to 8.2), P < 0.01)/ 4.37** (0.1 to 8.7) / 3.92* (−0.6 to 8.4) - Adjusted difference: 4.96 (1.0 to 8.9), P < 0.01)/ 5.41** (0.9 to 9.9)/ 3.87* (−0.6 to 8.4) 2) Post operation well-being: Respondents from VAS-eligible villages reported greater improvements in well-being after the hospitalization in all categories which were statistically significant in three of the six categories

				No controls (N=173)/ Controls for illness composition (N=173)/ Controls for illness composition/ demographic characteristics†(N=173) • Walking ability 0.765*** (0.248)0.700*** (0.261)0.605** (0.273) • Pain 0.778*** (0.228)0.660*** (0.244)0.559** (0.246) • Anxiety0.464* (0.242)0.451* (0.261)0.387 (0.272
Sood et al, 2014	Quasi experimental design Multi variate models were used for analysis	All households in sampled villages of Karnataka were asked to participate in a door-to-door survey, and 81% of them completed the survey.	PFHI covered= VAS 31 476 households (22 796 below poverty line and 8680 above poverty line) in 300 villages where the scheme was implemented and 28 633 households (21 767 below poverty line and 6866 above poverty line) in	**Utilization of healthcare** **1. Households using tertiary care facility for potentially covered conditions** A) All facilities Unadjusted= −4.3% (p=0.52) Adjusted= −5.4% (p=0.64) B) All tertiary care facilities Unadjusted= 12.3% (p=0.46) Adjusted= 19.9% (p=0.26)

			272 neighboring matched villages ineligible for the scheme. A government insurance program (Vajpayee Arogyashree scheme) that provided free tertiary care to households BPL in about half of villages in Karnataka from February 2010 to August 2012.	C) Excluding emergency department admissions and stays of 4 ≤days Unadjusted= 44.2% (p=0.06) Adjusted= 42.7% (p=0.08) **Households reporting forgone need for care for VAS condition** Reported forgone need Unadjusted= −35.5% (p=0.07) Adjusted=−33.4% (p=0.09)
Sriram & Khan, 2020	Survey among poor individuals: Propensity score matching, logistic regression and Tobit regression.	NSSO survey 2014. N=64270 poor individuals	PFHI covered: Any PFHI scheme PFHI (n= 5917) were matched with control group (n=5917).	**Effect of PFHI on hospitalization (Multivariate analysis):** People enrolled in PFHI program have 1.23 (1.06-1.44) higher odds of incidence of hospitalization compared to poor people without HI.

			Average Treatment on Treated (ATT) Propensity Score Testing of Two Groups: Treated=0.1407, Control= 0.1191, Difference= 0.0216, T statistic= 2.89, SE: 0.0074. Matched with age, individual consumption expenditure, HH size, location and education.	-Individuals with **chronic illnesses** have 3.55 (2.87–4.45) higher probability of hospitalization compared to individuals without any chronic conditions. -All the **age groups** show higher probability of hospitalization compared to the reference age group of less than 18 years. [19-40: 1.06 (0.82–1.36), 41 to 60 years 2.44 (1.89–3.15), 61 to 80 years 2.99 (2.14–4.17), Older than 80 years 4.85 (1.71–13.69)] -Individuals belonging to the medium i.e. 5-8 [0.77 (0.66–0.89)] and large I.e. more than 8 [0.47 (0.39–0.58)] **HHs size** had lower probability of incidence of hospitalization compared to individuals from small HHs. -Social group, religion, urban/rural location, household type, marital status, education, number of hospital beds in the state were not significant in explaining variability in the incidence of hospitalizations.

				- state of residence of the individual using fixed effects had no significant effects. **Effect of PFHI on the duration or length of hospitalization (Tobit model):** Being enrolled in PFHI had no significant effect [0.44 (−0.47 - 1.35)] on the duration of hospitalization. -People who had **chronic illnesses** [3.15 (1.96–4.33)] had significantly higher duration of hospitalization compared to people with no chronic illnesses. -Other covariates such as HH type, religion, age, urban/ rural location, HH size, marital status, education, and number of hospital beds had no significant effect on the duration of hospitalization - Rajasthan, Uttar Pradesh, and Gujarat were the only three state showing significant results in fixed effects for the state of residence

Sabharwal et.al, 2014	Quasi experimental mixed methods study design	Two districts were selected for this study: Moradabad district in Uttar Pradesh and Aurangabad district in Maharashtra. At the block level (district sub-division), sites were selected where blocks had proportions of SC and Muslim population equal to the district average, and villages were selected with mixed social group populations. Altogether, the study was conducted in 30 villages (14 villages in Moradabad and 16 villages in Aurangabad).	PFHI covered: RSBY 1.Target group: SC, Muslim and upper caste poor households who are beneficiaries of RSBY (whether they have used the smart card or not) 2.Control group: SC, Muslim and upper caste poor households who are eligible for RSBY but who are not enrolled.	**Health care utilization:** In-patient care: Non-beneficiary: Any member of the household ever hospitalized, 1.65 (n=78), Beneficiary but not used RSBY, 1.85 (n=134) and beneficiary but used RSBY, 1.80(n=203) Between group F value: 0.60, not significant Outpatient care: Non-beneficiary: Any member of the household never hospitalized, 2.71(n=361) Any member of the household ever hospitalized, 2.87(n=70), Beneficiary but not used RSBY, 2.67(n=772) and beneficiary but used RSBY, 2.45(n=249) Between group F value: 1.76, not significant

		The households were randomly selected from each village based on RSBY beneficiary lists and BPL lists. The households in each location were stratified into beneficiary ('treatment') households and non-beneficiary or ('control') households. We included a control group in order to allow measurement of impact, given that this survey does not have a baseline		
Financial risk protection				

Azam, 2017	Three large scaled household surveys Matching difference-in-difference analysis (MDID) of longitudinal data	Two waves of India Human Development Survey (2011-12) and (2004-2005) and Human Development Profile of India (HDPI) collected in 1993-94. Data from three states I.e. Andhra Pradesh, Karnataka and Tamil Nadu was not considered.	PFHI covered: RSBY The households having RSBY cards were considered as treatment groups and household not having RSBY cards were control groups in an RSBY implemented district	**OOPE** **Rural India:** **A)** RSBY HHs were 1.1% points (p>0.05; SE=0.013) more likely to report OOPE expenditure. ATT as % change for RSBY HHs was 1.56. B) Per capita in-patient expenditure (in INR) for RSBY HHs was –11.567 (SE=12.897). ATT as % change for RSBY HHs was –19.46. C) Per capita out-patient expenditure (in INR) for RSBY HHs was 11.257 (SE=11.200). ATT as % change for RSBY HHs was –11.89 D) Per capita total OOP in INR for RSBY HHs was -22.717 (SE=20.156). ATT as % change for RSBY HHs was -14.76. E) RSBY HHs were –0.5% points (p>0.05; SE=0.014) more likely to incur Catastrophic medical expenditure (10% of consumption exp)

				F) RSBY HHS were 1.1% points (p>0.05; SE=0.010) more likely to incur Catastrophic medical expenditure (25% of consumption exp.) G) RSBY HHs were 0.8% points (p>0.05; SE=0.008) more likely to take loan for meeting medical expenses. H) Per capita expenditure on long-term morbidity, for RSBY HHs, was –13.450 (p>0.05; SE=12.531) I) Per capita expenditure on medicines, for RSBY households was -21. 782 (p<0.05; SE=9.492) (This means reduction by 22 INR) **Urban India:** **A)** RSBY HHs were –3.7% points (p<0.1; SE=0.020) more likely to incur OOPE. ATT as % change for RSBY HHs was –5.56. B) For RSBY HHs, per capita inpatient expenditure in INR was - 3.786 (p>0.05; SE=38.906).

				C) For RSBY HHs, per capita outpatient expenditure in INR was -10.574 (p>0.05; SE=11.390) D) Per capita total OOP in INR was - 14.540 (p>0.05; SE=35.198) E) RSBY HHs were –3.3% points (p>0.05; SE= 0.022) more likely to incur catastrophic medical expenditure (10% of consumption exp.) F) RSBY HHs were –2.2% points (p>0.05; SE= 0.014) more likely to incur catastrophic medical expenditure (25% of consumption exp.) G) RSBY HHs were 3.0% points (p<0.05; SE=0.013) more likely to take loan for meeting medical expenses H) Per capita expenditure on long-term morbidity, for RSBY HHs, was 40.978 (p>0.05; SE=31.105) I) Per capita expenditure on medicines, for RSBY households was 28.763 (p>0.05; SE=31.492)

Barnes et al., 2017	Cross sectional household Survey (nature experiment) Models used for analysis: Empirical model Stylized utility model	Survey was carried out in total of 572 village 272 villages from the northern part of Karnataka and 300 villages from the southern part of Karnataka Total sample was 6964 HHs with BPL cards	PFHI covered: Vajpayee Arogya Shree Scheme Intervention group: northern district village that had access to VAS: 272 Villages Control group: Southern district villages that did not have an access to VAS: 300 Villages	**1) Money borrowed for health reasons in past one year** VAS households= 20.7% Non-VAS households= 24.2% Difference= -3.5% ($p<0.01$) **2) Catastrophic health care expenditures** Percentage of non-food expenditure limit A) Percentage reaching catastrophic limit: a. 40% of non- food expenditure limit VAS= 2.70% Non-VAS= 3.41 % Difference= -0.71% ($p<0.1$) b. 50% of non- food expenditure limit VAS= 2.22% Non-VAS= 2.6 1% Difference= −0.39% (non-significant) c.60% of non- food expenditure limit VAS= 1.68%

				Non-VAS= 2.08% Difference= −0.40% (not significant) d. 70% of non- food expenditure limit VAS= 1.34% Non-VAS= 1.80% Difference= −0.46 % (non-significant) e.80% of non- food expenditure limit VAS= 0.91% Non-VAS= 1.54% Difference= −0.6 3% (p<0.05) B) Mean amount over catastrophic limit (INR) a. 40% of non- food expenditure limit VAS= 36 ,822.19 Non-VAS= 56 ,700.92 Difference= −19,878.73 (p<0.05) b. 50% of non- food expenditure limit VAS= 36,862.71 Non-VAS= 66,307.45

				Difference= −29,444.75 (p<0.05) c.60% of non- food expenditure limit VAS= 40,356.36 Non-VAS= 75, 415.93 Difference= −35, 05 9.58 (p<0.05) d. 70% of non- food expenditure limit VAS= 43,215.88 Non-VAS= 80,362.84 Difference= −37,146.96 (p<0.05) e.80% of non- food expenditure limit VAS= 56,292.79 Non-VAS= 86,913.19 Difference= −30,620.40 (non-significant) Percentage of total expenditure limit A) Percentage reaching catastrophic limit: a. 10% of total expenditure limit VAS= 10.03% Non-VAS= 10.09%

				Difference= −0.05 % (non-significant) b. 20% of total expenditure limit VAS= 5 .92% Non-VAS= 6.38% Difference= −0.46 % (non-significant) c. 30% of total expenditure limit VAS= 3.89% Non-VAS= 4.49% Difference= −0.60% (non-significant) d. 40% of total expenditure limit VAS= 2.58% Non-VAS= 3.34% Difference= −0.76 % (p<0.1) e. 50% of total expenditure limit VAS= 2.09% Non-VAS= 2.55 % Difference= −0.45 % (non-significant) B) Mean amount over catastrophic limit (INR)

				a. 10% of total expenditure limit VAS= 21,313.18 Non-VAS= 31,983.49 Difference= −10,670.31 (p<0.01) b. 20% of total expenditure limit VAS= 26,232.83 Non-VAS= 40,554.01 Difference= −14,321.17 (p<0.05) c. 30% of total expenditure limit VAS= 30,760.43 Non-VAS= 48,536.53 Difference= −17,776.10 (p<0.05) d. 40% of total expenditure limit VAS= 37,489.47 Non-VAS= 56,974.87 Difference= −19,485.41 (p<0.05) e. 50% of total expenditure limit VAS= 37,6 90.21

				Non-VAS= 66,712.53 Difference= −29,022.32 (p<0.05) **3) Distributional effects of access to insurance on out-of-pocket spending** **Using conditional quantile regression and censored quantile regression** Conditional VAS Estimates Using Koenker & Basset Estimator 5th Quantile: VAS estimate= −529.99 (SE=215.56, p<0.05) 10th Quantile: VAS estimate= −711.76 (SE=243.99, p<0.01) 15th Quantile: VAS estimate= −876 .6 2 (SE=343.74, p<0.05) 25th Quantile: VAS estimate= −1,485.29 (SE=459.92, p<0.01) 40th Quantile: VAS estimate= −2,197.19 (SE=495.55, p<0.01)

				50th Quantile: VAS estimate= −2,878.92 (SE=706.33, p<0.01) 60th Quantile: VAS estimate= −2,589.79 (SE=1,242.94, p<0.05) 75th Quantile: VAS estimate= −4,484.71 (SE=1,340.32, p<0.01) 85th Quantile: VAS estimate= −6,408.61 (SE=3,600.68, p<0.1) 90th Quantile: VAS estimate= −4,941.37 (SE=5,196.11, p>0.1) 95th Quantile: VAS estimate= −23,548.1 (SE=8,199.09, p<0.01) Unconditional VAS Estimates Using Chernozhukov & Hong Estimator For unconditional distribution effect on OOPE was not seen for initial lower quantiles 85th Quantile: VAS estimate= 802.20 (SE=365.61, p<0.05)

				90th Quantile: VAS estimate= −1,026.96 (SE=705.06, p>0.1) 95th Quantile: VAS estimate= −3,906.08 (SE=1,748.25, p<0.05)
Fan, Karan and Mahal, 2012	Secondary data analysis Difference in difference (DID) method; regression	Data from Consumer Expenditure Surveys for 1999-2000, 2004-2005, 2007-2008 i.e., The 55th, 61st and 64th round of the NSSO surveys	PFHI covered: Arogyashree in AP **Treatment groups (Andhra Pradesh)** Phase 1: Activities started in April 2007 and renewal in April 2008. Phase I districts were Ananthapur, Mahabubnagar, and Srikakulam. n: 2004-05=1702 and 2007-08 =448	**The impact of Aarogyasri on per capita monthly OOP spending**: (Only statistically significant DID results are extracted here, **p<0.01, *p<0.05) **A. Andhra Pradesh sample** *1.Inpatient expenditure*: a. Region and state fixed effects: Phase 1: −12.177 (SE: 0.352)**, Phase 2: Not significant result b. With HH covariates in addition to region and state fixed effects Phase 1: −11.822 (SE: 0.425)**, Phase 2: Not significant result *2.Inpatient drug expenditure*

			Phase 2: Activities started in December 2007 and renewed in December 2008. Phase II districts were East Godavari, West Godavari, Nalgonda, Rangareddy, and Chittoor n: 2004-05 = 2057 and 2007-08= 863 **Control Group (Andhra Pradesh)** that were not covered by Phases 1 and 2. 2004-2005 (n)= 5269 2007-2008 (n)= 2172	a. Region and state fixed effects: Phase 1: −5.325 (SE: 1.017)**, Phase 2: Not significant result b. With HH covariates in addition to region and state fixed effect: Phase 1: −5.111 (SE: 0.926)**, Phase 2: Not significant result *1.Outpatient, outpatient drug and total expenditure* result was not significant for both, Phase 1 and 2 **B) South India sample** *1.Inpatient expenditure*: a. Region and state fixed effects: Phase 1: −14.350 (SE: 4.005)**, Phase 2: Not significant result b. With HH covariates in addition to region and state fixed effect:

			Control Groups (All India) n= 2004-05: 116,136 and 2007-08: 46,814	Phase 1: −13.430 (SE: 3.791)**, Phase 2: Not significant result *1.Inpatient drug expenditure* a. Region and state fixed effects:: Phase 1: −4.617 (SE: 1.143)**, Phase 2: Not significant result b. With HH covariates in addition to region and state fixed effect Phase 1: −4.310 (SE: 1.067)**, Phase 2: Not significant result *1.Outpatient drug expenditure* a. Region and state fixed effect: Phase 2: −7.120 (SE: 3.055)*, Phase 1: Not significant result b. With HH covariates in addition to region and state fixed effect: Phase 2: −7.211(SE: 3.201)*, Phase 1: Not significant result

				1.Outpatient and total expenditure: Result was not significant for both phases **C) All India sample** *1.Inpatient expenditure*: a. Region and state fixed effects: Phase 1: −11.304 (SE: 1.717)**, Phase 2: Not significant result b. With HH covariates in addition to region and state fixed effects Phase 1: −10.606 (SE: 1.787)**, Phase 2: Not significant result *1.Inpatient drug expenditure* a. Region and state fixed effects: Phase 1: −3.669 (SE: 0.664)**, Phase 2: Not significant result b. With HH covariates in addition to region and state fixed effects

				Phase 1: −3.517 (SE: 0.606)**, Phase 2: Not significant result *1.Outpatient drug expenditure* a. Region and state fixed effects: Phase 2: −6.417 (SE: 2.747)*, Phase 1: Not significant result b. With HH covariates in addition to region and state fixed effects Phase 2: −6.973 (SE: 2.837)*, Phase 1: Not significant result *1.Outpatient and total expenditure*: Result was not significant for both phases **Effect of Aarogyasri on impoverishment and CHE over 2004–2008** A. **Impoverishment:** Results of intervention, South India and All India locations for both Phases (1 &2) were statistically not significant, irrespective of using region and state fixed

				effects or using HH covariates in addition to region and state fixed effect models. B. **Impoverishment from OOPE:** Results of intervention, South India and All India locations for both Phases (1 &2) were statistically not significant, irrespective of using region and state fixed effects or using HH covariates in addition to region and state fixed effect models. A. **Total health expenditure ≥ 15% of total household expenditure:** Phase 2 using region and state fixed effect model, DID for all India sample was: −0.041 (SE: 0.020)*. Results of intervention and South India for both Phases (1 &2) were statistically not significant, irrespective of using region and state fixed effects or using HH covariates in addition to region and state fixed effect models. Result was not significant for phase 1 of All India locations using both models and

				for phase 2 using HH covariates in addition to region and state fixed effect model. B. **Total health expend. ≥25% of non-food household expenditure** Phase 2 using region and state fixed effect model, DID for all India sample was: −0.043 (SE: 0.020)*and using HH covariates in addition to region and state fixed effect model was −0.042 (SE: 0.020)*. Results of intervention and South India for both Phases (1 &2) were statistically not significant, irrespective of using region and state fixed effects or using HH covariates in addition to region and state fixed effect models. C. **Total health expend. ≥ 15% of total expend. and inpatient expend. ≥ 7.5%** a. **Andhra Pradesh sample** Phase 1: region and state fixed effect model: −0.025 (SE: 0.010)* and using HH covariates in addition to

				region and state fixed effect models −0.025 (SE: 0.010)*. For Phase 2 it was not significant. b. **South India sample** Phase 1: region and state fixed effect model: −0.029 (SE: 0.013)* and using HH covariates in addition to region and state fixed effect models −0.027 (SE: 0.018)*. For Phase 2 it was not significant. c. **All India sample** Phase 1: region and state fixed effect model: −0.030 (SE: 0.012)* and using HH covariates in addition to region and state fixed effect models −0.029 (SE: 0.011)*. Phase 2: region and state fixed effect model: −0.014 (SE: 0.005)* and using HH covariates in addition to region and state fixed effect models −0.014 (SE: 0.000)*. **Effect of Aarogyasri on prevalence of any health expenditure in household over 2004–2008**

				A. **Any health expenditure** a. **Andhra Pradesh sample** Phase 1: region and state fixed effect model: −0.180 (SE: 0.021)** and using HH covariates in addition to region and state fixed effect models −0.164 (SE: 0.020)*. For Phase 2 it was not significant. b. **South India sample** Phase 1: region and state fixed effect model: −0.163 (SE: 0.068)* and using HH covariates in addition to region and state fixed effect models −0.150 (SE: 0.066)*. For Phase 2 it was not significant. c. **All India sample** Phase 1: region and state fixed effect model: −0.176 (SE: 0.060)* and using HH covariates in addition to region and state fixed effect models −0.167 (SE: 0.057)*. For Phase 2 it was not significant.

				B. **Any inpatient expenditure** a. **Andhra Pradesh sample** For both Phases and using both model the result was not significant. b. **South India sample** Phase 1: region and state fixed effect model: −0.061 (SE: 0.022)* and using HH covariates in addition to region and state fixed effect models −0.059 (SE: 0.023)*. For Phase 2 it was not significant. c. **All India sample** Phase 1: region and state fixed effect model: −0.065 (SE: 0.020)* and using HH covariates in addition to region and state fixed effect models −0.063 (SE: 0.020)*. For Phase 2 it was not significant. C. **Any outpatient expenditure** a. **Andhra Pradesh sample**

				Phase 1: region and state fixed effect model: −0.132 (SE: 0.017)** and using HH covariates in addition to region and state fixed effect models −0.116 (SE: 0.013)*. For Phase 2 it was not significant. b. **South India sample** Phase 1: region and state fixed effect model: −0.138 (SE: 0.063)* and using HH covariates in addition to region and state fixed effect models −0.125 (SE: 0.061)*. For Phase 2 it was not significant. c. **All India sample** Phase 1: region and state fixed effect model: −0.149 (SE: 0.059)* and using HH covariates in addition to region and state fixed effect models −0.140 (SE: 0.056)*. For Phase 2 it was not significant. D. **Any inpatient drug expenditure** a. **Andhra Pradesh and South India sample**

				The result for both phases and using both models, was not statistically significant b. **All India sample** Phase 1: region and state fixed effect model: −0.048 (SE: 0.021)* and using HH covariates in addition to region and state fixed effect models −0.046 (SE: 0.021)*. For Phase 2 it was not significant. E. **Any outpatient drug expenditure** **a. Andhra Pradesh sample** Phase 1: region and state fixed effect model: −0.100 (SE: 0.029)** and using HH covariates in addition to region and state fixed effect models −0.084 (SE: 0.026)*. For Phase 2 it was not significant. **b. South India sample** Result for both phases and both models was not significant. c. **All India sample**

				Phase 1: region and state fixed effect model: −0.125 (SE: 0.056)* and using HH covariates in addition to region and state fixed effect models −0.116 (SE: 0.053)*. For Phase 2 it was not significant.
Ghosh & Gupta, 2017	Impact evaluation: Coarsened exact matching and, linear and logit regression	National Sample Survey data: 18 states, which do not have additional state funded insurance (round not reported). States having specific PFHIs, union territories not exposed to RSBY and states not having functional RSBY in the year 2014-15 were excluded	PFHI covered: RSBY **Treated group**: Household having at least one person enrolled in RSBY. **Control**: no RSBY	**1) OOPs on all OP visits:** no statistically significant difference between RSBY insured & uninsured households in terms of OOP expenditure on OP visits i.e. SATT=-1014.12 (p=0.097) 2) Incidence of **catastrophic expenditure for OP care**: OR= 0.64 (p=0.23) 3) **OOPs on all IP visits**: no statistically significant difference between RSBY insured & uninsured households in terms of OOP expenditure on inpatient visits I.e. SATT=-6122.37 (p=0.063) 4) the probability of **incurring zero OOP expenditure on IP care** is not statistically different

				between the RSBY-insured and uninsured families i.e. OR= 1.75 (p=0.127) 5) Incidence of **catastrophic expenditure for IP care:** OR= 0.86 (p=0.5). 6) **Impoverishment due to OOP on IP car**e: SATT= 0.83 (p=0.663) 7) **Total OOP spendin**g: SATT= -550.47 (p=0.067) 8) Incidence of catastrophic expenditure: OR= 0.76 (p=0.130) 9) **Impoverishment**: SATT= 0.96 (p=0.896)
Garg, 2020	Impact evaluation using NSS survey 2004 when there was no PFHI, and 2014 data (for older PFHI scheme) and primary household survey in 2019 (for data related to the effect of	NSS survey data Multivariate analysis to see the effect of PMJAY on CHE and OOPE OLS model for continuous outcome available	PFHI covered: PMJAY scheme introduced in the year 2018. The study also mentions other PFHI schemes like MSBY and RSBY operational in Chhattisgarh	**1) OOPE and financial protection** A) Mean OOPE for Hospitalization Episodes (in INR) Public= 3078 (95% CI1928–4228) Private= 19,375 (95% CI11305–27,447) B) Median OOPE for Hospitalization Episodes (in INR) Public= 530 (95% CI 379–758) Private= 7299 (95% CI 3788–9032)

	first year of implementing PMJAY) in the state of Chhattisgarh, India	and Probit model for binary outcome variable. Compared with ATT under Propensity Score Matching or PSM Multivariate analysis was repeated for OOPE and CHE using IV approach. For OOPE 2sls was applied as IV model, and for CHE two step IV Probit was applied		C) Proportion of incurred CHE25 for Hospitalization Episode (%) Public= 7.6 (95% CI 4.5–11.0) Private= 43.6 (95% CI 36.3–51.4) **2) Effect of enrolment in PMJAY and other PFHI on OOPE and CHE** A) OLS model (for continuous outcome variable) OOPE (PMJAY)= coeff − 4287 (p=0.09) OOPE (PFHI)= coeff. −87 (p=0.97) Log of OOPE (PMJAY)= coeff. −0.45 (p< 0.01) Log of OOPE (PFHI)= coeff. −0.34 (p < 0.01) B) Probit Model (for binary outcome variable) CHE 10 (PMJAY)= coeff. 0.08 (p=0.35) CHE10 (PFHI)= coeff. −0.07 (p=0.29) CHE25 (PMJAY) =coeff. 0.22 (p= 0.01) CHE25 (PFHI)= coeff. 0.04 (p= 0.56) CHE40 (PMJAY)= coeff. 0.26 (p=0.01) CHE40 (PFHI)= coeff. 0.05 (p=0.55)

				C) PSM model (ATT) OOPE (PMJAY)= coeff. − 4614 (p=0.20) OOPE (PFHI)= coeff. − 1066 (p=0.73) Log of OOPE (PMJAY)= coeff. −0.37 (p< 0.01) Log of OOPE (PFHI)= coeff. − 0.50 (p< 0.01) CHE10 (PMJAY)= coeff. 0.02 (p=0.52) CHE10 (PFHI)= coeff. 0.003 (p=0.90) CHE25 (PMJAY)= coeff. 0.05 (p=0.08) CHE25 (PFHI)= coeff. 0.02 (p=0.33) CHE40 (PMJAY)= coeff. 0.04 (p=0.14) CHE40 (PFHI)= coeff. 0.01 (p=0.36) D) IV model OOPE (PMJAY)= coeff. 48,734 (p=0.59) OOPE (PFHI)= coeff. 17,315 (p=0.72) Log of OOPE (PMJAY)= coeff. −0.48 (p=0.86) Log of OOPE (PFHI)= coeff. 1.01 (p=0.53) CHE10 (PMJAY)= coeff. −4.39 (p=0.28) CHE10 (PFHI)= coeff. −2.23 (p=0.23)

				CHE25 (PMJAY)= coeff. −2.03 (p=0.54) CHE25 (PFHI)= coeff. −1.28 (p=0.48) CHE40 (PMJAY)= coeff. −0.67 (p=0.85) CHE40 (PFHI)= coeff. −0.68 (p=0.74)
Garg, Chowdhury & Sundararaman, 2019	Secondary data analysis of the two rounds of NSS cross- sectional survey	The 60th round of NSSO (2004) and 71st round of NSSO (2014) in three states of Andhra Pradesh, Karnataka and Tamil Nadu. Instrument Variable (IV) method was used in the multivariate analysis Two-step least square (2sls) for OOPE and Two-step IV Probit model for Utilization and CHE	PFHI covered: The three Public Funded Health Insurance (PFHI) Schemes operational in Andhra Pradesh (Rajiv Arogyashree or the NTR Vaidya Seva); Karnataka (Vajpayee Arogya Shree); Tamil Nadu (Tamil Nadu Chief Minister's Comprehensive Health Insurance Scheme)	A) **Mean OOPE for hospitalization episodes (in INR)** **Andhra Pradesh** 2004: Public Hospital 5042 (95% CI=4110–5976); Private hospital 19,657 (95% CI=17302–22,013) 2014: PFHI enrolled: Public hospital 2864 (95%CI=1725–4004); Private hospital 15,827 (95%CI=14570–17,084) Non enrolled: Public hospital 2355 (95% CI=1714–2998); Private hospital 17,934 (15676–20,194) **Karnataka:** 2004: Public hospital 4511 (95% CI=3794–5229); Private hospital 18,085 (95%CI=16111–20,058)

			The pre PFHI in 2004 and post PFHI (2014) comparisons were made	2014: PFHI enrolled: Public hospital 2888 (95%CI=1551–4226); Private hospital 16,121 (95%CI=12482–19,760) Non enrolled: Public hospital 3556 (95%CI=3030–4082); Private hospital 17,873 (95%CI=16489–19,258) **Tamil Nadu** 2004: Public hospital 3291 (95% CI=1873–4710); private hospital 24,637 (95% CI=20752–28,522) 2014: PFHI enrolled: Public hospital 802 (95%CI=611–993); Private hospital 23,966 (95%CI=21060–26,872) Non enrolled: Public hospital 954 (95%CI=788–1120); private hospital 26,425 (95%CI=24140–28,711) **B) Median OOPE for hospitalization episode (in INR)**

				Andhra Pradesh 2004: Public Hospital 1660 (95%CI=1461–1853); Private hospital 9900 (95%CI=9020–10,719) 2014: PFHI enrolled: Public Hospital 600 (95%CI=500–850); Private hospital 10,493 (95%CI=9894–11,303) Non enrolled: Public hospital 925 (95%CI=600–1140); Private hospital 12,130 (95%CI=10990–13,500) **Karnataka** 2004: Public hospital 2027 (95%CI=1667–2437; private hospital 8800 (95%CI=7700–9612) 2014 PFHI enrolled: Public hospital 1140 (95%CI=817–1914); private hospital 8800 (95%CI=7239–10,835) Non-enrolled: Public Hospital 1975 (95%CI=1700–2250; private hospital 10,625 (95%CI=10000–11,400)

				Tamil Nadu 2004: Public Hospital 535 (95%CI=466–629); private hospital 10,718 (95%CI=9602–11,271) 2014 PFHI enrolled: Public hospital 370 (95%CI=300–500); private hospital 15,450 (95%CI=13900–17,584) Non-enrolled: Public hospital 350 (95%CI=300–400); private hospital 15,095 (95%CI=14000–15,771) **C) Proportion of individuals incurred CHE25 (Catastrophic Health expenditure 25% of annual household consumption expenditure) for Hospitalization Episode (%)** **Andhra Pradesh** 2004: Public 6.4 (95%CI=4.6–8.2); private 24.7 (95%CI=22.6–26.8) 2014: For PFHI enrolled: Public 2.7 (95% CI=1.1–4.4); Private 17.7 (95%CI=15.3–20.1)

				Non enrolled: Public 1.7 (95% CI=0–3.5); private 17.1 (95% CI=14.5–19.8) **Karnataka** 2004: public 5.1 (95%CI=3.2–7.0); private 23.9 (95% CI=21.2–26.6) 2014 For PFHI enrolled: Public 2.2 (95%CI=0–5.8); private 20.0 (95%CI=13.1–26.9) Non enrolled: Public 3.1 (95%CI=1.9–4.4); 22.6 (95%CI=20.6–24.5) **Tamil Nadu** 2004: Public 2.4 (95% CI=1.5–3.4); private 27.4 (95% CI=25.2–29.7) 2014 For PFHI enrolled: Public 0 (95%CI=0–0); private 27.2 (95%CI=23.1–31.4) Non-enrolled: Public 0.3 (95%CI=0–0.6); private 29.3 (95%CI=27.2–31.5)

				D) Proportion of individuals incurred CHE40 for hospitalization episode (%) **Andhra Pradesh** 2004: Public 3 (95%CI=1.7–4.2; private 13.7 (95%CI=12.0–15.4) 2014 For PFHI enrolled: Public 0.2 (95%CI=0–0.7); private 9.4 (95%CI=7.6–11.3) Non-enrolled: Public 0 (95%CI=0–0); private 8.7 (95%CI=6.7–10.7) **Karnataka** 2004: Public 2.6 (95%CI=1.2–4.0); private 12.5 (95%CI=10.3–14.6) 2014: For PFHI enrolled: Public 0.8 (95%CI=0–3); private 11.3 (95%CI=5.8–16.8) Non-enrolled: Public 1.7 (95%CI=0.8–2.6); private 11.8 (95%CI=10.3–13.3)

				Tamil Nadu 2004: Public 1.5 (95%CI=0.7–2.2); private 17 (95%CI=15.1–18.9) 2014 For PFHI enrolled: Public 0 (95%CI=0–0); private 14.7 (95%CI=11.4–18.0) Non-enrolled: Public 0 (95%CI=0–0); 14.4 (95% CI=12.7–16.0) **E) Proportion of individuals incurred CHE10 for hospitalization episode (%)** **Andhra Pradesh** 2004: Public 17.9 (95%CI=15.1-20.7); private 53.6 (95%CI=51.2 – 56.1) 2014 For PFHI enrolled: Public 8.7 (95% CI=5.8-11.6); private 51 (95%CI=47.8-54.2) Non-enrolled: Public 7.3 (95%CI=3.5-11.2); private 50.9 (95%CI=47.4-54.4)

				Karnataka 2004: Public 20.3 (95%CI=16.8-23.8); private 49.6 (95%CI=46.5-52.8) 2014 For PFHI enrolled: Public 8 (95%CI=1.4-14.5); private 43.1 (95%CI=34.5-51.7) Non-enrolled: Public 11.5 (95%CI=9.3-13.9); private 53.2 (95%CI=50.9-55.5) **Tamil Nadu** 2004: Public 8 (95%CI=6.3-9.7); private 50 (95%CI=47.4-52.5) 2014 For PFHI enrolled: Public 0.7 (95%CI=0-1.9); Private 59.3 (95%CI=54.7-63.9) Non enrolled: Public 1.2 (95%CI=0.6-1.8); private 58.3 (95%CI=55.9-60.6) **F) 2sls regression for size of OOPE for hospitalization**

				PFHI enrolment was not associated with the size of OOPE in any of the three states Andhra Pradesh Government insurance(yes)= coeff 2944.541 (SE= 35372.290, 95%CI= -66383.880 to 72272.960) Karnataka Government insurance (yes)= coeff 45744.550 (SE= 34789.840; 95%CI= -22442.280 to 113931.400) Tamil Nadu Government insurance (yes)= coef 63942.380(SE= 49332.880; 95%CI= - 32748.280 to 160633.000) **G) Association between government insurance and CHE25** Enrolment in PFHI schemes was not significantly associated with incidence of CH25 Andhra Pradesh: coef 1.407(SE= 0.881; 95%CI= -0.319 TO 3.134)

				Karnataka: coef 2.463 (SE= 2.279; 95%CI= -2.003 to 6.929) Tamil Nadu: coef 1.58(SE= 1.859; 95%CI= -2.063 to 5.223) **H) Association between government insurance and CHE40** Enrolment in PFHI schemes was not significantly associated with incidence of CHE40 in all the three states Andhra Pradesh: coef -1.788 (SE= 1.171; 95%CI= -4.084 to 0.508) Karnataka: coef. 0.788 (SE= 2.668; 95%CI= -4.440 to 6.016) Tamil Nadu: coef. 1.653 (SE= 2.099; 95%CI= -2.462 to 5.768) **I) Association between government insurance and CHE10**

				Enrolment in PFHI schemes was not significantly associated with incidence of CHE10 in all the three states Andhra Pradesh: coef. -1.35178 (SE= 0.8440585; 95%CI= -3.006104 to 0.3025442) Karnataka= coef. 3.546654 (SE= 6.232684; 95%CI= -8.669182 to 15.76249) Tamil Nadu: coef. 1.039547(SE= 1.048903; 95%CI= -1.016266 to 3.09536) **J) Association between PFHI enrolment and OOPE** Andhra Pradesh: coef. − 5374 ($p<0.001$) Karnataka: coef. -4064 ($p<0.05$) Tamil Nadu: coef. 2665 ($p>0.05$) **K) Association between PFHI enrolment and CHE 10** Andhra Pradesh: −0.235 ($p<0.001$) Karnataka: −0.153 ($p>0.05$)

				Tamil Nadu: −0.085 (p>0.05) **L) Association between PFHI enrolment and CHE 25** Andhra Pradesh: −0.210 (p<0.001) Karnataka: −0.083 (p>0.05) Tamil Nadu: −0.031 (p>0.05) **M) Association between PFHI enrolment and CHE 40** Andhra Pradesh: −0.255 (p<0.001) Karnataka: −0.118 (p>0.05) Tamil Nadu: 0.090 (p>0.05)
Johnson, & Krishnaswamy, 2012	Secondary data analysis of the two rounds of NSSO data	NSSO round 61 (conducted in 2004-05) and round 66 (conducted in 2009-10) as pre and post surveys Excluding Andhra Pradesh, Karnataka and Tamil Nadu	PFHI covered: RSBY **Treatment group**= RSBY treated districts *A household is deemed treated if the policy start	**1) Impact of RSBY (without household matching)** **A)** OP expenditure (in Rs) Triple diff= - 4.478 (p<0.05) DID= -4.716(p<0.01) B) IP expenditure (in Rs) Triple diff.= -8.938 (p>0.1 i.e. 0.104) DID= 1.106 (P>0.1 I.e. p=0.461)

		-Difference in differences analysis -Triple difference analysis (non BPL households as a second control) -Coarsened exact matching approach	date in that district was two month prior to the date of the interview in order to give the household sufficient time to undergo a procedure **Control 1=** those districts where RSBY was planned (and an insurer identified), but not launched at the time of the survey **Control 2=** districts where RSBY was not planned at the time.	C) Total Medical Exp. (in Rs.) Triple diff.= -13.42 (p<0.05 i.e. p= 0.046) DID= -3.610 (P<0.05 I.e. p= 0.025) D) Was hospitalized Triple diff.= 0.0249 (p<0.05 i.e. p= (0.018) DID= 0.0157 (P>0.1 I.e. p= 0.473) **2) For duration of treatment model (without household matching)** **A)** OP expenditure (in Rs) Triple diff.= -0.230 (p>0.1 i.e. p= 0.357) DID= -0.280 (P<0.05 I.e. p= 0.033) B) IP expenditure (in Rs) Triple diff.= -0.811 (p<0.1 i.e. 0.066) DID= - 0.00277 (P>0.1 I.e. p= (0.984) C) Total Medical Exp. (in Rs.) Triple diff.= - 1.041 (p<0.1 i.e. p= (0.075) DID= -0.282 (P<0.1 I.e. p= 0.076) D) Was hospitalized

			297 control and 204 treatment districts with a total of 186,065 households. Out of these, 102,810 are from the PRE intervention round and 83,255 from the POST round	Triple diff.= 0.00299 (p<0.01 i.e. p= 0.006) DID= 0.000672 (P>0.1 I.e. p= 0.720) **3) Impact of RSBY (for matched districts and households)** **A)** OP expenditure (in Rs) Triple diff.= -3.767 (p<0.1 i.e. p= 0.071) DID= - 4.934 (P<0.01 I.e. p= 0.001) B) IP expenditure (in Rs) Triple diff.= -7.683 (p>0.1 i.e. 0.143) DID= 1.183 (P>0.1 I.e. p= 0.413) C) Total Medical Exp. (in Rs.) Triple diff.= -11.45 (p<0.1 i.e. p= 0.053) DID= -3.751 (P<0.05 I.e. p= 0.015) D) Was hospitalized Triple diff.= 0.0259 (p<0.05 i.e. p= 0.019) DID= 0.0171 (P>0.1 I.e. p= 0.437) **4) For duration of treatment model (matched districts and households)**

				A) OP expenditure (in Rs) Triple diff.= -0.136 (p>0.05 i.e. p= (0.511) DID= - 0.312 (P<0.05 I.e. p= 0.025) B) IP expenditure (in Rs) Triple diff.= -0.677 (p>0.1 i.e. p= 0.117) DID= - 0.00457 (P>0.1 I.e. p= 0.972) C) Total Medical Exp. (in Rs.) Triple diff.= -0.813 (p>0.1 i.e. p= 0.109) DID= - 0.316 (P<0.05 I.e. p= 0.041) D) Was hospitalized Triple diff.= 0.00311 (p<0.01 i.e. p= 0.005) DID= 0.000715 (P>0.1 I.e. p= 0.706) **5) Impact of RSBY (matched districts and households) – No Uttar Pradesh and Haryana** **A)** OP expenditure (in Rs) Triple diff.= -3.650 (p>0.05 i.e. p= (0.511) DID= - 2.878 (P<0.01 I.e. p= 0.010) B) IP expenditure (in Rs)

				Triple diff.= -10.52 (p>0.1 i.e. p= 0.153) DID= 1.734 (p>0.1 I.e. p= 0.346) C) Total Medical Exp. (in Rs.) Triple diff.= -14.17 (p>0.1 i.e. p= 0.096) DID= -1.144 (P>0.1 I.e. p= 0.403) D) Was hospitalized Triple diff.= 0.0269 (p<0.05 i.e. p= 0.042) DID= 0.0543 (P<0.1 I.e. p= 0.005) **6) For duration of treatment model (Matched districts and households) (No Uttar Pradesh and Haryana)** **A)** OP expenditure (in Rs) Triple diff.= -0.186 (p>0.1 i.e. p= 0.496) DID= -0.122 (P>0.1 I.e. p= 0.314) B) IP expenditure (in Rs) Triple diff.= -0.679 (p>0.1 i.e. p= 0.292) DID= 0.0322 (p>0.1 I.e. p= 0.834) C) Total Medical Exp. (in Rs.)

				Triple diff.= -0.865 (p>0.1 i.e. p= 0.241) DID= -0.0895 (P>0.1 I.e. p= 0.560) D) Was hospitalized Triple diff.= 0.00419 (p<0.01 i.e. p= 0.000) DID= 0.00349 (P<0.1 I.e. p= 0.076) Note: OP exp, IP Exp and Total exp. are per capita per month
Karan, Yip, Mahal, 2017	-Three repeated cross section HH Surveys -Difference-in-differences (DID) methods were used to evaluate the causal impacts of RSBY -'intention to treat' (ITT) effect -propensity-score matching, to create	Three waves of HH 'Consumer Expenditure Surveys' (CES): 1999-2000 (pre-intervention= T1), 2004-5 (T2) & 2011-2 (post-intervention= T3), conducted by the NSSO. Sample size in three rounds ranged from: 100,000 and 125,000 HHs.	PFHI covered: RSBY implementation began in 2008-09. **Treatment group**: Poor HHs in RSBY implementing districts. **Control**: Poor in non-RSBY districts. Poor: belonging to the two poorest expenditure	**Districts which began participating in RSBY on or before March 2010 (treat 1)** **1) IP OOP:** Pre-intervention DID coefficient estimates are not statistically significant for all outcomes of interest. A) RSBY increased statistically insignificant likelihood of incurring any inpatient OOP in the treatment group 'treat1' by 22% relative to Controls (OR: 1.223, SE: 0.2777). B) Conditional on having positive IP OOP, the HH OOP spending per person remained unchanged for the

	comparable treatment and control districts using pooled data from the two pre-intervention years (2000 and 2005).		quintiles as a proxy for BPL HHs.	treatment compared to controls (Difference in pre-post: 0.005, SE: 0.212). C) No effect of the scheme on the share of IP OOP spending in total HH expenditures for the 'treat1' group (DID coefficients: -0.007, SE: 0.0079). D) RSBY lowers the likelihood of experiencing catastrophic IP OOP spending by 26%, the effect is not statistically significant (OR: 0.743, SE: 0.2272). 2) **OP OOP:** A) RSBY increased the likelihood of incurring OP OOP in treatment HHs by 23% (OR: 1.226, SE: 0.1806); B) Per person OP OOP (conditional on reporting any OP OOP) declined by 5% in 2012 and these impacts were statistically significant (Difference: -0.049, SE: 0.0580). C) RSBY did not affect the share of OP OOP in total spending (DID coefficient: - 0.004, SE: 0.0028).

				D) The probability of catastrophic OP OOP among treat1 HHs was lower by 11% (OR: 0.891, SE: 0.1425) but remained statistically insignificant. **3) Total OOP:** Total OOP spending showed mostly statistically insignificant differences in the changes in all the four OOP indicators between treatment and control groups, excepting 30% (OR: 1.298, SE: 0.2013) increase in probability of any OOP payments in treat1 **4) Nonmedical expenditure of households:** RSBY increased nonmedical expenditure of HHs in the treat1 group by 5% **5) Drug and non-drug expenditure:** RSBY did not affect the likelihood of incurring both drug and non-drug IP OOP. However, conditional on positive non-drug OOP, the level of OOP was 27% higher among treat1 households after RSBY was introduced, and this difference was statistically significant.

				Districts which began participating between April 2010 and March 2012 (treat 2) **1) IP OOP:** A) RSBY increased the probability of incurring any IP OOP by 28% (OR: 1.281, SE: 0.3201) and B) lowered per member OOP IP expenditure (conditional on reporting any IP OOP) by 16% (Difference: - 0.164, SE: 0.2175), but were statistically insignificant. C) No impact of RSBY on IP OOP as a share of total HH spending in 'treat2' HHs (DID coefficient: -0.008, SE: 0.0081). D) RSBY lowered the probability of incurring any catastrophic inpatient OOP by almost 9% (OR: 0.911, SE: 0.3162) in 'treat2' HHs, but this was statistically insignificant. 2) **OP OOP:**

				No statistically significant effect of the scheme in the treat2 households (Probability of any OOP OR: 1.093, SE: 0.1737; OOP Share DID –0.004, SE: 0.0033; Probability of Catastrophic OR 1.003, SE 0.1972), except for per person monthly OP OOP spending, which declined by 19% (Difference: -0.151, SE: 0.0735). 3) **Total OOP:** Insignificant result in all OOP indicators except 11% (OR: -0.113, SE: 0.0738) decline in OOP level **4) Nonmedical expenditure of households:** No difference. **5) Drug and non-drug expenditure:** mostly small and Insignificant **Subgroup analysis using only data for treated districts with "high enrolment rates," defined as enrolment exceeding 50% of eligible families:** Did not find evidence of larger effects in

				high-enrolment districts. The direction of change of all the outcome indicators remained largely similar to the findings for the broader set of intervention districts
Katyal et al., 2015	A retrospective, longitudinal, controlled quasi-experimental Study (Two large surveys): Difference-in-differences	Pre-post intervention effect: Pre-intervention NSSO 2004 survey and post intervention NSSO 2012 survey.	PFHI covered:RAS and RSBY No. Of HHs: **Intervention 1**: RAS of AP in 2004: 0559 and 2012: 8623. **Intervention 2**: RSBY of MH in 2004: 5314 & in 2012: 10073	1) **Changes in average IP expenditure—public vs private** (the real terms change (deflated to 2004 prices) in these outcomes at follow-up and the DID estimate comparing AP with MH) **Private:** The overall expenditure on IP care per episode in private facilities has increased in both states and the DID is -2076.5 (-3996:-157) p=0.04 INR in AP compared to MH. **Public:** The average expenditure on public facilities has also increased in both states, and DID is -1605.3 (-2628.6:-582.1) p=0.002 INR in AP compared to MH
Khetrapal &	Cross sectional survey (bivariate analysis and Student's t test)	Districts of Patiala, Punjab & Yamunanagar, Haryana in 2011-13. Participants	PFHI covered: RSBY RSBY had completed at least two years of	RSBY beneficiaries had incurred OOP expenditure of mean: ₹5748 (±9211) though it was lesser than for

Acharya, 2019		chosen from 12 empaneled hospitals (3 public and 3 private each from both the districts)	implementation in these districts at the time of data collection. Participants who were enrolled in RSBY (n=751) and non RSBY (n=364)	non-RSBY (mean: ₹10667 ±16990.9) and less at public facilities when compared to private
Mahapatro, Singh & Singh, 2018	Analysis of the 71st round of cross- sectional household NSS 2014 survey Bi variate and multivariate analysis was done	-71 st round National Sample Survey, 2014, 'Social Consumption: Health' Schedule 25.0 -To examine the impact of health insurance on OOP payment, two-part model was used (part 1 logit and part 2 linear)	PFHI covered: Government funded health insurance schemes like RSBY, Arogyashree, CGHS, ESIS Information of hospitalization during 365 days was used for the analysis. For association comparisons were made	**1) Average OOP Expenditure per hospitalization** For government funded health insurance (RSBY, Arogyasri, CGHS, ESIS): Public provider Mean= Rs 3987 (47%); Private provider Mean= Rs 19737 (53%); Total Mean= 12408 (100%) For other HI: Public provider Mean= 7934 (18%); private provider Mean= 20764 (72%); Total Mean= 18510 (100 %) Not Health insured: Public provider Mean= 5437 (46%); Private provider Mean= 24341 (54%); Total= 15647 (100 %)

			between insured and uninsured	**2) Extent of OOP expenditure (Monthly) by insurance status** For Government health insurance=Rs 1034 For Private (other) HI= Rs 1542 For non-insured= Rs 1304 Therefore, OOP expenditure was lower for government insurance holder than those not having any of government Insurance schemes **3) Association of OOPE with health insurance** For PFHI insurance= - 2.47 ($p<0.01$) (part 1 Logit model) For PFHI insurance= -0.34 ($p<0.01$) (part 2 Linear model)
Nandi, Schneider & Dixit, 2017	Secondary data, multi variate logistic regression	NSSO, the Chhattisgarh State data used in this study were extracted from the 25th schedule of the 71st round of the cross-sectional	PFHI covered: Government funded health insurance schemes in Chhattisgarh viz. RSBY, MSBY, ESIS, CGHS	**Out of pocket expenditure:** -Government insurance coverage (AOR 0.265; 95% CI: 0.174–0.405) and childbirth conditions (AOR 0.516; 95% CI: 0.290–0.918) were significantly less

		Indian National Sample Survey, conducted between January and June 2014 The Chhattisgarh sample included 1205 house- holds and 6026 individuals (household members) Out of pocket expenditure on hospitalization was calculated per episode as medical expenditure minus reimbursements. Weighted medians of OOP expenditure were calculated		likely to entail OOP expenditure than no insurance and other ailments respectively -Women (AOR 1.700; 95% CI: 1.012–2.858) more likely to incur OOP expenditure than men and hospitalization in private hospital had a significantly higher possibility of incurring OOP expenditure than any other type of facility.
Philip, Kannan and	A comparative cross-sectional survey of 149 insured and 147	Using generalized estimating equations, the correlates of inpatient	PFHI covered: CHIS of Kerala	OOPE: The mean OOP expenses for inpatient services among insured participants (INR 448.95) was

Sarma, 2016	uninsured BPL households was conducted in Trivandrum district of Kerala. Pearson's $\chi 2$ test comparison. Multivariate logistic regression analysis was used to derive the predictors of insurance status.	service utilization of individuals were estimated. The models were built by the method of iterative backward elimination and forward selection because the study did not use any conceptual framework, and it aimed at exploration. The Mann-Whitney *U* test was used to compare the expenditure associated with inpatient care between the 2 group	A total of 149 insured and 147 uninsured households, with 667 and 578 members, respectively, were included in the study	significantly higher than that of the uninsured households (INR 159.93); p = .003 at 95% CI.
Ranjan et. al 2018	Analysis of a cross-sectional study	-Data from the 71st round of NSSO survey I.e. 'Social Consumption: Health' survey	PFHI covered: Public Funded Health Insurance (PFHI) schemes e.g. RSBY	**1) Average OOPE (the median) with PFHI coverage and no insurance** A) Rural

		-Propensity score matching (PSM) for the effectiveness of PFHIs and multiple logistic regression for association		People having government insurance: Average OOPE in public= Rs 2848; Average OOPE in private= Rs. 17,493 People with no insurance: Average OOPE in public =Rs 3994; Average OOPE in private= Rs 20,445 B) Urban People having government insurance: Average OOPE in public= Rs 2738; Average OOPE in private= Rs. 19,111 People with no insurance: Average OOPE in public =Rs 6322; Average OOPE in private= Rs 27,102 **2) Impact Assessment of PFHI on CHE at 10% and 25% threshold using Propensity Score Matching (PSM)** For 10%CHE Public insurance v/s no insurance (unmatched)= -0.05 (SE=0.01)

				Public insurance v/s no insurance (ATT)= −0.13 (SE=0.02; 95%CI= −0.16, −0.10) For 25%CHE Public insurance v/s no insurance (unmatched)= −0.02 (SE=0.01) Public insurance v/s no insurance (ATT)= −0.06 (SE= 0.01; 95%CI= −0.09, − 0.04) **3) Impact Assessment of PFHI on CHE at 10% and 25% threshold using Propensity Score Matching (PSM) for below three quintiles** For 10%CHE Public v/s no insurance (unmatched)= −0.02 (SE= 0.009) Public insurance v/s no insurance (ATT)= −0.004 (SE=0.03; 95%CI=−0.04 to − 0.001) For 25%CHE Public v/s no insurance (unmatched)= −0.008(SE= 0.007)

				Public insurance vs no insurance (ATT)= −0.01(SE= 0.027; 95%CI= −0.022 to 0.005) **4) Impoverishment effect of OOPE on hospitalization** For Government funded HI schemes a) Percentage of household below poverty line pre-payment= 21.85 B) Percentage of household below poverty line post-payment= 33.51 For Employer supported scheme A) Percentage of household below poverty line pre-payment= 11.04 B) Percentage of household below poverty line post-payment= 17.33 For Arranged by household A) Percentage of household below poverty line pre-payment= 3.53

				B) Percentage of household below poverty line post-payment= 10.33 Not covered A) Percentage of household below poverty line pre-payment= 28.83 B) Percentage of household below poverty line post-payment= 42.01 **5) Financial protection and PFHI** A) Private provider without any insurance Mean OOPE per hospitalization= Rs 22,604 Median OOPE per hospitalization= Rs 11,300 Incidence of CHE-10= 62.4 Incidence of CHE-25 30.0 Impoverishment= 19.1 B) Private provider with PFHI Mean OOPE per hospitalization= Rs 17,741 Median OOPE per hospitalization= Rs 10,120 Incidence of CHE-10= 60.0

				Incidence of CHE-25= 29.2 Impoverishment= 18.2 C) Public provider without any insurance Mean OOPE per hospitalization= Rs 4919 Median OOPE per hospitalization= Rs 1451 Incidence of CHE-10= 16.1 Incidence of CHE-25= 6.0 Impoverishment= 6.8 D) Public provider with PFHI Mean OOPE per hospitalization= Rs 3204 Median OOPE per hospitalization= Rs 950 Incidence of CHE-10= 14.8 Incidence of CHE-25= 5.6 Impoverishment= 4.6

Rao et al., 2014	A difference-in-differences (DID) study using repeated cross-sectional surveys with parallel control.	NSSO 2004 survey, A total of 5314 and 5059 households from MH and AP were surveyed by the NSSO in 2004 and Survey in 2012 included 10 073 (MH) and 8623 (AP) households.	PFHI covered: Arogyashree Two cross-sectional surveys: as a baseline, the data from the NSSO 2004 survey collected before the Aarogyasri and RSBY schemes were launched; and as postintervention, a survey using the same methodology conducted in 2012. A survey of 18 696 households across 2 states and 1871 locations	1) **Inpatient OOPE** (In INR) 2012 compared to 2004: 1 year prior to survey after deducting reimbursement from total expenditure, if any. Both the states: unadjusted DID=−498.2, 95% CI −792.9 to −203.5, p=0.0009 and adjusted: −565.8 (862.9 to −268.6) 0.0002 **Subgroup analysis based on HH head characteristics:** a) Gender Male: Mean DID: −513.7 (−843.9 to −183.4) p=0.0023, female it was not significant. b) Social group: SC: Mean DID −708.7 (−1234.3 to −183.2) p=0.0082 All other groups: Mean DID −1110.46 (−1868 to −352.9) p=0.0041 For ST and other excluded groups, it was not significant. c) Location

				Rural: Mean DID −504 (−801.9 to −206.0) p=0.0009, for Urban it was not significant d) Quintile Poorest: Mean DID −1001.3 (−1751 to −251.7) p=0.0089 Middle: Mean DID −798.1 (−1362.9 to −233.3) p= 0.0056 For second, fourth and fifth quintile it was not significant. 2) **Large inpatient OOPE** (A HH with OOPE for inpatient care was equal to or greater than INR 23,000 (USD419)). Adjusted for both states, Mean DID=−1.8, 95% CI −3 to −0.7, p=0.0009 **Subgroup analysis based on HH head characteristics:** Quintile: Poorest: Mean DID −0.2 (−3.8 to −0.19) p=0.0307

				For other quintile variables, gender, social groups, location it was not significant. 3) **Large borrowing** (if the borrowing was equal to or exceeded the BPL threshold set by the Government of AP: INR 70 000 for urban families and 65000 for rural HHs) In both states: Unadjusted Mean DID: −3.7 (−6.4 to −0.908) p=0.0100 and adjusted DID=−4, 95% CI −6.6 to −1.4, p=0.0032 **Subgroup analysis based on HH head characteristics:** a) Gender Male: Mean DID −3.6 (−6.6 to −0.62) p=0.0187 Female: Mean DID −4.7 (−8.3 to −1) p=0.0137 b) Social group ST: Mean DID −5.5 (−9.3 to −1.8) p=0.0048 All other groups: Mean DID −4.1 (−7.9 to −0.4.0) p=0.0302

				For SC and Other excluded groups, it was not significant. c) Location Rural: Mean DID −4.7 (−7.3 to −2.1) p=0.0007, for urban it was not significant d) Quintile Poorest: Mean DID −9 (−14 to −4.4) p=0.0002 For others quintile groups it was not significant.

Ravi & Bergkvist, 2014	Analysis of a cross sectional survey	NSSO data for consumption expenditure Difference-in-differences method and regression analysis	PFHI covered: Different PFHI schemes Pre and post analysis of the effects of different schemes	**1) Means of outcome: Impoverishment** **For overall sample** A) Overall impoverishment Treatment: Pre: 0.281 (–0.003); Post: 0.207 (–0.004); Diff: –0.074 (–0.005) Control: Pre: 0.357(–0.003); Post: 0.276(–0.004); Diff: –0.081(–0.005) Difference: Pre: –0.076(–0.004); Post: –0.069(–0.006); Diff: 0.007(–0.007) B) OOP impoverishment Treatment: Pre: 0.321(–0.003); Post: 0.24 (–0.004); Diff: –0.081 (–0.005) Control: Pre: 0.401 (–0.003); Post: 0.312 (–0.004); Diff: –0.089 (–0.005) Difference: Pre: –0.08 (–0.004); Post: –0.072 (–0.006); Diff: 0.008 (–0.007) **For long term sample**

				A) Overall impoverishment Treatment: Pre: 0.273 (–0.004); Post: 0.169 (–0.005); Diff: –0.104 (–0.007) Control: Pre: 0.335 (–0.002); Post: 0.266 (–0.003); Diff: –0.069 (–0.004) Difference: Pre: –0.062 (–0.005); Post: –0.097 (–0.006); Diff: –0.035 (–0.008) B) OOP impoverishment Treatment: Pre: 0.306 (–0.004); Post: 0.193 (–0.006); Diff: –0.113 (–0.007) Control: Pre: 0.38 (–0.002); Post: 0.303 (–0.003); Diff: –0.077 (–0.004) Difference: Pre: –0.074 (–0.005); Post: –0.11 (–0.007); Diff: –0.036 (–0.008) **2) Means of Outcomes, Catastrophic Headcount Threshold—40% of Non-food Expenditure** **For overall sample:** A) OOP

				Treatment: Pre: 0.0466 (–0.0013); Post: 0.0448 (–0.0018); Diff: –0.0018 (–0.0022) Control: Pre: 0.0453 (–0.0013); Post: 0.036 (–0.0017); Diff: –0.0093 (–0.0021) Difference: Pre: 0.0013 (–0.0018); Post: 0.0088 (–0.0025); Diff: 0.0075 (–0.0031) B) Outpatient Treatment: Pre: 0.0397 (–0.0012); Post: 0.0309 (–0.0016); Diff: –0.0089 (–0.002) Control: Pre: 0.0439 (–0.0013); Post: 0.0254 (–0.0015); Diff: –0.0185 (–0.002) Difference: Pre: –0.0042 (–0.0018); Post: 0.0054 (–0.0022); Diff: 0.0096 (–0.0028) C) Drugs Treatment: Pre: 0.0179 (–0.0008); Post: 0.0167 (–0.0011); Diff: –0.0012 (–0.0014) Control: Pre: 0.0231 (–0.0009); Post: 0.0151 (–0.0012); Diff: –0.008 (–0.0015)

				Difference: Pre: –0.0052 (–0.0012); Post: 0.0016 (–0.0016); Diff: 0.0068 (–0.002) **Long term sample** A) OOP Treatment: Pre: 0.0389 (–0.0018); Post: 0.0367 (–0.0026); Diff: –0.0022 (–0.0032) Control: Pre: 0.0479 (–0.001); Post: 0.0411 (–0.0014); Diff: –0.0067 (–0.0018) Difference: Pre: —0.009 (–0.0021); Post: –0.0044 (–0.003); Diff: 0.0046 (–0.0037) B) Outpatient Treatment: Pre: 0.0332 (–0.0017); Post: 0.0282 (–0.0025); Diff: –0.005 (–0.003) Control: Pre: 0.0444 (–0.001); Post: 0.0279 (–0.0012); Diff: –0.0165 (–0.0016) Difference: Pre: –0.0112 (–0.002); Post: 0.0003 (–0.0027); Diff: 0.0115 (–0.0034) C) Drugs

				Treatment: Pre: 0.011 (–0.001); Post: 0.0095 (–0.0013); Diff: –0.0015 (–0.0016) Control: Pre: 0.0234 (–0.0007); Post: 0.0176 (–0.001); Diff: –0.0058 (–0.0012) Difference: Pre: –0.0124 (–0.0012); Post: –0.0082 (–0.0016); Diff: 0.0042 (—0.002) **3) Changes in poverty gap index overtime** **For overall sample** A) Overall PGI Treatment: Pre: 0.059 (–0.0009); Post: 0.04 (–0.001); Diff: –0.019 (–0.0013) :Control: Pre: 0.079 (–0.0008); Post: 0.056 (–0.0011); Diff: –0.023 (–0.0013) Difference: Pre: –0.02 (–0.001); Post: –0.016 (–0.001); Diff: 0.004 (–0.002) B) OOP PGI Treatment: Pre: 0.07(–0.0009); Post: 0.048 (–0.001); Diff: –0.022 (—0.0014)

				Control: Pre: 0.091 (–0.0009); Post: 0.066 (–0.0011); Diff: –0.025 (–0.0014) Difference: Pre: –0.021(–0.001); Post: –0.018 (–0.002); Diff: 0.003 (–0.002) For Long term sample A) Overall PGI Treatment: Pre: 0.058 (–0.0014); Post: 0.032 (–0.0013); Diff: –0.026 (–0.0019) Control: Pre: 0.073 (–0.0007); Post: 0.053 (–0.0008); Diff: –0.02 (–0.0011) Difference: Pre: –0.015(–0.002); Post: –0.021 (–0.002); Diff: –0.006 (–0.002) B) OOP PGI Treatment: Pre: 0.065 (–0.0014); Post: 0.038 (–0.0014); Diff: –0.027 (–0.002) Control: Pre: 0.086 (–0.0007); Post: 0.063 (–0.0009); Diff: –0.023 (–0.0012)

				Difference: Pre: –0.021(–0.002); Post: –0.025 (–0.002); Diff: –0.004 (–0.002) **After regression analysis with fixed state effects** **Short term impact** **1) Impoverishment Effects in Overall Sample** A) Overall impoverishment: Treatment*Post: 0.0082(–0.0065; p>0.1) B) Impoverishment net of OOP: Treatment*Post: 0.0089(–0.0067; p>0.1) C) Impoverishment net of hospitalization: Treatment *Post: 0.0063 (–0.0065; p>0.1) D) Impoverishment net of outpatient: Treatment *Post: 0.0107 (–0.0067; p>0.1) E) Impoverishment net of drugs: Treatment *Post: 0.0094 (–0.0067; p>0.1) **2) Catastrophic Headcount, Overall sample—Threshold 40% of Non-food Expenditure**

				A) Due to OOP: Treatment *Post: 0.0075 (–0.003; p<0.05) B) Due to hospitalization: Treatment *Post: 0.0004(–0.0014; p>0.1) C) Due to outpatient: Treatment *Post: 0.0096 (–0.0028; p<0.01) D) Due to drugs: Treatment *Post: 0.0069(–0.002; p<0.01) **3) Poverty Gap Index, Overall Sample** A) Poverty gap index: Treatment *Post: 0.0037(–0.0018; p<0.05) B) PGI net of OOP: Treatment *Post: 0.0047(–0.0019; p<0.05) C) PGI net of hospitalization: Treatment *Post: 0.0036(–0.0018; p<0.05) D) PGI net of outpatient: Treatment *Post: 0.0049(–0.0019; p<0.01)

				E) PGI net of drugs: Treatment *Post: 0.0048(–0.0019; p<0.05) **Long term impact of PFHIS** **1) Impoverishment, Long-term Sample** A) Overall impoverishment: Treatment *Post: –0.0308 (–0.0077; p<0.01) B) Impoverishment net of OOP: Treatment *Post: –0.0316(–0.008; p<0.01) C) Impoverishment net of hospitalization: Treatment *Post: –0.0313(–0.0077; p<0.01) D) Impoverishment net of outpatient: Treatment *Post: –0.0293(–0.0079; p<0.01) E) Impoverishment net of drugs: Treatment *Post: –0.0275(–0.0079; p<0.01) **2) Catastrophic Headcount, Long-term Sample—Threshold 40% of Non-food Expenditure** A) Due to OOP: Treatment *Post: 0.0048(–0.0036; p>0.1)

				B) Due to hospitalization: Treatment *Post: –0.0006(–0.0017; p>0.1) C) Due to outpatient: Treatment *Post: 0.0120(–0.0033; p<0.01) D) Due to drugs: Treatment *Post: 0.0045(–0.002; p<0.05) **3) Poverty Gap Index, Long-term Sample** A) Poverty gap index: Treatment *Post: –0.0047(–0.0021; p<0.05) B) PGI net of OOP: Treatment *Post: –0.0035(–0.0022; p>0.1) C) PGI net of hospitalization: Treatment *Post: –0.0047(–0.0021; p<0.05) D) PGI net of outpatient: Treatment *Post: –0.0035(–0.0022; p>0.1) E) PGI net of drugs: Treatment *Post: –0.0032(–0.0022; p>0.1)

Raza, van de Poel & Panda, 2016	Two cross sectional surveys among SHG members themselves or the head of the (households) HHs: Regression	Primary study: Baseline survey: March and May 2010 (3,686 HHs) and follow-up survey: March and April in 2012 (3,318 HHs) and 2013 (3307 HHs). Location: Kanpur Dehat and Pratapgarh districts in Uttar Pradesh and Vaishali in Bihar	PFHI covered: RSBY membership	**1)) OOP Spending (Log of healthcare expenses conditional on spending (INR)**: RSBY membership to be associated with a reduction in OOP spending in Bihar (36%) [-0.361* (0.190), n=577]. Pooled: -0.056 (0.170), n=1361 and UP: 0.224 (0.296), n=804 are not significant. **Sensitivity analysis** by restricting the sample to HHs in the bottom two asset tertiles: Bihar it is significant -0.675 (0.234), n=403, while pooled and UP it is not. **2) Log of the amount of debt conditional on borrowing (INR)**: RSBY HHs in Bihar concurrently experience a 55% [-0.547 (0.232), n=457] reduction in the amount of debt incurred in dealing with the cost of hospitalization. Pooled: -0.078 (0.206), n=1100 and UP: 0.251 (0.353), n=643 are not significant. **Sensitivity analysis** by restricting the sample to HHs in the bottom two asset tertiles: Bihar it is significant -

				0.611 (0.277), n=355, however not for pooled and UP. 3) **Probability of having healthcare expenses conditional on use:** not significant irrespective of sensitivity analysis 4) **Probability of debt conditional on use were not significant:** not significant sensitivity analysis
Sabharwal et al., 2014	Quasi experimental mixed methods study design	Two districts were selected for this study: Moradabad district in Uttar Pradesh and Aurangabad district in Maharashtra. At the block level (district sub-division), sites were selected where blocks had proportions of SC and Muslim population equal to the district average, and	PFHI covered: RSBY • Target group: SC, Muslim and upper caste poor households who are beneficiaries of RSBY (whether they have used the smart card or not) • Control group: SC, Muslim and upper caste poor households who are	Expenditure as inpatient in Treated INR (US$) 6366.7/ (US$ 1012) and in controls INR 8444.6/ (US$ 135) and average treatment effect (ATT) -2077.8 (US$ -33) and T Stat, -0.87 amongst the total observations of 451- Radius matching Expenditure as inpatient in Treated 6350.4 (/US$10 2) and in controls 9970.0 (US$ 160) and average treatment effect of - 3619.6*** (US$ -58) and T stat, -2.44 amongst the total observations of 91- nearest neighborhood matching

		villages were selected with mixed social group populations. Altogether, the study was conducted in 30 villages (14 villages in Moradabad and 16 villages in Aurangabad). The households were randomly selected from each village based on RSBY beneficiary lists and BPL lists. The households in each location were stratified into beneficiary ('treatment') households and non-beneficiary or ('control') households. We included a control group in	eligible for RSBY but who are not enrolled.	Average expenditure as outpatient in INR (US$) of total observations 882, Expenditure as inpatient in Treated 701 (US$ 11) in controls 710 (US$ 11) and ATT -9.3 and a T stat -0.13- Radius matching Average expenditure as outpatient in INR (US$) of total observations 385 observations, Expenditure as inpatient in Treated 695 (US$ 11) in controls 710 (US$ 11) and ATT of 14 with a T stat of 0.29- nearest neighborhood matching Monthly per capita expenditure accounts to 74.0 (US$ 1) in treated and 66.2 (US$ 1) in controls and ATT of 7.7 (US$ 0.12) with a T stat of 0.52- Radius matching Monthly per capita expenditure accounts to 73.1 (US$ 1) in treated and 63.4 (US$ 1) in controls and ATT of 9.7 (US$ 0.16) with a T stat of 0.95- nearest neighborhood matching

		order to allow measurement of impact, given that this survey does not have a baseline.		
Selvaraj & Karan, 2012	Two cross sectional surveys (Authors considered as case control approach and Pre-post approach): difference in difference	Secondary data based on two rounds of NSSO data 2003-04 Pre-intervention and 2009-10 as post intervention.	PFHI covered: RSBY and state insurances implemented in 2007-09. **RSBY**: 247 districts; **State insurance**: 74 districts (Andhra Pradesh n=23, Karnataka n=22 and Tamil Nadu n=29); and **control**: 291 districts	**Changes in average real per capita OOP expenditure of HHs in pre- (2004-05) and post-insurance (2009-10) years** **A) Case control findings**: **1) 2004-05 (pre-insurance period) (Rs)** *a. Non-intervention districts (NID)*= OOP total expenditure: 34.01, IP expenditure: 8.05, OP expenditure: 25.96, Medicine expenditure: 24.53 *b. Intervention districts (ID)*= Expenditure in terms of OOP: 45.56, IP: 12.70, OP: 32.86 and Medicine: 32.27

				c. Difference between ID and NID= Total: 11.55, IP: 4.65, OP: 6.90, Medicine: 7.74. **2) 2009-10 (post-insurance period) (Rs)** *a. NID*= Expenditure in terms of OOP: 39.70, IP: 13.48, OP: 26.22 & Medicine: 26.90 *b. ID*= Expenditure in terms of OOP: 48.97, IP: 15.81, OP: 33.16 and Medicine: 33.56. c. *Difference between ID and NID*=Total: 9.27, IP: 2.33, OP: 6.94, Medicine: 6.63. **B) Difference between pre- and post-insurance period (Rs)** *a. NID*=Total: 5.69, IP: 5.43, OP: 0.26, Medicine: 2.37. *b. ID*=Total: 3.41, IP: 3.11, OP: 0.30, Medicine: 1.26. *c. Difference between ID and NID*= Total: -2.28, IP: -2.32, OP: 0.04, Medicine: -1.11

				Percentage Share of OOP Expenditure in Overall Household Expenditure **A) Case control findings**: **1) 2004-05 (pre-insurance period)** *a. Non-intervention districts (NID)*= OOP total expenditure: 4.88, IP expenditure: 1.16, OP expenditure: 3.73, Medicine expenditure: 3.52 *b. Intervention districts (ID)*= Expenditure in terms of OOP: 6.33, IP: 1.76, OP: 4.57 and Medicine: 4.48 *c. Difference between ID and NID*= Total: 1.45, IP: 0.61, OP: 0.84, Medicine: 0.96. **2) 2009-10 (post-insurance period)** *a. NID*= Expenditure in terms of OOP: 5.21, IP: 1.77, OP: 3.44 & Medicine: 3.53 *b. ID*= Expenditure in terms of OOP: 5.96, IP: 1.92, OP: 4.04 and Medicine: 4.08.

				c. *Difference between ID and NID*=Total: 0.75, IP: 0.16, OP: 0.60, Medicine: 0.55. **B) Difference between pre- and post-insurance period** *a. NID*= Total: 0.33, IP: 0.61, OP: -0.29, Medicine: 0.01. *b. ID*= Total: -0.37, IP: 0.16, OP: -0.53, Medicine: -0.40. *c. Difference between ID and NID*= Total: -0.70, IP: -0.45, OP: -0.24, Medicine: -0.41 **Catastrophic Headcount of OOP Expenditure (% of HHs)** **A) Case control findings**: **1) 2004-05 (pre-insurance period)**

				a. Non-intervention districts (NID)= OOP total expenditure: 11.65, IP expenditure: 2.37, OP expenditure: 9.71, Medicine expenditure: 8.45 *b. Intervention districts (ID)*= Expenditure in terms of OOP: 15.89, IP: 3.53, OP: 13.23 and Medicine: 11.06. *c. Difference between ID and NID*= Total: 4.24, IP: 1.16, OP: 3.52, Medicine: 2.61. **2) 2009-10 (post-insurance period)** *a. NID*= Expenditure in terms of OOP: 11.01, IP: 2.76, OP: 7.99 & Medicine: 6.75 *b. ID*= Expenditure in terms of OOP: 14.90, IP: 4.06, OP: 10.84 and Medicine: 09.26. c. *Difference between ID and NID*= Total: 3.90, IP: 1.30, OP: 2.86, Medicine: 2.51. **B) Difference between pre- and post-insurance period** *a. NID*= Total: -0.65, IP: 0.39, OP: -1.72 Medicine: -1.70.

				b. ID= Total: -0.99, IP: 0.53, OP: -2.38, Medicine: -1.81. *c. Difference between ID and NID*= Total: -0.34, IP: 0.14, OP: -0.66, Medicine: -0.10 **Catastrophic Headcount (%) due to of Hospitalization Expenditure** **1) Pre-insurance years (2004-05)** *a. Poorest:* NID= 0.88, ID= 0.72, difference (Diff)= -0.16 *b. Second poorest:* NID= 1.42, ID= 1.96, Diff= 0.53 *c. Middle*: NID=2.14, ID= 2.61, Diff= 0.47 *d. Second richest*: NID= 2.74, ID= 3.87, Diff= 1.13 *e. Richest*: NID=5.15, ID= 8.14, Diff= 2.99 **2) Post-insurance years (2009-10)** *a. Poorest:* NID= 0.87, ID= 1.20, Diff= 0.33 *b. Second poorest:* NID= 1.20, ID= 2.36, Diff= 1.16 *c. Middle*: NID=2.20, ID= 3.03, Diff= 0.83 *d. Second richest*: NID= 3.54, ID= 4.93, Diff= 1.39

				e. Richest: NID=7.05, ID= 8.27, Diff= 1.22. **3) Difference between pre- and post-insurance years** *a. Poorest:* NID= -0.01, ID= 0.48, Diff= 0.50 *b. Second poorest:* NID= -0.22, ID= 0.40, Diff= 0.62 *c. Middle*: NID=0.06, ID= 0.42, Diff= 0.36 *d. Second richest*: NID= 0.80, ID= 1.06, Diff= 0.26 *e. Richest*: NID=1.90, ID= 0.13, Diff= -1.77.
Sinha, 2018	A matched controlled cross-sectional study	In order to see whether different characteristics of enrolled and non-enrolled households were matching, *z*-test was performed comparing the proportion of the characteristics of two sets of households.	PFHI covered: RSBY a sample size of 425 households was estimated with 80 per cent power to detect the change in CHE between insured and non-insured households' arm for each block Duration of 3 months	1.The determinant of incidence of Catastrophic Health Expenditure (CHE) Among the Studied Households, households enrolled in RSBY co-efficient–0.077, SE 0.181 and odds ratio of 0.925 2. The Determinant of Incidence of Health Expenditure-Induced Poverty Among the Studied Households Which Are at Risk of Becoming Poor, households enrolled in RSBY co-efficient—0.422, SE 0.195, Odds ratio of 1.524

		two purposively selected administrative blocks, namely Silli and Bundu of Ranchi district in Jharkhand between April to June 2014		3. The Determinants of Hospitalization Among the Studied Households; households enrolled in RSBY, co-efficient 0.884, SE 0.571, Odds ratio of 2.421
Sood et al, 2014	Quasi experimental design Multi variate models were used for analysis	All households in sampled villages were asked to participate in a door to door survey, and 81% of them completed the survey.	PFHI covered: VAS 31 476 households (22 796 below poverty line and 8680 above poverty line) in 300 villages where the scheme was implemented and 28 633 households (21 767 below poverty line and 6866 above poverty line) in 272 neighboring matched villages ineligible for the scheme.	Eligible households had significantly reduced OOPE for admissions to hospitals with tertiary care facilities likely to be covered by the scheme (64% reduction, 35% to 97%; P<0.001).

			A government insurance program (Vajpayee Arogyashree scheme) that provided free tertiary care to households below the poverty line in about half of villages in Karnataka from February 2010 to August 2012.	
Sriram & Khan, 2020	Survey among poor individuals: Propensity score matching, logistic regression and Tobit regression.	NSSO survey 2014. N=64270 poor individuals	PFHI covered: any PFHI scheme PFHI (n= 5917) were matched with control group (n=5917). Average Treatment on Treated (ATT) Propensity Score Testing of Two	**Effect of PFHI on inpatient out-of-pocket health expenditures (Tobit regression coefficient and 95% CI)** Enrolment did not have any effect on inpatient OOP health expenditures [−950.36 (− 2501.5 – 600.8)]. -Duration of stay in hospital [521.40 (435.3–607.5)], -Graduate level education [7634.86 (2798.5–12,471.3)],

			Groups: Treated=0.1407, Control= 0.1191, Difference= 0.0216, T statistic= 2.89, SE: 0.0074. Matched with age, individual consumption expenditure, HH size, location and education.	-Age groups of 19 to 60 years [19 to 40 years 1857.13 (−68.3, - 3782.6) and 41 to 60 years 2231.96 (234.3–4229.6)], -Using a private hospital for treatment [3772.82 (1004.0–6541.6)], -Admission in paying ward [Paying General 9095.49 (6978.9–11,212.1), and Paying Special 13,642.31 (9856.4–17,428.3)], and -Having ailments and injuries (significant) -Utilization of AYUSH type of treatment had significant negative effect [− 9020.48 (−16,224.0 - -1817.0)] on OOP health expenditures compared to individuals using allopathic treatment. -Factors such as location, social group, HH type, HH size, and number of hospital beds in states had no statistically significant effect on OOP health expenditures.

				-Gujarat and Kerala states show significantly lower OOP expenses, keeping all other factors contact, than other states of India in the state fixed effects model.
Willingness to pay				
Vellakkal, Juyal, & Mehedi, 2014	Cross sectional study; contingent valuation method, applied a bidding game method	n=1846, Mean Age: 54.55 (12.23) Proportion of CGHS beneficiary in the sample: 65% and remaining were ECHS beneficiary additional monthly financial contribution towards the scheme beneficiaries was willing to pay for better quality of healthcare services" WTP Version 1: WTP base amount is INR 100 and the	PFHI covered: CGHS and ECHS schemes	-WTP for better quality healthcare under the schemes -Among willing people: how much per month would pay in addition to their current contribution -About 71% of CGHS beneficiaries, 28% of ECHS beneficiaries were willing to pay additionally every month for health insurance schemes. -The amount of WTP by CGHS beneficiaries was 64% higher than their current contribution

		bid amount was INR 10 (10% of the base amount). WTP Version 2: WTP base amount was INR 150 and the bid amount was INR 15 (10% of the base amount). WTP Version 3: WTP base amount is INR 200 and the bid amount was INR 20 (10% of the base amount).		

AOR: Adjusted Odds Ratio; AP: Andhra Pradesh; ATT: Average Treatment on Treated; BPL: Below Poverty Line; CGHS; Central Government Health Scheme; CHE: Catastrophic Health Expenditure; CHIS: Comprehensive Health Insurance Scheme; CI: Confidence Interval; DID; Difference-in-Differences; ECHS: Ex-serviceman Contributary Health Scheme; ESIS: Employee State Insurance Scheme; HHs: Households; INR: Indian National Rupee; IP: In-Patient; IV: Instrumental Variable; MSBY: Mukhyamantri Swasthya Bima Yojana; NA: Not Applicable; NSSO: National Sample Survey Office; OLS: Ordinary Least Square; OOP: Out of pocket payment; OOPE: Out Of Pocket Expenditure; OR: Odds Ratio; PMJAY: Pradhan Mantri Jan Arogya Yojana; PSM: Propensity Score Matching; RAS: Rajiv Arogya Shree; RSBY: Rashtriya Swasthya Bima Yojana; SC: Scheduled Castes; SE: Standard Error; SHG: Self Help Groups; UMPCE: Usual Monthly Per Capita Expenditure; VAS: Vajpayee Arogya Shree; WTP: Willingness to Pay

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2-3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	6
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	6
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	-
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	7
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	7-8
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	7-8
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	8
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	8
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	8-9
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	9
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	10
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	10

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	-
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	-
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	10
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	10, 26-28
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	10-12
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	10-13, 33-46
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	-
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	-
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	-
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	13-16
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	16
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	17
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	19

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