

An efficient model for improved access to quality healthcare services and reduced catastrophic healthcare expenditure?

An evaluation of the Rajiv Aarogyasri Health Insurance Scheme

IDRC Final Technical Report

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Basic Project Information

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As far as we are aware, this is among the first studies of health financing innovations in India using a quasi experimental design. We thank IDRC for their support not only to the funding of the study but also for their encouragement and advice throughout the study.

Abstract

In 2007 Andhra Pradesh launched a pioneering new state-wide fully state-funded health insurance scheme, the Rajiv Aarogyasri Community Health Insurance Scheme (Aarogyasri) to reduce out of pocket health expenditure and improve access of poor families to treatment for serious and life-threatening illnesses. Inspired by the Aarogyasri, a number of neighbouring states have initiated similar schemes for their population. Maharashtra (MH), however, had, in 2009, introduced the Rashtriya Swasthya Bima Yojana (RSBY) which provides access to inpatient hospital care but at a lower level of financial cover. We compared changes in health related expenditures and behaviours in AP and MH before and after the rollout of the Aarogyasri scheme in AP and the RSBY scheme in MH using difference-in-difference analysis to uncover the differential impacts of the schemes and the net effect of Aarogyasri if any, over and above RSBY. We used data from the National Sample Survey Organization (NSSO) household health and morbidity survey undertaken in 2004 as our baseline and used the same household survey design and methods as those used by NSSO, to conduct a post-intervention household survey in AP and MH in 2012. Variations in outcomes were examined between male and female-headed households, and rural and urban populations, as well as across social groups and economic groups represented by asset quintiles. Our second method of analysis is to exploit the Aarogyasri and RSBY roll-outs over time to compare the effects of Aarogyasri with the pre-intervention period in AP as well as with the effects of RSBY. Thirdly, we have also collected narrative evidence in the form of case studies to illustrate how families in AP seek health care when faced with serious illness.

Our first method demonstrated that health innovations in AP had a greater beneficial effect on hospital inpatient care-related expenditures than innovations in MH. The Aarogyasri scheme is likely to have contributed to these impacts in AP at least in part. However, in both states, out of pocket expenditure increased over time. Schemes such as the Aarogyasri and RSBY may result in some positive outcomes but, equity of access to health care and the reduction of the overall burden of out of pocket expenditures especially in the most vulnerable sections of the population are likely to require additional interventions that address gaps in the availability of and access to care. The case studies offer important narrative evidence to support this conclusion. Further analysis using more complex models is in progress.

Key Words

Aarogyasri, health expenditure, access, catastrophic illness

The Research Problem

The 2010 World Health Report stated that 'millions of people cannot use health services because they have to pay at the time they receive them. Many of those who use services suffer financial hardship, or are even impoverished, because they have to pay'. Different approaches to health financing are emerging to ensure universal healthcare coverage and quality of care. The Rajiv Aarogyasri Community Health Insurance scheme (Aarogyasri) was launched by the Government of Andhra Pradesh (GoAP) in 2007 to improve access of Below Poverty Line families to 'quality treatment for serious diseases' and covered approximately 85 percent of the state's 84.66 million people by 2009.

As one of the first schemes of its kind at this scale, Aarogyasri has generated national and international interest, inspiring other Indian states to develop similar models. Detailed evaluation of the scheme is critical not only for continuous improvement and sustainability of this scheme but also in ensuring learning benefits access to healthcare globally.

A rapid assessment commissioned by the GoAP in 2008, provided recommendations that were accepted in full. Following a suggestion from the Planning Commission of India, the Aarogyasri Trust Board chaired by the Chief Minister, requested a consortium of institutions to conduct a formal evaluation of the scheme. This proposal is in response to that request. The study also provides an important opportunity to build capacity for research, evaluation, the development of evidence based health policy in India, establish a baseline for future evaluations and identify areas for further research.

Since the evaluation began in 2011, India's Twelfth Five Year Plan period 2012-2017 has begun. Among the highest health priorities for this Plan is the development of a roadmap for universal health coverage, through defining a 'national health package'. This evaluation is of great importance in informing the preparation of the universal health care plan.

Objectives

This evaluation is intended to address the need for evidence on the impact of the Aarogyasri scheme on out of pocket health expenditure and access to health care for serious illness. The findings of the evaluation are also intended to serve as a baseline to measure effectiveness of future modifications of the scheme. Its objectives initially also included a study of the design and management of the scheme. However, these objectives were dropped as the Aarogyasri Healthcare Trust decided to commission a separate evaluation of these aspects of the scheme.

Another equally important objective of this study is to build future capacity for the implementation and evaluation of health financing schemes. There is a recognised lack of capacity in India and in many other low and middle income countries to design and manage health financing schemes and consequently, an urgent need to build this capacity, to enable governments to respond to the growing public demand for health financing reforms. There is also a great need to build capacity for evaluations of policies and strategies.

Aims

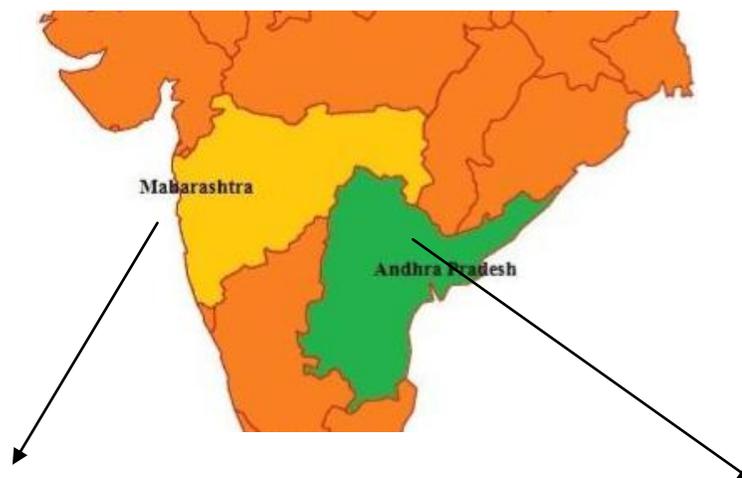
The aims of the study were to assess the impact of the Aarogyasri scheme in reducing out of pocket health expenditure (OOPE) and improving equity of access to health care for serious illness in Andhra Pradesh (AP).

Methodology

Overview

In India, evaluation is not routine, even of large costly public health care programmes and none of the initiatives – including the Aarogyasri scheme in which we are especially interested – was piloted in a systematic way, let alone via a carefully designed randomized controlled trial. Hence baseline estimates of health expenditure and health seeking behaviours were not collected prior to the start of the Aarogyasri. Following the UK Medical Research Council Guidance and best practice on the evaluation of complex interventions, we therefore opted for a quasi experimental design in which we compare changes in health care related expenditures and behaviours in the states of AP and Maharashtra (MH) before and after the launch of the Aarogyasri scheme in AP. The basis for the choice of MH as the state for comparison was that AP and MH have a similar development profile (Figure 1). The other socio-economically similar neighbouring states of Karnataka and Tamil Nadu had already introduced Aarogyasri-like schemes, and Odisha the only other neighbour had comparatively higher levels of socio-economic deprivation.

Figure 1. Location of and selected indicators for Andhra Pradesh and Maharashtra



Maharashtra	Indicator	Andhra Pradesh
112.37	Population (2011 census, in millions)	84.66
10.20	% Schedule Caste (2001 Census)*	16.60
8.90	% Schedule tribe (2001 census)*	6.20
101,314	Per capita income 2011-12 (in INR)**	71,540
35	Number of districts	23
5,314	Households covered in NSSO 60 th round (2004-05)	5,059
10,073	Households covered in the study 2012	8,623

*Note that 2011 census data for social groups are not yet published

**Source: Presentation on Annual Plan 2012-13 and Five Year Plan 2012-17

But, a challenge we faced was that the Rashtriya Swasthya Bima Yojana scheme (RSBY), which provides access to free inpatient hospital care to 'Below Poverty Line' families had been launched in MH in 2008 and rolled out to most districts in the state by 2012. Furthermore, the Aarogyasri and RSBY were implemented against a backdrop of other health service developments such as the National Rural Health Mission. However, the benefit package provided by RSBY is set at a substantially lower financial limit than the Aarogyasri (INR 30,000 vs INR 200,000). And, the NRHM was common to both states and the other initiatives were small in scale or unlikely to significantly affect OOPE for and access to hospital inpatient care. Nevertheless, the difference in changes between AP and MH is not an estimate of a specific initiative. Rather it tells us whether, on balance, the AP initiatives have had larger (or smaller) beneficial effects than the MH initiatives, and if so how much more (or less) beneficial they have been. Any difference in change in terms of hospital inpatient care between the two states is quite likely to be due to differential effects of the Aarogyasri and RSBY programmes. In summary, our comparison between trends in OOPE for and equity of access to health care in AP and MH, based on a study design which addressed the difficulties in identifying an appropriate 'control' population allowed us to infer the differential impacts of the Aarogyasri and RSBY in the two states and elicit net effects of Aarogyasri over and above those of the RSBY. Importantly, it has enabled us to contribute new knowledge on the impact and role of the health financing innovations, provide lessons for other programmes, and strengthen the evidence base for policy on universal health coverage in India.

A summary of the major health sector initiatives in AP and Maharashtra

The Rajiv Aarogyasri Health Insurance Scheme of AP

In 2007 AP launched a pioneering new state-wide fully state-funded health insurance scheme, the Rajiv Aarogyasri Community Health Insurance Scheme (Aarogyasri) to provide treatment for serious and life-threatening illnesses. The specific objectives include: to improve access of poor families to quality 'tertiary' medical care (meaning low-frequency, high cost specialist care) and treatment of identified diseases requiring hospitalisation through an identified network of health care providers, to provide financial cover for catastrophic illnesses which have the potential to wipe out life time savings of poor families and to provide 'universal coverage to the urban and the rural poor in the state albeit for the conditions covered in the benefits package. All families with a 'below poverty line' (BPL) ration card, i.e. those on an annual income below USD 1384 (INR 75,000) in urban areas and USD 1107 (INR 60,000) in rural areas, and including individuals with pre-existing medical conditions are *automatically* enrolled and the scheme was estimated to cover approximately 20.4 million poor and lower middle class families, comprising about 85 percent of the state's population in 2009. Enrollees make no contribution, the annual benefit is a maximum of USD 4,500 (INR 200,000) per family per year and there is no limit on the size of the family. A total of 942 medical and surgical procedures across 31 clinical specialties are provided and the benefits include all inpatient costs - associated investigations, food, transport and medicines for 10 days following discharge. One year follow-up packages including consultation,

medicines, and diagnostics are also available for 125 procedures requiring longer periods of follow up. Aarogyasri has unique features including *Aarogyamithras* (health system navigators), outreach *health camps* delivered by participating hospitals to educate, screen and case-find and a state-of-the-art information technology-based management system. At the time of this study, 353 public and private sector hospitals were 'empanelled' to provide services to Aarogyasri beneficiaries.

In 2009, a descriptive study of *Aarogyasri*, based on an analysis of claims data and a survey of beneficiaries, concluded that while the scheme was beginning to reach its intended beneficiaries uptake was lower among scheduled castes and tribes. This was confirmed by V Y Fan, A Karan and A Mahal, who used variations in programme roll-out over time and districts to evaluate the scheme using National Sample Survey data collected before and after its launch. They reported reduced OOPE in this initial phase but no major impact on catastrophic healthcare expenditure. Inspired by Aarogyasri and mindful of the political benefits of introducing popular health reforms, other states have launched health financing innovations similar to this model.

RSBY in Maharashtra

RSBY was launched across a number of states by the Ministry of Labour, Government of India (GOI) in 2008 and provides access to free inpatient hospital care up to USD 550 (INR 30,000) per family per year. Households which meet the criteria based on the much more limiting definition of poverty and numbers of poor families provided for each State by the GOI Planning Commission are eligible to enrol, and pay a contribution of USD 0.55 (INR 30) at registration and at each annual renewal. Up to 5 family members, including those with pre-existing conditions can be covered, and personal information including biometric data are collected prior to the issue of a smart card with encoded details of the family. 700 procedures covering 18 broad categories of interventions are covered and the benefit packages include the intervention, public transport costs limited to 1.8 USD (INR 100) per visit and 18.2 USD (INR 1000) per year and post-hospitalization drugs for 5 days. Networked hospitals are required to provide free outpatient consultations but other costs such as ambulatory diagnostics and medicines have to be borne by the beneficiaries, except if investigations lead to inpatient admissions within a day. A pilot of the RSBY scheme was launched in 1 district of AP, but only after the start of our household survey.

In Maharashtra, enrolment began in Aug 2009, and by mid 2013, approximately 2 million of the eligible 4 million families were enrolled in the scheme which is being implemented in 31 of 35 districts in the state. Enrolment had extended to 26 districts prior to June 2012, when our household survey began. Notably, only 15 out of 1215 hospitals contracted for RSBY funded services are from the public sector. Early assessments of the scheme's impact nationally, suggest that although the rate of hospitalisations has increased, awareness of the scheme was poor and remains a barrier to uptake. In Maharashtra, utilisation rates have been reported to be lower than in other states and the male:female enrolment ratio is 6.5:3.5.

Other major health sector initiatives in AP and Maharashtra

Aarogyasri in AP and RSBY in MH have been introduced against a backdrop of other health service innovations during the past decades. Some are common to both states and driven by national strategies, and others owe their existence to state-level enterprise, innovation and political support.

The National Rural Health Mission (NRHM) was launched in 2005 nationwide, with a key aim of reducing maternal and infant mortality. Government reports suggest that its notable achievements include an increase in institutional deliveries; in AP from 1.25 million in 2005-06 to 1.46 million by 2011-12 and in MH from 1.1 million to 1.63 million, achieving an institutional delivery rate of approximately 92 percent in both states. Also common to both states is the '104 health information help line' launched in AP in 2008 and MH in 2011, to provide medical advice and information based on validated algorithms and disease summaries, direct callers to appropriate health facilities or to receive a complaint against a public sector health facility. In AP the help line and call centre were subsumed within the Aarogyasri infrastructure by 2011.

In MH, the RSBY was preceded by the Jeevandayee scheme launched in 1997 with the objective of reducing catastrophic OOPE on inpatient care in the BPL population. Potential beneficiaries were required to apply for funding after a diagnosis was confirmed and the scheme covered serious illness such as cardiac and renal disease and cancer. However, the scheme uptake has been low, and while it has continued to run in parallel to the RSBY, only 66,853 procedures (4456 procedures per year in a state with 112.37 million people) have been approved during the scheme's lifetime. Launched in 1995-96, the Navasanjeevani Yojana scheme is exclusive to the 15 tribal districts of MH and was to improve maternal and infant mortality in these vulnerable populations. It has focused on strengthening primary health and nutrition services and access to safe drinking water.

A service available in AP but not in MH is the '108' scheme, launched in 2005 to provide a state-of-the-art medical emergency response service. At the time of our study, 802 ambulances catered to approximately 3,500 emergencies per day.

Study design

Surveys

Baseline Survey : 2004

We used the original data from the National Sample Survey Organization (NSSO) 60th decennial round household survey undertaken in 2004 to estimate baseline health related expenditures and behaviour for AP and MH. This NSSO healthcare and morbidity round (questionnaire attached at Annex 1) was the most recent round covering the “curative aspects of the general health care system in India, utilization of health care services provided by the public and private sector and the expenditure incurred by the households for availing these services”. The household survey used a multi-stage stratified sampling methodology to identify a representative random population sample and an interviewer completed questionnaire to obtain measures of health related expenditures and behaviours together with socio-demographic, household expenditure and other information.

Follow up survey: 2012

We used the same household survey design and methods as those used by NSSO to collect post-intervention data in AP and MH. Briefly, the household survey used a multi-stage stratified sampling methodology with the 'First Stage Units' (FSUs) identical to those used by NSSO in their 66th round (2008-09), the latest round for which FSUs had been mapped. However, the FSUs were not the same as those in NSSO 2004, our baseline survey, rapid urbanisation having changed substantially, the urban-rural landscape of both states and thus the geographical basis for sampling units.

Project Activities

Questionnaire design

Our household survey questionnaire was designed to address the objectives of our study and focused on the following components:

- Health expenditure
 - i. Outpatient expenditure
 - ii. Inpatient expenditure
 - iii. Source of financing of health expenditure
- Equity
- Health seeking behaviour
- Service quality
- Awareness about the schemes

For the majority of the questionnaire for our household survey, we replicated questions used in the NSSO 2004 Morbidity and Health care round, to ensure comparability of data between 2004 and 2012. We used not only the Morbidity and Health care round but also the 2004 consumer expenditure surveys as a basis for our questionnaire development. The consumer expenditure survey is the best source of information nationally, on all expenditures incurred by the household. We also populated various sections of our questionnaire with questions elicited by an extensive literature search on household surveys in India. Some of these additional questions were based on those used in the Indian Human Development survey (IHDS). We chose the IHDS survey since its household interviews covered health, education, employment, economic status, marriage, fertility, gender relations, and social capital, topics relevant to our study. Our survey questionnaire comprises of 8 sections and is attached (Annex 2).

Pre- testing the questionnaire and Pilot survey

The purpose of pre-testing the draft questionnaire was to check the flow of questions and respondents willingness to answer the questions. It was also an important opportunity to ensure that the questions were unambiguous, and were therefore valid and replicable. The questionnaires were translated into Telugu and Marathi. 20 households in Sangareddy and Nalgonda districts of AP were visited and the draft household questionnaire was administered by two teams in January 2012. In-depth discussions were held with the households to seek their advice on the best sequence of questions which would appear logical, put the family at ease and enable the survey to be completed within a reasonable amount of time. One observation from the pre-testing was that we needed to change the sequence of the questions, because the respondents were reluctant to respond to questions related to consumer expenditure if these were included in the introductory section. A revised order of the questionnaire sections which concluded with questions on household expenditure yielded useful unhesitating responses and determined the sequence in the final version of the tool.

The pre-testing was followed by a pilot survey in AP and MH. The field survey teams involved in the pilot were given a one day training in March 2012. The aim of the pilot was to test the survey tool across a larger sample of households, prior to the main survey and to ensure that the questions were easily understood, appropriate and could be administered in a consistent manner in Telugu and Marathi. The pilot also enabled the evaluation team to assess the rate of consent. The pilot included 'above poverty line' and 'below poverty line' rural and urban households to ensure representativeness and was carried out in 50 households in each state. In AP the pilot was carried out in Choutuppall, Medchal, Srirangaram, Yacharam and Dandumailaram 'First Stratum Units' (FSUs) in Rangareddy and Nalgonda districts. In Maharashtra Markal, Shikrapur, Manchar and Narayangaon FSUs in Pune district were included. The main observations from the pilot were that:

1. Consumer expenditure questions used by NSSO took more than 2 hours to administer and would need to be replaced in our household survey questionnaire by an abbreviated version which would reduce the time required per household to 1 hour 35 minutes.
2. Verification of the break-up of hospitalization expenditures reported by households was not possible.
3. Questions related to the recall of illnesses and treatments received within the previous 15 days or 1 month were acceptable to households and elicited responses by the majority of respondents.
4. Incorrect code entries on the part of field survey teams could be avoided if an easy-to-use reference document listing all response codes could be distributed to the survey staff.

Post-pilot feedback enabled major areas for questionnaire improvement to be understood and acted on. The questionnaire was appropriately shortened and many questions not central to the key research questions were deleted, to ensure that the study focused on its main objectives. The pilot was carried out by the evaluation team and the survey agency IMRB working together. Discussions to strengthen the questionnaires and survey logistics were also held jointly by the 2 groups, to pool expertise and experience and to ensure that the final version of the questionnaire and plan for its administration would fulfil the objectives of the study.

Training of the survey teams

Training of the field survey teams was conducted before the pre-testing of the questionnaire, the pilot and the survey. The training prior to the start of the survey involved a three day programme for the field survey staff in AP and Maharashtra. In AP the training was conducted from 23 to 25 May 2012 and in Maharashtra, from 31 May to 2 June 2012. The programme included an explanation of the purpose of the study and its national policy implications. This was followed by detailed training on the NSSO household listing and sampling methods and the use of a random numbers table. Also included were discussions on each question in the survey tool, as well as the concepts and definitions on which questions were based.

To support the training and survey, we recruited a group of retired NSSO officers from AP to share their vast experience of NSSO surveys with us, contribute to the training of the field staff and to verify the

listing of households and the conduct of the survey. A team from the Indian Socioeconomic Research Unit, Pune which carried out the data verification in MH also participated in the training programme for field staff, to gain an in-depth understanding of the study.

The household survey

The household survey was administered across AP and MH using a multi-stage stratified sampling methodology, identical to that of the NSSO 60th round survey, to select households for the survey. For the first stage of the stratification, the ‘First Stage Units’ (FSUs) mapped for the 66th round (2008-09), the most recently published National Sample Survey (NSS), were used. These FSUs were not the same as those in the 2004 NSSO baseline survey, rapid urbanisation having changed substantially, the urban-rural landscape of both states and thus the geographical basis for sampling units. FSUs consisted of Census villages in the rural sector and ‘Urban Blocks’ in the urban areas and cover all the districts of a state. The NSS methodology selects villages in which their survey is to be undertaken, by a probability proportional to size with replacement method, from the census listing of villages (NSSO, 2011). The urban blocks are ‘mapped’ by the NSSO taking into consideration the increase or decrease in the population of urban agglomerations and also newly declared towns. Each block includes a population of 600 to 800 people living in 120 to 160 households (MOSPI, 2012). Thus, the household survey was conducted in all FSUs identified for the 66th NSS round - 864 in Andhra Pradesh and 1,008 in Maharashtra. Maps of urban FSUs were required to be ordered and purchased from a number of regional NSSO offices across both states during the preparatory phase of the survey.

Table 1: Urban and rural populations and households surveyed in 2004 and 2012 in Andhra Pradesh and Maharashtra

	Andhra Pradesh		Maharashtra	
	NSSO 60th round 2004-05	Our survey 2012	NSSO 60th round 2004-05	Our survey 2012
Population	76,210,007*	84,665,533**	96,878,627*	112,372,972**
Urban population	20,808,940*	28,353,745**	41,100,980*	50,827,531**
Rural population	55,401,067*	56,311,788 **	55,777,647*	61,545,441**
Total households (urban)	4,397,138*	6,778,225**	8,403,224*	10,813,928**
Total households (rural)	12,607,167*	14,246,309**	11,173,512*	13,016,652**
Total households	17,004,305*	21,024,534**	19,576,736*	23,830,580**
FSUs (urban)	183	371	267	504
FSU (rural)	325	490	265	504
Total households surveyed (urban)	1824	3715	2664	5038
Total households covered (rural)	3235	4908	2650	5035

*2001 census ** 2011 census

FSU - First Stratum Unit

The second stage stratification, i.e. the selection of households for the questionnaire survey, replicated the methodology used for the 2004 NSS (the survey used as the baseline). All households in each FSU were listed and stratified into four categories; households with experience of at least one hospitalization in the last 12 months, households with at least one child aged below 5 years, households with at least one member aged 60 years or above and the remaining households were listed as 'Other households'. Out of these categories 10 households were selected randomly, 4 from the 'hospitalization' group, 2 from the households with children, 2 from the households with older members and 2 from the 'other' households. Thus, 18,696 households were surveyed across AP and Maharashtra (Table 1).

The survey was undertaken between June and September 2012.

Verification

We planned three levels of verification of the study data; the first to be undertaken by the survey agency, the second to be carried out by the study team and the third, an independent verification undertaken by an external group or organisation. Survey teams for each district were accountable to a field supervisor who was responsible for checking both the household listing and data entry on a daily basis. The study team also accompanied the field staff to survey sites on a regular basis. The retired NSSO officers who contributed to training the field staff (see previous section) also carried out the independent data verification in AP and the Indian Socioeconomic Research Unit, Pune undertook this work in Maharashtra. Data collected from 250 households in each state (approximately 2.5% of the surveyed households) and 186 of the FSU listings (approximately 10%) were verified in both the villages and urban blocks in order to ensure that the sampling method and administration of the questionnaire survey were being correctly applied. Due to their significant field experience, both verification teams in AP and Maharashtra were able to correct errors in the household listing and administration of household questionnaires as the field work was in progress and help resolve problems that were encountered in the field quickly to ensure that there were no major delays in the completion of the survey.

Data entry and validation

The data entry was done by staff of the survey agency IMRB which had been commissioned to carry out the survey, using a double entry method. In addition to our verification, IMRB also verified the data at both field and entry level. The questionnaires reported incorrect were sent back to the field for re-survey. The research team carried out a final validation and review of the data, following which some minor corrections were made.

Project outputs

Our study achieved significant outputs which advance knowledge of the impacts of large health financing innovations in India and build capacity for evidence based policy and for policy relevant research and evaluation in India.

Research

This study has collected a wealth of data. Complex interdisciplinary methodologies combining epidemiological statistics and health economics with qualitative methods are required to analyse and report on the data. The research reports will therefore continue to be generated beyond the life of this study. We have listed below (Table 2) the papers which have been submitted for publication or are being prepared for likely submission over the next few months. This first round of analysis and preparation of reports has focused on the key objectives of the study. In addition the table lists other outputs; posters presented at a conference as well as details of oral presentations planned for a global conference in July in 2013.

Table 2. Research outputs - reports and presentations

Mode of dissemination	Journal/Conference	Status	Title
Journal articles	National Medical Journal of India	Accepted	Using the Indian National Sample Survey Data in Public Health Research
	Lancet	Submitted	Trends in addressing inequalities in access to hospital care: A tale of two Indian states
	Globalization and Health /Social Science and Medicine	To be submitted	A report of the Rajiv Aarogyasri Scheme: Assessment of some case studies
	Journal of Health Economics	Work in progress The impact of Aarogyasri in Andhra Pradesh and RSBY in Maharashtra on expenditure, access and means of financing in-patient healthcare using difference in difference and different identification strategies e.g. exploiting the phased rollout of Aarogyasri and RSBY, and compare households with different lengths of exposure to the two schemes and households in districts without the schemes.	
	Health Policy and Planning	Work in progress. Private vs public sector healthcare use and spending in AP and Maharashtra using DID. (Draft at Annex 3)	
	British Medical Journal	Work in progress. Links between education and hospitalization and catastrophic health expenditure in AP (note on methods at Annex 4)	

Posters	Health Systems Research Symposium, Beijing	Presented	'Quality medicare for the unreached' - has it been achieved by the Rajiv Aarogyasri Health Insurance Scheme of Andhra Pradesh?
	Health Systems Research Symposium, Beijing	Presented	The impact of health insurance for the poor on debt financing for hospitalization - Evidence from the Aarogyasri health insurance scheme in Andhra Pradesh, India
Oral Presentations	International Health Economics Association, Private Health Sector symposium	Accepted	Rajiv Aarogyasri Health Insurance Scheme - health financing for the unreached population for procedures deemed expensive
	International Health Economics Association Congress	Accepted	Catastrophic Health Insurance for the Poor: A Quasi-Experimental Evaluation of Andhra Pradesh's Rajiv Aarogyasri scheme
Web Portal	ACCESS Health website	To be uploaded	Health Financing Systems: A literature review

Papers written or in progress

'Using the Indian National Sample Survey Data in Public Health Research', has been accepted by the National Medical Journal of India and will be published soon (Annex 5).

Anuradha Katyal, Mala Rao, Prabal Singh, Amit Samarth, Sofi Bergkvist.

Abstract

The National Sample Survey Organisation (NSSO) of India has been responsible for the collection and dissemination of National Sample Surveys (NSSs) data, which are recognised for providing critically important information on socio-demographic trends for the past 62 years. These data are among the most important information sources for public health research in India. Researchers and organizations ranging from the World Health Organization, the World Bank and the Planning Commission of India on the one hand, to academic and private institutions on the other, continue to utilise these data, which find their way into peer reviewed journals, but also blogs, newspapers and press releases. But few understand how these data are collected, and this limits their use. The NSSO has a highly sophisticated and large organisational structure to design the surveys and implement data collection, analyses and publication. The data architecture appears complex, and challenging to use. The aim of this paper is to encourage and enable greater use of these data by public health researchers, by de-mystifying the NSS methodology and describing how it is collected and how reliability and accuracy of data are assured.

'Trends in addressing inequalities in access to hospital care: A tale of two Indian states', has been submitted to the Lancet and comments are awaited (Annex 6.1 & 6.2).

Mala Rao, Anuradha Katyal, Prabal Singh, Amit Samarth, Sofi Bergkvist, Manjusha Kancharla, Adam Wagstaff, Gopal Netuveli, Adrian Renton.

Abstract

Background. India has one of the highest levels of out-of-pocket health expenditure. To address this, its *Twelfth Five Year Plan (2012-2017)* proposed the development of government-funded health insurance schemes, building on the evidence from experimental schemes being introduced across many States to reduce out of pocket expenditure and improve access to health care for the poor. We report findings from a comparative analysis of trends in out of pocket expenditure for and equity of access to inpatient hospital care in the neighbouring states of Andhra Pradesh and Maharashtra which have introduced the Rajiv Aarogyasri Community Health Insurance Scheme (Aarogyasri) in 2007 and Rashtriya Swasthya Bima Yojana (RSBY) in 2009 respectively. This comparison allows us to infer the differential impacts of the various initiatives in the two states.

Methods. We compared changes in hospital inpatient care related expenditures and behaviours in AP and MH before and after the rollout of the Aarogyasri scheme in AP and the RSBY scheme in MH. We used the original data from the National Sample Survey Organization (NSSO) 60th decennial round household survey undertaken in 2004 as our baseline information and used the same household survey design and methods as those used by NSSO, to collect post-intervention data in AP and MH in 2012. We estimated outcomes averaged across states, and compared changes in these over time between AP and MH, using a difference-in-difference (DID) analysis to uncover the net effect of Aarogyasri over and above RSBY. 5314 and 5059 households from MH and AP were surveyed by the NSSO in 2004. Our survey in 2012 included 10073 (MH) and 8623 (AP) households.

Results. Overall, average inpatient expenditure increased in real terms in both the states between 2004 and 2012, but the increase was significantly greater in MH (adjusted DID= -489.8 INR, 95% CI= -982.7: 3.0, $p=0.0514$). DID's reached significance in scheduled castes, rural households and the middle and fourth asset quintiles. In both states proportions of households incurring large borrowings to meet inpatient expenses increased from 2004 to 2012 but there was a consistent pattern of smaller increases in AP for the overall population, as well as all subgroups with DID's reaching significance for the overall population, (unadjusted and adjusted), female headed households, scheduled tribes, rural households and all asset quintile groups except the richest quintile. Hospitalisation rates have increased in both AP and Maharashtra but more so in AP (5.6 per 1000 population vs 2.2), although the DID was not statistically significant and the sub group analysis presented a mixed picture. Proportions of households incurring large expenditures showed an increase in both states, with a somewhat smaller increase in AP, but the DID between AP and MH was not statistically significant for the sample as a whole or for any group.

Conclusion. Health innovations in AP had a greater beneficial effect on hospital inpatient care-related expenditures than innovations in MH. The Aarogyasri scheme is likely to have contributed to these

impacts in AP at least in part. However, in both states, OOPE increased over time. Schemes such as the Aarogyasri and RSBY may result in some positive outcomes but, equity of access to health care and the reduction of the overall burden of OOPE especially in the most vulnerable sections of the population are likely to require additional interventions that address gaps in the availability of and access to care. Our study needs to be followed up with further and repeated evaluations as AP's and MH's schemes evolve; to assess the impacts of re-design and to help health policy leaders achieve their aspiration of universal access to good quality health care.

'A report of the Rajiv Aarogyasri Scheme: some case studies'

Venkatesh Boddu, Haripriya Narasimhan, Mala Rao, Prabal V Singh, Anuradha Katyal

The Aarogyasri scheme exists against a backdrop of published literature which highlights that there is a gap between even the most enlightened health policies and their accessibility especially to the poor. The reasons for the failure of policy to be translated into practice are often complex and include factors related to the health system as well as the wider social dimensions such as poverty and illiteracy. This paper describes, through a few case studies, the intricate ways in which the scheme actually works in people's lives, and drawbacks that are present in the system. The report also suggests some recommendations which could alleviate the suffering of the poor, for whom the scheme is primarily intended and improve their access to its benefits. This research is based on six case studies on hospitalization in Nalgonda, Ranga Reddy and Hyderabad districts of Andhra Pradesh. In all except one case, people sought private medical care. There are various factors responsible for this situation, and the report discusses this in detail (attached at Annex 7).

Posters

Two posters were presented at the World Health Organisation's Second Global Symposium on Health Systems Research in Beijing held between 31st October-3 November 2012.

These are attached at Annexes 8 & 9 and their abstracts are reproduced below

The impact of the scheme on debt financing for hospitalisation

In summary, the overall ratio of households having to borrow more than INR 30,000 (\$600) or more than INR 60,000 (\$1,200) for hospitalizations had decreased in the Andhra Pradesh or the 'treatment' as well as in the Maharashtra or the 'control' group. There was, however, an increase in the ratio of households having to borrow money for hospitalization to treat cardiac or cancer ailments in the control group. The treatment group, on the other hand, has experienced a reduction in the ratio of debt financing for hospitalization mainly in the cases of cardiac and cancer treatment. This may be an impact of Aarogyasri Health Insurance Scheme as cardiac and cancer are two of the most common ailments treated under the programme. It will be important to assess what the changes have been to the poorest people for whom the program was designed. We had not yet carried out quintile regressions and improved the efficiency of the model through coarsened exact matching before the difference in

difference analysis. This is merely a first indication of how the ratio of debt financing had changed while more analysis is required to draw any conclusions on the effectiveness of the programme in reducing debt financing.

'Quality medicare for the unreached' - has it been achieved by the Rajiv Aarogyasri Health Insurance Scheme of Andhra Pradesh?

Anuradha Katyal, Amit Samarth, Mala Rao, Prabal V Singh, Sundaresh Peri, Sofi Bergkvist

The breakdown of hospitalizations in various social groups was used to assess the hospitalizations in the Scheduled caste and Scheduled tribal population, since the majority of these fall under the poor and hard-to-reach population groups. This comparison was also undertaken for a costly procedure such as heart disease.

Oral Presentation

Papers to be presented at the 9th World Congress of the International Health Economics Association, Sydney, 6-10 July 2013

Rajiv Aarogyasri Health Insurance Scheme - health financing for the unreached population for procedures deemed expensive

Anuradha Katyal, Prabal Singh, Mala Rao, Sofi Bergkvist, Amit Samarth

An oral presentation will be made by Anuradha Katyal at the Private Sector Symposium on 6 July. This session will be chaired by Prof David Bishai from the Johns Hopkins Bloomberg School of Public Health (Programme attached at Annex 10).

Abstract

India has a wide spectrum of healthcare facilities, owing to a huge economic disparity. At one end of the spectrum lie the public hospitals with a dearth of human resources and infrastructure. Despite being home to the second largest population, India spends only about 1 percent of GDP on healthcare. According to the National Commission on Human Resources in Health (2012) India's doctor:patient ratio is about 1:1953. While public care facilities have been significantly eroded over time, the private healthcare sector is boasting of cutting edge technology and state of the art facilities, at a high cost. Yet both sectors offer specific advantages. The government funded facilities provide affordable care and the private sector comes with a promise of technology and quality.

This paper presents the results of analysis of data collected from a household survey conducted in Andhra Pradesh (AP) and Maharashtra (MH). The main aim of the survey was to compare the impact of the government sponsored health insurance schemes, the Rajiv Aarogyasri scheme in AP and the Rashtriya Swasthya Bima Yojana in Maharashtra. Both provide hospital in patient care to below poverty line households, but offer different benefit packages.

Our outcomes of interest are access to and out-of-pocket expenditure for public and private sector hospital in patient care and perceptions of quality of hospital care as reported by the households. We estimated difference-in-differences to assess changes between 2004 baseline and 2012, the year of our household survey. Our results demonstrate a decline in the utilization of public sector hospitals in both states. The decline is greater in AP. The overall in patient expenditure on private hospital care has increased in both states. The duration of stay in private facilities has increased in MH (slightly) and decreased in AP, with a significant DID. Possible explanations for these trends will be presented.

Catastrophic Health Insurance for the Poor: A Quasi-Experimental Evaluation of Andhra Pradesh's Rajiv Aarogyasri scheme

Mala Rao, Prabal V Singh, Anuradha Katyal, Amit Samarth, Sofi Bergkvist, Adam Wagstaff, Adrian Renton, Manjusha Kancharla, Sundaresh Peri.

An oral presentation will be made by Sofi Bergkvist on 10 July at the 9th International Health Economics Association Congress at the session India: Quality, Accountability, and Financing Reform chaired by Prof Christian Gericke of the Wesley Research Institute and University of Queensland (session details available at- <http://ihea2013.abstractsubmit.org/sessions/1689/>).

Abstract

Background. The Rajiv Aarogyasri scheme in Andhra Pradesh (AP) provides all families living below the poverty line with financial coverage of up to INR 200,000 (\$4,000) per year against the costs of tertiary care. Care is delivered through public and private hospitals that have been contracted by the scheme. The empanelment process employs strict medical and non-medical criteria; to date, most empanelled hospitals are private. The scheme provides 'Aarogyamithras' who are in effect 'hand-holders'; slightly more than half of them work at government health centers, the rest at empanelled hospitals. The day-to-day running of the scheme with pre-authorizations, claims and grievance management was initially contracted out to a private insurance company. Aarogyasri Trust, an autonomous body of the state government, has now taken over most responsibilities. The Aarogyasri Trust also sets the standards, contracts with the hospitals and manages the scheme's sophisticated IT platform.

Objectives. The first objective of the study is to shed light on how much people know about the scheme, who is entitled to it, who is covered, and who has (directly) benefited from it. The second objective is to rigorously estimate the impacts of the scheme on key outcomes, including the use of healthcare services in public and private sector, but also financial outcomes such as out-of-pocket spending and the methods households use to finance their spending, including borrowing and dissaving.

Methods. To achieve our first objective, we use data from a household survey carried out in 2012 in AP specifically to shed light on the Aarogyasri scheme. A stratified multi-stage sampling design was adopted in which 8,623 households were interviewed in AP. The household survey was carried out to assess health-seeking behavior, healthcare expenditure, access to healthcare and awareness of the Aarogyasri scheme and other government programs. To estimate the scheme's impacts we use four identification strategies. First we compare AP and the neighboring state Maharashtra (MH) pre- and post-Aarogyasri.

Our pre-Aarogyasri data are from the National Sample Survey Organization (NSSO) survey 'Morbidity, Health Care and the Condition of the Aged' from 2004 which was fielded in all Indian states, and our post-Aarogyasri data are from the aforementioned 2012 household survey which we undertook in both AP and Maharashtra. This strategy risks overlooking the effects of the introduction in 2010 and 2011 in some districts in Maharashtra of the Rashtriya Swasthya Bima Yojna (RSBY) insurance scheme. Our second identification strategy is to compare AP, the MH RSBY districts, and the rest of MH pre- and post-Aarogyasri. Our third approach is to exploit the phased rollout of Aarogyasri and RSBY, and compare households with different lengths of exposure to the two schemes, including 2004 households with zero exposure.

Capacity Building

The study has provided a very substantial opportunity for learning for the core team, collaborators from partner organisations, as well as other public health and research organisations with an interest in impact evaluations of health innovations, and importantly, for current and future policy leaders.

Shared learning through workshops

The study core team contributed to capacity building and gained learning through organising and participating in a number of workshops during the life of this study.

A workshop on measuring the impact of different models of health financing- experiences and methodologies. 24 June 2011

A 1 day workshop was organised jointly by the Administrative Staff College of India, ACCESS Health International and Indian School of Business on 24 June 2013, to present and discuss the methods used in the evaluation of social health insurance schemes and subsequently to focus on methods to be used in the impact evaluation of the Rajiv Aarogyasri Health Insurance Scheme of Andhra Pradesh. Participants included policy leaders from the Government of Andhra Pradesh, and representatives of public health institutes and research organizations in Andhra Pradesh and from other states in India.

Arranged during the early months of the planning of the methodology, the event provided a valuable opportunity for the core team as well as other participants to gain an understanding of the methodologies available for impact evaluations of health financing models as well as the challenges likely to be faced particularly in the Indian context where baseline measurements are unavailable. It also provided an opportunity for attendees with a common interest in evaluations of health financing models to get to know each other and identify potential partners for research.

World Bank's Sixth Forum of Government Sponsored Health Insurance Schemes in India: 'Analyzing Data, Measuring Impact'. Bangalore 13-15 May 2013.

The Sixth Forum of Government Sponsored Health Insurance Schemes in India was organized by the World Bank's India health team. Participants included senior policy makers and academic partners from India as well as international experts. The objectives of the forum were to facilitate the sharing of

experience among policy makers and academics, to enable the gaining of insights from the international experience and from research and to discuss ways forward on strengthening monitoring and evaluation of health financing schemes in India. Mala Rao made a presentation on impact evaluation methodologies based on the experience of this study. The session generated considerable interest and discussion among the attendees, many of whom are from states which are planning to launch evaluations of their health financing schemes.

Capacity building of the core team, other contributors and advisers

The study has substantially enhanced the knowledge and experience of the core team which carried out the study, other contributors and the advisers. It has brought together an interdisciplinary group of researchers with skills and experience in areas ranging from public health medicine, health service management, epidemiology and biostatistics, health economics and anthropology to contribute to a common goal. The junior members of the team have had the opportunity to be mentored and guided by highly distinguished experts who have themselves gained from the experience of working with new partners and data sources. The challenges of the lack of baseline data and 'ideal' control populations have had to be overcome and evaluation models have been developed, enriching the experience of both advisers and the core team.

In terms of formal training, 2 members of the core team, Anuradha Katyal and Sofi Bergkvist have been trained in the use of STATA. Anuradha Katyal has also received training in the use of ADePT, SPSS and Microsoft Excel. Continuous interactions with the advisers has strengthened the confidence of the junior members of the team in the use of analytical software and methodologies. Anuradha Katyal, Sofi Bergkvist and Amit Samarth learnt how to extract NSSO data. The core team has grown into competent and experienced users of NSSO data, able to translate the NSSO methodology into large household surveys. Other newly acquired competences on the part of the junior members of the core team include the commissioning and management of large household surveys, grant management, data handling and analysis and writing up of study findings and presentation of results at conferences and in policy fora. In the case of colleagues from the field of anthropology, the study has provided an excellent opportunity to contribute their qualitative methodological skills to a health care delivery study of national importance.

Development of curricula for teaching

The case studies are being developed into learning resources and will be included in training programmes for health policy leaders. They provide powerful evidence of barriers to translating well intentioned policies into health care delivery and provide an ideal learning resource for leadership development programmes for policy makers.

Project outcomes

This study is a response to a request received in 2010 from the Aarogyasri Trust Board for a formal evaluation of the scheme. The development of the study proposal was enthusiastically supported by the then Principal Secretary, Department of Health, Medical and Family Welfare, Government of Andhra Pradesh, Dr P V Ramesh. The study results have been shared with the current leadership of the Department of Health and a formal presentation to a larger group of stakeholders is also being planned. The key findings of our analysis is that the Aarogyasri scheme is demonstrating some benefits in terms of out of pocket expenditure for hospital in patient care. Aarogyasri is therefore perceived with some justification across India, as a successful scheme, and is being rapidly replicated across the states.

Our study has highlighted that such schemes may result in some positive outcomes. But it also suggests, especially through our case studies, that equity of access to health care and the reduction of the overall burden of OOPE particularly in the most vulnerable sections of the population are likely to require additional interventions that address gaps in the availability of care and provide patients appropriate pathways that support their journey from primary care where they may be informed of their entitlements and investigated for their initial symptoms prior to referral to appropriate hospitals for the treatment of serious illness. This message is consistent with that of the Twelfth Five Year Plan strategy entitled 'Faster, Sustainable and More Inclusive Growth', which highlights the need for a 'more comprehensive vision of healthcare' as the means to deliver universal health coverage. The strategy highlights that the Twelfth Five Year Plan will explore the possibilities of building on current health financing innovations across India and the evidence from impact evaluations, to introduce health insurance which will focus on both preventive and curative services (Para 9.37 page 94). Our data analysis has only just come to the end of the first phase, and there has been limited time thus far to highlight these implications on policy and practice. Our plan is to advocate for a comprehensive health delivery system, using our evidence to support appropriate recommendations.

Our study is among the first evaluations using a quasi-experimental methodology to provide much needed evidence to inform India's journey towards universal health care. Since July 2012, MH too has joined the list of states offering an Aarogyasri-like scheme, the Rajiv Gandhi Jeevandayee Arogya Yojana. There are plans for detailed discussions to be held with the Government of Maharashtra, to encourage the use of our MH data as their baseline and to develop plans for monitoring and evaluation which are integral to the scheme delivery.

We also plan to contribute our evidence of 'what works' in terms of both policy and practice, and also research and further development to the IDRC supported Community of Evaluators to promote high quality impact evaluations in South Asia.

Overall Assessment and recommendations

There is a serious gap in expertise in health financing research and expertise in India which needs to be recognised and addressed. IDRC is an exemplar in supporting high quality evaluations and in working with the Community of Evaluators and others to build capacity for evaluations and support the development of appropriate policy. IDRC is therefore well placed to advocate for more rigorous monitoring and evaluations of innovations in health financing and health service delivery.