

Service Coverage and Financial Risk Protection Among Urban Poor Under Tamil Nadu's Voluntary Government-sponsored Health Insurance Scheme

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Providing financial risk protection (FRP) to the poor and vulnerable population by preventing the incurrence of Catastrophic Health Expenditure (CHE) is critical to achieving Universal Health Coverage in any country. The World Health Organization has endorsed the ability of pre-payment financing mechanisms such as Social Health Insurance (SHI) to provide FRP and to improve access to healthcare for the poor. The state of Tamil Nadu in India introduced one of the early state-sponsored health insurance programmes in 2009, known since 2012 as the Chief Minister's Comprehensive Health Insurance scheme (CMCHIS). The scheme covers low-income households for hospitalizations. In this paper we examine the extent to which CMCHIS has enabled urban poor households to meet all their healthcare needs without the risk of incurring CHE.

We conducted a ten-month longitudinal study of 600 urban-poor households, selected using multi-stage random sampling, in the Kanyakumari district of Tamil Nadu. We categorized the poor households into four, based on their socioeconomic status: very poor, poor, marginal and vulnerable. Four waves of data were collected at zero, one, six and ten months, from six wards of two municipalities. Healthcare needs of the household were defined as any household member having chronic disease, seeking out-patient care (acute morbidity) or in-patient care (hospitalization).

Out of the 600 households 300 (50 per cent) households had one or more healthcare needs during the ten-month study period. Only 13 households out of the 138 (9.4 per cent) had all the hospitalizations in their households fully covered by CMCHIS, and a vast majority (113 or 81.9 per cent) had no member or episode of hospitalization covered. Households that were identified as Above Poverty Line (APL) by the government; and the marginal and vulnerable households with a relatively better economic status among the poor, were more likely to have service-coverage as compared to Below-Poverty-Line (BPL) households and very poor and poor households. Single episodes of hospitalizations with fewer days of admission in hospital were more likely to be covered by CMCHIS. Almost 64 per cent of the households with hospitalizations incurred catastrophic health expenditure, with a mean OOP of Rs 34,700, and the range was Rs 1560- Rs 7, 35,600). More than one-fourth of the households with CHE were APL card holders (28.8 per cent). Twenty-two households used CMCHIS and had hospitalizations and of these, 15 (68.2 per cent) had CHE. Only seven households enjoyed Financial Risk Protection by using CMCHIS. More than one third (33.7 per cent) of the households spent more than 100 per cent of their capacity to pay to take care of the health-related expenses. More than four-fifths (83 per cent) of the households with hospitalizations used distress financing mechanisms like sale of assets, un-secured loans, gold loans, mortgage of assets, mortgage of land or assistance / gift to meet the healthcare expenses.

This study indicates that even in a context of high availability of public and private sector health facilities and high literacy, the CMCHIS, which has a relatively higher utilization rate and one of the best benefit packages in the country, offered little service coverage with very poor financial risk protection to low income populations. This study suggests the need for careful reconsideration of the shift to a predominantly health-insurance-based healthcare system in the current Indian setting.

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Providing financial risk protection (FRP) to poor and vulnerable populations is critical to the achievement of Universal Health Coverage in any country. Data from around the world show that poor people have the greatest healthcare needs (Smith, 1999, p.145). There is a two-way relationship between poverty and health, with poverty leading to ill health and ill health further contributing to poverty (Wagstaff, 2002, p.97). While lack of financial resources or information can create barriers to accessing services, it has been found that the causal relationship between access to health services and poverty also runs in the other direction (World Bank, 2000). When healthcare is needed but is delayed or not obtained, people's health worsens, which in turn leads to lost income and higher healthcare expenditures, both of which contribute to poverty at the household as well as societal level (Marmot, 2006, p.2081, Narayan et al., 2000).

Considering the vulnerability to ill health of those living in poverty, there are healthcare programmes and schemes which target the poor the world over (World Health Organization [WHO], 2000). There are extensive debates about how to provide FRP to poor households in low and middle income countries (LMICs) (Meng et al., 2011, p.93, Mills, 2014, p.552). The World Health Organization has endorsed pre-payment financing mechanisms such as Social Health Insurance (SHI) to provide FRP and to improve access to healthcare to the poor (WHO, 2005). Many LMICs have introduced government-sponsored health insurance schemes for the poor and vulnerable groups, which are fully or partially subsidized by the government and have limited benefit packages (Meng, et al., 2011, p.95, Mills, 2014, p.554). This has also been the case in India. The Government of India launched a country-wide health insurance scheme named "Rashtriya Swasthya Bima Yojana" (RSBY) in 2008 targeting households living Below Poverty Line (BPL) (Narayana, 2010, p.13, Prinja, Chauhan, Karan, Kaur, & Kumar, 2017, p. e0170996).

Health insurance schemes for the poor and vulnerable in India

There are ten health insurance schemes¹ targeting poor and vulnerable households in India. Of these, RSBY is the only nation-wide scheme covering the costs of hospitalization of BPL households. The rest are state-run health insurance programmes. In all these schemes, the poor are identified based on a poverty threshold used by the government of India or by the state government concerned, and all who fall below the threshold are classified as poor or BPL, regardless of the depth of their poverty and deprivation. More than 40 per cent of the Indian population lives under the global poverty line of \$1.25 per day. Consequently, any expenditure other than essential food expenditure, such as significant out-of-pocket spending for healthcare is likely to push households just above the poverty line to below poverty line (Government of India [GOI], 2014).

¹ These are the Comprehensive Health Insurance scheme-CHIS (2008) in Kerala, Rajiv Arogyasri in Andhra Pradesh (2007), Chief Minister's Comprehensive Health Insurance Scheme-CMCHIS (2012) in Tamil Nadu, Karnataka's Yeshasvini Co-operative Farmers Health Care Scheme (2003), Karnataka's Vajpayee Arogyashri Scheme (2009), Rajiv Gandhi Jeevandayee Arogya Yojana (RGJAY) in Maharashtra (2012), Mukhyamantri Swasthya Bima Yojana (MSBY) in Chhattisgarh (2017), Mukhyamantri Swasthya Bima Yojana (MSBY) in Uttarakhand (2015) and Himachal Pradesh's RSBY Plus Scheme (2012).

Chief Minister's Comprehensive Health Insurance Scheme-CMCHIS

In place of RSBY, the state of Tamil Nadu chose to introduce in 2009, the Kalaigai Scheme, a state sponsored health insurance programme. In 2012, the state introduced the CMCHIS. Although both RSBY and CMCHIS cover only in-patient healthcare, the CMCHIS is very different from the classic RSBY scheme in terms of population coverage, service and financial coverage. While RSBY covers only five members of a household on a floater basis, CMCHIS covers all the household members. Not only BPL households, but those with an income of less than Rs 72,000 per year are eligible to benefit from the CMCHIS Scheme. While Smart Cards are issued, even those without a card but with a letter from the Tahsildar (official who preside over matters related to Land, Tax and Revenue at district level) certifying the household's income status are eligible to benefit from the Scheme. CMCHIS covers 1016 procedures, inclusive of 23 diagnostic procedures and 113 follow-up packages. It provides a financial coverage of Rs 1,00,000 per family per year (up to Rs 150,000 for specified ailments) for medical and/or surgical procedures (Government of Tamil Nadu, 2017, Narayana, 2010, p.13, Prinja et al., 2017).

As per a report in 2017, CMCHIS covers more than 56 per cent of the population i.e., 1.5 crore households in the year 2017. But only 16.9 per cent households possessed a CMCHIS smart card. The claim ratio for the year 2015-16 was 107 (Total claim/Total premium) with a burn out ratio of 117 (Total expenditure/ Total premium). In the year 2015-16, the total expenditure on CMCHIS, the total premium paid, and the total claim amounts were Rs 887 crore, 755 crore and 811 crore respectively (Karan et al., 2017). In the year 2017, 178 government hospitals, 168 private hospitals and 52 diagnostic centres were empanelled under CMCHIS (Government of Tamil Nadu, 2017).

Rationale and objectives of the study

Currently, there is increasing support for a shift from a publicly financed and provisioned healthcare system to publicly-financed insurance with public and private-sector-based healthcare delivery. The National Health Policy 2017 of India explicitly stated its plan to continue with targeted government-sponsored health insurance schemes throughout the country. The government of Tamil Nadu allocates tax money of Rs 750 crore annually for CMCHIS (Government of Tamil Nadu, 2017, Prinja et al., 2017). In this context it is important to look at the extent of service coverage and FRP provided by CMCHIS in Tamil Nadu to gather evidence on the extent to which CMCHIS is on track with respect to achieving its objectives. However, there are very few published studies assessing the impact of CMCHIS and almost none examine issues from the perspective of the intended beneficiaries.

This paper examined the extent to which CMCHIS has enabled poor households to meet all their healthcare needs without incurring catastrophic health expenditure (CHE). It (a) identifies the healthcare needs and assesses the population coverage and service coverage by CMCHIS among poor households (b) examines the out-of-pocket expenses (OOPE) associated with healthcare needs and (c) calculates the percentage of poor households experiencing CHE.

Methodology

Study design and study setting

This paper uses data from a larger longitudinal study conducted in two states, Kerala and Tamil Nadu with 1200 poor households in two urban settings. In this paper we use data pertaining to

600 urban poor households from Kanyakumari district, Tamil Nadu. Kanyakumari district has a population of 1.87 million with a higher than state-average literacy rate of 91.8 per cent (2011) and a high Human Development Index (HDI) of 0.812 (as compared to 0.6663 for Tamil Nadu). More than 80 per cent of its population lived in urban areas (Registrar General of India [RGI], 2011). In 2017, five government hospitals (including one medical college hospital), three private hospitals, one cancer institute and one private diagnostic centre were empanelled under the CMCHIS in the district of Kanyakumari.

Working Definitions

- a. Poor households: Since there were many limitations identified with the current 'Below-Poverty-Line' (BPL) list prepared by the government (GOI, 2014), for the purpose of the study 'poor household' was defined as a household with an income two times that of the Poverty line threshold set by the Rangarajan Committee i.e., Rs 2,707.36 per capita per month (GOI, 2014), with standard of living score ≤ 21 . We used a standard of living (SOL) screening questionnaire to identify poor households. The questionnaire included variables such as type of employment of the highest earning member, ownership of house with land, house type, flooring, source of lighting, location of toilet, source of water, fuel for cooking and ownership of durable goods. Poor households were again categorized into four SES categories namely: Very poor (≤ 0.75 of poverty line income and SOL score ≤ 12); poor ($0.75-1$ of poverty line income and SOL score 13-15); Marginal ($1-1.25$ of poverty line income and SOL score 16-17); and vulnerable households (>2 poverty line income and SOL score ≥ 18) (Sengupta et al., 2008).²
- b. Healthcare need: A household was counted as having a healthcare need if during the study period, any household member
 - was under treatment for a chronic disease
 - suffered from any morbidity of sudden onset which affected the activities of daily living for more than 24 hours in the last 30 days or acute morbidity
 - suffered from any illness necessitating admission to a health facility of more than 24 hours during the past 30 days, or
 - used the health insurance card for obtaining healthcare.
- c. Service coverage for hospitalization was defined as households with all episodes of hospitalization covered by CMCHIS as a proportion of the total number of households having one or more episodes of hospitalizations in the sample during the study period.
- d. Financial Risk Protection (FRP): was defined as households who did not incur catastrophic health expenditure (CHE) with the use of CMCHIS as a proportion of the total number of households, which did not incur CHE for any health care need the in the sample.
- e. Catastrophic health expenditure (CHE): Out-of-pocket expenses were considered to be catastrophic if it was greater than or equal to 40 per cent of the household's capacity to pay (CTP) (Xu et al., 2003).

² Sengupta et al (2008) used the same 4 categories/terminologies in a series of papers on how to define the common people of India in terms of levels of consumption and socio-economic profile. We adopted the same terminologies for our study.

Sample size and Sampling procedure

Based on the utilization rate of insurance in Tamil Nadu, which was 7.8 per cent (Government of Tamil Nadu, 2017) the sample size was calculated with 95 per cent confidence intervals and 20 per cent precision. Adjusting for design effect and non-response, the final sample size was 600 poor households. Sample households were selected using three-stage random sampling: first, two municipalities were randomly chosen. Then three wards each were chosen from each of the municipalities and then, 100 households from each of the six wards, respectively.

Data collection

Data on healthcare needs, health-seeking behavior and OOPE of households was collected in four waves: at zero, one, six and ten months, with a view to capturing seasonality of morbidity and obtaining more accurate information on insurance-coverage and OOPE because recall errors could be minimized.

Data collection was done using a pre-tested interview schedule by the Principal investigator and trained field assistants in Nagercoil and Padmanabhapuram municipalities of Kanyakumari district.

Ethical considerations

Ethical clearance was obtained from the Institutional Ethical Committee of Sree Chitra Tirunal Institute for Medical Science and Technology, Thiruvananthapuram. Data was collected after obtaining written informed consent from the participants.

Results

The study population consisted of 600 poor households with 2154 family members. Out of these, only 69 per cent were identified as poor by the state government and the remaining 31 per cent had a ration card that identified them as Above Poverty Line or APL. According to our SES classification, 173 (28.8 per cent) of the 600 households were very poor, 115 (19.2 per cent) were poor, 179 (29.8 per cent) were marginal and 133 (22.2 per cent) were vulnerable. The mean household size was 3.57 with a standard deviation of 1.34. A majority of the households had 3-4 members (57.5 per cent) and the heads of the households were mainly manual labours (53.0 per cent). Most of the households used LPG as cooking fuel (given free by the government) but almost 8 per cent of the houses did not have toilets.

At the individual level, more than two-thirds of the sample population (68 per cent) belonged to the productive age group (age 19-60 years), 7.8 per cent were elderly (age >60 years) and 6.3 per cent were children under five years of age. The male to female ratio was 1:0.0967. Almost two-thirds of the sample population was married (65.9 per cent) and 9.9 per cent were widowed/separated. Almost one-sixth of the sample population were illiterate (16.9 per cent) and most of the others had schooling up to 10th standard (58.9 per cent). Only 4.8 per cent had education up to post-graduation-level or more.

Table 1: Sample Characteristics: Household and individual

Variables	Total (per cent) N=600
Household size (members)	
<=2	127(21.2)
3-4	345(57.5)
>=5	128(21.3)
Categories of SES	
Very poor	173 (28.8 per cent)
Poor	115 (19.2 per cent)
Marginal	179 (29.8 per cent)
Vulnerable	133 (22.2 per cent)
Occupation of head of household	
Un-employed / on pension	130(21.7)
Un-skilled labour	318(53.0)
Private job/ self employed	107(17.8)
Professional	45(7.5)
Job of the highest earning member	
Un-employed / on pension	39(6.5)
Un-skilled labour	361(60.2)
Private job/self employed	144(24.0)
Professional(only one gulf employed)	56(9.3)
Categories based on Poverty Line	
Rice only card	252(42.0)
Sugar only card	162(27.0)
Others	186(31.0)
Religion	
Hindu	389(64.8)
Christian	183(30.5)
Muslim	28(4.7)
Caste	
SC*	104(17.3)
OBC	421(70.2)
Others	75(12.5)
Type of house	
Kutchra	53(8.8)
Semi-pucca	199(33.2)
Mixed	123(20.5)
Pucca	225(37.5)

Ownership of Land	
Yes	51(8.5)
No	549(91.5)
Location of toilet	
no toilet	50(8.3)
Shared toilet	63(10.5)
Outside house	149(24.8)
Inside house	338(56.3)
Cooking fuel	
Wood/ kerosene	72(12.0)
LPG or electricity	528(88.0)
Monthly per-capita Household expenditure (median with range) RS	
Food expenditure	1000(2416.67)
Non-food expenditure	845(2656)
Total expenditure	1720(4395)
INDIVIDUAL CHARACTERISTICS	N=2154
Age	
0-5	136(6.3)
6-18	385(17.9)
18-60	1464(68.0)
>60	169(7.8)
Sex	
Male	1095(50.8)
Female	1059(49.2)
Marital status (excluding males<21 years and females <18years)	
Un-married	386 (24.2)
Married	1055(65.9)
Widow/separated	159(9.9)
Educational status(excluding <5 year children)	
Illiterate	347(16.9)
4 years of schooling	253(12.4)
5-7 years of schooling	328(16.0)
8-10 years of schooling	624(30.5)
11-12 years of schooling	168(8.2)
Undergraduate	229(11.2)
Post graduate/professional	99(4.8)

Healthcare needs

Of the 600 households, 300 (50 per cent) households reported having at least one individual with a healthcare need (chronic disease/acute morbidity/ hospitalization) during the ten-month-study-period. Two hundred and forty (40 per cent) households had at least one member having one or more chronic diseases, 90 (15.0 per cent) had at least one member who had experienced acute morbidity and 138 (23 per cent) had at least one member hospitalized. Healthcare needs varied across the poor, marginal and vulnerable groups. The very poor category had the highest proportion of households with healthcare need (59.5 per cent) as compared to the other poverty-categories. The difference was statistically significant ($p=.018$). They also had the highest proportion of persons suffering from chronic diseases (45.7 per cent) and had the highest proportion of hospitalizations (27.7 per cent) compared to other groups

Table 2 Household-level Health Care Needs During Study Period

Variables	Chronic diseases N=240		p value
	Yes (per cent)	No (per cent)	
Categories of SES			
Very poor	79(45.7)	94(54.3)	.127
Poor	37(32.2)	78(67.8)	
Marginal	74(41.3)	105(58.7)	
Vulnerable	50(37.6)	83(62.4)	
	Acute morbidity N=90		
Very poor	28(16.2)	145(83.8)	.113
Poor	10(8.7)	105(91.3)	
Marginal	26(14.5)	153(85.5)	
Vulnerable	26(19.5)	107(80.5)	
	Hospitalizations n =138		
Very poor	48(27.7)	125(72.3)	.342
Poor	26(22.6)	89(77.4)	
Marginal	36(20.1)	143(79.9)	
Vulnerable	28(21.1)	105(78.9)	
	Overall healthcare need N=300		
Very poor	103(59.5)	70(40.5)	.018
Poor	49(42.6)	66(57.4)	
Marginal	82(45.8)	97(54.2)	
Vulnerable	66(49.6)	67(50.4)	

Turning now to healthcare needs at the individual level, out of the 2,154 individuals, 447 (20.8 per cent) had a healthcare need during the study period, out of which 295 (13.7 per cent) had chronic diseases, 106 (4.9 per cent) had acute morbidities and 180 (8.4 per cent) had hospitalizations during the study period. Elderly (>60 years) had the highest proportion of persons with overall healthcare needs (53.8 per cent), chronic diseases (50.9 per cent) and hospitalizations (9.5 per cent) as compared to other age groups. Children under-five had the highest proportion of acute morbidities (14.7 per cent). Males reported slightly higher overall healthcare needs, hospitalizations and acute morbidity compared to females. But the prevalence of chronic disease was higher among females (14.1 per cent). Widowed and separated individuals had the highest proportion of healthcare needs (43.4 per cent). Persons with no schooling and unemployed persons were more likely to have had a healthcare need as compared to other groups. At the individual level, those from the poorest groups had the highest proportion with healthcare needs (28.1 per cent)

Table 3 Individual-level Healthcare Needs During Study Period

Variables	Chronic diseases N=295 Yes (per cent)	Acute morbidity N=106 Yes (per cent)	Hospitalizations n =180 Yes (per cent)	Overall healthcare need N=447 Yes (per cent)
Individual level data				
Age Group				
0-5	1(0.7)	20(14.7)	9(6.6)	29(21.3)
6-18	7(1.8)	18(4.7)	22(5.7)	39(10.1)
19-60	201(13.7)	52(3.6)	133(9.1)	288(19.7)
>60	86(50.9)	16(9.5)	16(9.5)	91(53.8)
Sex				
Male	146(13.3)	56(5.1)	106(9.7)	219(20.0)
Female	149(14.1)	50(4.7)	74(7.0)	208(19.6)
Marital status				
Un-married	30(3.2)	28(2.9)	60(6.4)	98(10.4)
Married	199(18.9)	64(6.1)	103(9.8)	260(24.6)
Widow/separated	66(41.5)	14(8.8)	17(10.7)	69(43.4)
Education				
Illiterate	109(31.4)	37(10.7)	37(10.7)	126(36.3)
Primary education	28(11.1)	16(6.3)	24(9.5)	48(18.9)
Upper primary education	51(15.5)	17(5.2)	20(6.1)	69(21.0)
High school education	79(12.7)	27(4.3)	56(8.9)	124(19.9)
>10years of schooling	29(5.8)	9(1.8)	43(8.7)	60(12.1)

Occupation				
Un-employed /on pension	79(31.5)	12(4.9)	24(9.6)	85(33.9)
Un-skilled labour	93(19.2)	34(7.0)	48(9.9)	124(25.6)
House-wife	67(13.3)	21(4.2)	31(6.2)	94(18.7)
Privately employed/ gulf/self employed	49(20.2)	19(7.8)	36(14.8)	64(26.3)
students/children	7(1.0)	20(2.9)	41(6.1)	60(8.9)
Category SES				
Very poor	89(17.5)	29(5.7)	65(12.8)	143(28.1)
Poor	52(11.4)	12(2.6)	33(7.2)	76(16.6)
Marginal	91(13.2)	34(4.9)	44(6.4)	117(17.0)
Vulnerable	63(12.5)	31(6.2)	38(7.6)	91(18.1)

Health- seeking behavior

There were 161 episodes of acute morbidities requiring out-patient-care among 106 individuals. Most of them (64.2 per cent) had a single episode of acute morbidity. Only 19.8 per cent had two episodes of acute morbidities and 16 per cent had three episodes. Eleven episodes of acute morbidities were untreated. We found that 65.9 per cent sought care for acute morbidities from private hospitals, and only 29.9 per cent sought care from public hospitals.

In the case of events of hospitalization, about 70 per cent of the individuals had only one episode of hospitalization and about 21 per cent had two episodes of hospitalization. The majority (78.3 per cent) obtained care from private hospitals and only 15.6 per cent obtained care from public hospitals.

Table 4 Details of Health Seeking Behavior for Acute Morbidities and Hospitalizations

Variables	Individuals (per cent)	Episodes (per cent)
Acute morbidities		
Yes	106 (4.9)	161
No	2048 (95.1)	
Details of episodes		
Single episode	68 (64.2)	68 (42.2)
Two episodes	21 (19.8)	42 (26.1)
Three episodes	17 (16.0)	51 (31.7)
Treatment		
Yes	97	150 (93.2)
Private hospitals/clinics	64 (65.9)	113 (75.3)
Public hospitals	29 (29.9)	32 (21.3)
Homeopathic clinics	2 (2.1)	3 (2.0)
Ayurvedic clinics	2 (2.1)	2 (1.3)
Untreated morbidity	11	11 (6.8)
Self-medication	9 (81.8)	9 (81.8)
No	2 (18.2)	2 (18.2)
Insurance covered		
Yes	0	0
No	106 (100)	161(100)
Hospitalization		
Yes		
	180 (8.4)	217
No	1974 (91.6)	
Details of episodes		
Single episode	151 (69.7)	151(69.6)
Two episodes	23 (21.2)	46(21.2)
Three episodes	4 (5.5)	12(5.5)
Four episodes	2(3.7)	8(3.7)
Treatment (episodes)		
Public hospitals	28(15.6)	42(19.4)
Private hospitals	141(78.3)	160(73.7)
Empanelled private	10(5.6)	14(6.5)
Alternate medicine	1(.5)	1(0.4)

Population coverage

We defined population coverage as the proportion of the households in the sample with CMCHIS card/ who has letter from Tahasildar for the year 2015-16. Out of the 600 sample households only

97 households (16.2 per cent) possessed a CMCHIS smart card during the study period, and 56 households (9.3 per cent) had renewed their card or used CMCHIS scheme. This may be because there was no active enrolment for CMCHIS for the year 2015-16.

Service coverage

Since the CMCHIS Scheme covers only hospitalization, more than half of the households with healthcare needs (162/300 or 54 per cent) are out of its purview. For service coverage we only examined the 138 households, which had one or more members hospitalized during our study period. For better understanding of the service coverage offered by CMCHIS we defined: “fully-covered households” as households with all episodes of hospitalization covered under CMCHIS, “partially- covered households” as households with not all, but only some episodes of hospitalization covered by CMCHIS and “not- covered households” as households with none of the episodes of hospitalization covered by CMCHIS.

Only 13 households out of the 138 (9.4 per cent) had all the hospitalizations in the households “fully- covered” by CMCHIS. Twelve (8.7 per cent) households had some episodes covered for one or more members of the household. A vast majority of the households (113 or 81.9 per cent) were “not-covered” i.e. none of the episodes of hospitalizations for any of its members was covered by CMCHIS. Thus, four-fifths of the households were totally unprotected by CMCHIS.

Households with single hospitalized member with only one episode of hospitalization were more likely to be “fully-covered” under CMCHIS. In terms of individual level service coverage, only 13 (7.2 per cent) individuals had all episodes covered by CMCHIS out of the total of 180 individuals who were hospitalized during the study period.

Determinants of service coverage: While looking at the services coverage among the four SES groups it can be seen that very poor and poor households had the least percentage of “fully-covered” hospitalizations compared to the marginal and vulnerable households. Households that were identified as APL by the government; the marginal and vulnerable households with a relatively better economic status among the poor households were more likely to have service coverage as compared to BPL households and very poor and poor households

Table 5 Household-level by CMCHIS

Variables	Fully/partially covered	Not-covered	p-value
Categories based on Poverty Line			
Below Poverty Line (BPL)	6 (15.4)	33(84.6)	.05
Above Poverty Line (APL)	19(19.2)	80(80.8)	
Category SES			
Very poor	5(10.4)	43(89.6)	.04
Poor	5(19.2)	21(80.8)	
Marginal	8(22.2)	28 (77.8)	
Vulnerable	7(25.0)	21(75.0)	
Household size			
<=2 members	4(16.7)	20(83.3)	.523
2-4 members	16(21.3)	59(78.7)	
>=5members	5(12.8)	34(87.2)	
Chronic disease present			
Yes	17(18.3)	76(81.7)	.572
No	8(17.8)	37(82.2)	

As for factors affecting service coverage, the only factor that emerged as statistically significant at the individual level was the presence of chronic disease. Individuals who had chronic diseases were more likely to be covered by CMCHIS as compared to others. Widowed or separated individuals also had a higher chance of being covered by CMCHIS as compared to those who were currently married or never married. There were no significant differences in coverage across other social and demographic characteristics. It is worth noting, however, that the economically productive age group had the maximum proportion of individuals who were “fully-covered” by CMCHIS for all episodes of hospitalizations (11 out of 13 fully covered individuals, 84.6 per cent) and children under 5 years of age and adolescent age groups had none who were “fully-covered”.

There was no significant difference between males and females in service coverage. As education increased the proportion with “fully-covered” decreased. Unskilled labourers had the highest proportion (5 out of 13 fully covered individuals, 38.5 per cent) of “fully-covered” episodes. Those with single episode of hospitalizations had more chance of being “fully-covered” under CMCHIS as compared to those with more than one episode of hospitalizations. Among individuals with four episodes of hospitalizations none were covered by CMCHIS.

For testing whether there is any statistical difference in the duration of hospital stay (number of days) between those covered and those not covered by CMCHIS, we first checked the normality of the distribution (test of normality). On finding that it was not a normal distribution, we used non-parametric test (Mann-Whitney U test) to compare the differences in duration of hospital stay by coverage status of CMCHIS. We found that episodes with fewer days of hospital stay were covered by CMCHIS, $p=.003$.

Table 6 Individual- level Factors Affecting Service Coverage by CMCHIS

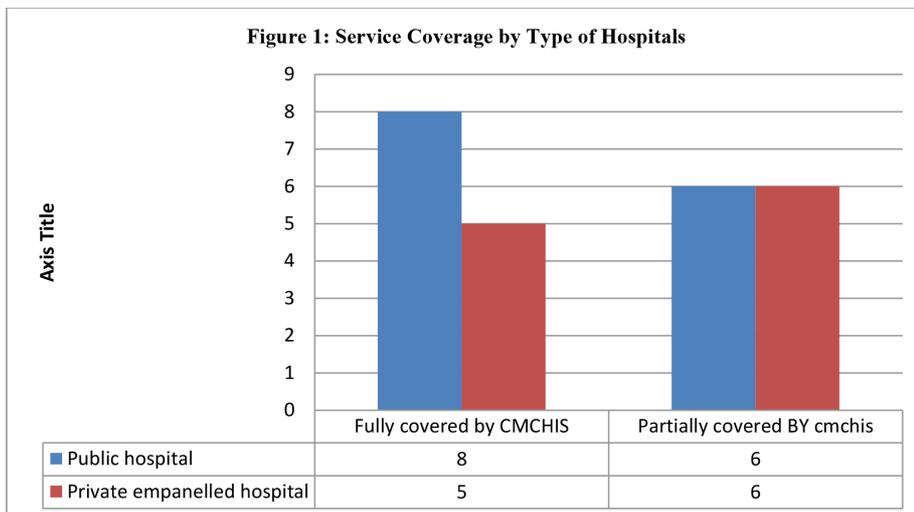
Variables	Fully-covered	Not-covered	p-value
Age Group			
0-5	0	9(100)	.348
6-18	0	22(100)	
18-60	11(8.3)	122(91.7)	
>60	2(12.5)	14(87.5)	
Sex			
Male	6(5.7)	100(94.3)	.248
Female	7(9.5)	67(90.5)	
Marital status			
Un-married	1(7.8)	59(98.3)	.008
Married	8(7.8)	95(92.2)	
Widow/separated	4(23.5)	13(76.5)	
Education			
Illiterate	4(10.8)	33(89.2)	.771
Primary education	2(8.3)	22(91.7)	
Upper primary education	2(10.0)	18(90.0)	
Secondary education	3(5.4)	53(94.6)	
>10years of schooling	2(4.6)	41(95.4)	
Occupation			
Un-employed /on pension	3(12.5)	21(87.5)	.414
Un-skilled labour	5(10.4)	43(89.6)	
House-wife	3(8.3)	33(91.7)	
Privately employed/students/children	2(2.8)	70(97.2)	
Chronic Disease			
Yes	11(8.7)	116(91.3)	.001
No	2(3.8)	51(96.2)	
Median Days of hospital stay(Range)			
	14(3-30days)	30(12-17days)	.003

Out of the 13 “fully-covered” hospitalizations by CMCHIS majority (8) were in government hospitals (61.5 per cent) and five were in private empanelled hospitals. Out of the 12 partially covered hospitalizations by CMCHIS half were in government hospitals

Out-of-pocket expenses and financial risk protection (FRP)

For computing the total healthcare- related expenses, we added drug related expenses for chronic diseases, direct and in-direct out-of-pocket expenditure related to acute morbidities and hospitalizations during our study period. We excluded the 300 households which had no healthcare need during the study period.

Figure 1: Service Coverage by Type of Hospitals



It was found that the mean (range) OOP expenses related to monthly drug expenses at household level was Rs. 1,094.1 (0-5040) . The mean (range) OOP expenses related to acute morbidity was Rs 3,871 (0-24000) . The mean (range) OOP expenses for all hospitalizations was 34,700 (1560-7,35,600) . The mean (range) direct OOP expenses was Rs 16,989.18 (0- 4,90,000) and mean (range) indirect OOP expenses was Rs 4,902.12 (1150-2,65,000) . For hospitalization- related expenses we compared the direct, indirect and total out-of-pocket expenses among the two groups (those episodes which were covered by CMCHIS and not covered by CMCHIS) using Mann-Whitney test after checking for normality of the distribution. We found that the mean total OOP were higher among those not covered Rs 46,400, with a range of Rs 6,743 to 7, 35,600. But the mean direct expenses were highest among the episodes covered by CMCHIS: Rs 22636.4, range (0-4,09,000). The mean indirect and total OOP expenses were highest among the episodes which were not covered by CMCHIS, with mean as Rs 4,927.0, and range from Rs 1150 - 2, 65,000))

Table 7: Household level Out-of-pocket Expenses for Various Health Care Needs

Out-of-pocket expenses	
Chronic disease related monthly drug expenses	(mean with range)RS
Total OOP	1094.1 (0-5040)
Acute morbidity related expenses	
Direct OOP	2628 (0-18000)
Indirect OOP	1243.6 (40-8100)
Total OOP	3871 (0-24000)
Hospitalization related expenses	
Direct OOP	16,989.18 (0-4,09,000)
Indirect OOP	4902.12 (1150-2,65,000)
Total OOP	34,700(1560-7,35,600)
Hospitalization related expenses	
OOP among those who used CMCHIS	
Direct OOP	22636.3636(0-409000)
Indirect OOP	4877.2727 (2400-74000)
Total OOP	23000 (1100-541400)
OOP among those who did not use CMCHIS	
Direct OOP	11341.9741 (0-3,14,000)
Indirect OOP	4926.9741 (1150-2,65,000)
Total OOP	46400 (6743-7,35,600)

Catastrophic Health Expenditure: Hospitalization related out-of-pocket expenses were considered to be catastrophic if they were greater than or equal to 40 per cent of the household's capacity to pay (CTP) (Xu et al., 2003). For assessing the extent of FRP offered by CMCHIS among the insured we computed the percentage of households which had no catastrophic health expenditure. CTP of a household was total household expenditure minus subsistence expenditure or food expenditure, whichever among the two was less. Food Expenditure (FE) corresponds to money spent by the household on food items and non-alcoholic beverages. Subsistence Expenditure (SE) refers to the average food expenditure of the household in the 45th to 55th percentile adjusted for household size.

We found that 177 (59 per cent) of the households with any healthcare need (drug expenses for chronic diseases, acute morbidity- related- expenses or hospitalization- related- expenses) experienced catastrophic healthcare spending. Of the 240 households that had members with chronic diseases, 86 (35.8 per cent) had CHE. Of the 90 households with acute morbidity 8 (8.9 per cent) had CHE. If hospitalizations alone were taken into account, 64 per cent of the households had catastrophic healthcare expenditure (CHE).

We then examined catastrophic health expenditure among households covered by CMCHIS. We found that out of the 22 households which had the CMCHIS-Smart Card and had hospitalizations 15 (68.2 per cent) had CHE. More than one-fourth of the households with CHE were APL card holders (28.8 per cent).

Only seven of the 123 households without CHE during the study period enjoyed financial risk protection by using CMCHIS (5.7 per cent). Of the 300 households that had a healthcare need, 101 households (33.7 per cent) had spent more than 100 per cent of their capacity to pay to take care of the health-related expenses. More than four-fifth (83 per cent) of the households with hospitalizations used distress financing mechanisms like sale of assets, un-secured loans, gold loans, mortgage of assets, mortgage of land or assistance / gift to meet the healthcare expenses.

Discussion

This is among the few studies as per our knowledge carried out in Tamil Nadu, looking at healthcare needs, service coverage and financial risk protection offered by the state sponsored health insurance schemes among the urban poor. We used prospective data on healthcare needs and out-of-pocket expenses, at different points of time during a 10-month period to capture seasonal variations and to minimize recall bias.

When we examined the socio-demographic and economic characteristics of urban poor in Kanyakumari district of Tamil Nadu, we found that even in the state with one of the least percentages of urban poor (6.2 per cent) as per the World Bank data, the living conditions were abysmal. Almost 8 per cent had no toilets and one-fifth of them were living in mud houses with thatched roofs. The study population consisted mainly of productive age group and had only 7.8 per cent elderly population. This was because many of the urban poor households had settled in urban areas for employment, while their elderly parents remained in the villages.

Half of the households had some healthcare need during a ten-month period. The healthcare needs among the poorest households were the highest as compared to the other three groups of the slightly better of households which is very much sync with the literature on healthcare needs of the poorest (Smith, 1999, p.145).

Population coverage

Although CMCHIS is meant to cover all households with an annual income of less than Rs 72,000, less than 10 per cent of the households in our sample had a Smart Card in their possession. All our sample households would come under the income category eligible to be CMCHIS beneficiaries. So in practice the population coverage by CMCHIS is minuscule even though the government documents claims that it covers 50 per cent of the whole population (Government of Tamil Nadu, 2017). This result is very similar to findings from other studies on RSBY and CHIS in Kerala, which also find that population coverage for voluntary SHI schemes are very low compared to mandatory SHI schemes (Philip, Kannan, & Sarma, 2015, Prinja et al., 2017).

Service coverage

A majority of healthcare needs of the urban-poor were not a part of the benefits package because CMCHIS covers only hospitalization. Service coverage was only 9.4 per cent. It was surprising to find that even in the district of Kanyakumari with a high literacy rate and with more than 49 empanelled hospitals (Government of Tamil Nadu, 2017) mainly concentrated in the urban areas, only 6 per cent of the episodes of hospitalizations were covered even after 7 years since the beginning of the insurance scheme. We also found that the very poor and the poor households had the least service coverage by CMCHIS. Thus, the most socially and economically vulnerable households

were not covered. The existing literature on government-sponsored health insurance schemes for poor also reports that the neediest in the target population are excluded in most of the cases (Spaan et al., 2012, Jowett, Contoyannis, Vinh, 2003, Gakidou et al., 2006). As CMCHIS is a voluntary scheme and as there was no active enrolment, people were totally unaware of the scheme and its benefits.

In terms of service coverage, there is limited evidence that government-sponsored-health insurance schemes have increased access to healthcare services. This is especially true if there is no public investment to create any new point of service provision, but the insurance tries only to remove the financial barrier in accessing care (Acharya et al., 2012). The narrow benefits-package is another reason for the low service coverage. The schemes are mainly focused on secondary care and exclude the most impoverishing, high cost treatments due to the principles of social health insurance i.e., exclusion of the low frequency high cost interventions (Scheil-Adlung et al., 2006, Normand & Weber, 1996).

Financial risk protection

We next examined whether the insured incurred out-of-pocket spending, given that CMCHIS was introduced with the specific aim of reducing OOPE. Since CMCHIS only covered 13 episodes of hospitalizations, the households incurred both direct and indirect OOP expenses for healthcare needs not involving hospitalization. We also found that instead of reducing the out-of-pocket spending during hospitalization, those who used CMCHIS had higher direct OOPE compared to those who did not use it. This finding was contrary to findings from Vietnam and a systematic review by Ernst Spann et al from Asia and Africa. These studies found that insurance reduced OOP expenses (Spaan et al., 2012, Jowett, Contoyannis, Vinh, 2003).

However, studies from India have similar findings to ours. They have found that there was either no impact or an increase in OOP expenditures among the insured (Philip, Kannan, & Sarma, 2015, Prinja et al., 2017). This finding can be attributed to the non-translation of population coverage into service coverage which provides a false assurance of coverage among insured. They go to empanelled private hospitals expecting all their healthcare expenses to be covered, but are left with a huge bill to pay because the total expenditure exceeds the maximum amount to be covered. The rampant corruption in hospitals, which are empanelled under CMCHIS could also result in insured persons being deliberately not given the benefits due to them and many beneficiaries stated that they had to pay bribe in the hospital (Karan et al., 2017). The financial burden borne by the households were immense. The mean OOP per episode of hospitalization is almost nine times the mean per capita expenditure (MPCE) of an urban household in Tamil Nadu (Rs 2,534.32) and 31 times the MPCE of the lowest quintile (Rs 725). The mean drug expenditure per month was more than the total expenditure of the lowest quintile in Tamil Nadu (GOI-NSSO, 2015). So the households are financing their healthcare by distress finance mechanisms and this is not a one-time event as these poor households have people who are prone to hospitalizations and drug expenses for chronic diseases are life-long. This finding calls an immediate attention of the policy makers to develop a service package which also covers acute morbidities and chronic disease care which constitutes more than 70 per cent of the total OOPE in India (GOI, 2005), otherwise more and more households will be pushed below poverty due to the huge OOP spending.

Catastrophic health expenditure

A majority of the hospitalized households incurred catastrophic health expenditure, which was supposed to be covered by insurance, by spending more than 100 per cent of their capacity to pay to take care of the health-related expenses. Moreover, CHE was incurred during treatment for acute morbidities, and for expenses on drugs for chronic diseases, both of which are not covered by CMCHIS. This finding is consistent with findings from other studies, showing that between 3.5 per cent and 6.2 per cent of the India's population is pushed below the poverty line every year due to out-of-pocket (OOP) expenses (Gupta, 2009, GOI, 2005, Van Doorslaer et al., 2006, Garg & Karan, 2009, Berman, Ahuja, & Bhandari, 2010). These findings suggest that voluntary government-sponsored health insurance schemes may not contribute towards reducing poverty by providing financial risk protection to poor households.

Conclusion

There is an ongoing debate on the breadth of the service and financial coverage provided by the government sponsored targeted health insurance schemes and whether it will promote equitable healthcare access and financial access. This study indicates that even in a context of high availability of public and private sector health facilities and high literacy, the CMCHIS, which has a relatively higher utilization rate and one of the best benefit packages in the country, offered little service coverage for less than 10 per cent of hospitalizations and financial risk protection to less than 6 per cent of low income populations. This was the experience of an urban-poor population, which constituted the target population of CMCHIS and lived in an area with a high concentration of empaneled hospitals. This study suggests the need for careful reconsideration of the shift to a predominantly health- insurance- based healthcare system in the current Indian setting.

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