

Influence of publicly funded conditional cash transfer programmes on utilization patterns of healthcare services for acute childhood illness

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Background: Conditional cash transfers are widespread and effective for utilization of targeted health services, but there is little evidence of their influence on the utilization of non-targeted or extended general healthcare services. Using data from a population-based health utilization survey, we evaluated the influence of conditional cash transfers for maternal and immunization services on the utilization of healthcare services for acute childhood illnesses.

Methods: Participants included mothers or primary caretakers of children <2 y of age residing in 2407 households in urban Vellore, Tamil Nadu, India. Mothers of children with illness in the preceding month were interviewed on presenting symptoms, provider choice and beneficiary status of maternal and immunization-based conditional cash transfer programs.

Results: Of 2407 children <2 y of age, about 48% reported being beneficiaries of maternal and immunization-based conditional cash transfers. Beneficiary status was associated with an increased use of public services (adjusted relative risk [aRR] 3.14 [95% confidence interval {CI} 1.96 – 5.02]) but not the use of private services (aRR 1.42 [95% CI 0.97 – 2.08]) relative to home or informal care.

Conclusions: Our findings indicate financial incentives for use of maternal and immunization services could have an indirect, non-targeted effect on utilization of formal healthcare for acute childhood illnesses.

Keywords: acute childhood illness, conditional cash transfers, health-seeking behaviour, health utilization, non-targeted effects

Introduction

Utilization of healthcare services is an important indicator of a well-functioning health system.¹ India's mortality rate for children <5 y of age is 48 deaths per 1000 live births, which is about average for low- and middle-income countries (LMICs) and much higher than the Millennium Developmental Goal's target of 28 per 1000 by 2015² and the Sustainable Developmental Goal's target of 25 per 1000 by 2030.³ While achieving substantial economic growth in the last two decades, India has not had sufficient improvements in health indicators. There is growing recognition of the link between improvement in health indicators with metrics of access, utilization and quality of healthcare.⁴ For healthcare access and quality, India ranks 154th of 195 countries in the Global Burden of Disease (GBD) rankings,⁵ which is lowest among the subcontinental countries and could be a major factor related to slower progress in child health indicators.

Acute respiratory and diarrheal illnesses are two leading

causes of mortality in children <5 y of age, accounting for about 25% of deaths in that age group.⁶ The majority of these child deaths may be prevented if health services are accessed early for medical interventions.⁷ Recognizing this, policymakers have prioritized testing strategies to improve coverage for effective child health interventions. Social protection is increasingly recognized as an important strategy to accelerate progress in the prevention of adverse child health outcomes. In particular, conditional cash transfer (CCT) programmes are social protection schemes that consist of delivering cash directly to households or individuals on the condition that they adopt certain health behaviours, such as utilization of preventive health services by pregnant women and children.⁸

In 1987, the Tamil Nadu state government launched a child-birth assistance programme known as the Muthulakshmi Reddy Maternity Benefit Scheme, to reduce the infant mortality rate and maternal mortality ratio. Initially 500 Indian rupees (INR) was given as a maternity benefit, and this was raised to 2000 INR in

2005 and to 6000 INR in 2006. In 2011, the benefit amount was doubled to 12 000 INR. The scheme covers the first two deliveries of pregnant women accessing care at government facilities. The money was distributed in three instalments, conditional on the pregnant woman having a minimum of three antenatal visits by the seventh month of pregnancy (first instalment), delivery in a government health facility (second instalment) and completion of three doses of pentavalent immunization of the child during the fourth month (third instalment). The benefit amount was increased to 18 000 INR per beneficiary in 2018.

While the literature universally supports the fact that the demand-side financing increases the utilization of targeted services, it is unclear whether the CCT programmes also have effects that extend beyond services on which they are conditioned.⁹ We hypothesized that as beneficiaries of CCT programmes have better awareness of benefits of availing healthcare services, it might lead to utilization of healthcare facilities for other non-targeted healthcare services. Within an integrated framework, the Anderson behavioural model presents a causal ordering of factors influencing healthcare utilization.^{10,11} This framework assumes that an individual's utilization is a function of their predisposing factors (e.g. age, sex, education), enabling factors (e.g. income, insurance) and need for healthcare (e.g. illness, severity). We viewed beneficiary status for the CCT programme as an enabling factor within this framework for healthcare utilization because this would enable the beneficiaries to easily relate to the importance of availing healthcare services and potentially influence their overall health utilization patterns. Using data from a household survey within a Demographic Surveillance Site (DSS), we evaluated the influence of CCT programmes on the utilization of healthcare services for acute childhood illnesses according to Andersen's health behavioural model.

Methods

Study setting

The survey was conducted in the Vellore district, one of 32 districts in the southern state of Tamil Nadu, India. The district has an area of 6022 km² and a population of approximately 4 million (2011 census). For better monitoring and administration of health services, the district is divided into two health unit districts (HUDs): Vellore and Thirupattur. This study was conducted in the Vellore HUD, which consists of 10 administrative blocks, 6 municipalities and 1 corporation. It has an estimated population of approximately 2 million and an annual birth cohort of approximately 30 000. The healthcare system in the HUD consists of two major groups of formal providers: public and private. The public sector consists of 1 teaching hospital, 6 district hospitals, 58 primary health centres and 269 health subcentres (HSCs). The private sector encompasses a wide range of providers: individual-run clinics or group-owned general or specialty hospitals, as well as private laboratory and radiology services.

A demographic surveillance system (DSS) was established in 2001 by the Wellcome Trust Research Laboratory of the Christian Medical College, Vellore, and was expanded in 2012. The DSS includes 23 urban wards covering a total population of 105 345 from approximately 26 067 households. All households within these areas are currently under yearly surveillance for sociode-

mographic processes, vital events (births, deaths and migration) and population health. The current survey includes all households in the DSS area with children <2 y of age. The survey was conducted between November 2015 and March 2016. The institutional review board of the Christian Medical College, Vellore approved the study and written informed consent was obtained from each participant.

Data collection

A structured questionnaire was used to collect data on antenatal care, immunization services, history of illness and sociodemographic information. A recall period of 4 weeks was used to assess illness history. The questionnaire was prepared in English and translated into Tamil, the local language, and was translated back into English to check for consistency. The primary respondents were the mothers or caretakers of children <2 y of age. The questionnaire was pre-tested and revisions were included in the final version. A 1 d training programme was conducted for field workers and supervisors about each item in the questionnaire. The field team had 15 field workers, 5 supervisors and an investigator. The completeness of the questionnaires was checked by the supervisor and rechecked by the investigator.

Explanatory variables

Our explanatory variables were based on Anderson's model.^{10,11} Predisposing factors included for analysis were highest education in the family, child's age, sex, birth order, place of birth, religion and socio-economic status. Socio-economic status was defined by categorization of an asset-based score constructed for each household. Enabling factors included whether the family received any incentives from government schemes related to health. We considered sickness and visit to a healthcare provider as need factors.

Data analysis

We used descriptive statistics to summarize reported illnesses and reported use of healthcare. Symptom clusters were established using k-means clustering analyses, which aims to group children with similar symptoms together. A three-cluster solution had the best fit to the symptoms data. We compared symptoms between the three clusters to understand the nature of these clusters. Prior to multivariable analyses we performed bivariable analyses and included variables with $p < 0.2$ for selection in the multivariable analyses. Among the selected variables, we investigated for collinearity; educational status was found to be strongly collinear with socio-economic status and was dropped from the analysis. Multinomial logistic regression analyses were performed to assess the association between the CCT programme and healthcare utilization. The outcome of interest for this analysis was choice of healthcare service: (1) no care, (2) public care and (3) private care. The odds ratios (ORs) with 95% confidence intervals (CIs) were reported to examine the strength of associations of the CCT programme with the choice of healthcare service provider after adjusting for different cofactors. Variables with $p < 0.10$ in the bivariate analyses were included in

Table 1. Sociodemographic characteristics of mothers or caretakers of children <2 y of age according to the choice of healthcare provider (N=1496)

Variables	Home (n=131 [8.8%])	Public (n=204 [13.6%])	Private (n=1161 [77.6%])	Total (N=1496)	p-Value
Gender					
Male	64 (8.3)	102 (13.3)	609 (78.4)	768 (51.3)	0.744
Female	67 (9.2)	102 (14.0)	559 (76.8)	728 (48.7)	
Age (months) ^b					
<12	35 (8.0)	78 (17.8)	325 (74.2)	438 (29.3)	0.010 ^a
≥12	96 (9.1)	126 (11.9)	833 (79.0)	1055 (70.7)	
Religion					
Hindu	98 (9.3)	153 (14.5)	804 (76.2)	1055 (70.5)	0.376
Muslim	29 (7.6)	43 (11.2)	312 (81.3)	384 (25.7)	
Other	4 (7.0)	8 (14.0)	45 (79.0)	57 (3.8)	
Education					
<10 y	45 (8.3)	93 (17.2)	403 (74.5)	541 (36.2)	0.011 ^a
≥10 y	86 (9.0)	111 (11.6)	758 (79.4)	955 (63.8)	
Socio-economic status					
Low	57 (8.6)	122 (18.4)	483 (73.0)	662 (44.2)	<0.0001 ^a
Medium	50 (8.5)	66 (11.2)	472 (80.3)	588 (39.3)	
High	24 (9.8)	16 (6.5)	206 (83.7)	246 (16.4)	
CCT					
Yes	51 (7.1)	136 (18.9)	534 (74.0)	721 (48.8)	<0.0001 ^a
No	80 (10.6)	66 (8.7)	612 (80.7)	758 (51.2)	
Family type					
Extended	7 (7.8)	9 (10.0)	74 (82.2)	90 (6.0)	0.006 ^a
Joint	65 (8.7)	86 (11.5)	596 (79.8)	747 (49.9)	
Nuclear	59 (9.0)	109 (16.5)	491 (74.5)	659 (44.1)	
Improvement in child health ^b					
Yes	86 (7.1)	174 (14.4)	950 (78.5)	1210 (81.8)	<0.0001 ^a
No	44 (16.4)	28 (10.4)	197 (73.2)	269 (18.2)	
Symptom clusters					
Fever with diarrhoea and vomiting	27 (12.3)	34 (15.5)	158 (72.2)	219 (14.6)	0.182
Fever with cold and cough	99 (8.2)	164 (13.5)	951 (78.3)	1214 (81.2)	
Fever with other symptoms ^c	5 (7.9)	6 (9.5)	52 (82.5)	63 (4.2)	
Duration of illness ^b (d)					
≤4	80 (9.3)	126 (14.6)	658 (76.2)	864 (62.0)	0.481
>4	40 (7.6)	72 (13.8)	406 (78.6)	528 (38.0)	

Data are presented as n (%) and totals are presented as column percentages.

^ap<0.05.

^bVariables include missing observations.

^cOther symptoms include allergies, skin rashes, ear and eye infections, urinary tract infections, chicken pox, seizures, fits, injuries, dog bites, etc.

the multivariable analysis. Hosmer–Lemeshow statistics were used to test the goodness of fit of the model.

In addition to conventional multivariable regression to account for the potential confounding effect of socio-economic status, we used the propensity scores approach to correct for possible selection bias. This approach consisted of two stages: first, we used a logistic regression model to estimate the probability (or propensity) that a household would have received a cash transfer based on socio-economic status and other variables associated with the CCT. We then used these estimated

propensities as covariates in our multinomial regression model for the choice of healthcare providers.

Results

Sample characteristics

A total of 2407 mothers or primary caregivers participated in this household survey. About 48% had received financial incentives or benefits in the form of a CCT from the government for the

use of antenatal care or immunization services. The median size of the household was five persons. About 50% of households had members with a primary education and 44% had members with >10 y of education. The majority of households were Hindu (90%). A little more than half (54%) of the mothers had given birth in a public facility. The average age of children was 14 months (standard deviation 5.4). About 45% of households had a low socio-economic status (Table 1).

Illness and healthcare providers

Of 2407 children <2 y of age, 69.6% had an episode of diarrhoea and/or respiratory illness in the preceding 4 weeks. The median duration of illness was 4 d, with a range of 0–10 d. Upper respiratory infection/common cold (56%) was the most commonly reported symptom, followed by fever (46%), cough (35%), diarrhoea (6%) and vomiting (2%). Using cluster analysis, three symptom groups were identified: fever with cough and cold, fever with diarrhoea and vomiting, and fever with other symptoms such as rashes or eye infections. Of families reporting an illness event, a majority (89.7%) had sought healthcare outside the home and nearly three-quarters (69.3%) indicated that they went to private providers. A total of 12.2% sought public healthcare and 7.8% used informal or home care; 8.3% received care from more than one source in different combinations of health providers and 2.4% did not respond to this question. However, there were no significant differences between symptom clusters and public, private or informal healthcare providers.

Influence of CCT programmes on choice of healthcare provider

In Table 2 we present results from multinomial logistic regression analyses of factors associated with provider choices among people who sought care. After adjusting for covariates, being a CCT beneficiary was associated with an increased use of public services (adjusted relative risk [aRR] 3.14 [95% CI 1.96–5.02]) but not the use of private services (aRR 1.42 [95% CI 0.97–2.08]) relative to home or informal care. Results from multinomial logistic regression models adjusted for propensity scores showed an estimated OR of 3.38 (95% CI 2.1–5.4) for public services and 1.42 (95% CI 0.9–2.1) for private services, revealing that CCTs are associated with the use of public health services. The area under the curve (AUC) for the statistical model was calculated as 0.681 (95% CI 0.643>0.717) for public, 0.609 (95% CI 0.575>0.643) for private and 0.618 (95% CI 0.563>0.673) for home or informal care.

Discussion

Our results support the hypothesis that CCT beneficiary status might act as an enabling factor under the Anderson behavioural model framework and leads to sustained use of formal healthcare services rather than informal or home care for acute childhood illnesses. In our study, CCT beneficiary status was strongly associated with the use of public healthcare services but not with private healthcare services. Although information about enabling factors of healthcare utilization distinguishing between private and public healthcare facilities is lacking, a possible explanation could be due to financial access to private

Table 2. Association between CCT beneficiary status and healthcare provider choice

Variables	Public OR (95% CI)	Private OR (95% CI)
Age (months)		
≥12	Ref	Ref
<12	1.90 (1.16–3.12) ^a	1.14 (0.75–1.72)
Socio-economic status		
High	Ref	Ref
Low	2.64 (1.22–5.70) ^a	1.03 (0.59–1.81)
Medium	1.70 (0.79–3.63)	1.10 (0.64–1.87)
CCT		
No	Ref	Ref
Yes	3.14 (1.96–5.02) ^a	1.42 (0.97–2.08)
Family type		
Extended	Ref	Ref
Nuclear	1.25 (0.43–3.65)	0.81 (0.35–1.89)
Joint	1.08 (0.37–3.10)	0.89 (0.39–2.03)
Improved child health		
No	Ref	Ref
Yes	3.66 (2.11–6.36) ^a	2.55 (1.71–3.80) ^a

^ap<0.05.

facilities. The cost of private healthcare services is more expensive and the most common form of payment is out of pocket at the point of use of healthcare services. Hence those who are beneficiaries of the CCT programme have prior experience utilizing and interacting with public sector health facilities for antenatal, delivery or postnatal care and this might have resulted in continuation of utilizing public healthcare facilities over private rather than informal or home care services. It is also possible that socio-economic and demographic differences between CCT beneficiaries and non-beneficiaries may have influenced this observed increase in the use of public health services. To assess if this association is influenced by socio-economic imbalances, we used both traditional modelling approaches and propensity score adjustments. Results from this propensity score-adjusted analysis and traditional approaches showed a similar direction of the association, indicating that socio-economic differences do not account for the association between CCT beneficiary status and utilization of public healthcare facilities.

The Tamil Nadu state government, under the Dr. Muthulakshmi Reddy scheme, provides CCTs of up to 12 000 INR in three instalments to women as a financial incentive to encourage antenatal care, birth at a public healthcare facility and immunization.¹² Our results imply that the effect of this financial incentive was not explicitly tied to the use of maternity or immunization services only and could act as a reinforcement in influencing care-seeking options and may encourage people towards a substitution effect away from informal or home care. This finding is encouraging, as proactive health-seeking behaviour is associated with an

increase in the likelihood of survival of children, especially in LMICs.^{13,14}

Of those who sought care, three-quarters utilized private health facilities over government-run facilities, a useful metric in understanding the relative weight of the private sector in the provision of care.¹⁵ Despite the availability of free public health facilities with no formal charges, this study confirms that private providers constitute a substantial share of the market in urban areas. This is not surprising given that private facilities outnumber public facilities and are perceived to be better for a variety of reasons, including convenience and prompt care of patients.

Limitations of the study

The limitations of the study include a lack of generalizability given the systematic epidemiological, geographical and structural differences between Indian states and the potential for recall bias and under-reporting in interpreting healthcare utilization patterns. We were unable to assess the effects of unmeasured variables, including health system supply-based factors or quality, to study the relationship to healthcare utilization. Nonetheless, the comprehensive nature of the instrument made it possible to validate variables against each other and to check for consistency of responses across different questions that to some extent compensate for recall bias and under-reporting.

Conclusions

The government's CCT programme to encourage antenatal care, institutional delivery and immunization also acts as an enabling factor leading to a significant increase in the utilization of formal public healthcare services over informal or home care for acute childhood illnesses.

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Competing interests: None declared.

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