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Out-of-pocket expenditure for hospitalization in Haryana State of India: Extent, determinants & financial risk protection

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Background & objectives: India aspires to achieve universal health coverage, which requires ensuring financial risk protection (FRP). This study was done to assess the extent of out-of-pocket (OOP) expenditure and FRP for hospitalization in Haryana State, India. Further, the determinants for FRP were also evaluated.

Methods: Data collected as a part of a household level survey conducted in Haryana 'Concurrent Evaluation of National Rural Health Mission: Haryana Health Survey' were analyzed. Descriptive analysis was undertaken to assess socio-demographic characteristics, hospitalization rate, extent and determinants of OOP expenditure and FRP. Prevalence of catastrophic health expenditure (CHE) (more than 40% of non-food expenditure) and impoverishment (Int\$ 1.25) were estimated. Multivariate logistic regression was used to assess determinants of FRP.

Results: Hospitalization rate was found to be 3106 persons or 3307 episodes per 100,000 population. Median OOP expenditure on hospitalization was ₹ 8000 (USD 133), which was predominantly attributed to medicines (37%). Prevalence of CHE was 25.2 per cent with higher prevalence amongst males [odds ratio (OR)=1.30], those belonging to scheduled caste and scheduled tribes (OR=1.35), poorest 20 per cent households (OR=3.05), having injuries (OR=4.03) and non-communicable diseases (OR=3.13) admitted in a private hospital (OR=2.69) and those who were insured (OR=1.74). There was a 12 per cent relative increase in poverty head count due to OOP payments on healthcare.

Interpretation & conclusions: Our findings showed that hospitalization resulted in significant OOP expenditure, leading to CHEs and impoverishment of households. Impact of OOP expenditures was inequitably more on the vulnerable groups. OOP expenditure may be curtailed through provision of free medicines and diagnostics and removal of any form of user charges.

Key words Catastrophic expenditure - financial risk protection - hospitalization - out-of-pocket expenditure

Out-of-pocket (OOP) payments are the principal means of healthcare financing in most low- and middle-income countries. In India, nearly 60 per cent of total health expenditure is sourced by the households through OOP payments¹. While the share

of government spending on health as a proportion of total health expenditure has increased from 26 per cent in 2000 to 30.5 per cent in 2011², a commensurate decline in OOP expenditure, especially in terms of per capita expenditure, has not been seen. This has

led to an increase in the number of households facing catastrophic health expenditure (CHE) from 15 per cent of all households in 2004-2005 to 18 per cent in 2011-2012³.

OOP expenditure acts as a deterrent for utilization of the healthcare services for a considerable proportion of the population. As per National Sample Survey (NSS) 71st round, no care was reported for 4.1 and 2.8 per cent of illness episodes in rural and urban areas, respectively⁴. More importantly, this unmet need was higher amongst poorer sections. In addition, many of those who seek care face impoverishment. Nearly 63 million people in India are forced below the poverty line (PL) due to OOP expenses for healthcare³. The problem of high OOP expenditure is further compounded by the lack of protective mechanisms such as risk pooling. Only 14 and 18 per cent of rural and urban Indian population respectively is covered by any form of health insurance⁴.

The need to reduce OOP expenditures and provide financial risk protection has been cited in various policies^{3,5,6}. However, existing evidence on OOP has some limitations. Majority of existing published studies on OOP expenditure and financial risk protection (FRP) have used older data from NSS on healthcare utilization and expenditure (60th round) and other cross-sectional health surveys which are almost a decade old^{7,8}. Further, these surveys have a number of disaggregated expenditure categories and recall periods^{7,8}. Those relying on the use of recent consumption expenditure survey could lead to underestimation of catastrophic expenditure as these do not contain disaggregated data on consumption expenditure (into food and non-food expenditure). The validity and applicability of findings of these studies in relation to high healthcare inflation rates (7.5%)⁹ has also not been established. Further, assessing the extent of FRP in particular for hospitalization care through publicly financed health insurance schemes has become an important policy question. Haryana has also launched a supply-side funded scheme called *Mukhyamantri Muft Ilaj Yojana* in 2013, which specifically provides completely free treatment for all hospitalizations including surgeries, diagnostics and drugs¹⁰. Finally, while several policy documents such as the High Level Expert Group (HLEG) report as well as the 12th Five-Year Plan recommend State governments to undertake pilot interventions at district level to universalize health coverage^{5,6}, there is no study till date which reports on FRP at district level.

This study was aimed to assess the extent of OOP expenditure and FRP due to hospitalization in Haryana State, India. FRP is reported at State and district level. Second, the determinants of FRP for hospitalization in Haryana State were also evaluated.

Material & Methods

Study design: Data of a large cross-sectional household level survey 'Concurrent Evaluation of National Rural Health Mission (NRHM): The Haryana Health Survey' conducted from September 2012 to May 2015 were analyzed. It was approved by the Ethics Committee of the Post Graduate Institute of Medical Education and Research, Chandigarh, India.

The Haryana State has 53 secondary and tertiary care hospitals; 95 community health centres and 440 primary health centres and 2630 sub-centres (SCs) to provide healthcare services¹¹. Multistage stratified random sampling was used to select primary sampling units (PSUs) which comprised a SC in rural areas and an urban polio post in urban areas. Using a proportion of hospitalizations at government hospitals as 40 per cent (NSS 60th round)⁸, 11 per cent absolute error, 5 per cent type II error and a design effect of 1.25, the sample size was estimated to be 23 at the PSU level.

The overall sample to be selected at PSU level (*i.e.*, SC) was further divided amongst its constituent villages based on population proportional to size. Within each village, the geographic area was divided broadly into four zones, from which one zone was randomly selected. The investigators selected the first house randomly and moved in consecutive order till the required sample of cases with any hospitalization in past one year was obtained. More details of overall study methodology are available elsewhere^{12,13}.

Data collection: Respondents were interviewed using a semi-structured interview schedule. First part of this questionnaire dealt with general household information *i.e.*, household and living characteristics, socio-demographic profile, assets and consumption expenditure. Consumption expenditure for households producing their own food grains, pulses, milk, *etc.*, was computed by eliciting the actual quantity of consumption and then monetizing with the locally prevalent market rates of that commodity. The second part elicited information on any hospitalization within one year preceding the date of survey, ailment causing hospitalization, treatment-seeking behaviour and OOP expenditure incurred. Data were collected based on

respondent recall which is a standard practice in many surveys^{4,14}. Further, it was tried to substantiate the recall-based information on expenditure with a review of bills wherever available. A reference period of 365 days was used which is considered appropriate for hospitalization expenditure^{4,14,15}. This was justified on two grounds; first, hospitalization being a rare event, a longer reference period was desirable for identifying enough episodes. Second, since it was a rare and important event in the household, members were likely to remember its features.

Statistical analysis: Data were analysed using SPSS software version 16.0 (SPSS Inc., Chicago, IL, USA) software. A composite household asset index was created using principal component analysis to assess the wealth status¹⁶. Twenty seven household assets were used for creating the asset index. In around 14.7 per cent cases, respondent was not able to recall detailed breakup of OOP expenditure for hospitalization. To avoid excluding this sample, overall expenditure amongst these households was apportioned into the five categories, on the basis of trends in remaining 85.3 per cent cases where detailed breakup of OOP expenditure was available. Besides at overall level, mean and median OOP expenditure was estimated for medicines, diagnostics, hospital charges or user fee (in public sector), transportation and other charges. For the purpose of conversion, 1 USD was taken to be equal to ₹ 60.11¹⁷.

Financial risk protection (FRP): CHE was calculated based on capacity to pay (CTP). A hospitalization OOP expenditure was considered to be catastrophic if it was ≥ 40 per cent of the households' CTP¹⁸.

CTP was defined as total household expenditure (THHE) minus subsistence expenditure (SE) or food expenditure (FE) whichever amongst the two was lesser:

$$CTP = THHE - SE \text{ or } FE \text{ (whichever is less)}$$

$$CHE = \frac{\text{Total OOP expenditure on hospitalization}}{\text{Capacity to pay}}$$

If ≥ 0.4 , then CHE is present; If < 0.4 , then CHE is absent.

Poverty head count: Poverty head counts was compared before and after OOP payments for hospitalization. The pre-hospitalization poverty head count (Pre-Hp) was calculated using mean per capita consumption

expenditure (MPCE; x_i) using the world bank international PL cut-off of \$ 1.25/day/person.

$$\text{Pre-Hp} = 1/n \sum (x_i \leq PL)$$

where n=number of individuals.

The post-hospitalization poverty head count was also computed in a similar manner by netting out OOP payments for hospitalization from consumption expenditure and then comparing with PL.

$$\text{Post Hp} = 1/n \sum (x_i - OOP) \leq PL$$

where n=number of individuals.

Estimate of impoverishment was weighted by rural-urban distribution and size of district population.

Determinants of catastrophic health expenditure (CHE): Binary logistic regression was performed to assess the independent factors determining the CHE amongst the hospitalized patients. Independent factors reported to be showing significant association with CHE were considered for multivariate analysis^{19,20}. The variables included in first place were age of the patient, gender, social class, educational status, family size, wealth quintiles, type of ailment, type of healthcare provider and insurance status. Step-down approach was adopted for the development of final model. The correlation was assessed between the independent factors determining CHE to rule out the presence of multicollinearity. Wealth status of the family and education of head of household were found to be moderately correlated (0.44), and therefore, education was excluded from the multivariate analysis. The final model included gender, social class, family size, income quintiles, type of ailment, type of healthcare provider and insurance status as the explanatory variables.

Results

The present analysis comprised 79,743 households consisting of 436,657 individuals, of whom 13,253 individuals were hospitalized. Only 2.2 per cent were covered under any form of health insurance scheme; rate of hospitalization was found to be 3106 persons or 3307 episodes per 100,000 population. Majority (76.2%) of the patients sought hospitalization in the private sector. Communicable diseases, non-communicable diseases (NCD) and injuries led to 31.4, 30.9 and 10.2 per cent hospitalization, respectively (Table I).

Out-of-pocket expenditure: The median and mean OOP expenditure on hospitalization in Haryana was ₹ 8000

Table I. Out-of-pocket (OOP) expenditure according to socio-demographic, epidemiological and care-seeking profile of hospitalized patients in Haryana

Characteristic	Category	Number of patients (%)	Mean OOP expenditure ₹ (USD)	Median OOP expenditure ₹ (USD)
Gender	Male	7022 (55.1)	26,298 (437.5)	8500 (141.4)
	Female	5726 (44.9)	17,730 (295.0)	7000 (116.5)
	Total	12,748 (100)	22,449 (373.5)	8000 (133.1)
Age (yr)	<15	2748 (21.6)	14,039 (233.6)	6000 (99.8)
	15-29	2732 (21.4)	21,843 (363.4)	7100 (118.1)
	30-44	2734 (21.4)	25,282 (420.6)	10,000 (166.4)
	45-60	2603 (20.4)	26,639 (443.2)	9000 (149.7)
	60	1926 (15.1)	25,674 (427.1)	8000 (133.1)
	Total	12,743 (100)	22,457 (373.6)	8000 (133.1)
Education	Illiterate	4086 (32.3)	20,509 (341.2)	7000 (116.5)
	Below secondary level	4640 (36.6)	19,219 (319.8)	7250 (120.6)
	Secondary or above but not graduate	3228 (25.5)	26,812 (446.1)	8157 (135.7)
	Graduate or above	709 (5.6)	35,222 (586.0)	10,000 (166.4)
	Total	12,663 (100)	22,451 (373.5)	8000 (133.1)
Social group	SC/ST	4655 (37.1)	19,006 (316.2)	7200 (119.8)
	OBC	4276 (34.1)	21,895 (364.3)	7550 (125.6)
	Others/general	3603 (28.7)	26,995 (449.1)	8500 (141.4)
	Total	12,534 (100)	22,288 (370.8)	8000 (133.1)
Quintile	Poorest	2615 (20.5)	17,528 (291.6)	6000 (99.8)
	Poor	2496 (19.6)	17,242 (286.9)	7000 (116.5)
	Moderate	2615 (20.5)	23,485 (390.7)	8500 (141.4)
	Rich	2527 (19.8)	23,617 (392.9)	7500 (124.8)
	Richest	2494 (19.6)	30,562 (508.5)	10,000 (166.4)
	Total	12,747 (100)	22,451 (373.5)	8000 (133.1)
Insurance status	Uninsured	12,464 (97.8)	21,688 (364.1)	7900 (131.4)
	Insured	248 (2.2)	47,174 (784.8)	13,600 (226.3)
	Total	12,748 (100)	22,449 (373.5)	8000 (133.1)
Type of ailment	Communicable disease	3138 (31.4)	12,000 (199.6)	5700 (94.8)
	NCDs	3094 (30.9)	32,465 (540.1)	10,225 (170.1)
	Injuries	1017 (10.2)	38,755 (644.8)	14,400 (239.6)
	Others	2758 (27.6)	18,600 (309.5)	8500 (141.4)
	Total	10,007 (100)	22,866 (380.4)	8000 (133.1)
Number of hospitalization episodes	1	12,155 (100)	18,737 (311.7)	6800 (113.1)
	2	707 (5.5)	24,802 (412.6)	6500 (108.1)
	3	128 (1)	40,219 (669.1)	7225 (120.2)
	4	14 (0.1)	8214 (136.7)	5750 (95.7)
	5	7 (0.1)	51,071 (849.7)	50,000 (831.9)
Type of healthcare provider	Public	2792 (23.0)	12,552 (208.8)	2500 (41.6)
	Private	9256 (76.2)	24,474 (407.2)	10,000 (166.4)
	Others [#]	96 (0.8)	21,556 (358.6)	9370 (155.9)
	Total	12,144 (100)	21,710 (361.2)	7900 (131.4)

[#]NGO only. USD, United States Dollar; NCDs, non-communicable diseases; NGO, non-government organization

and ₹ 22,450 (₹ 21,441-₹ 23,457), respectively (Table II). Median OOP expenditure incurred on hospitalization was four times higher in the private sector (₹ 10,000) than in the public sector (₹ 2500). Nearly 15.8 per cent of those admitted in public sector hospitals did not incur any OOP expenditure. On the contrary, all those admitted in private health facilities incurred some OOP expenditure. Majority of this was incurred on medicines (34%) followed by hospital charges or user fee (28%) (Fig. 1). Medicines accounted for close to half of total OOP expenditure in the public sector (48%) (Fig. 1).

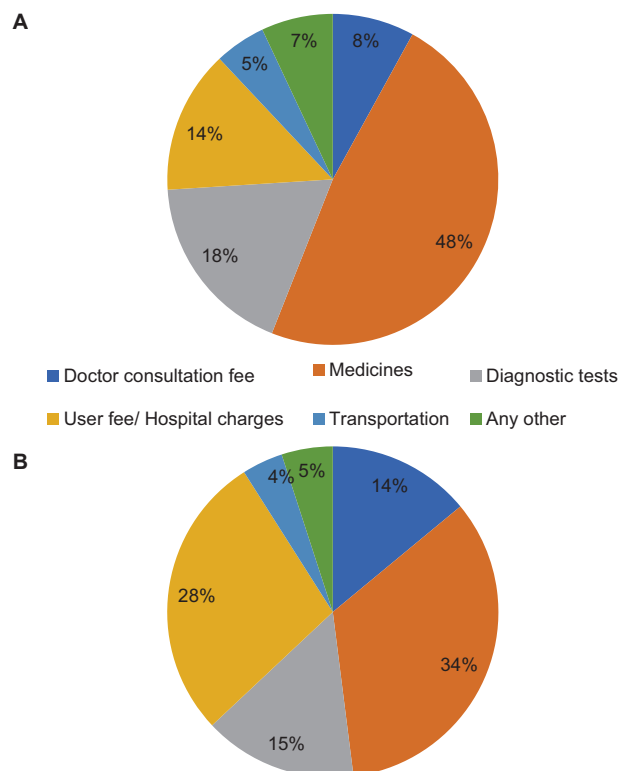


Fig. 1. Distribution of out-of-pocket expenditure on hospitalization in health facilities of Haryana (**A**) Public health facilities (**B**) Private health facilities.

Borrowing money was the main coping mechanism used to finance OOP payments for hospitalization (43%). The share of insurance for coping OOP payments was only 4.4 per cent (Fig. 2).

Financial risk protection (FRP): The prevalence of CHE for hospitalization in Haryana State was 25.2 per cent. A relative increase of 12 per cent in poverty head count post-OOP payments for hospitalization was observed. Wide inter-district variations were observed in FRP. CHE prevalence was maximum in Sirsa (46.3%) and lowest in Gurgaon (9.0%), whereas a relative increase in poverty head count was maximum for Fatehabad and least for Rohtak (17.4 and 5.7%, respectively) (Fig. 3). The CHE was significantly more amongst males [odds ratio (OR)=1.30; 95% confidence interval (CI)=1.13-1.49; $P<0.001$], Scheduled Castes/Scheduled Tribes (OR=1.35; 95% CI=1.14-1.61; $P=0.001$), poorest quintile (OR=3.05; 95% CI=2.41-3.87; $P<0.001$) and amongst insured (OR=1.76; 95% CI=1.20-2.57; $P=0.004$). Second, prevalence of CHE was significantly higher for those being admitted for NCDs (OR=3.13; 95% CI=2.62-3.76; $P<0.001$) and for those who sought care at a private healthcare facility (OR=2.69; 95% CI=2.21-3.28) ($P<0.001$). Odds of

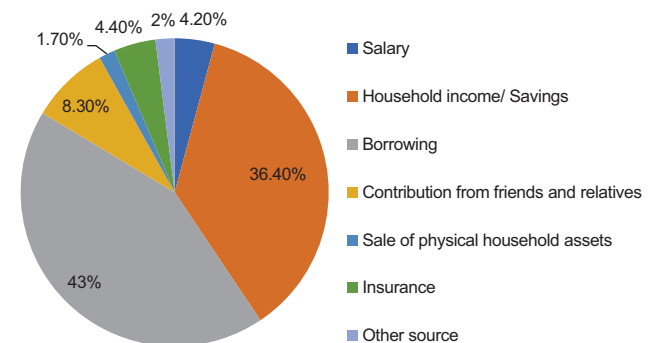


Fig. 2. Coping strategies for out-of-pocket payments.

Table II. Out-of-pocket expenditure due to hospitalization in Haryana State

Characteristics	Median ₹ (USD)	IQR ₹	Mean ₹	95% CI ₹
Overall	8000 (133.1)	15,800	22,450	21,441-23,457
Doctor consultation fee	200 (3.3)	1000	2748	2503-2993
Medicines	2500 (41.6)	5200	8298	7836-8760
Diagnostic tests	2500 (41.6)	5200	3590	3346-3833
User fee/hospital charges	1000 (16.6)	4000	5632	5257-6006
Transportation	200 (3.3)	1000	901	850-952
Any other	0	600	1282	1154-1410

USD, United States Dollar; IQR, interquartile range; CI, confidence interval

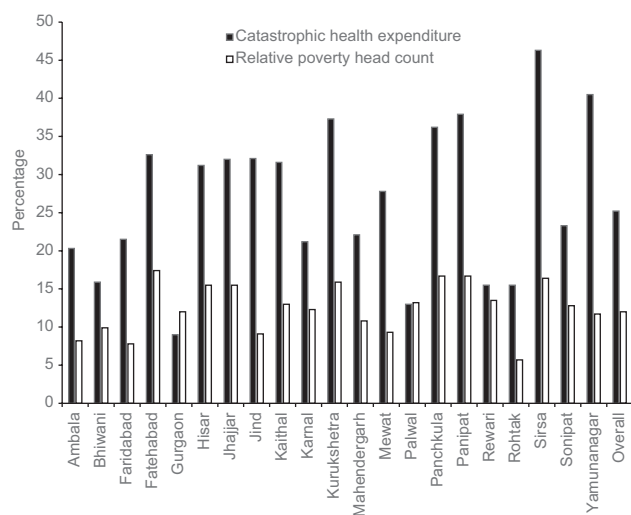


Fig. 3. Financial risk protection at district level.

facing CHE was higher in insured than uninsured (OR=1.76; 95% CI=1.20-2.57) (Tables III and IV).

Discussion

Overall, the median cost of OOP expenditure on hospitalization was estimated to be ₹ 8000 (USD 133). Medicines constituted major share of OOP expenditure (37%). Nearly one-fourth of the households (25.2%) faced financial catastrophe, whereas there was a 12 per cent relative increase in poverty head count as a result of OOP expenditures. Prevalence of CHE was significantly higher in private sector hospitalizations, those due to NCD, amongst poor people and those who were having a health insurance.

The strength of this study lied in the analysis of locally representative, notably large data set on hospitalization. Second, our estimates were valid at district level. With most of government health programmes encouraging decentralized planning process, it is important to generate evidence on health financing also at district level. The HLEG group report as well as the 12th Five-Year Plan recommend undertaking district-level pilots for universal health care^{5,6}. Third, the consumption expenditure data in our study were differentiated into food expenditure and non-food expenditure, making the use of WHO recommended 40 per cent cut-off level for CTP feasible.

Our estimates of mean OOP expenditure (₹ 22,450) were close to the hospitalization expenditure in Haryana reported in the NSS 71st round survey on healthcare service utilization and

Table III. Extent of financial risk protection for hospital care in Haryana

Characteristics	Catastrophic health expenditure	
	Prevalence (%)	<i>P</i>
Age (yr)		
<15	20.3	<0.001
15-29	25.6	
30-44	30.0	
45-60	27.8	
>60	30.2	
Gender		
Male	29.1	<0.001
Female	23.6	
Social group		
SC/ST	31.7	<0.001
OBC	22.2	
General	21.2	
Education		
Illiterate	32.0	<0.001
Below secondary level	26.6	
Secondary/above but not graduate	21.7	
Graduate/post-graduate	11.4	
Family size		
≤5 members	27.5	<0.001
>5 members	22.5	
Wealth quintile		
Poorest	34.6	<0.001
Poor	31.2	
Moderate	24.4	
Rich	22.4	
Richest	15.9	
Insurance status		
Uninsured	25.3	<0.001
Insured	39.0	
Type of ailment		
Communicable disease	15.3	<0.001
NCDs	33.3	
Injuries	38.6	
Others	26.9	
Type of healthcare provider		
Public	16.1	<0.001
Private	28.9	
Others	20.5	
NCDs, non-communicable diseases		

Table IV. Determinants of financial risk protection for hospital care in Haryana

Characteristics	Catastrophic health expenditure	
	OR (95% CI)	P
Gender		
Female	1	
Male	1.30 (1.13-1.49)	<0.001
Social group		
Others/general	1	
SC/ST	1.35 (1.14-1.61)	0.001
OBC	0.94 (0.78-1.13)	0.483
Family size		
≤5	1	
>5	1.29 (1.12-1.49)	<0.001
Quintile		
Poorest	3.05 (2.41-3.87)	<0.001
Poor	2.24 (1.77-2.83)	<0.001
Middle	1.68 (1.33-2.12)	<0.001
Rich	1.48 (1.17-1.88)	0.001
Richest	1	
Insurance status		
Uninsured	1	
Insured	1.76 (1.20-2.57)	0.004
Type of ailment		
Communicable diseases	1	
NCDs	3.13 (2.62-3.76)	<0.001
Injuries	4.03 (3.16-5.15)	<0.001
Others	2.17 (1.80-2.62)	<0.001
Type of health care provider		
Public	1	
Private	2.69 (2.21-3.28)	<0.001

CI, confidence interval; OR, odds ratio;
NCDs, non-communicable diseases

expenditures (₹ 24,214 per hospitalization case)⁴. OOP expenditure incurred on hospitalization was almost twice in the private sector than in the public sector, which was similar to previous study finding²¹. Majority expenditure in both the private as well as the public sectors was incurred on medicines. The same was evident from the findings of another study, which reported that medicines accounted for around 70 per cent of the total OOP expenditures⁷. The reasons for this high expenditure on medicines could be due to non-availability of drugs in public sector hospitals, irrational use of drugs both by the users as well as the

prescribers, over prescription, multidrug prescription and use of expensive but often unnecessary drugs.

The OOP expenditure was found to be progressive *i.e.*, higher amongst the richer quintiles, which was similar to what has been reported earlier⁷. The possible reasons for the same can be inequity in extent and nature of healthcare utilization amongst the rich and the poor²². The poor have a higher unmet need and hence lower OOP expenditure. Second, the rich tend to access care from more costly private sector while poor seek care from the public hospitals. Finally, poor substitute inpatient care with cheaper forms such as outpatient care²¹.

It was found that 25.2 per cent of households suffered financial catastrophe at a 40 per cent threshold which was highest in poorest quintile (34.6%) and least in richest quintile (15.9%). A previous analysis also observed that CHE was regressive in Haryana State²¹.

Policy implications

An important finding of our study was that the odds of facing CHE were 1.7 times higher amongst the insured as compared to uninsured. This finding is similar to a recently published systematic review of the impact evaluations of publicly financed health insurance schemes in India²³. It has significant implications for India's health financing policies, where the government is trying to invest more in the form of demand-side financing mechanisms such as publically financed health insurance schemes. Of the four studies, which have evaluated the impact of these schemes on FRP, three have reported no reduction of catastrophic spending amongst those who are insured²⁴⁻²⁷. This implies that there is a need to evaluate the existing health insurance schemes, before investing heavily in them to achieve universal health coverage. On the contrary, since public sector health expenditures are significantly lower and since strategies to reduce OOP through public sector strengthening have resulted in positive effects²⁸, it is recommended to invest in developing public sector infrastructure through supply-side funding as a strategy for universal health coverage.

Both OOP expenditure and the prevalence of CHE were higher for hospitalizations related to injuries and NCDs as compared to communicable diseases. This points to the urgent need to invest in prevention of NCDs and injury and strengthening public health systems for provision of primary care for NCDs. A

better management of NCDs by focusing on preventive and primary healthcare and thereby reducing the cost of curative care is lacking at present.

One of the methods to reduce OOP payments on hospitalization is through reduction in expenditure on medicines. This can be done by ensuring free availability of medicines in public sector institutions. Models of Tamil Nadu Medical Services Corporation²⁹ and Rajasthan Medical Service Corporation³⁰ for the provision of free medicines need to be emulated by other States. The centralized procurement and decentralized distribution system in Haryana State should be strengthened further³¹.

Finally, user fee or hospital charge was the second major contributor for OOP expenditure and should be removed. Previous analyses from Haryana State showed that implementing a surgical package care programme did not reduce user charges, and rather resulted in a decline in trends of public sector surgeries³². Similar negative findings in terms of declining overall hospitalizations were observed in early years of health sector reforms when user charges were introduced. Moreover, increased public health spending results in the more equitable utilization of hospital services³³.

The study has methodological and data limitations. First, OOP was presented as costs associated with hospital admissions only and did not describe OOP expenditure associated with outpatient visits and with those who did not seek care in hospitals; these costs would be important in giving a comprehensive picture. Second, due to recall bias, detailed breakup of OOP expenditure could not be obtained in about 14.7 per cent cases. This was later apportioned using the distribution of expenditure in cases where detailed breakup was available. However, this could reduce variability. Third, the severity of illness was not assessed. While lack of measurement of severity of illness did not affect the validity of OOP expenditure estimation at the population level as our sample was drawn randomly, it could potentially affect the extent of FRP in one stratum versus another, especially if the severity of illness is systematically different in the two strata. Fourth, the interest of money borrowed to make hospitalization payments was not accounted for. It has been argued that a complete measure of hardship financing should include the additional costs accrued as a result of borrowings incurred to pay the OOP expenditure³⁴. Hence, our estimate on FRP could be considered to be a slight underestimate. Further,

besides interviewing the respondents, it was tried to obtain bills of hospital to record exact expenditures. Despite attempts to elicit detailed expenditure data, there could be recall bias.

In conclusion, our study showed high OOP expenditure and its catastrophic impact on households at district level in Haryana. The government should increase the public health spending to reduce the economic burden on households. Better availability of drugs and diagnostics in public sector are likely to yield results. There is a need to re-orient and strengthen the public health systems towards the provision of holistic primary care.

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Conflicts of Interest: None.

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