Out-of-pocket health expenditure: A repeated cross-sectional analysis of National Sample Survey data, 2004-11 to 2022

Abhishek Kumar *

Several ongoing reforms in India in the health sector are aimed at reducing the financial burdens of the households. Against this backdrop the study presents the estimates of out-of-pocket expenditure and incidence of catastrophic health expenditure.

We analyze out-of-pocket and catastrophic health expenditures using data from three National Sample Survey rounds (2004-05, 2011-12, 2022). Additionally, we report institutional and non-institutional medical expenditure across categories like medicines and diagnostic tests. Using logistic regression, we assess the socioeconomic factors influencing catastrophic health expenditure within a multivariate framework.

The share of total medical expenditure as a percentage of MPCE was 5.9% in 2004-05, and 6.6% in 2022. The incidence of catastrophic health expenditure, if it exceeds 10% of MPCE, was 14.6% in 2004-05, and 15.9% in 2022. Among non-institutional health expenditures, pathological tests accounted for a significant portion. Muslim households; SC and OBC households, casual laborers and households in the upper quintiles are more likely to experience catastrophic health expenditure.

This study underscores the urgent need for well-designed policy interventions to reduce OOP expenses. Expanding insurance coverage and providing subsidized treatment at public facilities are key steps toward achieving universal health coverage.

Abhishek Kumar*, FLAME University, Pune, Maharashtra

For supplementary materials such as appendices, datasets, and author disclosure statements, see the article page at https://healthempirics.org/

Out of pocket expenditure refers to the direct payment made by individuals while seeking healthcare at private or public facilities (Wagstaff et al., 2020). The payments are not reimbursable from insurance and government scheme. Out of pocket expenditure can have significant consequences for households. In absence of insurance coverage and rising medical costs, the households are forced to forgo treatment, discontinue treatment or have to settle for substandard quality of services. On the other hand, catastrophic health expenditure occurs when a household out of pocket expenditure exceeds a certain threshold of their income or consumption and can lead to financial distress (Wagstaff et al., 2020). Catastrophic health expenditure is an important indicator for assessing the financial protection in health care systems.

To ensure the well-being of people, the Sustainable Development Goals which is a collective commitment by many countries, emphasize the need for providing universal health coverage (Royston et al., 2020). UHC includes providing equitable access to health care services to everyone. India as a signatory to the 2030 agenda for sustainable development has taken measure to achieve the targets laid out in SDG framework and ensure UHC for its population. However, out of pocket health expenditure is a major cause of concern for India as the coverage of insurance is low and the demographics are changing substantially over time (Khan et al., 2021; Dang et al., 2021; Sarwal & Kumar, 2021).

Here it is worth noting that Out-of-pocket (OOP) expenditure can be measured in several ways to assess its financial burden on households (Wagstaff et al., 2020). Absolute measures include total OOP expenditure, which captures the direct amount spent on healthcare services, and per capita OOP expenditure, which calculates the average spending per person (Wagstaff et al., 2020; Banthin et al., 2008). The relative measures express OOP expenditure as a proportion of total household expenditure or income, providing insight into financial strain (Wagstaff et al., 2020). Another critical measure is catastrophic health expenditure (CHE), which occurs when OOP spending exceeds a predefined threshold, such as 10% of total household expenditure, or 40% of a household's non consumption expenditure (Wagstaff et al., 2020; Berki, 1986). Additionally, OOP spending can lead to impoverishment, where households fall below the poverty line after paying for healthcare (Wagstaff & Doorslaer, 1992; Wagstaff & Doorslaer, 2003). The poverty headcount approach quantifies this by measuring the proportion of households pushed into poverty due to medical expenses.

Measurement of out-of-pocket is challenging given the different nature of diseases and recall biases. Estimates are usually based on household survey data and consumption expenditure is used as the denominator in absence of reliable estimates for income. Relative measures are usually used to allow temporal comparisons. There are several studies which have tried to estimate the out-of-pocket expenditure for India based on household survey data. Some studies found

that CHE has increased between 1993 and 2011 based on consumption expenditure round of NSS (Karan et al., 2014; Selvaraj et al., 2018). A recent study based on NSS data also found that OOP expenditure was catastrophic for 17% of the households (Selvaraj et al., 2018). In fact, a comparison for countries in South Asia reveals that India ranks third among countries which report high OOP expenditure. As per national health accounts data, the out-of-pocket payments for India are estimated to be 39% of the total health expenditure (NHSRC, 2024).

In addition, the overall OOP payments conceal the expenditure for different diseases. For instance, the OOP expenditure for cancer and other NCDs is quite high and more detrimental and impoverishing (Dhankar et al., 2021; Yadav et al., 2021). However, the problem with these studies is the small sample size and inadequate representation in the overall sample. There are other studies which have estimated OOP expenditure for certain age groups and established association with socio-economic characteristics. For instance, catastrophic expenditure is commonest among households comprising only people aged 60 years or older (Yadav et al., 2021). There are few studies which have also estimated the expenditure on components of health such as medicine and pathological tests (Selvaraj et al., 2018; Prinja et al., 2022).

There is a consensus that increasing public spending could lead to a reduction in OOP expenditure (WHO, 2021). Although, India has in place the Ayushman Bharat yojana, but the spending as a share of GDP on public health spending has remained low over the past few decades (Jakovljevic et al., 2022). Over, the past few years, the medical inflation has been very high, the doctor consultation and diagnostic charge has also increased many folds. The current insurance coverage across India shows a divide (Keshri & Ghosh, 2019). The states in south have better coverage. Although, the National Health policy strives to mitigate the impact of the high OOP payments but it is not visible in the budget. An analysis of the OOP expenditure on various components could be a good starting point to provide insights for effective policy making. These estimates are essential for informed decision-making on fund allocation and drafting health packages. Therefore, we present detailed estimates of health-related costs and their percentage contributions using the latest (2022) round of the National Sample Survey on Consumption Expenditure, which captures the post-COVID-19 period and allows for assessment of how the pandemic influenced household health spending patterns.

Data and Methods

- Data

The study is based on data from three rounds of Consumer expenditure survey conducted during 2004-05, 2011-12 and 2022 by the National Sample Survey

Organization (NSSO). A key focus of these surveys is to collect data on the socio-economic and demographic characteristics of the households. Information is collected on food as well as non-food items. The primary objective of the survey is to estimate and analyze the distribution of households' Monthly Per Capita Expenditure (MPCE) across rural and urban areas.

The information on out-of-pocket expenditure incurred by household on hospitalization (institutional expenditure) during last 365 days and non-hospitalization (non-institutional expenditure) for last 30 days was collected separately during the survey. Information on different items for Medicine, Doctor's/surgeon's fee, X-ray, ECG, pathological test, etc.; hospital & nursing home charges; and other medical expenses was collected for both hospitalization and non-hospitalization cases.

- **Survey Design**

The Consumer expenditure survey follows a multi-stage survey design covering the whole of India. Clusters are formed by grouping districts with similar characteristics, from which urban and rural areas are identified for data collection. In the first stage, the selection process follows the probability proportional to size (PPS) method. In other words, this design involves dividing the population into first stage units (FSUs) and ultimate stage units (USUs). The first stage units (FSUs) are villages, blocks, or sub-units (SUs). The ultimate stage units (USUs) are households which are circular systematically selected to constitute the final sample.

A total of 1,24,644 households were interviewed in 2004-05; 1,01,662 (in type 1) and 1,01,651 (in type 2) during 2011-12 and 2,61,746 during 2022. In the 2011-12 round two different data collection schedules were used- "Type 1" and "Type 2". The difference between the two is that Type 1 generally uses a longer recall period (last 30 days and last 365 days) compared to Type 2 which uses a shorter recall period (last 7 days) for specific food items. We have used data for both the schedules for the analysis.

- **Outcomes**

The data on health expenditure was used to create three new variables a) per capita medical expenditure (institutional and non-institutional) b) OOP spending on medical as well as medicine as a share of MPCE and non-food MPCE c) percentage of households reporting catastrophic health expenditure. Two thresholds were established for catastrophic health expenditure: one where medical expense exceeded 10% of Monthly Per Capita Expenditure (MPCE) and another where medical expenses exceeded 40% of non-food MPCE. The estimates are also provided separately for rural and urban areas. The break-up of the medical expenditure for different rounds is also provided.

- **Independent variables**

Socio-economic differentials can have a significant impact on the incidence of OOP expenditure. In this study, we considered religion, social group, household type, household size and quintiles based on MPCE as the key determinants. Social group was categorized as scheduled tribes (ST), scheduled castes (SC), other backward classes (OBC) and other castes. In addition, the religion (Hindu, Muslim and Others) and household type based on employment type (Self-employed, Salaried, Casual Labour and Not employed) were considered. The household were categorized in five quintiles based on value of MPCE.

- **Statistical Analysis**

We report medical expenditure for both institutional and non-institutional sources across various survey rounds and examine expenditure inequalities among different social groups. All household expenditure data for 2004, 2011, and 2023 were converted into real terms (constant 2011 prices) using the Consumer Price Index (CPI). Additionally, we estimate the number of households experiencing catastrophic health expenditure. To analyse the factors associated with catastrophic health expenditure, we use logistic regression within a multivariate framework, adjusting for socioeconomic status (SES) factors. The results are reported as Odds Ratios (OR) with corresponding 95% confidence intervals. These odds ratios provide a relative measure of effect, enabling comparisons between groups relative to a reference group. The analysis was conducted using Stata 12.

Results

- **Socio-economic Characteristics of the households**

The distribution of household socio-economic characteristics has remained largely consistent across survey rounds (Table 1). In 2022, 81.5% of the interviewed households were Hindu, 44.7% belonged to the OBC category, and 57.1% were self-employed. The percentage of self-employed households increased from 52.6% in 2004 to 57.1% in 2022, while the share of casual labour households declined from 29.3% in 2004 to 23% in 2022.

- **Financial Burden on the households**

First, we present estimates of Monthly Per Capita Expenditure (MPCE), total medical expenditure, and expenditure on medicines (both institutional and non-institutional) for each survey round (Table 2). Household MPCE increased from ₹1223.7 in 2004 to ₹2405.5 in 2022, while non-food MPCE rose from ₹634.3 in 2004-05 to ₹1359.9 in 2022. The mean per capita institutional and non-institutional medical expenditures were ₹52.4 and ₹107.2 in 2022, respectively. In

Table 1: Sample Characteristics, NSS 2004, 2011–12 (Type 1 and 2) and 2022

	2004		2011 (Type 1)		2011 (Type 2)		2022	
	N	%	No.	%	No.	%	No.	%
Religion								
Hindu	102402	82.2	82847	81.5	82769	81.4	213249	81.5
Muslim	15774	12.7	13869	13.6	13833	13.6	34931	13.3
Others	6468	5.2	4947	4.9	5049	5	13566	5.2
Total	124644	100	101662	100	101651	100	261746	100
Social Group								
ST	10761	8.6	9079	8.9	9150	9	26291	10
SC	24413	19.6	19351	19	19412	19.1	51802	19.8
OBC	51031	40.9	44790	44.1	44240	43.5	116908	44.7
Others	38440	30.8	28442	28	28849	28.4	66746	25.5
Total	124644	100	101662	100	101651	100	261746	100
Household type								
Self-employed	65616	52.6	51831	51	51248	50.4	149417	57.1
Salaried	12438	10	17724	17.4	17468	17.2	37761	14.4
Casual Labour	36536	29.3	27850	27.4	28426	28	60295	23
Not employed	10055	8.1	4230	4.2	4476	4.4	14273	5.5
Total	124644	100	101635	100	101618	100	261746	100
MPCE based Quintiles								
Quintile 1	24934	20	20339	20	20331	20	52350	20
Quintile 2	24931	20	20329	20	20331	20	52350	20
Quintile 3	24922	20	20331	20	20332	20	52353	20
Quintile 4	24931	20	20333	20	20330	20	52345	20
Quintile 5	24926	20	20330	20	20327	20	52348	20
Total	124644	100	101662	100	101651	100	261746	100

2022, institutional expenditure on medicines was ₹21.1, while non-institutional expenditure on medicines was at ₹82.5. The share of total medical expenditure (both institutional and non-institutional) as a percentage of MPCE was 5.9% in 2004-05, 6.8% in 2011 (Type 1), and 6.6% in 2022, showing a decline between 2011 and 2022. The share of medicine expenditure decreased from 4.53% in 2011 to 4.31% in 2022. The total medical expenditure in rural areas (7.1%) is higher as compared to urban areas (5.9%) (Table S1).

- **Catastrophic Health Expenditure**

The incidence of catastrophic health expenditure, based on the first approach, where health expenditure is considered catastrophic if it exceeds 10% of MPCE,

Table 2: Financial burden indicators, India, 2004–2005, 2011–2012 and 2022–23

NSS round	2004	2011 (Type-1)	2011 (Type -2)	2022
Monthly Per Capita Expenditure (Current price)				
Household MPCE	1223.7	1627.1	1772.7	2405.5
	[1217.7,1229.7]	[1617.4,1636.9]	[1761.6,1783.7]	[2398.5,2412.4]
Household Non-food MPCE	634.3	919.2	912.1	1359.9
	[629.7,639]	[911.3, 927.1]	[903.8, 920.3]	[1354.6,1365.1]
Monthly Total medical expenditure per capita				
Medical expenditure institutional				
365 days (converted to 30 days)	19.0	36.4	36.7	52.4
	[18.1,19.9]	[34.8,37.9]	[35.2,38.2]	[51.2,53.6]
Medical non institutional				
30 days	52.6	74.3	72.9	107.2
	[51.8,53.4]	[73.2,75.5]	[71.8,74.1]	[106.2,108.1]
Monthly Expenditure on Medicines per capita				
Expenditure on medicine (institutional)	7.8	15.5	14.6	21.1
	[1.8,2.1]	[14.5,16.5]	[14,15.3]	[20.6,21.7]
Expenditure on medicine (non-institutional)	43.3	58.2	56.8	82.5
	[42.6,43.9]	[57.3,59]	[56.1,57.6]	[81.8,83.1]
Share in total MPCE				
Total medical as Share of MPCE (%)	5.9	6.8	6.2	6.6
	[5.8,5.9]	[6.7,6.9]	[6.1,6.3]	[6.6,6.7]
Total medicine as Share of MPCE (%)	4.2	4.5	4	4.3
	[4.1,4.2]	[4.5,4.6]	[4,4.1]	[4.3,4.3]
Share in total non-food MPCE				
Total medical as Share of non-food MPCE (%)	11.3	12	12	11.7
	[11.2,11.4]	[11.9,12.2]	[11.9,12.1]	[11.7,11.8]
Total medicine as Share of non-food MPCE (%)	8.0	8	7.8	7.6
	[8,8.1]	[7.9,8.1]	[7.8,7.9]	[7.6,7.7]

was 14.6% in 2004-05, 17.3% in 2011 (Type 1), and 15.9% in 2022 (Table 4). The percentage of households reporting catastrophic expenditure on medicines under this approach was 10.1% in 2004-05, 10.4% in 2011 (Type 1), and 9.1% in 2022. Using the second approach, where health expenditure is considered catastrophic if it exceeds 40% of non-food MPCE, the incidence was 4.6% in 2011 (Type 1) and 4.1% in 2022. The incidence was 4.1% in rural areas in 2022 (Table S2).

Table 3: Percentage of households incurring catastrophic payments with respect to total OOP spending and medicines OOP spending, India, 2004–2005, 2011–2012 and 2022–23

	2004	2011 (Type-1)	2011 (Type -2)	2022
Catastrophe using MPCE				
Percentage of Households reporting total medical expenditure >10%	14.6	17.3	15.3	15.9
	[14.4,14.8]	[17.1,17.6]	[15.1,15.5]	[15.8,16]
Percentage of Households reporting total expenditure on medicines >10%	10.1	10.4	9.4	9.1
	[10,10.3]	[10.2,10.6]	[9.2,9.5]	[9,9.2]
Catastrophe using Non-food MPCE				
Percentage of Households reporting total medical expenditure>40%	4.5	4.6	5.0	4.1
	[4.4,4.6]	[4.5,4.8]	[4.9,5.1]	[4,4.1]
Percentage of Households reporting total expenditure on medicines >40%	2.0	1.7	1.8	1.2
	[1.9,2.1]	[1.6,1.8]	[1.7,1.9]	[1.1,1.2]

- **Expenditure on Medical items**

The monthly per capita expenditure (MPCE) on various items shows that spending on medicines remained the highest, reaching ₹21.1 in 2022, up from ₹7.8 in 2004 and ₹15.5 in 2011 (Type 1). The share of institutional medicine expenditure in MPCE increased from 0.6% in 2004 to 1% in 2011, and was at 0.9% in 2022. In contrast, the share of non-institutional medicine expenditure decreased from 3.5% in 2004 to 3.4% in 2022. Among non-institutional health expenditures, pathological tests accounted for a significant portion. In 2022, the monthly per capita expenditure on non-institutional health items was ₹82.5.

- **Catastrophic expenditure by household characteristics**

The percentage of households experiencing catastrophic health expenditure, based on Approach 1 (where health expenditure is considered catastrophic if it exceeds 10% of MPCE), was 17.4% in 2011 (type 1) and 15.7% in 2022 among Hindu households. Among Scheduled Caste (SC) households, the incidence declined from

Table 4: Break up of monthly per capita expenditure on medical items, India, 2004–2005, 2011–2012 and 2022-23

	Absolute values				% share of MPCE			
	2004	2011 (Type-1)	2011 (Type -2)	2022	2004	2011 (Type-1)	2011 (Type -2)	2022
Institutional								
Medicine	7.8	15.5	14.6	21.1	0.6	1.0	0.8	0.9
Doctor's/surgeon's fee	1.9	3.9	4.0	6.1	0.2	0.2	0.2	0.3
X-ray, ECG, pathological test, etc.	2.9	4.6	5.1	7.8	0.2	0.3	0.3	0.3
Hospital & nursing home charges	4.3	8.1	8.4	12.8	0.4	0.5	0.5	0.5
Other medical expenses	2.0	4.3	4.6	4.6	0.2	0.3	0.3	0.2
Medical -hospitalisation: sub-total	19.0	36.4	36.7	52.4	1.6	2.2	2.1	2.2
Non-institutional								
Medicine	43.3	58.2	56.8	82.5	3.5	3.6	3.2	3.4
Doctor's/surgeon's fee	2.3	4.6	4.6	7.8	0.2	0.3	0.3	0.3
X-ray, ECG, pathological test, etc.	6.0	9.3	9.0	12.7	0.5	0.6	0.5	0.5
Family planning devices	0.1	0.2	0.3	0.4	0.0	0.0	0.0	0.0
Other medical expenses	1.0	2.0	2.3	3.8	0.1	0.1	0.1	0.2
Medical –non- hospitalisation: sub-total	52.6	74.3	72.9	107.2	4.3	4.6	4.1	4.5

18.5% in 2011 (type 1) to 15.4% in 2022, while for OBC households, it dropped from 18.4% to 16.3% over the same period. There were no significant changes in the incidence of catastrophic health expenditure among salaried and non-employed households. By economic status, the incidence declined from 10.8% to 8.6% among households in the bottom quintile and from 17.3% to 15.0% among those in the top quintile between 2011 (type 1) and 2022.

Table 5: Percentage households who incurred catastrophic expenditure (as share of total MPCE) by background characteristics

Background Characteristics	2004		2011 Type 1		2011 Type-2		2022	
	N	%	No.	%	No.	%	No.	%
Religion								
Hindu	102402	14.5	82847	17.4	82769	15.3	213249	15.7
Muslim	15774	15	13869	16.7	13833	15.3	34931	16.4
Others	6468	14.8	4947	18	5049	15.8	13566	17.8
Total	124644	14.6	101662	17.3	101651	15.3	261746	15.9
Social Group								
ST	10761	8.9	9079	9.9	9150	9.8	26291	10
SC	24413	14.4	19351	18.5	19412	15.9	51802	15.4
OBC	51031	15.7	44790	18.4	44240	16.4	116908	16.3
Others	38440	14.7	28442	17.2	28849	15	66746	17.9
Total	124644	14.6	101662	17.3	101651	15.3	261746	15.9
Household type								
Self-employed	65616	14.4	51831	16.9	51248	15.3	149417	15.4
Salaried	12438	12.3	17724	15.6	17468	14.1	37761	15
Casual Labour	36536	15.1	27850	18	28426	15	60295	15.8
Not employed	10055	16.2	4230	25	4476	22.5	14273	24.4
Total	124644	14.6	101635	17.3	101618	15.3	261746	15.9
MPCE Quintiles								
Quintile 1	24934	7.4	20339	10.8	20331	8.9	52350	8.6
Quintile 2	24931	10.9	20329	13.4	20331	12.4	52350	12.6
Quintile 3	24922	13.2	20331	16.4	20332	14.8	52353	15.3
Quintile 4	24931	17.3	20333	19.8	20330	17.1	52345	18.5
Quintile 5	24926	23.9	20330	26.2	20327	23.4	52348	24.5
Total	124644	14.6	101662	17.3	101651	15.3	261746	15.9

- **Association of Catastrophic expenditure with socio-economic characteristics of the household**

Casual laborers are 20% [OR-1.20, 95% CI: 1.16-1.24] more likely to incur catastrophic health expenditure, while non-employed individuals also tend to have higher health expenditures. Households in the upper quintiles are three times more likely [OR-3.71, 95% CI: 3.51-3.92] to experience catastrophic health expenditure.

SC [OR-1.47, 95% CI: 1.38-1.57] and OBC [OR-1.47, 95% CI: 1.39-1.56] households face a 47% higher likelihood [OR-1.47, 95% CI: 1.38-1.57] of experiencing such expenses. Muslim households are 8% [OR-1.08, 95% CI: 1.03-1.13] more likely to incur catastrophic health expenditure compared to Hindu households.

Table 6: Logistic regression results for experience of catastrophic health expenditure

		2004	2011 Type 1	2011 Type-2	2022
Religion	**Hindu**	**1**	**1**	**1**	**1**
		[1.00,1.00]	[1.00,1.00]	[1.00,1.00]	[1.00,1.00]
	Muslim	1.20***	1.03	1.07	1.08***
		[1.10,1.31]	[0.93,1.15]	[0.96,1.20]	[1.03,1.13]
	Others	0.83***	0.91	0.9	1.02
		[0.75,0.91]	[0.81,1.03]	[0.79,1.03]	[0.96,1.09]
Social group	ST	1	1	1	1
		[1.00,1.00]	[1.00,1.00]	[1.00,1.00]	[1.00,1.00]
	SC	1.58***	1.88***	1.62***	1.47***
		[1.40,1.79]	[1.61,2.20]	[1.36,1.93]	[1.38,1.57]
	OBC	1.59***	1.76***	1.54***	1.47***
		[1.41,1.79]	[1.51,2.04]	[1.31,1.81]	[1.39,1.56]
	Others	1.24***	1.46***	1.24**	1.52***
		[1.10,1.40]	[1.25,1.70]	[1.05,1.46]	[1.44,1.62]
Household Type	Self-employed	1	1	1	1
		[1.00,1.00]	[1.00,1.00]	[1.00,1.00]	[1.00,1.00]
	Salaried	0.83***	0.80***	0.81***	0.97
		[0.75,0.91]	[0.73,0.87]	[0.73,0.88]	[0.93,1.02]
	Casual Labour	1.45***	1.30***	1.14***	1.20***
		[1.36,1.56]	[1.19,1.42]	[1.04,1.25]	[1.16,1.24]
	Not employed	0.95	1.54***	1.51***	1.72***
		[0.87,1.04]	[1.37,1.74]	[1.33,1.71]	[1.64,1.80]

		2004	2011 Type 1	2011 Type-2	2022
MPCE Quintile	Quintile 1	1	1	1	1
		[1.00,1.00]	[1.00,1.00]	[1.00,1.00]	[1.00,1.00]
	Quintile 2	1.62***	1.32***	1.50***	1.54***
		[1.45,1.82]	[1.14,1.53]	[1.29,1.75]	[1.45,1.63]
	Quintile 3	2.15***	1.76***	1.92***	1.96***
		[1.92,2.40]	[1.53,2.02]	[1.65,2.22]	[1.85,2.07]
	Quintile 4	3.19***	2.34***	2.36***	2.53***
		[2.86,3.55]	[2.04,2.67]	[2.05,2.72]	[2.39,2.67]
	Quintile 5	5.36***	3.62***	3.74***	3.71***
		[4.82,5.96]	[3.17,4.14]	[3.25,4.31]	[3.51,3.92]
	Constant	0.04***	0.06***	0.06***	0.05***
		[0.03,0.04]	[0.05,0.07]	[0.05,0.07]	[0.05,0.05]
	N	124644	101635	101618	261746

Discussion

We estimate the out-of-pocket expenditure and incidence of catastrophic health expenditure using two commonly used approaches based on data from three rounds of National sample survey on consumption expenditure. Following are the four salient findings from this study which could provide insights into financial burden on households.

First, the share of monthly per capita expenditure (MPCE) on both hospitalization and non-hospitalization in total and non-food MPCE has declined over time. A study based on consumer expenditure surveys from 1993–94 to 2011–12 reported an increase in the share of medical expenses in MPCE from 4.84% to 6.77% (Selvaraj et al., 2018). While our study indicates a decline between 2011 and 2022, the magnitude of reversal is not as large. However, these findings are in line with other studies based on health consumption and morbidity survey data which show a decrease in the out-of-pocket (OOP) expenditure share between the 71st (2014) and 75th (2017–18) rounds of the NSS (Mohanty & Dwivedi, 2021). Furthermore, National Health Accounts data reveal a decline in OOP expenditure as a share of total health expenditure, from 64.2% in 2013–14 to 39.4% in 2021–22, a positive trend (NHSRC, 2024). This shift may be attributed to increased government investment in public healthcare initiatives like Ayushman Bharat, improving access to affordable healthcare and reducing direct medical expenses (Parmar et al., 2023). Additionally,

a rise in government health expenditure as a percentage of GDP could be another factor (NHSRC, 2024). Some studies suggest that countries with an increase in national health expenditure as a share of GDP incur lower expenditure on OOP (WHO, 2021). However, it should be noted that several health insurance schemes such as the Rajiv Aarogyasri Health Insurance Scheme in Andhra Pradesh, the Rajiv Gandhi Jeevandayee Arogya Yojana in Maharashtra, and the centrally implemented Rashtriya Swasthya Bima Yojana (RSBY), were introduced to reduce financial hardships for the poor. However, they did not perform as expected (Sriram & Khan, 2020; Prinja et al., 2017).

Second, the percentage of household reporting CHE based on approach one (greater than 10% as a share of MPCE) has declined from 17.3% to 15.9% between 2011 and 2022 while based on approach 2, greater than 40% of non-food MPCE) has declined from 4.6 to 4.1%. Interestingly, an earlier study had showed that the percentage of households reporting CHE had increased between 1993-94 and 2011-12 from 13.9 to 17.9% based on approach 1 but had actually declined from 9.7 to 4.9% based on approach two (Selvaraj et al., 2018). Study based on health consumption and morbidity survey data also show that the incidence of CHE has declined from 23.45 in 2013-14 to 16.69 in 2017-18 (Mohanty & Dwivedi, 2021). While recent studies based on 75th round has reported that a total of 20.4% households faced CHE for hospitalization based on the average per capita consumption expenditure while 28% of households were grappling with the complexity of financial burden due to elevated inpatient healthcare (Yadav et al., 2021; Panda et al., 2024).

Third, we found that the share of household expenditure on medicines has remained largely unchanged. Most of this spending goes toward medicines and hospital or nursing charges for hospitalization, as well as medicines and pathological tests for non-hospitalization cases (Selvaraj et al., 2018; Ambade et al., 2022). A previous study estimated that spending on medicines accounts for approximately 7.6% of non-food MPCE, indicating that the financial burden of medical expenses has not significantly changed (Selvaraj et al., 2018). The National Health Policy 2017 emphasized the need to provide free medicines in public health facilities by increasing funding and improving drug procurement and supply chain mechanisms (MoHFW, 2017). States like Tamil Nadu and Rajasthan have well-functioning supply chain systems that ensure drug availability (Selvaraj et al., 2014; Kokilam et al., 2016). Additionally, the Indian government's recent initiative to exempt basic duty on cancer drugs, as well as for rare and chronic diseases, is a positive step. However, it remains to be seen whether these benefits will effectively reach patients.

Lastly, we found that out-of-pocket (OOP) expenditure varies based on households' socio-economic characteristics. Specifically, households that are Muslim, belong to the Other Backward Classes (OBC), work as casual laborers, or are in the upper wealth quintiles are more likely to incur catastrophic health expenditure (CHE). Several studies have highlighted the higher incidence of CHE among certain groups

which raises concerns about the effectiveness of existing health schemes (Karan et al., 2014; Pandey et al., 2018; Gaddam & Rao, 2023). One possible reason for the higher incidence of catastrophic health expenditure (CHE) among the richest quintile is their greater capacity and willingness to seek and pay for healthcare, including costlier institutional care and specialized treatments. In contrast, poorer households often delay or forgo medical treatment altogether because of financial barriers, limited access to quality healthcare, or reliance on public facilities with lower out-of-pocket costs. As a result, while the poor may face unmet health needs, the rich appear to incur higher medical expenses, leading to a relatively greater incidence of CHE despite their stronger financial position.

Limitations

This study has several limitations. First, the household survey data relies on self-reported expenditures, which may be affected by recall bias. Since there is no way to validate health expenditures from other sources, the data's accuracy remains uncertain. Additionally, households may underreport expenses due to social desirability bias. Second, the analysis only accounts for direct costs, excluding indirect costs such as lost income, transportation, and accommodation expenses. As a result, catastrophic health expenditures may be underestimated. Third, the study focuses on households that had the ability to pay for treatment, excluding those who did not seek medical care due to financial constraints. This might have underestimated the proportion of households experiencing catastrophic health expenditures.

Furthermore, the study does not include a disaggregated analysis by disease type. When CHE is assessed only at the household level, high costs associated with specific illnesses such as chronic conditions, maternal care, or hospitalization may be diluted by averaging total household spending. As a result, disease-specific or service-specific analyses can reveal more precise patterns of financial hardship, particularly for conditions that disproportionately affect certain demographic or socioeconomic groups. Therefore, disaggregated analyses are required to better inform targeted health financing and protection policies (Ataguba et al., 2024).

Finally, the use of cross-sectional survey data introduces temporal limitations. A longitudinal database is needed to capture the true burden of catastrophic health expenditures over time, especially to account for the impact of policy changes.

Conclusion

This study offers several policy-relevant insights. The findings suggest that out-of-pocket medical spending continues to be a major source of financial burden for households, with outpatient care, particularly diagnostic tests playing a significant

role. Vulnerability to catastrophic health expenditure remains pronounced among socially and economically disadvantaged groups as well as higher-income households who tend to seek more expensive care. These patterns reinforce the need for stronger financial protection mechanisms, including targeted subsidies for outpatient services and improved access to affordable diagnostics and medicines. Strengthening public health infrastructure and ensuring the consistent availability of essential drugs, as emphasized in the National Health Policy 2017, remain critical to reducing household financial strain and advancing toward universal health coverage.

References

Ambade, M., Sarwal, R., Mor, N., Kim, R., & Subramanian, S. V. (2022). Components of out-of-pocket expenditure and their relative contribution to economic burden of diseases in India. JAMA Network Open, 5(5), e2210040-e2210040.

Ataguba, J. E., Ichoku, H. E., Ingabire, M. G., & Akazili, J. (2024). Financial protection in health revisited: Is catastrophic health spending underestimated for service-or disease-specific analysis?. Health Economics, 33(6), 1229-1240.

Banthin, J. S., Cunningham, P., & Bernard, D. M. (2008). Financial burden of health care, 2001–2004. Health Affairs, 27(1), 188-195.

Berki, S. E. (1986). A look at catastrophic medical expenses and the poor. Health affairs, 5(4), 138-145.

Dang, A., Dang, D., & Vallish, B. N. (2021). Importance of evidence-based health insurance reimbursement and health technology assessment for achieving universal health coverage and improved access to health in India. Value in Health Regional Issues, 24, 24-30.

Dhankhar, A., Kumari, R., & Bahurupi, Y. A. (2021). Out-of-pocket, catastrophic health expenditure and distress financing on non-communicable diseases in India: A systematic review with meta-analysis. Asian Pacific Journal of Cancer Prevention: APJCP, 22(3), 671.

Gaddam, R., & Rao, K. R. (2023). Incidence, inequality and determinants of catastrophic health expenditure in India. Journal of Health Management, 25(1), 30-39.

Jakovljevic, M., Lamnisos, D., Westerman, R., Chattu, V. K., & Cerda, A. (2022). Future health spending forecast in leading emerging BRICS markets in 2030: health policy implications. Health research policy and systems, 20(1), 23.

Karan, A., Selvaraj, S., & Mahal, A. (2014). Moving to universal coverage? Trends in the burden of out-of-pocket payments for health care across social groups in India, 1999–2000 to 2011–12. PloS one, 9(8), e105162.

Keshri, V. R., & Ghosh, S. (2019). Health Insurance for Universal Health Coverage in India: A critical analysis based on coverage, distribution and predictors from National Family Health Survey–4 Data.

Khan, P. K., Perkins, J. M., Kim, R., Mohanty, S. K., & Subramanian, S. V. (2021). Multilevel population and socioeconomic variation in health insurance coverage in India. Tropical Medicine & International Health, 26(10), 1285-1295.

Kokilam, M. B., Joshi, H. G., & Kamath, V. G. (2016). Strengthening the pharmaceutical supply chain management with information communication technology intervention: a windfall to the Indian Rural Public Healthcare System. Journal of Health Management, 18(2), 274-289.

Ministry of Health and Family Welfare (MoHFW) GoI. National Health Policy, 2017. 2017. https://www.nhp.gov.in//NHPfiles/national_ health_policy_2017.pdf

Mohanty, S. K., & Dwivedi, L. K. (2021). Addressing data and methodological limitations in estimating catastrophic health spending and impoverishment in India, 2004–18. International Journal for Equity in Health, 20, 1-18.

National Health Systems Resource Centre (2024). National Health Accounts Estimates for India (2021-22). New Delhi: Ministry of Health and Family Welfare, Government of India. https://nhsrcindia.org/sites/default/files/2024-09/NHA%202021-22.pdf

NSSO. "Level and Pattern of Consumer Expenditure, 2004–05", Ministry of Statistics and Programme Implementation, Government of India: 2006.

NSSO. "Level and Pattern of Consumer Expenditure, 2022-23", Ministry of Statistics and Programme Implementation, Government of India: 2024.

NSSO. Level and Pattern of Consumer Expenditure, 2011–12, Ministry of Statistics and Program Implementation. 2014.

Panda, H. S., Rout, H. S., & Jakovljevic, M. (2024). Catastrophic health expenditure of inpatients in emerging economies: evidence from the Indian subcontinent. Health Research Policy and Systems, 22(1), 104.

Pandey, A., Kumar, G. A., Dandona, R., & Dandona, L. (2018). Variations in catastrophic health expenditure across the states of India: 2004 to 2014. PLoS One, 13(10), e0205510.

Parmar, D., Strupat, C., Srivastava, S., Brenner, S., Parisi, D., Ziegler, S., ... & De Allegri, M. (2023). Effects of the Indian National Health Insurance Scheme (PM-JAY) on hospitalizations, out-of-pocket expenditures and Catastrophic expenditures. Health Systems & Reform, 9(1), 2227430.

Prinja, S., Chauhan, A. S., Karan, A., Kaur, G., & Kumar, R. (2017). Impact of publicly financed health insurance schemes on healthcare utilization and financial risk protection in India: a systematic review. PloS one, 12(2), e0170996.

Prinja, S., Kumar, S., Sharma, A., Kar, S. S., Tripathi, N., Dumka, N., ... & Aggarwal, A. K. (2022). What is the out-of-pocket expenditure on medicines in India? An empirical assessment using a novel methodology. Health policy and planning, 37(9), 1116-1128.

Royston, G., Pakenham-Walsh, N., & Zielinski, C. (2020). Universal access to essential health information: accelerating progress towards universal health coverage and other SDG health targets. BMJ Global Health, 5(5), e002475.

Sarwal, R., & Kumar, A. (2021). Health insurance for India's missing middle.

Selvaraj, S., Farooqui, H. H., & Karan, A. (2018). Quantifying the financial burden of households' out-of-pocket payments on medicines in India: a repeated cross-sectional analysis of National Sample Survey data, 1994–2014. BMJ open, 8(5), e018020.

Selvaraj, S., Mukhopadhyay, I., Kumar, P., Aisola, M., Datta, P., Bhat, P., ... & Pachauli, C. (2014). Universal access to medicines: evidence from Rajasthan, India. WHO South-East Asia journal of public health, 3(3-4), 289-299.

Sriram, S., & Khan, M. M. (2020). Effect of health insurance program for the poor on out-of-pocket inpatient care cost in India: evidence from a nationally representative cross-sectional survey. BMC Health Services Research, 20, 1-21.

Wagstaff, A., & Doorslaer, E. V. (2003). Catastrophe and impoverishment in paying for health care: with applications to Vietnam 1993–1998. Health economics, 12(11), 921-933.

Wagstaff, A., & Van Doorslaer, E. (1992). Equity in the finance of health care: some international comparisons. Journal of health economics, 11(4), 361-387.

Wagstaff, A., Eozenou, P., & Smitz, M. (2020). Out-of-pocket expenditures on health: a global stocktake. The World Bank Research Observer, 35(2), 123-157.

World Health Organization. (2021). Global expenditure on health: public spending on the rise?. In Global expenditure on health: public spending on the rise?.

Yadav, J., Menon, G. R., & John, D. (2021). Disease-specific out-of-pocket payments, catastrophic health expenditure and impoverishment effects in India: an analysis of National Health Survey data. Applied Health Economics and Health Policy, 19(5), 769-782.

Yadav, J., Allarakha, S., Menon, G. R., John, D., & Nair, S. (2021). Socioeconomic impact of hospitalization expenditure for treatment of noncommunicable diseases in India: a repeated cross-sectional analysis of national sample survey data, 2004 to 2018. Value in Health Regional Issues, 24, 199-213..