

## Household, individual and episodic incidences of illness, hospitalization and health spending in India, 2017-18

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### Abstract

Estimates of morbidity, hospitalization, and out-of-pocket (OOP) payments are often made at an episodic or individual level that overlooks the household feature, though the financial burden is met at the household level. The aim of this paper is to provide the episodic, individual, and household incidences of illness, hospitalization, and health spending in India. The unit-level data from the 25.0 schedule of the 75<sup>th</sup> round of the National Sample Survey (NSS) was used for the analysis. Hospitalization rate, proportion of ailing, and OOP were estimated at the household level. Descriptive statistics and logistic regression were used for the analyses. At the national level, the hospitalization rate based on household was 36.1 compared to 27.1 at the individual and 28.2 at the episodic level. The median expenditure of households with a single episode of hospitalization was ₹5,220, and with multiple episodes of hospitalization was ₹24,060. The average intensity of catastrophic health spending (CHS) of households with a single episode of hospitalization was 16%, compared to 39% for multiple episodes of hospitalization in India. The richest fifth of the population, urban households, households covered with insurance, household with a single chronic disease, and household with two or more elderly people enhanced the risk of household hospitalization and experience of CHS. The incidences of hospitalization on the household level is significantly higher than at the individual level.

**Key words:** Episodic, individual, household, hospitalization, CHS, India

### Introduction

Morbidity, hospitalization, and health spending follow a hierarchical structure: episodic, individual, and households. The episodes are nested within individuals and individuals are nested within households. An individual may likely have repeated ailment/hospitalization in a year, while multiple members may have been hospitalized in a year. When we read into the incidences of hospitalization as an event and its episodes, there remains an underlying complexity relating to the fact that an individual may well be hospitalized with repeat episodes, and similarly, the households that experience hospitalization

too may well be experiencing it multiple times for the same individuals or more than one individual. While the ill health of an individual compromises his/her health and well-being, it simultaneously affects the household well-being. Several measures at episode, individual, and household level has been used to estimate disease burden and impoverishment due to health spending. The estimates of catastrophic health spending and impoverishment are provided at household level, while the out-of-pocket payment (OOP) is often estimated at the episode level. The insurance coverage is estimated at household and individual levels. On the other hand, the proportion of

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ailing and hospitalization are provided at the individual/episodic level. In this context, we provide comprehensive estimates of episodic, individual, and household level assessment of ailment, hospitalization, and health spending in India and outline the discrepancy in these estimates. We propose to incorporate the household estimates in research and policy.

Healthcare utilization and per capita health spending have been increasing across countries over time. In 2018, the per capita health spending varied from 31US\$ in the Democratic Republic of the Congo to 10,624 in Liberia and 12,643 in USA (WHO, 2018); while public spending accounts for three-fifth of health spending in developed countries, it is less than one-fifth in developing countries (WHO, 2018). Household remains the major source of health spending in many developing countries, accounting for three-fifth of health spending (WHO, 2018). In the absence of universal health coverage, household health spending, often synonymous with out-of-pocket payment, is large and catastrophic among poor households and in poor countries. Reduction of catastrophic health spending and universal health coverage are two of the priority SDG indicators (Kieny et al., 2017; Chapman, 2016; WHO, 2018). Despite an increase in financial protection in the form of insurance coverage, catastrophic health spending has been increasing worldwide (Dieleman, 2018; Esteban and Roser, 2020). Literature on catastrophic health spending used household as the unit of analysis that comprises individual and episodic health spending. An Estimated 588 million populations are impoverished due to health spending. The poverty impact of health spending, measured at household

level, is larger in poorer countries and among poorer people (Wagstaff et al., 2018).

In India, household accounts for 69 percent of health spending in 2014 (MoHFW, 2016). In the absence of low insurance coverage and low reimbursement, household health spending is largely out-of-pocket and often assumes catastrophic proportions. An estimated 18 percent of households experienced catastrophic health spending in 2011-12 as against 25 percent in 2014 (Pandey et al., 2018). Similarly, 4-5 percent of households were impoverished due to medical spending, and about 33 million were poor due to medical spending (Garg and Karan, 2009). The high OOP spending and CHS has been acknowledged in central and state government policy documents and policy (MoHFW, 2017). The various insurance schemes of the central government, state government, reimbursement schemes, and private insurance are designed for provisioning at the household level for multiple members of the family. Further for any programme of protection, households remain the point of intervention, and the insurance coverage is also made at the household level.

While CHS and impoverishment due to health spending are largely assessed at the household level, studies on hospitalization and ailment are largely individual or episodic-centric (Pandey et al., 2018; Kastor and Mohanty, 2018; Arsenijevic et al., 2013). Such a mismatch in the unit of analysis fails to aid policy intervention as the burden of ill health, although of the individual, ultimately falls on the household in terms of its associated direct and indirect costs. Hence, an individual magnitude of disease burden may not be apt and adequate for assessment of its financial burden and implication unless

the same is made at the household level to capture the disease burden, health spending, and its consequential implications for poverty and impoverishment.

Studies have suggested that the household with one or more older members (60+ years) with chronic disease were 2.4 to 3.3 times more likely to experience CHS, and household headed by a member covered by the medical insurance for urban residence had experienced a significant pro-rich effect on CHS (Li et al., 2014). In India, 47 percent of multidimensional poor households had incurred catastrophic health spending, while the same remains at 35 percent among non-poor households. The likelihood of catastrophic health spending was 1.56 times more among multidimensional poor households when contrasted against the multidimensional non-poor ones (Mohanty et al., 2017). The household health spending is increasing disproportionately against the overall household expenditure, compromising on its well-being, and the changing pattern of population age structure is contributing towards the health spending in a significant manner (Mohanty et al., 2016). Age, education of the head of household, health insurance, type of health facilities and type of illness, rural areas, large households, and chronically sick household members are found to be significant predictors of the incidences of catastrophic health spending among households (Arsenijevic et al., 2013, Aregbeshola and Khan, 2018; Arsenijevic et al., 2016; Falconi and Bernabé, 2018; Wang et al., 2015; Brinda et al., 2014). The incidences and intensity of catastrophic health expenditure are higher, especially among households in the poorest quintile, households located in rural areas, female-headed households, households with uneducated household heads, households

with unemployed heads, and those without health insurance and the risk of incurring catastrophic health expenditure reduces among households in the richest quintile, households headed by an employed person, households located in urban areas, households with no hospitalized member and households who utilized private hospitals (Cleopatra and Eunice, 2018).

A study from Georgia identifies the major factors determining the financial catastrophic of ill health being hospitalization, household members with chronic illness, and poverty status of household (Gotsadze et al., 2009). The median expenditure per episode of hospitalization due to NCDs was 149 USD, which was 3 times higher among the richest quintile, but the higher prevalence of catastrophic expenditure was among the poorest quintile (Tripathy et al., 2016). A study based on a sample of urban households in Tamil Nadu observes that 84 percent of illness episodes in urban areas accounted for a mean OOP for inpatients and outpatients being higher among higher income households and at a 10 percent threshold level, about 60 of households which used private health services had catastrophic payment (Vaishnavi and Dash, 2009). A study from Turkey found that household head's health insurance was highly associated with catastrophe and, household with preschool child was a protective factor, and household with an elderly or disabled person was at risk of catastrophe (Yardim et al., 2009). The multimorbidity had a positive association with health service use of inpatient and hospitalization and also increased the likelihood of catastrophic health spending (Zhao et al., 2019).

## Data and Methods

### Data

Data from the 25.0 schedule, 75<sup>th</sup> round of the National Sample Survey (NSS), 2018, is used in the analyses. The NSS health survey collects detailed information on the ailment, episode of hospitalization, spell of outpatient visits, and expenditure on health care. Expenditure of natal care was collected as part of hospitalization, while that of antenatal, post-natal and immunization were collected in a reference period of one year. A total of 113,823 households were covered, amounting to 93,925 episodes of hospitalization for 87,310 individuals, involving 81,769 households. Hence, 72,802 households experienced a single episode of hospitalization, whereas against 8,967 households that had multiple episodes of hospitalization.

### Outcome variables

The outcome variables are household hospitalization (shown in model 1) and household catastrophic health spending (shown in model 2). In model 1 the outcome variable is dichotomous and categorized as 'no' for 'household members without hospitalization' and 'yes' for 'any member of households hospitalized'. Similarly, in model 2, the outcome variable is in binary and categorized as 'no' for 'household without catastrophic' and 'yes' for 'household with catastrophic'.

### Predictor variables

The predictor variables are MPCE (monthly per capita consumption expenditure) quintile (*poorest/poorer/middle/rich/richest*), sector (*rural/urban*), household size (*1-4 person/5-7 person/8 person*), household insurance coverage (*yes/no*), household employment status (*lab our/regular wage/self-employed/others*), sex (*male/female*), education of the head of household (*no education/up to*

*primary/middle or secondary/higher secondary*), religion (*Hindu/Muslim/Christian/Sikh/other*), household's member with chronic disease (*without chronic/1 chronic/2 or more chronic*), household having children (*no/1 children/2 or more children*), and household with elderly members (*no/1 elderly/ 2 or more elderly*).

### Statistical analysis

Descriptive statistics, estimation of catastrophic health spending, and logistic regression analyses are used. A brief description of each of the methods used is given below.

### Proportion of ailing

The proportion of ailing was defined as the ratio of estimated number of persons in the population who reported ailing in the 15-days reference period to the estimated population. For estimate of number of persons in the population reported as ailing, we have excluded the childbirth cases, non-usual members, and death cases. The proportion of ailing at the episodic, individual, and household levels is given as follows:

$$\text{Proportion ailing episode} = \frac{\text{Estimated number of episodes in population reported ailing in 15 days reference period}}{\text{Estimated total population}} * 100 \quad (1)$$

$$\text{Proportion ailing individual} = \frac{\text{Estimated number of individuals reported ailing in 15 days reference period}}{\text{Estimated number of individual}} * 100 \quad (2)$$

$$\text{Proportion ailing household} = \frac{\text{Estimated number of households reported ailing in 15 days reference period}}{\text{Estimated number of household}} * 100 \quad (3)$$

### Proportion of hospitalization

The proportion of hospitalization was defined as the estimated spell in population reported as hospitalized to the total population at risk in a reference period of 365-day. For estimate of spell in population

hospitalized we have only excluded the child birth cases. The proportion of hospitalization at the episodic, individual, and household levels is given as follows:

$$\text{Proportion hospitalization episode} = \frac{\text{Estimated spell of episode reported as hospitalization}}{\text{Estimated number of population at risk}} * 100 \quad (4)$$

$$\text{Proportion hospitalization individual} = \frac{\text{Estimated spell of individual reported as hospitalization}}{\text{Estimated individual at risk}} * 100 \quad (5)$$

$$\text{Proportion hospitalization household} = \frac{\text{Estimated spell in household reported as hospitalization}}{\text{Estimated household at risk}} * 100 \quad (6)$$

### Out of pocket expenditure (OOP)

The OOP is defined as the total health expenditure less of reimbursement.

### Catastrophic health spending (CHS)

A household is said to incur catastrophic health expenditure if the OOP on hospitalisation exceeds 40 percent of its capacity to pay (CTP). We have estimated the CHS using the methodology suggested by Xu, 2005 (Xu, 2005). The method of estimating the CHS is given as follows:

$$\text{OOP}_i / \text{CTP}_i > = 0.4_{\text{SEP}}$$

where  $\text{OOP}_i$  is the out-of-pocket expenditure (OOP) on health, and CTP is the capacity to pay for  $i^{\text{th}}$  household. The capacity to pay is defined as household expenditure less subsistence expenditure. We have used subsistence expenditure as the median of food expenditure.

### Logistic regression

The binary logistic regression model was used to understand the significant predictors of household hospitalization and household catastrophic health spending in India. The description of outcome and predictor variables is given below.

The logistic regression equation for the household hospitalization is expressed in Model 1 below:

$$\text{Log} \left( \frac{p}{1-p} \right) = \beta_0 + \beta_1 (\text{MPCE quintile}) + \beta_2 (\text{sector}) + \beta_3 (\text{size}) + \beta_4 (\text{insurance}) + \beta_5 (\text{employment}) + \beta_6 (\text{sex}) + \beta_7 (\text{education}) + \beta_8 (\text{religion}) + \beta_9 (\text{chronic disease}) + \beta_{10} (\text{children}) + \beta_{11} (\text{elderly}) \quad (7)$$

Where  $\beta_i$  ( $i= 1,2,3,\dots,11$ ) are the regression coefficients associated with predictor variables.

The logistic regression equation for the household catastrophic health spending is expressed in Model 2 below:

$$\text{Log} \left( \frac{p}{1-p} \right) = \beta_0 + \beta_1 (\text{MPCE quintile}) + \beta_2 (\text{sector}) + \beta_3 (\text{size}) + \beta_4 (\text{insurance}) + \beta_5 (\text{employment}) + \beta_6 (\text{sex}) + \beta_7 (\text{education}) + \beta_8 (\text{religion}) + \beta_9 (\text{chronic disease}) + \beta_{10} (\text{children}) + \beta_{11} (\text{elderly}) + \beta_{12} (\text{reimbursement}) + \beta_{13} (\text{episode hospitalization}) \quad (8)$$

Where  $\beta_i$  ( $i= 1,2,3,\dots,13$ ) are the regression coefficients and the additional two explanatory variable household reimbursement (yes/no) and episode of hospitalization (single/multiple) and all other variables has the same notation as that of equation 7.

### Results

While reading the incidence of hospitalization corresponding to its three units, i.e., episodes, individuals, and households, we obtained an interesting feature of the same that not only identifies multiple episodes and multiple hospitalizations but also households with one incidence in a year and multiple incidences during the same period. Table 1(a) presents the sample distributions of

episodes, individuals, and household hospitalization in 365 days' reference period and ailments in 15 days' reference period in India. In 2018, 113,823 households reported 93,925 episodes of hospitalization involving 87,310 individuals. About 72 percent of households reported any type of hospitalization (excluding childbirth). While 89 percent of households had a single episode of hospitalization, 11 percent of households had multiple episodes of hospitalization. Similarly, there were 43,112 episodes of ailment in the 15 days' reference period, involving 39,778 individuals from 29,631 households. These figures clearly indicate individuals having multiple episodes of illness as well as households experience multiple incidences of ailments. To make a comparative assessment of this phenomenon across Indian states, Table 1(b) presents the average number of episodes, individuals, and household hospitalization across the states of India during 2017-18. In India, the mean number of episodes of hospitalization per individual was 1.08, and that of household was 1.15. The mean number of individuals hospitalized per household in India was 1.07.

The mean number of episodes of hospitalization per individual was highest in

Kerala (1.20), followed by Lakshadweep (1.19), and Andaman and Nicobar (1.18), and lowest in Meghalaya and Nagaland (1.00 each), followed by Arunachal Pradesh and Manipur (1.01 each) (Fig. 1(a)).

The mean number of episodes of hospitalization per household was highest in Kerala (1.50), followed by Lakshadweep (1.38), and Andaman and Nicobar (1.27), and it is least in Nagaland (1.01), followed by Meghalaya (1.02), and Manipur (1.03). The mean number of individuals hospitalized per household was highest in Kerala (1.25), followed by Lakshadweep (1.16), and Himachal Pradesh (1.11), and lowest in Nagaland (1.00), followed by Meghalaya (1.01), and Assam, Bihar, Daman and Diu, Manipur, Sikkim, and Uttarakhand (1.02 each). Results suggest that the household burden of hospitalization and ailment was higher in Kerala compared to other states of India.

The mean number of episodes of hospitalization per individual was highest in Kerala (1.20), followed by Lakshadweep (1.19), and Andaman and Nicobar (1.18), and lowest in Meghalaya and Nagaland (1.00 each), followed by Arunachal Pradesh and Manipur (1.01 each) (Fig. 1(a)).

**Table 1 (a)** Number of episodes, individuals and household hospitalization in India, 2017-18

Total number of households	113,823
Number of episodic of ailment	43,112
Number of individual ailments	39,778
Number of household ailment	29,631
Number of episodes of hospitalisation	93,925
Number of Individuals hospitalised	87,310
Number of households hospitalised	81,769
Number of households with single episode of hospitalisation	72,802
Number of households with multiple episode of hospitalisation	8,967

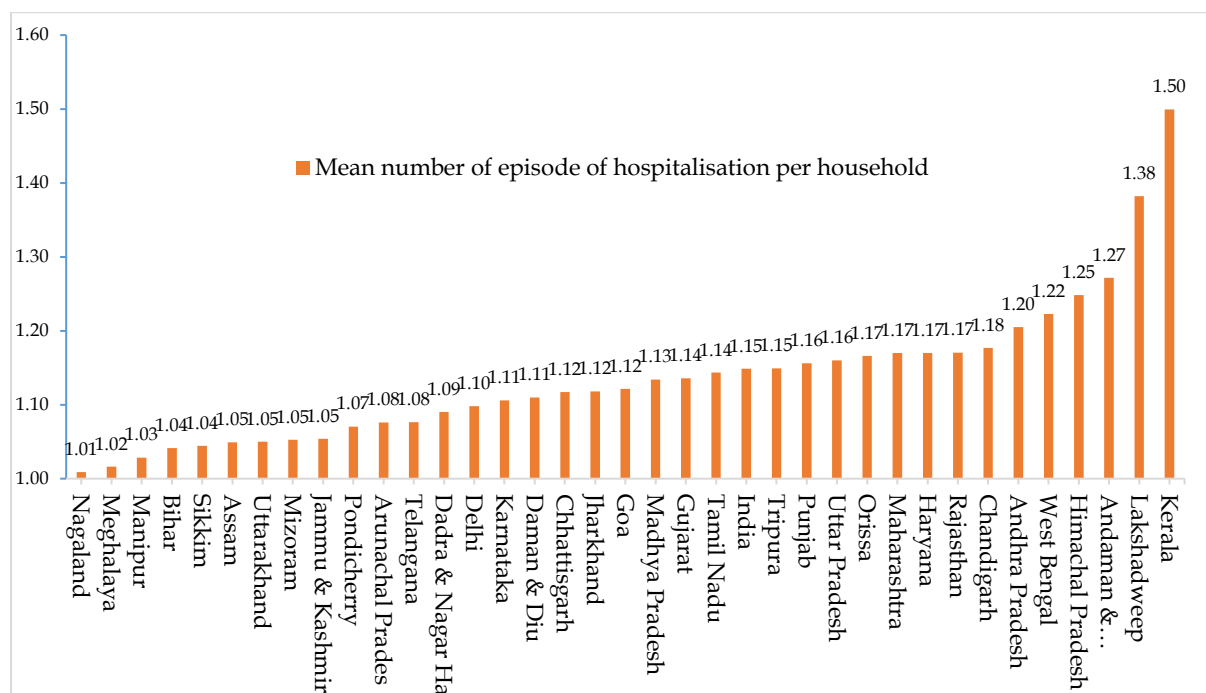
**Table 1 (b):** Average number of episodes, individuals and household's hospitalization by states of India, 2017-18

States/UTs	Number of episodes	Number of individuals	Number of households	Mean number of episodes of hospitalisation per individual	Mean number of episodes of hospitalisation per household	Mean number of individuals hospitalised per household
Andaman & Nicobar	543	459	427	1.18	1.27	1.07
Andhra Pradesh	3753	3384	3115	1.11	1.20	1.09
Arunachal Pradesh	979	972	910	1.01	1.08	1.07
Assam	2760	2673	2631	1.03	1.05	1.02
Bihar	3836	3759	3684	1.02	1.04	1.02
Chandigarh	286	259	243	1.10	1.18	1.07
Chhattisgarh	2382	2258	2132	1.05	1.12	1.06
Dadra & Nagar Haveli	157	151	144	1.04	1.09	1.05
Daman & Diu	101	93	91	1.09	1.11	1.02
Delhi	1053	1018	959	1.03	1.10	1.06
Goa	360	342	321	1.05	1.12	1.07
Gujarat	3495	3280	3077	1.07	1.14	1.07
Haryana	2517	2347	2151	1.07	1.17	1.09
Himachal Pradesh	1900	1691	1522	1.12	1.25	1.11
Jammu & Kashmir	2543	2479	2413	1.03	1.05	1.03
Jharkhand	2272	2109	2032	1.08	1.12	1.04
Karnataka	3880	3736	3509	1.04	1.11	1.06
Kerala	4986	4144	3325	1.20	1.50	1.25
Lakshadweep	199	167	144	1.19	1.38	1.16
Madhya Pradesh	4606	4293	4062	1.07	1.13	1.06
Maharashtra	7587	7051	6485	1.08	1.17	1.09
Manipur	1954	1944	1900	1.01	1.03	1.02
Meghalaya	880	877	866	1.00	1.02	1.01
Mizoram	1179	1153	1120	1.02	1.05	1.03
Nagaland	809	805	802	1.00	1.01	1.00
Orissa	3660	3337	3139	1.10	1.17	1.06
Pondicherry	456	447	426	1.02	1.07	1.05
Punjab	2942	2732	2545	1.08	1.16	1.07
Rajasthan	4304	3942	3677	1.09	1.17	1.07
Sikkim	633	619	606	1.02	1.04	1.02
Tamil Nadu	5727	5314	5009	1.08	1.14	1.06
Telangana	2903	2811	2697	1.03	1.08	1.04
Tripura	1710	1620	1488	1.06	1.15	1.09
Uttar Pradesh	9007	8246	7766	1.09	1.16	1.06
Uttarakhand	1220	1187	1162	1.03	1.05	1.02
West Bengal	6346	5611	5189	1.13	1.22	1.08
<b>All-India</b>	<b>93925</b>	<b>87310</b>	<b>81769</b>	<b>1.08</b>	<b>1.15</b>	<b>1.07</b>

Source: Authors own computation based on, Key Indicators of Social Consumption in India: Health, 25.0 schedule NSS 75<sup>th</sup> Round (July 2017-June 2018)

The mean number of episodes of hospitalization per household was highest in Kerala (1.50), followed by Lakshadweep (1.38), and Andaman and Nicobar (1.27), and it is least in Nagaland (1.01), followed by Meghalaya (1.02), and Manipur (1.03). The mean number of individuals hospitalized per household was highest in Kerala (1.25),

followed by Lakshadweep (1.16), and Himachal Pradesh (1.11), and lowest in Nagaland (1.00), followed by Meghalaya (1.01), and Assam, Bihar, Daman and Diu, Manipur, Sikkim, and Uttarakhand (1.02 each). Results suggest that the household burden of hospitalization and ailment was higher in Kerala compared to other states of India.

**Fig 1(a)** Mean number of episodes of hospitalization per household in India, 2017-18

While analysing ailment burden at a household level, an attempt is made to situate the states in terms of households reporting ailment as against the all-India average. **Figure 1 (b)** shows this relative share of household proportion ailing in states of India compared to the national average. Telangana tops the list in terms of this relative share of the proportion of household reporting ailment (2.34), followed by Punjab (1.56), and Lakshadweep (1.54). Karnataka had the least share of the proportion ailing household (0.07), followed by Haryana (0.13), and Uttar Pradesh (0.31). Similar comparison has been made for the cases of hospitalization reported by household (Figure 1 (c)), exhibiting the relative share of proportion of household hospitalization in India. Kerala had the highest share of the proportion of household hospitalization (1.37), followed by Arunachal Pradesh (1.32), and Goa (1.26). Assam and Bihar both had the least share of proportion of household hospitalization

(0.65 each), followed by Jharkhand (0.73), and Daman & Diu (0.77).

Following the assessment of reported ailment and hospitalization at the household level, we make a comparison of the proportion of ailing and hospitalization by episode, individual, and household in the states of India (see Table 2). At the national level, ailment episodes per hundred remained at 8, against the same for 100 individuals being 7.5, indicating repeat ailments for a few individuals. But this statistic computed at the household level is 25 per 100 households, conveying the concentration of ailments in a quarter of households and a three-fourth of them are free from any ailments. Similar statistics show that Kerala remains the highest proportion of ailing at the episodic (31.4), individual (24.5) and at household (58.8) levels followed by Andhra Pradesh. The least proportion of ailing at the episode, individual, and household level was observed for Meghalaya.



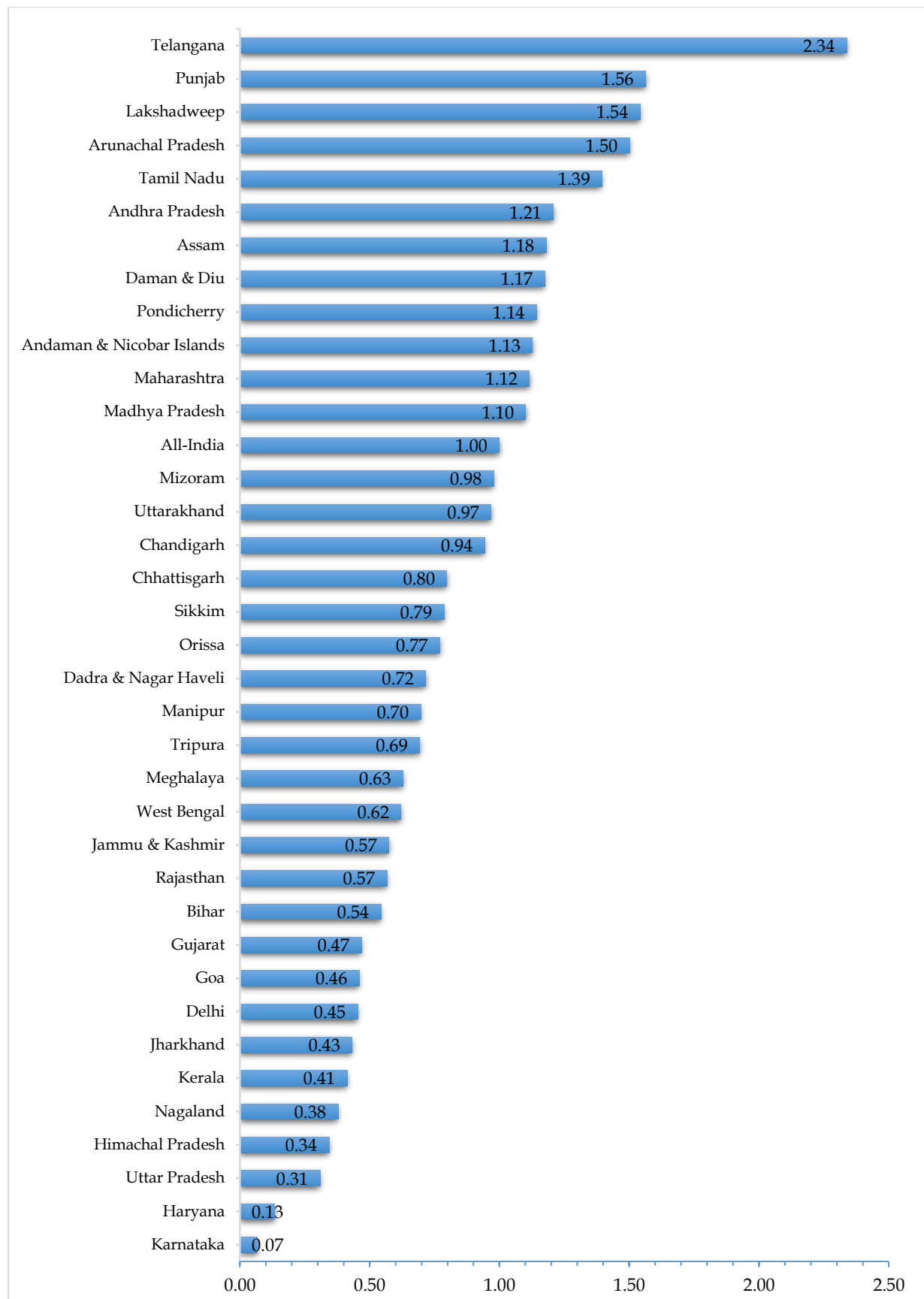
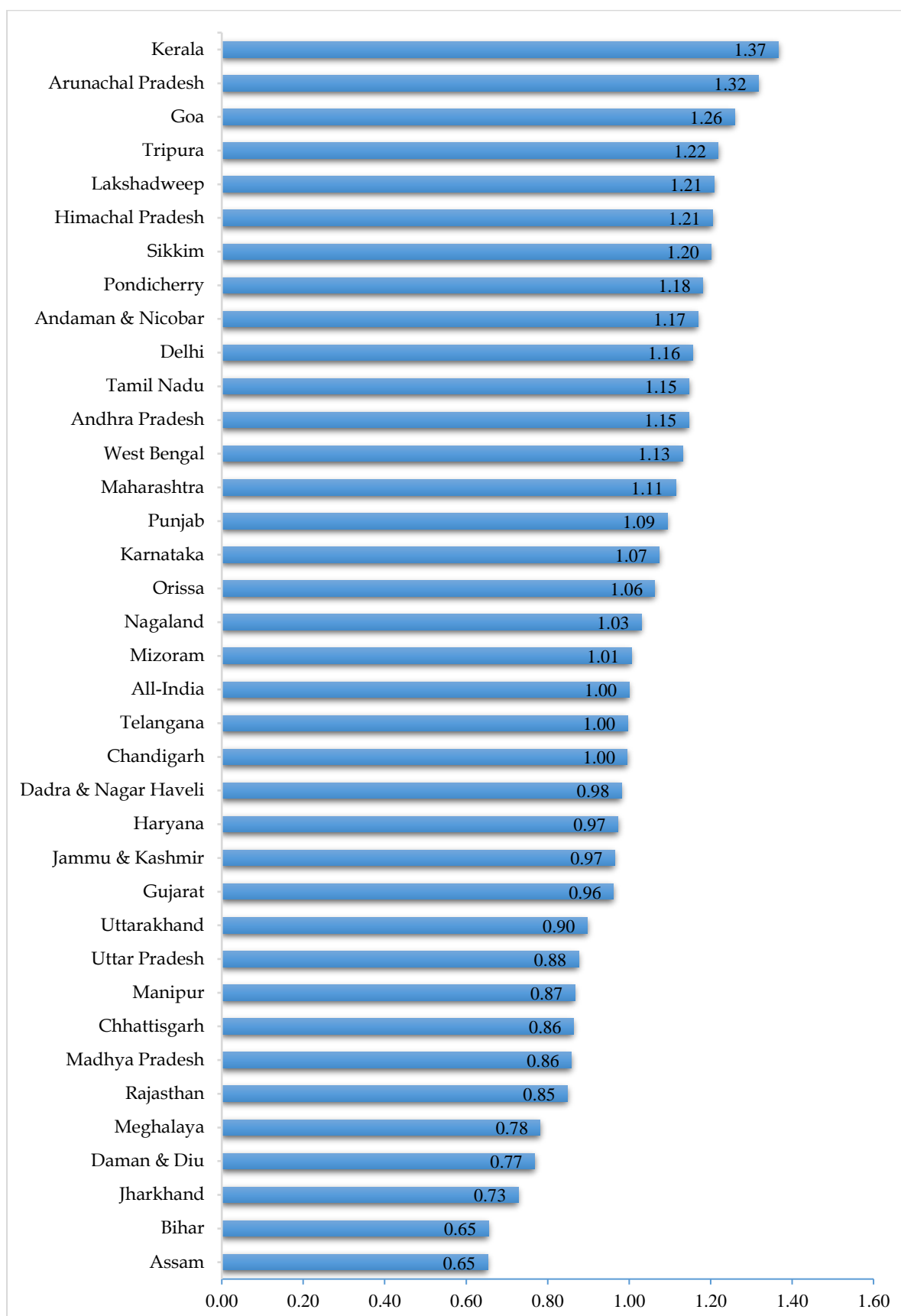
**Fig 1(b)** Relative share of household proportion ailing in India, 2017-18

Fig 1(c) Relative share of household hospitalization rate in India, 2017-18



**Table 2** Proportion of ailing (per 100) and hospitalization rate (per 1000) based on episode, individual and household level by states in India, 2017-18

State/UTs	Proportion ailing based on			Hospitalisation rate based on		
	Episode	Individual	Households	Episode	Individual	Households
Andaman & Nicobar	8.7	8.6	24.4	49.9	49.0	50.5
Andhra Pradesh	16.7	14.2	39.3	38.1	37.2	41.5
Arunachal Pradesh	2.9	2.9	11.8	35.4	35.4	38.6
Assam	2.5	2.5	10.4	9.7	9.3	21.9
Bihar	2.5	2.5	11.4	12.3	12.1	27.9
Chandigarh	9.6	9.4	29.7	19.0	18.2	25.0
Chhattisgarh	5.0	4.9	17.5	19.7	18.5	30.4
Dadra & Nagar Haveli	6.3	6.3	19.4	26.1	26.1	37.2
Daman & Diu	3.3	3.3	9.5	10.0	9.9	18.3
Delhi	6.0	5.9	20.1	32.5	31.1	38.7
Goa	6.1	5.9	19.8	46.2	45.4	40.2
Gujarat	7.0	6.7	24.6	24.1	23.3	32.6
Haryana	5.9	5.9	23.7	28.4	26.5	38.8
Himachal Pradesh	10.6	10.0	30.4	44.0	39.9	44.3
Jammu & Kashmir	7.3	7.1	28.4	23.5	23.2	35.6
Jharkhand	6.7	6.7	27.7	14.1	13.4	25.3
Karnataka	4.5	4.3	14.3	28.3	27.9	36.2
Kerala	31.4	24.5	58.8	104.3	100.5	79.1
Lakshadweep	12.3	10.2	35.1	56.0	54.6	52.9
Madhya Pradesh	4.0	3.9	15.8	21.4	20.7	32.3
Maharashtra	9.1	8.8	28.8	31.2	30.5	37.2
Manipur	1.9	1.9	8.6	20.2	20.1	34.6
Meghalaya	0.4	0.4	1.7	16.5	16.3	32.0
Mizoram	3.4	3.4	14.4	27.6	26.3	40.2
Nagaland	0.8	0.8	3.4	13.5	13.5	19.7
Orissa	9.4	9.2	28.1	32.7	31.3	39.4
Pondicherry	2.4	2.2	7.8	31.1	30.6	38.3
Punjab	11.5	11.2	37.8	30.4	29.1	33.9
Rajasthan	4.9	4.9	18.0	24.9	23.9	36.7
Sikkim	3.4	3.4	11.6	28.1	27.8	34.8
Tamil Nadu	6.4	6.1	17.4	32.4	31.1	36.9
Telangana	5.7	5.6	15.6	22.8	22.4	32.5
Tripura	3.1	3.1	10.9	54.2	53.5	58.7
Uttar Pradesh	7.5	7.4	29.6	22.7	21.1	33.4
Uttarakhand	3.5	3.5	13.7	16.5	15.9	26.6
West Bengal	14.7	13.8	38.8	41.7	39.5	45.4
<b>All-India</b>	<b>8.0</b>	<b>7.5</b>	<b>25.2</b>	<b>28.2</b>	<b>27.1</b>	<b>36.1</b>

Source: Authors own computation based on, key Indicators of Social Consumption in India: Health, 25.0 schedule NSS 75<sup>th</sup> Round (July 2017-June 2018)

Considering the hospitalisation in 365 days' reference period, the same at the episodic, individual, and household level, remains greater compared with that of ailment at 15 days' reference period. In India, the proportion of households hospitalized at the episodic level was 28.2 and 27.1 at the individual level, but as high as 36.1 at household level. Kerala had the highest proportion of hospitalization at episode (104.3), individual (100.5), and household

(79.1). Assam had the lowest proportion of hospitalization at episode (9.7), at individual (9.3), but Daman and Diu had the lowest at household (18.3). This kind of verification of the phenomenon of morbidity as well as hospitalization at varying units, conveys the magnitude and concentration of ill health on the one hand and its ill-being implications on the other. In fact, the emerging figures at the household level are greater merely because the count of households are smaller

compared with the count of individuals but ill health facing households are the ones to be taken into calculus of burden as they ultimately have to be targeted for any proposed protection measures. The rising magnitude of ailment in household units is a real eye-opener towards the assessment of the burden of ill health in the population.

Moving beyond the event and assessing the related expenditure on that count is attempted at the varying unit level. Table 3 (a) presents the average total expenditure, reimbursement, and OOP expenditure by episodic, individual, and household level of hospitalization in the states of India. In India, the average expenditure per episode of hospitalization was ₹18,048, that of the individual was ₹19,541, and ₹21,072 at household level. The average reimbursement per episode of hospitalization was ₹1,492, whereas the average reimbursement per individual and household of hospitalization were ₹1,615 and ₹1,742, respectively. The pattern of OOP was similar to that of overall expenditure, as OOP accounts for 92 percent of household health spending. There remains considerable variation across the states as regards average expenditure, reimbursement, and OOP. The average expenditure per episode of hospitalization was highest in Chandigarh (₹42,803), followed by Punjab (₹27,556), and Maharashtra (₹24,576) and it was the lowest in Dadra and Nagar Haveli (₹5,023) followed by Meghalaya (₹6,303) and Arunachal Pradesh (₹6,407). The average expenditure per individual for hospitalization was also the highest in Chandigarh (₹45,807), followed by Punjab (₹30,791), and Andaman and Nicobar (₹28,046), and it was the lowest in Dadra and Nagar Haveli (₹5,186) followed by Meghalaya (₹6,310), and Arunachal Pradesh (₹6,463). The average

reimbursement of hospitalization per household was the highest in Chandigarh (₹12,894), followed by Delhi (₹7,257), and Mizoram (₹6,128) and it was the lowest in Bihar (₹23) followed by Pondicherry (₹130) and Jammu and Kashmir (₹133). The average OOP per episode of hospitalization was highest in Chandigarh (₹31,478) followed by Punjab (₹25,493), and Telangana (₹22,935) and the lowest in Dadra and Nagar Haveli (₹4,686), followed by Meghalaya (₹4,754), and Mizoram (₹5,705). The average OOP per household of hospitalization was the highest in Chandigarh (₹35,838) followed by Punjab (₹30,907) and Kerala (₹29,332) and the lowest in Meghalaya (₹4,797) followed by Dadra and Nagar Haveli (₹5,098) and Mizoram (₹6,016). The OOP was about 92 percent of the share of household expenditure of hospitalization. Most of the states have OOP expenditure above 90 percent share of household expenditure on hospitalization.

The highest share of OOP as a share of household expenditure was in Bihar (99.75%) and the lowest in Mizoram (49.54%). The OOP was less than 80 percent of health spending in the states of Chandigarh, Delhi, Meghalaya, and Mizoram.

Given the wide variation in the magnitude of expenditure, reimbursement, and OOP expenditure across the states along the three different axes of measurement episodic, individual, and household, a median level is computed for all these to make a comparative assessment of the same across states. Table 3 (b) presents the median total expenditure, reimbursement, and OOP expenditure by episodic, individual, and household level of hospitalization in the states of India.

**Table 3 (a)** Average total expenditure (mean), reimbursement and OOP expenditure (in ₹) by episodic, individual and household level by states on hospitalization in India, 2017-18

States/UTs	Average expenditure per episode	Average expenditure per individual	Average expenditure per household	Average reimbursement per episode	Average reimbursement per individual	Average reimbursement per household	Average OOP per episode of hospitalisation	Average OOP per individual of hospitalisation	Average OOP per household of hospitalisation	OOP as share of household expenditure
Andaman & Nicobar	23993	28046	30117	1838	2149	2307	22154	25898	27810	92.34
Andhra Pradesh	19103	21295	23422	1744	1944	2138	17359	19351	21284	90.87
Arunachal Pradesh	6407	6463	6872	129	130	138	6276	6333	6734	97.99
Assam	11580	11769	11941	853	867	880	10726	10902	11061	92.63
Bihar	8979	9058	9231	22	22	23	8956	9036	9208	99.75
Chandigarh	42803	45807	48732	11325	12120	12894	31478	33687	35838	73.54
Chhattisgarh	17763	18761	19908	1166	1231	1307	16597	17529	18601	93.44
Dadra & Nagar Haveli	5023	5186	5465	337	348	367	4686	4837	5098	93.28
Daman & Diu	17117	18214	18602	1447	1539	1572	15670	16675	17030	91.55
Delhi	24356	25001	27100	6522	6695	7257	17834	18306	19843	73.22
Goa	16021	19214	21539	2211	2651	2972	13810	16563	18567	86.20
Gujarat	16024	17135	18653	2019	2159	2350	14006	14977	16304	87.40
Haryana	22278	23575	25666	2959	3132	3409	19318	20443	22256	86.72
Himachal Pradesh	20056	22726	25549	1660	1881	2115	18396	20845	23435	91.72
Jammu & Kashmir	9479	9656	9879	127	130	133	9352	9527	9746	98.66
Jharkhand	14498	15423	16074	898	955	996	13600	14467	15078	93.81
Karnataka	17919	18656	19863	1858	1934	2059	16062	16722	17804	89.63
Kerala	21722	26395	32216	1944	2363	2884	19777	24033	29332	91.05
Lakshadweep	16742	19481	21986	801	932	1052	15936	18549	20934	95.21
Madhya Pradesh	11658	12391	13170	380	403	429	11278	11987	12741	96.74
Maharashtra	24576	26274	28499	2612	2793	3029	21964	23481	25469	89.37
Manipur	15800	15866	16255	210	211	216	15589	15655	16039	98.67
Meghalaya	6303	6310	6360	1549	1551	1563	4754	4759	4797	75.43
Mizoram	11516	11723	12144	5811	5916	6128	5705	5807	6016	49.54
Nagaland	9742	9774	9891	299	300	304	9443	9474	9587	96.93
Orissa	12481	13652	14556	606	662	706	11875	12990	13849	95.15
Pondicherry	18932	19253	20118	122	124	130	18810	19129	19988	99.36
Punjab	27556	30791	33408	2063	2305	2501	25493	28486	30907	92.51
Rajasthan	13933	15213	16389	886	968	1042	13046	14246	15347	93.64
Sikkim	10215	10460	10618	1180	1208	1227	9035	9251	9391	88.45
Tamil Nadu	19065	20702	21999	1425	1547	1644	17639	19154	20354	92.52
Telangana	24551	25040	26406	1616	1648	1738	22935	23392	24668	93.42
Tripura	8159	8720	9366	359	383	412	7801	8337	8954	95.60
Uttar Pradesh	19905	21339	22826	684	733	784	19221	20606	22042	96.56
Uttarakhand	19749	20234	21151	3269	3349	3501	16479	16885	17650	83.45
West Bengal	16426	18608	20206	1996	2261	2455	14429	16347	17750	87.85
<b>All-India</b>	<b>18048</b>	<b>19541</b>	<b>21072</b>	<b>1492</b>	<b>1615</b>	<b>1742</b>	<b>16556</b>	<b>17926</b>	<b>19330</b>	<b>91.74</b>

Source: Authors own computation based on, key Indicators of Social Consumption in India: Health, 25.0 schedule NSS 75<sup>th</sup> Round (July 2017-June 2018)

The median estimates were much lower than the mean value suggesting a negatively skewed distribution of these expenditures and the averages, representing a distorted scene of the heterogeneity in health spending across regions. Another additional feature that emerges from this analysis is that among the three axes, the magnitude appears to be greater, conveying the real extent of the burden as ultimately, the household is the one that accommodates the expenditure within its budget.

Retaining the focus on household as the unit of analysis, an attempt is made to compare expenditures, OOP expenditures, and incidences of catastrophic expenditure among households with single episode and multiple episodes of ailments. Table 4 presents the total expenditure, OOP, and intensity of catastrophic health spending (CHS) of the households with single and multiple episodes in India. In India, the average total expenditure of a household with a single episode of hospitalization was ₹16,645, while household with multiple episodes of hospitalization was ₹53,654. This conveys the episodic impact of expenditure, and the differences are quite large with a very small share of households with experience of multiple episodes of hospitalization. Delhi (₹26,779) residents experience the highest average total expenditure of household with a single episode of hospitalization, whereas Punjab reports the highest expenditure with multiple episodes of hospitalization that was ₹78,262. Both expenditure and OOP on health are the lowest in Arunachal Pradesh for both on account of single (₹6,371) and multiple (₹13,849) episodes of hospitalization. The episodic analysis informs very clearly as to the average OOP of households with a single episode of

hospitalization being quite low (₹15,263) as against multiple episodes of hospitalization i.e., ₹49,268 at the national level. It was the highest in Punjab for both single episode (₹23,814) and multiple episode (₹71,370) of hospitalization and the lowest in Arunachal Pradesh for both single episode (₹6,223) and multiple episodes (₹13,849). Given the extent of OOP expenditure being quite variant between single episode and multiple episodes, it is natural that the catastrophic aspect too is episodic in nature. The average intensity of CHS among households with single episode of hospitalization was 16 percent, whereas it was 39 percent among households with multiple episodes of hospitalization in India. In this regard, for single episodic instances Maharashtra records the highest intensity of CHS (24%), and the state of West Bengal reports the highest intensity of CHS (72%) in case of multiple episodes of hospitalization. Although the pattern of incidences of CHS is consistent between single episode and multiple episodic instances, states like Odisha has the lowest intensity of CHS for both single (1%), as well as multiple episodes (7%) of hospitalization. The inferences unfolding here relate to overlooking of the episodic feature of hospitalization that differentiates the risk intensity of CHS to a large extent. Further, with a smaller share of households with multiple episodes of hospitalization and greater intensity of CHS along with a large majority of households with single episodes of hospitalization and lesser intensity of CHS, it is desirable to consider this disparity in aggregate assessment of incidences and intensity of CHS. Based on the aforementioned analysis, it can be said that every household experiencing hospitalization is not equally likely to face CHS as it depends upon the episodes of hospitalization.

**Table 3 (b)** Median total expenditure, reimbursement and OOP expenditure by episodic, individual and household level (in ₹) by states on hospitalization in India, 2017-18

States/UTs	Median expenditure per episode	Median expenditure per individual	Median expenditure per household	Median OOP per episode of hospitalisation	Median OOP per individual of hospitalisation	Median OOP per household for hospitalisation	OOP as share of household expenditure
Andaman & Nicobar	1200	1300	1620	1200	1780	1600	98.77
Andhra Pradesh	9280	10000	10700	8100	10350	10000	93.46
Arunachal Pradesh	4300	4300	4500	4100	4350	4500	100.00
Assam	3200	3200	3200	3100	3100	3050	95.31
Bihar	3600	3600	3600	3600	3700	3600	100.00
Chandigarh	7600	7900	8310	6500	5700	7000	84.24
Chhattisgarh	2500	2530	2600	2200	2210	2200	84.62
Dadra & Nagar Haveli	710	710	710	650	630	650	91.55
Daman & Diu	3580	4160	3580	3580	4900	3580	100.00
Delhi	3300	3300	4100	3000	3400	3400	82.93
Goa	4200	4800	4800	4000	4800	4800	100.00
Gujarat	6450	6600	7000	5800	6400	6300	90.00
Haryana	9000	9000	9200	8100	8570	8340	90.65
Himachal Pradesh	6510	6470	7250	5900	7000	7000	96.55
Jammu & Kashmir	4250	4300	4320	4200	4600	4300	99.54
Jharkhand	3705	3550	3471	3600	3250	3320	95.65
Karnataka	8600	8780	9330	8000	8600	8700	93.25
Kerala	8500	10150	12950	7701	12450	11800	91.12
Lakshadweep	1150	1480	1720	1150	3880	1720	100.00
Madhya Pradesh	2020	2000	2075	2000	2100	2020	97.35
Maharashtra	10100	10200	10400	9400	9960	9900	95.19
Manipur	8100	8150	8160	8000	8000	8000	98.04
Meghalaya	3050	3050	3000	2050	2050	2050	68.33
Mizoram	4400	4400	4500	2260	2300	2300	51.11
Nagaland	5500	5500	5600	5300	5500	5350	95.54
Orissa	4500	4500	4700	4450	4750	4650	98.94
Pondicherry	2350	2350	2350	2350	2350	2350	100.00
Punjab	12600	12500	13800	11500	13040	12600	91.30
Rajasthan	4100	3950	4060	4000	3600	3950	97.29
Sikkim	5200	5200	5300	5000	5500	5000	94.34
Tamil Nadu	4700	5050	5320	4550	5320	5150	96.80
Telangana	13235	13400	13520	12000	12000	12040	89.05
Tripura	3300	3500	3600	3250	3700	3550	98.61
Uttar Pradesh	6800	6740	7000	6730	7100	6780	96.86
Uttarakhand	6830	6800	6800	6500	6300	6500	95.59
West Bengal	3350	3500	3800	3100	3700	3600	94.74
<b>All-India</b>	<b>5900</b>	<b>6000</b>	<b>6300</b>	<b>5500</b>	<b>5990</b>	<b>5930</b>	<b>94.13</b>

Source: Authors own computation based on, key Indicators of Social Consumption in India: Health, 25.0 schedule NSS 75<sup>th</sup> Round (July 2017-June 2018)

Apart from describing the regional pattern of the expenditure, OOP, and incidences of CHS, it is also pertinent to make a characteristic verification of the same. **Table 5** shows the total expenditure, OOP, and intensity of catastrophic health spending (CHS) of the households with single and multiple episodes by background characteristics in India. The richest MPCE quintile had higher average expenditure on health at the household level for both single episode (₹25,553) and multiple episodes (₹76,674) of hospitalization compared to the poorest MPCE quintile. Urban households had the higher average household expenditure with single episode (₹24,659) and multiple episodes (₹64,027) of hospitalization compared to rural household. The household covered with any insurance spends more for both single and multiple episodes of hospitalization than households without any insurance. The elderly household has the higher total expenditure of household for both single and multiple episodes of hospitalization. The better educated household had a higher total expenditure of household for both single and multiple episodes of hospitalization. Sikh community had the higher total expenditure of households with single and multiple episodes of hospitalization. The OOP of households for both single and multiple episodes of hospitalization was higher in Urban households, smaller households (1 to 4 members), elderly households, higher educated households, and Sikh community. But, it was higher in female-headed households and household covered with any insurance scheme for a single episode of hospitalization, whereas it was higher in households without insurance and male-headed households for multiple episodes of hospitalization. The poorest MPCE quintile had the higher intensity of CHS of

households with both single episode (28%) and multiple episodes (54%) of hospitalization compared to richest MPCE quintile. The rural and smaller household (1 to 4 members), household without insurance, and uneducated households had higher intensity of CHS of households for both single and multiple episodes of hospitalization.

This household characterization of the magnitude of expenditure on single and multiple episodes of hospitalization along with the extent of OOP as well as the intensity of CHE, indicates a pattern wherein the expenditures are roughly three times more in case of multiple episodes as against the single episodes and the intensity of CHE is also two times more in case of multiple episodes of hospitalization. While there is an expected systematic pattern of expenditure in keeping with characteristic features, one striking feature emerging from such characterization defines vulnerability attributes of households and the notable one being regular wage households are less vulnerable compared with other categories of households. Such an exposition offers a clue in relation to health-shock absorbing differences between households with varying sources of income and livelihood.

Following the characterization of hospitalization and its consequential CHE, the two outcomes have been modelled with all these variables together in a logistic regression model. The results are presented in **Table 6** in terms of the odds ratio of household hospitalization and catastrophic health spending (CHS) by background characteristics in India. The household with the richest MPCE quintile was 1.4 times more likely to be hospitalized compared to the poorest MPCE quintile.



**Table 4** Total expenditure, out of pocket expenditure (OOP) and Intensity of catastrophic health spending (CHS) (in ₹) in the household with single and multiple episode by states in India, 2017-18

States/UTs	Total expenditure						Out of pocket expenditure (OOP)						Intensity of Catastrophic health spending (CHS)			
	Households with			Households with			Households with			Households with			Households with		Households with	
	Only one episode of hospitalisation (mean)	Only one episode of hospitalisation (median)	N	Multiple episode of hospitalisation (mean)	Multiple episode of hospitalisation (median)	N	Only one episode of hospitalisation (mean)	Only one episode of hospitalisation (median)	N	Multiple episode of hospitalisation (mean)	Multiple episode of hospitalisation (median)	N	Only one episode of hospitalisation (mean)	N	Multiple episode of hospitalisation (mean)	N
Andaman & Nicobar	23982	1200	346	59373	4100	81	22529	1200	346	52992	4100	81	6.78	346	16.75	81
Andhra Pradesh	18577	9355	2645	49545	29750	470	16888	8730	2645	44985	21630	470	10.97	2645	47.87	470
Arunachal Pradesh	6371	4220	845	13849	9600	65	6223	4050	845	13849	9600	65	10.43	845	42.39	65
Assam	10378	3100	2536	72641	29500	95	9597	2950	2536	67904	29500	95	7.78	2536	16.19	95
Bihar	8283	3500	3556	45972	24500	128	8261	3500	3556	45911	24500	128	11.08	3556	32.73	128
Delhi	26779	4950	885	30211	3400	74	19699	3300	885	21235	3400	74	15.63	885	63.23	74
Gujarat	15067	6160	2764	45452	20880	313	13125	5700	2764	40052	16910	313	12.96	2764	19.41	313
Haryana	21483	8100	1875	56358	31300	276	18291	7100	1875	51353	28000	276	4.86	1875	14.66	276
Himachal Pradesh	18392	4920	1231	55998	27810	291	17070	4500	1231	50514	25236	291	13.67	1231	49.04	291
Jammu & Kashmir	9290	4200	2311	26944	12290	102	9155	4200	2311	26864	12290	102	2.50	2311	10.07	102
Jharkhand	11908	2965	1851	62779	22430	181	11611	2795	1851	53949	21570	181	10.89	1851	22.09	181
Karnataka	18187	8700	3211	37262	20140	298	16182	8000	3211	34644	19270	298	2.71	3211	12.20	298
Kerala	22864	9500	2326	55236	26280	999	20995	8180	2326	49855	23470	999	10.59	2326	46.62	999
Madhya Pradesh	10542	1710	3648	37762	13930	414	10165	1700	3648	36845	13820	414	14.08	3648	50.05	414
Maharashtra	22289	9130	5612	70884	33400	873	20096	8500	5612	62151	27000	873	24.28	5612	57.91	873
Orissa	11429	4100	2779	39849	19050	360	10765	4000	2779	38798	18840	360	0.81	2779	7.30	360
Punjab	25545	11570	2243	78262	39300	302	23814	10700	2243	71370	37500	302	18.95	2243	42.21	302
Rajasthan	12632	3240	3214	42782	24100	463	11680	3150	3214	41103	22950	463	14.45	3214	33.39	463
Tamil Nadu	18779	4560	4482	47597	19800	527	17346	4500	4482	44272	19385	527	4.99	4482	28.80	527
Telangana	22896	12000	2526	77000	62307	171	21107	11100	2526	75996	59850	171	13.47	2526	34.21	171
Tripura	7149	3300	1313	25276	7500	175	6888	3250	1313	23781	7500	175	14.88	1313	33.20	175
Uttar Pradesh	17654	5600	6852	67503	38260	914	16983	5400	6852	65740	37380	914	9.63	6852	15.21	914
West Bengal	15227	3188	4324	44880	11400	865	13489	2950	4324	38869	10500	865	20.87	4324	71.98	865
<b>All-India</b>	<b>16645</b>	<b>5220</b>	<b>72802</b>	<b>53654</b>	<b>24060</b>	<b>8967</b>	<b>15263</b>	<b>4910</b>	<b>72802</b>	<b>49268</b>	<b>21900</b>	<b>8967</b>	<b>16.00</b>	<b>72802</b>	<b>39.00</b>	<b>8967</b>

**Note\*:** We have excluded the following states and union territories i.e. Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Goa, Lakshadweep, Manipur, Meghalaya, Mizoram, Nagaland, Pondicherry, Sikkim, Uttarakhand due to smaller sample size (less than 50).

Source: Authors own computation based on, key Indicators of Social Consumption in India: Health, 25.0 schedule NSS 75<sup>th</sup> Round (July 2017-June 2018)

**Table 5** Total expenditure, out of pocket expenditure (OOP) and Intensity of catastrophic health spending (CHS) (in ₹) in the household with single and multiple episode by the background characteristics in India, 2017-18

Background characteristics	Total expenditure		Out of pocket expenditure (OOP)		Intensity of Catastrophic health spending (CHS)	
	Households with		Households with		Households with	
	Only one episode of hospitalisation	Multiple episode of hospitalisation	Only one episode of hospitalisation	Multiple episode of hospitalisation	Only one episode of hospitalisation	Multiple episode of hospitalisation
<b>MPCE Quintile</b>						
Poorest	9698	32491	9497	31675	27.73	54.43
Poorer	13850	38390	13273	36592	15.49	42.57
Middle	14951	51697	14303	48558	14.83	36.73
Rich	16866	53098	15441	49610	12.28	32.28
Richest	25553	76674	22025	67187	10.06	35.10
<b>Sector</b>						
Rural	13047	47849	12621	45963	17.65	44.98
Urban	24659	64027	21147	55174	11.28	28.62
<b>Household Size</b>						
1-4	18317	55989	16415	49745	19.80	44.98
5-7	15250	52850	14175	48660	13.30	37.83
8	15676	50950	15021	49656	9.68	30.73
<b>Household Insurance covered</b>						
No	15259	52452	15231	52253	16.32	41.55
Yes	22262	56567	15390	42034	13.06	33.18
<b>Any elderly member in the household</b>						
No elderly	13878	47483	12827	44362	14.61	39.98
Elderly	23876	61946	21630	55860	18.46	37.94
<b>Household employment type</b>						
Labour	10724	32067	10482	30458	16.13	38.92
Regular wage	21930	60891	18467	52190	12.68	32.25
Self employed	16431	56159	15496	53555	15.59	40.45
Others	27881	90416	24346	77889	24.91	51.76
<b>Age of head of household</b>						
less than 30	8733	34308	8104	32772	14.85	41.32
30-44	14075	44725	13104	43085	14.36	37.50
45-59	17296	53134	15831	48672	14.88	40.28
60+	25243	66447	22841	59305	19.84	38.21
<b>Sex</b>						
Male	16440	53899	15084	49410	15.22	38.69
Female	18549	51744	16920	48161	19.94	42.37
<b>Education of head of household</b>						
No education	12219	38448	11929	37282	16.57	40.96
up to Primary	13910	46168	13522	43525	15.38	38.90
Middle/secondary	16604	58494	15359	54041	15.46	38.17
Higher secondary	27034	84093	22469	71280	15.04	37.90
<b>Religion</b>						
Hindu	16847	55079	15380	50362	16.24	40.53
Muslim	13708	41392	13146	39152	13.87	33.94
Christian	21159	63782	18326	56815	12.26	34.87
Sikh	23805	69053	21950	67359	8.52	34.27
Others	21031	68301	18959	60133	16.55	39.76
<b>Total</b>	<b>16645</b>	<b>53654</b>	<b>15263</b>	<b>49268</b>	<b>15.68</b>	<b>39.11</b>

Source: Authors own computation based on, key Indicators of Social Consumption in India: Health, 25.0 schedule NSS 75<sup>th</sup> Round (July 2017-June 2018)

**Table 6** Odds ratio of hospitalization and catastrophic health spending (CHS) of households by background characteristic in India, 2017-18

Background characteristics	Household Hospitalization			Catastrophic Health Spending (CHS)		
	Model-I			Model-II		
	OR	SE	95% CI	OR	SE	95% CI
<b>MPCE Quintile</b>						
Poorest	1.000			1.000		
Poorer	<b>1.135***</b>	0.026	1.085-1.188	<b>0.442***</b>	0.013	0.417-0.468
Middle	<b>1.268***</b>	0.030	1.210-1.328	<b>0.318***</b>	0.010	0.299-0.338
Rich	<b>1.272***</b>	0.030	1.215-1.332	<b>0.229***</b>	0.007	0.215-0.244
Richest	<b>1.399***</b>	0.033	1.336-1.465	<b>0.159***</b>	0.005	0.149-0.17
<b>Sector</b>						
Rural	1.000			1.000		
Urban	<b>1.085***</b>	0.017	1.052-1.12	<b>0.414***</b>	0.009	0.396-0.433
<b>Household Size</b>						
1-4	1.000			1.000		
5-7	<b>1.36***</b>	0.021	1.319-1.403	<b>0.534***</b>	0.012	0.511-0.558
8	<b>1.488***</b>	0.044	1.404-1.578	<b>0.356***</b>	0.014	0.330-0.384
<b>Household Insurance covered</b>						
No	1.000			1.000		
Yes	<b>1.262***</b>	0.023	1.218-1.306	<b>0.915***</b>	0.023	0.871-0.96
<b>Household employment type</b>						
Labour	1.000			1.000		
Regular wage	<b>1.119***</b>	0.026	1.069-1.17	<b>1.196***</b>	0.039	1.122-1.275
Self employed	<b>1.09***</b>	0.020	1.052-1.13	<b>1.172***</b>	0.030	1.115-1.233
Others	<b>0.819***</b>	0.025	0.771-0.87	<b>1.783***</b>	0.077	1.639-1.94
<b>Sex</b>						
Male	1.000			1.000		
Female	0.957	0.022	0.915-1.002	<b>1.223***</b>	0.040	1.148-1.304
<b>Education of head of household</b>						
No education	1.000			1.000		
up to Primary	<b>1.084***</b>	0.022	1.041-1.128	1.017	0.029	0.962-1.075
Middle/secondary	<b>1.108***</b>	0.022	1.065-1.152	<b>1.108***</b>	0.030	1.049-1.169
Higher secondary	1.001	0.024	0.956-1.049	<b>1.387***</b>	0.045	1.301-1.479
<b>Religion</b>						
Hindu	1.000			1.000		
Muslim	<b>0.909***</b>	0.019	0.873-0.947	<b>0.896***</b>	0.027	0.845-0.95
Christian	<b>0.808***</b>	0.022	0.766-0.852	<b>0.574***</b>	0.027	0.524-0.629
Sikh	0.998	0.050	0.905-1.1	0.873	0.068	0.749-1.017
Others	<b>0.674***</b>	0.030	0.618-0.735	<b>0.705***</b>	0.053	0.609-0.817
<b>Household member with chronic disease</b>						
Without chronic disease	1.000			1.000		
with 1 chronic disease	<b>1.552***</b>	0.037	1.481-1.627	<b>1.818***</b>	0.051	1.720-1.92
with 2 or more chronic disease	<b>1.515***</b>	0.064	1.395-1.646	<b>1.855***</b>	0.086	1.694-2.031
<b>Household with children</b>						
No children	1.000			1.000		
with 1 child	<b>2.973***</b>	0.054	2.869-3.081	<b>0.810***</b>	0.019	0.774-0.847
with 2 or more children	<b>3.451***</b>	0.083	3.291-3.618	<b>0.567***</b>	0.017	0.534-0.602
<b>Household with elderly member</b>						
without elderly	1.000			1.000		
with 1 elderly	<b>1.391***</b>	0.028	1.337-1.446	<b>1.397***</b>	0.036	1.328-1.47
with 2 or more elderly	<b>1.614***</b>	0.044	1.529-1.703	<b>1.654***</b>	0.055	1.551-1.765
<b>Constant</b>	<b>0.879***</b>	0.023	0.836-0.925	<b>0.897***</b>	0.031	0.838-0.961

Note: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$  (indicates statistically significant)

Source: Authors own computation based on, key Indicators of Social Consumption in India: Health, 25.0 schedule NSS 75<sup>th</sup> Round (July 2017-June 2018)

The urban household (OR=1.085, SE=0.017), household with more than 8 members (OR=1.488, SE=0.044), households covered with insurance (OR=1.262, SE=0.023), household with single chronic disease (OR=1.552, SE=0.037), household with 2 or more children (OR=3.451, SE=0.083) and household with 2 or more elderly (OR=1.614, SE=0.044) were the highly significant contributing factors for household hospitalization and Christian household (OR=0.808, SE=0.022) is the only significant factor which was less likely to hospitalization. In the case of CHS, the female-headed household (OR=1.223, SE=0.040), higher educated head of household (OR=1.387, SE=0.045), household with 2 or more chronic diseases (OR=1.855, SE=0.086) and household with 2 or more elderly members (OR=1.654, SE=0.055) were highly significant and more likely to incur catastrophic health spending (CHS). The richest MPCE quintile (OR=0.159, SE=0.005), urban household (OR=0.414, SE=0.009), household covered with insurance (OR=0.915, SE=0.023), Christian household (OR=0.574, SE=0.027) and household with 2 or more children (OR=0.567, SE=0.017) were less significant for incurring catastrophic health spending (CHS).

### Discussion and Conclusion

This is a maiden attempt at providing estimates of hospitalisation and the proportion of ailing at the household level in India. We have analysed the latest available data that covered over 113,823 households in India. The following are the salient findings of the study.

At the national level, the average number of episodes of hospitalisation per household is 1.15 and that of individual is 1.08, indicating the prevalence of multiple episodes of hospitalization within a given household.

The mean number of episodes of hospitalisation was as high as 1.5 in Kerala followed by Lakshadweep (1.38) and Andaman and Nicobar (1.27). It was close to 1 in the states of Nagaland, Meghalaya, Manipur. Second, the proportion of ailing at household level is significantly higher than the estimates at the individual and episodic level. At the national level, the proportion of ailing at the household level is about three times higher (25.2 per 100) compared to the episodic (8.0 per 100) and individual (7.5 per 100) level. This comparison offers a fresh understanding of ailment prevalence that is quite high when assessed at the household level, which has a wide variation across the states. Similarly, the computation of hospitalization rates against the three different bases, depicts a similar pattern with 36.1 per 1000 at household levels followed by episodic (28.2 per 1000) and individual level (27.2 per 1000).

The state of Kerala has the highest hospitalization rate at household (79.1 per 1000) levels, compared to individual (100.5 per 1000) and episodic level (104.3 per 1000). While regional comparison of hospitalization rates at the household level informs on the differential burden of hospitalization care among households, the variation in the episodic rates represent the severity that warrants hospitalization. The least in this regard is represented by Assam and a few other north-eastern states, which could possibly be conditioned by the health infrastructure and access to availing the same. Besides the outcome, the associated expenditure too depicts variation across the three bases with the same at the household level being the largest in contrast with individual and episodes. Fourth, in India, the mean total expenditure at the household level was 17 percent higher than episodic level (₹18,048 vs ₹21,072). The OOP

percentage share of household is almost stagnant across the states. Fifth, the mean total expenditure for single episode of hospitalization is ₹16,645 and it is more than three times higher for multiple episodes of hospitalization (₹53,654). But in case of median expenditure, it is more than four times higher for multiple episodes of hospitalization. The mean OOP for single episode of hospitalization is ₹15,263 and for multiple episodes of hospitalization is ₹49,268. But, the median OOP for multiple episodes of hospitalization (₹21,900) is more than three times higher than single episode of hospitalization. The mean intensity of catastrophic health spending (CHS) for a single episode of hospitalization is ₹16.00 and it is more than two times higher for multiple episodes of hospitalization (₹39.00). Sixth, the richest MPCE quintile, urban household, household covered with insurance, households with a single chronic disease, households with 2 or more children, and households with 2 or more elderly were highly significant contributing factors for household hospitalization and incurring catastrophic health spending (CHS).

This exercise of assessing the prevalence of ailment, its consequent hospitalization and associated expenditure on account of the same becomes relevant on various counts. First, the assessment at the individual level is not a true representation of burden as ailment burden is as much for the individual, it is equally if not more for the household. Given the fact that multiple individuals of the same households may be sick and there can be numerous episodes of the sickness the assessment made here is undoubtedly relevant for the assessment of burden. The revealing magnitudes at the household level being larger conveys the significance of such accounting and ultimately offers an eligible comparison across regions.

We provide some plausible explanations in support of the findings. The high hospitalisation at the household level is due to multiple member's hospitalisation and multiple episodic hospitalisation. It also associated with the age structure of the population. As evident the average number of hospitalisations per household is higher in Kerala and some of the states with advanced stages of demographic transition. This also explains the high CHS incurred in the state of Kerala. Often, we found Kerala has the highest CHS and possibly, the frequent hospitalisation is the reason for the high CHS in the state.

Based on the analyses, we suggest that the health research should provide the estimates at the household level along with episodic and individual estimates. Because, any possible intervention towards protection of risks and vulnerabilities arising out of ailment experience and hospitalization has to be made at the household level. Given the point of contact being household in each and every state intervention, the proposed assessment here could be immensely useful for policy and programme.

#### **List of abbreviations**

OOP: Out-of pocket  
 NSS: National sample survey  
 CHS: Catastrophic health spending  
 SDGs: Sustainable development goals  
 NCDs: Non-communicable diseases  
 CTP: Capacity to pay  
 MPCE: Monthly per capita consumption expenditure  
 OR: Odds ratio

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**Ethics approval and consent to participate:**

Not applicable as this study is based on secondary data source.

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**Author's contribution:** USM and SKM: Conceptualization of the study; SKM and US: formal analysis and interpretation; USM, SKM and US: drafting the manuscript; SKM, USM and US: critical revision of the manuscript for important intellectual content; The authors read and approved the final manuscript.

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