

## SHORT ARTICLE

# Assessing Household Catastrophic Healthcare Expenditure and its Associated Factors: A Study in a North-Eastern State of India

Nilutpal Neog<sup>1</sup>, Protim Pranjal Buragohain<sup>2</sup>, Karabi Biswas<sup>3</sup>

<sup>1,2</sup>Department Economics, Dibrugarh University, Assam

<sup>3</sup>Department of Economics, Sarupathar College, Assam

### CORRESPONDING AUTHOR

Dr Nilutpal Neog, Department of Economics, Dibrugarh University, Assam 786004

Email: [nilutpal900@gmail.com](mailto:nilutpal900@gmail.com)

### CITATION

Neog N, Buragohain PP, Biswas K. Assessing Household Catastrophic Healthcare Expenditure and its Associated Factors: A Study in a North-Eastern State of India. Indian J Comm Health. 2024;36(2):297-301. <https://doi.org/10.47203/IJCH.2024.v36i02.022>

### ARTICLE CYCLE

Received: 20/12/2023; Accepted: 22/03/2024; Published: 30/04/2024

*This work is licensed under a Creative Commons Attribution 4.0 International License.*

*©The Author(s). 2024 Open Access*

### ABSTRACT

**Background:** Out-of-pocket expenses (OOPE) are the primary means of funding healthcare costs in developing nations, and when the cost is too high, it leads to catastrophic healthcare expenditures (CHE). **Aim & Objective:** This study aimed to assess the proportion of households that faced CHE and also examined the associated factors that determine CHE at the household level. **Methods and Material:** Between September 2020 and February 2021, a cross-sectional study covering a sample of 771 households was conducted in four districts of Assam. A multistage sampling design was employed to select the sample households. **Statistical analysis used:** Binary logistic regression analysis has been performed to ascertain the factors that could determine household CHE. **Results:** 23% households had experienced CHE, high dependence on the private healthcare system. Monthly household income, duration of illness, presence of children under five years of age and elderly members, education of household head, and health insurance were the significant factors influencing CHE. **Conclusions:** The study identified the growing use of private healthcare services as a major concern that contributes to the prevalence of CHE. To make all healthcare services accessible and affordable and to lower OOP on healthcare, it is also crucial to improve the infrastructure and quality of the public healthcare system in rural and remote locations.

### KEYWORDS

Catastrophic healthcare expenditure (CHE), Assam, Healthcare

### INTRODUCTION

Protecting households from incurring high out-of-pocket (OOP) expenditures has been the prime objective of the healthcare system worldwide. High OOP expenditure frequently prevents poor people from accessing and utilizing quality healthcare services. Expenditure on the healthcare of a household

becomes catastrophic when healthcare expenditure increases significantly and the household have minimize other expenses which ultimately puts them in financial difficulties. The ability of households to maintain their quality of living is impacted because catastrophic healthcare costs take up a significant portion of household budgets (1).

Catastrophic health expenditure (CHE) is defined as any household out-of-pocket (OOP) health spending that exceeds a particular proportion of the household's financial ability.

(2) People facing catastrophic expenditures are not good for a growing economy.

Healthcare cost is primarily financed through out-of-pocket expenses (OOPE) in developing countries. India, which over the years has spent an average of 1% of its GDP on healthcare, is one of the nations with low healthcare spending. India is third in Southeast Asian nations regarding high OOP health expenditures, with OOP health spending making up approximately 62.6% of overall health spending.(3,4). In India, the majority of the population from the lower and middle-income groups have serious healthcare finance issues, forcing them to compromise on medical treatments in some situations. On the background of increasing healthcare expenditure the present study was conducted to assess the proportion of households that experienced CHE as well as to study the factors associated with CHE in the study households.

## MATERIAL & METHODS

The study was conducted in the state of Assam, specifically in four districts. The districts of Dibrugarh, Golaghat, Kamrup (M), and Baksa were selected based on the state's Human Development Index (HDI) and the corresponding HDI values of each district. A multistage sampling design was employed to select the sample households. Firstly, the district with the highest population was chosen from each selected district. Then, from each chosen district, one development block and one town with the highest rural and urban population, respectively, were selected. Next, 5% of gaon panchayats (village councils) were chosen from each development block, followed by selecting 5% of villages from each gaon panchayat. Subsequently, 10% of rural households were randomly selected from each sample village to form the sample rural households. For sample urban households, 5% of wards were selected from the chosen sample town, and 10% of households were randomly chosen from each ward. In total, the study included 771 households, comprising

393 rural households and 378 urban households. To collect the necessary data, a systematically validated questionnaire covering socioeconomic, demographic, morbidity, healthcare-seeking behaviour and healthcare expenditure was developed and utilized to assess information from the sample households over a one-year recall period. The data were analyzed using two binary logistic regression analysis separately for rural and urban areas.

To assess catastrophic health expenditure the study uses the framework given by Wagstaff and Doorslaer, 2003; Xu et al. 2008. (5, 6) In this study, a household's expenditures on healthcare are considered catastrophic if out-of-pocket health expenditure as a share of the household's capacity to pay exceeds 40% where the capacity to pay is defined as annual household consumption expenditure remaining after food expenditure.

Catastrophic health expenditure (CHE) is defined as

$$CHE = \frac{T}{X - f(x)} > Z$$

Where x is the total annual household's consumption expenditure, T is the total annual household's OOP healthcare expenditures, f(x) is the total annual household's food expenditure, and Z is the threshold level; here the threshold level is 40%.

## RESULTS & DISCUSSION

All the surveyed households in the study areas experienced one or more cases of illness. It is noteworthy that no individual within these households had multiple episodes of illness, resulting in a cumulative count of 829 cases of illness among the 2944 family members who were affected during the specified period. Not all instances of illness were addressed through medical interventions. Certain cases were managed through self-treatment, while others were left untreated. The most common self-treated or untreated illness cases includes fever, jaundice, and chicken pox. Untreated instances of illness were more common in rural areas, accounting for 12.5% of cases, compared to a lower rate of 3.2% in urban areas. Interestingly, private healthcare services which are primarily urban-centric emerged as the preferred choice for seeking medical care,

with a significant proportion of households (47.3% in rural areas and 69.8% in urban areas) opting for private health facilities as their primary healthcare providers. In both rural and urban areas, overall private health facilities are the primary source of healthcare. Similar results were found in a study by Verma et al. (2018) in Uttar Pradesh, India where the majority of the population is utilizing private healthcare services. (7)

During the reference period, overall 22.7% of households faced catastrophic health expenditure (CHE). In rural areas, a larger proportion of households (29%) experienced CHE. The proportion of households with CHE was higher in rural areas. In a study by Dalui et al. 2020 in West Bengal it was observed that 16.2% household had faced CHE. (8). In rural regions, the majority of households facing CHE were from the lower-income group (30.2%), while in urban areas, this was more prevalent

among the middle-income group (46.2%). Both in rural and urban settings, households incurring catastrophic healthcare expenses utilized public, private, or a combination of both types of health facilities. However, the study found that most households experienced CHE when they utilized private healthcare facilities. Specifically, about 72% of rural households and 68% of urban households that used both outpatient and inpatient services ended up facing catastrophic healthcare expenses. In rural areas, there was a significant association between experiencing CHE and households' annual income ( $p=0.003$ ), source of treatment ( $p=0.000$ ), and type of healthcare service ( $p=0.000$ ). However, in urban areas, the relationship was significant between CHE and households' annual income ( $p=0.000$ ) as well as the type of healthcare service ( $p=0.000$ ), but it was not statistically significant between CHE and source of treatment ( $p=0.457$ ) (Table 1)

**Table 1 CHE and its association with income, place and type of treatment**

Variables	Rural		p	Urban		p
	Faced CHE			Faced CHE		
<b>Annual Income</b>	Yes (%)	No(%)		Yes (%)	No(%)	
<b>Lower</b>	48(48)	188(64.2)		6(8)	7(2.3)	
<b>Middle</b>	38(38)	88(30)	0.003	39(52)	193(63.7)	0.000
<b>Upper</b>	14(14)	17(5.8)		30(40)	103(34)	
<b>Source of Treatment</b>						
<b>Public facility</b>	10(10)	111(49.5)	0.000	10(13.3)	53(19.6)	0.457
<b>Private facility</b>	77(77)	109(48.7)		61(81.3)	203(75.2)	
<b>Both public and Private facility</b>	13(13)	4(1.8)		4(5.3)	14(5.2)	
<b>Type of healthcare service</b>						
<b>Outpatient</b>	13(13)	185(82.6)	0.000	15(20)	224(82.9)	0.000
<b>Inpatient</b>	15(15)	13(5.8)		9(12)	18(6.7)	
<b>Both outpatient and Inpatient</b>	72(72)	26(11.6)		51(68)	28(10.4)	

The results of the binary logistic regression analysis indicated a significant association between experiencing CHE and several factors, including monthly income, educational attainment of the household head, duration of illness, presence of under 5-year-old children and elderly members, and health insurance status. However, it is worth noting that while certain variables were found to be significant overall, some differed between rural and urban areas. The regression analysis showed that, for both rural ( $OR=.130$ ,  $p<0.001$ ) and urban areas ( $OR=.130$ ,  $p<0.05$ ), as the monthly household income decreases, the probability of experiencing catastrophic healthcare expenditure (CHE) increases significantly. As

household income increases, so does the capacity to afford healthcare expenses without compromising the consumption of essential items, leading to a lower incidence of CHE. (9) The likelihood of incurring CHE rises by 65.5% ( $OR = 1.655$ ,  $p<0.1$ ) in rural areas and by 2.3% ( $OR=1.023$ ,  $p<0.1$ ) in urban areas with each increase in the duration of illness. It was reported in an earlier study that a higher duration of illness requires longer hospital stays and a higher duration of hospital stays increases the chances of experiencing CHE. (10) Rural households with children under five years of age had a 61.3% higher chance of facing CHE ( $OR=1.613$ ,  $p<0.1$ ) while urban households with members above 60 years of

age are 88.1% more likely to incur catastrophic healthcare expenditure (OR=1.888,  $p<0.05$ ). Children or elderly persons are more vulnerable to health risks and thus households with children and elderly persons are likely to spend more on healthcare. (11) Many times children and elderly person requires special treatment which ultimately increases overall healthcare expenditures. In rural areas, having health insurance coverage reduced the likelihood of CHE by 33.7% (OR = 0.663,  $p<0.1$ ), while in urban areas, the reduction was 45.5%

compared to households without health insurance (OR = 0.545,  $p <0.1$ ). Health insurance is an effective financial mechanism in protecting households from incurring high expenditure on healthcare, a significant association between facing CHE and health insurance was observed in the present study that households with health insurance had lower odd of facing CHE. Households in urban areas with heads of high school education or above were more likely to incur CHE (OR=4.466,  $p<0.05$ ). (Table 2)

**Table 2 Result of Binary logistic regression for CHE**

Variables	Rural			Urban		
	Co-efficient	Odd Ratio	P-value	Co-efficient	Odd Ratio	P-value
Age (Ln_Age)	3.942	51.531	.301	2.290	9.875	.1312
Income (Ln_I)	-2.041***	.130	.000	-1.902***	.149	.001
<b>Education</b>						
Below high school	Ref			Ref		
High school and above	.001	1.001	.108	1.496**	4.466	.033
Duration of illness	.504*	1.655	.094	.012*	1.023	.097
Household size	.109	1.115	.284	.090	1.095	.394
<b>Nature of illness</b>						
Acute	Ref			Ref		
Chronic	-.063	.939	.799	.219	1.245	.382
<b>Under five children</b>						
No	Ref			Ref		
Yes	.478*	1.613	.088	.167	1.181	.592
<b>Elderly member</b>						
No	Ref			Ref		
Yes	.106	1.112	.675	.635**	1.888	.045
<b>Healthcare service utilized</b>						
Private	Ref			Ref		
Public	.098	1.103	.673	-.346	.708	.349
<b>Health insurance</b>						
No	Ref			Ref		
Yes	-.411*	.663	.065	-.607*	.545	.066

\*\*\*=Significant at 1%, \*\*=Significant at 5%, \*=Significant at 10%

## CONCLUSION

The present study showed that a significant portion of households, approximately 23%, were experiencing CHE. More specifically, the majority of the sample households depended on private healthcare services, which resulted in higher healthcare costs. The study identified the increasing use of private healthcare services as a critical concern, contributing to the occurrence of CHE. The lack of health insurance coverage added to the distress, as households were compelled to pay the full cost of healthcare out of pocket, leading to

catastrophic results when expenses became deliberately high

## RECOMMENDATION

Lack of access to high-quality healthcare facilities leads rural residents to travel far for health services, adding to their financial burden. Based on these findings the study suggests proper action for improvement in existing public healthcare facilities; improving public healthcare facilities in rural areas can enable rural people to get the required treatment at nearby health facilities without visiting other health facilities far from their

areas. Promoting health insurance is also essential

#### **LIMITATION OF THE STUDY**

The study has been carried out based on primary data considering only one year reference period. As the data are collected for a one-year reference period, the possibility of not reporting some health issues by sample households cannot be ruled out. Respondents provided information based on recalling incidents regarding health issues; therefore, there might be recall bias.

#### **RELEVANCE OF THE STUDY**

Only few studies has been carried out on the aspects of CHE. The present study has analyzed out-of-pocket expenditure and related significant issues at micro level using household data. The outcome of this study will help authority to improve public healthcare infrastructure and quality in rural and remote regions to make healthcare services available and affordable to all.

#### **AUTHORS CONTRIBUTION**

All authors have contributed equally

#### **FINANCIAL SUPPORT AND SPONSORSHIP**

Nil

#### **CONFLICT OF INTEREST**

There are no conflicts of interest

#### **ACKNOWLEDGEMENT**

The authors were highly thankful to all the respondents of the present study for their kind cooperation in providing information.

#### **DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS**

The authors haven't used any generative AI/ AI assisted technologies in the writing process

#### **REFERENCES**

1. Berki SE. A look at catastrophic medical expenses and the poor: Health affairs. 1986;5(4):138-45
2. Wagstaff A, Flores G, Hsu J, Smits MF, Chepynoga K, Buisman LR, van Wilgenburg K, Eozenou P. Progress on catastrophic health spending in 133 countries: a retrospective observational study. *Lancet Glob Health*. 2018;6(2):e169-e179.
3. Hooda, Shailender Kumar. Out-of-pocket payments for healthcare in India: who have affected the most and why?. *J Health Manag*. 2017;19(1):1-15.
4. Sriram S, Albadrani M. A STUDY OF CATASTROPHIC HEALTH EXPENDITURES IN INDIA - EVIDENCE FROM NATIONALLY REPRESENTATIVE SURVEY DATA: 2014-2018. *F1000Res*. 2022;11:141.
5. Wagstaff A, van Doorslaer E. Catastrophe and impoverishment in paying for health care: with applications to Vietnam 1993-1998. *Health Econ*. 2003;12(11):921-34.
6. Xu K, Evans DB, Kawabata K, Zeramdini R, Klavus J, Murray CJ. Household catastrophic health expenditure: a multicountry analysis. *Lancet*. 2003;12;362(9378):111-7.
7. Verma, C. S., Shivani Singh, Alok Ranjan, and T. Sundararaman. Social and systemic determinants of utilisation of public healthcare services in Uttar Pradesh. *Econ Polit Wkly*. 2018;53(45) <https://www.epw.in/journal/2018/45/special-articles/social-and-systemic-determinants.html>
8. Dalui A, Banerjee S, Roy R. Determinants of out-of-pocket and catastrophic health expenditure in rural population: A community-based study in a block of Purba Barddhaman, West Bengal. *Indian J Public Health*. 2020; 64(3):223-228.
9. Pandey A, Clarke L, Dandona L, Ploubidis GB. Inequity in out-of-pocket payments for hospitalisation in India: Evidence from the National Sample Surveys, 1995-2014. *Soc Sci Med*. 2018 Mar;201:136-147.
10. Cavagnero, Eleonora, Guy Carrin, Ke Xu, and Ana Mylena Aguilar-Rivera. Health financing in Argentina: an empirical study of health care expenditure and utilization. *Innovations in Health Financing: Working Paper Series 8* (2006).
11. Molla, A.A., Chi, C. & Mondaca, A.L.N. Predictors of high out-of-pocket healthcare expenditure: an analysis using Bangladesh household income and expenditure survey, 2010. *BMC Health Serv Res* (2017).17, 94