

# Scourge of out-of-pocket expenditure on health: A study on its burden and predictors in a rural community of West Bengal

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## ABSTRACT

**Introduction:** Globally, one-third of current health expenditure had been out-of-pocket expenditure (OOPE). The health system financing of almost all low- and middle-income countries including India rely heavily on out-of-pocket (OOP) payments for health care. OOPE on health payments is particularly hard on any community, especially the poor leading to incomplete or even no treatment during their ill health. This study estimated OOPE among residents of a rural community in West Bengal and explored the associated factors with high OOP expenses. **Methods:** A community-based cross-sectional study was conducted in a rural community in Singur, West Bengal from June 2019 to February 2020. The study was done among 398 villagers selected from 15 clusters or villages. Households were randomly selected in each village. All members of the selected households were interviewed. SPSS was used for data analysis both for descriptive and inferential statistics. **Results:** Only 14.6% of morbid persons had catastrophic expenditure. The incidence of catastrophic expenditure was higher among those who opted for private practitioners and or ayurveda, yoga and naturopathy, unani, siddha, and homeopathy (AYUSH) facilities. There was zero catastrophic expenditure for the unqualified sector. There was an increasing trend of OOP payments among the lower socioeconomic groups. Again, low-income individuals had a higher share in cumulative expenditure (Gini coefficient of 0.35). Most of the participants (78.4%) had no health insurance coverage. **Conclusion:** Promotion for higher utilization of public health facilities may reduce the burden of OOP expenses. Government health insurance schemes must be widened with the inclusion of coverage of outpatient services. Integrating AYUSH services in the public sector is another option to reduce OOP expenses.

**Keywords:** Catastrophic expenditure, cost for illness, health cost, health insurance, out-of-pocket expenses

## Introduction

Starting from the goal of “Health for all by 2000” set in the 30<sup>th</sup> World Health Assembly in 1977 through the

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Millennium Development Goal set in the Millennium Summit (September 2000) to today’s Sustainable Development Goal to be achieved by 2030, the discussions on “equity” of health care have always remained the central theme and dogma. Equity in health care is defined as equal access to available care for equal needs; equal utilization for equal needs and equal quality for care for all.<sup>[1]</sup> “WHO” declared their theme “Universal Health Coverage: everyone, everywhere” for World Health Day in 2018 and 2019.<sup>[2,3]</sup>

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The health system financing of almost all low- and middle-income countries including India rely heavily on out-of-pocket (OOP) payments. In India, in the last two decades, the private sector health system had witnessed rapid growth, whereas the public sector of health system performance is not up to the mark. Financial consequences of OOP expenses increase the risk of being pushed into poverty as it impacts to use of their savings, selling assets or borrowing from others, and even destroying their livelihood. Thus, OOP payments are particularly proving to be hard on the poor, whose illnesses either remain untreated or are partially treated. It forces the underprivileged population to get entangled in the quagmire of poverty, ill health, and early death thus highlighting the ill effects of inequity of health care service and distancing from Universal Health Coverage. The Government of India has aimed to decrease the proportion of households facing catastrophic health expenditure from the current levels by 25% by 2025.<sup>[4]</sup> The Government of India (2018) has launched Pradhan Mantri Jan Arogya Yojana (PMJAY) to protect 50 crores of underprivileged people under health insurance.

Estimation of the cost of illness in a hospital set-up reveals only a part of their health expenditure. Facility-based “cost for illness” studies cannot draw out the cost incurred in home-based care and preventive care. Literature shows very few studies on health expenditure at the community level particularly in rural areas. Most figures obtained are indirect statistical estimates from different national and international organizations. With this background, a study was conducted to estimate the burden of out-of-pocket expenditure (OOPE) and its predictors in a rural community in West Bengal.

## Materials and Methods

It was a community-based observational study with a cross-sectional design in the rural field practice area of All India Institute of Hygiene and Public Health in Singur block, West Bengal. The study was conducted between June 2019 and February 2020 among all the villagers of 64 villages. People residing in the study area for more than one year were included. Those who had not given informed written consent were excluded.

### Sampling

Paul *et al.*<sup>[5]</sup> in their study in Amdanga Block, West Bengal showed 20.7% of households were having catastrophic health expenditures. The sample size was calculated using the formula  $(Z^2 \times P \times Q) / L^2$  where the proportion (P) of catastrophic expenditure was 0.207.<sup>[6]</sup> Standard deviation at 95% confidence interval (Z) = 1.96. Taking absolute error (L) at 5%, the minimum sample size (n) was 253. As simple random sampling was not used, the design effect considered was 1.5. Therefore, the final sample size calculated was 380. For the house-to-house survey, the visit was done at the household level. The average household size in the rural Singur block was 4.3.<sup>[7]</sup> So minimum of  $380 \div 4.3 = 89$  households were considered for the study. Fifteen clusters (villages) were selected by the probability

proportional to size (PPS) method from 64 villages. In each cluster,  $89 \div 15 = 6$  households were visited. Therefore, the total number of households visited was  $6 \times 15 = 90$ . In each village, six households were selected randomly, and in each household, all members were studied after fulfilling the inclusion criteria. After data collection, the total number of study participants was found to be 398.

### Data collection and tools

A face-to-face interview with a predesigned pretested structured schedule was done. Dependent variables were the estimated cost of health care in the last 30 days and the presence of catastrophic expenditure. Age, religion, caste, marital status, education, type of family, per capita income, occupation, addiction profile, and morbidity pattern were independent variables.

The face and content validity of the schedule were ascertained. The schedule was translated into Bengali and back-translated into English. The back-translated English version was compared with the original English version and any discrepancies found were corrected in the original schedule maintaining semantic equivalence. Pretesting was done on 30 similar people outside the rural field practice area, in the Singur block. A review of medical records and other relevant documents was also done.

### Operational definition

- BG Prasad's socioeconomic scale 2019 was used to classify the socioeconomic classes.
- Monthly direct OOP expenses included doctor's fees, transport fees, hospital costs, operations fees, medicine, any health-related instrument or materials, and other service charges related to health.
- Monthly indirect OOPE included costs for transport, wage loss, food, and lodging.
- Catastrophic expenditure was termed when household health expenditure crossed 40% of monthly non-food expenditure.<sup>[8]</sup>

### Statistical analysis and ethical approval

Data were analyzed using Statistical Package for Social Sciences software (SPSS Inc., Chicago, IL, version 16.0 for Windows). Descriptive statistics were calculated as frequency, percentage, mean, standard deviation, median, interquartile range (IQR), and range. Kruskal–Wallis test was done to estimate the statistical significance of OOPE differences among different facilities of health care. Mann–Whitney U test was done to test the hypothesis regarding the difference in expenses between acute and chronic morbidity. Jonckheere–Terpstra test was done to compare median OOPE among five separate ordinal income groups.

Logistic regression analysis was performed to find out the association between the dependent and the independent variables. A P value less than 0.05 was considered significant throughout all statistical tests in the analysis. Lorenz curve with the Gini

coefficient was calculated to estimate any inequity in OOPE across the different income classes.

Ethical approval was taken from Institutional Ethics Committee (IEC certificate PSM/IEC/2018/3); informed written consent was taken from each participant before data collection. For those below 18 years of age, assent was taken and for below seven-year children, consent was taken from parents. Confidentiality was maintained at each step of data collection and analysis.

### Results

The mean ( $\pm$  SD) years of age of the participants was  $36.5 \pm 18.7$  years. Nearly one-fifth population (20.4%) belonged to the scheduled caste (SC) and scheduled tribe (ST). The mean ( $\pm$  SD) years of schooling was  $7.3 (\pm 4.3)$  years. There were around 10.7% illiterates. Most of the participants (42.2%) belonged to Class III BG Prasad socioeconomic class with a mean ( $\pm$ SD) per capita income of ₹2590.5 ( $\pm$  1335.4). The proportion of unemployed persons was 8.3%. More than one-tenth of study participants (13.1%) belonged to below poverty level. The proportion of study participants having an addiction to smoking and smokeless tobacco was 15.9% and 7.3%, respectively. Around 4% of people consumed alcohol at least once a month. Most of the participants (78.4%) had no health insurance. The proportion of having a state health insurance scheme was 18.6% [Table 1].

The median OOPE per episode of illness was ₹180 (IQR- ₹40-535). The maximum share of expenditure was for medicine costs (62%); followed by doctors' fees (13%) and investigation costs (10%). Wage loss due to morbidity contributed to 9% of OOPE. Out of all morbid persons under treatment, 14.6% and out of all study participants, 3.5% showed catastrophic health expenditure [Table 2]. The occurrence of catastrophic expenditure was highest among private practitioners and AYUSH facility attendees (nearly one-third). Interestingly, in the unqualified sector, there was zero catastrophic expenditure. Borrowing from relatives was an option of payment for 8.3% of cases of OOPE.

A statistically significant difference in OOPE was found among different facilities ( $P$ -value  $< 0.001$ ). On the post-hoc test, it was revealed that there was an actual statistical difference in OOPE between the public and private sectors as well as the public and unqualified sectors. OOPE in the unqualified sector (₹193.8  $\pm$  157.8) and public sector (₹206.9  $\pm$  489.7) was much cheaper than the private sector (₹600.3  $\pm$  565.3) and AYUSH sector (₹400  $\pm$  695.7) [Table 3].

In the univariate multinomial regression model, zero OOP expenses in the last 30 days were considered as a reference category. Increasing age made a high chance of getting both OOPE (OR- 1.02; CI- 1.01-1.03) and catastrophic OOPE (OR- 1.06; CI-1.03-1.09). Nuclear families had more odds of getting OOPE (OR-1.73; CI- 1.02-2.96) and catastrophic OOPE (OR- 3.27; CI- 1.1-9.68). A higher year of schooling (OR- 0.92, CI- 0.87-0.98) was a

**Table 1: Sociodemographic characteristics of the Study Participants (n=398)**

Variables	Number	Percentage
Age group		
0-19	67	16.8
20-59	177	69.8
>60	54	13.4
Gender		
Male	208	52.3
Female	190	47.7
Religion		
Hindu	380	95
Muslim	18	5
Caste-		
SC-ST-OBC	145	36.5
General	253	63.5
Family Type		
Nuclear	128	32.2
Joint	270	67.8
Education level		
Primary and below	149	40.7
Above primary	217	59.3
Marital Status		
Unmarried	125	31.4
Married	236	59.2
Widow/separate/divorced	37	9.4
Per Capita Income (₹)		
<1800	98	24.6
≥1800	300	75.4
Occupation		
Working Population	154	38.7
Non-working population	244	61.3
Current Addiction		
Yes	99	25.1
No	299	74.9
Health Insurance		
Present	86	21.6
Absent	312	78.4

**Table 2: Distribution of expenditure pattern for illnesses and category of participants according to OOPE burden**

OOPE for illness episodes (n=146)	Mean $\pm$ SD (in ₹)
Total OOPE	388.1 ( $\pm$ 537.6)
Expenditure for Acute Illness	315 ( $\pm$ 254.9)
Expenditure for Chronic Illness	408.3 ( $\pm$ 592.8)
Expenditure for direct cost	342.7 ( $\pm$ 532.5)
Expenditure for indirect cost	45.4 ( $\pm$ 122.2)
Category of Persons according to OOPE burden (n=398)	Proportion
Catastrophic OOPE	14 (3.5)
Non-catastrophic OOPE	314 (78.9)
Zero OOPE	70 (17.6)

protective factor for OOPE. People having no health insurance had less chance of getting both OOPE (OR- 21; CI- 0.12-0.37) and catastrophic OOPE (OR- 0.18; CI-0.06-0.53). In the multivariable multinomial regression model, after adjusting with all other relevant variables, increasing age had higher odds of both catastrophic expenditure (AOR-1.09; CI- 1.05-1.14)

and OOPE (AOR-1.02; CI-1.01-1.03). Villagers of nuclear families (AOR- 3.53; CI- 1.09-11.44) had a higher chance of getting catastrophic expenditure. Non-insured persons had fewer odds for both catastrophic (AOR-0.16; CI- 0.05-0.53) expenditure and OOPE (AOR-0.21; CI- 0.12-0.38) compared to insured persons. Model fitting information showed that the *P* value in the likelihood ratio test was <0.001. The goodness-of-fit was present as evident from retained null hypothesis in Pearson Chi-square (*P*-0.967) and deviance Chi-square test (*P*- 1.00). The adequacy of regression fit was assessed using the proportion (14%–23%) of the total variance in the occurrence of catastrophic OOPE explained by the model (Nagelkerke pseudo-R<sup>2</sup>- 0.16, Cox and Snell R<sup>2</sup>- 0.23, and McFadden R<sup>2</sup>-0.14) [Table 4].

The percentage of OOPE out of capacity to pay (here “Non-Food Expenditure”) sharply rose from the fifth (richest) to the first (poorest) income quintiles. There was a statistically significant trend of higher median OOPE percentage (out of family income) with high to low levels of socioeconomic groups, Jonckheere-Terpstra test statistics ( $T_{JT}$ ) = 29534, *z* = 2.268, *P*- 0.023.

In the Lorenz curve, the area under the curve was 0.67 (more than 0.5). Therefore, there was inequity in the distribution of OOP payments with income percentile. Lower-income individuals spent most OOP payments; comparatively higher income individuals had a lower share in cumulative OOP. The Gini coefficient index was 0.35 indicating a moderate amount of inequity in OOPE across all the income classes [Figure 1].

**Table 3: Distribution of Mean OOPE per Illness Episode according to Various Health Care Facilities (n=146)**

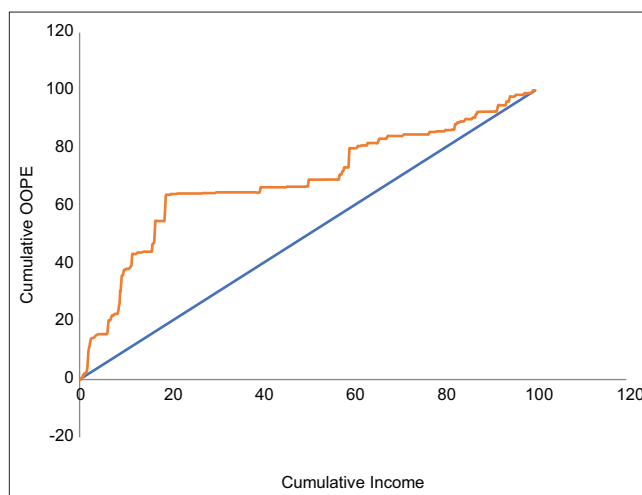
Facility (n)	Out-of-Pocket Expenditure	
	Mean±SD	Median±IQR
Government (53)	206.9±489.7	20 (0-180)
Private (64)	600.3±565.3	475 (150-847.5)
AYUSH (8)	400±695.7	185 (57.5-325)
Unqualified (21)	193.8±157.8	150 (85-310)
Total	388.1 (±537.6)	180 (40-535)

## Discussion

### Burden of OOP expenses

The present study showed that per episode monthly median OOPE was ₹180 and the mean value was ₹388.1 (± ₹537.6). The estimated mean per capita monthly OOPE was ₹582.6 (± ₹857.4) with a median value of ₹300. National Sample Survey (NSS) showed much higher expenditure.<sup>[9]</sup> The survey was conducted long before the wide popularization of public-private partnerships, fair-price shops, and free medicines in the government sector. In a study by Chowdhury *et al.*,<sup>[10]</sup> Gupta *et al.*,<sup>[11]</sup> and Prinja *et al.*,<sup>[12]</sup> estimates are consistent with current study findings. Ray *et al.*,<sup>[13]</sup> Rajaratnam *et al.*,<sup>[14]</sup> and Bera *et al.*<sup>[15]</sup> showed lower OOPE estimation than the current study. Those studies including NSS were conducted before the mushrooming of private facilities in rural India.

In the present study, 14.6% of morbid persons had catastrophic health expenditures. Paul *et al.*<sup>[5]</sup> reported a much higher (20.7%) proportion of catastrophic health expenditure in a rural area in West Bengal. Prinja *et al.*<sup>[16]</sup> showed a proportion of



**Figure 1: Relationship of Cumulative Out-of-Pocket Payment with Cumulative Income in Lorenz Curve (n = 398)**

**Table 4: Predictors of Out-of-Pocket Expenditure for Health Care service: Univariate and Multinomial Logistic Regression (n=398)**

Covariates	No OOPE (Ref.)	Non-catastrophic OOPE		Catastrophic OOPE	
		OR (CI), <i>P</i>	AOR (CI) <i>P</i>	OR (CI), <i>P</i>	AOR (CI) <i>P</i>
Age ↑	1	1.02 (1.01-1.03), 0.015	1.02 (1.01-1.03), 0.023	1.06 (1.03-1.09), <0.001	1.09 (1.05-1.14), <0.001
Male	1	0.96 (0.57-1.62), 0.903	-	1.22 (0.41-3.59), 0.719	-
PCI less than ₹1800 (1 <sup>st</sup> Qt)	1	1.58 (0.91-2.75), 0.108	1.49 (0.87-2.61), 0.11	2.27 (0.76-6.74), 0.14	2.14 (0.69-5.94), 0.2
General Caste	1	1.31 (0.75-2.29), 0.335	-	1.08 (0.35-3.31), 0.888	-
Hindu Religion	1	3.71 (0.48-28.41), 0.208	-	0.69 (0.09-5.67), 0.737	-
Working population	1	1.18 (0.69-1.96), 0.549	-	1.64 (0.57-4.76), 0.354	-
Year of schooling↑	1	0.92 (0.87-0.98), 0.013	0.94 (0.88-1.01), 0.078	0.97 (0.85-1.09), 0.594	1.11 (0.95-1.31), 0.186
BPL card absent	1	0.55 (0.27-1.11), 0.093	-	0.31 (0.09-1.05), 0.061	-
Nuclear family	1	1.73 (1.02-2.96), 0.044	1.73 (0.97-3.08), 0.162	3.27 (1.1-9.68), 0.033	3.53 (1.09-11.44), 0.035
Not insured	1	0.21 (0.12-0.37), <0.001	0.21 (0.12-0.38), <0.001	0.18 (0.06-0.53), 0.002	0.16 (0.05-0.53), 0.002
Total	314 (78.9)		70 (17.6)		14 (3.5)

catastrophic expenditure as 28.5% for outpatient care. Other studies showed similar patterns.<sup>[10,17]</sup> Proportion of catastrophic health expenditure was not very high in the current study; this might be due to the preference for the quack system which is comparatively cheaper.

The impact of OOP payments cannot be fully captured by catastrophic spending alone; distressed financing, important needs compromised by families while paying for health care, and the proportion of patients deferring health care need due to inability to pay are also important. The current study showed 8.3% of morbid persons had to borrow money for their health expenditures. In northern rural India, Quintussi *et al.*<sup>[18]</sup> showed that households coped with health expenditures mostly by dissaving, borrowing, and selling assets.

### Predictors of High OOPE

Higher age made villagers more susceptible to catastrophic expenditure in the current study. Morbidity increases with age and the younger people being healthier sought less medical aid. Contrary to the above finding, in a study among the urban poor in Delhi by Kusuma *et al.*,<sup>[19]</sup> OOPE was more among the young. The present study did not find out any association of gender with health expenditure. Studies conducted in rural areas such as by Ray *et al.*<sup>[13]</sup> and Bera *et al.*<sup>[15]</sup> also showed similar findings. However, males had more OOPE as observed by Kusuma *et al.*<sup>[19]</sup> and Gupta *et al.*<sup>[11]</sup> No influence of caste category was on OOPE in the current study. Rout *et al.*<sup>[20]</sup> found that OOPE was influenced by caste. Sharma *et al.*<sup>[21]</sup> showed that SC and ST were significantly associated with catastrophic expenditure.

Low education status was related to catastrophic expenditure. Similarly, Rout SK *et al.* pointed out the influence of educational status on OOPE. Low education level, in most cases, was associated with low living standards, and lack of knowledge on healthy lifestyles. These may lead to sickness and the need for more medical help and high OOPE. The nuclear family made villagers susceptible to catastrophic expenditure in the current study. The nuclear family evolves on the fragmentation of a joint family, eventually reducing the per capita income, and leading to catastrophic expenditure. The proportion of health expenditure out of total monthly expenditure steadily increased towards lower income quintiles. Poor people spent more in proportion to their capacity to pay. Singh *et al.*<sup>[22]</sup> and Paul *et al.*<sup>[5]</sup> analyzed that low-income quintiles were associated with catastrophic health expenditure. Most studies showed a high share of OOPE in total household expenditure in lower-income quintiles.<sup>[10,11,23]</sup> There was a significant difference in OOPE between the public and private sectors as evident in the current study. A similar pattern was observed in most studies.<sup>[11,19,21,22]</sup>

The current study observed that 21.6% of villagers were enrolled in health insurance. Similarly, in a study by Kumar *et al.*,<sup>[24]</sup> health insurance coverage was 22.9%. NSS showed 13% of the rural population was protected by health insurance.<sup>[9]</sup> However, NSS

was conducted long before Ayushman Bharat and other state health insurance. Insurance had no protective role on OOP expenses in the present research. In any government scheme, ambulatory health care is not insured. Patient with chronic disease but on ambulatory care needs continuous medication and frequent follow-up. This results in a financial barrier to seeking optimum health care. This indicates the need for a sustainable financial mechanism to protect those who are suffering from chronic diseases from the high outpatient expenditure.

Being cross-sectional in nature, month-wise or season-wise morbidities along with the incurred medical expenditure for individuals and families could not be explored. Moreover, the cross-sectional design made it difficult to define the directionality of any association between the dependent outcome and the predictors. Participants often were unable to recall their small expenses. It might have led to an underestimation or even overestimation of their expenses.

The results of this study are also directly relevant to the recent enthusiastic endeavors in India for the amelioration of the sky-rocketing OOPE in the health sector with the introduction of health insurance schemes for the general public with special attention to the deprived and the marginalized population. Government health care services including essential drugs are currently available free of cost to patients. Yet people are often reluctant to make avail of health care services meted out to them by the public sector. This service may be robust at the primary level but health needs at higher levels requiring special or super special care require monetary expenditure, which is unaffordable for many. Beyond this, bad behavior of health personnel, long waiting hours, inconvenient consultation time, and delayed treatment of diseases that need urgent care are some of the impediments to the non-use of health care services provided by the government sector. Therefore, it is imperative that priority is given to taking care of these lacunae with celerity and rapidity and get on a war footing in the mission to implement the concept of equity of health care service. Proper, appropriate, and affordable medical insurance will help in the fulfillment of the optimistic aim to bring the best health care services to one and all along with minimum financial burden. Ayushman Bharat is one such flagship program launched by the Government of India as recommended by the National Health Policy in 2017. Its two components of Health and Wellness Clinics and PMJAY (Health Insurance) have adopted a continuum of care approach with comprehensive and affordable need-based health care services to one and all. It may be envisaged as a giant leap for the implementation of Universal Health Coverage in India with a massive improvement in the health status of this nation.

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## Conflicts of interest

There are no conflicts of interest.

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