

# Out-of-pocket expenditures and catastrophic expenditures on inpatient care among households of an urban village in Delhi

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## Abstract

**Background:** Out-of-pocket expenditure (OOPE) for inpatient care has been known to cause maximum impoverishment. It can have debilitating consequences for urban poor households. It is necessary to study inpatient care costs and the related factors among the households of an urban village to determine their vulnerability to catastrophic expenditure and to protect them from it.

**Objective:** The study aimed to calculate the mean OOPE on inpatient care, and catastrophic health expenditure among households of an urban village in Delhi.

**Design:** This was a cross-sectional study conducted over 18 months among urban village households of Delhi who have been residing for the last 1 year.

**Methods:** A sample size of 188 was calculated based on another study, and households were selected using systematic random sampling. A pre-designed, pre-tested, semi-structured, and interviewer-administered questionnaire in Hindi was used to elicit and record relevant information. Data were recorded and coded, and analysis was done using licensed SPSS v.26 software. Tables were generated for relevant data, and cross-tables were used to assess statistical association with chi-square or Fisher exact tests, as required. A  $p$ -value of 0.05 was considered statistically significant.

**Results:** The mean annual OOPE borne by a household on inpatient care was INR 6870.3 (SD  $\pm$  30,580.6), where 93.3% of OOPE was incurred while seeking treatment from public facilities. The OOPE on inpatient care had a statistically significant association with households having joint family, members from vulnerable population, and belonging to Delhi.

**Conclusion:** The households of an urban village of Aliganj, Delhi, have high OOPE on inpatient care (60.6%) and catastrophic health expenditure (75.6%).

## Keywords

Out-of-pocket expenditure, inpatient care, OOPE, urban village, catastrophic expenditure

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## Introduction

The Sustainable Development Goals (SDG) Target 3.8 other than promulgating the coverage of essential health services emphasizes decreasing the proportion of population with significant household expenditure on health as a share of total household expenditure or income (SDG Target 3.8.2). Due to healthcare expenses, 100 million people globally are pushed into extreme poverty every year. That is why the concept of Universal Health Coverage

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(UHC) came about and was adopted under SDG target 3.8 in 2015 at the United Nations General Assembly, which envisaged that all people have access to health services, along with financial risk protection, access to quality essential health care services and access to safe, effective, quality, and affordable essential medicines and vaccines.<sup>1</sup>

National Health Accounts Estimates in India reported that out-of-pocket expenditure (OOPE) accounted for 52% of Current Health Expenditure for the year 2019–2020, and 1.54% of gross domestic product (GDP), which is one of the highest in the world.<sup>2</sup> As reported by a study examining various National Statistical Office (NSO) surveys, due to out-of-pocket health expenditure, 55 million people in India were propelled into poverty during the 1994–2014 period. Out of this, nearly 38 million incurred catastrophic health expenditure (CHE) when defined as 10% of total household expenditure.<sup>2</sup>

While considering OOPE, it has been observed in multiple studies that a large share of it is incurred on medicine, followed by investigations and consultation charges; non-communicable diseases (NCDs), especially cancer, are responsible for a major part of OOPE, but infectious diseases tend to push more people into the quagmire of poverty.<sup>3–6</sup>

OOPE tends to be specifically financially debilitating when it involves inpatient episodes, which often involve a huge expenditure. With inpatient care expenses, the catastrophic expenditure is not only there when a patient is hospitalized but end-of-life care and cost of healthcare for those who could not survive tend to be far worse.<sup>7</sup>

During inpatient episodes, it is not only the cost of care being provided along with medicines, but the indirect costs also tend to soar, as attendants and support providers have to arrange for travel, food, lodging, and so on.<sup>8</sup>

India has Government of India's flagship Pradhan Mantri Jan Arogya Yojana (PMJAY) for selected underprivileged population for care in public or private institutions and Employees' State Insurance Corporation health insurance scheme for individuals earning less than INR 21,000 per month in an ESI registered workplace covering illness, disability, and death. There are various other state-provided health insurance and private health insurance schemes, all providing a basket of protective mechanisms against health expenses. Despite that, there is a dearth of protective mechanisms against OOPE in India which covers the majority of population, and furthermore, the protective role of health insurance against inpatient OOPE is often have been found limited.<sup>9</sup>

The vision of UHC cannot be attained unless we examine the health financing at the household level and the factors causing maximum financial burden to the households and then work to protect the households against them. Multiple studies in the past have tried to find out the inpatient healthcare cost and its associated factors, but most of them have analyzed the national data from multiple

National Sample Surveys. Only a few have carried out community-based studies in an urban vulnerable population. Much of the unexpected growth in the country is occurring in urban areas where a large number of the new arrivals can only afford to live in informal settlements; and as observed during the COVID-19 pandemic, a focus on healthcare pattern and expenditure among the urban poor is crucial to move toward UHC.

Against this background, this study was planned among the households of an urban village—a special setting characterized by unplanned and haphazard settlements, overcrowding, and poor sanitation—with the objective of calculating the mean OOPE on inpatient care, CHE, and the associated factors among the households of an urban village of Delhi.

## Materials and methods

We conducted this cross-sectional study over an 18-month period to determine the mean OOPEs and catastrophic expenditures for inpatient care among households of an urban village in Delhi.

**Study settings**—The study was carried out in a setting of an urban village in Delhi—Aliganj. An urban village is an unauthorized and/or unplanned settlement, where many homes have been constructed in an unplanned, haphazard manner leading to overcrowding, and where residential and commercial properties exist together without clear demarcation.<sup>10</sup>

**Study area**—Aliganj has an Urban Health Training Health Center (UHTC) catering to a population of approximately 6000 inhabitants majorly comprising migrants from other states and villages.

**Study design**—Cross-sectional study.

**Duration**—18 months.

**Inclusion criteria**—Households residing for more than 1 year in the area.

**Sample size**—The sample size was estimated using the formula:  $n = Z^2SD^2/L^2$  based on a cross-sectional study conducted assessing OOPE in 196 urban households of Dakshina Kannada by Tiwari et al., who had reported a mean household OOPE of INR 1974.23 ± 4722.35.<sup>11</sup>

Z was taken to be 1.96, SD as 4722.35, and L as 15% of SD. With a non-response rate of 10%, the sample size came out to be around 187. A total of 188 households were included in the study.

**Sampling technique**—Systematic Random Sampling. A sampling frame from preexisting socio-demographic data of Aliganj having 1668 households was adapted for systematic random sampling. The first house was chosen using a random number between 1 and 9, and from there on, every subsequent house was selected by adding a sampling interval of 9. When a household selected by the above process was found locked or not having the head of household at least three consecutive visits were made to

contact. Then the next household was selected by using simple random sampling.

### Operational definitions

**Household:** A household was defined as a group of persons normally living together and taking food from a common kitchen. In a house inhabited by multiple families, a household was identified by the number of kitchens or Chulah.<sup>12</sup>

**Head of Household:** The one who made all the major decisions of the household.

**OOPE:** Out-of-pocket payments are those made by people at the time of getting any type of service (preventive, curative, rehabilitative, palliative, or long-term care) provided by any type of provider. They include cost-sharing (the part not covered by a third party like an insurer) and informal payments (e.g. under-the-table payments), but they exclude insurance premiums. Out-of-pocket payments could be financed out of a household's income, including remittances, savings, or borrowing. They exclude any reimbursement by a third party, such as the government, a health insurance fund, or a private insurance company.<sup>1</sup> A period of the last 30 days was considered to assess OOPE on out-patient care, to limit recall bias. To calculate annual health expenditure, the monthly expenses were multiplied by 12.

**Inpatient care:** Any ailment which required an overnight stay in a health care facility for treatment was assessed as an inpatient care episode.<sup>13</sup> For the study, pre-hospitalization and post-hospitalization care and expenditure were assessed with inpatient care. A period of 1 year was considered for calculating inpatient expenditure.<sup>12</sup>

**Direct expenditure:** It included treatment charges directly paid while seeking treatment such as doctors' fees, cost of medicines and investigations, bed charges, cost of healthcare packages, attendant charges, and the expenditure incurred on physiotherapy, personal medical appliances, blood, oxygen, and so on.<sup>12</sup>

**Indirect Expenditure:** It included all non-medical expenditures incurred while seeking treatment. It included expenditure incurred for transport of the patient whether accompanied by other household members or not, cost of food, lodging, and other charges such as telephone charges, expenditure on soap, towel, toothpaste, and so on for the patient and escort(s).<sup>12</sup>

**Catastrophic Health Expenditure (CHE):** Out-of-pocket health expenditure exceeding 10% of total household expenditure was considered a catastrophic expenditure.<sup>1</sup> For the purpose of the study, CHE was calculated based on last 1 year's household expenses

**Study tool—**A pre-designed, semi-structured, questionnaire was prepared in English and then translated to Hindi. The questionnaire was pre-tested on 10% of the sample size in a population of a similar area, Piliyani, Delhi, before the study. Participants were interviewed to elicit relevant

information regarding socio-demographic profile, OOPE on inpatient care and its associated factors, and catastrophic expenditure incurred.

The above information was collected from the head of household for all the members of that household. Whenever possible hospital bills, BPL cards, and so on were checked to verify the information provided. Socio-economic status was calculated as per the revised Kuppaswamy Scale, 2019, which is an aggregated scale calculated by scoring family income, along with the head of household's education and occupation. The resulting score categorizes the socio-economic status of the family.

**Statistical methods—**Data entry was done in Microsoft Excel spreadsheets using variable coding. Data were verified by double entry and proofreading. Data cleaning and analysis were done using the licensed SPSS software (version 26). All the variables were analyzed using descriptive statistics to calculate frequency, mean, range, and so on. Bivariate analysis was done to determine an association between the presence of OOPE, CHE, and other associated factors. Statistical tests of significance for the difference between proportions, that is, Chi-square test and Fisher's exact test were applied and the calculated results were considered significant at a  $p$ -value  $< 0.05$ . After data entry, every 10th questionnaire was picked randomly and data entry was verified. An independent person verified the data entry of 2 randomly chosen forms after the entry of every 25 questionnaires.

**Ethical issues—**Each eligible subject was explicitly explained about the purpose of the study by the investigator and informed consent was obtained before inclusion. Approval from the Institutional Ethical Committee was taken before the start of the study. Privacy of subjects and confidentiality of information was maintained, and this was also explained to the subjects before inclusion.

## Results

This study was conducted in 188 households of Aliganj, New Delhi, where we interviewed the heads of the households. These study households had a total of 795 individuals, whose data were analyzed as study participants for the purpose of this study.

We found the mean age of the head of the households in the study was 41.5 years (SD  $\pm$  11.3), with 177 (94.1%) households' heads being males, and most of the households (174; 92.5%) Hindu by religion. Out of 188 heads of households, 22 (11.7%) were unemployed, and the rest had some kind of employment.

The median number of members a family had was 4, and the majority (147; 78.2%) of the households had a nuclear family. As per the Modified Kuppaswamy Scale, revised for 2019, 59 (31.4%) of the study households belonged to the upper-middle socio-economic class, and the rest 129 (68.6%) belonged to the lower socio-economic

class. Eighty percent (151) of the households resided in rented accommodations. Seventy-nine (42.0%) households had members from vulnerable groups like children less than 5 years old, pregnant women, and geriatric. A total of 74 (39.3%) households had at least 1 member covered under any kind of health insurance (Table 1).

Out of a total of 795 study participants in the 188 households, 45 (5.7%) reported having inpatient care episodes in the last 1 year. Of these 45, 42 (92.9%) reported having 1 inpatient episode, while 2 (4.8%) reported 2, and 1 (2.4%) reported having 5 inpatient episodes in the last 1 year. Out of 45, 23 (51.5%) inpatient care episodes were of 1–3 days of duration, 11 (24.4%) were of 4–6 days duration, and for 11 (24.4%) inpatient episodes, the duration of the episode was for more than 6 days. The mean duration of inpatient care was  $4.7 \pm 4.6$  days, having a range of 21 days, with a median of 3 days, and an interquartile range (IQR) of 4 days (Table 2).

For 31 (68.9%) of 45 inpatient episodes in the last 1 year, the source of treatment was a government health facility. The reasons cited for selecting a particular type of hospital for inpatient care were accessibility (16; 35.6%), prior experience with the hospital (9; 28.9%), recommendation by someone (6; 13.3%), affordability (4; 8.9%), empanelment by an insurance provider (3; 6.7%), and other reasons (3; 6.7%) including COVID-19 saturation in government hospitals (2; 4.4%) and quality of care (1; 2.2%) (Table 3).

In the study, 13 (28.9%) episodes were related to obstetric care mainly childbirth, while 6 (13.3%) were cardiovascular system-related morbidities including heart and blood pressure-related events, 6 (13.3%) genitourinary system morbidities, 6 (13.3%) for gastrointestinal morbidities, 5 (11.1%) episodes were because of fever where respondents were not aware of the exact cause of fever, 3 (6.6%) episodes concerned respiratory system morbidities such as pneumonia, COVID-19, and so on, 1 (2.2%) episode each of cancer and mental disorder, and the rest other 4 (8.9%) inpatient morbidities included 2 episodes of musculoskeletal morbidities, 1 episode each of gynecological and diabetic morbidities (Figure 1).

Out of 45 inpatient care episodes, 26 (57.8%) episodes followed pre-hospitalization treatment. Of these 26, the duration of pre-hospitalization treatment for more than half (57.7%) episodes was between a month and a year.

A total of 38 (84.4%) were followed by post-hospitalization treatment. Of these 38, 18 (47.4%) were continuing the treatment at the time of interview. The source of post-hospitalization treatment was a government facility in 23 (60.5%) episodes (Table 4).

The source of financing for the inpatient care episodes was majorly (30; 66.7%) income or savings (Figure 2).

A total of 41 (21.8%) households or all the households who sought inpatient care had OOPE. Overall, each household was spending INR 6870.3 (SD  $\pm$  30,580.6) on inpatient care in a year. The mean OOPE incurred per

inpatient episode was INR 28,702.6, where direct OOPE (INR  $6896.1 \pm 32,084.9$ ) was incurred by 35 (18.6%) households, and indirect OOPE (INR  $1075.3 \pm 5388.5$ ) by 31 (16.5%) households. Only 3 (1.6%) households had received any reimbursement for seeking inpatient care (Mean: INR  $1154.3 \pm 12,555.5$ ) which was deducted from overall inpatient care OOPE (Table 5).

A total of 13 out of the 41 households (75.6%) which incurred OOPE on inpatient care had catastrophic expenditure on healthcare.

Only 3 (7.1%) households out of 42 had received any kind of reimbursement for the inpatient care episodes (Figure 3).

A total of 93.3% of inpatient care OOPE was incurred on government health facilities (in 31 (68.9%) inpatient episodes) having a mean inpatient OOPE of INR 13,362.9 (SD  $\pm$  21,268.4), and rest 6.7% was incurred on private health facilities (in 14 (31.1%) episodes) having a mean inpatient OOPE of INR 61,955.0 (SD  $\pm$  92,027.0) (Table 6).

Since all the households that sought inpatient care had OOPE, we tested the association between the households incurring OOPE versus those which did not. We found a statistically significant association of incurring OOPE on inpatient care with type of family, state of origin, having a member of a vulnerable group in the household, and having any kind of health insurance; with households having a joint family, belonging to Delhi, having a member of vulnerable population, and not having health insurance were statistically more likely to incur OOPE on inpatient care ( $p < 0.05$ ) (Table 7).

## Discussion

In our study, we found that 5.7% of 795 study participants sought inpatient treatment in the last 1 year, of which 7.4% participants were hospitalized more than once in that duration. This is much higher than those reported in the NSO survey 75th round, HSC data on Health (India, 2019),<sup>4</sup> and a study by Kusuma and Babu (Delhi, 2019).<sup>14</sup> The reason could be that the current population having better accessibility to multiple public healthcare facilities in proximity along with the study demography comprising mainly of migrant workers employed in low-income jobs, having minimal household expenditure on food and healthcare, makes them more vulnerable to frequent inpatient care episodes. This is further emphasized by the findings of Kashyap et al. (Kanpur, 2018)<sup>15</sup> who reported that 6% of tannery workers had hospitalization episodes in the last 1 year.

Although we found that a higher proportion of households had hospitalization treatment in the study, the mean duration of inpatient care in this study was  $4.7 \pm 4.6$  days, with a median of 3 days, which is markedly lesser than those found by Rout and Choudhary (Odisha, 2018)<sup>16</sup> and Kashyap et al. (Kanpur, 2018),<sup>15</sup> likely due to high turnover rate of patients at nearby large tertiary care hospitals. Rout

**Table I.** Distribution of study households according to socio-demographic characteristics (N = 188).

1. Age of head of household (in completed years)	Number (%)
18–27	17 (9.0)
28–37	64 (34.1)
38–47	44 (23.4)
48–57	47 (25.0)
58–67	12 (6.4)
68–77	4 (2.12)
Mean age = 41.5 years; SD = ± 11.3; Max = 76; Min = 20; Range = 56	
2. Sex of the head of the household	Number (%)
Male	177 (94.1)
Female	11 (5.9)
3. Religion	Number (%)
Hinduism	174 (92.5)
Islam	12 (6.4)
Christianity	2 (1.1)
4. Education of head of the household	Number (%)
Illiterate	15 (8.0)
Primary school	13 (7.0)
Middle school	38 (20.2)
High school	46 (24.5)
Intermediate	49 (26.0)
Graduate and other higher education	14.3
5. Occupation of the head of the household	Number (%)
Unemployed	22 (11.7)
Unskilled worker	66 (35.1)
Semi-skilled worker	51 (27.1)
Skilled worker	18 (9.7)
Clerical/shop/farm	19 (10.1)
Semi-professional	10 (5.3)
Professional	2 (1.0)
6. Number of family members	Number (%)
2	28 (14.9)
3	32 (7.0)
4	64 (7.0)
5	36 (7.0)
≥6	28 (7.0)
Median = 4; IQR = 2; Max = 13; Min = 2; Range = 11	
7. Type of family	Number (%)
Nuclear	147 (78.2)
Joint	41 (21.8)

(Continued)

**Table I.** (Continued)

8. Socio-economic class as per Modified Kuppuswamy Scale 2019	Number (%)
Upper-middle (II)	59 (31.4)
Lower-middle (III)	58 (30.8)
Upper-lower (IV)	71 (37.8)
9. House ownership	Number (%)
Rent	151 (80.3)
Owned	37 (19.4)
10. State of origin	Number (%)
Uttar Pradesh	40 (21.3)
Delhi	38 (20.2)
Bihar	34 (18.1)
Uttarakhand	32 (17.0)
Odisha	13 (6.9)
Others	31 (16.4)
11. Caste	Number (%)
General	92 (48.9)
Other backward class	59 (31.4)
Scheduled class	34 (18.1)
Scheduled tribe	2 (1.6)
12. Below poverty line cardholder	Number (%)
No	177 (94.1)
Yes	11 (5.9)
13. Ration cardholder	Number (%)
No	151 (80.3)
Yes	37 (19.7)
14. Households with vulnerable groups present	Number (%)
No	109 (58.0)
Yes	79 (42.0)
15. Households with health insurance	Number (%)
Yes	74 (39.3)
No	114 (60.7)

and Choudhary (Odisha, 2018)<sup>16</sup> found the average duration of inpatient care at secondary-level public health institutions in two districts of Odisha to be 6.14 days. Similarly, Kashyap et al. (Kanpur, 2018)<sup>15</sup> reported, the mean duration of stay for tannery workers to be  $18.7 \pm 11.9$  days.

The mean OOPE for inpatient care in this study was INR 6870.3 (SD ± 30,580.6), and the cost per inpatient episode was INR 28,480.4. Similar to our findings, Sharma et al. (India, 2020) in their study among urban poor in multiple randomly selected states of India found

**Table 2.** Distribution of study participants according to inpatient care episodes in the last 1 year (N=795).

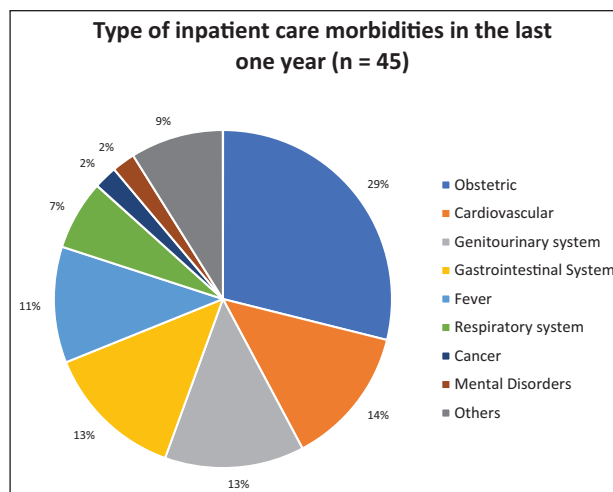
I. Inpatient episode	Number (%)
No	750 (94.3)
Yes	45 (5.7)
2. Number of episodes (n=45)	Number (%)
1	42 (92.9)
2	2 (4.8)
≥3	1 (2.4)
3. Duration of inpatient care episode (n=45)	Number (%)
1–3 days	23 (51.5)
4–6 days	11 (24.4)
>6 days	11 (24.4)

Mean duration:  $4.7 \pm 4.6$  days; median=3; interquartile range (IQR)=4; range=21.

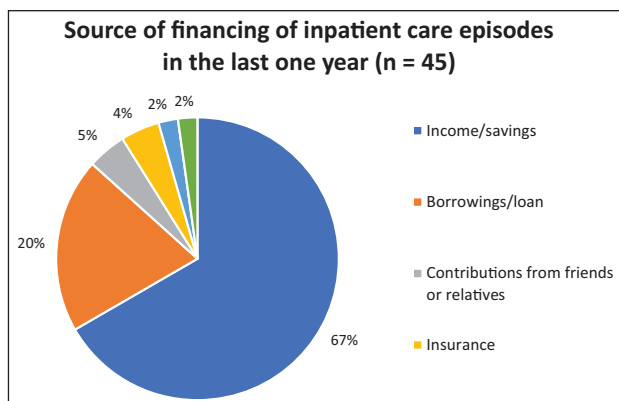
**Table 3.** Distribution of the participants according to the type of health facility sought for inpatient care episodes in the last 1 year (n=45).

I. Type of health facility	Number (%)
Government	31 (68.9)
Private	14 (31.1)
2. Reasons for selecting a facility	Number (%)
Accessibility	16 (35.6)
Prior experience with the facility	13 (28.9)
Recommendation	6 (13.3)
Insurance empanelment	4 (8.9)
Affordability	3 (6.7)
Other	3 (6.7)

the mean expenditure on hospitalization per inpatient episode to be INR 27,025.<sup>17</sup> Similarly, NSO survey 75th round, HSC data on Health (India, 2019) reported average medical expenditure per hospitalization case (excluding childbirth) in rural India to be INR 16,676 and INR 26,475 in urban India. They further reported the average per inpatient care OOPE in Delhi to be INR 25,094.<sup>4</sup> Kusuma and Babu (Delhi, 2019)<sup>14</sup> reported that an average of INR 5112 was spent out of pocket on hospitalization, which is near to our findings of mean inpatient OOPE 6870.3 among the study population. Similarly, Tiwari and Datta (Dakshina Kannada, Karnataka; 2018)<sup>11</sup> found that the mean OOPE per visit of hospitalization in their study was INR 7421.21.

**Figure 1.** Distribution of inpatient care episodes according to the type of morbidity in the last 1 year (n=45).**Table 4.** Distribution of inpatient episodes according to pre-hospitalization and post-hospitalization treatment.

I. Pre-hospitalization treatment (n=45)	Number (%)
Yes	26 (57.8)
No	19 (42.2)
2. Duration of pre-hospitalization treatment (n=26)	Number (%)
< 1 month	9 (34.6)
1 month to 1 year	15 (57.7)
> 1 year	2 (7.7)
3. Source of pre-hospitalization treatment (n=26)	Number (%)
Government	18 (69.2)
Private	8 (30.8)
4. Post-hospitalization treatment (n=45)	Number (%)
Yes	38 (84.4)
No	7 (15.6)
5. Duration of post-hospitalization treatment (n=38)	Number (%)
Continuing	18 (47.4)
≤30 days and complete	11 (29.0)
>30 days and complete	9 (23.6)
6. Source of post-hospitalization treatment (n=38)	Number (%)
Government	23 (60.5)
Private	15 (39.5)



**Figure 2.** Distribution of inpatient care episodes in the last 1 year according to the source of finance for treatment ( $n = 45$ ).

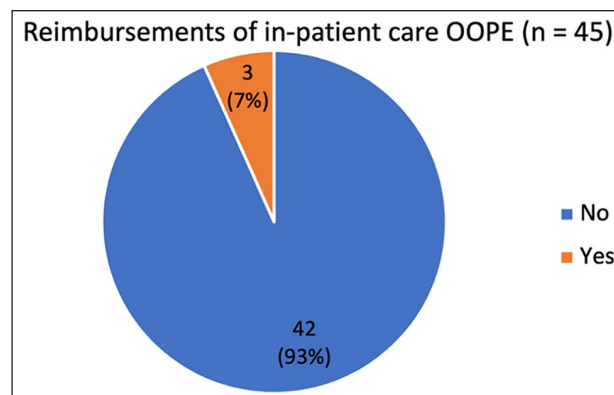
**Table 5.** Distribution of households incurring out-of-pocket expenditure (OOPE) on inpatient treatment ( $N = 188$ ).

	Number (%)	Mean expenditure (SD) (INR)
Direct inpatient care OOPE	35 (18.6)	6896.1 (32,084.9)
Indirect inpatient care OOPE	31 (16.5)	1075.3 (5388.5)
Total inpatient care OOPE	41 (21.8)	6870.3 (30,580.6)

SD: standard deviation.

The mean OOPE for hospitalizations for a 1-year period was INR 22,489 in Haryana as reported by Prinja et al. (Haryana, 2018)<sup>3</sup> which again reiterates the same pattern of higher costs of inpatient care. Singh et al. (Rural Punjab, 2018)<sup>18</sup> in their study to assess health care-seeking patterns and expenditure among households in rural Punjab found the mean OOPE for inpatient care to be INR 53,889 per episode. Such higher costs in their study could be justifiable considering they had a higher prevalence of major inpatient episodes being prone to incurring massive expenditures, as they had 10 episodes for cancers and 40 inpatient episodes because of accidents, which were scarce in our study. Furthermore, far more episodes of inpatient care were treated in private facilities (51.6%) in their study in comparison with ours (31.1%).

It also highlighted that the cost of inpatient treatment significantly varies in India, with rural populations incurring a high cost of treatment while seeking care in distant urban healthcare centers. Furthermore, seeking treatment in public centers can bring down OOPE significantly, as Rout and Choudhary (Odisha, 2018)<sup>16</sup> reported in their study to find out OOPE in inpatient care at secondary-level public health institutions in two districts of Odisha where they found the mean OOPE for the secondary care facility to be INR 3136.14.



**Figure 3.** Distribution of inpatient episodes according to reimbursement of OOPE incurred ( $n = 45$ ).

In this study, the source of treatment for 68.9% of inpatient episodes in the last 1 year was a government health facility, while for the rest 31.1%, it was a private healthcare facility, showing a majority of the participants preferred public healthcare facilities for inpatient care, likely to protect themselves from large OOPE. A similar trend was seen in the study by Sharma et al (India, 2020)<sup>17</sup> among urban poor in multiple randomly selected states of India, when they found 65% of respondents reported undergoing hospitalization in public healthcare facilities, while the rest in private. The pattern represented by NSO survey 75th round, HSC data on Health (India, 2019)<sup>4</sup> differs from that trend as they reported 42% of inpatient hospitalization happening in public health facilities, 55.3% in private, and the rest 2.7% in charitable/trust/nongovernmental organization (NGO)-run health facilities. A higher preponderance toward private facilities might reflect the average popular sentiments that quality care is better assured in the private sector, and also due to the overburdening of healthcare infrastructure in Delhi, a lot of patients have to seek care from private facilities. Nonetheless, in Delhi, people still prefer government facilities over private likely due to the presence of multiple apex public healthcare institutions, as reported by the NSO survey 75th HSC data for Delhi. They found that 63.2% of participants preferred public health facilities (including charitable/trust/NGO-run hospitals), while the rest 36.8% had predilection toward private facilities.<sup>4</sup>

The major reasons for selecting a hospital for inpatient care we found were accessibility, prior experience with the hospital, recommendation by someone, affordability, empanelment, and other reasons including COVID saturation in government hospitals (4.4%) and quality of care (2.2%). The same motivating factors were reiterated in the study by Singh et al. (Rural Punjab, 2018)<sup>18</sup> where the participants cited affordability, cost of medicines, and referral were reasons for choosing a particular health facility for inpatient treatment as major determining factors for selecting a particular hospital.

**Table 6.** Distribution of OOPE according to healthcare facility utilized for inpatient care episodes (N = 45).

Type of health facility utilized	Number (%)	Mean OOPE (SD) (INR)	% of Total OOPE
Only government	31 (68.9)	13,362.9 (21,268.4)	93.3
Only private	14 (31.1)	61,955.0 (92,027.0)	6.7
Total	45 (100.0)	28,480.4 (57,690.3)	100.0

SD: standard deviation; OOPE: out-of-pocket expenditure.

**Table 7.** Association between socio-demographic characteristics of the head of the household and out-of-pocket expenditure (OOPE) on inpatient care among study households (N = 188).

Age (in completed years)	OOPE on inpatient care			p value
	Present	Absent	Total	
	Number (%)	Number (%)	Number (%)	
<60	<b>41 (60.6)</b>	<b>147 (39.4)</b>	<b>188 (100)</b>	0.19 <sup>a</sup>
≥60	36 (20.7)	138 (79.3)	174 (100)	
Sex				
Male	39 (22.0)	138 (78.0)	177 (100)	1.00 <sup>a</sup>
Female	2 (18.2)	9 (64.3)	11 (100)	
Religion				
Hindu	39 (22.0)	135 (77.6)	174 (100)	0.74 <sup>a</sup>
Others	2 (18.2)	12 (85.7)	14 (100)	
Education				
Illiterate	2 (13.3)	13 (86.7)	15 (100)	0.53 <sup>a</sup>
Literate	39 (22.5)	134 (77.5)	173 (100)	
Occupation				
Unemployed	8 (36.4)	14 (63.6)	22 (100)	0.10 <sup>a</sup>
Gainfully employed	33 (19.9)	133 (80.1)	166 (100)	
Number of family members				
≤4	22 (17.7)	102 (82.3)	124 (100)	0.06 <sup>a</sup>
>4	19 (29.7)	45 (70.3)	64 (100)	
Socio-economic status				
Middle	26 (22.2)	91 (77.8)	117 (100)	0.09 <sup>b</sup>
Lower	15 (21.1)	56 (78.9)	71 (100)	
Type of family				
Nuclear	27 (18.4)	120 (81.6)	147 (100)	0.03 <sup>b</sup>
Joint	14 (34.1)	27 (65.9)	41 (100)	
House ownership				
Rent	29 (19.2)	122 (80.8)	151 (100)	0.08 <sup>b</sup>
Owned	12 (32.4)	25 (67.6)	37 (100)	
Caste				
General	16 (17.4)	76 (82.6)	92 (100)	0.34 <sup>b</sup>
OBC	16 (27.1)	43 (72.9)	59 (100)	
SC/ST	9 (24.3)	28 (75.7)	37 (100)	
BPL cardholder				
Yes	5 (45.5)	6 (54.5)	11 (100)	0.06 <sup>a</sup>
No	36 (20.3)	141 (79.7)	177 (100)	
Ration cardholder				
Yes	8 (21.6)	29 (78.4)	37 (100)	0.98 <sup>b</sup>
No	33 (21.9)	118 (78.1)	151 (100)	
State of origin				
Delhi	13 (34.2)	25 (65.8)	38 (100)	0.04 <sup>b</sup>
Other states	28 (18.7)	122 (81.3)	150 (100)	

(Continued)



**Table 7.** (Continued)

Age (in completed years)	OOPE on inpatient care			p value
	Present	Absent	Total	
	Number (%)	Number (%)	Number (%)	
Vulnerable groups				
Yes	23 (29.1)	56 (70.9)	79 (100)	0.04 <sup>b</sup>
No	18 (16.5)	91 (83.5)	109 (100)	
Health insurance				
Yes	22 (19.3)	52 (80.7)	74 (100)	0.03 <sup>b</sup>
No	19 (16.7)	95 (83.3)	114 (100)	

Bold values indicate statistically significant p values. BPL: below poverty line.

<sup>a</sup>Fisher exact test; <sup>b</sup>chi-square test.

This study found the mean OOPE incurred by the study households for inpatient treatment in government facilities was INR 13,362.9 (SD ± 21,268.4), and in private health facilities, it was INR 61,955.0 (SD ± 92,027.0). In a study by Singh et al. (Rural Punjab, 2018),<sup>18</sup> it was reported that the mean OOP on inpatient treatment in public health facilities was INR 20,071 (SD ± 303.6), and in private facilities, it was INR 86,342 (SD ± 1306.1). Their study further highlights the higher cost of inpatient treatment that households residing in peripheral rural areas have to incur, irrespective of the source of treatment. Prinja et al. (Haryana, 2018)<sup>3</sup> estimating district-level OOPE on healthcare in Haryana reported the mean OOPE for seeking inpatient care in private health facilities was INR 24,440 and INR 12,607 in public health facilities. Though both studies show that inpatient care sought in private health facilities costs manifolds than in public hospitals, the cost of inpatient care in private facilities can vary greatly across the nation, with treatment being more expensive in major cities.

The major source of healthcare financing was income and there was a significant share of borrowings, contributions, or selling of assets in the current study, as well as others. NSO survey 75th round, HSC data on Health (India, 2019)<sup>4</sup> found that, for urban areas, 83.7% of inpatient episodes were financed through household income or savings, 8.5% by borrowings, 3.8% contributions from friends and relatives, 0.4% by sale of physical assets, and rest 3.4% by other financial sources. Similarly, in Delhi, a study by Kusuma and Babu (Delhi, 2019)<sup>14</sup> among urban poor reported that, for 56.1% of the hospitalizations, the source of finance was earnings or savings, then borrowings (33.5), from health insurance (10%). Kusum and Babu reported a bigger proportion being financed from insurance, likely due to better experience with insurance schemes in their population improving their attitude toward health insurance and more utilization of it.

Despite 74 households having health insurance, the major source of health financing in the study was income,

leading to financial distress. This highlights not only inadequate coverage of health insurance such as Ayushman Bharat Pradhan Mantri Jan Arogya Yojana or Employees' State Insurance Scheme or any of the numerous private or public health insurance schemes but also the lack of effective protection for the population. More assessment and intervention are required to ensure the vulnerable population is protected against CHE, and reimbursements are credited timely.

We found that 75.6% of those who sought inpatient care in the last 1 year had catastrophic expenditures on healthcare. Kastor and Mohanty (India, 2018)<sup>19</sup> in their analysis of data from the 71st round of the National Statistical Organization (2014) reported that 49% of households who had sought inpatient care incurred CHE (OOPE more than 10% of household consumption expenditure). Likewise, Singh et al. (Rural Punjab, 2018)<sup>18</sup> reported that the households seeking inpatient care incurred catastrophic expenditure in 57% of households. Though highlighting the impoverishing effects of healthcare costs of inpatient treatment, the higher proportion of catastrophic expenditure in this study further highlights the financial vulnerabilities of urban poor.

## Limitations

1. Recall bias may have influenced the responses of the household members pertaining to inpatient expenditure and indirect expenditure.
2. Unforeseen circumstances due to the COVID-19 pandemic during the study duration may have influenced the expenditure on health.

## Conclusion

The households of an urban village of Aliganj, Delhi, have high OOPE on inpatient care (60.6%) and CHE (75.6%). The study advocates for better financial protective mechanisms against inpatient OOPE for the urban poor.

## Recommendations

1. The majority (60.6%) of the households had incurred OOPE on inpatient care, which highlights the need for active financial protection to bring down the OOPE, in the form of providing accessible, economical healthcare for the urban poor. Schemes like Ayushman Bharat Pradhan Mantri Jan Arogya Yojana of the Government of India should be extended to accommodate more fractions of urban poor households, along with other group insurance schemes to protect employees.
2. There is a need for conducting a prospective community-based study in urban poor households, with expenditure cards to log the expenditure on inpatient care including both direct and indirect expenses, to avoid recall bias and provide a better estimation of expenditure on health.

## Declarations

### Ethics approval and consent to participate

Ethics approval was taken from the institutional ethical committee, VMMC & Safdarjung Hospital, New Delhi, having number 2019-10/06.

### Consent for publication

Written informed consent was taken from the participants for the study.

### Author contributions

**Suraj Prakash Singh:** Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Software; Validation; Writing—original draft; Writing—review & editing.

**Anita Khokhar:** Conceptualization; Methodology; Project administration; Supervision; Validation; Writing—review & editing.

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### Availability of data and materials

Not applicable.

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