

# Out-of-pocket expenditure and its predictors for illness of under-five children: A cross-sectional study in urban slums of Eastern India

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## ABSTRACT

**Introduction:** Out-of-pocket (OOP) expenditure influences the access to the healthcare of the marginalized and vulnerable population including under-five children (U5C). The aim of the study is to estimate the OOP expenditure and its predictors in Bhubaneswar, a region of eastern India. **Methods:** A cross-sectional study was conducted using a semi-structured interview schedule in 20 urban slums of Bhubaneswar. The survey was carried out by using the National Sample Survey Office (NSSO) health consumption schedule 25.0 in which mothers of U5C with illness (n = 530) were interviewed. For data analysis, the nonparametric Wilcoxon rank-sum test and Kruskal-Wallis test were used as tests of significance. **Results:** The study revealed that the mean OOP expenditure for outpatient department (OPD) care was ₹375.9 (₹219.48). The mean approximated expenditure was ₹1669.8 (₹1131.9) for inpatient department (IPD) care. In OPD care, doctors' fee and medicine cost constituted 65.01% and 50.46% of OOP expenditure, respectively. In IPD care, medicine cost and doctors' fee contributed to 36.62% and 30.54% of OOP expenditure, respectively. The major significant predictors that contributed to increased OOP were gender and delay in approaching the source of treatment in OPD, whereas in IPD no such predictors were observed. **Conclusions:** This study prominently sheds light on the issue of accessibility and affordability of health services without a comprehensive health insurance scheme for U5C illness among the vulnerable urban slum dwellers to achieve universal health coverage.

**Keywords:** illnesses, out-of-pocket payments, under-five children, Universal Health coverage

## Introduction

Out-of-pocket (OOP) expenditure is the cost that is directly paid by people for healthcare services. A major barrier to the much needed health care is mostly unregulated direct charges that result in increased OOP expenses.<sup>[1]</sup>

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Many low- and middle-income countries (LMIC)<sup>[2]</sup> have raised the concept of Universal Health Coverage (UHC) as expenditure due to illnesses can result in financial strains for the family, especially in developing countries like India. Odisha, being one of the eight low performing states of India in terms of health, spending even a little amount on healthcare can amplify the household burden.<sup>[3,4]</sup> Here, the poverty paradigm is shifting from rural to urban. The unhygienic living environment of these urban slums makes the children vulnerable to various health hazards resulting in high morbidity.<sup>[5,6]</sup> With this background, this study was conducted

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to estimate the OOP expenditure for under-five children (U5C) illnesses in the slums of Bhubaneswar.

## Methods

This community based cross-sectional study was conducted from January to April, 2019 in the slums of Bhubaneswar, a city of Odisha.

The study participants were mothers/caregivers having U5C with illness. The formula  $4pq/L^2$  was used to determine the sample size, where population size (for finite population correction factor or fpc) (N) is 28,000. As the number of U5C constitute 9.3% of the total population (census 2011), 28,000 U5C can be found in the slums of Bhubaneswar city. The prevalence of hypothesize % of OOP for U5C (p) was 30% +/-5% and confidence limits as % of 100 (absolute +/- %) (d) was 5%. For cluster surveys with the design effect of 1.5 at 95% confidence level, the sample size (n) = 479. Considering a non-response rate of 10%, the total sample size was rounded up to 530.

The samples were collected using the multistage cluster sampling technique. The selected slums were clusters for the study. Twenty slums out of 87 slums with a population of 1000 or more were selected. The study subjects from each slum were selected proportionately. House to house visit was carried out in the selected slums to identify eligible respondents (mothers of U5C). The first household was selected randomly then consecutive households were visited till the achievement of the desired sample size in that particular slum.

Interview was done using a pretested, semi-structured schedule based on the NSSO health consumption schedule 25.0 with suitable modification and contextualization to the local situation. Data was collected in the local language, i.e., Odia. A recall period of one month was used to avoid any recall bias.

Informed consent was taken before the data collection. The ethical clearance was taken from the Institutional Review Board of the Kalinga Institute of Medical Sciences, Ref No- KIMS/KIIT/IEC/611/2019, Bhubaneswar. Ethical approval is obtained on dt-06/03/2019.

## Operational definitions

**Out-of-pocket expenditure** (OOP) comprises the direct and indirect costs which include consultation, medicine, diagnosis, hospital admission charges, and transport, accommodation, and food cost. The costs towards these are indicated in terms of INR.<sup>[7]</sup>

**Outcome Variables:** Dependent variable includes OOP expenses and Independent variables include categories like household characteristics, demographic characteristics, particulars of medical treatment received, and the amount spent in the last 30 days among U5C illness in IPD and OPD.

The outcome variables of U5C illnesses were calculated for a total period of 1 month. The total expenditure for U5C morbidity

was calculated by adding all the medical and nonmedical expenditures.<sup>[8]</sup>

Data analysis was done using the R software (version 3.1.1). Descriptive statistics were analyzed to know the background characteristic of U5C illness. As the data were skew, the association of different categorical variables with OOP expense for U5C illness in OPD and IPD were checked using the nonparametric Wilcoxon rank-sum test and Kruskal-Wallis test. A  $P < 0.05$  value was considered statistically significant.

## Result

In this study, data were collected from 530 mothers having children below the age of five. The mean age of the mothers was found to be 24.9 (1.4) years. Among them, fathers of only 29% (155) children had a regular wage occupation and were daily laborers. The mean monthly household expenditure was ₹6345.1 (₹1569.2). 98.1%(520) of the children had illnesses in the last one month preceding the survey [Table 1].

Among the 530 children suffering from various illnesses in the last one month, the most common morbidity reported was diarrheal disease which was found in 30.4% of children and respiratory infection found in 29.1% of children.

## OOP expenses in OPD and IPD for U5C illness

The average OOP spending for U5C was ₹375.9 (₹219.48) and the median OOP was ₹326 (₹348) in the OPD. Most of the expenditure was toward doctors' charges followed by medicine cost; mostly, they have preferred private clinics. No insurance was covered for the OPD expenditure.

**Table 1: Background information of particulars of spells of ailment in U5C during the last 30 days**

Variables	Number (Percentage)
Time lapse in approaching the source from where treatment was taken	
Immediately (24 hrs)	148 (27.9)
2 days above	307 (57.9)
Reason for not availing govt. sources	
No medical facility available in the neighborhood	86 (16.2)
Facility of satisfactory quality not available	106 (20)
Facility of satisfactory quality too expensive	13 (2.5)
Facility of satisfactory quality involves long waiting	78 (14.7)
Ailment not considered serious	28 (5.3)
Loss of household income, if any, due to ailment (INR) of U5C	
No income loss	195 (36.8)
Upto ₹500	203 (38.3)
>₹500	126 (23.8)
Details of medical services received	
Not received	5 (0.9)
Received: free	86 (16.2)
Partly free	176 (33.2)
On payment	174 (32.8)

The average and median OOP expenses for U5C in IPD was ₹1669.8 (₹1131.9) and ₹1325 (₹1102.5), respectively. The indirect costs were not being covered by any insurance, while some of the direct costs were covered by medical insurance. The mean amount reimbursed by an insurance company was ₹5099 (₹3019.77) [Table 2]

A comparison in healthcare expenditure between OPD and IPD shows a clear indication that there was a high expenditure in IPD compared to OPD. Both direct and indirect costs are more in IPD [Figure 1]

### Association of OOP expenses in OPD with U5C illness

Using the Wilcoxon rank-sum test and Kruskal-Wallis test, predictors like gender ( $P \leq 0.001$ ), time-lapse in approaching the source of treatment ( $P \leq 0.001$ ), nature of ailment ( $P \leq 0.001$ ), education of father ( $P \leq 0.001$ ), nature of treatment ( $P \leq 0.001$ ), level of care ( $P \leq 0.001$ ), decision-making person while seeking health care ( $P \leq 0.001$ ), loss of household income if any due to ailment (₹) of U5C ( $P \leq 0.001$ ), and total household expenditure per month ( $P = 0.03$ ) were found to have a significant association with the likelihood of OOP expenditure in OPD. [Table 3]

### Association of OOP expenses in IPD with U5C illness

Using the Wilcoxon rank-sum test and Kruskal-Wallis test, the predictors like mothers with mass media exposure ( $P = 0.04$ ), social

group ( $P = 0.04$ ), coverage by any insurance scheme ( $P = 0.002$ ), nature of treatment ( $P = 0.006$ ), and level of care ( $P = 0.005$ ) were positively associated with the amount of OOP expenditure in IPD. [Table 4]

## Discussion

In this study, the median OOP expense incurred for U5C illnesses in OPD was found to be 326 (348) INR. Similar findings were reported by Nair D *et al.* while the median OOP in their study was ₹375 and ₹450.<sup>[9]</sup> Daga *et al.* assessed the median OOP expenditures of children <6 years to be ₹122 (IQR ₹61-₹220), which is comparatively less in contrast to our study.<sup>[10]</sup> Whereas

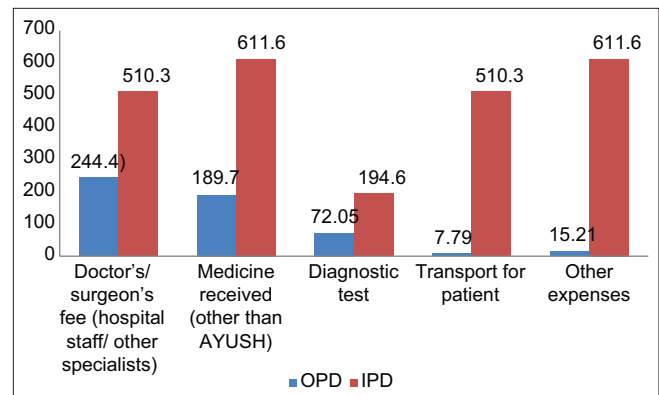


Figure 1: Health Expenditure in IPD and OPD for U5C illness (INR)

Table 2: Expenses incurred on treating the illness of U5C and OOP illnesses in OPD and IPD

Cost parameters	Mean (SD) in INR	Median (IQR) in INR	Expenditure cost (%) contributing to OOP
Expenses incurred on treating the illness of U5C and OOP IN OPD			
doctor's/surgeon's fee (hospital staff/other specialists)	244.4 (131.12)	250 (250)	65.01%
Medicine received (other than AYUSH)	189.7 (104.94)	180 (130)	50.46%
Medicine received (AYUSH)	112.5 (66.04)	80 (90)	29.92%
Diagnostic test	72.05 (32.01)	50 (50)	19.15%
Medical expenditure (₹): total	355.6 (213.9)	300 (340)	
Transport for patient	7.793 (5.25)	6 (5)	2.07%
Transport for others, (expenditure on escort, etc.)	15.21 (13.7)	10 (8)	4.04%
Expenditure (₹): total	371.6 (220.2)	10 (8)	4.04%
Total OOP in OPD	375.9 (219.48)	326 (348)	
Expenses incurred on treating the illness of U5C and OOP IN IPD			
Package component (₹)	5335 (2587.32)	5500 (4125)	-
Doctor's/surgeon's fee (hospital staff/other specialists)	510.3 (202.38)	600 (300)	30.54%
Medicines (₹)	611.6 (377.84)	450 (450)	36.62%
Diagnostic tests (₹)	194.6 (114.15)	150 (50)	11.65%
Bed charges (₹)	1594 (509.29)	1500 (1000)	-
Other medical expenses (attendant charges, physiotherapy, personal medical appliances, blood, oxygen, etc.)	291.1 (413.31)	250 (100)	17.43%
Medical expenditure (₹): total	3410.6 (3494)	2385 (3765)	-
Transport for patient	99.97 (65.9)	80 (60)	5.98%
Other nonmedical expenses incurred by the household (₹) (food, transport for others, expenditure on escort, lodging charges if any, etc.)	443.7 (132.22)	400 (120)	26.57%
Expenditure (₹): total	3739 (3570.2)	1810 (3750)	
Total amount reimbursed by medical insurance company or employer (₹)	5099 (3019.77)	4100 (5075)	
Total OOP in IPD	1669.8 (1131.9)	1325 (1102.5)	

**Table 3: Association of different predictors with OOP expenses in OPD**

Binary variables with OOP expenses in OPD (Wilcoxon rank-sum test)			
Variables	n	Median (IQR) in INR	P
Sex of the child			
Male	177	465 (385)	<0.001***
Female	91	245 (167)	
Time lapse in approaching the source from where treatment was taken			
Immediately	121	518 (318)	<0.001**
2 days above	146	248 (158)	
Multiple categorical variables with OOP expenses in OPD (Kruskal-Wallis test)			
Variable	n	Median (IQR) in INR	P
Nature of ailment in U5C			
Diarrheal disease	82	289 (315)	<0.001
Respiratory infection	86	258 (293)	
Malaria	63	586 (354)	
Wound and skin diseases	33	190 (175)	
Measles		0	
Other illness	4	287.5 (361)	
Education of father			
Illiterate	1	704 (0)	<0.001****
Primary	96	246.5 (316)	
Above Primary	171	358 (341)	
Nature of treatment			
Allopathy	153	235 (150)	<0.001
Allopathy private	91	608 (163)	
Desi dawai, traditional healers	21	190 (135)	
Pharmacists	3	45 (139)	
Level of care			
CHC and below level	124	230 (162)	<0.001**
Private hospital	129	548 (225)	
Public hospital	12	222.5 (94)	
Decision-making person while seeking health care			
Mother	5	280 (165)	<0.001***
Father (F)	97	255 (305)	
Jointly	146	330.5 (375)	
Grandparents (GP)	2	419 (111)	
F + GP	18	477.5 (248)	
Loss of household income, if any, due to ailment (₹) of U5C			
No income loss	102	246.5 (228)	<0.001
upto ₹500	157	435 (360)	
>₹500	5	530 (390)	
Household's usual consumer expenditure (₹) in a month			
Low	117	308 (365)	0.03**
Middle	70	298 (245)	
High	81	390 (381)	

in a study by Shubha DB *et al.* a higher mean expenditure of ₹550 ± ₹125 was seen for U5C illness.<sup>[11]</sup> In this study, most of the expenditure was towards doctors' charges similar to that in the study by Nair D *et al.*<sup>[9]</sup> followed by medicine cost, which was mostly incurred in private clinics study, with other studies even indicating the people's preference for private clinics.<sup>[12]</sup> Insurance was not covered for the OPD expenses in this study population.

In this study, the median OOP expense in IPD was ₹1325 (₹1102.5). In another study, there was high OOP expense which may be due to the study participants being the general population.<sup>[13]</sup> In a study by Pradhan *et al.* on the IPD expense,

the direct expense was ₹7015.00 and indirect expenses were ₹5190.00 for febrile illness in a tertiary hospital.<sup>[14]</sup> The median expense incurred for fever and respiratory illness among U5C visiting a healthcare center in Haryana, India in OPD was ₹447.00 and IPD was ₹7506.00.<sup>[13]</sup>

In our study, most of the expenditure was contributed toward medicine in the OPD which has a mean expense amount of ₹611.6 (377.84) because medicine charges are not covered by insurance. Whereas a huge portion of OOP expenses in IPD is contributed by other nonmedical expenses, it comprises 26.57% of the OOP expenses in IPD. In the case of IPD services, there

**Table 4: Association of different predictors with OOP expenses in IPD**

Binary variables with OOP expenses in IPD (Wilcoxon rank-sum test)			
Variables	n	Median (IQR) in INR	P
Mothers with mass media exposure			
Yes	52	1510 (1193)	0.04
No	10	1055 (593)	
Multiple categorical variables with OOP expenses in IPD (Kruskal-Wallis test)			
Variables	n	Median (IQR) in INR	P
Social group			
Scheduled Tribes	23	1180 (765)	0.04
Scheduled Castes	5	680 (530)	
Other Backward Classes/SEBC	13	1350 (790)	
Others	21	1920 (1540)	
Whether covered by any scheme for health expenditure support-government-funded insurance scheme			
Govt	44	1190 (812)	0.002
Others	16	2060 (655)	
Not covered	2	850 (0)	
Nature of treatment			
Allopathy	14	910 (568)	0.006
Allopathy private	47	1600 (1050)	
Desi dawai, traditional healers	1	320 (0)	
Pharmacists		0	
Level of care			
CHC and below level	5	1030 (310)	0.005
Private hospital	47	1600 (1050)	
Public hospital	10	675 (595)	

is scope of insurance benefit but one has to incur OOP expenses as the indirect cost was not covered by any insurance scheme. Similarly, a study by Gambhir shows that indirect costs are not covered.<sup>[15]</sup> A study by Anand *et al.* also shows that low income level and productivity in the slums have made OOP for U5C illnesses a burden as reported by our study.<sup>[16]</sup>

The most common reason for morbidity reported in this study was diarrheal disease that affects 30.4% and respiratory illnesses that affect 29.1% of children. Another study shows that respiratory illness was the major cause of morbidity<sup>[13]</sup> and a study by Nair *et al.* also shows that the most common illness was respiratory disease.<sup>[9]</sup> In contrast, the morbidity rate in our study was much lower than that reported by an observational study done in urban Puducherry (63.7%). This may be due to the seasonal effect during their study period.<sup>[17]</sup>

Results from this study reflect that the predictors affecting OOP expenses in OPD services are gender and time lapse in approaching the source of treatment and they had a significant association with the likelihood of OOP expenditure in OPD. Similar findings were seen in studies by Mishra S *et al.*<sup>[18]</sup> and Saikia N *et al.*<sup>[19]</sup> in which significantly lower episodes of disease in girls were being treated than those in males. Studies by Tahsina *et al.*<sup>[7]</sup> and Marcelo *et al.*<sup>[20]</sup> show that children suffering from illness mostly belong to poor households and were twice at higher risks of suffering from hardship expenditure. In a different context, social determinants had a major effect on increasing OOP. Studies show that the nature of the disease, length of stay at hospital,

ethnicity,<sup>[21]</sup> treatment cost,<sup>[22]</sup> and invisible costs like loss of wages and time and travel cost contributed to OOP expenses.<sup>[23]</sup>

Addressing these key predictors will help primary care doctors to protect the households from high OOP expenditure as they play a central role in providing U5C treatment, especially in slums where accessibility and affordability are a challenge. The sustainable development goal target to reduce U5C mortality and morbidity will not be achieved unless quality accessible and affordable health care is provided without increasing the OOP expenses. This paper highlights that the U5C OOP expenses are not only related to the disease type but also to the lack of insurance coverage and to the cost of medicines. There is definitely a need to address the expenditures borne by indirect expenses of caregivers. Social factors like gender and delay in approaching the source from where treatment is taken are key predictors for inflated OOP expenditure among U5C in urban slums.

### Limitations of the study

Since the study was conducted in urban slums and only U5C illnesses were considered, the findings cannot be generalized to the general population.

### Conclusion

The study findings show that the most common morbidity reported was diarrheal disease followed by respiratory infection in children. No insurance was covered for the OPD expenditure. Medicine cost contributed to the major portion of OOP in IPD



and doctors' charges in OPD as it was mostly incurred in private clinics. Despite the free health services available in govt. sectors, OOP expenses occur due to indirect expenses and opting for private healthcare services. Gender and delay in approaching the source from where treatment was taken are the significant predictors associated with the likelihood of OOP expenditure in OPD.

This study infers and focuses on how lack of insurance for outdoor patients, medicine expenses in IPD, doctors' fee in OPD and sociodemographic conditions limit availing appropriate timely health services resulting in the impoverishment of families. This makes it important to improve awareness on the consumer side and the quality of the service provider to upgrade the health delivery system which will ultimately reduce OOP expenses for U5C illness. Families with more than one U5C will have even more OOP expenses. With the private sector being an important driver, there is great necessity to ensure affordable and fair pricing. Hence, in the long run, good quality accessible and affordable public care services by primary care doctors along with comprehensive health insurance schemes will reduce the OOP expenditure in the urban slums. It is much needed for the policy makers to tailor financial policies which will provide a financial cushion to the families with U5C. Increased public funds and strategic approaches will minimize OOP for U5C.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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