

Prevalence and Determinants of Out-of-Pocket Expenditure among Urban Households in Puducherry – A Cross-Sectional Study

Ganesh Kumar K¹, Arthi M², Sneha JS³, Surendar Rangasamy⁴, Janani S⁵

¹Post Graduate, Department of Community Medicine.

^{2,4}Professor Department of Community Medicine.

³Assistant Professor, Department of Community Medicine.

⁵Tutor cum Statistician, Department of Community Medicine.

^{1,3,5}Sri Venkateshwarra Medical College Hospital & Research Centre, Puducherry, India.

Abstract

Background: Out-Of-Pocket Expenditure (OOPE) on healthcare is a significant concern in many parts of the world, particularly in developing countries. It represents the direct payments made by households to healthcare providers at the point-of-service. Urban households face the dual challenge of accessing quality healthcare while managing high costs. **Objective:** To study the prevalence of OOPE and to determine the factors associated with health expenditure among urban households. **Methods:** A cross-sectional study was carried out among urban households of Puducherry. By using simple random sampling method (Random Number Generation Method), the Sample size was calculated to be 347 households. A semi-structured, interviewer administered questionnaire was used to record the information. Chi-square test was applied to find the association between OOPE and factors influencing it. **Results:** A total of 347 households participated in the study, of which 165 (47.6%) had health insurance coverage, while 182 (52.4%) were uninsured. Out-of-Pocket Expenditure (OOPE) was observed in both the groups, affecting 20 insured households (12.12%) and 49 uninsured households (26.9%). A significant association was found between OOPE and having active health insurance coverage ($p = 0.005$). **Conclusion:** The urban households of Puducherry, despite high resources, have incurred a conspicuous OOPE. Implementing cost-reduction strategies through policy interventions and expanding insurance coverage are essential steps towards achieving the goal of "Zero Out-Of-Pocket Expenditure" envisioned under Universal Health Coverage.

Keywords: Out-Of-Pocket Expenditure, Urban Households, Health Insurance.

Introduction

Health expenditure is the consumption of a resource with the primary goal of promoting, restoring, and sustaining health. The global health budget was US\$4.1 trillion in 2004. This makes up around 10% of the world GDP. Approximately 70% of people in low-income nations pay for their own medical care, underscoring the issue of financial obstacles to essential medical care. ⁽¹⁾

Out-Of-Pocket Expenditure (OOPE) refers to payments that individuals make towards healthcare, which can be either direct or indirect expenses. ⁽²⁾ The global burden on the rise of non-communicable diseases has increased healthcare demand, especially in low- and middle-income countries like India, where many individuals cannot afford advanced private healthcare options. ⁽³⁾ To bridge the inaccessibility, the Government of India has implemented various health schemes and insurance initiatives primarily targeting economically weaker sections. ⁽⁴⁾

India's per capita health expenditure in 2021-22 reached Rs 6,602, an 82% rise since 2013-14. The country's total health expenditure for 2021-22 was Rs 9,04,461 crore, which is 3.83% of GDP. High OOPE is a global problem, which is a barrier for healthcare access and an impediment in achieving Universal Health Care Coverage. ^(5,6)

Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY) and Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP) two flagship schemes launched by the Government of India have significantly contributed to the reduction in OOPE. ⁽⁷⁾ AB-PMJAY Launched in September 2018, this scheme provides health coverage of up to Rs 5 lakh per year for vulnerable families. PMBJP launched in 2008, which provides affordable generic medicines through subsidized outlets and aims to increase access to essential medicines for all. ^(8,9)

Despite a progressive decline of OOPE in total health expenditure, from 64.2% in 2013-14 to 39.4% in 2021-22, the global ranking for health expenditure of India is at 179th of 189 countries. ^(10,11)

The Indian households, especially the urban household's major financial burdens are arranging funds toward the treatment expenses of chronic illnesses like Diabetes and Hypertension. Finances are usually met by bank loans, borrowing from friends and family and sale of valuables like gold ornaments. ^(12,13)

The Union Territory of Puducherry, with its higher doctor-to-population ratio and positive health indicators compared to the national average, is well-placed for healthcare delivery. Urban households face the dual

challenge of accessing quality healthcare while managing high costs. The presence of both public and private healthcare providers in Puducherry adds complexity to the financial dynamics, often leading to substantial OOPE. Though many studies have examined OOPE on a national scale, there is limited evidence on OOPE patterns in urban Puducherry, particularly in the context of recent national insurance expansions. There is a need to address the knowledge gap regarding the financial burden of healthcare and explore the challenges faced by urban residents on urban households in Puducherry. Hence, this study aimed to assess the prevalence of OOPE among urban households in Puducherry and to determine the associated factors.

Methodology

A community-based cross-sectional study was conducted among urban households in Puducherry District of Puducherry between January and April 2025. Ethical approval was obtained from the Institutional Scientific and Ethics Committee (Ref No: 178/SVMCH/IEC-Cert/Dec; Dated: 19-12-2024). The study was conducted in the urban field practicing areas of a medical college, Puducherry, which includes multiple municipal wards representing diverse socio-economic and healthcare access patterns. The required sample size was calculated to be 347 households using a prevalence of Out-of-Pocket Expenditure (OOPE) of 65.8% from a prior study by Vasudevan et al. (2019), with a 5% absolute precision and 95% confidence interval. ⁽¹⁴⁾ All households located in the selected urban wards (5 wards) were included. Data was collected from the head of the household or a responsible adult (>18 years) with knowledge of healthcare expenditures (outpatient or inpatient) in the past 3 months. Locked households and those unavailable after two consecutive visits were excluded. A multistage sampling method was used to ensure geographic and demographic representation across urban areas.

1: Selection of Urban Wards - From a total of 15 wards covering 9,684 population in Urban field practicing area of the college, five wards which are completely urban were selected purposively.

2: Selection of Streets - From each selected ward, a complete list of streets was obtained from municipal records. From each ward, 2–3 streets were selected randomly (based on population proportion).

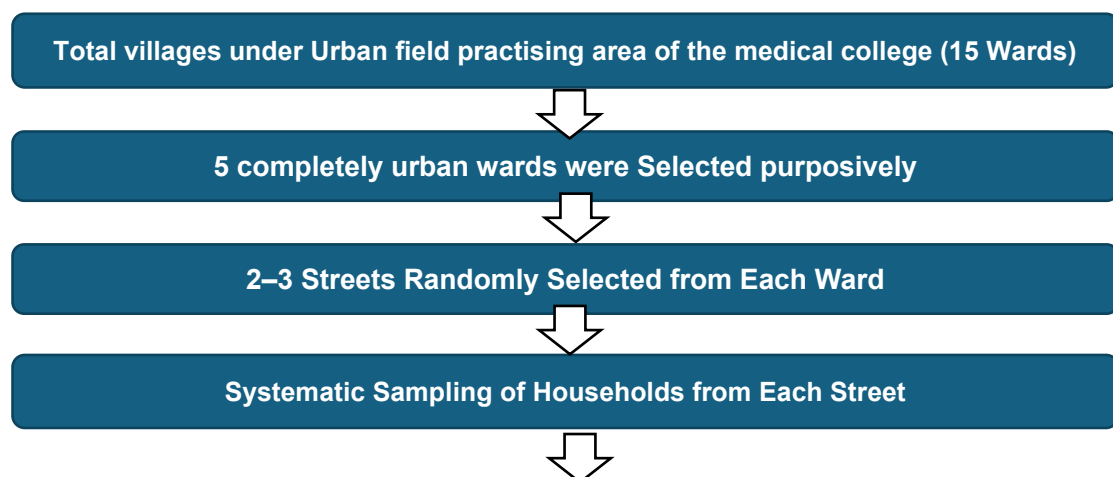
3: Selection of Households - In each selected street, the total number of households was listed. Using systematic random sampling, households were selected to meet the proportionally allocated sample for that ward to reach the required sample of 347 households.

Data Collection Tool

Data was collected using a semi-structured, pretested, pre-validated interviewer-administered questionnaire developed in English and translated into Tamil. The tool captured:

- **Socio-demographic profile** (family type, SES using Modified BG Prasad 2024, household size, income)
- **Healthcare utilization** in the last 3 months (OPD/IPD visits)
- **Health expenditures:** direct (consultation, drugs, diagnostics) and indirect (transport, wage loss)
- **Insurance coverage:** status, scheme type
- **Source of payment:** savings, loans, insurance, sale of assets

The tool was validated by three public health experts and pilot tested in 30 households (excluded from the final sample). Internal consistency was acceptable (Cronbach's alpha = 0.78).



Results

Out of the 347 households participated in the study, the mean age of the participants was 52.11 ± 11.32 . Majority of them were female 215 (62.0%). About 131 (37.8%) were male and 1(0.1%) transgender. About 238 (68.5) had education of higher secondary and above, 117 (33.7) were professionals. Among the households, 203 (58.5) were in possession of APL (Yellow) ration card and 144 (41.5) were having BPL (Red) ration cards, with 240 (69.16) nuclear families and 107 (30.84) were joint/ extended families.

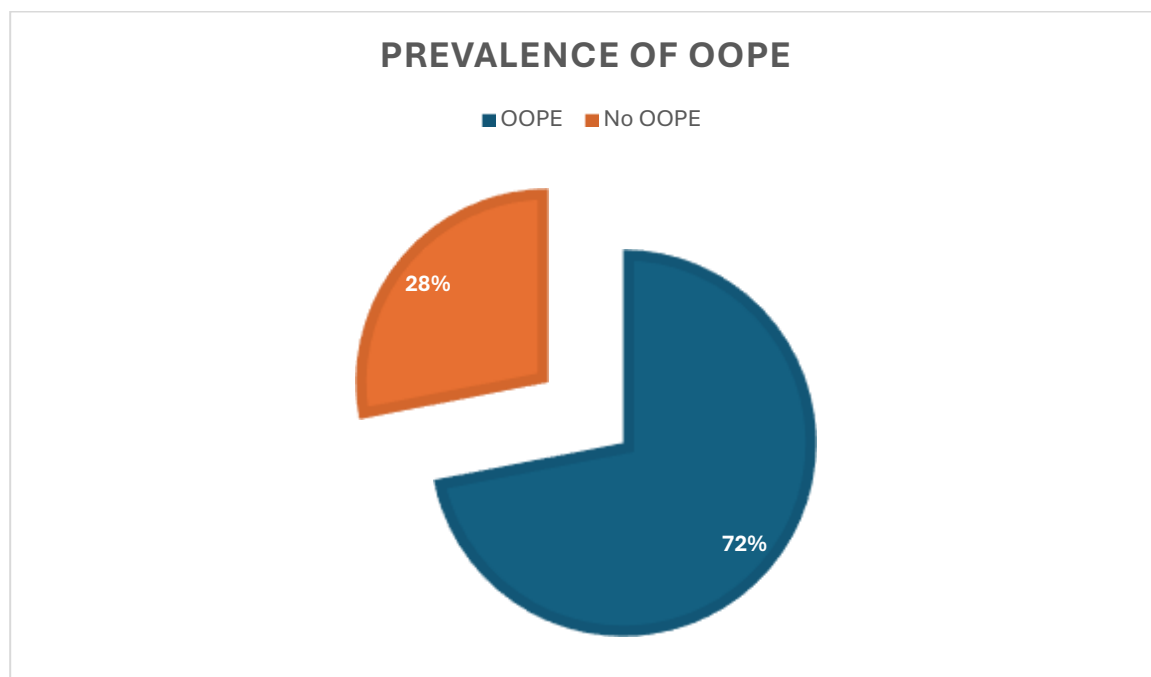


Figure 1. Prevalence of Out Of Pocket Expenditure among Participants

About 47.6% (n = 165) had at least one member covered by a health insurance policy in primarily public schemes (e.g., Ayushman Bharat, ESIC) and 52.4% (n = 182) were uninsured. Of these, 20% (69 families) had out-of-pocket expenses (OOPE), whereas 80% (278 households) did not. The median direct OOPE was Rs. 900 with an IQR of 650–110, and the median indirect OOPE was Rs. 500 with an IQR of 350–750. Various diseases for which the households incurred OOPE were chronic metabolic diseases like Diabetes and Hypertension (42%) followed by cardiovascular disease, surgeries and acute febrile illnesses (16, 15 and 15% respectively), Road Traffic Accident contributes least OOPE (1%).

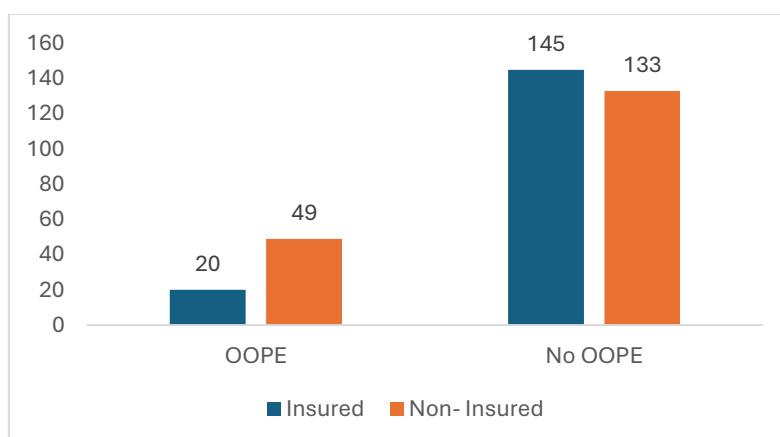


Figure 2. Distribution of Out Of Pocket Expenditure among Insured and Non-Insured Participants

Males were more likely to incur OOPE (27.5%) than females (19.8%), the difference was statistically significant. Education status had an impact those with only primary (31.5%) or secondary (45.5%) education had much higher OOPE compared to those with higher secondary or above (11.3%). Below Poverty Line (BPL) card holders (25.6%) faced significant OOPE compared to just 11.8% of Above Poverty Line (APL) card holders. Family type those from joint or extended families incurred higher OOPE (38.3%) than those from nuclear families (4.2%). Across socio-economic classes based on Modified B G Prasad Scale -Jan 2025, upper middle (44.2%) and middle class (32.7%) participants had greater OOPE, as did the lower class (28%), though the pattern was variable. Only 2.1% of insured participants reported OOPE, compared to 26.9% of the uninsured. The associations were statistically significant for most of the variables. (Table 1)

Table 1: Association between selected Demographic variables and OOPE. (n = 347)

Variable		N= 347	OOPE		χ^2	p- value
			Yes n (%) 69 (19.8)	No n (%) 278 (80.2)		
Gender	Male	131	36 (19.8)	95 (80.2)	12.15	0.001*
	Female	215	32 (27.5)	183 (72.5)		
	Transgender	01	01 (100)	00 (00.0)		
Education	Primary	54	17 (31.5)	37 (68.5)	38.02	0.001*
	Secondary	55	25 (45.5)	30 (54.5)		
	Higher Secondary & above	238	27 (11.3)	211(88.7)		
Occupation	Unskilled	67	17 (25.4)	50 (74.6)	2.80	0.09
	Skilled/Salaried	84	14 (16.7)	70 (83.3)		
	Professional	117	20 (17.1)	97 (82.9)		
	Unemployed	79	18 (22.8)	61 (77.2)		
	/Retired					
Ration card	APL	144	17 (11.8)	127 (88.2)	10.085	0.001
	BPL	203	52 (25.6)	151 (74.4)		
Family Type	Nuclear	240	10 (4.2)	230 (95.8)	43.797	0.001
	Joint/Extended	107	41 (38.3)	66 (61.7)		
Socio-Economic Status	Upper	46	09 (19.6)	37 (80.4)	11.598	0.020
	Upper Middle	43	(44.2) 18	24 (55.8)		
	Middle	55	(32.7) 16	37 (67.5)		
	Lower Middle	96	(16.7)	80 (83.3)		
	Lower Class	107	30 (28.0)	77 (72.0)		
Insurance	Insured	165	20 (12.1)	145 (87.9)	11.902	<0.001
	Uninsured	182	49 (26.9)	133 (73.1)		

In event of unexpected health expenses, among the participating households 95 (27.37) cope up the expense through personal savings, 95 (27.4%) borrowed from friends and families, 57 (16.4%) through loans from money lenders, 09 (2.6%) sold assets, 18 (5.2%) through miscellaneous means and 01 (0.29) delayed or avoided treatment.

Table 2. Binary Logistic Regression analysis of factors associated with OOPE.

Variable	β (B)	SE	Wald χ^2	OR (Exp(B))	95% CI for OR	p-value
Gender (Male vs. Female)	0.75	0.27	7.69	2.11	1.23 – 3.60	0.006*

Education (Illiterate vs. Literate)	1.59	0.29	29.6	4.90	2.80 – 8.54	<0.001*
Occupation (Employed vs. Unemployed)	0.22	0.32	0.47	1.25	0.68 – 2.30	0.460
Ration Card (APL vs. BPL)	-0.97	0.31	9.78	0.38	0.21 – 0.70	0.001*
Type of Family (Nuclear vs. Joint/Extended)	-1.56	0.29	28.8	0.21	0.12 – 0.37	<0.001*
Insurance (Insured vs. Uninsured)	-1.02	0.38	7.20	0.36	0.17 – 0.77	0.008*

Binary logistic regression revealed that males had more than two times higher odds of incurring OOPE compared to females (OR = 2.11, 95% CI: 1.23–3.60, $p = 0.006$). Illiterates had nearly five times greater odds of OOPE compared to literates (OR = 4.90, 95% CI: 2.80–8.54, $p < 0.001$). Occupation was not significantly associated with OOPE (OR = 1.25, 95% CI: 0.68–2.30, $p = 0.460$).

Households with Above Poverty Line (APL) ration cards had a 62% lower likelihood of OOPE than Below Poverty Line (BPL) households (OR = 0.38, 95% CI: 0.21–0.70, $p = 0.001$). Similarly, joint or extended families were at a 79% lower risk compared to nuclear families (OR = 0.21, 95% CI: 0.12–0.37, $p < 0.001$). The presence of health insurance reduced the odds of OOPE by 64% compared to uninsured households (OR = 0.36, 95% CI: 0.17–0.77, $p = 0.008$).

Discussion

This study finds that one in five households in Puducherry incurred out-of-pocket expenditure (OOPE) on healthcare, a rate distinctly lower than what has been previously reported across similar study setting. This contrast is especially stark when compared with the findings of Vasudevan et al., who observed OOPE in nearly two-thirds of households in both urban (65.8%) and rural (68.3%) Puducherry. Several factors may contribute to this difference, including variations in study design, recall periods, and definitions used for OOPE. Vasudevan et al. also noted that Puducherry's relatively comprehensive healthcare infrastructure may help to limit household spending, even as medication costs remain the central factor of OOPE—a trend observed in our study.⁽¹⁴⁾

When examining the socio-demographic factors, certain groups were found to be at greater risk for OOPE, including males, those with less formal education, joint or extended families, uninsured individuals, and holders of Below Poverty Line (BPL) cards. These findings closely align with patterns seen in national data. For example, Yadav et al. demonstrated through their nationwide analysis of persons with disabilities that men consistently faced heavier OOPE burdens than women, highlighting persistent gender disparities in financial access to care.⁽¹⁵⁾

Socioeconomic status, particularly as reflected by type of ration card, continues to be an important determinant. Our results indicate that APL households faced lower OOPE risks, which may reflect the benefits of targeted public subsidies and entitlements—a finding also observed by Vasudevan et al. and supported by Sahu KS et al. in urban Odisha, who found OE frequently exceeded household income, sometimes resulting in catastrophic health spending among the poorest families.^(14,16) The pattern remains consistent across states: Varma P et al., reporting from urban Hyderabad slums, emphasized that financial support and government programs made a significant difference for new mothers in lowering OOPE.⁽¹⁷⁾ In a similar way, Singh SP et al. conducted a study from an urban village in Delhi showed that less-educated and economically disadvantaged households were more prone to incurring both OOPE and catastrophic health costs.⁽¹⁸⁾

Health insurance, while offering meaningful protection, is not a universal remedy. In our study, nearly half the households reported some form of insurance, and the uninsured remained at significantly greater risk for OOPE. Nationally, only about 15.2 percent of population in India is covered with any health insurance, and even among those covered, out of pocket expenditure on inpatient care continues to be high both in public and private settings.⁽¹⁹⁾ This limited coverage and benefit scope underline the need for more comprehensive insurance reforms.

Households manage sudden health expenses using savings or borrowing, but insurance significantly lowers the risk of out-of-pocket expenditure (OR 0.36, 95% CI 0.17–0.77, $p = 0.008$). This aligns with evidence from India

showing 40–50% of urban OOPE is funded through loans or asset sales, leading to financial hardship.⁽²⁰⁾ Risk factors such as low education, uninsured status, and joint family structure highlight gaps in financial protection. These findings echo the Crocodile Trial, which documented catastrophic health costs in India and nearby countries.⁽²¹⁾ Even moderate health expenses cause considerable stress, especially for illiterate, unemployed, or joint family households, who face higher OOPE odds. Strengthened policies are crucial to protect vulnerable families from financial hardship due to healthcare costs.

The burden of catastrophic health expenditure is particularly acute among groups facing chronic illness, the uninsured, and those reliant on private sector services. As Singh SP et al. report, hospitalizations (often in private facilities) can result in catastrophic spending for a substantial minority of urban households, highlighting the continuing need for stronger public financial protection in both rural and urban contexts.^(18,21)

Conclusion

Although the Out-Of-Pocket Expenditure in Puducherry is comparatively lower; the observed socioeconomic and demographic patterns are aligned with national trends. A considerable burden persists, particularly due to medication costs, leading to financial hardship for many households. Strengthening financial risk protection through wider insurance coverage, improved access to affordable medicines, and targeted subsidies for vulnerable populations will be essential to reduce avoidable hardship and advance health equity in India.

References

1. Edejer TT, Garg C, Hernandez P, Van de Maele N, Indikadahena Care Costs, Structures and Trends. International Encyclopedia of Public Health. Oxford: Academic Press; 2008:153–160.
2. Singh SP, Khokhar A. Out-of-pocket expenditure on healthcare amongst households of an urban village in Delhi. Int J Community Med Public Health. 2023 Sep 30;10(10):3688-97
3. 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 Bardhaman, West Bengal. Indian J Public Health. 2020 Jul-Sep;64(3):223-228. doi: 10.4103/ijph.IJPH_848_20. PMID: 32985421.
4. Varadarajan P, Moharana L, Venkatesan M. Health Care Expenditure of Rural Households in Pondicherry, India. Int J Med Stud [Internet]. 2013 Aug. 31 [cited 2025 Sep. 22];1(2):74-9. Available from: <https://ijms.info/IJMS/article/view/v01i02a04>
5. Almasiankia A, Kavosi Z, Keshtkaran A, Jafari A, Goodarzi S. Equity in health care financing among Iranian households. Shiraz E-Med J. 2015;16(11-12):e28653. doi:10.17795/semj28653.
6. Chen M, Chen W, Zhao Y. New evidence on financing equity in China's health care reform--a case study on Gansu province, China. BMC Health Serv Res. 2012 Dec 18;12:466. doi: 10.1186/1472-6963-12-466.
7. National Health Accounts Estimates for India (2019-20) [Internet]. New Delhi: Ministry of Health and Family Welfare; 2023 Apr 19 [cited 2024 Jul 31]. Available from: https://mohfw.gov.in/sites/default/files/5NHA_19-20_dt%2019%20April%202023_web_version_1.pdf
8. National Family Health Survey (NFHS) – various rounds [Internet]. Mumbai: IIPS; [cited 2024 Jul 31]. Available from: <http://rchiips.org/nfhs/index.shtml>
9. Economic survey 2020-21. Vol 1, Chapter 5 [Internet]. New Delhi: Government of India; 2021 [cited 2024 Jul 31]. Available from: https://www.indiabudget.gov.in/budget202122/economicsurvey/doc/echap05_vol1.pdf
10. Catastrophic health spending and impoverishment of households while seeking hospital treatment of children (0-4 years) in India [Internet]. New Delhi: NITI Aayog; 2023 [cited 2024 Jul 31]. Available from: <https://www.niti.gov.in/catastrophic-health-spending-and-impoverishment-households-while-seeking-hospital-treatment-children-0-4>
11. Department of Health and Family Welfare, Government of Puducherry. Home page [Internet]. Puducherry: Government of Puducherry; [cited 2024 Sep 26]. Available from: <http://health.puducherry.gov.in/>
12. Massito J, Hinju G. Out of pocket and catastrophic health expenditure in Tanzania: recent evidence on the incidence, intensity and distribution. BMC Health Serv Res. 2025 May 10;25(1):677. doi: 10.1186/s12913-025-12783-w. PMID: 40349032; PMCID: PMC12065384.
13. Kheibari M, Esmaeili R, Kazemian M. Impacts of health reform plan in Iran on health payments distributions and catastrophic expenditure. Iran J Public Health. 2020;49(3):512–9.
14. Vasudevan U, Akkilagunta S, Kar SS. Household out-of-pocket expenditure on health care: a cross-sectional study among urban and rural households, Puducherry. J Family Med Prim Care. 2019;8(7):2278-82. doi:10.4103/jfmpc.jfmpc_302_19

15. Yadav J, John D, Menon GR, Singh R. Gender inequality in out-of-pocket expenditure on healthcare among persons with disabilities in India. *J Health Manag.* 2024;26(2):238-55. doi:10.1177/09720634241229247
16. Sahu KS, Bharati B. Out-of-pocket health expenditure and sources of financing for delivery, postpartum, and neonatal health in urban slums of Bhubaneswar, Odisha, India. *Indian J Public Health.* 2017 Apr-Jun;61(2):67-73. doi: 10.4103/ijph.IJPH_168_15.
17. Varma P, Mohandas A, Siddu A, Balakrishna N, Pattnaik S, Mathai D, et al. Out of pocket expenditure and utilization of government financial assistance among women who had institutional delivery in an urban slum of Telangana, India. *Natl J Community Med [Internet].* 2023 Sep 1 [cited 2025 Sep 22];14(9):575-80. Available from: <https://njcmindia.com/index.php/file/article/view/3017>
18. Health insurance coverage in India: insights for National Health Protection Scheme [Internet]. New Delhi: Ministry of Health and Family Welfare; [date unknown] [cited 2025 Sep 22]. Available from: <https://prc.mohfw.gov.in/fileDownload?fileName=Health%20Insurance%20Coverage%20in%20India%20Insights%20for%20National%20Health%20Protection%20Scheme.pdf>
19. Singh SP, Khokhar A. Out-of-pocket expenditure on healthcare amongst households of an urban village in Delhi. *Int J Community Med Public Health [Internet].* 2023 Sep. 30 [cited 2025 Sep. 22];10(10):3688-97. Available from: <https://www.ijcmph.com/index.php/ijcmph/article/view/11498>.
20. Kamath S, Maliyekkal J, Elstin Anbu Raj S, Varshini RJ, Brand H, Sirur A, et al. Understanding out-of-pocket expenditure in India: a systematic review. *Front Public Health.* 2025;13:1594542. doi:10.3389/fpubh.2025.1594542.
21. Kruk ME, Chukwuma A, Mbaruku G, et al. Financial catastrophe, health insurance, and household vulnerability in low- and middle-income countries: analysis of the Crocodile Trial. *Lancet Glob Health.* 2024;12(1):e45-e54. doi:10.1016/S2214-109X(23)00527-8.