

Socioeconomic and regional determinants of out of pocket expenditure on delivery care in India: Evidence from NFHS 4

Chandni Saha¹, Dr. Poulami Chatterjee² and Dr. Damayanti Sen^{*3}

^{1 2 3}Department of Economics, St. Xavier's University, Kolkata, India

Email: chandnisaha2000@gmail.com¹; poulamichatterjee@sxuk.edu.in²

*Correspondence: damayantisen20@gmail.com

Abstract

High out of pocket health expenditure (OOPE) remains a critical barrier to achieving universal health coverage in India, undermining equity in access to care and exposing households to financial vulnerability. This study examines the socioeconomic, demographic, and regional determinants of OOPE incurred for delivery care in India using data from the fourth round of the National Family Health Survey (NFHS 4, 2015-16). Descriptive statistics and ordinary least squares (OLS) regression are used to identify the factors associated with OOPE for maternal delivery care. The findings show that household wealth and education are the strongest predictors of OOPE, and that women covered by health insurance and those using private healthcare facilities incur significantly higher out of pocket costs. Substantial regional disparities are observed, with the western region reporting the highest OOPE share alongside the lowest health insurance coverage, while southern states also report significantly higher spending relative to other regions. Working women incur higher OOPE than non working women, and general caste households report higher spending, although caste category and place of residence (rural versus urban) do not show a statistically significant effect once other factors are controlled for. These results point to a persistent shift in the maternal healthcare landscape following the introduction of the Janani Suraksha Yojana (JSY) and related schemes. The study recommends strengthening institutional delivery care access and financial protection mechanisms, particularly for economically and socially vulnerable populations, as a step toward universal health coverage in India.

Keywords: Out of Pocket Health Expenditure, Maternal Healthcare, Delivery Care, Health Insurance, Socioeconomic Determinants, NFHS 4, India

JEL Classification: I11, I13, I14, I15, J16

1. Introduction

Healthcare is one of the most important cornerstones of any country's growth and advancement. The expenditure on health care helps to improve the health care facilities and health system. In the last ten years maternal mortality rates in India, decline from 566 per 100,000 live births in 1990 to 130 per lakh live births in 2014-16 to 122 in 2015-17 (*Significant Decline in Maternal Mortality in India*, 2022). Still, the country ranks first in the world with regard to the overall number of women fatalities owing to pregnancy-related issues. (Yadav et al., 2021). The cost of health care is a key barrier to establishing universal health care in emerging economies like India. The seventh schedule of the Indian Constitution delegated the state's health responsibilities such as public health service delivery, sanitation, and hospitals. The other important responsibilities at the national level are entrusted to both the centre and the states. The Centre finance the policies and schemes relating to population control, medical education, family welfare, the prevention of food adulteration, quality control in the manufacturing of drugs, etc. In India, state government budgets account for over 80% of healthcare funding, with the remainder coming from the Union government (12 per cent) and municipal governments (8 per cent). (Financial Express Healthcare, 2023). The entire health expenditure is split into two types: public and private medical expenses. Government health expenditure includes all initiatives financed and controlled by the Union, State, and Local Governments, as well as quasi-governmental bodies and contributors in circumstances where money is directed through government organisations. Government health spending has a significant impact on the healthcare system. Low government health expenditures may result in a large reliance on out-of-pocket household spending, leading to financial obligations in many poor and vulnerable households. In impoverished nations such as India, public health expenditure is an important component of progressive policy since most citizens' income is low and credit market imperfections are high, preventing the great majority of the population from providing appropriate healthcare through private cost. Despite the percentage of government health expenditure in overall health expenditure has grown from 28.6 per cent in FY14 to 40 per cent in FY19, India's public health spending remains relatively low as compared to the amount spent on private health care and out-of-pocket health expenditure. (Press Information Bureau, 2023) In 2015-16 the cost on Medical and Public Health and Family Welfare as the Ratio to Aggregate Expenditure was highest in NCT Delhi (10.3) in India and it was lowest in Haryana (3.1) (Reserve Bank of India, 2019).

Out-of-pocket expenditure is one of the important parts of total health expenditure. Out-of-pocket expenses are expenditures directly made by households at the point of receiving health care. This indicates the extent of household spending on healthcare payments. Considering the decline in Out-of-Pocket spending as a percentage of overall health expenditure from 64.2 per cent in FY14 to 48.2 per cent in FY19 (Pti, 2023a) still in a growing country like India, this percentage of out-of-pocket expenditure (OOPE) is huge hurdle to attaining comprehensive healthcare in a growing nation like India. As a result of insufficient funding from the government, the costly nature of

hospitalisation, the expense of drugs, the absence of insurance, and the overwhelming power of private providers of healthcare, a huge proportion of the population suffers. OOPE worsens the financial situation of the poor. Surprisingly, financial difficulty is the primary cause of inadequate usage of maternal health care in India. The household in a low- or middle-income country (like South Africa, India, or Latin America) has to bear a high burden of out-of-pocket expenses because of the absence of formal health insurance. even though there are some considerable cross-country dissimilarities in household outcomes. This high burden of out-of-pocket health expenditures sometimes pushes many households towards impoverishment. (Alam et al., 2014). Out-of-pocket health expenditure reduces poverty rates in India and China by about 8 per cent and 7 per cent, respectively. Due to out-of-pocket health expenditures, the income percentage shortfall for the population is 1.3 per cent in India and 2 per cent in China (Kumar et al., 2015).

2. Literature Review

Several studies found that income and education were the most important indicators of health expenditure in OECD whereas the unemployment rate and discrepancy ratio did not have any significant effect on it (Birol Yetim et al., 2020; Akca N et al., 2017; Furuoka et al., 2011). The factors contributing to the rise of disastrous out-of-pocket medical expenditure in India have been studied using data from the National Sample Survey Organization's (NSSO) all-India family & quota; Consumer medical cost study, & Quota; performed from July 2004 to June 2005. With a 30-day recall period, the dataset provides information on household expenditures on health care, both inpatient and outpatient. The research demonstrates, using multivariate analysis, that the social and economic status of Indian households is a significant factor in the incidence of frequency of disastrous health spending and that education decreases the possibility of incurring catastrophic health costs. The findings are sensitive to the measure of catastrophic out-of-pocket (OOP) health expenditure, and therefore, it is crucial to consider an appropriate measure of catastrophic OOP health expenditure (Pal, 2012).

Using multivariate analysis, Pandey et al. (2018) evaluated long-term shifts in out-of-pocket health expenditures (OOPHE) and catastrophic health expenditure (CHE) in India across a two-decade period (1993–2014). Their findings indicate a nationwide escalation in CHE over these twenty years, with impoverished households experiencing a disproportionately higher financial burden than wealthier quintiles. Furthermore, the likelihood of incurring catastrophic expenses was significantly pronounced among vulnerable demographic groups, including rural households, female-headed households, and families with elderly members. Corroborating these findings, broader literature indicates that while absolute OOPHE scales with income quintiles, socioeconomically disadvantaged families face a substantially higher relative risk of falling into health-induced impoverishment. Even smaller out-of-pocket health expenditures (OOPHE) appear to be disastrous for families in lower socioeconomic segments. Any family member was at a higher risk of developing a chronic illness. When services were sought from private providers compared

to public health providers, out-of-pocket health expenditures (OOPHE) were significantly higher; for inpatient care, catastrophic expenses incurred in both situations were discovered. To reduce out-of-pocket health expenditures (OOPHE) and incidences of catastrophic health expenditures (CHE), urgent action is needed to design healthcare finance policies that are more equitable and efficient (Sinha et al., 2016).

Yadav et al., 2021 investigate the socioeconomic as well as demographic characteristics that impact healthcare use, private health expenditure, and medical expenditure funding solutions in India. The data from the fourth round of the “National Family Health Survey” (NFHS-4, 2015-2016) has been used in this study which analyses healthcare utilization, out-of-pocket medical expenditure, and policies for maternal services in India. NFHS-4 data is the Indian equivalent of the Population-based Health Survey. To attain its purpose, this research article employs two-variable regression, multiple variates, and discrete logistical regression models to achieve its goal. In the initial phase, multiple variate analysis was used to identify the variation of women choosing government healthcare during delivery and to assess the condition of health-related services in the private sector available for women's maternal health-related care. In the second part of the analysis, by selecting the background characteristics of women, the mean healthcare expenditure (such as expenditure of medical, expenditure of non-medical, transportation expenditure, and out-of-pocket expenditures) were discovered for the utilisation of maternal healthcare services. In the third step, to evaluate the effects of the selected explanatory variable on OOPHE and financial burden, a multifactorial regression evaluation was performed to find the economic burden on maternal health services. The study looks at the disparities in the health systems employed for providing maternal health care in India. The study shows some states give more public medical services for maternal health care, such as Telangana provides 64 per cent, Kerala provides 60 per cent, Gujarat provides 61 per cent, and Andhra Pradesh provides 58 per cent. This study examines the fact that the percentage of private health facilities in delivery care is about 29 per cent, which is almost less than two of three equal parts of the total birth that was conducted in government healthcare facilities (71 per cent). The study found that higher educated, rich women have higher private health-cost for maternal health care compared to poor women. The “Janani Suraksha Yojana” (JSY) might cover a maximum of forty per cent of all medical costs of pregnant women across all states in India. To pay for the medical costs associated with childbirth, many households took out loans or sold off assets or jewelry. Many households borrowed money or sold property or gold jewelry to cover childbirth health expenses. People have to spend more money on the utilisation of private medical care for pregnant women. Women from lower-income households are more likely to face difficulties in financing delivery care than women from higher-income quintiles.

Jayakrishnan et al., 2016 study the “out-of-pocket (OOP) health expenditure” and the factors that affect it to understand the impact of publicly financed health insurance schemes (PFHI) on OOP in India. The study analyses the available data from the NSSO survey which was conducted between 2004 and 2014. Other published research on the evaluation of publicly financed health

insurance schemes was incorporated in order to examine the influence of publicly financed health insurance schemes on OOP. The percentage of Ailing Persons (PAP) has increased by 13 points in the previous ten years to 104 per 1000. The public services utilization for outpatient (OP) care was 25 per cent and inpatient (IP) care utilization was 40 per cent. During the last ten years, OP expenditure has increased by more than 100 per cent and IP care expenditure increased by almost 300 per cent. In India, more than 80 per cent of health spending is met by out-of-pocket (OOP). The urban households more relied on their 'income/saving' (75 per cent) for financing expenditures on hospitalizations, and '(18 per cent) borrowings but mostly rural families primarily depended on their 'household income/savings (68 per cent) and 'borrowings' (25 per cent). Both rural and urban regions took out loans from the higher quintile to fund the costs of hospitals, a rate of 23 per cent and 14 per cent respectively. Very few per cent of the population were able to get any protection coverage through any of the publicly financed health insurance schemes (PFHI) like "Rashtriya Swasthya Bhima Yojana" (RSBY). In urban areas, it is just 12 per cent and in rural areas, it is 13 per cent. The paper also concluded that in the last decade, the morbidities cost per illness episode unavoidably increased with the increase in life expectancy and demographic change of the more aged population in India.

Rahman, 2008 examines the factors of government health care expenditure and their geographical disparities among Indian states. Paper's empirical results using methods based on panel data show that the determinants that are statistically significant in the justification of the number of geographic regions health care spending include original financial status and rate of literacy and elements such as a growing elderly population and other related fundamental aspects of the demand variables are not statistically significant., since GSDP is a significant variable rising state per capita GDP did not increase the cost on medical in India between the period 1990 to 2002.

Pandey, 2018 investigates the poverty effect of "out-of-pocket (OOP) expenditures" for health care on Indian families, where just under ten per cent of the overall population is insured. Using macro-level data from the Indian Human Development Survey (Desai et al., 2008), which was conducted in 2004-05. This is a survey with a national sample of 200 thousand citizens from over 41 thousand households spread across 1,503 rural areas and 971 urban areas and the survey used multiple phases stratified selection approach. The share of rural impoverished households attributed to OOP health spending is 11.4, 9.5, 7.9, and 7.3 per cent, respectively. In the four least developed states of Orissa, Bihar, Uttar Pradesh, and Madhya Pradesh. These states' equivalent proportions of urban poverty families are 7.2, 7.5, 5.9, and 5.1 per cent, respectively. It has also been shown that when there is income disparity and a lack of doctors at the state level, OOP payment tends to rise dramatically. Insufficiency in the medical treatment system, as assessed by population density per physician, has a cascading effect on poverty.

The study analyses the impact of government health expenditure on the infant death rate by using panel data between the years 1983 and 1984 and 2011 and 2012 across Indian states. The paper

used to control some useful covariates of health like total income, competition in political parties, urbanization, and women's literacy rate to analyse the government health expenditure on the infant fatality rate. The finding of the paper is that 1 per cent of the state-wide net domestic product of an increase in public health expenditure is associated with a fall in the Indian infant mortality rate. The reduction in infant mortality rate is about nine infant deaths per thousand live births as the increase in 1 per cent state-level public health expenditure. The paper also finds that competition in political parties, women's literacy rate, and urbanisation also help to decrease the infant mortality rate. (Andrew J. Barenberg et al., 2017). The health system of India did not improve as much as the economic development of India. Despite some notable successes in public health initiatives, such as the overall ranking of 191 WHO member countries, the Indian health system ranks 118 in the last decade. (Ramani et al., 2006). This study aims to answer the following questions:

- ▶ What are the socioeconomic and demographic indicators that affect out-of-pocket health expenditure for delivery care in India?
- ▶ Is there any variation in health expenditure in different regions in India?

3. Data and Methodology

This study makes use of data from the fourth-round Indian version of the Demographic and Health Survey (DHS), the National Family Health Survey (NFHS-4). To analyse the different types of out-of-pocket health expenditure in India, a descriptive analysis has been carried out across states, age groups, religions, castes, education, type of residence and wealth quintiles. This descriptive analysis has been used to calculate the OOPE against the various socio-economic factors for delivery care. The OOPE is calculated by the summation of the mean costs (hospital costs, medicines, tests, transportation and other medical costs) incurred for delivery care. For the second research question, the study divided all the states of India into five regions (North, North-East, East, West, and South) then examine how health insurance is covered in different regions of India and also examined the percentage share of OOPE in different regions in India. Next to find the significant socio-economic factors that affect OOPE for delivery care in India a multiple regression analysis has been done. Then for regression analysis, the study uses the log value of OOPE (out-of-pocket health expenditure) as the dependent variable against the various socio-economic factors for delivery care.

3.1 Description of Outcome Variables and Covariates

Outcome variable: Out-of-pocket health expenditure (OOPE), which is the summation of the hospitalization costs, medicines, tests, transportation and other medical costs incurred for delivery care. For regression analysis, the paper uses the log value of out-of-pocket health expenditure.

Covariates used in the regression analysis:

- Wealth Index (Poor, Middle, Rich)
- Delivery-Care-Used (Public, Private)
- wanted the last child (wanted, Unwanted)
- Respondent's Education (No education, primary, secondary, or higher)
- Partner's Education (No education, primary, secondary, or higher)
- Total Children ever born (0-5, 6-10, 11-15)
- Place of residence (Urban, Rural)
- Religion (Hindu, Muslim, Christian, Sikh)
- Respondent's age (15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49)
- Gender of household head (Male, Female)
- Region (North, North-East, East, West, South)
- Respondent's occupation
- Respondent's Partner's occupation
- Caste (schedule caste, schedule tribe, OBC, General)

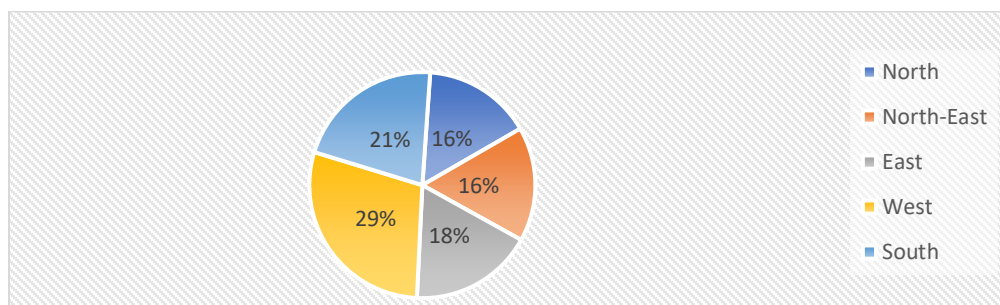
Above mentioned variables have been taken as the important socio-economic and demographic factors which may affect the “out-of-pocket health expenditure” for delivery care.

4. Results

4.1 Descriptive Analysis

The percentage of the total amount of out-of-pocket health spending (OOPE) utilized by various regions in India is provided below to present an overall picture of OOPE for delivering care by individuals in multiple regions in India.

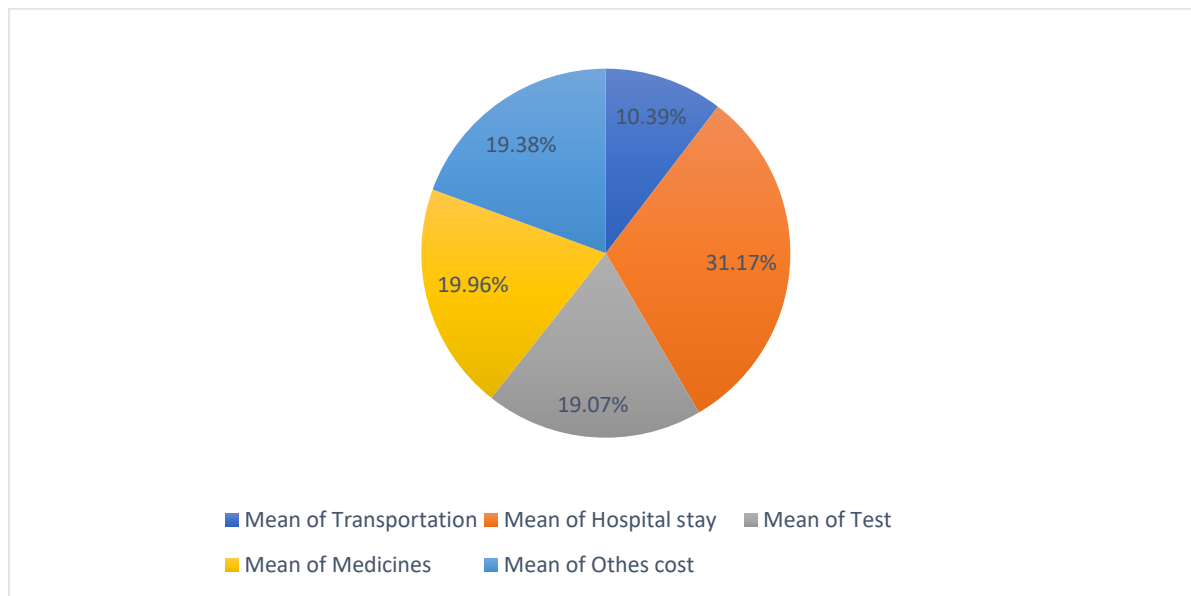
Figure 1. The Percentage Share of OOPE in Different Regions in India



Source – Calculations based on NFHS-4 (2015-2016)

The pie chart shows that the western region women of India have the highest(29%) percentage of OOOPE for delivery care, while the northern and northeastern regions have the lowest at 16 per cent. Women in the southern and eastern regions spend 21 per cent and 18 per cent respectively for OOOPE of delivery care.

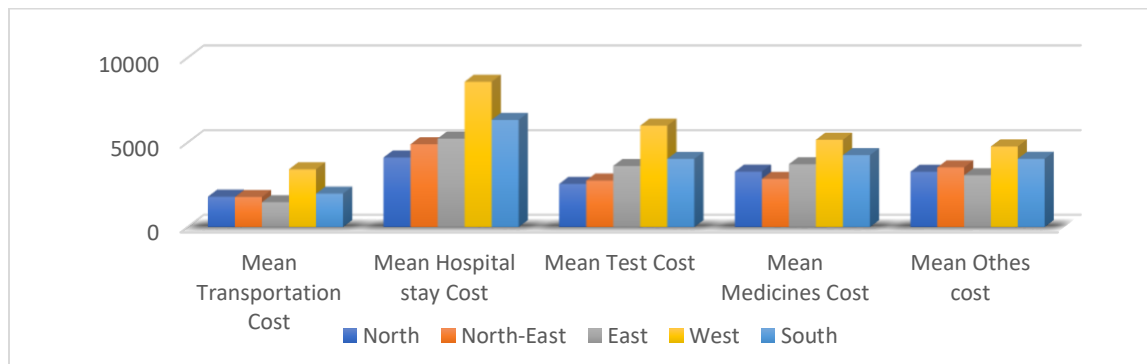
Figure 2. The Percentage Share of Different Health Expenditures



Source: Calculations based on NFHS-4 (2015-2016)

Both in Figure: 2 and Figure: 3, it has been shown that there is a feasible difference between different kinds of out-of-pocket health expenditure in different regions in India. The mean hospitalization cost which is the average cost of hospitalization for delivery care is larger than the mean of other medical costs like medicines cost, tests cost, transportation cost and other medical costs.

Figure 3. Region-wise Different Types of Health Expenditure for Maternal Care

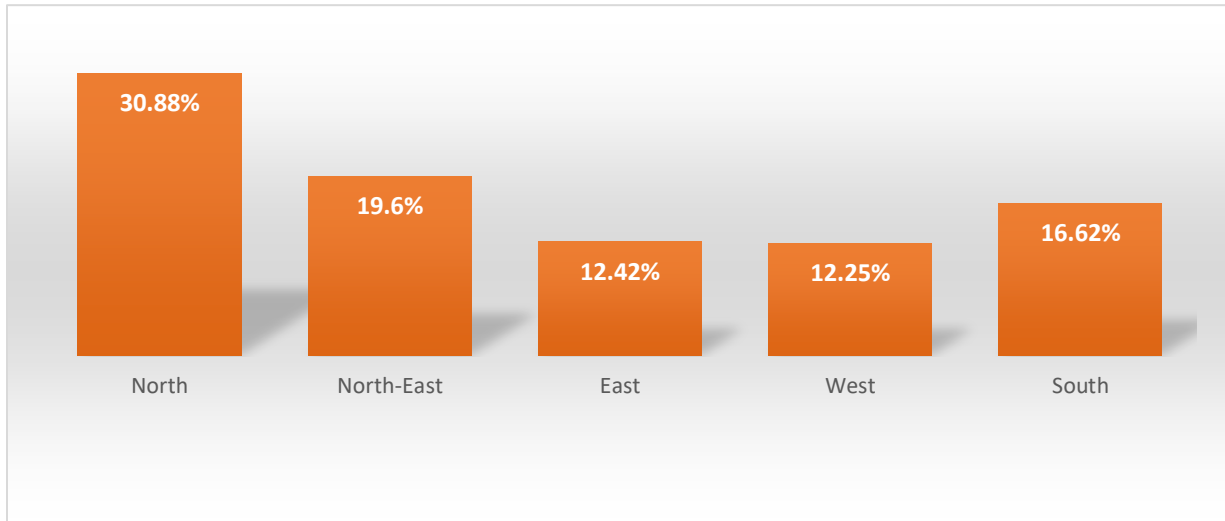


Source: Calculations based on NFHS-4 (2015-2016)

Figure: 3 also shows that the western region spends comparatively higher OOPE for delivery care than the other regions in India.

Figure: 4 is used to examine the percentage of health insurance coverage of the total health care expenditure in different regions in India, where all the states of India are divided into 5 regions (North, North-East, East, West, and South).

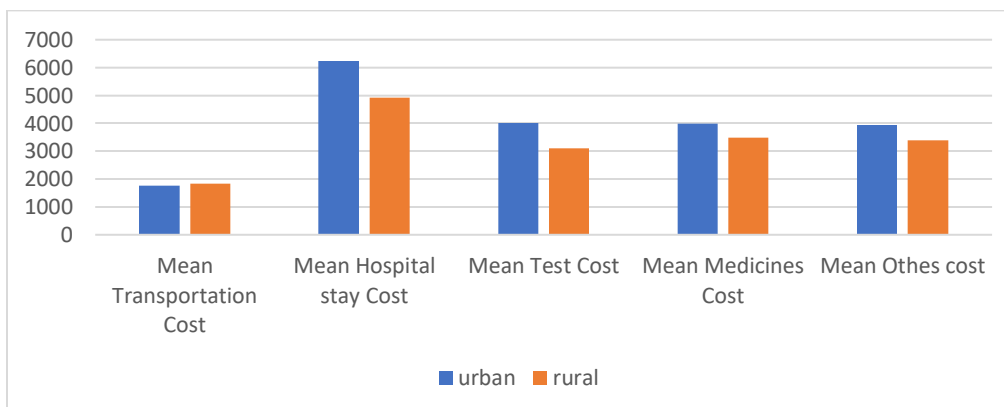
Figure 4. Health Insurance Coverage across Different Regions in India (in Percentage)



Source: Calculations based on NFHS-4 (2015-2016)

The above figure shows health insurance covered the lowest amount (12.25 per cent) in the western region of India compare to the northern region which has the highest (30.88 per cent) of total health expenditure. From the descriptive statistic it has been found that compared with the other regions of India, it has been found as the western region covered the lowest amount of health expenditure by health insurance, and it has the highest OOPE for delivery care.

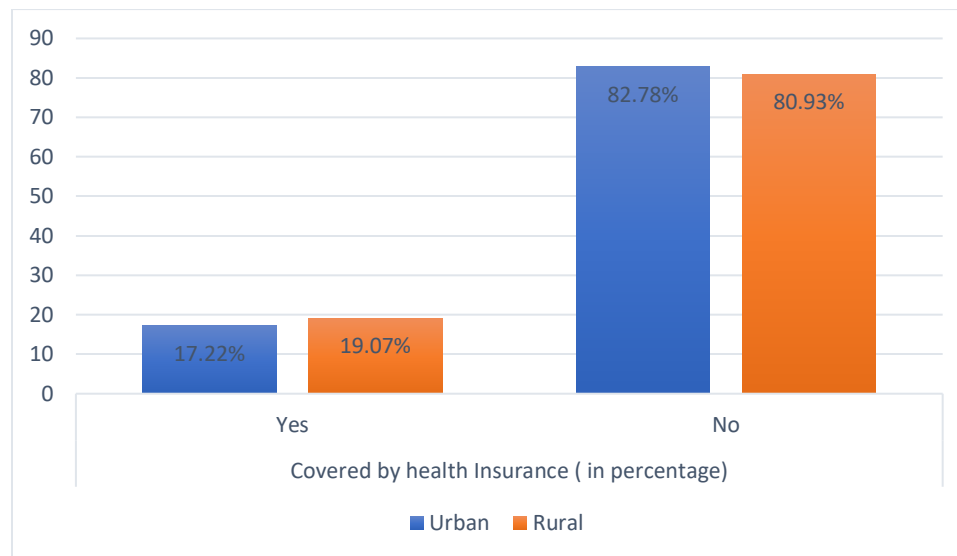
Figure 5. Comparison between Urban and Rural OOPHE



Source: Calculations based on NFHS-4 (2015-2016)

Figure: 5 examines the average spending of urban and rural citizens on various kinds of out-of-pocket health expenditures (OOPHE) such as hospitalization costs, medicines, tests, transportation and other medical costs. It has been found that compare to rural citizens, urban citizens spend more on different out-of-pocket health expenditures (OOPHE) especially they spend more on hospitalization costs.

Figure 6. Percentage of Rural and Urban Residents with Health Insurance



Source: Calculations based on NFHS-4 (2015-2016)

Figure: 6 analyses the proportion of urban and rural residents who have health insurance coverage. The figure shows there are significantly low out-of-pocket health expenditures in both urban and rural areas. Although compare with the urban citizens, rural residents have little more health insurance coverage. So, comparing Figure – 5.1 and Figure – 6.1, it can be concluded that as rural residents have more health insurance coverage, they need to spend less out-of-pocket health expenditures than urban residents.

Table 1. Mean of Various “Out-of-Pocket Health Expenditures” for Maternal Healthcare in the Past 5 Years

Socio-economic and Demographic Factors	Healthcare Expenditures					
	Mean of Transport ation cost (in Rupees)	Mean of Hospital Stay cost (in Rupees)	Mean of Test cost (in Rupees)	Mean of Medicines cost (in Rupees)	Mean of Other Cost (in Rupees)	Mean of Total OOPE (in Rupees)
Caste						
Schedule caste	1948.43	5397.14	3842.99	3735.15	3282.95	18206.66
Schedule tribe	1778.46	4869.33	2669.74	2845.90	3094.88	15258.32
Other backward castes	1708.52	5253.97	3331.06	3584.88	3686.28	17564.70
None of them	1788.68	5538.95	3557.38	4024.35	3817.26	18726.62
Husband/partner's occupation						
Not in workforce	1414.09	4663.11	2860.12	3122.68	3849.02	15909.02
Professional/technology	2426.99	7034.29	3990.16	4173.56	4625.24	22250.23
Clerical	1091.38	5959.12	3253.25	3784.74	3956.18	18044.66
Sales	1578.58	5747.61	3703.39	3926.09	3852.03	18807.69
Agricultural	2019.50	4904.89	3142.23	3487.24	3025.03	16578.89
Services	1681.77	5936.06	3540.39	3383.46	3841.53	18383.21
skilled and unskilled	1440.84	5447.75	3403.25	3650.99	3652.00	17594.83
Respondent's occupation						
Not in workforce	1689.09	5718.11	3451.03	3706.44	3823.00	18387.67
Professional/technology	2395.08	5287.70	4036.06	4328.67	3983.61	20031.12
Clerical	715.69	9581.31	3725.00	2993.75	2406.25	19422.00
Sales	2139.51	7686.98	5328.84	3300.00	3295.35	21750.68
Agricultural	1576.88	4287.52	2830.89	2635.11	3042.45	14372.84
Services/household	2014.95	4836.74	2728.16	3762.52	2704.85	16047.22
Manual – skilled	2814.20	6377.39	4170.44	4745.86	3505.01	21612.90

Socio-economic and Demographic Factors	Healthcare Expenditures					
	Mean of Transport ation cost (in Rupees)	Mean of Hospital Stay cost (in Rupees)	Mean of Test cost (in Rupees)	Mean of Medicines cost (in Rupees)	Mean of Other Cost (in Rupees)	Mean of Total OOPE (in Rupees)
Respondent's education level)						
No education	1448.21	3860.46	2635.06	2942.25	2740.64	13626.62
Primary	2189.03	5379.21	3512.01	3575.29	3414.07	18069.61
Secondary	1709.69	5292.61	3320.67	3556.62	3437.09	17316.68
Higher	2210.01	6911.72	4273.82	4538.03	4721.56	22655.14
Husband's education level						
No education	2063.60	4124.04	2908.65	2857.67	2835.50	14789.45
Primary	1932.58	5088.18	3244.36	3658.40	3700.63	17624.15
Secondary	1554.22	5568.63	3437.86	3602.88	3479.57	17643.16
Higher	2054.65	6448.32	3736.48	4104.13	4509.07	20852.65
Total Children ever born						
0 to 5	1827.84	5433.90	3440.42	3683.90	3602.28	17988.34
6 to 10	1151.03	3383.05	2446.54	2143.36	2397.71	11521.69
11 to 15	855.00	10320	1305.00	1700.00	1465.00	15645
Place of residence						
Urban	1774.87	6247.34	4004.86	3977.25	3942.18	19946
Rural	1840.50	4925.88	3093.90	3478.29	3378.23	167169
Religion						
Hindu	1826.08	5333.72	3410.79	3658.98	3608.88	17838
Muslim	1845.89	5694.85	3546.29	3641.94	3594.03	18323
Christian	1662.32	5358.01	2742.21	3409.40	3311.55	16483
Sikh	1755.81	5683.97	4066.51	4018.99	3438.28	18963
Age						
15-19	2936.71	6171.50	3496.07	4014.66	3781.58	20400
20-24	1968.41	5249.36	3344.99	3478.79	3551.38	17592
25-29	1689.66	5287.73	3434.17	3616.91	3564.27	17592.74
30-34	1674.52	5542.42	3468.90	3761.22	3556.18	18003.24

Socio-economic and Demographic Factors	Healthcare Expenditures					
	Mean of Transport cost (in Rupees)	Mean of Hospital Stay cost (in Rupees)	Mean of Test cost (in Rupees)	Mean of Medicines cost (in Rupees)	Mean of Other Cost (in Rupees)	Mean of Total OOPE (in Rupees)
35-39	1606.64	5710.79	3362.65	4006.10	3714.06	18400.22
40-44	2253.71	6178.69	3947.83	4091.36	3833.23	20304.82
45-49	4440.48	6624.86	4459.19	5052.95	4056.91	24634.39
Gender of Household Head						
Male	1806.35	5334.81	3376.61	3632.89	3544.77	17695.43
Female	1895.59	5913.45	3768.75	3849.77	3857.77	19285.33
Wealth Index						
Poor	1751.21	4270.15	2856.92	3048.01	2870.4	14796.7
Middle	1688.43	5209.72	3309.76	3700.49	3357.8	17266.2
Rich	1908.11	6111.61	3784.46	3977.22	4070.0	19851.4
Delivery_Care_Used						
Public	1937.22	4134.19	3266.91	2894.00	2585.3	14817
Private	1764.87	5961.38	3492.79	3994.31	4019.5	19232
Wanted the last child						
Wanted	1809.50	5444.53	3436.07	3694.03	3605.7	17989
Unwanted	2015.45	4398.42	3118.32	2776.26	2996.1	15304
Region						
North	1795.69	4115.58	2553.57	3279.92	3272.3	15017
North-East	1775.90	4895.40	2749.37	2849.14	3526.7	15796
East	1465.79	5232.30	3611.35	3715.62	3062.5	17087
West	3415.73	8581.75	5996.61	5161.08	4768.7	27923
South	1976.24	6332.89	4030.45	4254.83	4036.0	20630

Source – Calculations based on NFHS-4 data (2015-2016).

The out-of-pocket health expenditure (OOPE) for delivery care is calculated by the summation of the mean costs (hospital costs, medicines, tests, transportation and other medical costs) incurred for delivery care. The descriptive analysis has been used to calculate the OOPE against the various socio-economic factors for delivery care. From the table, it can be concluded that the general caste spends more out-of-pocket (OOPE) for delivery care than the other castes. The people who are

working in the technological field, and sales spend more OOPE than other groups. Analysing the table, we can find that mostly the rich, educated, urban people's OOPE is higher. People spend more in private hospitals than in public. We can see that the female household head families spend more on OOPE delivery care. People spend more on wanted children especially those who have children less than 6 numbers. The woman aged 45-49 spends more on OOPE delivery care. People belonging to the western region in India spend more for OOPE delivery care, and we could not find much deviation in OOPE for different religions in India.

4.2 Multiple Regression Analysis

Table 2 shows the results of regression analysis. In the regression where IN_OOPE (log of OOPE) is our dependent variable, by doing the regression of the independent variable wealth index, where poor is the base category, we get the value of the middle and high-income category is significant in both 5 per cent and 1 per cent level of significance. The analysis shows that comparing public health care expenditure, private sector OOPE value is significant at both 1 per cent and 5 per cent levels of significance (LS). It shows that people expend 0.83 times more on private healthcare services compared to public services

Table 2. Results of Multiple Regression Analysis

IN_OOPE	Coefficient	Std. Err.	P>t
Wealth index (base: poor)			
Middle	0.15***	0.05	0.01
Rich	0.26***	0.05	0.00
Delivery_Care_Used, (base category: public sector)			
Private sector	0.84***	0.04	0.00
Respondent's occupation, (base category: no working)			
Sales	0.26**	0.14	0.05
Caste (base category: schedule caste)			
General	0.03***	0.05	0.04
Education, (base category: no education)			
Primary	0.16***	0.07	0.03
Secondary	0.23***	0.06	0.00
Higher	0.37***	0.07	0.00
Age, (base category: 15-19)			
45-49	1.09***	0.34	0.00
States Region, (base category: north)			
South	0.13***	0.05	0.01

Health Insurance covered, (base category: No)			
Yes	0.18***	0.04	0.00

*** and ** significant at 1% and 5% level respectively.

By taking non-working women as the base category of the respondent's occupation we get the respondents who are working in sales has a significant value of 5 per cent LS. The respondents who work in sales jobs spend 0.26 times more than the non-working women. From the regression we get primary educated women data is significant at a 5 per cent level of significance and secondary, higher secondary values are significant at both 1 per cent and 5 per cent level, where non-educated respondents are taken as the base category. It shows that educated women spend significantly higher for out-of-pocket delivery care. The result shows that southern citizens spend significantly higher for OOPE healthcare and women aged 45-49 spend more for OOPE delivery care than 15-19 aged women. The study finds that women who have health insurance spent significantly higher than those who do not have health insurance coverage.

5. Conclusion

The purpose of this article was to determine the socioeconomic and demographic parameters influencing out-of-pocket health spending for delivery care in India. Descriptive and OLS regression analysis has been carried out to examine the predictors or the significant factors that affect out-of-pocket expenditure (OOPE) for maternal care in India. The result of the descriptive study finds western area of India has the lowest (12.25 per cent) health insurance coverage, while the northern region has the highest (30.88 per cent) overall health spending. Women in India's western region have the greatest proportion of OOPE for delivery care, while women in the northern and north-eastern regions have the lowest, at 16 per cent. According to the current study, it has been found that compared to other regions of India, the western region has the lowest amount of health spending covered by health insurance and the greatest OOPE for delivery care. From the regression analysis, the study finds that income and education are the most significant factors of out-of-pocket medical costs, these findings also match with previous studies (Yadav et al., 2021). The southern states significantly spend higher than the other region of India. The study finds that working women spend significantly higher than non-working women and most people spend more in the private healthcare sector. Although the study shows that the general caste spends significantly higher OOPE we cannot find any significant role for different castes and places of residence (like rural and urban) women. The sex of the household head, the respondent's partner's education level and his occupation also have no significant effect on OOPE delivery care. More in-depth research is needed in this area to understand the demand side issues of "out-of-pocket health expenditure" because the rise in "out-of-pocket expenditure" worsens the condition of middle and poor people. Government policies such as the Janani Suraksha Yojana (JSY),

“Rashtriya Swasthya Bhima Yojana” (RSBY), and Janani Shishu Suraksha Yojana in 2005, 2008 and 2011 have been implemented in India to give health securities to the poor which also helps to improve the maternal healthcare system. It is well acknowledged that health insurance is one method of protecting impoverished households from the possibility of health expenses leading to poverty. The impoverished are unable or unwilling to obtain health insurance due to the high cost or perceived lack of advantages. As evidenced by NFHS data, there has been a significant shift in the maternal healthcare picture with the introduction of JSY. More policies like this are needed to promote and push institutional healthcare facilities to supply services to achieve universal health coverage but only this type of policy implementation cannot solve whole the problem. It is also vital to ensure that those who truly require the advantages of these schemes receive the benefits without any corruption.

References

- Akca, N., Sonmez, S., & Yilmaz, A. (2017). Determinants of health expenditure in OECD countries: A decision tree model. *Pakistan Journal of Medical Sciences*, 33(6), 1490-1494.
- Alam, K., & Mahal, A. (2014). Economic impacts of health shocks on households in low- and middle-income countries: a review of the literature. *Globalization and health*, 10(1), 1-18.
- Azzani, M., Roslani, A. C., & Su, T. T. (2019). Determinants of household catastrophic health expenditure: a systematic review. *The Malaysian journal of medical sciences: MJMS*, 26(1), 15-43.
- Barenberg, A. J., Basu, D., & Soylu, C. (2017). The effect of public health expenditure on infant mortality: evidence from a panel of Indian states, 1983–1984 to 2011–2012. *The Journal of Development Studies*, 53(10), 1765-1784.
- Bonu, S., Bhushan, I., Rani, M., & Anderson, I. (2009). Incidence and correlates of ‘catastrophic’ maternal health care expenditure in India. *Health policy and planning*, 24(6), 445-456.
- Financial Express Healthcare. (2023, March 29). *Healthcare financing needs attention - Nathealth*. Nathealth. <https://nathealthindia.org/healthcare-financing-needs-attention/>
- Furuoka, F., Lim, B. F. Y., Kok, E., Hoque, M. Z., & Munir, Q. (2011). What are the determinants of health care expenditure? Empirical results from Asian countries. *Sunway Academic Journal*, 8, 12-25.
- Jayakrishnan, T., Jeeja, M. C., Kuniyil, V., & Paramasivam, S. (2016). Increasing out-of-pocket health care expenditure in India-due to supply or demand. *Pharmacoeconomics*, 1(105), 2.
- Kumar, K., Singh, A., Kumar, S., Ram, F., Singh, A., Ram, U., Negin, J. & Kowal, P. R. (2015). Socio-economic differentials in impoverishment effects of out-of-pocket health expenditure in China and India: evidence from WHO SAGE. *PloS one*, 10(8), e0135051.

- Ladusingh, L., & Pandey, A. (2013). Health expenditure and impoverishment in India. *Journal of Health Management*, 15(1), 57-74.
- Leone, T., James, K. S., & Padmadas, S. S. (2013). The burden of maternal health care expenditure in India: multilevel analysis of national data. *Maternal and child health journal*, 17, 1622-1630.
- Mondal, S., Kanjilal, B., Peters, D. H., & Lucas, H. (2010). Catastrophic out-of-pocket payment for health care and its impact on households: Experience from West Bengal, India. *Future Health Systems, Innovations for equity*.
- Pal, R. (2012). Measuring incidence of catastrophic out-of-pocket health expenditure: with application to India. *International journal of health care finance and economics*, 12(1), 63-85.
- Pandey, A., Ploubidis, G. B., Clarke, L., & Dandona, L. (2018). Trends in catastrophic health expenditure in India: 1993 to 2014. *Bulletin of the World Health Organization*, 96(1), 18-28.
- Priyadarshini, P., & Abhilash, P. C. (2020). Exploring the 'Safe Operating Space' of India for the implementation of UN-Sustainable Development Goals through effectual policy alignment. *Sustainability Science*, 15(4), 1149-1168.
- PTI. (2023a). Govt's share in health expenditure increased from 28.6 pc in FY-14 to 40.6 pc FY-19: Eco survey. *ThePrint*. <https://theprint.in/india/govts-share-in-health-expenditure-increased-from-28-6-pc-in-fy-14-to-40-6-pc-fy-19-eco-survey/1345716/>
- Rahman, T. (2008). Determinants of public health expenditure: some evidence from Indian states. *Applied Economics Letters*, 15(11), 853-857.
- Ramani, K. V., & Mavalankar, D. (2006). Health system in India: opportunities and challenges for improvements. *Journal of health organization and management*.
- Reserve Bank of India. (2019). Annual report. Reserve Bank of India - Publications. <https://m.rbi.org.in/Scripts/PublicationsView.aspx?id=19283>
- Significant Decline in Maternal Mortality in India. (2022, December 14). Press Information Bureau. <http://pib.gov.in/FeaturesDeatils.aspx?NoteId=151238>
- Sinha, R. K., Chatterjee, K., Nair, N., & Tripathy, P. K. (2016). Determinants of out-of-pocket and catastrophic health expenditure: a cross-sectional study. *British Journal of Medicine and Medical Research*, 11(8), 1-11.
- Yadav, J., John, D., Menon, G. R., & Allarakha, S. (2021). Out-of-Pocket payments for delivery care in India: do households face hardship financing? *Journal of Health Management*, 23(2), 197-225.

Appendix 1

Table 3. State-wise Medical Expenditure as a Ratio to Total Aggregate Expenditure (2015-2016)

State	2015-16
1. Andhra Pradesh	4.5
2. Arunachal Pradesh	4.3
3. Assam	6.8
4. Bihar	4.1
5. Chhattisgarh	5.1
6. Goa	5.5
7. Gujarat	5.6
8. Haryana	3.1
9. Himachal Pradesh	5.2
10. Jammu and Kashmir	5.7
11. Jharkhand	4
12. Karnataka	4.1
13. Kerala	5.2
14. Madhya Pradesh	4.4
15. Maharashtra	4.5
16. Manipur	5.4
17. Meghalaya	7.6
18. Mizoram	5.8
19. Nagaland	5.1
20. Odisha	4.7
21. Punjab	4.1
22. Rajasthan	4.6
23. Sikkim	5.8
24. Tamil Nadu	4.9
25. Telangana	3.9
26. Tripura	5.3
27. Uttar Pradesh	4.5
28. Uttarakhand	5



State	2015-16
29. West Bengal	5.6
30. NCT Delhi	10.3
31. Puducherry	8.3

Source: Calculated based on the data from RBI Bulletin