Research Article

Determinants of Healthcare Expenditure in Eastern Uttar Pradesh, India: Through the lens of NSSO Data

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A B S T R A C T

This study aims to examine the determinants of health-care expenditure in the Eastern region of Uttar Pradesh. Secondary data from the National Sample Survey Office (NSSO) of 75th round on social consumption related to health were utilized. The Heckman two-step selection model was used to analyse household and individual decisions to seek care. Findings of this study reveal that having household head aged between 31 to 60 and above 60 years, household size greater than 5 members, belonging to religion other than Hindu, non-ST category as Schedule caste, Other backward class and others, people residing in urban area, people having higher economic status, private hospitals, upper primary and secondary+ schooling of household head and having household members with chronic illnesses were determinants contributing more health-care spending. However, female household head had less likely to incur healthcare expenditure as compared to male household in the region. An important finding indicates that the majority of people visited private hospitals in the region which increased the health-care spending at large and it burdened financially to the vulnerable section of the society. Based on the discussion, a few policy suggestions have been proposed to counter the above problems.

Keywords: Determinants, Healthcare, Expenditure, Eastern, Uttar Pradesh, NSSO

Introduction

During the post reform era, India experienced substantial economic and agricultural growth, resulting in rising incomes and aggregate food self-sufficiency. Despite these merits, India's demographic and health indicators continue to lag behind, with low life expectancy (69 years), prevalence of infectious & communicable diseases, high maternal & child mortality rate (almost 37 per 1,000 lives), high fertility coupled with a young age structure and increased urbanization.[51] Economic survey 2019 depicts that, "Access to healthcare is still a major challenge in India. If India's hospital facilities remain at current levels, rising population over the next two decades (even with slowing population growth rates) will sharply reduce the per capita availability of hospital beds in India across all major states" which we have been witnessing in this COVID-19 period. It adds that many states like Madhya Pradesh, Uttar Pradesh, Bihar, Rajasthan and Odisha have poorly manned primary

119

Ram M and Kumar A
J. Commun. Dis. 2021; 53(3)

health centres and witness more number of mother and child deaths.

Normally, health is a priority sector of government activities. Economic growth is greatly affected by health as its impact is obvious on human capital accumulation.[11,51] We have evidences that efficiency of healthy people is higher compared to that of those who are less healthy or ill. A greater amount of wealth is accumulated by healthy people due to their improved work abilities.[2] That is why a higher budgetary allocation on health expenditure is needed in any country. One of the major determinants of budget allocation on health sector is the prevailing socio-economic conditions of the country. Among the socio-economic factors, the most important are education level and the coverage of national health programmes. Two other important factors are health infrastructure and health personnel. Verma CS, Usmani G[7] in their study recommend a greater focus on the healthcare delivery mechanism in order to achieve higher rates of economic growth. Another important study[22] has revealed that urbanization, education, crude birth rate and foreign aid are significant determinants of health expenditure.

Though most of the countries have to face multiple problems related to financing of their health systems,[27] the worst hit are the low and middle-income countries (LMICs) like India. The health financing arrangements are skewed in such countries. It comes to observation that in these countries the level of protection against financial risk is a thin, health-care services and non-affordable and the coverage of health-care services is small. We can attribute these to five A's i.e. Awareness Absence or the lack of awareness, Access Absence or the lack of access, Absence or crisis the manpower in healthcare, Adverse Affordability in terms of cost of healthcare and Absence or lack of Accountability.[3] All these have been a cause of inefficient functioning of the Indian healthcare system and poor health outcomes. Moving closer to universal health coverage (UHC)[53] as urged by World Health Assembly depends on the health financing arrangement of a country. In the context of above mentioned scenario, the aim of present study i.e. to gain a deeper understanding of the determinants contributing to health-care spending among households in India, particularly, in eastern Uttar Pradesh (U.P.) becomes really important. This will impart new knowledge to enable policy makers and political actors to act for the improvement of the noted determinants. This study is an attempt to analyses the extent of healthcare spending and its determinants among households in India, particularly, in eastern U.P. It is important to note that a number of studies in different countries have analysed the determinants of healthcare spending.[6,10,12,22,41,44,45,47-49,54] The findings of these studies have revealed that the determinants of health expenditure among households include education, household size, chronic illness, income, age structure of population,

residence, gender, weight, employment, population density, insurance coverage, life expectancy, population per primary healthcare centre, population per doctor, urbanization, crude birth rate, foreign aid, fiscal capacity, state's priority to health, political participation and lifestyle.

However, there is dearth of evidences on healthcare spending determinants at the household level in India using NSSO (National Sample Survey Office) data. One such study is "Determinants of Public Expenditure on Health in India: The Panel Data Estimates". This study used data sets of Finance Account of individual states and of RBI-State Finance. The main findings were that policy reforms initiated in 2005, fiscal capacity and people's political participation in a particular state had significant positive influence on government health expenditure. Another study[41] revealed that demographic factors have less impact on spending. Verma CS et al.[49] have concluded that the likelihood of selecting a public provider for hospitalization care was 4.8 times higher in the poorest quintile and 3.4 times as high for women. Since, people go untreated in absence of adequate access to public sector services; this factor may be responsible for an apparently higher proportion of utilisation of healthcare services of private sector in data. The main difference of our study from the previous studies is on the determinants of healthcare expenditure in eastern region of U.P. The present study uses the NSSO data set and the Heckman two-step 'selection model'.[6,25] The study provides evidence and makes significant contribution to the scarce literature on determinants of healthcare expenditure in eastern U.P. and presents implications of the same for health policy in respect of universal health coverage. This study hypothesizes that individual and household characteristics are not significant determinants of healthcare spending in eastern UP, India.

Overview of the Indian Health-care System in General and Eastern Uttar Pradesh in Particular

With a population of more than 1.2 billion, India is the world's largest democracy. With the rapid economic growth over the decade, the country has witnessed increased integration with the global economy and has emerged as a global player.[52] Being world's third largest economy in terms of purchasing power parity the country aspires to become a high-middle income country by 2030.[52] However, on comparing the country with other countries that had witnessed almost similar level of economic development at the time of independence, the burden of preventable disease in India remains higher and healthcare remains far away from being equitable, accountable, or affordable.[38] Indian healthcare system is a complex mix of private hospitals operating as enterprises under a free market and public hospitals which operate under government control with staff salaries paid by government and all buildings and

Ram M and Kumar A
J. Commun. Dis. 2021; 53(3)

120

equipment owned by government. According to National Family Health Survey-3, private sector accounts for almost 70% of health-care services in urban area and 63% in rural India viz-a viz the public health sector which accounts for only 30% of health-care services in urban area and 37% in rural India.

The three categories of healthcare delivery mechanism in India, classified under three categories- primary, secondary and tertiary care, are meant to work together for ensuring smooth delivery of healthcare. However, duplication of responsibilities among these three has resulted in poor coordination. Crippling with a number of challenges like decaying and poor infrastructure, poor governance, less budgetary allocation, poor service delivery and poor performance of health workers, the primary healthcare system which is supposed to be the foundation of country's health system, has miserably failed to provide basic healthcare services to Indian population.[17] The health indicators for India are poorer when compared to the average for South Asia on similar indicators. India has a life expectancy of 69 years, under-5 mortality rate at 37 per 1000 live births, maternal mortality ratio at 145 per 100,000 live births and neonatal mortality rate at 23 per 1000 live births. The health financing and expenditure indices also reveal that total health expenditure in India is only 1.6% of GDP while public expenditure on health as a percentage of total health expenditure is only 27.13% and, private expenditure on health as a percentage of total health expenditure is 72.06%.[52]

In addition to the above mentioned facts, we know that Uttar Pradesh is among the poorest states in India. It not only accounted for 39.8% of its population living below the poverty line in 2011-12[35] but also had worst performance on health indices with a high infant mortality rate (43 per 1,000 live births)[8] and high maternal mortality ratios (201 per 1,00,000 live births as of 2014-16). There is a dire need in Uttar Pradesh to remove financial barriers in its way of accessing healthcare services and reconstructing a healthcare system that provides greater financial protection against the costs of healthcare. However, observations from 75th round of NSSO (July 2017 to June 2018) reveal that burden of average healthcare expenditure on people of U.P. is far greater in comparison of the similar average at India level.[31] The average total medical expenditure per hospitalization case in U.P. is Rs. 26089 as against Rs. 20135 in India. The average total medical expenditure per hospitalization case in rural and urban areas of the Uttar Pradesh is Rs. 23144 and Rs. 33339 as against Rs. 16676 and Rs. 26475 in the rural and urban areas of the country respectively.

NSSO has divided Uttar Pradesh into NSS regions as Northern upper Ganga plains, Central, Eastern, Southern,

and Southern upper Ganga plains. The region of eastern Uttar Pradesh consists of 18 districts. Compared to female population, the male population in the state is higher with a percentage ranging between 53.6% and 50.5%. Sex ratio in eastern Uttar Pradesh districts ranges between 1020 and 867 while literacy ranges from 66.1% to 35.2%. Demographic analysis of the area reveals that share of working population in the districts of eastern region ranges between 28.5% and 39.4%.

Workers in this area are engaged in different occupations. By occupation workers are classified as cultivators, agricultural labourers, worker in household industry and other workers. The share of cultivator varies between 59.7% and 21.1%, the share of agricultural labourers ranges between 40.1% and 10.4% while the share of workers in households' industry ranges between 22.6 % and 2.2 %. This is indicative of cottage and household industry based economic activity (Upadhyay & Upadhyay, 2011). Moreover, the average total medical expenditure per hospitalization in case of Eastern U.P. is Rs. 22422 as against Rs. 26089 in overall U.P. This low health status as compared to all-India and at U.P. must be inquired, hence, the present study tries to find out determinants of healthcare expenditure in eastern U.P.

Materials and Methods

Data Source

The present study has used secondary data from the NSSO. In India, NSSO carries out surveys on socio-economic, demographic, agricultural and industrial subjects to collect households and enterprises data from villages and towns. NSSO acts as focal agency of the Govt. of India for collection of vital statistical data for developmental planning. Its 75th round on social consumption related to health, forms a vital source of primary data on the subject for the country. The survey has come out with basic information on the health sector by providing data on morbidity, ailments and treatment profiles, role of private sector as well as of government in healthcare provisions, expenditure on medicines, medical consultation, investigation, hospitalization expenditure, maternity, childbirth and the condition of the aged etc. A stratified multi-stage design was adopted for the 75th round survey and the survey covered the entire Indian union government (except for those villages in Andaman and Nicobar Islands, which are difficult to access), where data were collected from 1,13,823 households.

Data Collection

For the purpose of the study, data was extracted from NSSO 75th round on social consumption related to health using STATA 14. Only 10 variables relevant to the objectives of the study were selected.

121

Ram M and Kumar A
J. Commun. Dis. 2021; 53(3)

Variables Measurement

Dependent Variable

The dependent or outcome variable in this study was healthcare spending/medical expenditure. It comprised of all the expenditure spent on health and medical care for availing all health facilities by individuals in the household. The expenditure by individuals on health & medical care includes package components, consultation fees, medicines, bed charges, diagnostic tests and other medical expenditure on traditional/alternative medicines. Healthcare expenditure for preventive and curative care both is a continuous variable and to estimate the same, questions were asked about amount paid for bed charges, doctor's/surgeon's fees, total amount paid for medicines, diagnostic tests, attendant charges, physiotherapy, personal medical appliances, and blood, oxygen, etc.[31]

Independent Variables

Grossman's theory of the demand for health,[16] Andersen's Behavioural Model,[1] and a literature review on the determinants of health care expenditure[6,10,12,22,37,41,44,45,47,49,54] were used as a guide for the independent or explanatory variables. According to Grossman M,[16] factors such as age, wage rate, and education influence the demand for health and healthcare. In his model, he proposes that the demand for health may be viewed as a durable capital stock that produces an output of healthy time. Using supply and demand curves for health capital, the model provides an explanation for variations in healthcare among persons. Grossman's model predicts that if the rate of depreciation increases with age, after some point in the life cycle, the quantity of health capital demanded would decline over the life cycle. The model of demand for health also enables one to analyse the effects of demographic variables like age, wage rate, and education without assuming that these variables are positively or negatively correlated with consumers' "tastes" for health.[16] The Andersen Behavioural Model, categorises the variables determining individual's decision to seek health-care into: predisposing factors (age, sex, ethnicity, and household head characteristics); enabling factors (location, geo-political zone, education, health insurance status, and household income); and need factors (perceived severity of illness, self-reported health status, presence of physician diagnosing chronic diseases, and overweight).

It is the interaction of these factors that determines whether or not an individual will seek healthcare. In our study, education of household head was classified into five groups' viz. no schooling, below primary, primary, upper primary, and secondary, age was categorized into three groups and gender (sex) of household head was categorized into male and female. Household size was defined as the number of individuals in a household, and was re-coded in two categories i.e. less than five members and more than five members. Place of residence (location) was classified into urban and rural areas where urban residents were defined as households living in towns and urban neighbourhoods of cities, while rural residents were defined as households living in villages and suburban areas of the cities. Religion was grouped into two categories Hindu and others, while, social group was defined according to the survey questionnaire, and grouped into four categories as ST, SC, OBC and Others. Further, economic status was defined as poor, middle and richest, however, chronic ailments was divided in two groups 'no' and 'yes'. For the purpose of study, Medical institutions were defined according to the survey questionnaire, and categorized into government/ public hospital, charitable and private hospital.

Research Tool

Since, estimation of the determinants of healthcare spending from the sub-population who consulted health practitioners for treatment may have introduced bias, we applied the Heckman 'two-step' selection model,[55] as used in earlier studies[6] to address the issue of selection bias among individuals who did not report paying for healthcare. The Heckman 'two-step' selection model checks potential sample selection bias.[54] Using the regression equation (i) and selection equation (ii) in the model:

$$y_j = x_j\beta + u_1 j \qquad\qquad (i)$$

Health-care spending was not always observed. Rather, health-care spending for households who fell sick and sought health-care services was observed if:

$$z_j\gamma + u_2 j > 0 \qquad\qquad (ii)$$

Where,

* $u_1 \sim N(0, \sigma)$
* $u_2 \sim N(0, 1)$
* corr. $(u_1, u_2) = \rho$

When $\rho \neq 0$, the application of standard regression techniques to the first equation yields biased results. However, use of Heckman model provides consistent, asymptotically efficient estimates for all the parameters in such cases (Heckman 1979). We also checked the model for presence of multi-collinearity and assessed the goodness of fit using the Hosmer-Lemeshow test.

Results and Discussion

Table 1 presents the determinants of health expenditure by regression and Two-step Heckman selection model. In the regression model, household heads with age between 31 to 60 years (0.14, p=0.54) and above 60 years (0.13, p=0.61), household size greater than five members (0.17, p=0.18) and religion other than Hindu (0.10, p=0.52) were found

Ram M and Kumar A
J. Commun. Dis. 2021; 53(3)

122

more likely to incur health-care spending in comparison to their reference categories, but the relation was not found significant. As per the regression, Social group of patient is a potential determinant of expenditure on healthcare as Schedule caste (1.48, p=0.01), other backward class (1.27, p=0.01), and others (1.47, p=0.01) were found to incur more expenditure on health care than their counterpart. Place of residence had positive association with health care expenditure as urban residents (0.01, p=0.95) were found more likely to incur health care expenditure in comparison to rural residents. Economic status of the households also had great association with expenditure on health. Regression shows that middle income households (0.48, p=0.00) and richest households (0.5, p=0.00) were incurring

more expenditure on health care in comparison to poor households. Gender wise findings revealed that female household heads were (-1.12, p=0.45) less likely to incur expenditure on healthcare in comparison to male household heads. Further, household heads with upper primary and Secondary+ schooling of (0.27, p=0.07) were likely to incur significantly more expenditure on health care compared to household heads with no schooling. As was expected, households having members with chronic illness (0.16, p=0.25) had more health care spending in comparison to the reference category. Private hospitals (1.22, p=0.00) were also found likely to incur more healthcare expenditure than government and charitable hospitable.

Table 1.Determinants of Health-care Expenditure by Regression and Two-step Hackman Selection Model

Variable	Regression		Heckman Selection Model	
Household head age	Coef. (Std. error)	P-value	Coef. (Std. error)	P-value
< 31 years®				
31 to 60 years	0.14 (0.23)	0.54	1.07*** (0.32)	0.00
> 60 years	0.13 (0.25)	0.61	1.09** (0.4)	0.01
Household size				
< = 5®				
> 5	0.17 (0.12)	0.18	-0.38 (0.27)	0.16
Religion				
Hindu®				
Others	0.10 (0.15)	0.52	-0.21 (0.31)	0.50
Social group				
ST®				
SC	1.48** (0.52)	0.01	0.88 (0.63)	0.16
OBC	1.27** (0.51)	0.01	1.05* (0.62)	0.09
Others	1.47** (0.52)	0.01	1.28* (0.67)	0.06
Place of residence				
Rural®				
Urban	0.01 (0.13)	0.95	0.70** (0.35)	0.04
Economic status				
Poor®				
Middle	0.48*** (0.14)	0.00	0.23 (0.31)	0.45
Richest	0.5*** (0.16)	0.00	-0.34 (0.35)	0.33
Sex (household head)				
Male®				
Female	-0.12 (0.15)	0.45	-1.41*** (0.27)	0.00
Schooling (household head)				
No schooling®				
Below primary	-0.05 (0.24)	0.84	-1.11** (0.4)	0.01

123

Ram M and Kumar A
J. Commun. Dis. 2021; 53(3)

Primary	-0.01 (0.17)	0.94	-0.68** (0.33)	0.04
Upper primary	0.18 (0.18)	0.31	0.06 (0.41)	0.88
Secondary +	0.27* (0.15)	0.07	-0.37 (0.33)	0.26
Chronic ailment				
No°				
Yes	0.16 (0.14)	0.25	-0.15 (0.31)	0.63
Medical institution				
Govt./public hospital°				
Charitable	0.26 (0.35)	0.45	-0.31 (0.47)	0.52
Private hospital	1.22*** (0.12)	0.00	1.36*** (0.26)	0.00
Number of observations	522		566	

*significant at p<0.1, **significant at p<0.05, ***significant at p<0.01, °Reference category.

In the selection model, household heads having age between 31 and 60 years (1.07, p=0.00) and above 60 years (1.09, p=0.01) were found more likely to incur expenditure on healthcare. Households with other backward category (1.05, p=0.09) and others (1.28, p=0.06) were also more likely to incur expenditure on healthcare in comparison to the reference category. As in the regression model, in selection model too, Social group of patient has been found a potential determinant of expenditure on healthcare. Schedule caste (0.88, p=0.16), other backward class (1.05, p=0.09), and others (1.47, p=0.01) were found to incur more expenditure on health care than their counterpart. Place of residence had positive association with healthcare expenditure. Households in the category urban residents (0.70, p=0.04) were more likely to incur expenditure on healthcare compared to those in the category rural residents. When compared to male household heads, female household heads (-1.41, p=0.00) were less likely to incur expenditure on health care. Households with upper primary schooling (0.06, p=0.88) were more likely to incur expenditure on healthcare. Medical treatment in private hospitals (1.36, p=0.00) was also likely to incur more healthcare expenditure as in the regression model.

Discussion

The findings of our study reveal that household and individual characteristics play an important role in variations of the likelihood of health-care spending. In the present study, household heads of age between 31 to 60 years (0.14, p=0.54) and above 60 years (0.13, p=0.61) have shown increased likelihood of healthcare expenditure. This could be the result of more awareness programme introduced by government recently and older population, which may contribute to the rising costs of healthcare. This finding is supported by studies conducted in OECD countries,[45] Bangladesh,[44] Spain[10] but it is in contrast with studies from Malaysia,[25] Iran[55] and WHO,[54] which show that households with members aged 65 years and above either have no impact or significant negative impact on healthcare expenditure. Present study reveals that household size greater than five members (0.17, p=0.18) increased the likelihood of healthcare expenditure. A possible explanation for this may be that households with family size of more than five members have less resources on an average and cannot afford to pay for health care as much as those households which have a family size of five or less members. This finding is consistent with studies from America (Halliday et al., 2009)[57] and Nepal[19], where household size was found significantly associated with health-care spending. Households belonging to religion other than Hindu (0.10, p=0.52) or to a non-ST category i.e. schedule caste (1.48, p=0.01), Other backward class (1.27, p=0.01), or others (1.47, p=0.01), those residing in urban area (0.01, p=0.95) and those having higher economic status like middle income households (0.48, p=0.00) and richest households (0.5, p=0.00) were found to be spending significantly higher on healthcare than their counterparts. The findings of the study also revealed that households belonging to the lower socio-economic status (Hindu religion, rural people, ST - category and Poor income household) had been constantly experiencing poor health outcomes. Inability to have access to healthcare facilities or to pay for the use of healthcare services may be a reason for this. These findings were supported by the studies carried out by Dwivedi R, and Pradhan J,[56] Prinja S et al.,[36] Mills A et al.[28] and Cissé B et al.[9]

Further, present study revealed that private hospitals (1.22, p=0.00) were more likely to incur healthcare expenditure than government and charitable hospitals. It is noted that public hospitals have to face multiple challenges like deficiency of skilled staff, improper or inadequate infrastructure, unmanageable patient load and poor or average quality of services, therefore public moves towards private hospitals for treatment. It has also been noted that people who use the services of private hospitals have the suspicion that many private providers of health care perform

Ram M and Kumar A
J. Commun. Dis. 2021; 53(3)

124

unnecessary diagnostic tests and surgical procedures. However, despite this suspicion, people are yet choosing the private sector in overwhelming numbers since the public alternative is much worse with interminable waits in dirty surroundings with hordes of other patients. Many medicines and tests are also not available in the public sector, so patients have to go to private shops and laboratories to avail the healthcare. Owing to these reasons private hospitals were found more likely to incur health care expenditure in this region. This result is supported by the studies carried out by Mohsin M,[29] Kruse FM et al.,[26] Bel G & Esteve M,[5] Bajpai V[50] and Sengupta A.[40]

As per the findings, female household heads (-1.12, p=0.45) were less likely to incur expenditure on health care as compared to their male counterparts. This may be attributed to the greater ability of female-headed households to take proper health precautions and increasing rate of female literacy in this region in recent years. This result is consistent with the studies of Azzani M et al.,[4] Pal R,[34] Okunade AA et al.[32] but it is inconsistent with the studies of Htet S et al.[20] and Fan L, Habibov NN[14] where gender of the head of household was found to be a non-significant factor. However, the study revealed that household heads with schooling levels upper primary and secondary (0.27, p=0.07) were likely to incur significantly more expenditure on healthcare than the household heads with no schooling. A possible explanation is that as a person becomes more educated, he becomes more knowledgeable and possesses more information about better healthcare options at his command. This result is similar to studies in Myanmar[24], African Country,[33] Thailand[32] and Burkina Faso[47] but it is in contrast with the studies from Bangladesh[44] and Nepal.[19]

Lastly, households having members with chronic illness (0.16, p=0.25) had increased health care spending when compared to the reference category. An appropriate explanation for this is that cost of managing chronic illnesses is higher in comparison to the cost of managing non-chronic illnesses. This finding is similar to study in Myanmar,[24] Bangladesh,[37] China[43] and Zambia.[18] The study also found that the type of illness suffered by households is an important determinant of healthcare spending.

Conclusion and Policy Implication

Although some studies have been conducted on determinants of healthcare expenditure in general, there is still dearth of research on it for the eastern region of Uttar Pradesh. In this study, we have examined the determinants of healthcare expenditure in the Eastern region of Uttar Pradesh with the help of Heckman 'two-step' selection model. Our findings suggest that individual and household characteristics increases and decreases the risk of incurring healthcare spending. Female household heads are less likely to incur healthcare expenditure. Further, the study

indicated that households belonging to the lower socio-economic status (Belongs to Hindu religion, rural people, ST - category and poor income household) were constantly experiencing poor health outcomes. This is due to the fact that these people have minimum access to healthcare facilities or they are not in a position to pay for the use of healthcare services on frequent basis. Moreover, the majority of people visited private hospitals in the region which increased the healthcare spending and ultimately it burdened financially to the vulnerable section of the society. Hence, policy makers and political actors need to stop the high reliance on private healthcare facilities by increasing public health expenditure at length and more focus must be given on female education in the region.

Conflict of Interest: None

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125

Ram M and Kumar A
J. Commun. Dis. 2021; 53(3)

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126

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