



Received: 06 September 2016  
Accepted: 14 October 2016  
Published: 01 November 2016

\*Corresponding author: Ayantika Biswas, Department of Mathematical Demography and Statistics, International Institute for Population Sciences, Mumbai 400088, Maharashtra, India  
E-mail: [ayantika111@gmail.com](mailto:ayantika111@gmail.com)

Reviewing editor:  
Jamie Halsall, University of Huddersfield, UK

Additional information is available at the end of the article

## SOCIOLOGY | RESEARCH ARTICLE

# Medical and non-medical cost of hypertension and heart diseases in India

Ayantika Biswas<sup>1\*</sup>, Rakesh Kumar Singh<sup>1</sup> and S.K. Singh<sup>1</sup>

**Abstract:** Cardiovascular diseases are a major public health challenge in India with the emergence of disease burden of non-communicable diseases equivalent to that of communicable diseases. Long-term diseases entail large out-of-pocket expenditure too. There is also a dearth of studies regarding recent estimates of expenditures on treatment of people suffering from chronic conditions. The present paper focuses on the medical and non-medical expenditure associated with cardiovascular diseases (hypertension and coronary heart disease) in India. The Indian Human Development Survey (2011–12) data has been used. The sample size of hypertension and coronary heart diseases (15 and above years) are 6,015 (4.3%) and 1,509 (1.1%) from a total sample size of 147,201. ANOVA test has been applied to check the significance of differences in means. The number of hypertensive and CHD-affected adults preferring private providers for seeking treatment is three times the number of those preferring government providers. CHD-affected adults preferring private providers have been found to spend Rs. 4,000 more as average expenditure as compared to government providers. In spite of the country's health programs' endeavour to provide public institutional care for cardio-vascular diseases available universally, the findings show otherwise and put the glaring differences in medical and non-medical expenditure in sharp perspective.

**Subjects:** Mathematics & Statistics; Development Studies; Health and Social Care

**Keywords:** India; medical; hypertension; coronary heart disease



Ayantika Biswas

### ABOUT THE AUTHORS

Ayantika Biswas is a PhD research scholar at the International Institute for Population Sciences (IIPS), Mumbai. The key research areas of her interest are public health, medical health expenditure, HIV and non-communicable diseases.

Rakesh Kumar Singh is a senior research fellow (SRF) at International Institute for Population Sciences (IIPS), Mumbai. He has worked at Family Health International, New Delhi and has expertise in handling large scale data surveys. He has published numerous research papers in the areas of sexually transmitted diseases, non-communicable diseases, anaemia, fertility transition, maternal health etc. He has also presented his research findings at international forums.

Dr S.K. Singh is a professor at IIPS, Mumbai. He has published and presented numerous research papers in the fields of HIV, reproductive and sexual health, migration. He also has experience of research projects with international collaborations.

### PUBLIC INTEREST STATEMENT

The present paper shows the disparity in health-seeking behaviour in India with a majority of the population affected with non-communicable diseases preferring private institutions for treatment. The differential burden on people with chronic conditions who need multiple services for treatment of diseases, thereby increasing out-of-pocket (OOP) spending, has also been examined. Large OOP spending hinders access to healthcare, affects the health status and even the quality of life. Low insurance coverage and rising healthcare expenditures can lead to financial catastrophe, forcing households into poverty or deepening their existing poverty. A new comprehensive monitoring structure across various levels of India functioning in association with the Public Sector Health System is the need of the hour.

## 1. Introduction

The global burden of disease for cardio-vascular diseases (CVD) like hypertension is escalating mainly due to a rapid health transition in the developing countries. CVDs are the leading causes of death as of 2015. In 2012, it claimed the lives of an estimated 17.5 million people, a share of 31% of all the global deaths (World Health Organization, 2014). Moreover, around 75% three quarters of the deaths occur in low and middle-income countries, underlining the severity of the problem in developing countries. About 82% of the 16 million deaths below the age of 70 years are in less economically developed countries out of which 37% are caused due to CVDs (World Health Organization, 2014). CVD, having become a global cause of morbidity and a leading cause of mortality in most countries (Murray & Lopez, 1997), people living with such chronic conditions are subject to rising out-of-pocket (OOP) expenditures. In spite of the recognition of the need to provide universal health care, equal access to health care services remains a distant dream in developing countries like India. Low public health spending and almost non-existent health insurance coverage propel OOP spending to exorbitant levels. This keeps healthcare access out of the reach of the common poor.

## 2. Previous literature

The Millennium Development Goals (MDGs) have put health at the heart of their development agenda with 3 out of the 8 goals directly aimed at improvement of health. The necessity of examining the financial dimension of health, namely the OOP expenditure in this context is crucial (Garg & Karan, 2009). Consequences of a high share of OOP spending include a higher poverty incidence and a larger proportion of households facing catastrophic expenditures (O'Donnell et al., 2007; Xu et al., 2003). OOP spending, being an inefficient and inequitable way of healthcare financing has a negative tendency of increasing the risk of economically vulnerable groups of slipping into poverty. India spends less than 5% of its Gross Domestic Product (GDP) on health expenditure (Industry Report, 2014). An estimated 17% of the total Indian population was covered by insurance at the end of March 2014 (The Hindu, 2014). Owing to a weak insurance system and other community-based financing, OOP payments constitute 95% of private health expenditures (Ahuja, 2004; Garg & Karan, 2009; Government of India, 2009; Mahal, Sakthivel, & Nagpal, 2005). People living with chronic conditions are more vulnerable to higher OOP medical spending. The differential burden on people with chronic conditions who need multiple services for treatment of diseases increases OOP spending (Paez, Zhao, & Hwang, 2009). It can lead to constraining of expenditure of necessities and, hence, welfare loss at both the macro (national) and micro (household) level (Russell, 2004). Large OOP spending hinders access to health care, affects the health status and even the quality of life (Altman, Cooper, & Cunningham, 1999). Increasing OOP spending with an intention to reduce discretionary spending comes with its own set of problems like the reduction in access of even clinically necessary services like drugs preventing progression and onset of new chronic conditions (Chernew & Newhouse, 2008). Earlier studies have linked increasing OOP, drug costs in particular, to the number of chronic diseases acquired and being of significant extent in both the elderly and the non-elderly (Hwang, Weller, Ireys, & Anderson, 2001).

Increase in healthcare utilization due to increases in the prevalence, diagnosis, awareness of chronic diseases and demands among patients for services, provision and awareness among providers, access to treatments and sharp increments in incomes forms a pattern which is only expected to continue to increase in the future (Engelgau, Karan, & Mahal, 2012). The major portion of medical expenditure is on medicines, tests and medical instruments. Apart from these, doctors' consultation and hospitals' charges are the main expenditures. A higher amount of expenditure on chronic illnesses among the richer wealth quintiles puts rest to the notion of NCDs creating financial burden only on the poor (Ghaffar, Reddy, & Singhi, 2004; Yip & Mahal, 2008). But individuals belonging to the lowest wealth quintiles living closer to the poverty line, allocation of even small portions of their income to treatment of chronic diseases have the added risk of pushing them below the poverty line. The private sector plays a major role in delivery of health care services. There is an even higher financial risk associated with private services as the services are costlier in comparison to government institutions (Engelgau et al., 2012).

As nations trudge on the path of epidemiological transition, the health expenditure changes alongside it too. Communicable diseases require short-term treatment and interventions. NCDs, on the other hand, need long-term as well as expensive treatment. India is simultaneously reeling under both the kinds of diseases. The dual burden of communicable and non-communicable diseases experienced by India puts tremendous pressure on the healthcare system of India (Barik & Desai, 2014).

Even in rural India, non-communicable diseases are the leading causes of death exceeding injuries and external causes of death (Joshi et al., 2006). The differential burden on people with chronic conditions who need multiple services for treatment of diseases increases OOP spending (Paez et al., 2009). Large OOP spending hinders access to health care, affects the health status and even the quality of life (Altman et al., 1999). Earlier studies have linked increasing OOP, drug costs in particular, to the number of chronic diseases acquired and being of significant extent in both the elderly and the non-elderly (Hwang et al., 2001). The major portion of medical expenditure is on medicines, tests and medical instruments. Apart from these, doctors' consultation and hospitals' charges are the main expenditures. A higher amount of expenditure on chronic illnesses among the richer wealth quintiles puts rest to the notion of NCDs creating financial burden only on the poor (Ghaffar et al., 2004; Yip & Mahal, 2008). Nevertheless, Indians from all income levels face a huge amount of prohibitive costs, with a hospital stay having the potential to be worth more than an individual's annual income (Yip & Mahal, 2008).

The Government of India (GoI) implemented many vertical programs for effective reduction and control of NCDs like the National Cancer Control Programme was started in 1975 (Rao, Gupta, & Agarwal, 2002), the National Programme for Control of Blindness was initiated in 1976 (Dua, 2005) as well as a National Mental Health Programme was launched in 1982 (Jain & Jadhav, 2009). In the 11th Plan the convergence of these programs with the public sector health system was a major aim of the programs. National Rural Health Mission provided a wider framework for the functioning, up-scaling and expansion of these programs. Most of the NCDs like cancer, CHD, hypertension have considerably long pre-disease periods where modifiable factors like reduction in alcohol and tobacco use, consumption of healthy foods can reduce or control NCDs. The efforts made by the GoI have been unsuccessful in checking the rising burden of NCDs. Though there have been funds allocated for provision of medical services, they are far from being adequate for the public sector, which, in turn, forces people to approach private healthcare providers. NCDs, being prevalent across the whole of the country, only private healthcare sector in urban settings would not be of much use. A new comprehensive monitoring structure across various levels of India functioning in association with the Public Sector Health System is the need of the hour (Srivastava & Bachani, 2011). Strengthening of the public health system along with consolidation of the existing infrastructure will pave the way for effective management and alleviation of the burden of disease.

In India, OOP spending being the major source of healthcare financing, it leads to catastrophic level of spending and impoverishment of households (Berman, Ahuja, & Bhandari, 2010; Ghosh, 2011; Pal, 2010). With widespread inequalities between population groups, socio-economic conditions as well as rural and urban settings, the differentials ought to be studied.

### 3. Need for the study

Table 1 represents the demographic and socio-economic profile of India. India is a developing country with a population of approximately 1.3 billion. A sex ratio of 943 females per 1,000 males, an infant mortality rate of 40 per 1,000 live births and a life expectancy of 67.3 years for males and 69.6 years for females puts the demographic and health situation of the country into perspective. A predominantly rural population (68.8% of the Indian population lives in rural areas), coupled with differences in socio-economic characteristics influencing the health-seeking and expenditure patterns of the population at large, paves the way for studies to be conducted on the aforementioned areas. Cardiovascular diseases are a major public health challenge in India with the emergence of disease burden of non-communicable diseases equivalent to that of communicable diseases. India is currently suffering from the pressure of dual burden of diseases. Long-term diseases entail large

**Table 1. Demographic and socio-economic profile of India**

| <b>Indicators</b>  | <b>2011</b>                |
|--|----------------------------|
| <i>Population total (crore)</i>  | 121.1                      |
| Female   | 58.7                       |
| Male   | 62.3                       |
| Rural  | 83.3                       |
| Urban  | 37.7                       |
| Percentage of urban population   | 31.2                       |
| <i>Caste (%)</i>   |                            |
| Scheduled caste  | 16.6                       |
| Scheduled tribe  | 8.6                        |
| <i>Sex ratio (female per 1,000 males)</i>                                | 943                        |
| <i>Vital statistics</i>  | 2013                       |
| Infant mortality rate  | 40 per 1,000 live births   |
| Under five mortality rate  | 49 per 1,000 live births   |
| Maternal mortality ratio*  | 167 per 100000 live births |
| Total fertility rate   | 2.3 per women              |
| <i>Life expectancy at birth (years)</i>                                  | 2011–15                    |
| Male   | 67.3                       |
| Female   | 69.6                       |
| <i>Literacy rate (7 + years)</i>   | 2011                       |
| All  | 72.99                      |
| Male   | 82.14                      |
| Female   | 65.46                      |
| Scheduled caste  | 66.1                       |
| Scheduled tribe  | 59                         |
|  | Urban                      |
| <i>Total households (in crore)</i>                                       | 24.69                      |
| <i>Distribution of households by condition of house (%)</i>              | Urban                      |
| Good   | 53.1                       |
| Livable  | 41.5                       |
| Dilapidated  | 5.4                        |
| <i>Expenditure by Government on social services as percentage of GDP</i> | 2014–15 (BE)               |
| Education  | 3.1                        |
| Health   | 1.2                        |
| Other social services  | 2.5                        |
| <i>Domestic product and national income at current prices</i>            | 2014–15 (PE)               |
| Gross domestic product (GDP) at market prices (in lakh crore)            | 125.4                      |
| Growth rate (%)  | 10.5                       |
| Per capita national income (in '000)                                     | 87.75                      |

Notes: P-provisional, RE-revised estimate, BE-budget estimate.

Source: Government of India, Ministry of Statistics and Programme Implementation, Central Statistics Office, Research & Publication Unit, New Delhi.

\*Figures under the columns for the year 2013 are for the period 2011–13.

OOP expenditure too, with the Government of India spending only about 1.2% of the GDP on health services (Table 1). There is also a dearth of studies regarding recent estimates of expenditures on treatment of people suffering from chronic conditions.

The present study attempts to estimate the average medical and non-medical expenditures incurred by people suffering from chronic diseases like hypertension and coronary heart disease. The present study has been divided into two sections. The first section deals with the source of treatment preferred by those affected with cardio-vascular diseases for IHDS II. The second section deals with the differentials in mean annual expenditure of patients by various background and familial characteristics for IHDS II.

#### 4. Data and methods

Indian Human Development Survey (IHDS) was conducted in two rounds in 2004–05 and 2011–12 respectively. The survey was conducted by the National Council of Applied Economic Research, New Delhi and the University of Maryland.

Indian Human Development Survey II (2011–12) is a nationally representative survey covering a wide range of topics collected from 42,152 households in 1,503 villages and 971 urban wards/blocks across India. The data for the second round are mostly re-interviews of households interviewed for IHDS-I with 85% of 2004–05 households having been re-interviewed. The methods of data collection for IHDS included cognitive assessment test, face-to-face interview, paper and pencil interview (PAPI).

The individual questionnaire module was selected and the basic information, access to medical facilities and the medical conditions of respondents were examined. The unit of analysis is individuals aged more than 15 years. The variables regarding doctor’s and hospital’s fees (Rs.), fees on medicines, laboratory tests (Rs.) and expenditure on tips, boarding, lodging and travelling (Rs.) while getting treatment have been examined. Variables regarding the place of treatment sought have also been examined (Government, Private, Others).

$$\text{Average Medical cost} = \frac{\text{Total medical cost of patients(in and out) affected by a specific disease}}{\text{Total number of patients affected by the disease}}$$

$$\text{Average non – medical cost} = \frac{\text{Total cost oftips, fare, lodging for patients affected by a specific disease}}{\text{Total number of patients affected by the disease}}$$

Analysis of variance (ANOVA) is used to analyse the differences among group means as well as treatment effects (associated procedures) (between and within group differences). It tests the hypothesis that two or more populations are equal, assessing the importance of one or more factors by comparing response variable means by changing factor levels.

#### 5. Results

##### 5.1. Treatment source for cardio-vascular diseases, IHDS 2011–12

According to Table 2, for IHDS II, 73.1% of the hypertensive population have been found to prefer private institutions for treatment, 25.9% opting for government institutions and 0.9% for other sources of treatment. Similarly, for those affected by coronary heart disease, 74.3% of them opt for private institutions, 25.4% of them opt for government institutions and 0.3% for other kinds of treatment sources.

**Table 2. Treatment source for cardio-vascular diseases, IHDS, 2011–12**

| Rounds | Disease       | Treatment sources |             |            | Sample size |
|--------|---------------|-------------------|-------------|------------|-------------|
|        |               | Government (%)    | Private (%) | Others (%) |             |
| IHDS 2 | Hypertension  | 25.90             | 73.10       | 0.90       | 6,015       |
|        | Heart disease | 25.40             | 74.30       | 0.30       | 1,509       |

### 5.2. Differentials in mean annual expenditure of patients by various background and familial characteristics in India, IHDS, 2011–12

Table 3 gives the mean annual expenditure by background and hospitalization characteristics for IHDS 2011–12. For males, the mean expenditure on doctor’s and hospital’s fees is Rs. 7,725 and that for females is Rs. 5,904. For rural places of residence, the mean fees for the doctor and the hospital is Rs. 7,033 and that for other fees including laboratory tests and medicines is Rs. 2,873. For urban areas, the mean annual doctor and hospital fees is found to be Rs. 6,119 and other fees rise to Rs. 2,775.

**Table 3. Differentials in the mean annual expenditure of patients by various background and familial characteristics in India, IHDS, 2011–12**

|                           | Medical                             |   | Non-medical                          | ANOVA p-value |
|---------------------------|-------------------------------------|---|--------------------------------------|---------------|
|                           | Mean cost of treatment (doc + hosp) | Mean cost of medicines + tests (except doc + hosp fees) | Mean cost of tips/train/fare/lodging |               |
| <i>Gender</i>             |                                     |   |                                      |               |
| Male                      | 7,725                               | 3,259   | 592                                  | 0.01          |
| Female                    | 5,904                               | 2,570   | 450                                  | -             |
| <i>Place of residence</i> |                                     |   |                                      |               |
| Rural                     | 7,033                               | 2,873   | 598                                  | 0.00          |
| Urban                     | 6,119                               | 2,775   | 407                                  | -             |
| <i>Age</i>                |                                     |   |                                      |               |
| 15–34                     | 5,597                               | 2,317   | 673                                  | 0.00          |
| 35–50                     | 5,787                               | 2,526   | 448                                  | -             |
| More than 50              | 7,011                               | 2,999   | 513                                  | -             |
| <i>Religion</i>           |                                     |   |                                      |               |
| Hindu                     | 6,072                               | 2,737   | 493                                  | 0.00          |
| Muslim                    | 6,315                               | 3,188   | 495                                  | -             |
| Others                    | 10,441                              | 2,930   | 579                                  | -             |
| <i>Caste</i>              |                                     |   |                                      |               |
| Brahmin/general           | 7,256                               | 3,205   | 515                                  | 0.00          |
| OBC                       | 6,342                               | 2,585   | 521                                  | -             |
| SC/ST                     | 5,580                               | 2,505   | 433                                  | -             |
| Others                    | 4,636                               | 2,166   | 502                                  | -             |
| <i>Wealth quintile</i>    |                                     |   |                                      |               |
| Poorest quintile          | 5,834                               | 2,501   | 462                                  | 0.00          |
| Poor quintile             | 4,464                               | 2,152   | 479                                  | -             |
| Middle quintile           | 6,139                               | 2,245   | 451                                  | -             |
| Rich quintile             | 6,894                               | 3,048   | 460                                  | -             |
| Richest quintile          | 7,619                               | 3,326   | 581                                  | -             |
| <i>BMI categories</i>     |                                     |   |                                      |               |
| Underweight               | 4,661                               | 2,597   | 531                                  | 0.00          |
| Normal weight             | 6,089                               | 2,565   | 447                                  | -             |
| Overweight/obese          | 6,465                               | 2,975   | 514                                  | -             |
| <i>Education</i>          |                                     |   |                                      |               |
| No education              | 5,568                               | 2,721   | 462                                  | 0.00          |
| Primary or lower          | 5,883                               | 2,312   | 422                                  | -             |
| Class 6 to secondary      | 7,849                               | 3,137   | 486                                  | -             |

(Continued)

**Table 3. (Continued)**

|                                   | Medical                             |   | Non-medical                          | ANOVA p-value |
|-----------------------------------|-------------------------------------|---|--------------------------------------|---------------|
|                                   | Mean cost of treatment (doc + hosp) | Mean cost of medicines + tests (except doc + hosp fees) | Mean cost of tips/train/fare/lodging |               |
| Class 11 or higher                | 7,341                               | 3,139   | 738                                  | -             |
| <i>Marital status</i>             |                                     |   |                                      |               |
| Married                           | 6,378                               | 2,909   | 505                                  | 0.00          |
| Unmarried or married but no gauna | 6,365                               | 2,177   | 1,081                                | -             |
| Divorced or separated             | 7,210                               | 2,597   | 456                                  | -             |
| <i>Days hospitalized</i>          |                                     |   |                                      |               |
| Not hospitalized                  | 3,453                               | 2,228   | 323                                  | 0.09          |
| Less than a week                  | 13,083                              | 4,492   | 925                                  | -             |
| 1 week–1 month                    | 31,038                              | 8,200   | 2,117                                | -             |
| 1 month–1 year                    | 66,800                              | 11,582  | 2,214                                | -             |

For those aged above 50 years, the mean expenditure on doctor’s and hospital’s fees is Rs. 7,011 while that for widowed or divorced or separated adults is the highest among marital statuses at Rs. 7,210. Brahmin or general category respondents spend Rs. 7,256 on an average annually on doctor’s and hospital’s fees while among religions, those belonging to religions other than Hindus and Muslims are found to spend the most on an average annually at Rs. 10,441 on doctor’s and hospital’s fees. The mean annual cost of treatment increases according to wealth quintiles with the poorest quintile spending Rs. 5,834 on an average on treatment while the highest quintile spends Rs. 7,619 on an average on doctor’s and hospital’s fees. Among body mass index categories, the highest mean cost of treatment is Rs. 6,465 for overweight or obese respondents. Those with more than secondary level education spend Rs. 7,341 on doctor’s and hospital’s fees on an average annually and Rs. 3,139 on medicines and laboratory tests. According to days hospitalized, those who are not hospitalized are found to spend Rs. 3,453 on doctor’s and hospital’s fees on an average annually and Rs. 2,228 on other tests and medicines while those who are hospitalized for a duration of 1 month–1 year are found to spend Rs. 66800 on an average annually as well as Rs. 11,582 on tests and medicines on an average annually.

### 6. Discussion

OOP payments being the principal method of financing healthcare in most low-income countries, India is also found to observe this pattern (Ghosh, 2011). Developments in the health sector have pushed OOP expenditure upward in both public and private facilities, in turn, affecting healthcare utilization and health. Low insurance coverage and rising healthcare expenditures can lead to financial catastrophe, forcing households into poverty or deepening their existing poverty (van Doorslaer et al., 2006). So impact of these expenditures on household living standards should be assessed. Negative consequences as a result of these OOP expenditures have been found in empirical studies conducted in many countries (Chaudhuri & Roy, 2008; Garg & Karan, 2009). Findings of this nature are of major concern for policy makers and programme personnel concerned about financing of healthcare at different levels.

According to the Bulletin on Rural Health Statistics in India, a shortage of 36,346 sub-centres, 6,700 primary health centres and 2,350 community health centres remains a problem which widely affects the public healthcare delivery system of India (Government of India, 2014), especially in rural areas which could be a reason for the higher value of healthcare expenditure in rural areas, as

obtained in this study. Coupled with the human resource shortage at all levels of the healthcare delivery system in India, it contributes hugely to diversion of people from the public facilities to the ever-growing private secondary and tertiary health facilities (Jayakrishnan, Jeeja, Kuniyil, & Paramasivam, 2016).

In case of treatment seeking for minor illnesses, which do not require much laboratory tests, private providers are preferred across both rural and urban areas for their easy availability and greater convenience. Disparities across health-seeking behaviour become prominent on observing major illnesses like CHD and hypertension (Barik & Thorat, 2015). Medical expenses associated with these diseases assessed in the present study comprise medical costs like the doctor's and hospital's fees, medicine and tests' expenditures and non-medical costs like expenditure on travelling, boarding, lodging for the duration of the treatment. The present study found 70% of hypertensives opting for treatment in private institutions while an equal percentage of those with CHD also opting for the same in IHDS 2011–12. The proportion increased to 73% of hypertensive population availing of services provided by private facilities while 74% of those affected by CHD choosing the same in IHDS 2011–12. Asymmetric availability of healthcare across urban and rural areas subjects urban residents to choices between private and public institutions for treatment but rural residents are left with little choice in terms of health care services.

Socio-cultural and environmental determinants of healthcare services utilization have been put into perspective by Suchman (1964, 1965a, 1965b, 1966), highlighting people's knowledge to be a vital factor in healthcare utilization and that it varies amongst different socio-economic groups. The "life cycle determinants" model (Anderson, 1968) and "framework for the study of access" (Aday & Andersen, 1974) stress on the conditions influencing service use, e.g. family composition (age, sex, marital status), social structure (occupation, social class, education, ethnicity) as well as health beliefs. A balance of these influences plays a major role in influencing service utilization. The envisioned universal access to healthcare is a distant reality in India. Though public facilities have been springing up in rural areas too, unavailability of doctors, staff and scarcity of funding and resources renders it mostly useless. Limited public health spending and easily accessible private facilities renders people spending more on private facilities (Roberts, Hsiao, Berman, & Reich, 2004). As a result, rural people are forced into the throes of impoverishment on account of treatment of major illnesses (Ghosh, 2011). Quality health services, both government and private with some government regulation, remains the need of the hour. Well-equipped health facilities in proximity of the needy as well as awareness regarding disease conditions are important for the affordable accessibility of public health services (Chaudhuri & Roy, 2008).

The health insurance coverage of India is also very low, raising the OOP expenditure burden on the country. Studies assessing changes in insurance coverage are underway including the recently on-going National Family Health Survey 4. More studies of this kind will help in understanding the treatment-seeking behaviour and the expenditure on illnesses of the general population of India and pave the way for more policies to reform the existing health care services as well as development of new services.

#### Funding

The authors received no direct funding for this research.

#### Author details

Ayantika Biswas<sup>1</sup>

E-mail: [ayantika111@gmail.com](mailto:ayantika111@gmail.com)

Rakesh Kumar Singh<sup>1</sup>

E-mail: [rakeshiips5700@gmail.com](mailto:rakeshiips5700@gmail.com)

S.K. Singh<sup>1</sup>

E-mail: [sksingh31962@gmail.com](mailto:sksingh31962@gmail.com)

<sup>1</sup> Department of Mathematical Demography and Statistics, International Institute for Population Sciences, Mumbai 400088, Maharashtra, India.

#### Citation information

Cite this article as: Medical and non-medical cost of hypertension and heart diseases in India, Ayantika Biswas, Rakesh Kumar Singh & S.K. Singh, *Cogent Social Sciences* (2016), 2: 1250616.

#### Correction

This article was originally published in the section "Architecture & Planning" but should have been published in the section "Sociology". This has now been corrected.

#### References

Aday, L. A., & Andersen, R. (1974). A framework for the study of access to medical care. *Health Services Research*, 9, 208–220.

- Ahuja, R. (2004). Health insurance for the poor. *Economic and Political Weekly*, 3171–3178.
- Altman, B. M., Cooper, P. F., & Cunningham, P. J. (1999). The case of disability in the family: Impact on health care utilization and expenditures for nondisabled members. *The Milbank Quarterly*, 77, 39–75.  
<http://dx.doi.org/10.1111/milq.1999.77.issue-1>
- Anderson, R. A. (1968). *A behavioural model of families' use of health services* (No. 25). Chicago, IL: University of Chicago.
- Barik, D., & Desai, S. (2014). Determinants of private Healthcare Utilisation and Expenditure Patterns in India. In S. B. A. S. Ghosh (Ed.), *The Road to Universal Health Coverage* (pp. 52–64). New Delhi: IDFC.
- Barik, D., & Thorat, A. (2015). Issues of unequal access to public health in India. *Frontiers in Public Health*, 3, 1.
- Berman, P., Ahuja, R., & Bhandari, L. (2010). The impoverishing effect of healthcare payments in India: New methodology and findings. *Economic and Political Weekly*, 45, 65–71.
- Chaudhuri, A., & Roy, K. (2008). Changes in out-of-pocket payments for healthcare in Vietnam and its impact on equity in payments, 1992–2002. *Health Policy*, 88, 38–48.  
<http://dx.doi.org/10.1016/j.healthpol.2008.02.014>
- Chernew, M. E., & Newhouse, J. P. (2008). What does the RAND health insurance experiment tell us about the impact of patient cost sharing on health outcomes? *The American Journal of Managed Care*, 14, 412–414.
- Dua, A. S. (2005). *National programme for control of blindness* (Vol. 299). Burden of Disease in India.
- Engelgau, M. M., Karan, A., & Mahal, A. (2012). The economic impact of non-communicable diseases on households in India. *Globalization and Health*, 8(1), 1.
- Garg, C. C., & Karan, A. K. (2009). Reducing out-of-pocket expenditures to reduce poverty: A disaggregated analysis at rural-urban and state level in India. *Health Policy and Planning*, 24, 116–128.
- Ghaffar, A., Reddy, K. S., & Singhi, M. (2004). Burden of non-communicable diseases in South Asia. *BMJ*, 328, 807–810.  
<http://dx.doi.org/10.1136/bmj.328.7443.807>
- Ghosh, S. (2011). Catastrophic payments and impoverishment due to out-of-pocket health spending. *Economic & Political Weekly*, 46, 63–70.
- Government of India. (2009). *National health accounts-India (2004–05)–with provisional estimates from 2005–06 to 2008–09*. New Delhi: National Health Accounts Cell. Ministry of Health and Family Welfare.
- Government of India. (2014). *Rural health statistics* (pp. 2013–2014). New Delhi: Statistical division, Ministry of Health and Family Welfare, Government of India.
- Hwang, W., Weller, W., Ireys, H., & Anderson, G. (2001). Out-of-pocket medical spending for care of chronic conditions. *Health Affairs*, 20, 267–278. Retrieved March 19, 2016, from [content.healthaffairs.org](http://content.healthaffairs.org)  
<http://dx.doi.org/10.1377/hlthaff.20.6.267>
- Industry Report. (2014, July). *The economist intelligence unit*. Hong Kong: Healthcare.
- Jain, S., & Jadhav, S. (2009). Pills that swallow policy: Clinical ethnography of a community mental health program in Northern India. *Transcultural Psychiatry*, 46, 60–85.
- Jaykrishnan, T., Jeeja, M. C., Kuniyil, V., & Paramasivam, S. (2016). Increasing out-of-pocket health care expenditure in India—due to supply or demand? *Pharmacoeconomic*, 1(105), 1–6.
- Joshi, R., Cardona, M., Iyengar, S., Sukumar, A., Raju, C. R., Raju, K. R., ... Neal, B. (2006). Chronic diseases now a leading cause of death in rural India—mortality data from the Andhra Pradesh Rural Health Initiative. *International Journal of Epidemiology*, 35, 1522–1529.
- Mahal, A., Sakthivel, S., & Nagpal, S. (2005). National health accounts for India. In National Commission on Macroeconomics and Health (NCMH) (Ed.), *Financing and delivery of health care services in India*. NCMH Background Papers (pp. 256–263). New Delhi: Ministry of Health and Family Welfare, Government of India.
- Mehra, P. (2014, December 22). Only 17% have health insurance cover. *The Hindu*. Retrieved from <http://www.thehindu.com/news/national/only-17-have-health-insurance-cover/article6713952.ece>
- Murray, C. J. & Lopez, A. D. (1997). Alternative projections of mortality and disability by cause 1990–2020: Global burden of disease study. *The Lancet*, 349, 1498–1504.  
[http://dx.doi.org/10.1016/S0140-6736\(96\)07492-2](http://dx.doi.org/10.1016/S0140-6736(96)07492-2)
- O'Donnell, O., van Doorslaer, E., Rannan-Eliya, R. P., Somanathan, A., Adhikari, S. R., Harbianto, D., ... Garg, C. C. (2007). The incidence of public spending on healthcare: Comparative evidence from Asia. *The World Bank Economic Review*, 21, 93–123.  
<http://dx.doi.org/10.1093/wber/hl009>
- Paez, K. A., Zhao, L., & Hwang, W. (2009). Rising out-of-pocket spending for chronic conditions: A ten-year trend. *Health Affairs*, 28, 15–25. Retrieved from February 5, 2016, from [content.healthaffairs.org](http://content.healthaffairs.org)  
<http://dx.doi.org/10.1377/hlthaff.28.1.15>
- Pal, R. (2010). Analysing catastrophic OOP health expenditure in India: Concepts, determinants and policy implications (No. 22775). East Asian Bureau of Economic Research.
- Rao, Y. N., Gupta, S., & Agarwal, S. P. (2002). *National Cancer Control Programme: Current Status & Strategies* (pp. 41–47). Fifty Years of Cancer Control In India. Dir Gen of Health Services MOHFW, Government of India.
- Roberts, M., Hsiao, W., Berman, P., & Reich, M. (2004). *Getting health reform right: A guide to improving performance and equity*. New York, NY: Oxford University Press.
- Russell, S. (2004). The economic burden of illness for households in developing countries: A review of studies focusing on malaria, tuberculosis, and human immunodeficiency virus/acquired immunodeficiency syndrome. *The American Journal of Tropical Medicine and Hygiene*, 71, 147–155.
- Srivastava, R. K., & Bachani, D. (2011). Burden of NCDs, policies and programme for prevention and control of NCDs in India. *Indian Journal of Community Medicine*, 36, S7–S12.
- Suchman, E. A. (1964). Sociomedical variations among ethnic groups. *American Journal of Sociology*, 70, 319–331.  
<http://dx.doi.org/10.1086/223842>
- Suchman, E. A. (1965a). Social Patterns of Illness and Medical Care. *Journal of Health and Human Behavior*, 6, 2–16.  
<http://dx.doi.org/10.2307/2948614>
- Suchman, E. A. (1965b). Stages of illness and medical care. *Journal of Health and Human Behavior*, 6, 114–128.  
<http://dx.doi.org/10.2307/2948694>
- Suchman, E. A. (1966). Health orientation and medical care. *American Journal of Public Health and the Nations Health*, 56, 97–105.  
<http://dx.doi.org/10.2105/AJPH.56.1.97>
- van Doorslaer, E., O'Donnell, O., Rannan-Eliya, R. P., Somanathan, A., Adhikari, S. R., Garg, C. C., ... Karan, A. (2006). Effect of payments for health care on poverty estimates in 11 countries in Asia: An analysis of household survey data. *The Lancet*, 368, 1357–1364.  
[http://dx.doi.org/10.1016/S0140-6736\(06\)69560-3](http://dx.doi.org/10.1016/S0140-6736(06)69560-3)
- World Health Organization. (2014). *Global status report on noncommunicable diseases*. Geneva: Author.
- Xu, K., Evans, D. B., Kawabata, K., Zeramdini, R., Klavus, J., & Murray, C. J. (2003). Household catastrophic health expenditure: A multicountry analysis. *The Lancet*, 362, 111–117.  
[http://dx.doi.org/10.1016/S0140-6736\(03\)13861-5](http://dx.doi.org/10.1016/S0140-6736(03)13861-5)
- Yip, W., & Mahal, A. (2008). The health care systems of China and India: Performance and future challenges. *Health Affairs*, 27, 921–932.  
<http://dx.doi.org/10.1377/hlthaff.27.4.921>



© 2016 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.

You are free to:

Share — copy and redistribute the material in any medium or format

Adapt — remix, transform, and build upon the material for any purpose, even commercially.

The licensor cannot revoke these freedoms as long as you follow the license terms.

Under the following terms:

Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made.

You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

No additional restrictions

You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.



**Cogent Social Sciences (ISSN: 2331-1886) is published by Cogent OA, part of Taylor & Francis Group.**

**Publishing with Cogent OA ensures:**

- Immediate, universal access to your article on publication
- High visibility and discoverability via the Cogent OA website as well as Taylor & Francis Online
- Download and citation statistics for your article
- Rapid online publication
- Input from, and dialog with, expert editors and editorial boards
- Retention of full copyright of your article
- Guaranteed legacy preservation of your article
- Discounts and waivers for authors in developing regions

**Submit your manuscript to a Cogent OA journal at [www.CogentOA.com](http://www.CogentOA.com)**

