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## Original Article

# Cost of diabetic care in India: An inequitable picture

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### ABSTRACT

**Aim:** Diabetes is a growing public health problem in India which is soon going to become the 'diabetes capital' of the world. It requires regular care and follow up. We aimed to estimate the household out-of-pocket (OOP) expenditure and catastrophic expenditure due to hospitalization and outpatient care as a result of diabetes.

**Materials and methods:** Secondary analysis of nationally representative data for India collected by National Sample Survey Organization in 2014, reporting on health service utilization and health care related OOP expenditure by income quintiles and by type of health facility (public or private).

**Results:** The median household OOP expenditure from hospitalization due to diabetes was USD 151, and was 3 times higher among the richest quintile compared to the poorest quintile ( $p < 0.001$ ). There was a significantly higher prevalence ( $p < 0.001$ ) of catastrophic expenditure among the poorest quintile (36%) compared to the richest (14%). Median private sector OOP hospitalization expenditure was four times higher than the public sector ( $p < 0.001$ ). Medicines accounted for 41% and 69% of public sector hospitalization and outpatient care respectively. Concentration indices show gross inequity in hospitalization expenditure, prevalence of catastrophic expenditure and utilization of public health facility.

**Conclusion:** Households with diabetic patients incur a high risk of catastrophic expenditure, particularly for those in the lowest income quintiles and those seeking care in the private sector. Increased availability and access to essential drugs and strengthening of public facilities will significantly reduce OOP expenditure.

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## 1. Introduction

According to the International Diabetes Federation (IDF), around 415 million people had DM in 2015 and this number is expected to rise to 642 million by 2040 [1]. Global health care expenditures for diabetes have tripled between 2003 and 2013 as a result of an increase in the number of people with diabetes as well as the cost of health care for the treatment of diabetes. This increase is expected to grow exponentially in the coming years, especially for those with low and middle incomes [1]. In the USA, the estimated total cost of treatment for diabetes in 2012 was 245 billion USD, 176 billion USD for direct medical expenses and 69 billion USD for loss of productivity [2].

India is witnessing an alarming rise in the incidence of diabetes and soon going to become the 'diabetes capital' of the world. Currently home to 69.1 million people with DM, India is estimated to have the second highest number of cases of DM in the world after China in 2015 [1]. Two recent large population based studies have found the overall prevalence of DM to be ranging from 7.3–8.3% and prediabetes from 6.3–10.3% [3,4]. DM continues to increase as a result of rapid cultural and social changes, which include: ageing populations, increasing urbanization, dietary changes, reduced physical activity and unhealthy habits coupled with strong genetic predisposition among Asian Indians [5].

India has one of the lowest public health expenditures in the world. This results in high out-of-pocket expenditure (OOP) amounting to about 70% of total health spending [6]. Financing and delivery of health care in India has been left largely to the private sector in both the urban and rural sectors catering to more than 70% of illnesses, in spite of them being very costly [7,8]. In this context of high OOP expenditure for health care and high burden of diabetes, there is little information about cost of diabetes care and its impact on households in India.

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## 2. Methods

### 2.1. Study design

This is a secondary data analysis of a large representative nationwide survey data collected by the National Sample Survey Office (NSSO), India. Similar methodology has been used by the authors in a previous study using this survey dataset [9].

### 2.2. Data source

NSSO is a national organisation under the Ministry of Statistics which was established in 1950 to regularly conduct surveys and provide useful statistics in the field of socio-economic status of households, demography, health, industries, agriculture, consumer expenditure etc. Results of NSSO surveys are brought out in the form of NSS reports available at the website of the Ministry ([www.mospi.nic.in](http://www.mospi.nic.in)). This survey (71st round) on health care utilization and expenditure was carried out for six months from January–June 2014. A multi-stage stratified sampling design was adopted. The first stage units were the census villages in the rural sector and Urban Frame Survey (UFS) blocks in the urban sector. A total of 4577 villages and 3720 urban blocks were surveyed from which 36,480 and 29,452 households were sampled in rural and urban areas respectively using stratified random sampling method. A total of 333,104 persons were interviewed. The detailed methodology can be found in the survey report [8].

A subset of the survey data reporting hospitalization and outpatient care for diabetes was selected for analysis. In the survey, diabetes was coded under a single disease category under the section “Endocrine, metabolic and nutritional disorders”. OOP expenditure related to drugs; diagnostic tests (including ECG, X-ray, pathological tests, etc.); professional fees for doctors; payments to hospital/institution; other medical expenses (bed charges, physiotherapy, personal medical appliances, blood, oxygen, attendant charges etc.); and other indirect costs was recorded. Indirect costs included transport for patients and other accompanying persons, food related expenses, lodging charges and others. Household consumption expenditure was recorded as well as other socio-demographic characteristics including caste, occupation, gender and education. Data were also collected on type of facility (public or private) accessed for medical care and reasons for not availing public facility.

The recall periods for assessing expenditure due to inpatient hospitalization and outpatient care were 365 days and 15 days respectively. Household consumption expenditure in the last one month was also recorded. OOP expenditure per hospitalization episode amounting to more than 30 per cent of annual consumption expenditure was termed as ‘catastrophic’ [10–12]. Disease conditions in the household survey were self-reported.

### 2.3. Data analysis

Data were imported into SPSS version 17.0 for analysis. The study population was divided into quintile groups based on monthly per capita consumption expenditure (MPCE). The household monthly per capita consumption expenditure limits (in USD) for the five quintiles are as follows: first quintile (4–16), second quintile (17–22), third quintile (23–30), fourth quintile (31–46) and the fifth quintile (47–508). Median values/percentages for all indicators were compared across each of the five MPCE quintiles and type of health facility (public and private). Median household expenditure was estimated for those who reported hospitalization or outpatient care due to diabetes. The survey reports expenditure per episode of hospitalization or outpatient visit. However, aggregate function (using household ID as the key) in SPSS was

used to derive the total household healthcare expenditure due to diabetes. Thus, the unit of analysis here is the household. Kruskal-Wallis test was used to evaluate the statistical significance of differences in expenditures between the quintiles. Chi-square test was done to assess the statistical difference in proportions across quintiles and type of health facility. Since it is a multistage stratified random survey, estimates were derived by applying sampling weights given by the NSSO.

### 2.4. Ethical approval

The source of data for the study was a national survey conducted by the Government of India and the dataset is available in public domain. The Ethics Advisory Group of International Union Against Tuberculosis and Lung Disease, Paris, France, determined that ethics clearance was not required for this study.

## 3. Results

### 3.1. Socio-demographic and medical care related characteristics

A total of 3935 episodes of hospitalization due to diabetes in the last one year were included. Nearly half of those hospitalised were aged 45–64 years (49%) and nearly two-thirds were males (64%). Nearly two-thirds (64%) were hospitalised in the private sector. A total of 915 episodes of outpatient care for diabetes were reported in the last 15 days. The majority were males (64%), more than half (52%) were aged 45–64 years (54%) and 73% were treated in the private sector. [Table 1](#)

### 3.2. In-patient care expenditure

The median household out-of-pocket expenditure from hospitalization due to diabetes was 151 USD, and was nearly 3 times higher among the richest quintile (266 USD) compared to the poorest quintile (89 USD). There was a significantly higher prevalence of catastrophic expenditure among the poorest quintile

**Table 1**  
Socio-demographic and medical care related characteristics of patients who were hospitalised or received outpatient care for diabetes mellitus, India, 2014.

Characteristics	Hospitalization n (%)	Outpatient care n (%)
Sex		
Males	657 (72)	2510 (64)
Females	243 (27)	1316 (33)
Missing	15 (01)	109 (03)
Age group		
0–14 years	15 (02)	35 (1)
15–44 years	142 (16)	476 (12)
45–64 years	451 (49)	2029 (52)
65 and above	307 (34)	933 (24)
Missing	0 (0)	462 (11)
Days of hospitalization		
≤ 7 days	639 (70)	–
> 7 days	276 (30)	–
Missing	0 (0)	–
Type of health facility		
Public	333 (36)	972 (25)
Private	582 (64)	2856 (73)
Missing	0 (0)	107 (02)
Number of episodes of hospitalizations or outpatient visits per household*	N = 745	N = 3491
One	635 (85)	3073 (88)
Two	70 (9)	394 (11)
Three	26 (4)	22 (1)
More than three	14 (2)	2 (0)
Total	915	3935

Unit of analysis is episode of hospitalization or outpatient visit; \*number may not add upto the total because the unit of analysis here is the household and not the number of episodes of care.

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