

Original Research Article

The economic burden of health expenditure on diabetes mellitus among urban poor: a cross sectional study

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ABSTRACT

Background: Diabetes mellitus (DM) is a chronic metabolic disease that arises when the pancreas does not produce enough insulin or when the body cannot effectively use insulin. Diabetes is a costly disease because of its chronic nature, the severity of its complications and the means required to control them. The objective of the study was to estimate the expenditure on health care by patients suffering from diabetes mellitus.

Methods: A community based cross sectional study was conducted among 189 diabetes mellitus patients in the urban area, Mangalore taluk over a period of 6 months. Data collected by personal interview method, questionnaire was developed to collect the appropriate information on socio demographic details, direct costs and indirect cost in health care for diabetes. Data entry was done in MS Excel and analyzed using SPSS v 16.0.

Results: The mean duration of diabetes mellitus 3.93 ± 2.0 years with majority of them had associated co-morbidities 54% and complications 28%. The total expenditure on diabetes is 912 INR per visit, the direct cost of healthcare for diabetic individuals was 553 INR, and indirect expenditure was 359 INR. The average time lost on each visit- 2.6 hours which included travel time, waiting period and consultation.

Conclusions: This study shows that the economic burden of diabetes mellitus and its complications are very high and increasingly affecting the lives of urban poor.

Keywords: Diabetes mellitus, Health expenditure, Urban area

INTRODUCTION

Diabetes is a chronic metabolic disease that arises when the pancreas does not produce enough insulin or when the body cannot effectively use insulin.¹ A diabetes epidemic is underway as the World Health Organisation's Global Report on diabetes 2016 demonstrates that the number of individuals living with diabetes has almost quadrupled since 1980 to 422 million and the number of deaths attributed to diabetes and its complications is also significantly increasing.²

Diabetes is a costly disease because of its chronic nature, the severity of its complications and the means required

to control them.² Studies in India estimate that, for a low-income Indian family with an adult with diabetes, as much as 25% of family income may be devoted to diabetes care.² The costs of diabetes affect everyone, everywhere, but they are not only cause financial problem; it also causes pain, anxiety, inconvenience and generally lower quality of life.²

It is predicted the diabetes prevalence for 2025, total direct healthcare expenditure on diabetes worldwide for that year will be between 213-396 billion international dollars. In some countries this will be as much as 40% of their total healthcare budget.³ The studies conducted in India stated that economic burden of diabetes care on

families in developing countries is rising rapidly, even after accounting for the inflation.⁴

In developing countries like India, which lacks a comprehensive health care system, availability of information on the cost of treatment, is limited though both private and public health care systems which exist. The government hospitals offer free treatment to the poor. Except few private hospitals the chronic care model is lacking in many centres. Private hospitals preferred by many, although it is more costly.⁴

The diabetes epidemic is growing rapidly as the primary prevention is failing. Immediate action is required to control the tide of diabetes and to introduce cost-effective treatment strategies to reverse this trend. Hence this study is designed to estimate the expenditure on health care by patients suffering from diabetes.

METHODS

A community based cross sectional study was conducted among known diabetic individuals for a period of 6 months from June-December 2015. In urban field practice area of Department of Community Medicine, Yenepoya Medical Colleges in Mangalore Taluk.

Sample size estimation

There are 6000 residents in the study area- Bengere, considering only the individuals above the age of 30. i.e., 42% of the population is 2520.⁶ Prevalence of self-reported diabetes in coastal Karnataka is 11% that is 277.⁷ Estimated number of diabetes patient >30 years in 6000 population would be 277. A rapid house to house survey was carried out to enlist all the diabetic individuals. The inclusion criteria included residents of Bengre area above the age of 30 years and who are diagnosed of diabetes and are on treatment for a minimum of one year duration and the exclusion criteria consisted of those individuals unwilling to participate in the study and whose houses were locked for three consecutive visits that gave us the final sample size of 189.

Data collection

Data collected by personal interview method, pre-designed, pre-tested, validated questionnaire was used to collect the information. Questionnaire was developed based on study Khowaja, to collect the appropriate information.⁵ The questions included basic socio demographic details direct costs and indirect cost. Retrospectively the expenditure incurred for diabetes care was obtained

In this study direct cost was considered in relation to medical care such as diagnosis and treatment of diabetes and its complications i.e., lab investigations, physician's consultation charges, inpatient or outpatient care,

medication and transportation. Indirect cost was considered as loss work days due to illness or inability to attend work due to hospital visit of the study participant or/and accompanying individual.

Ethical issues

This study was initiated after approval from the Institutional Ethics Committee. Written informed consent was taken from study participants after they were explained the objective of the study in local language

Statistical analysis

The data collected was entered in excel sheets and analyzed using SPSS 17.0. Descriptive statistics were applied. Percentages, proportions and ratios were used. Chi-square test will be applied to find out the association between two attributes. Statistical significance will be set at 0.05% level of significance ($p < 0.05$)

RESULTS

Among the 189 individuals who participated in the study, the mean age of the study participants was 53.8 ± 11.3 years. There were 96 (50.8%) male and 93 (49.2%) female participants. In this study majority of the participants 171 (90.5%) were literates with minimum schooling up to primary school. 18 (9.5%) participants were illiterate. In this study 171 (90.5%) individuals were married and living with family were as 18 (9.5%) of them were either unmarried/separated/ widowed. Among the study participants 107 (56.6%) were employed, the most common reason for not having a full time job was housewife 43 (22.8%), retired 28 (14.8%), unable to continue job due to health issues 11 (5.8%). Modified BG Prasad classification was used for estimating the socio economic status. The mean per capita income was 3453.4 INR as reported by the study participants. Nearly half of them 95 (50.3%) of them belonged to class 2 according to the classification.

The mean duration of the illness due to diabetes was 3.9 ± 2.0 years, ranging from a minimum of 1 year to as high as 13 years. Current mode of treatment for diabetes among study participants included 88 (46.6%) on oral hypoglycaemic drugs, 31 (16.4%) were on insulin 41 (21.7%) of them were on combination treatment and 29 (15.4%) were on other modes of treatment like ayurvedic/homeopathy. 102 (54%) of the participants stated they had co morbidities (hypertension 37%, dyslipidemia/ heart disease 25.4%, depression 2.6%, others 11.6%) associated along with diabetes and 53 (28%) of them reported that they have developed one or more complications of diabetes (microvascular and macrovascular).

The mean of amount of money spent on the current visit was 553.15 INR. The direct cost of healthcare for diabetic individuals was 553 INR, among them medicines

accounted for the largest share. The mean number of visits to the health care facility in one year was 5.3 ± 3.1 years. The indirect costs were loss of wages due to skipping work due to ill health or due to consultation timing and loss of wages of accompanying person. The average of amount lost by indirect expenditure was 359 INR. The average time lost on each visit- 2.6 hours which included travel time, waiting period and consultation. The total amount spent on healthcare of diabetes was 912 INR per visit. The expenditure on diabetes increased along with the duration of illness ($p=0.22$) and as complications increased ($p=0.14$). 80 (42.3%) of them stated that they were always accompanied by a family member during the

visit. Only 78 (41.3%) of the participants stated that they could afford the medical expenses by themselves the rest of the participants 111 (58.7%) of them needed support from family members or friends. Only 4 (2.1%) of them stated that they had some or the other form of health insurance scheme to support their health expenditure. 78 (41.3%) of them stated that they missed consultation with the doctor and 59 (31.2%) of them skipped checking blood sugar levels as it was a financial burden over the family. A statistical significant association ($p=0.09$) was observed between socio economic classes and expenditure on diabetes care.

Table 1: Socio-demographic details of the study participants.

S. no	Variables	Number(%)
1	Age (years)	20-40
		19 (10.1)
		41-50
2	Gender	56 (29.6)
		51-70
		111 (61.3)
3	Education	Male
		96 (50.8)
4	Occupation	Female
		93 (49.2)
		Illiterate
		18 (9.5)
5	Socio economic status (Modified BG Prasad classification)	Up to primary
		31 (16.4)
		Up to secondary- intermediate
6	Duration of diabetes	106 (56.1)
		Graduate and above
7	Mode of treatment	34 (18.0)
		Employed
8	Co morbidities	Unemployed
		107 (56.6)
		Class 1
		20 (10.6)
9	Duration of diabetes	Class 2
		95 (50.3)
		Class 3
10	Mode of treatment	61 (32.3)
		Class 4
		13 (6.9)
11	Co morbidities	1-5 years
		149 (78.8)
		6-10 years
12	Mode of treatment	39 (20.6)
		>10 years
		1 (0.5)
13	Co morbidities	Oral hypoglycaemic drugs
		88 (46.6)
		Insulin
14	Mode of treatment	31 (16.4)
		Other modes of treatment
15	Co morbidities	41 (21.7)
		Present
16	Mode of treatment	102 (54)
		Absent
17	Co morbidities	87 (46)

Table 2: Expenditures in diabetic care in the previous visit.

Variable	Mean expenditure in rupees (INR)
Consultation	151.59
Lab investigations	128.31
Medicines	211.53
Travel	45.95
Others	7.04

DISCUSSION

In this study the mean age of the study participants observed is 53.8 ± 11.3 years a similar study conducted by Tharkar et al, reported the mean age of 56 years.⁸ There were 50.8% male and 49.2% female participants in this

study. A study conducted by Kumar et al, stated that there were 57.5% were male and 42.5% were female in their study.⁹ We observed 9.5% participants were illiterate in our study, Akari et al, reported that 24% of the participants of their study were illiterate.¹⁰ In this study 43.4% were unemployed, the common reasons for unemployment included home maker 22.8%, retired 14.8% and health conditions not supporting to continue the job 5.8%, a similar study reported that 53% of them were unemployed.⁸ We used modified BG Prasad classification to assess the socio economic status of the individuals. 50.3% of them belonged to class 2 according to the classification, with the mean per capita income was 3453.4 INR. A similar study conducted in South India by Rayappa et al reported the majority of the participants had the adjusted annual income of 5470 INR.¹¹

The mean duration of the illness due to diabetes was 3.9 years in this study, a similar study conducted by Ramachandran, reported the mean age of the participants was 8.9 years including both urban and rural areas of India.⁴ Akari et al, reported that majority of the participants (60%) of them had the duration of the illness 1-5yrs.¹⁰ Current mode of treatment for diabetes among study participants included 88 (46.6%) on oral hypoglycaemic drugs, 31 (16.4%) were on insulin 41 (21.7%) of them were on combination treatment. Khowaja et al, reported that 73% of their study participants were on oral hypoglycemic drugs.⁵ A similar study reported that 59% were on oral hypoglycaemic drugs, 12% on insulin, 24% on combination treatment and 5% on life style and diet modifications.⁹ In this study 15.4% were on other modes of treatment like ayurvedic/homeopathy as they stated that allopathic medicine were too costly to afford.

In this study, 54% of the participants stated they had co morbidities associated with diabetic mellitus, a similar study by Akari, stated that 46% of their participants reported Hypertension and 20% of them reported ischemic stroke.¹⁰ 28% of the participants of this study reported that they developed complications due to Diabetes. Singh, stated that complications of diabetes increased the financial and emotional burden on families and expenditure on treatment of complications of diabetes varied significantly between the populations.¹² In this study we also observed that as the complications increased the expenditure on diabetes treatment, this finding was similar to the findings reported by other studies.^{5,9,10,11}

This study reported the mean amount of money spent was 912 INR per visit, a similar study conducted in Mumbai in 2017, reported the expenditure per visit to be 298 INR with the The mean total expenditure in the management of diabetes was INR. 853.47 per month.¹³ In this study were observed that expenditure on the drugs or Insulin accounted for the highest portion of expenditures which was found similar to the study conducted by Kapur et al.¹⁴ The average time spent on each visit- 2.6 hours which included travel time, waiting period and consultation. A similar study reported 3 hours.⁵

In this study, the utilization of health insurance schemes was very poor (2%). A study stated that none of the person with diabetes indicated that their cost is borne by an insurance company or their employer. Almost all the cost is out-of-pocket; from individual or family income.⁵ another study conducted by Kumar et al, in Haryana stated that 8% of the participants of their study utilized health insurances to cope up with Health expenditure on Diabetes.⁹

Limitations of the study

This study is a community based cross sectional study, the data collected is by personal interview method, it was

not possible to verify or confirm the all the information provided by cross checking it with medical records. As self-reported diabetic individuals were included, the economic burden of undiagnosed diabetic cases was not a part of this study which therefore would have resulted in underestimation of the results.

CONCLUSION

Diabetes mellitus is a rapidly spreading epidemic in developing countries. This study shows that the economic burden of diabetes mellitus and its complications are very high and increasingly affecting the lives of urban poor.

Recommendations

Measures need to be taken not only to halt the epidemic of diabetes mellitus but to reverse it. Though at the government setup diagnosis and treatment of Diabetes is free of cost very poor utilization is observed, hence specific IEC strategies need to be developed based on the populations to increase its acceptance. There is an urgent need to focus on the community health insurance system that the reduce the economic burden of Diabetes among urban poor.

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REFERENCES

1. WHO website, Diabetes – Fact sheet. Available at: <http://www.who.int/mediacentre/factsheets/fs312/en/>. Accessed on 23 October 2018.
2. World Health Organization. Global report on diabetes. World Health Organization; 2016
3. International Diabetes Federation: The economic impact of diabetes. In Diabetes Atlas. 2nd ed. Brussels, International Diabetes Federation. 2003: 175–192.
4. Ramachandran A. Increasing Expenditure on Health Care Incurred by Diabetic Subjects in a developing Country. *Diabetes Care*. 2007;30:252- 6.
5. Khowaja LA, Khuwaja A, Cosgrove P. Cost of diabetes care in out-patient clinics of Karachi, Pakistan. *BMC Health Services Res*. 2007;7(1):189.
6. Park, K. Park's textbook of preventive and social medicine. 23rd edition. 2014: 445
7. Rao CR, Kamath VG, Shetty A, Kamath A. A study on the prevalence of Type 2 diabetes in coastal Karnataka. *Int J Diabetes Dev Ctries*. 2010;30:80–5.
8. Tharkar S, Devarajan A, Kumpatla S, Viswanathan V. The socioeconomics of diabetes from a developing country: a population based cost of illness study. *Diabetes Res Clin Pract*. 2010;89(3):334-40.
9. Kumar D, Mukherjee K. Economic impact of type-2 diabetes mellitus on households in Hisar district of

- Haryana state, India. *The Health Agenda*. 2014;2(4):125-9.
10. Akari S, Mateti UV, Kunduru BR. Healthcare cost of diabetes in South India: A cost of illness study. *J Res Pharm Pract*. 2013;2:114-7.
 11. Rayappa PH, Raju KN, Kapur A, Bjork S, Sylvest C, Kumar KD. Economic cost of diabetes care: the Bangalore urban district diabetes study. *Int J Diab Dev Countries*. 1999;19(3):87-6.
 12. Singh J. Economic burden of diabetes. Muruganathan A, Geetha T, editors. Vol. 23. *Medicine Update*. Association of Physicians of India, India. 2013: 205.
 13. Fernandes SD, Fernandes SDA. Economic burden of diabetes mellitus and its socio-economic impact on household expenditure in an urban slum area. *Int J Res Med Sci*. 2017;5:1808-13.
 14. Kapur A, Bjork S, Nair J, Kelkar S, Ramachandran A. Socio-economic determinants of the cost of diabetes in India. *Diabetes Voice*. 2004;49:18-23.

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