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Review

Economic burden of diabetic patients in India: A review

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ABSTRACT

The Indian diabetic population is predicted to reach more than 80 million by the year 2030. It indicates that immediate health policy restructuring and investment will be needed if the best use is to be made of scarce health care resources with accompanying economic constraints. The costs of treatment of diabetes exists among the patients of all socioeconomic groups.A recent study showed that, in India, the total annual expenditure by patients on diabetes care was, on average, Rs. 10,000 in urban areas and Rs. 6260 in rural areas. The studies related to diabetes indicate that the direct and indirect cost implications of diabetes are multifold worldwide. The direct costs are related to the medical and non-medical cost of people with diabetes, mostly the burden on individual and at the family level. The indirect costs are related to the society and government, which are associated to loss of productivity. The review also finds that the annual direct and indirect medical costs per patient increase with the number of microvascular and macrovascular complications. A study in India during the years 2008 and 2009 found that total costs for patients without complications were Rs. 4493 compared to Rs. 14,692for patients with complications.The review reveals that it is imperative to work effectively towards implementing a holistic programme for diabetes prevention and reduce diabetic expenditure burden in the community.

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1. Introduction

Diabetes has now become a major health problem in India with an estimated 40 million people having diabetes in 2007, accounting for about 20% of the world's diabetic population. The projected numbers are much higher which shows by another 29 million cases, reaching 69.9 million, by 2025 [1]. The prevalence of diabetes israpidly increasing among urban poor, middle class and even in the rural areas of India [2].The increase of prevalence of diabetes expected to be more developing regions of the world attributed by an aging population. Further, urbanization, genetic predisposition combined with lifestyle changes, an increase of obesity and physical inactivity of people contribute to this rapid rise [3–5].

The WHO report predicts that while the majority of increase in diabetes would be in the >65 years' age group in developed countries. Whereas in, India and other developing countries, the highest increase would occur in the age group of 45–64 years which includes people in the peak of their productive lives. This can have a huge negative impact on the economy of developing countries [6].Further, diabetics and its complications cause a heavy economics burden for the patients, their family and the societies [7]. Management of chronic complications associated with diabetes, such as cardiovascular, renal and ophthalmic disease, accounts for one-fourth of the total health expenditures in 1997 in the United States [8].

The expenditure of diabetes is rapidly increasingworldwide. Duration of diabetes, disease severity and association of comorbidities with diabetes are affected on the direct and indirect cost of diabetes [7].Developed countries like Austria, France, Sweden and the Netherlands, will spend more than USD 4000 per person with diabetes. However, on other hand, less developed countries like Myanmar, Ethiopia, Nigeria, and Madagascar, will spend less than USD 20 per individuals with diabetes. India had an annual estimated diabetes treatment cost of Rs. 10,000 to 12,000 crore in 2003, which is likely to witness a scaling up to as much as Rest 1,26,000 crore by 2025 [9].

Diabetes is rapidly emerging as a major costly health care problem in India. Diabetes is a rapidly emerging a major costly health care problem in India. Therefore, there is a need build comprehensive accessible and affordable health care facility to people. Careful planning based on health economic assessments is

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necessary in order to maximize the use of funds for the treatment and prevention of diabetes [7,10].

The direct and indirect cost diabetics have multiple negative implications on population around the world.Similarly, cost variation of treatment getting among socioeconomic groups of India. The direct and indirect cost of diabetics have significant financial strain on households particularly the poor households face greater difficulties in treating CVDs and diabetes. The increasing trends of burden due to CVDs and diabetes in India more households will be subjected to these financial strains and unfortunately economically vulnerable among them will be the worst affected [11]. In India, a recent study showed that total annual expenditure by patients on diabetes care was, on average, Rs. 10,000 in urban areas and Rs. 6260 in rural areas [11]. Several studies have found that lower income groups spent a larger proportion of their income on diabetes care. Urban populations spent more in absolute terms, and that cost of complications weighed heavily on overall costs [12].

In this context, this paper reviews the economic burden and its components on the treatment of diabetes among India.

2. Types of diabetes

2.1. Type 1

Type 1 diabetes, previously called insulin-dependent diabetes mellitus (IDDM), may account for 5% to 10% of all diagnosed cases of diabetes. Risk factors such as autoimmune, genetic, and environmental factors are involved in the development of this type of diabetes [13].

2.2. Type 2

Type 2 diabetes, previously called non-insulin-dependent diabetes mellitus (NIDDM), may account for about 90% to 95% of all diagnosed cases of diabetes. Risk factors for Type 2 diabetes include older age, obesity, family history of diabetes, prior history of gestational diabetes, impaired glucose tolerance and physical inactivity [13].

3. Operational definition

3.1. Direct costs

In the direct costs includes all costs directly related to the health care intervention under consideration. Direct costs have two components, first, is a direct medical costs such costs of drugs, tests, procedures, salaries of health care providersDirect non-medical costs such as the cost of transportation of patients and it has mostly burden on individual and family level [10,14].

3.2. Indirect costs

The indirect costs associated with diabetes include health-related days absent from work, reduced job performance due to health problems, reduced labour force participation and reduced earnings capacity due to permanent disabilities and lost productivity from premature mortality [10,14].

4. Direct costs

Direct cost is related to medical and non-medical costs. The direct medical cost includes the medication costs, cost of laboratory investigations, cost of consultation and cost of hospitalization and cost of treating complications [15]. The direct non-medical costs include the time utilized for care, transportation cost to hospital and cost of food during the in developed countries such as in USA (U$11,744) and Germany (U$4713) were more than those in developing countries. The annual direct total cost per patient is very small, in countries like China (U$1321), India (U$525.5), (Iran U$152) [16]. Diabetic patient has to spend Rs. 7158 per capita direct cost in India [10]. In India diabetic patients spend annual direct cost of 35% on hospitalization, 22% on monitoring and lab, 17% on anti-diabetic drugs, 3 %on other drugs, 12% on a doctor visit and 3% on disposables [10]. Patients pay a higher share of prescription medication expenditures by out-of-pocket compared with other health care services. Non elderly adults with diabetes pay 42% of prescription medication, 2% of hospital stay, 9% of ambulatory care visit, and 28 %of other service expenses out-of-pocket. Elderly adults with diabetes pay 55% of prescription medication, 1 %of hospital stays, 8% of ambulatory care visit, and 31% of other service expenses out-of-pocket [17]. The lowest income groups bear the greatest burden, paying a larger proportion of household income toward diabetes care in India. Direct expenses of the diabetic patient are 27% and 34% of household incomes for rural and urban poor respectively. While the middle-to-high income groups in rural and urban areas consume 5–13%and 5–17 %t of income respectively on diabetes care [11].

5. Indirect costs

The indirect costs associated with diabetes include health-related days absent from work, reduced job performance due to diabetic condition, reduced labour force participation, reduced earnings capacity due to permanent disabilities and lost productivity from premature mortality [8]. Indirect cost arising from absenteeism, lowered productivity and disability benefits [4]. Indirect costs covers the man-days lost, low productivity, disability payment, social security, depression due to diabetes and the loss of personal as well as family income [4,10,18].

The monetary value of man-days lost has been calculated by multiplying number of man-days lost with reported personal daily income in monthly income [10′18]. To estimate productivity loss due to diabetes, lost income due to unpaid sick leave, treatment-related time off work, temporary unemployment, reduced on-the job productivity, premature retirement through morbidity or early mortality, unwanted job changes, loss of opportunities for promotion and education and loss of unpaid production while ill were considered [11,19]. Those working, a large proportion experienced problems at the job, affecting their productivity and at times requiring the change to a less strenuous job [18]. India accounts for 23.5% of the world's disability adjusted life years lost due to diabetes (DALYs) and total indirect cost for non-earning diabetic patients was estimated to be Rs. 9748 per capita, while for earning members it was Rs. 16,831 per capita [4]. Overall indirect cost was estimated to be Rs. 12,756. Of this, productivity loss accounted for Rs. 9166 while personal and family income loss accounted for an average of Rs. 1811 and 1779 respectively in India [10]. In America, annually $58 billion is lost due to reduced productivity from work-related absenteeism, reduced productivity at work and at home, unemployment from chronic disability, and premature mortality. Over one million of these people had diabetes, with over 445,000 cases of unemployment attributed to diabetes, equating to 107 million lost workdays at a national cost of $7.9 billion [8].

6. Cost on complications

Annual direct and indirect medical costs per patient increase with the number of microvascular and macrovascular complications. The economic costs of Type 2 diabetes are attributable largely to the management of microvascular and macrovascular

complications [16]. The total costs increase with an increased number of macrovascular and microvascular complications of diabetic patients. This indicates that macrovascular and microvascular complications attribute to major source of costs for diabetic patients and suggests that prevention and proper management of macrovascular complications may be effective interventions for reducing the long-term economic burden of diabetic therapy [16]. In Canadian health care system, $921 million (35%) of the total direct medical costs on macrovascular and microvascular complication, such as neurological disease accounted for $148 million (5.7%), peripheral vascular disease $63 million (2.4%), cardiovascular disease $637 million (24.3%), renal disease $49 million (1.9%), ophthalmic disease $6 million (0.2%), and other chronic complications $17 million (0.6%). Interestingly, the direct medical costs associated with cardiovascular disease complications in patients with diabetes were 11% greater than chronic diabetes care [20]. The annual direct medical costs for a patient with macrovascular and microvascular complications were two times higher than the costs for patients without complications with diabetes [16]. A study in India for the years 2008 and 2009 found that total costs for patients without complications were Rs. 4493 compared to Rs. 14,691.75 (US$ 301.32) for patients with complications. Among the different types of complications investigated, foot complications incurred the highest costs. Patients with foot complications spent four times more than patients without such complications. Patients with renal disease, cardiovascular and retinal complications spent three times more than those without complications. Consultation and hospitalization costs were especially high for patients with complications. For patients with complications, on average Rs. 1085 is for consultation costs and Rs. 5256.4 for hospital costs compared to patients without complications, Rs. 350 for consultation costs and Rs. 1083 for hospital costs [11].

7. Source of expenditure for diabetes patients

The studies indicate that they met their expenses through family and personal health expenditure resources for diabetes treatment, Irrespective of work status. Some patients got help from governmental institutions where parts of the services are free. The majority of patients 89% used their household income to fund the monitoring and treatment of their diabetes. Household savings were used by 22% of retired patients and in 19% of those in the lowest income bracket. However, the percentage of patients using household savings increased to 34% to pay hospitalization fees because of increased costs compared with routine treatment. A small proportion of patients (9 and 10% respectively) received loans from their employers or relatives, and only 1% claimed the costs of treatment on insurance in India [10]. In Hisar district of Haryana, 74.3% used their savings to cope with the financial expenditure due to diabetes; 5.3% took loans in the last one year to meet their expenditure of hospitalization. 8% of the respondents who were in government jobs, had some form of health insurance and had their expenditure reimbursed from their employer. The remaining 12.4% households used other methods to cope with their financial expenditure on diabetes [21]. Patients pay a higher share on prescription medication expenditures out-of-pocket compared with other health care services. Nonelderly adults with diabetes pay 42% of prescription medication, whereas elderly diabetic patients pay 55 2% on medication. The studies show that maximum expenditure was incurred on medication. Therefore, insurance schemes such as RashtriyaSwasthyaBimaYojana (RSBY) should be expended to other poor class and middle-income group, and beneficiaries should be benefitted at OPD level. It should also cover the cost of medicines to help the households to cope with the financial expenditure. Alternatively, the government could provide subsidized medicines for diabetes. Also, use of generic drugs should be promoted. Since most of the hospitalizations occurred due to complications with diabetes, screening programs for diabetes should be strengthened so that diabetes could be diagnosed early, and this could help in controlling the associated costs arising from complications [21].

8. Barriers to access to health care services

The researchers have found that the various obstacle to access the health care services, like poverty, financial difficulties, scarcity of health care services and lack of supportive person to diabetes, etc. The financial constraints appeared to be a major barrier to accessing health care services to woman and elderly diabetic patient in South India. Therefore diabetic are not taking medication on the regular basis [22]. Clinical inertia in achieving glycemic targets in Indian diabetic subjects could be expected to be even more due to the low rates of awareness of diabetes and its complications in India resulting in poor glycemic control seen in Indians with diabetes. Moreover, other factors like poverty, lack of accessibility to health services and inadequate follow-up are additional factors in developing countries like India.It is also clear from the study found that health insurance contributes to a very small percentage of the diabetes health care expenditure. Thus, adopting a new strategy of imposing medical insurance will help to provide good health care service delivery to diabetic patients in different health sectors and administrative health regions [23,24].

9. Conclusion

The high costs of treatment of diabetes among all socioeconomic patient groups will result in a serious burden on both patients and state resources alike. The long-term economic implications are worrying. The considerable financial strain which households, particularly the poor face in treating diabetes is alarming. As the burden due to diabetes increases in India, more households will be subject to these financial strains and unfortunately, the economically vulnerable among them will be the worst affected. While primary prevention of these conditions needs more emphasis, also, insurance schemes targeted at the poor have an important role to play in financially protecting vulnerable households. With the Indian diabetic population predicted to rise to more than 80.9 million by the year 2030, immediate health policy restructuring and investment in research and infrastructure, over-the-counter medications, disease management and other programs targeted to people with diabetes, it will be needed if the best use is to be made of scarce health care resources with accompanying economic constraints.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.dsx.2019.06.020.

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