Economic burden of diabetes in Telangana: A Cost of illness study

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ABSTRACT

The purpose of this study is to analyze the economic burden on people in Telangana due to diabetes. In Telangana, a prospective observational study was conducted by collecting patient data. 252 patient's data was gathered in 6 months period. This data includes health care costs and complications that is both microvascular complications (Neuropathy, Retinopathy & Nephropathy) and macrovascular complications (Coronary heart disease, Congestive heart failure, Myocardial infarction & Peripheral artery disease). The collected data consists of direct and indirect costs which was analyzed & calculated average cost spent in the treatment of diabetic patients. All the type 2 diabetes mellitus patients who are on anti – diabetic drugs irrespective of their co- morbidities & gender were included. Patients who are not on regular medication were excluded from the study. In this study , cost of illness of type-2 diabetes mellitus patients with & without complications were compared. The total cost of treatment per annum in patients without complications was USD 374.77 & in patients with complications was USD 497.763.

INTRODUCTION

Type- 2 Diabetes Mellitus is a chronic metabolic disorder occurs due to the dysfunction of beta cells & resistance for insulin[1,2].Worldwide about 425 million people (adults aged 20 to 79 years – 9% approximately) were estimated to have diabetes in 2020. Currently India represents 49 % of the world's diabetes population. With an estimated 72 million cases in 2017- a figure expected to almost double to 134 million by 2025. Prevalence is high in people who have adopted western lifestyle patterns while intermediate in developed countries & low in developing countries particularly in rural areas[3,4]. Prevalence increases with age & is similar in both sexes.

Prevalence is rapidly increasing in developing countries adopting western life styles[5].Type-2 Diabetes Mellitus Patients may suffer from both short & long term co-morbidities. One of the common cause of mortality & morbidity in type-2 Diabetes Mellitus patients is Cardio - vascular disease[6].

Cost of illness is defined as the analysis that analyses the impact of a disease on individuals, communities, specific regions and a country. It encompasses the decrease in health status and quality of life long with morbidity due to the range of incidence or prevalence of a disease. Cost of illness includes the expenditures due to co-morbidities, injury, disabilities & death[7,8].

An increase in the prevalence of diabetes all over the worldwide due to raise in population, aging, urbanization, and lifestyle changes that is physical activity results in an in obesity. Unlike in the West, where older people are the most affected, diabetes in Asian countries, is high in the young to middle-aged adults. This could have long-lasting adverse effects on a

nation's health and economy, especially for developing countries. According to the fifth report of the International Diabetes Federation, the second highest numbers of diabetics are present in India. The increase in the prevalence of Type-2 diabetes produces a major clinical, economic, and societal burden in India. The cost of diabetes care is more and is increasing worldwide[9,10].

AIM AND OBJECTIVE

To record all expenses of Type 2 Diabetes Mellitus patients including cost of drug therapy, laboratory tests, clinician fee, transport charges and diabetic diet cost. To analyse the economic burden on patients in Telangana.

METHODS

A prospective observational study was conducted in Telangana. A total of 252 patients data were collected including cost of drug therapy and other indirect costs.

Inclusion criteria:

All the Type 2 Diabetes Mellitus patients who are on Anti-Diabetic therapy irrespective of their co-morbidities, gender and are willing to participate in the study in the state of Telangana.

Exclusion criteria:

Patients who are not on regular medication for Type 2 Diabetes Mellitus and who are not willing to participate in the study. The data observed was analyzed for the average cost incurred in treating the diabetic patients and was calculated based on the total amount spent by the patients to that of total number of patients. The collected data was thoroughly analyzed. From the data obtained, overall cost per diabetic patient as well as total cost per period of one year was calculated. [11,12,13]All the costs data of Indian Rupee (INR) was converted into United

States Dollar (USD) at the rate of 1 USD = 72.18 INR value in the year 2019.

RESULTS

A total of 252 Type 2 Diabetic patients were enrolled based on inclusion and exclusion criteria. Of which 146 (57.94%) were males and 106 (42.06%) were females. Out of 252 patients, 171(67.86%) were with diabetes complications and the remaining 81 (32.14%) were without complications.

Table 01 : Type 2 Diabetes patients based on complications

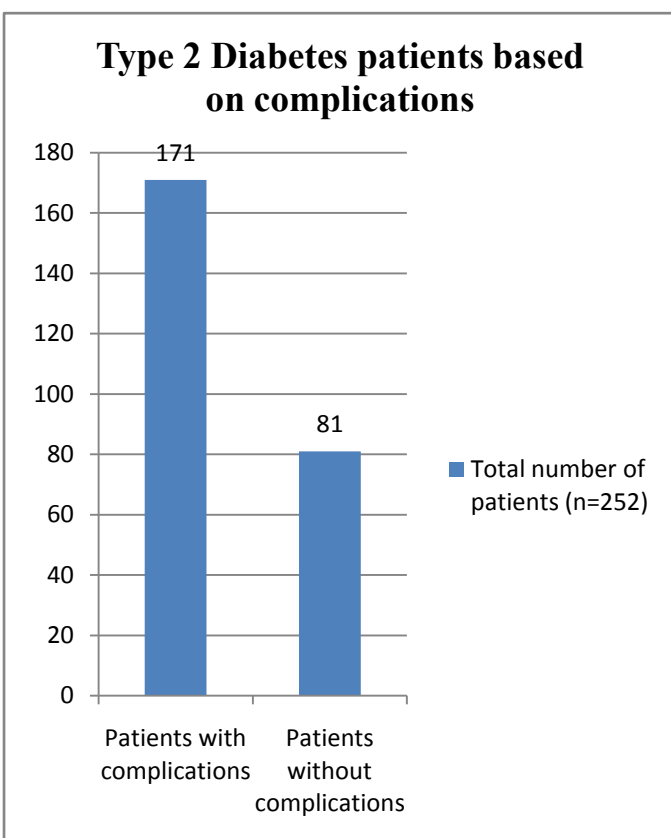| Type 2 Diabetes patients	Total number of patients (n=252)
Patients with complications	171
Patients without complications	81

Fig 01 : Type 2 Diabetes patients based on complications

AGE WISE DISTRIBUTION

Out of 252 diabetic patients (including both groups), 18(7.14%) were in the age group of upto 40 years ; 50(19.8%) were in the age group of 41-50; 73(28.7%) were in the age group of 51-60 and 111(44.01%) were in the age group of above 60 years. Most of the patients were in the age group of above 60 years.

The total cost of treatment per annum in patients without complications was USD 374.77 & in patients with complications was USD 497.76.

Table 02: Demographic characteristics of diabetic patients

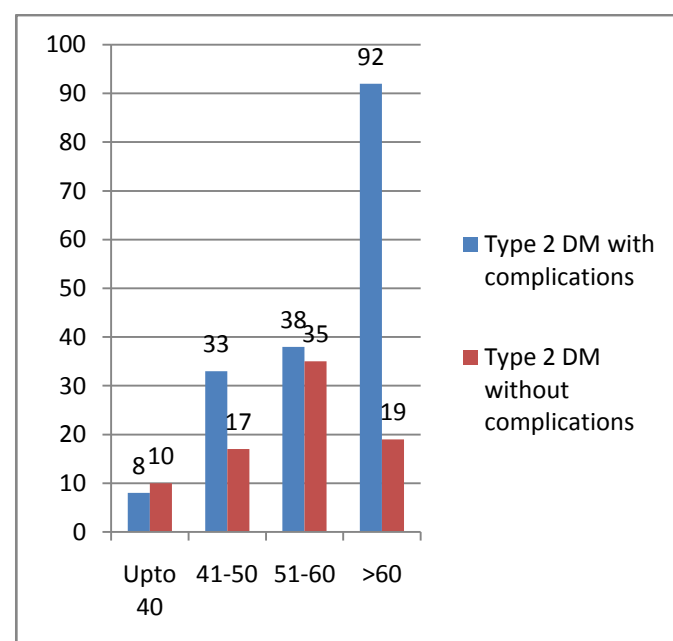| Demographics (Gender and Age)	Type 2 DM with complications (n=171)	Type 2 DM without complications (n=81)
Gender wise distribution Male Female	100(58.48%) 71(41.52%)	46(56.79%) 35(43.20%)
Age wise distribution (Year) Upto 40 41-50 51-60 >60	8(4.68%) 33(19.30%) 38(22.22%) 92(53.80%)	10(12.25%) 17(20.99%) 35(43.21%) 19(23.46%)

Fig 02 : Age Wise Distribution of Diabetic Patients

DIABETIC COMPLICATIONS

Table 03 : Types of diabetic complications

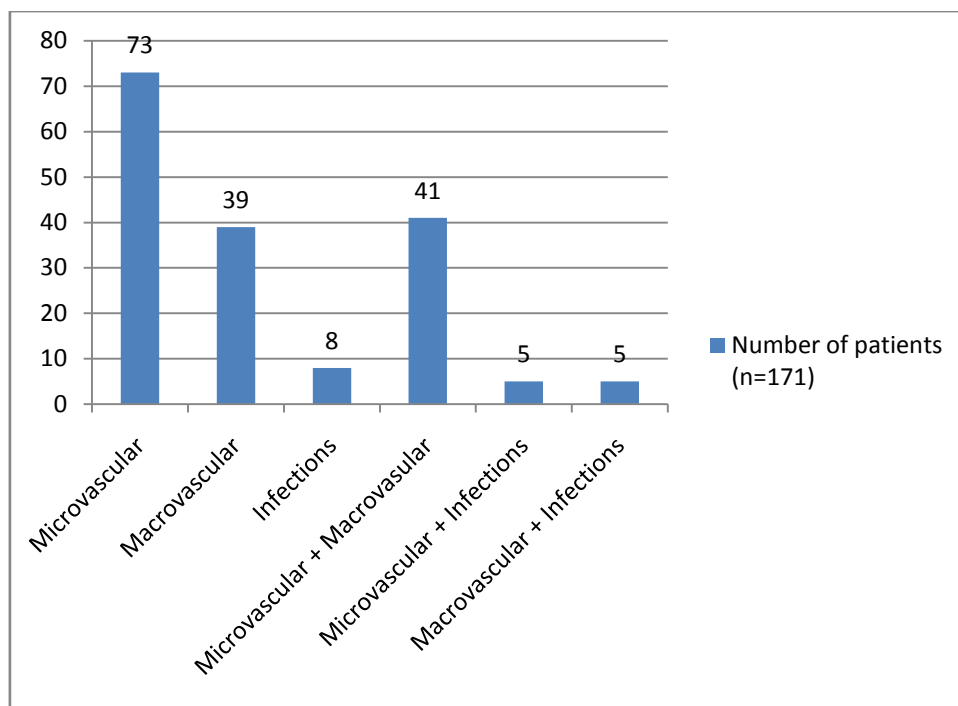| Complications	Number of patients (n=171)
Microvascular	73(42.69%)
Macrovascular	39(22.81%)
Infections	8(4.68%)
Microvascular + Macrovasular	41(23.98%)
Microvascular + Infections	5(2.92%)
Macrovascular + Infections	5(2.92%)

Fig 03 : Diabetic Foot Ulcer Complications

ANNUAL COST OF ILLNESS OF DIABETES CARE PER PATIENT

Table 05 : Annual cost of illness of diabetes care per patient

Annual costs per patient	Type 2 DM with complictions	Type 2 DM without complications
Direct cost – Direct medical cost Cost of Drugs Cost of Investigations Cost of Consultation	187.08USD 14.86 USD 37.37 USD	159.62 USD 14.39 USD 35.47 USD
Direct non medical cost Cost of Transportation Cost of Diet	26.07 USD 232.38 USD	21.03 USD 144.26 USD
Total cost of illness	**497.76 USD**	**374.77 USD**

DISCUSSION

Recently, many studies were conducted on the impact of diabetes on the cost concluded three major observations. First, diabetes imposes a financial burden on people with diabetes and their families. Second, diabetes leads to loss in productivity and economic growth. Last, the highest economic burden caused by diabetes is the monetary value associated with disability and loss of life as a result of the disease itself and its related chronic complications.

The present study is aimed at assessing the cost of diabetes care with or without complications. In this study, 171 patients were with diabetic complications and 81 patients were without complications were enrolled. Among them, majority ere males 100(58.48%) in the group with complications and 46(56.79%) in group without complications. Probability of getting complications in males is 1.07 times more than females. Moreover, majority of them were in the age group of above 60 years in complication group and in the age group of 51- 60 in non- complication group.

Among complications, out of 171 patients majority of them had microascular complications 73(42.69%). In the present study,

we calculated direct medical cost which includes the cost of drugs, investigations and consultation cost.

Direct non medical cost includes the cost of transportation and indirect cost includes diabetic diet. Finally, total cost of illness for diabetes with and without complications was calculated.

Under direct medical cost, annual drug cost was 187.08 USD for Type 2 DM with complications and 159.62 USD for Type 2 DM without complications. We found that the total cost of illness for diabetic care with complications was 497.76 USD per annum and for diabetic care without complications was 374.77 USD per annum.

All the studies have concluded that diabetes is a costly disease and diabetic complications makes it costlier. It is not only a burden to the patient, his family but also to the nation. When it comes to complications, the poor people in the urban and rural areas are more vulnerable because of delay in diagnosis of the condition and incomplete follow-up and treatment. These are also economically vulnerable when they develop diabetes complications. As our country still does not have universal health coverage, it is important to target interventions to these groups in terms of accessibility to education, training, investigation tests and medications to manage diabetes effectively.

CONCLUSION

In this study, cost of illness of diabetes patients with and without complications were compared. The total cost of treatment per annum in patients without complications was 374.77USD and in patients with complications was 497.76 USD. Complications in diabetic patients will increase the economic burden to family and also to the society. Findings of this study highlight the need fo early identification and prevention of complications to control the cost of management in diabetes patients.

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