Cost of Illness of Diabetes Mellitus in Thailand

Dr. Susmita Chattopadhyay

Economist, National Institute of Cholera and Enteric Diseases, Kolkata, India.

Abstract

Until a few decades ago, diabetes was generally seen as a problem primarily in developed countries. However, with changing lifestyles and dietary habits, diabetes has also emerged as an important public health problem in the developing world. It is projected that by 2025, there will be, almost, a 70% increase in the number of cases of diabetes in developing countries. Meanwhile, the increase in developed countries over the same time period will be only about 42%. Contrary to trends in developed countries, where the majority of diabetics are 65 years or older, most diabetics in the Southeast Asian region are between 45 and 64 years of age—the more economically productive age group.

The specific objectives of this study are: (a) to determine the rates of disability among individuals with diabetes in Thailand and (b) to obtain generalizable estimates of the total cost including cost of informal care to address the economic impact caused by diabetes.

The study looks at Waritchaphum District, Sakonnakhon Province in northeast Thailand, because of: (a) the high reported prevalence of the disease as compared to other regions (with the exception of Bangkok); (b) the highest number of disabled persons living in this part of the country; and c) easier data accessibility.

The research functions as a cost-of-illness study from societal perspective (i.e. to estimate costs incurred by all members of society including the private sector, the public sector and the private consumer) focusing on informal care and disabilities. Along with the cost-of-illness estimation, identifying and accounting for the undocumented component of diabetes care is especially important in Thailand. Among the Asian countries, Thailand expects a significant increase in the number of individuals with diabetes over the next few decades, because of a more pronounced ‘westernization’ of Thai society.

Introduction

Diabetes Mellitus, long considered a disease of minor significance in world health, is now taking its place as one of the main threats to human health. The past two decades have seen an explosive increase in the number of people diagnosed with diabetes worldwide (Zimmet, Alberti, & Shaw, 2001). Recent economic change, reflected by rapid industrialization, urbanization and increased wealth at both national and household levels, has led to an increasing proportion of the Thai population living with diabetes. According to the cross country survey in the InterAsia study, the prevalence of type 2 diabetes in Thailand was 9.8%, which was doubling the number forecast by the WHO (Aekplakorn, Stolk, Neal, Suriyawongpaisal, Chongsuvivatwong, & Cheepudomwit, 2003). The hospitalization rate for diabetes in Thailand had shown a rising trend over the years, from 33.3 per 100,000 population in 1985 to 91.0 in 1994 to 380.7 in 2003 and 586.8 in 2006. Hence, Thailand is inevitably moving towards the burden of such a public health problem (Ministry of Public Health Thailand, 2009).

People with diabetes are prone to consequences in both short-term and long-term complications. The chronic nature of diabetes and its devastating complications make it a very costly disease. In the United States, the total estimated cost of diabetes in 2007 was USD 174 billion (American Diabetes Association, 2008). In Latin America and the Caribbean, total annual cost associated with diabetes was estimated as USD 65,216 million in 2000 (Barcelo´, Aedo, Rajpathak, & Robles, 2003). In Thailand, there also exist some studies on cost of diabetes. A study based on four government hospitals in Thailand found that for outpatients, annual direct medical expenditure was more than five times higher for diabetic patients as compared to non-diabetics and for inpatients, the expenditure was more than two times higher in 2002-03 (Pongcharoensuk, Kongsaktrakool, Tantivipanuwong, Sema-ngern K, & Chaiyakunapruk, 2006). Riewpaiboon et al. (2007) estimated cost of diabetes at a district public hospital in Thailand and found that the direct medical cost was 6,331 baht per person per year in 2001 (Riewpaiboon, Pornlertwadee, & Pongsawat, 2007). However, all those studies estimated the cost from provider perspective, hence, reported only the direct medical cost of diabetes. In order to gather a comprehensive idea on economic burden of diabetes in

Thailand, the present study aimed to estimate the cost of illness of diabetes from societal perspective. As per the researcher's knowledge, this study was the first attempt to explore the cost of illness of diabetes from societal perspective in Thailand.

Materials and Methods

Study design

The study was a prevalence based cost of illness study and it presented a societal perspective of cost of diabetes (Kobelt, 2002). Cost of illness studies use either a prevalence based or incidence based approach, depending on whether a fixed time horizon or life time horizon is adopted as the conceptual paradigm. Prevalence based cost of illness studies measure the economic burden of a disease in a given period. In contrast, the incidence based approach measures the economic burden from the onset of disease until cure or death. In the societal perspective, all costs, regardless of who incurs them, are included. Thus, costs to the health care service, to social services, to patients and also to the rest of society in the form of production losses are included, but transfer payments are ignored. A micro-costing or bottom up approach was used to calculate the cost (Brouwer, Rutten, & Koopmanschap, 2001).

Study site and study participants

The study was conducted at Waritchaphum Hospital, Waritchaphum district of Sakhon Nakhon Province in north eastern Thailand, 660 km away from the capital city Bangkok. The study site was selected because of (a) high reported prevalence of the disease compared to other regions (except Bangkok), (b) the highest number of disabled persons living in this part of the country. The study hospital was a 30 bed public district hospital. Besides general outpatient, inpatient and emergency services, the hospital provided some minor surgery services such as debridement, excision (mass and cyst), dressing wound, tubal resection etc with the help of total 126 staff of whom, 4 were doctors, 28 nurses, 3 pharmacists, 2 dentists. During the financial year 2008, on average there were 169.80 outpatient visits per day and the occupancy rate of the hospital was 44%. Diabetic patients were a part of the hospital services. The cases were detected by using International Classification of Diseases, tenth revision (ICD-10 codes = E10 – E14). The present study participants were the diabetic patients as

identified by ICD – 10 codes and who received treatment from the study hospital during the financial year 2008. Given the time and budget constraint, the sample size for the study was fixed at 475 (1/3rd of all diabetic patients received treatment during 2007-08). From a total of 1425 diabetic patients, 546 patients were randomly selected from the hospital database (15% extra was drawn in order to avoid problem of refusals or incomplete data) and finally data were collected from 475 patients.

Data sources

The data were collected from the hospital financial records, medical records of each study participant as well as through direct personal interview method. A structured pre-tested questionnaire was administered to the study participants to obtain information on demographics, health care utilization pattern and related cost, activities of daily living and informal care (i.e. the care provided by the family members, friends and neighbours). The field data collection was done by a team of trained health centre and hospital staff of Waritchaphum district.

Costs

Cost of illness estimates using a prevalence based approach indicate the economic burden of the disease at a given point of time – for the present study the time frame was the financial year 2008 (1st October 2007 – 30th September 2008). In this study the cost components consisted of both direct and indirect costs. The direct economic costs reflected the resources used in treating or coping with the disease, including expenditures for medical care and the treatment of illness. Direct cost had been divided into two sub categories – (a) direct medical costs which included costs of hospitalization, outpatient visits, drug, laboratory tests, materials, emergency services (such as dressing for diabetic patients), dental services and traditional medicine services (e.g. foot massage for diabetic patients who had absence of foot pulse) and (b) direct non-medical costs. Direct non-medical costs included cost of transportation to the health care providers, time loss of the patient and the accompanied person for visiting the health care providers, costs of meal and accommodation during these

visits, costs of personal facilities needed (e.g. home modifications, personal devices) and cost of informal care. In this study, indirect cost included the societal cost of morbidity, permanent disability and premature mortality.

Methods of cost calculation

Direct Cost

The direct medical cost was calculated by multiplying the quantity of medical services consumed by their unit costs. The study participants received treatment from Waritchaphum hospital, from nine health centres under the hospital and the severe patients received treatment from the provincial hospital as well. Some patients also received treatment from other health care providers such as private clinics, hence, direct medical costs were calculated for all health care services availed by the study participants. Standard costing method was used to calculate the unit cost of medical services at Waritchaphum hospital (Brouwer et al., 2001).

For calculating the cost per visit at the health centres (there were no inpatient services at the health centres) the study result of Kongsawat (1999) was used which calculated the unit cost of services provided at the health care settings in 5 provinces of Thailand during the financial year 1997 under the health system reform project in the Ministry of Public Health (Kongsawatt, 1997). The outpatient visit and inpatient day cost at the provincial hospital was calculated on the basis of approximate average of the results of four studies conducted in different provincial hospitals in Thailand (Jawrakate, 2001; Koopitakkajorn, 2009; Pattanaphesaj, 2008; Tisayaticom, 2000). All costs were converted into 2008 price by using consumer price index for medical care of Thailand. For the drug and laboratory cost per visit at the provincial hospital, the same costs incurred at Waritchaphum hospital were used on the assumption that the drug and laboratory cost per visit will almost be the same at district and provincial hospital.

Indirect Cost

In this study the indirect costs associated with diabetes included health related days absent from work and / or normal activities, leisure time loss, lost earning capacity from permanent

disability and lost productivity from premature mortality. Human capital approach was used for indirect cost calculation (Pritchard & Sculpher, 2000). For calculating the work absence / normal activity lost days, the number of such lost days mentioned by the study participants during last three months from the date of interview was taken into account (following the maximum allowable recall period of 3 months) and then extrapolated the same for the whole year (Kobelt, 2002). Those lost days mentioned by the patients were excluding hospitalization days, hence total hospitalization days during the study period were added to get a complete picture of work absence / normal activity lost days of the study participants. For estimating the mortality cost, the number of death cases occurred among the study participants during the study period was considered and for permanent disability, the patients who reported during interview that they were out of the labour force because of disability were considered. Their Barthel index score (a simple index of independence useful in scoring improvement in the rehabilitation of the chronically ill) also confirmed their severity of disability. For calculating loss of productive life in both deceased and permanent disabled persons, the age of 60 years was considered (the official retirement age in Thailand).

For calculating indirect cost and cost of time loss of the study participants, accompanied persons and informal caregivers, the official minimum wage rate of Sakhon Nakhon Province (148 baht per day) was used in order to average out the differences in earning power of the study participants (Ministry of Labour, 2009). As most of the study participants were agriculturists, they didn't have regular income. Further, some of them must earned more than the minimum official wage while some others earned less than that, hence, using minimum wage was found appropriate. When a person in the active labour force dies or is out of the labour force because of permanent disability, his contribution to the country's Gross Domestic Product (GDP) is lost. Hence, a sensitivity analysis was conducted by using GDP per capita in mortality and permanent disability cost calculation in order to capture how the assumption of using minimum wage rate affected total cost of illness of diabetes.

A constant 5% growth rate in the minimum wage rate was used to calculate income in the future years, this was the average percentage increase in minimum wage in Sakhon Nakhon

province for last 5 years. The projected GDP growth rate was used from the International Monetary Fund's World Economic Outlook, 2008 report for Thailand. A 3% discount rate was used to convert future earnings to current value. However, this discount rate was varied to 0% and 6% to see the effect on cost (Edejer, Baltussen, Adam, Hutubessy, Acharya, Evans et al., 2003).

Results

Characteristics of the study participants

Out of total 475 study participants, 354 (74%) were females and the mean age of all participants were 59.34 ± 11.40 years. Most of them had primary education (90%) and were agriculturists (55%). As regards the type of diabetes, only 4 patients were found with type 1 diabetes (0.84%). The mean duration of the disease was 7.20 ± 6.40 years. 65% of the study participants had co-morbidity and diabetic complications were found among 31% of the study participants. In terms of payment schemes, most of them were covered by the Universal Health Coverage Scheme (83%).

Cost of illness of diabetes

Total cost of illness of diabetes was estimated USD 418,696 in 2008 (USD 1 = THB 32) (Table 1). Of this, 23% was direct medical cost, 40% was direct non-medical cost and 38% was indirect cost. This means that direct cost of illness outweighed the indirect cost (63% vs. 38%). While looking at the components of different costs, the major component in direct medical cost was the hospital care or the inpatient service cost which accounted for 11% of total cost of illness. Next came drug and outpatient visit cost (each contributed about 3% to total cost of illness). The hospitalization cost, outpatient visit, drug and laboratory test costs were presented together for the study hospitals, health centres and provincial hospitals, while the dispensing cost and other service utilization costs were calculated for the study hospital only as detailed data were not available for health centres and provincial hospital. In direct non-medical cost, the major component was the cost of informal care which was about 28% of total cost of illness and this was the highest individual cost component. In indirect cost,

cost of permanent disability contributed about 19% of total cost of illness while the contribution of mortality cost was 17%.

Sensitivity analysis was conducted by using GDP per capita in mortality and permanent disability cost calculation and the results were also presented in Table 1. Using GDP per capita in indirect cost calculation provided a completely different picture. Now the contribution of indirect cost (61%) outweighed that of the direct cost (39%). Cost of permanent disability became the highest cost component (31%) followed by mortality cost (29%) and cost of informal care (17%). The total cost of illness increased from USD 418,696 to USD 671,837.

Cost of illness of diabetes was also calculated for sub groups of patients identified on the basis of economic and clinical criteria and the costs were compared within each sub group by using Kruskal-Wallis test. Statistical significance was considered when p value was less than 0.05. These results were presented in Table 2. While comparing the cost of illness among different age groups, the highest average cost of illness was found for the age group 45-54 years (USD 1863.14) while the lowest was for the age group 35-44 years (USD 163.19). The average cost of illness for the male patients was USD 1463.86 while the same for female patients was USD 682.40. The average cost of illness was found to increase with the duration of the disease. As expected, the highest average cost was found for those who suffered from the disease for more than 20 years. There were only 4 patients with type 1 diabetes in the study sample and the average cost of illness for them was USD 1201.07 while the same for those with type 2 diabetes was USD 878.75. The cost of illness was also calculated for different fasting blood sugar levels. The levels were categorized based on the criteria followed by the Sakhon Nakhon provincial hospital. The highest average cost was found for those whose average fasting blood sugar level was 180 mg/dl and above during the study period. The average cost of illness was found to increase monotonically with the number of co-morbidities. The average cost for patients with one co-morbidity was USD 714.78, while the same for those with more than three co-morbidities USD 2014.02.

Complications and cost of illness

Diabetes is a complex chronic illness that is associated with multiple complications involving diverse organ system. Treatment of complications is a major part of the medical care of patients with diabetes accounting for a large proportion of health care costs. For identifying the complications status among the present study participants, the clinicians thoroughly reviewed the medical records of all study participants following the definitions of complications used in the Thailand Diabetes Registry Project (Chetthakul, Deerochanawong, Suwanwalaikorn, Kosachunhanun, Ngarmukos, Rawdaree et al., 2006; Krittiyawong, Ngarmukos, Benjasuratwong, Rawdaree, Leelawatana, Kosachunhanun et al., 2006; Leelawattana, Pratipanawatr, Bunnag, Kosachunhanun, Suwanwalaikorn, Krittiyawong et al., 2006). The prevalence of complications among the study participants was presented in Figure 1. Cataract was frequently observed in 15.16% of the diabetic patients. The second highest prevalence was diabetic nephropathy (11.79%) followed by diabetic foot complications (9.26%), diabetic retinopathy (3.16%), coronary artery diseases (2.32%) and stroke (2.32%).

The costs were compared for different types of complications as well as with and without complications. While comparing the costs among the patients with and without complications, it was found that the average cost for those with complications was significantly higher than those without complications (USD 1488.33 vs. USD 606.80) (Table 3). Further, the average costs were found to increase progressively with the increase in number of complications. While the average cost for those with one complication was USD 1059.44, the same was more than twice for those with three or more complications (USD 2929.03). The cost also varied significantly for different types of complications. For those who suffered from both microvascular (diabetic retinopathy, diabetic nephropathy and diabetic neuropathy) and macrovascular complications (coronary artery diseases, stroke), the average cost was found the highest for them (USD 3222.06). The average cost with macrovascular complication only was USD 2000.26 while the same for microvascular only was 1977.59.

Discussion

This study, a prevalence based cost of illness study, presented a societal perspective of cost of illness of diabetes in Thailand during the financial year 2008. Data were collected from 475 randomly selected diabetic patients who received treatment from a district public hospital in Sakhon Nakhon province of Thailand. The demographic characteristics of the study participants, for example, mean age (59.34 ± 11.40 years), predominance of female patients (74.5%) were quite similar to those found in other diabetes studies in Thailand. The present study results showed that 60% of the study participants were in the age group 45 – 64 years which supports the view that most diabetics in the South-East Asia Region are between 45 and 64 years of age - the more economically productive age group. As regards disease characteristics, the mean duration of the disease was 7.20 ± 6.40 years, most of the patients had type 2 diabetes (99%) and the mean fasting blood sugar level was 156.06 ± 37.49. These results are comparable with other diabetic studies in Thailand as well as in other countries (Chaikledkaew, Pongchareonsuk, & Chaiyakunapruk, 2008; Nitiyanant, Chetthakul, Sang - A - kad, Therakiatkumjorn, Kunsuikmengrai, & Yeo, 2007; Ramsey, Newton, Blough, McCulloch, Sandhu, & Wagner, 1999).

The total cost of illness of diabetes was estimated USD 418,696.45 in 2008. The contributions of direct medical cost, direct non-medical cost and indirect cost in total cost of illness were 22.66%, 39.87% and 37.47% respectively. The general tendency for indirect costs to make up a slightly larger proportion of total costs than the direct costs is largely due to the cost components included in the estimates. In this study, time loss of the patients and accompanied persons during visits to the health care providers, transportation cost and cost of informal care were incorporated which increased the percentage of direct non-medical cost in total cost of illness. However, these costs were generally neglected in cost of illness studies of diabetes even in recent times (American Diabetes Association, 2008; Barcelo´ et al., 2003). The present study result showed that informal care alone contributed about 28% of total cost of illness, hence, exclusion of this cost obviously underestimated the direct cost of illness of diabetes in other studies. Further, in this study, the calculation of mortality and permanent disability cost was done by using official minimum wage rate of Sakhon Nakhon province. Probably this underestimated the indirect cost in this study. In order to check how the

assumption of using minimum wage rate in mortality and permanent disability calculation affected total cost, a recalculation of these two costs were done by using GDP per capita. It was found that the contribution of indirect cost in total cost of illness increased from 37% to 61% and the total cost of illness increased by 60%. Hence, the indirect cost calculation based on minimum wage rate provided lowest cost of illness estimate. Another important assumption was to use 3% discount rate to convert future earnings to current value. This rate was varied to 0% and 6% and for that total cost of illness changed by 12.88% (increase) and 9.08% (decrease) respectively.

In a recent review on cost of illness studies on diabetes, it was emphasized that there is still lack of information on cost based on clinical and economic criteria such as types of diabetes, disease duration, age, gender and types of complications (Ettaro, Songer, Zhang, & Engelgau, 2004). The present study tried to add some knowledge into these areas. It was found that the average cost was the highest for the age group 45-54 years. Further, 71% of total cost of illness was attributed to the age group between 45–64 years. This estimate was more than twice of the same presented in recent diabetes study in the US. This once again confirmed that the more economically productive age group was affected in diabetes and the burden was also very high for this group. The male patients were found to have higher average cost than their female counterpart. The average cost was found to increase progressively with the duration of the disease. Further, average cost was significantly higher for those with average fasting blood sugar level 180 mg/dl and above.

The present study results showed that 65% of the study participants had co-morbidity and 31% had diabetic complications. While comparing the prevalence of diabetic complications among the study participants with another primary care based study of Thailand, it was found that the prevalence of diabetic retinopathy, cataract and nephropathy was lower in the present study while the prevalence of coronary artery diseases, stroke, foot ulcers and lower extremity amputation was higher (Nitiyanant et al., 2007). The reason of lower prevalence of nephropathy and retinopathy was probably because in the present study no laboratory tests were done to confirm the existence of complications; the complications were detected by

reviewing medical records of the study participants following the definitions used in other diabetic studies in Thailand. Hence, it is possible that the present study approach failed to capture all types of complications. The costs for patients with complications were substantially higher than those without complications and the costs were found to increase progressively with the increase in number of complications. Costs also differed significantly across the types of complications. The patients with both microvascular and macrovascular complications were found to incur the highest average cost.

The present study suffered from some limitations. Firstly, the cost of outpatient visit and inpatient days at the health centres and provincial hospital were calculated on the basis of approximate results of some previous studies. Further, dispensing cost, other service utilization cost (such as dressing for diabetic patients) were also not included for those who visited provincial hospitals. Hence, the direct medical cost didn't present the exact cost incurred in these two health care facilities. Secondly, indirect cost calculation didn't take into account reduced earning or productive capacity due to disability, it only considered the early retirement caused from disability. Thirdly, the present cost of illness estimate ignored the intangible cost such as pain and suffering from the disease. Finally, it had been noted that overestimates of indirect cost might occur while using human capital approach and the frictional cost approach was believed to be more conservative. However, the information needed to apply friction cost approach was not available at the time of the study hence the traditional human capital approach was used for indirect cost calculation.

Conclusion

The present study found that the average cost of illness of diabetes was USD 881.47 in 2008 which was 21% of per capita GDP of Thailand. Further, diabetes with complications resulted about 2.5 times higher cost of illness. Hence, the burden of diabetes and its complications was significant for the individual. Further, it should be noted that the cost of informal care contributed 28% of total cost of illness of diabetes. Hence, the disease not only affected the individual but also to the family members, friends and neighbours. Much of this cost associated with the disease is preventable through improved diet and exercise, prevention

initiatives to reduce the prevalence of diabetes and its co-morbidities and improved care. Keeping in mind the burden of the disease on individual as well as on the society, the health policy makers should emphasize on initiatives to prevent the disease prevalence and counseling to the diabetic patients should be done continuously to prevent the progression of the disease and its devastating complications.

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Table 1: Cost of Illness of Diabetes (USD at 2008 prices)*

			Sensitivity Analysis	
Types of Costs	**Total Cost**	**% of Total**	**Total Cost**	**% of Total**
Direct Medical Cost	**94878.88**	**22.66**	**94878.88**	**14.12**
Outpatient visit	12042.40	2.88	12042.40	1.79
Hospital care	46627.30	11.14	46627.30	6.94
Dispensing cost	4573.11	1.09	4573.11	0.68
Drug cost	13684.65	3.27	13684.65	2.04
Laboratory cost	8608.66	2.06	8608.66	1.28
Other service utilization cost	5951.03	1.42	5951.03	0.89
Expenditure at other health facilities	3391.72	0.81	3391.72	0.50
Direct Non-Medical Cost	**166932.53**	**39.87**	**166932.53**	**24.85**
Transportation	8137.65	1.94	8137.65	1.21
Accommodation	371.88	0.09	371.88	0.06
Meal	1630.00	0.39	1630.00	0.24
Cost of personal facilities	3118.44	0.74	3118.44	0.46
Other expenses	22237.63	5.31	22237.63	3.31
Time loss of patient	10536.22	2.52	10536.22	1.57
Time loss of accompanied person	3394.98	0.81	3394.98	0.51
Payment to paid caregivers	956.25	0.23	956.25	0.14
Cost of informal care	116549.49	27.84	116549.49	17.35
Total Direct Cost	**261881.40**	**62.53**	**261881.40**	**38.97**
Work absence / leisure time lost	5332.63	1.27	5332.63	0.79
Mortality cost	73285.63	17.50	195917.82	29.16
Cost of permanent disability	78266.78	18.69	208775.90	31.08
Total Indirect Cost	**156885.04**	**37.47**	**410026.34**	**61.03**
Total Cost of Illness	**418696.45**	**100.00**	**671837.74**	**100.00**

- 1 USD = 32 Thai Baht

Table 2: Cost of Illness for Different Categories (USD at 2008 prices)

Categories	Number	Cost of Illness			P value
		Mean	Median	Standard Deviation	
Age					
Less than 35 years	7	827.15	329.47	1177.04	<0.001
35 – 44 years	32	163.19	84.28	235.71	
45 – 54 years	111	1863.14	122.58	5301.86	
55 – 64 years	176	512.69	126.83	1117.93	
65 – 74 years	104	753.67	194.29	1419.67	
75 years and above	45	716.89	543.45	812.75	
Gender					
Male	121	1463.86	142.75	4344.21	0.754
Female	354	682.40	139.04	1983.00	
Duration of the disease					
1 – 5 years	264	826.64	110.40	3174.70	<0.001
6 – 10 years	100	731.96	148.73	2583.66	
11 – 15 years	61	1042.99	287.25	1969.15	
16 – 20 years	30	1070.87	521.81	1315.70	
21 years and above	20	1575.90	718.58	2271.87	
Type of diabetes					
Type 1	4	1201.07	747.87	1396.08	0.167
Type 2	471	878.75	139.51	2806.36	
Fasting blood sugar level*					
70 mg/dl – 130 mg/dl	114	914.56	127.76	2853.52	0.002
131 mg/dl – 179 mg/dl	250	627.03	125.36	2158.74	
180 mg/dl and above	100	1411.46	281.06	3808.51	
Co-morbidity					
With co-morbidity	308	947.60	148.70	2915.63	0.072
Without co-morbidity	167	759.49	125.40	2567.43	
Number of co-morbidities					
One co-morbidity	203	714.78	138.56	2387.69	0.022
Two co-morbidities	85	1252.72	170.89	3311.12	
Three and more co-morbidities	20	2014.02	425.14	5107.06	
Total	**475**	**881.47**	**139.79**	**2796.86**	

* Fasting blood sugar level data were available for 464 patients.

Table 3: Diabetic Complications and Cost of Illness (USD at 2008 prices)

	Number	Cost of Illness			P value
		Mean	Median	Standard deviation	
Complications					
With complications	148	1488.33	479.93	3022.57	<0.001
Without complications	327	606.80	115.12	2647.87	
Number of Complications					
One complication	96	1059.44	261.32	2505.05	<0.001
Two complications	44	2162.16	758.09	3846.47	
Three and more complications	8	2929.03	2131.34	2838.38	
Types of complications					
Microvascular	59	1977.59	641.20	3337.73	0.001
Macrovascular	11	2000.26	366.55	3028.60	
Micro and Macrovascular	11	3222.06	666.42	6760.88	
Microvascular and cataract	23	1137.86	745.44	1187.62	
Cataract	44	454.07	151.06	629.28	

Figure 1: Prevalence of Complications among the Study Participants