Direct Cost of Diabetes:
A Case Study in Sainthamaruthu Divisional Secretariat Area

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Abstract

Direct costs of diabetes are doctor consultation cost, transportation cost, cost for urine test, cost for blood test and medication cost. The objective of the study was to measure the direct cost of diabetic patient in Sainthamaruthu Divisional Secretariat Area. This study used primary and secondary data both qualitative and quantitative and questionnaire survey. Sample selected through the stratified sampling method from 243 patients. Random sampling method used to distribute a 100 questionnaire. For the data analyzing this study used cross-sectional descriptive method and cost of illness method used to estimate a direct cost of diabetes. Analyzing made through SPSS and Excel. This survey finds that monthly average direct cost of Sainthamaruthu Divisional Secretariat Area is Rs. 3,253. Here, monthly average doctor consultation cost is Rs. 882, monthly average transportation cost is Rs. 192, monthly average cost for urine test is Rs. 81, and monthly average cost for blood test is Rs. 226 and monthly average medication cost is Rs. 1,871. According to this research, higher level of economic cost shares by the male and lower income people. And 54 percentage of patients are depend on their families for fulfill their cost of diabetes. So most of the cost of diabetes imposes to their families of diabetic patient in Sainthamaruthu. And it is the big economic Burden among them.

 Keywords: Diabetes Mellitus, Cost of Illness, Disability, Morbidity

1. Introduction

Diabetes is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. Symptoms of high blood sugar include frequent urination, increased thirst, and increased hunger. The primary cause is excessive body weight and not enough exercise. Gestational diabetes is the third main form and occurs when pregnant women without a previous history of diabetes develop high blood-sugar levels (Brackendrige et al, 1998)

In economically diabetes and its complications bring about substantial economic loss to people with diabetes and their families and to health systems and national economies through direct medical costs and indirect cost. Direct costs include costs of outpatient visits hospitalization medication and other supplies as well as the economic and other sacrifices made by individual patient and their families and its complications indirect costs are defined as the production losses due to sick leave, early retirement and early death related to diabetes.

Diabetes is a disease which is rapidly increase and imposes a substantial burden on the economy in the current world**.** Globally, an estimated 422 million adults were living with diabetes in 2014, compared

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to 108 million in 1980. The global prevalence of diabetes has nearly doubled since 1980, rising from 4.7 percent to 8.5 percent in the adult population. Diabetes caused 1.5 million deaths in 2012. Higher-than-optimal blood glucose caused an additional 2.2 million deaths, by increasing the risks of cardiovascular and other diseases. 43 percent of these 3.7 million deaths occur before the age of 70 years (WHO report, 2014)

Sri Lanka being a lower middle income developing country lacks adequate resources, both financial and human, to manage this increased load of diabetic patients. However, the author is of the opinion that cost-effective utilization of existing resources would enable to face this challenge. The primary healthcare system in Sri Lanka has been a true success story where have reached a high standard of care despite limited resources.

According to the Diabetes Association of Sri Lanka, 2014 (DASL) more and more young persons were being afflicted by the disease and though the number of people affected by diabetics was ever-increasing. The prevalence of diabetes in the country had dramatically increased from around 16 per cent in 2009 to 20 per cent in 2014. The diabetes prevalence among the people over 20 years in the urban population was 16 per cent and among the rural population it was eight per cent.

Under the age of 20 years it was 8.2 per cent. According to DASL, the prevalence of diabetes among urban population had increased from 12.1 per cent in 1996 to 16.4 per cent in 2008. Overall prevalence increased from 6.87 per cent in 1987 to 30 per cent in 2006 (www.diabetessrilanka.org). Healthcare expenditures spent on diabetes account for 11.6 percent of the total healthcare expenditure in the world in 2010. This percentage varied from 7 percent in the Africa Region to 14 percent in the Middle East and North African Region and North America and Caribbean Region. However, there is a wide variation by country. As well as in Sri Lanka 106,802 $ spent for the diabetes in 2010. It is expected as 149,933 $ in 2030 (World Health Statistics report, 2011).

So this way Sainthamaruthu also show a rapid increase prevalence of diabetes. As a result expenditure of diabetic patient is increase. Therefore the study was investigated the direct cost of diabetes in Sainthamaruthu.

2. Literature review

Ambepitiyawaduge et al., (2012), this study carried out social cultural and economic determinants of diabetes in kalutara district. Aim of this study was describe the social and economic correlates and an inequality of diabetes in kalutura district cross sectional descriptive study was carried out among patient. Stratified and cluster sampling method used to select the gramaniladaries. As well as sample was selected through the random sampling method.According to this higher prevalence of diabetes in the more prosperous and educated segments of society. 14.7 per cent of adults who were effected the diabetes into this those educated up to advanced level 17.3 per cent. Prevalence among Sinhalese, Tamils and Muslims were 14.4 per cent, 29.9 per cent and 20 per cent respectively. This study fails to consider about gender. So fulfill this gap, this study analyzed the direct cost of Sainthamaruthu by gender.

Charls AK Yesuden et al., (2014)**,** this studied was economic burden of diabetes in India: a review of the literature. Finding of this study was direct cost of diabetes by individual was higher than the healthcare system. The cost of diabetes and its complication in India have focused on the costs borne by patient both direct and in direct and less evidence exist on the economic burden for health care system and society. But this study only considered the children. So fill the research gap this study analyzed about elders.

Dawsan, DanialGoams and hertizal (2002), the objective of this study was estimate the economic cost of diabetes in Canada 1998. Top-down costing methodology used in this research. And sensitivity analysis also followed. For estimate the productivity losses the human capital approach was used. Total economic burden of diabetes and its chronic complications in Canada for 1998 was likely to be between $4.76 and $5.23 billion. The direct medical costs associated with diabetes care were $573 million. It only analyzed the direct cost. As a consequence this survey included a direct cost of diabetes with a gender, age group and income wise.

Hind Elrayah (2007), this studied to estimate the cost of diabetes on patient and their families to among Sudanese and determine the quality of this care. Especially this study conducted a direct cost of adult patient with type to diabetes as a methodology this study used cross-sectional descriptive. And interview method and random sampling method also used. According to this study expenditure of per diabetes child was 283 annually, of which 36 per cent was spent on insulin. The direct cost of type 1 to diabetes was 175 per year. Household of diabetic children 16 per cent was received as financial helps from relatives and friends. As well as patient attending private clinics had both higher income and higher cost than those attending public clinics. However both groups had poor glycemic control, which may reflect the low direct costs and the minimum care given to all diabetic patients. Gap of this study was its only evaluates the direct cost of adult. So fill this gap this survey evaluate direct of patients in Sainthamaruthu.

Loganathan and John (2013), this study was carried out the economic burden of diabetes in Chennai. The objective of this study was evaluating the economic burden of diabetes in Chennai in Chennai among various socio-economic groups with a specific focus on middle-income and middle aged group.

 As a methodology this study was conducted six different outpatient clinics located in Chennai based on the cost of illness analysis. For the collection of data this study also used random sampling method. Through this study he found that high prevalence of diabetes recorded among middle-aged group in Chennai rather than the high-aged people. As well as there is a no significant difference among middle-income and high income people. middle-class population is going through a significant change in lifestyle and dietary habits, two key factors behind type 2 diabetes. Age, gender and education levels had no significant role in effecting the medical costs. However it is only focus on middle-aged and middle income group. In this study missed low income people as well as elder patients also missed. To the purpose of fulfill the research gap this study included lower income people and elder patients.

Katulanda, Sheriff and Matthews (2006), this study carried out the diabetes epidemic in Sri Lanka. According to this estimate 2.8 million adults with diabetes mellitus in Sri Lanka at present and a significant proportion of this may yet be undiagnosed. This study was taken the year from 1993 to 2005. In 1993 there is a 2.5 percent recorded as diabetes. In 2005 13.5 percent male and 14.2 percent female were recorded. However this study didn't estimate the direct cost and indirect cost separately and not looked at the problem among young adults and the elderly due to practical difficulties. So this study analyzed elder patients also to fill the gap.

Upalilllangasekera et al., (2002), this study about the increasing prevalence of diabetes in rural area of Sri Lanka. The study was carried out in the rural sector of the Hindagala Community Health Project Area. Clustered sampling method used for this study and this study also dealing with cost effective method. Finding of this study is 2.1 percent of people include in the prevalence of diabetes in that research area. The environmental factors which contribute to increased prevalence of diabetes have been identified as obesity, unhealthy diet and rapid changes in lifestyle factors has contributed to an alarming increase in the prevalence of diabetes.

Although above literature reviews are given information about the cost of diabetes in developing and developed countries. But they did not talk about the direct cost of diabetes in Sainthamaruthu. So this study aims at filling this research gap by estimate the direct cost of diabetes in Sainthamaruthu.

3. Materials and Methods

3.1 Data collection

In order to address the objective out lined earlier data from primary source collected. Both qualitative and quantitative method used for this study especially primary quantitative data would be used for this research.

This study developed based on gathered primary data for the purpose of fulfill the objectives. The selected research area has Sainthamaruthu Divisional Secretariat. So the study is made among diabetic patients in this area. Sample selected through the stratified sampling method from 243 patients and the patients were selected randomly and hundred questionnaires distributed among them. Sainthamaruthu Divisional Secretariat area consist 243 diabetic patients. Here female are included in the prevalence of diabetes rather than male. 134 females and 109 males are affected in the prevalence of diabetic. According to the stratified sampling method, 55 questionnaire distributed among female and 45 male included in this survey.

3.2 Methodology

This study proceeds with the help of descriptive cross sectional method as well as direct cost of diabetes measures by the cost of illness method. This study also used chart and graph. And all the collective data were analyzed by using MS Excel and SPSS.

3.2.1 Cost of illness method

This approach is based on the costs of individual units of service performed. It uses average cost of service estimates and applies these data to the total number of health care encounters related to the disease to arrive at an estimate of the health care costs of a disease (Thomas et al, 1998)

Direct cost	=	Average cost of hospital care by specific diagnosis	*	Total use for hospital services by specific diagnosis

4. Results and Discussion

Economic cost of diabetes included the direct cost and indirect cost. Direct cost of diabetes included some types. Such as doctor consultation, medication, transportation, urine test, blood test and cost of insulin (Jonathan, 1992)

This study explains the total direct cost of diabetes among patients of Sainthamaruthu divisional secretariat area. Here, the monthly average direct cost of diabetic patient in Sainthamaruthu is Rs.3, 253. If we see the diagram No:1 with the explanation purpose that seems as monthly average direct cost of diabetic patient in Sainthamaruthu: according to bellow graph monthly average doctor consultation cost is Rs.882. Diabetic patient spend monthly Rs.192 as a transportation cost and monthly average cost for urine and blood test are Rs.81and Rs. 226 respectively. As well as monthly medication cost for per diabetic patient is Rs. 1,871.
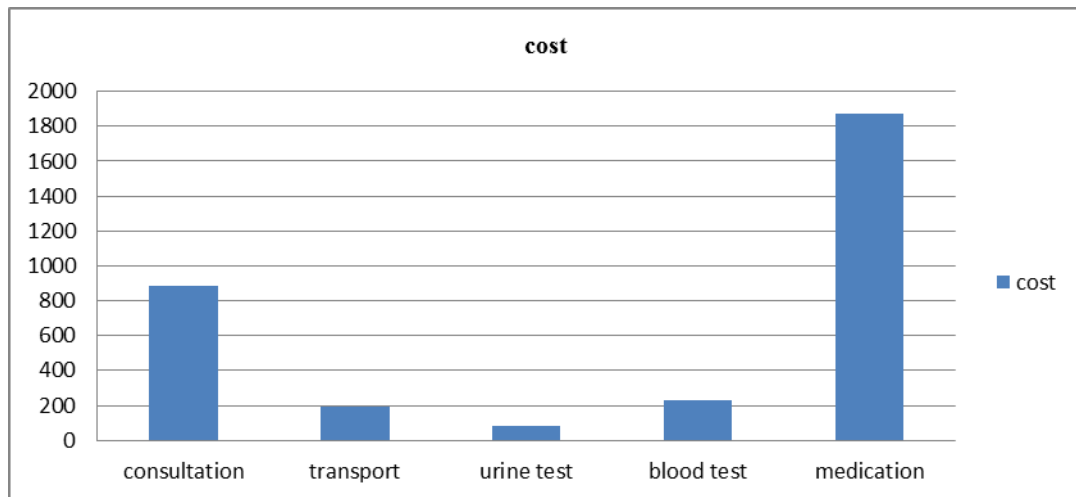

Chart No: 1 monthly average direct cost of diabetic patients

Totally we see the result of this study; people spend the highest money for the medication and the lowest money for the urine test. According to the conclusion of this study, the medication cost is higher because of 25 percentage of people go to their treatment in private hospital as well as 32 percentage of people get treatment for diabetes both private and government hospitals.

If we considered the direct cost of diabetes in age wise, this survey categorized the age as 35-45 year, 46-55 year, 56-65 year and 66-75 year. In this age group high level of cost spend by age group 56-65 year. According to the result of this survey monthly average direct cost of the age group between 35-45 year is Rs. Rs. 2,700, monthly average direct cost spend by age group between 46-55 year is Rs. 3,763, monthly average direct cost of the age group between 56-65 year is Rs. 3,722 and age group between 66-75 year shared monthly Rs. 1,583 as direct cost of diabetes.
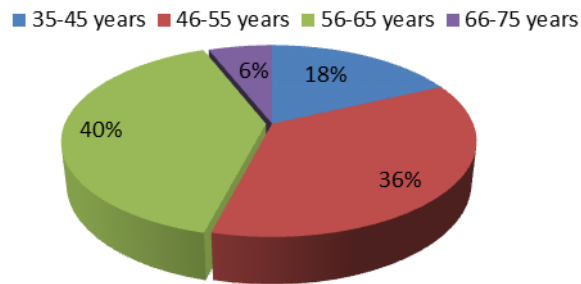

Chart No: 2 percentage monthly direct cost by age group

If we see the direct cost of diabetes by gender wise, male shared a 51 percentage of direct cost monthly and female shared 49 percentage of direct cost. According to the result of this study; male share the highest direct cost of diabetes rather than female.

If we see monthly average direct cost of male and female are Rs. 3,698 and Rs. 2,890 respectively. In the other hand low level of income people share a high level of direct cost annually. The chart No: 3 shows percentage of annual direct cost of diabetes by income level.

According to below chart, diabetic patient of income level between 0-10,000 people share 75 percentage, income level between 10,000-30,000 diabetic patient share 17 percentage and income level between 30,000-60,000 diabetic patients share 8 percentage monthly. The monthly average direct costs of above income level diabetic patients are Rs. 3,273, Rs. 3,209 and Rs. 3,648 respectively.
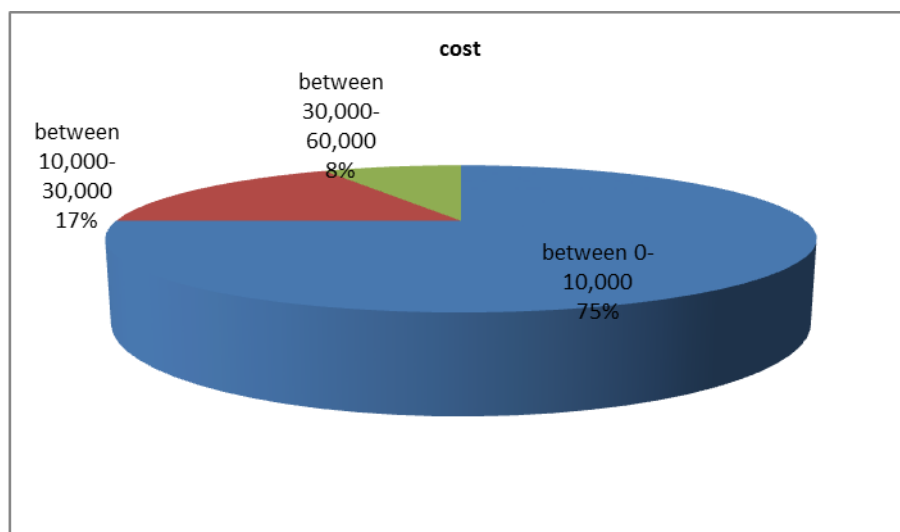
Chart No: 3 percentage of annual direct cost of diabetes by income level.

According to the finding of this study, patients go to clinic in government hospital once a month. It should be change as twice a month. In the study area lower income people effect in the prevalence of diabetes mostly. They are uneducated. So lack of knowledge about the diabetes and controlling method, prevalence of diabetes is increase highly among the lower income people. So government hospitals should be arranging awareness programs once a month. And like a food stamp programs, government may implement the diet food supply programs for diabetic patients.

Poor condition of this study area, people faces difficulty to handle their management of diabetes. So government may increase the amount of samoorthi and they also allocate separate amount to manage the diabetes for diabetic patients. As well in the study area's government hospitals, they have no enough resources of nutritionist. So policy makers may consider about that lack of resources.

Here, the hotels and canteens serve tea or coffee with a sugar. So the government should be implemented the rules that hotels and canteens serve the sugar separately with tea or coffee. If anyone break the rules, government levy find against them.

5. Conclusion

Based on this research evaluated the direct cost and cost of diabetes. Monthly average direct cost of Sainthamaruthu Divisional Secretariat Area is Rs. 3,253. Here, monthly average doctor consultation cost is Rs. 882, monthly average transportation cost is Rs. 192, monthly average cost for urine test is Rs. 81, monthly average cost for blood test is Rs. 226 and monthly average medication cost is Rs. 1,871.

 As an overall conclusion, monthly male shared a higher level of cost than female. Because, don't follow died, over consumption of fast food and sugar as the consequence of higher preference of hotels and canteens of work place, stress and lack of time to exercise. In the other side, over consumption of fast food and sugar highly shares by the age group between 46-55 years. As well as this study analyzed that higher level of income group patient use advance technology for exercise. As a result of this higher level of income people reduce their economic cost of diabetes rather than others.

According to this research 54 percentage of patients are depend on their families for fulfill their cost of diabetes. So most of the cost of diabetes imposes to their families of diabetic patient in Sainthamaruthu. And it is the big economic Burden among them.

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