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COST ANALYSIS OF ANTIDIABETIC DRUGS FOR DIABETES MELLITUS OUTPATIENT IN KODYA YOGYAKARTA HOSPITAL

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Diabetes mellitus is a chronic disorder that has been recognised by the Indonesian government as a major public health problem with far reaching consequences not just for its adverse impact on the health of Indonesians, but also for the economic burden it places on the healthcare systems. The objectives of this study were to describe the healthcare cost for outpatient diabetes mellitus treatment and to examine the cost of different classes of antidiabetic drugs. The medical records of Type 2 diabetes mellitus outpatients without compelling indication were retrospectively reviewed. Data was collected for patients treated from January 1st to December 31st, 2004 in Kodya Yogyakarta Hospital. Data collected included patient demographics, drug acquisition cost, medical consultation cost and laboratory cost. We analysed charts of 100 consecutive patients, of whom 71% are women and 29% are men. The average age of patient was 61.2 ± 13.7 years. The monthly mean cost of Type 2 diabetes mellitus was found to be equivalent to USD19.97 ± 13.71. Most of the direct medical costs were spent on drugs (96.4%). Blood glucose control using combination therapy was more frequently attained in patients taking glibenclamide and metformin (25%). The combination of gliquidone-metformin-acarbose (21%) was the most expensive, which was equivalent to USD39.44. The potential saving was 6.10% of total drug cost if generic substitutions were prescribed for diabetes mellitus in place of more expensive drugs. In conclusion, we identified that the costs of diabetes mellitus outside of hospitals are mainly dependent on the expenses with blood glucose-lowering drugs.

***Keywords**: Antidiabetics, Cost analysis, Diabetes mellitus*

INTRODUCTION

Diabetes has reached epidemic proportion and is one of the most serious public health problems facing the world today. The problem is particularly acute, with the increase in obesity leading to the Type 2 diabetes mellitus in affluent countries, but is rapidly spreading to developing countries as well. Diabetes is one of the leading causes of morbidity and mortality and, because of its chronic nature, over time becomes one of the most expensive diseases, placing a tremendous financial burden on patients, as well as on healthcare systems (Vivian 2006). In the United States, the costs of diabetes are staggering. In 2002, direct medical costs of diabetes were estimated to be USD92 billion, with an additional USD40 billion in indirect costs due to disability, work loss and premature mortality. Overall healthcare costs for people with diabetes are more than double the costs for people without diabetes (Hogan, Dall and Nikolov 2003).

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Diabetes is ranked as the tenth leading cause of death in Indonesia. Every year the number rises dramatically when deaths from diabetic complications are included. Coronary heart disease is the leading cause of death in patients with diabetes (Departemen Kesehatan 2002). The complications resulting from the disease are a significant cause of morbidity and mortality and are associated with the damage or failure of various organs such as the eyes, kidneys and nerves. People with diabetes are at increased risk of macrovascular and microvascular complications and are more likely than people without diabetes to have other cardiovascular risk factor, such as hypertension and hyperlipidemia. This factor contributes to an increased risk of illness and death, which places a significant burden on healthcare system. Because of the high morbidity, mortality and cost associated with Type 2 diabetes mellitus, there has been great interest in assessing the healthcare cost for outpatient diabetes mellitus treatment in Kodya Yogyakarta Hospital.

METHODS

We conducted a retrospective review of the medical records of 100 diabetes mellitus outpatients. Data was collected for patients treated from January 1st, to December 31st, 2004 in the Department of Internal Medicine, Kodya Yogyakarta Hospital. Patients were included if they were admitted for Type 2 diabetes mellitus without any other medical problems.

We collected patient data including baseline demographics, class of antidiabetics, antidiabetics dosage and dosage interval. Data regarding costs included drug acquisition cost, medical consultation and laboratory test. All evaluation was carried out from the hospital perspective and the cost was referred to 2004. Only direct medical costs, those directly related to delivery of the healthcare service, were included in the estimates reported here. Medical record of patients who had had a consultation during the year 2004 were collected including the purchase of drugs or supplies, payment for visits the doctors and laboratory tests. The costs of the antidiabetics drug therapies were calculated as a function of the dosage prescribed and the prices in the Kodya Yogyakarta Hospital. The overall cost of each class of antidiabetics was estimated as the mean cost of that class.

RESULTS AND DISCUSSION

From the 100 patients evaluated, 71% were female and 29% were male. The average age of the patients was 61.2 ± 13.7 years.

The goals in the treatment of patients with diabetes are to avoid secondary illnesses for as long as possible by establishing optimal blood glucose levels and to maintain the patient's quality of life (Huang *et al.* 2006). To meet the goal of achieving and maintaining glucose levels within the nondiabetic range, the guidelines and treatment algorithm emphasize initial therapy with lifestyle intervention and metformin, rapid addition of medications, and transition to new regimen when target glycemic goals are not achieved or sustained, and early addition of insulin therapy in patients who do not meet these target goals (Laurie 2006). This study showed that the class of antidiabetics agent for the treatment of type 2 diabetes mellitus without any other diseases in Kodya Yogyakarta were sulfonylurea (41.7%), biguanide (42.2%) and α-glucosidase inhibitor (16.1%). Sulfonylureas stimulate the beta cells of the pancreas to release more insulin. Biguanides lower blood glucose levels primarily by decreasing the amount of glucose produced by the liver. Metformin also helps to lower blood glucose levels by making muscle tissue more sensitive to insulin so that glucose can be absorbed. Acarbose helps the body to lower blood glucose levels by blocking the breakdown of starches. Because these drugs act in different ways to lower blood glucose levels, they may be used together. We found that only 3% of our patients were on monotherapy and the others were on combination therapy. Though taking more than one drug can be more costly and increase the risk of adverse effect, combining oral medications can improve blood glucose control when taking only a single pill does not have the desired effects. Switching from one single pill to another is not as effective as adding another type of diabetes medicine (Kimmel and Inzucchi 2005).

This study described the cost of the treatment and control of diabetes mellitus for patients taking blood glucose-lowering drugs. Each component of the cost was determined using information from the pharmacy department. The analysis of the components of total cost showed that the purchase of antidiabetic drugs accounted for 96.4% of the whole amount spent by diabetes patients (Table 1). The low expenditure on medical appointments and laboratory tests may be attributed to the fact that people use the public health systems.

Table 1: Monthly costs of healthcare components in the treatment of type 2 diabetes mellitus outpatients in Kodya Yogyakarta Hospital, 2004.

Healthcare component	Monthly cost (USD)
Direct cost	
Drugs	1909.02
Medical consultation	45.00
Laboratory test	26.20
Mean ± SD	19.97 ± 13.7

Table 2 shows the monthly mean cost of antidiabetic treatment per patient. Sulfonylurea (glibenclamide, glicazide, and gliquidone) and biguanide (metformin) were the drugs most frequently used. The cost of antidiabetic treatment was lower for glibenclamide monotherapy (USD1.20). The control of blood glucose using combination therapy was more frequently attained in patients taking glibenclamide-metformin (25%). Sulfonylurea and biguanide combination has been widely studied and is the most commonly used. Reduction in fasting blood glucose (25%–30%) and glycated haemoglobin (20%–30%) have been achieved in studies where metformin has been added in cases when sulfonylurea monotherapy has failed in Type 2 diabetic patients (Patel 2003). The combination of gliquidone-metformin-acarbose was the most expensive, which was equivalent to USD39.44.

Costs vary widely among the different medications. Generic versions of glibenclamide and glicazide are available and make these agents the cheapest of all secretagogues. Glicazide costs only slightly more than glibenclamide, and gliquidone is more expensive. These costs are less than brand-name products, namely Daonil® (glibenclamide), Diamicron® (glicazide), and Glurenorm® (gliquidone). The potential saving was 6.10% of the total drug cost if generic substitutions were prescribed for diabetes mellitus in place of more expensive drugs.

Table 2: Monthly mean cost of antidiabetic treatment per patient of Type 2 diabetes mellitus outpatients in Kodya Yogyakarta Hospital, 2004.

Antidiabetic drugs	N	Monthly mean cost (USD)
Glibenclamide	1	1.20
Metformin	2	3.98
Glibenclamide-metformin	25	5.80
Glicazide-metformin	15	9.36
Gliquidone-metformin	11	26.59
Gliquidone-metformin-acarbose	21	39.44
Glibenclamide-metformin-acarbose	11	20.34
Other combination	4	36.19

CONCLUSION

We identified that the costs of diabetes outpatient are mainly dependent on the expenses of blood glucose-lowering drugs. The treatment of diabetes using gliquidone, metformin, and acarbose was more expensive than the treatment using other combination. This finding may allow healthcare planners to make better decisions regarding the allocation of funds between competing therapeutic options and priorities. This economic evaluation provides a means for making such choices more rational and the allocation of resources more efficient.

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