CHAPTER I

INTRODUCTION

1. Statement of the problem

Diabetes is a global health problem. It is projected that the number of diabetes patients in the world will rise from 135 million in 1995 to 300 million in 2025[1]. In developing countries, the number of people with diabetes is projected to increase from 84 million in year 1995 to 228 million in year 2025 [1] . In Thailand, the Ministry of Public Health; Section of Non- communicable Disease[2] reported that the number of diabetes patients in 1997 was 148.70 (per 100,000) and up to 340.95 (per 100,000) in 2002. Furthermore, diabetes is related with many complications that cause increasing in morbidity, mortality, and health care expenditure. The Diabetes Registry Project 2003[3] reported that among 9,419 diabetes patients in Thailand had renal replacement therapy (0.24%), blindness due to diabetes(1.5%), history of amputation (1.6%), coronary diseases (8.5%) and cerebral vascular diseases (4.5%). In 2002, it was reported that [4] diabetes was one of the four leading chronic diseases that caused 29 million deaths worldwide. In Thailand [2] the number of patients dying from diabetes in 1997 was 7.5 (per 100,000) and up to 11.8 (per 100, 000) in 2002. The health care expenditure on treatment of diabetes is high in many countries. In Japan the health care expenditures on diabetes was 4% of total health care expenditures of the government [5]. The treatment cost in the first year of acute myocardial infarction found in diabetes patient in United States was $30,364 and $1,678 in the following year [6]. In Thailand, although the Ambulatory Patient Group (APG) is not yet used in the health care system, the data on APG study showed that costs of treatment diabetes were highest in out-patient visit costs. The average cost of diabetes out-patient visit per time was 467.5 Bath in 2004 [7].

The main goal of treating diabetes patients is to prevent macro and micro vascular complications by controlling near-normal blood glucose level. The United Kingdom Prospective Diabetes Study (UKPDS) [8] indicated that controlling blood glucose level could delay the progress of microvascular complication in type 2 diabetes.

Asian-pacific Type 2 diabetes policy group recommend the management algorithm for type 2 diabetes patient in 2005 [9]. The management will start with diet, exercise and weight control. If the glycemic target is not met, an oral diabetes medication should be added. In an obese patient, metformin should be drug of choice. If necessary, one or more oral diabetes medications might be used as additional therapy. In the non-obese patients, they can start the oral diabetes medications with one or more of metformin, thiazolidinediones (glitazones), sulfonylurea, meglitinides (glinides), or alpha-glucosidase inhibitors. In clinical practice, metformin and sulfonylurea are the most common medications that are used as combined therapy. However, even with the combination therapy, most patients cannot control their blood glucose. By nine years after diabetes diagnosis, patients with diabetes will need the addition of insulin therapy [10] .

Insulin therapy is effective in control blood glucose and decrease the risk of diabetes complications in clinical study[8].Nevertheless, starting insulin therapy in actual clinical practice is less effective than clinical trials [11]. A fear of needle in some patients may affect the compliance with insulin therapy. Furthermore, because insulin is a self-administered injection drug, patients may have the wrong technique in using insulin including the error of reading scale on insulin syringe, and nature of patient's holding insulin vial at the time of drawing-up the drug into the syringe [12].

Adding another oral diabetes drug can also help to control blood glucose level. Thiazolidinediones, also called glitazones, are oral antihyperglycemic agents that reduce insulin resistance in peripheral tissues and decrease hepatic glucose production [13]. The first of Thiazolidinediones class oral antihyperglycemic drugs launched in 1997 was troglitazone. Although troglitazone was withdrawn due to hepatotoxicity, there are two drugs in this class currently available in the market: rosiglitazone and pioglitazone. A recent meta-analysis of thiazolidinediones showed that both thiazolidinediones had a similar effect on glycemic control but pioglitazone was better in lipid profile [14]. They could reduce HbA1C about 1.0% -1.5%. Pioglitazone significantly decreased triglyceride level, increased HDL cholesterol (+4.6 mg/dL), and did not affected to LDL cholesterol

and total cholesterol. Rosiglitazone significantly increased HDL cholesterol (+2.7 mg/dL), increased LDL cholesterol and total cholesterol, and had neutral effect on triglyceride level. Furthermore, ,in the large clinical trial of pioglitazone, the PROactive(the Prospective Pioglitazone Clinical Trial in Macrovascular Events) [15], the use of pioglitazone could significantly reduce a composite secondary endpoint of all-cause mortality, stroke, and myocardial infarction with the relative risk reduction of 16% Therefore, adding of thiazolidinedione may help to delay the progression rate of macrovascular disease including myocardial infarction and stroke which the only combination of sulfonylurea and metformin cannot [8].

Although in Thailand both thiazolidinediones are included in the National List of Essential Medicines 2004 [16], a criterion for include thiazolidinediones in a government hospital drug list is that the hospital have to choose only one of them. In health care economic evaluation, we have to consider both cost and effectiveness. If one of thiazolidinediones is cheaper than another but it has less effectiveness, the cheaper drug may be not considered to include in the hospital drug list.

Cost-effectiveness analysis is one of the economic evaluation methods that can show both cost and effectiveness comparing two interventions in term of an incremental cost-effectiveness ratio. There are many cost-effectiveness studies in thiazolidinediones [17], [18], [19], [20], [21], [22]. However, the results in one country may not adapt for other countries because of the difference in healthcare systems and resource utilization pattern. Therefore, it is very important for the government hospital administrators to know the cost-effectiveness analysis of thiazolidinediones in Thailand in order to choose one of them for their hospital drug list.

2. Objectives

2.1. To determine an incremental cost-effectiveness ratio of pioglitazone compared to rosiglitazone

2.2. To apply diabetes modeling for Thailand health care system.