CHAPTER I

BACKGROUND AND RATIONALE

Diabetes Mellitus is now one of the world's top health concerns. The latest WHO Global Burden of Disease estimates the worldwide burden of diabetes in adult to be around 173 millions in the year 2002 [1] . The epidemic of diabetes increases in the developing world with an increasing proportion of affected people in younger age groups and further the burden of chronic diabetic complications worldwide [1]. In Thailand, the estimated diabetes prevalence in population age more than 35 years was 9.6 % in the year 1998 and about 95% of diabetes is type 2 [2]. Now it ranks as one of the most deadly, most visual threatening, and most costly disease. Each year, over 200,000 people die as a result of diabetes and diabetic retinopathy causes 12,000 to 24,000 new cases of blindness [3]. Up to nineteen years after a known duration of type 2 diabetes, 84 % of those patients taking insulin and 53% of those not taking insulin have retinopathy [4]. The bureau of Health Policy and Planning reported survey of disability adjusted life year (DALY) in Thailand that diabetes mellitus causes 435,749 DALY and diabetes mellitus is the third cause of DALY in female (7%) and the fifth in male. (3%) [5]

Diabetic retinopathy is the best-studied microvascular complication of diabetes mellitus and remains the most common cause of blindness in working adults around the world. Multiple epidemiologic studies and randomized clinical trials have described the natural history of diabetic retinopathy and the response of diabetic retinopathy to therapeutic intervention. Early detection, careful follow up [6], intensive glycemic control [7-10], tight control of blood pressure [11], judicious selection of the optimal time for laser photocoagulation [12-14] and vitrectomy surgery [15, 16] are essential for successful treatment of diabetic retinopathy.

Diabetic retinopathy usually causes no symptoms at its most treatable stages. Proliferative diabetic retinopathy can cause extensive damage before warning signs, such as decrease vision, occur. Patients with severe nonproliferative diabetic retinopathy, proliferative diabetic retinopathy, and clinically significant macular edema are beneficial in timely photocoagulation treatment [12-14, 17].

Diabetic retinopathy meets all the criteria for a disease that warrants screening. It has a long latent period before visual loss and is eminently treatable [14, 18]. As well, screening for retinopathy is noninvasive, and highly sensitive and specific [19]. Efficient identification of diabetic retinopathy is also cost-effective. Modeling studies demonstrate potential savings of hundreds of millions of dollars if an evaluation results in appropriate photocoagulation, compared to the disability payment provided tc people who would go blind without a screening [20-24]. As stated by many experts, regular screening for diabetic retinopathy and education of the patients are critical in limiting visual loss. In Thailand, traditionally, the ophthalmologists have provided diabetic retinopathy screening with indirect ophthalmoscopy. Unfortunately, less than 20 percents of type 2 diabetic population in Thailand receive an annual eye examination [25]. There are two main reasons. The first, there are lack and maldistribution of ophthalmologists in Thailand [26]. The second, most patients receive health care in primary care setting and the primary care physicians have neither expertise nor the equipment to screen accurately for retinopathy.

However, recent developments have increased the potential for ophthalmologists and primary care physicians to screen for diabetic retinopathy with greater accuracy and efficiency [27-36].A number of studies have introduced the usage of fundus images, either stereoscopic or non-stereoscopic, multiple -field or single-field, as an alternative to stereoscopic film-based fundus photography or clinical examination for diabetic retinopathy screening [37-52].A photographic screening has advantages over traditional screening. First, technicians can perform camera screening. Second, a camera can be flown to an isolated community. Third, images can be achived to permit comparison over time. Single field stereoscopic nonmydriatic fundus photography with wider viewing angle interpreted by the ophthalmologists or trained graders reveals the sensitivity and specificity parallel to the rate with traditional screening.

Studies have shown that the sensitivity, specificity or levels of agreement of retinopathy with photographic screening interpreted by other healthcare providers are extremely variable and generally lower than the rate achived by ophthalmologists or trained graders. It would be very helpful if the digital system could be accessed by diabetic patients who live in remote areas where the ophthalmologists cannot provide

adequate retinopathy screening. The family physicians may play an important role in the screening issue. Because they are the main healthcare providers in primary care setting.

Thus, it is necessary to design a study in Thailand. To evaluate that single field digital fundus photography interpreted by family physicians can serve as a screening tool for diabetic retinopathy screening for referral for ophthalmic evaluation and management.

If single field nonmydriatic fundus photography interpreted by family physicians is comparable with indirect ophthalmoscopy, we can introduce single field fundus photography interpreted by family physician as an alternative tool for diabetic retinopathy screening. This is useful to screen for majority of patients in rural area. We can give early treatment and prevent visual loss of diabetic patients. Although to meet an ophthalmologist for annually eye evaluation is the most preferable to get benefit to evaluate diabetic retinopathy and detect other eye problems. But in Thailand at present time, we still lack of ophthalmologists, so diabetic retinopathy screening with single field fundus photography may be next to the best we can do.