Thailand Diabetes Registry Project: Prevalence of Diabetic Retinopathy and Associated Factors in Type 1 Diabetes Mellitus

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Objective: *To determine the prevalence and factors associated with Diabetic Retinopathy (DR) of type 1 diabetes mellitus in Thailand.*

Material and Method: *A cross-sectional, multicenter, hospital-based study was carried out from April to December 2003. Diabetic patients in diabetic clinics of 11 tertiary centers were registered. Retinopathy was evaluated by the ophthalmologists.*

Results: *Seven thousand one hundred and nineteen diabetic patients received retinal examination. The number of patients with type 1 diabetes was 347. The prevalence of DR in type 1 diabetes was 21.6% (75). This consisted of Non-Proliferative DR (NPDR) 10.9% (38) and Proliferative DR (PDR) 10.7%. Patients with DR were significantly older, predominantly female, longer duration of diabetes, had higher BMI, systolic Blood Pressure (BP), diastolic BP, serum creatinine, and TriGlycerides (TG) levels than those without DR. Both groups of patients were not different in term of plasma glucose and glycosylated hemoglobin levels. Although the patients with DR had a higher percentage of overt proteinuria than those without DR, there was no difference in percentage of patients with positive microalbuminuria in both groups. This may be explained by limitation of data (only 16% had results of microalbuminuria and 19% had results of proteinuria). After adjusted for duration of diabetes, serum creatinine and smoking status, factors (adjusted odds ratio [95% confidence interval]) associated with DR were duration of diabetes 5-9.9 years (4.0 [1.49-10.91]), 10-14.9 years (6.86 [2.45-19.20]), 15-19.9 years (21.13 [7.22-61.78]), ≥ 20 years (22.15 [7.32-66.99]) when compared with duration of diabetes less than 5 years, serum creatinine > 2 mg/dl (6.0 [2.09-17.22]) when compared with creatinine less than 2 mg/dl. From the presented model, age, gender, systolic BP > 140 mmHg, diastolic BP > 90 mmHg, serum TG and smoking status were not factors associated with DR.*

Conclusion: *Diabetic retinopathy affects about one fifth of type 1 diabetic patients in our study. The authors found the factors associated with DR in type 1 DM were duration of diabetes and serum creatinine. Regular screening for DR and more aggressive management of metabolic factors should be done to reduce the prevalence of DR.*

Keywords: *Type 1 diabetes, Diabetic retinopathy*

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Diabetic Retinopathy (DR) is the most common microvascular complication of patients with type 1 diabetes mellitus. It is one of the major causes of vision loss and blindness in young adults despite the availability of effective treatment. In patients with type 1 diabetes, retinopathy begins to occur three to five years after the diagnosis of diabetes and the majority of the patients are affected over the subsequent two decades[1]. A number of important risk factors such as longer duration of diabetes, higher levels of glycosylated hemoglobin, higher blood pressure, and presence of proteinuria are identified to be related with progression of diabetic retinopathy[1,2]. Other factors including body mass index, gender, serum lipids, and cigarette smoking have been reported with varying results[1,2]. Understanding the natural history and risk factors associated with the development of DR is important to manage this complication in patients with type 1 diabetes.

In Thailand, the data regarding the prevalence of diabetic retinopathy and its associated factors in patients with type 1 diabetes are limited. Therefore, the purpose of the present study was to determine the prevalence and the associated factors of diabetic retinopathy in patients with type 1 diabetes in Thailand.

Material and Method

The Diabetic Registry Project is a cross-sectional hospital-based study that was carried out from April to December 2003. This multicenter registry was conducted in the diabetic clinics of eleven tertiary care centers in university hospitals and regional hospitals of Thailand. The subjects of the present study were diabetic patients who were treated in these diabetic clinics and agreed to participants in this registry. The diagnosis of diabetes mellitus was made according to the American Diabetes Association criteria in 1997[3]. Nine thousand four hundred and nineteen diabetic patients were registered. The clinical characteristics of these patients have been presented in previous section of this issue. Seven thousand one hundred and nineteen (75.6%) of the registered patients received retinal examination within one year prior to registry. Three hundred and forty-seven patients had type 1 diabetes. Only patients with type 1 diabetes were included for further analysis in this study.

The registry data was recorded in the case record form by interviewing and examining the patients, and reviewing their medical records. This consisted of demographic data, pertinent parts of physical examinations, laboratory examinations performed during the last 12 months of recruitment, specific medications including insulin, oral hypoglycemic agents, antihypertensive agents, lipid lowering agents and aspirin and diabetic complications. All of them were documented in medical records.

Results of eye examinations reported within one year from registry date were recorded such as the results of retinal examinations, visual acuity and cataract findings. The retinal examinations were evaluated by the ophthalmologists at each center with direct ophthalmoscopy after full dilatation of pupils. The level of retinopathy in the present study was classified into Non-Proliferative Diabetic Retinopathy (NPDR) and Proliferative Diabetic Retinopathy (PDR). NPDR was defined if it was characterized by an increase in vascular permeability or vascular closure such as microaneurysms, dot and blot hemorrhage, and exudates. PDR was defined if vasoproliferation of new vessels occurred on or within the retina including complications such as vitreous hemorrhage or pre-retinal hemorrhage. The level of retinopathy was based on the grading of the worst eye. Visual acuity was assessed by using the Snellen's chart. Legal blindness was defined as visual acuity of less than 6/60 in the better eye with best possible correction. Cataract findings were defined as positive or negative results.

Nephropathy was defined by at least one of the following urine examination results; positive microalbuminuria (urine microalbumin between 30-300 mg/dl/24 hr. or random urine microalbumin/ Creatinine between 30-300 mg/gm Cr) within one year and was confirmed for elevated urine microalbumin levels shown in at least two of three collections; positive proteinuria was defined as a positive urine dipstick test at least 1+ level; renal insufficiency and was defined when serum creatinine was more or equal to 2 mg/dl. Any patient without nephropathy was defined when he had negative urine microalbumin.

The authors defined smoking status into three categories as the following; current smokers defined as those who had continued smoking until the day of the examination or those who quit smoking for less than one year from the day of the examination, ex-smokers defined as those who had stopped smoking for at least one year from the day of the examination, and non-smokers were those who had never smoked. The authors defined alcoholic drinking status into three categories as the following; current drinkers defined as those who continued drinking until the day of the examination, abstinence, defined as those who had abstained from alcoholic drinking for at least one year from the day of

the examination, and non-alcoholic drinkers, defined as those who had never drunk alcohol or had drunk less than 2 times per month.

Fasting plasma glucose, serum total cholesterol, HDL Cholesterol (HDL-C) and triglyceride levels were determined by enzymatic methods. LDL Cholesterol (LDL-C) was calculated using the Friedewald's formula (LDL-C = total cholesterol – HDL-C – TG/5). Glycosylated hemoglobin (HbA1c), serum creatinine, and urine microalbumin levels were determined by central laboratory of each hospital using standard methods with local quality control. Urine analysis was performed by using a urine specimen in the morning.

Blood pressure was measured in the right arm twice, 30 seconds apart, after resting for 5 minutes, by automated blood pressure machines (OMRON T4). Hypertension was defined as systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg, or use of antihypertensive drugs. Height and weight were measured in light clothing. Body mass index was calculated as weight (kg)/height $(m)^2$. Information on alcohol consumption, cigarette smoking, medication and history of diabetes were obtained by interview.

The study was approved by the ethic committee of each hospital. Signed consent for the present study was obtained from all participants.

Statistical analysis

Descriptive statistics were used. Categories data variables were analyzed by Chi-square test and Fisher's exact test where appropriated. Differences in mean values of studied variables were compared by t-test or Mann-Whitney U test with 0.05 level of significant. The crude odds ratio was calculated to define each associated factor with diabetic retinopathy. Then confounding factors were adjusted by applied multiple logistic regression and this was calculated to define the associated factors with diabetic retinopathy. Whenever two variables were very similar and had multicollinearity, only one of them would be included in the model. Statistical analyses were performed using STATA version 8.0 (STATA Corporation, College Station TX, US).

Results

Three hundred and forty seven patients with type 1 diabetes who had retinal examinations were included for the analysis. There were 215 females and 132 males. The mean age of the patients was 29.9 ± 17.4 years, ranged from 2 to 84 years. The mean duration of diabetes was 9.2 ± 7.6 years. The prevalence of diabetic retinopathy was 21.6% (N = 75) and consisted of NPDR 10.9% (N = 38) and PDR 10.7% (N = 37). The prevalence of cataracts was 16.7%. The prevalence of diabetes-related legal blindness was 1.0% and that of non-diabetic related legal blindness was 3.1%. Fig. 1 demonstrated the prevalence of DR by age at the time of the examination. Nearly half of the presented patients were less than 30 years of age. The authors found peak prevalence of DR (30.7%) between the ages of 30-39 year-

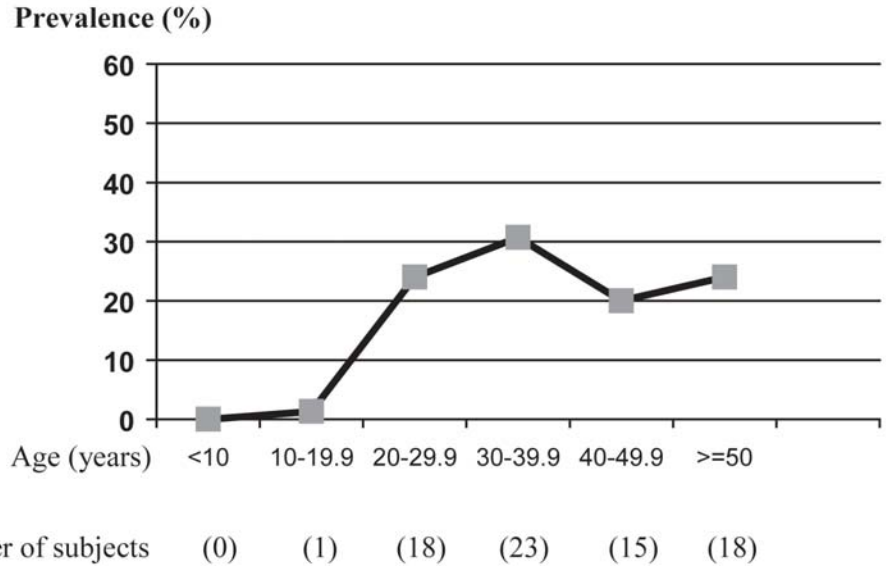

Fig. 1 Prevalence of diabetic retinopathy by age of type 1 diabetic patients (N = 347)

old, consisting of NPDR 13.3% and PDR 17.3%. An increasing frequency of DR was found with increased age from less than 10 to 39 year-old and then a slight decrease of DR frequency was demonstrated above the age of 40. The prevalence of DR in type 1 diabetic patients increased with a longer duration of diabetes from less than 3 years to more than twenty years as shown in Fig. 2. Two patients (2.7%) (2/75) who had been diabetics for less than 3 years, a 22 year-old and a 26 year-old female, were found to have PDR. Four patients (5.3%) (4/75) who had had diabetes between 3 to 5 years were found to have NPDR.

The clinical characteristics of patients according to diabetic retinopathy status were demonstrated in Table 1. When the authors compared the clinical characteristics between type 1 diabetic patients with and without DR, those with DR were significantly older at the time of the examination, a higher proportion of female gender, and had longer mean duration of diabetes. In addition; those with DR had significantly higher BMI, systolic BP, diastolic BP, serum creatinine, and triglycerides levels than those without DR. Nevertheless, other parameters that were not different between the two groups were alcoholic drinking and cigarette smoking status, mean fasting plasma glucose, mean glycosylated hemoglobin, mean total cholesterol, mean LDL-C and mean HDL-C level. Diabetic patients with DR had higher percentage of patients with overt proteinuria than in those without DR. However, there was no difference in the percentage of patients with positive microalbuminuria in both groups of patients. This may be explained by limitation of the presented data about the nephropathy status of type 1 diabetic patients, since only 16% of the presented patients had results of microalbuminuria and 19% of them had results of overt proteinuria.

The proportion of diabetic patients categorized by levels of metabolic control using the cut points according to the recommendations for adults with diabetes mellitus from the American Diabetes Association[5] are demonstrated in Table 2. The present findings in patients with DR showed the percentage of patients with systolic BP of more than 140 mmHg, those with diastolic BP of more than 90 mmHg, those with serum triglyceride of more than 150 mg/dl and those with serum creatinine of more than 2 mg/dl. They were significantly higher than those without DR. Other parameters of both diabetic patients with and without DR were not different including a percentage of patients with fasting plasma glucose more or equal to 130 mg/dl, those with glycosylated hemoglobin more than 7%, those with total cholesterol more or equal to 200 mg/dl, those with LDL-C more than 100 mg/dl, and those with HDL-C less than 50 in females or less than 40 in males.

Using multiple logistic regressions, the authors found that age, gender, BMI, systolic BP, diastolic BP,

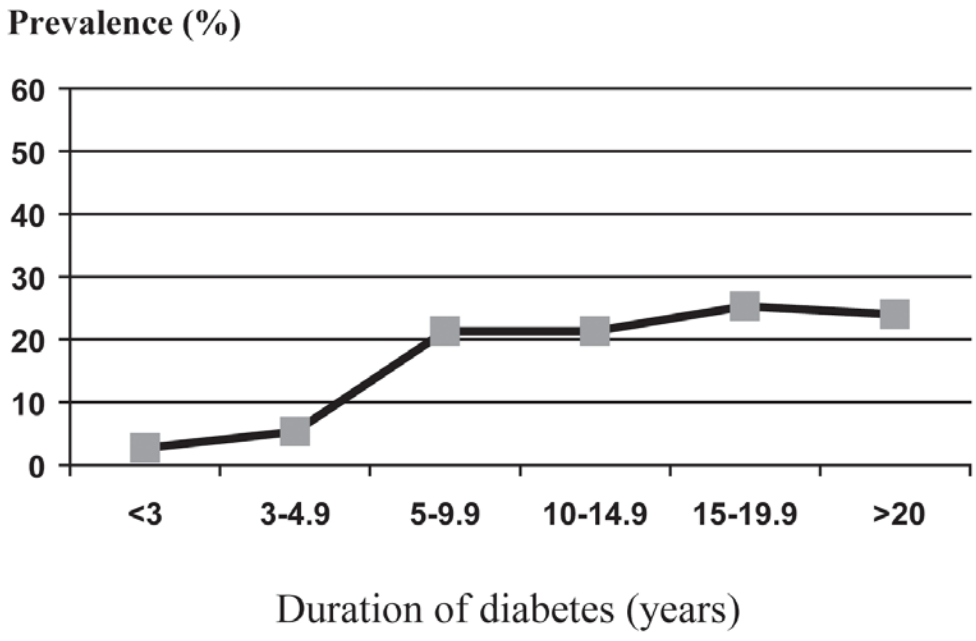

Fig. 2 Prevalence of diabetic retinopathy by duration of type 1diabetic patients (N = 347)

Table 1. Clinical characteristics of type 1 diabetic patients according to retinopathy status

Parameters*	DR (N = 75)	No DR (N = 212)	p value
Female (%)	76.0	58.1	0.005
Age (years)	40.6±13.9	26.9±17.2	<0.001
Duration of DM (years)	15.4±8.5	7.5±6.4	<0.001
Duration of DM (years) (%)			
< 3	2.7	26.8	
3-4.9	5.3	18.4	
5-9.9	21.3	27.6	<0.001
10-14.9	21.3	15.4	
15-19.9	25.3	6.6	
≥ 20	24.0	5.2	
Body mass index (kg/m^2)	22.9±4.2	21.1±3.6	0.001
Systolic BP (mmHg)	129.2±24.9	115.6±21.2	<0.001
Diastolic BP (mmHg)	76.9±12.5	69.8±12.5	<0.001
Fasting plasma glucose (mg/dl)	186.0±88.2	175.1±91.2	NS
Hemoglobin A1c (%)	9.2±2.5	9.0±2.3	NS
Serum creatinine (mg/dl)	1.6±1.5	0.9±0.6	<0.001
Total cholesterol (mg/dl)	209.6±65.5	195.2±39.1	NS
Triglyceride (mg/dl)	125.8±120.7	93.8±81.1	NS
LDL cholesterol (mg/dl)	126.0±57.4	115.9±33.5	NS
HDL cholesterol (mg/dl)	61.1±18.7	64.2±19.2	NS
Positive microalbuminuria (%) (n = 57)	65.0	46.0	NS
Positive overt proteinuria (%) (n = 66)	92.3	37.5	<0.001

* The parameter values are presented with mean ± SD or pecentages

Table 2. Level of metabolic control in type 1 diabetic patients according to retinopathy status

Parameters (%)	DR	No DR	p value
Systolic BP > 140 mmHg	29.3	12.3	<0.001
Diastolic BP > 90 mmHg	13.3	4.85	0.009
Fasting plasma glucose ≥ 130 mg/dl	69.3	64.4	NS
Hemoglobin A1c > 7 %	82.4	81.0	NS
Serum creatinine > 2 mg/dl	18.7	3.1	<0.001
Total cholesterol ≥ 200 mg/dl	54.7	42.1	NS
Triglyceride > 150 mg/dl	26.0	12.2	0.004
LDL cholesterol > 100 mg/dl	68.1	65.1	NS
HDL cholesterol	21.9	15.0	NS
< 40 mg/dl (male)			
< 50 mg/dl (female)			

and serum triglyceride were not significantly associated with the occurrence of DR. Therefore, the present model could be adjusted for duration of diabetes, serum creatinine and smoking status. However, the author did not include the status of microalbuminuria and proteinuria into the present model due to the limitation of data as the authors have mentioned. The factors associated with the occurrence of DR are demonstrated in Table 3. The authors found that the duration of diabetes of more or equal to five years was a risk factor associated with the occurrence of DR in type 1 diabetes when compared to those with duration of diabetes of less than three years, with adjusted odd ratio [95% confidence interval] were as the following; 5-9.9 years was

6.9 [1.51-31.22], 10-14.9 years was 11.7 [2.51-54.30]), 15-19.9 years was 35.9 [7.50-171.52]), ≥ 20 years was 37.7 [7.69-184.99]). In other words, the probability of development of DR increased as duration of diabetes became greater than 5 years. However, the duration of diabetes between three to five years was not shown to be significantly associated with the occurrence of DR in the present study. Another risk factor associated with the occurrence of DR (odd ratio [95% confidence interval]) was serum creatinine level more than 2 mg/dl (5.9 [2.07-16.87]) when compared with serum creatinine less or equal to 2 mg/dl. No association was found between the presence of retinopathy and the smoking status. Medication used of the type 1 diabetic patients is demonstrated in Table 4. The authors found that the percentage of patients with DR who had taken antihypertensive agents, lipid lowering agents and aspirin were significantly higher than those without DR. There was no difference in the percentage of patients who had used insulin or oral hypoglycemic agents in both groups.

Discussion

The present study is the first multicenter study on type 1 diabetic patients in tertiary care centers in Thailand. The prevalence of DR in the present study was 21.6% (NPDR 10.9% and PDR 10.7%.) The prevalence of DR in the present study was similar to that demonstrated in the DiabCare-Asia in 1998[6] that showed the prevalence of DR in Thailand of 23%. The present study collected data of eye examinations from 79 patients with type 1 diabetes whose mean age was 41.2 ± 13.5 years and mean duration of diabetes was 9.2 ± 6.3 years. Another report from Nitiyanant et al[7] during 1997-1999, demonstrated the prevalence of DR at 19.4% in survey of patients with type 1 diabetes. In the present study, the mean age of patients was 22.9 ± 6.3 years and mean duration of diabetes was 6.0 ± 5.6 years. The lower prevalence of DR in the present study by Nitiyanant et al might be explained by younger age of the patients and shorter duration of diabetes when compared to our patients.

The prevalence of DR in the present study

Table 3. Factors associated with occurrence of diabetic retinopathy in type 1 diabetes

Risk Factors	Adjusted Odd Ratio* (95%CI)	p value
Duration of diabetes (years)		
< 3	1	
3-4.9	2.7 (0.46-15.12)	0.275
5-9.9	6.9 (1.51-31.22)	0.013
10-14.9	11.7 (2.51-54.30)	0.002
15-19.9	35.9 (7.50-171.52)	<0.001
≥ 20	37.7 (7.69-184.99)	<0.001
Serum creatinine (mg/dl)		
≤ 2	1	
> 2	5.9 (2.07-16.87)	0.001

* Adjusted for the duration of diabetes, serum creatinine

Table 4. Medications used of among type 1 diabetic patients according to retinopathy status

Medication (%)	DR	No DR	p value
Antihypertensive agents*	56.0	19.8	<0.001
Lipid lowering agents**	46.7	12.9	<0.001
Aspirin	20.0	9.9	0.018

* Composed of angiotensin converting enzyme inhibitors, angiotensin receptor blockers, β-blockers, α-blockers, Ca-channel blockers and diuretics

** Composed of statin and fibrate

was lower than that reported prevalence from other regions. The EURODIAB IDDM complication study[2], a large multicenter cross-sectional study from European diabetic centers, demonstrated a prevalence of all DR of 46%. They were composed of mild NPDR 25.8%, moderate to severe NPDR 9.8% and PDR 10.6%. Moreover, the Wisconsin Epidemiologic Study of Diabetic Retinopathy (WESDR)[1], a large population-based study, reported the prevalence of DR varied from 17% to 97.5% in insulin-taking, younger-onset diabetic patients with a duration of diabetes of less than 5 years to 15 years or more, respectively. The reason for a higher prevalence of DR from those reports might be explained by the differences in ethnic groups, in classifications of DR and of methodology.

The present study demonstrated an increasing in prevalence of DR with an increased age from less than 10 to 39 year-old, and then a slight decrease of DR prevalence at the age of more than 40 years. DR was not found in patients less than 10 years of age in the present study. The present findings confirmed the results of WESDR[1], which demonstrated that DR was rare in children prior to puberty. Moreover, the present finding supported the ADA position statement[5] that any type 1 diabetic patients younger than 10 year-old do not need a retinal examination. The present report demonstrated increasing prevalence of DR with longer duration of diabetes from less than 3 years to more than 20 years. However, two patients who had the diabetes less than 3 years were found to have PDR and four patients who had a duration of diabetes between 3 to 5 years were found to have NPDR. These findings contradict the ADA position statement[4]. The ADA recommends that the first dilated eye examination should be performed after three to five years of diabetes because vision-threatening retinopathy virtually never develops in type 1 diabetic patients during this period. The Diabetes Control and Complications Trial (DCCT)[9] in type 1 diabetes reported prevalence of DR at baseline to be 19.4% in a group of patients with diabetes for less than one year, 25.5% in patients with diabetes for less than 2 years, and 35.1% in patients with diabetes less than 3 years. In addition, the DCCT also showed that patients who developed DR within the first 5 years had more rapid progression of vascular pathology. At present, whether dilated eye examination or retinal angiography should be included in the routine screening program of type 1 diabetes during the first five years remains uncertain.

The prevalence of cataracts was 16.7% in the present study, which was higher than that reported by Nitiyanant et al[7] (8.1%). This might be explained by the fact that most of the presented subjects were older and had longer duration of diabetes. The prevalence of diabetic related legal blindness in the present report was 1.0% and non-diabetic related legal blindness was 3.1%. This prevalence of legal blindness was higher than that of the EURODIAB study[2]. This demonstrated the prevalence of severe visual impairment of 2.3%. The high prevalence of legal blindness may be explained by the selection bias because the presented settings were referral centers so it is likely we have more complicated cases. However, the authors did not have enough information to determine the actual causes of non-diabetic related legal blindness.

The authors demonstrated that the proportion of females was significantly higher in the presented diabetic patients with DR than those without. In addition, the present results also support the idea that age, duration of diabetes and metabolic factors such as composed of blood pressure, serum triglyceride, serum creatinine and proteinuria, seem to be important for the development of DR. The authors' findings in patients with DR demonstrated the percentage of patients with systolic BP of more than 140 mmHg, those with diastolic BP of more than 90 mmHg, those with serum triglyceride of more than 150 mg/dl and those with serum creatinine of more than 2 mg/dl, were significantly higher than those without DR. After a multiple logistic regression was performed, only two factors were found to be associated with the presence of DR. They were the duration of diabetes of equal or more than five years, and serum creatinine of more than 2 mg/dl. The authors demonstrated that the odd ratios of the presence of DR were significantly increased from 6.9 to 37.7 with the duration of diabetes from five to more than twenty years. This supports that the duration of diabetes is the most important factor demonstrated to be associated with severity and progression of DR[1,7,10]. Nevertheless, the authors found that the duration of diabetes from three to five years was not a significant factor associated with DR when compared with that of less than three years. This finding may be explained by the authors statistical power that was limited by the small sample sizes in each stratum of the duration of diabetes.

The present study demonstrated that fasting plasma glucose or HbA1c level were not significantly associated with the presence of DR in type 1 diabetes. This could be explained by the indifferences of a percentage of patients with fasting plasma glucose < 130 mg/dl and that with HbA1c $\leq$ 7% in combination with the indifferences of mean levels of both parameters. In

contrast, there are many previous studies that confirmed the association between the development of DR and HbA1c level. In the EURODIAB study[2], they found that a higher HbA1c level was a significant factors related with moderate to severe NPDR. In addition, the WESDR[1] also demonstrated that a higher HbA1c level was significantly associated with retinopathy level in type 1 diabetes in patients with any duration of diabetes. An intensive insulin therapy was shown to be effective to delay the onset and also slows the progression of DR in the DCCT[11]. They demonstrated that a lowering HbA1c level of about 2% from intensive therapy, compared to conventional therapy, could reduce the risk of development of retinopathy by 76% and slow the progression of retinopathy by 47%. This benefit greatly outweighed the risk of early worsening of DR[12] so that, at present, strict glycemic control was recommended in all appropriate patients.

The present report did not show the association of the occurrence of DR with other factors including; serum lipid levels, blood pressure levels, gender and smoking status. These were demonstrated inconsistently from previous studies. The EURODIAB study[2] showed that serum triglyceride was associated with the frequency of moderate to severe NPDR and PDR, but not cholesterol. The WESDR[12] found that a change in cholesterol was not associated with the severity of DR; however, this change was shown to be associated with the presence of hard exudates. Moreover, they found no relation between HDL-C and the severity of DR. Nevertheless, the present findings regarding the association of serum lipid levels and the presence of DR might have been confounded by the effects of lipid lowering agents that were used more in patients with DR than those without. Data about the relation of blood pressure to DR in type 1 diabetes from previous studies were not consistent. In multivariate analysis of the WESDR[1], they found no relationship between BP and severity of DR in patients with a duration of diabetes of less than ten years. However, they found that diastolic BP was associated with severity of DR in patients with longer duration of diabetes. From the EURODIAB study[2], diastolic BP was a risk factor for moderate to severe NPDR and PDR. Although cigarette smoking seems to be associated with many vascular complications in diabetic patients, it was not shown to be associated with the incidence and progression of DR[14,15].

The present study had some limitations. First, it is a cross-sectional study; therefore, it can demonstrate only the association between the risk factors and the occurrence of retinopathy, without identifying any causation. Failure to find a strong relationship cross-sectionally does not negate the possible importance of some factors in the development of complications in Thai people. Second, the present study has a limitation with the accuracy of the duration of diabetes because it was based on self-reports from diabetic patients. Third, the presented data about the nephropathy status of diabetic patients were not completed because only 16% of them had results of microalbuminuria and only 19% of them had results of overt proteinuria. Therefore, the authors did not include the status of microalbuminuria and proteinuria, which were important associated risk factors, in the presented model of the multiple regression analysis.

Conclusion

Diabetic retinopathy affects one-fifth of type 1 diabetic patients in Thailand. The prevalence of cataracts in type 1 diabetes was 16% and the prevalence of DM related legal blindness was 1%. The prevalence of DR increased with the age of the patients and increased with the duration of diabetes. In multivariate analysis, the authors demonstrated the two factors associated with the occurrence of DR in type 1 diabetic patient were a longer duration of diabetes and a higher serum creatinine level.

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โครงการลงทะเบียนผู้ป่วยเบาหวานในประเทศไทย: ความชุกและปัจจัยที่สัมพันธ์กับเบาหวานในจอประสาทตาในผู้ป่วยเบาหวานชนิดที่หนึ่ง

ธัญญา เชฏฐากุล, สุภาวดี ลิขิตมาศกุล, ณัฐเชษฐ์ เปล่งวิทยา, สมพงษ์ สุวรรณวลัยกร, ณัฐพงศ์ โฆษชุณหนันท์, ชัยชาญ ดีโรจนวงศ์, สิริเนตร กฤติยาวงศ์, รัตนา ลีลาวัฒนา, ยุพิน เบ็ญจสุรัตน์วงศ์, พงศ์อมร บุนนาค, ธงชัย ประฏิภาณวัตร, ฉัตรประอร งามอุโฆษ, สิริมา มงคลสัมฤทธิ์, เพชร รอดอารีย์

วัตถุประสงค์: *เพื่อศึกษาความชุกและปัจจัยที่สัมพันธ์กับเบาหวานในจอประสาทตาในผู้ป่วยเบาหวานชนิดที่หนึ่ง ในประเทศไทย*

วัสดุและวิธีการ: *ทำการศึกษาตัดขวางแบบ hospital-based ในหลายสถาบัน ตั้งแต่ เมษายน พ.ศ. 2546 ถึง ธันวาคม พ.ศ. 2546 โดยทำการลงทะเบียนผู้ป่วยเบาหวานที่มารักษาในคลินิกเบาหวานของโรงพยาบาลตติยภูมิ 11 แห่ง และมีจักษุแพทย์เป็นผู้ตรวจจอประสาทตาของผู้ป่วยเบาหวาน*

ผลการศึกษา: *มีผู้ป่วย 9,419 รายที่ได้รับการลงทะเบียน ผู้ป่วย 7,119 รายได้รับการตรวจจอประสาทตาประกอบด้วยผู้ป่วยเบาหวานชนิดที่หนึ่ง 347 ราย พบความชุกของเบาหวานในจอประสาทตาในเบาหวานชนิดที่หนึ่งร้อยละ 21.6 ประกอบด้วย NPDR ร้อยละ 10.9 และ PDR ร้อยละ 10.7 ผู้ป่วยที่มีเบาหวานในจอประสาทตาพบมีอายุมากกว่า เป็นเพศหญิงมากกว่า มีระยะเวลาเป็นเบาหวานนานกว่า มีระดับดัชนีมวลกาย, ความดันโลหิตซีสโตลิกและไดแอสโตลิก, ครีอะตินีน และไตรกลีเซอไรด์ สูงกว่าผู้ป่วยที่ไม่มีเบาหวานในจอประสาทตา ผู้ป่วยสองกลุ่มนี้ไม่มีความต่างกันของระดับน้ำตาลในเลือดและน้ำตาลสะสม ถึงแม้ผู้ป่วยที่มีเบาหวานในจอประสาทตามีอัตราตรวจพบ overt proteinuria มากกว่าผู้ป่วยที่ไม่มีเบาหวานในจอประสาทตา แต่ผู้ป่วยสองกลุ่มนี้ไม่มีความต่างกันของอัตราการเกิด microalbuminuria ซึ่งสามารถอธิบายได้จากความจำกัดของข้อมูล (มีข้อมูลของ microalbuminuria ในผู้ป่วยร้อยละ 16 และมีข้อมูลของ proteinuriaในผู้ป่วยร้อยละ 19) หลังจากควบคุมปัจจัยคือ ระยะเวลาเป็นเบาหวาน และระดับครีอะตินีน พบปัจจัยที่สัมพันธ์กับเบาหวานในจอประสาทตา (adjusted odds ratio[95% confidential interval])ได้แก่ ระยะเวลาเป็นเบาหวาน 5-9.9 ปี (4.0[1.49-10.91]), 10-14.9 ปี (6.9[2.45-19.20]), 15-19.9 ปี (21.1[7.22-61.78]), ≥ 20 ปี (22.2[7.32-66.99]) เมื่อเทียบกับระยะเวลาเป็นเบาหวานน้อยกว่า 5 ปี, ระดับครีอะตินีนมากกว่า 2 มก./ดล. (6.0[2.09-17.22]) เมื่อเทียบกับระดับครีอะตินีนน้อยกว่า 2 มก./ดล. ปัจจัยที่ไม่สัมพันธ์กับเบาหวานในจอประสาทตาได้แก่ อายุ เพศ ระดับความดันโลหิตซีสโตลิกมากกว่า 140 มม.ปรอท ระดับความดันโลหิตไดแอสโตลิกมากกว่า 90 มม.ปรอท, ระดับไตรกลีเซอไรด์ และ การสูบบุหรี่*

สรุป: *เบาหวานในจอประสาทตาในผู้ป่วยเบาหวานชนิดที่หนึ่งในประเทศไทยพบได้ประมาณหนึ่งรายในห้าราย ปัจจัยที่สัมพันธ์กับเบาหวานในจอประสาทตาได้แก่ ระยะเวลาเป็นเบาหวานและระดับครีอะตินีน การตรวจจอประสาทตาอย่างสม่ำเสมอ และการควบคุมปัจจัยทางเมตาบอลิกอย่างเข้มงวดสามารถลดความชุกของเบาหวานในจอประสาทตาได้*