Medical Complications Among Type 2 Diabetes Mellitus Patients at a General Hospital in East Coast Malaysia

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ABSTRACT

Introduction: *Diabetes Mellitus (DM) is a chronic metabolite disorder with high potential of multisystemic medical complications especially among poorly controlled patients. This study was conducted at Raja Perempuan Zainab II Hospital, Kota Bharu with objectives to explore the pattern of common diabetic mellitus type 2 complications and to compare between gender and races in relation to other risk factors during their hospitalization.* **Materials and Methods:** *This is a retrospective study based on patients' record involving 215 patients (110 women and 105 men) who were admitted with diabetic complications in medical ward for a period of 6 months (January to June 2006)* **Results:** *Out of total 300 identified subjects, 285 case notes were traceable. From 285, 84.6% (241 subjects) were diagnosed as DM type 2. 215 out of 241 subjects (89.2%) had one or more diabetic complications. In general the most common diabetic complication was diabetic nephropathy 34.9% (75 patients). When we compared between genders, diabetic foot ulcers was the most common diabetic complications among males (43.8%) and diabetic nephropathy for females (40.9%). A total of 199 patients (92.6%) had poor blood sugar control during their hospitalization and 103 patients (47.9%) had hypertension.* **Conclusion:** *Patients with DM type 2 had a high prevalence of complications. Common diabetic complications among genders were varied. Patients with diabetic complications had high prevalence of risk factors such as poor blood sugar control, concomitant hypertension and smoking habit.*

KEYWORDS: Diabetes mellitus type 2, complications, risk factors.

INTRODUCTION

Prevalence of diabetes mellitus (DM) in Malaysia is gradually increasing. This figure is really alarming and it is very much related to the increase in prevalence of obesity in this country. The prevalence of DM in Malaysia was 6% according to The First Malaysian National Health and Morbidity Survey.[1] This figure increased to 8.2% after 10 years.[2] By year 2010, the global incidence of type 2 diabetes is estimated to increase 50% and will double by 2025.[3] In many developed countries prevalence of diabetes has reached an epidemic proportion. The increasing trend is largely due to population growth, obesity, ageing, unhealthy dietary intake and lack of exercise.

Diabetes is a major public health problem as it causes considerable amount of other medical comorbidities, disabilities, premature mortality as well as demands on health care facilities. Diabetes also could cause cascading other medical complications. Among its acute complications are diabetic ketoacidosis, hyperosmolar non-ketotic coma and hypoglycemia. Chronic complications include macrovascular and microvascular diseases. The macrovascular diseases are cardiovascular disease, cerebrovascular disease and peripheral vascular disease. The microvascular diseases are diabetic retinopathy, nephropathy and neuropathy. Combination of both macro and microvascular complications give rises to diabetic foot ulcer and diabetic dermatopathy.[4] These complications will result in increasing the global health and economic burden due to hospitalization, medications and loss of productivity due to various disabilities. In long term, diabetes mellitus causes significant rate of mortality and morbidity to its sufferers especially those with poor blood sugar control.[5]

Diabetic patients are at risk of ischemic heart disease, cardiomyopathy and heart failure. People with diabetes are also more likely to develop kidney disease mainly due to microvascular complication of diabetes. About 25 to 30% of diabetic patients are having chronic renal disease or renal failure that requires dialysis.[6] After an average duration of 25 years, diabetic patients are more likely to develop retinopathy. The prevalence of retinopathy among diabetic patients is 22.1% in 15 years and doubles to 52% after 36 years.[7] Risk factors which may aggravate the condition include comorbidities of hypertension, obesity, hyperlipidemia and smoking.[4]

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MATERIALS AND METHODS

This is a descriptive and retrospective study looking at prevalence and types of diabetes complications based on patients' note. This study only focused on all patients who had been admitted to Raja Perempuan Zainab II Hospital medical wards with diagnosis of diabetes mellitus type II with or without complications. However analysis will focus on those with complications only. Duration of study was decided for 6 months from January 2006 to June 2006. Those traceable case notes with diagnosis of DM type 2 were set as inclusion criteria.

After all medical records were obtained from Record Unit and relevant patients' information such as age, gender, race, marital status and smoking status were retrieved. Apart from that, information on patients' medications, diabetic complications, mean of blood sugar and mean blood pressure were also recorded.

From a total of 300 patients who had been admitted during this period for all kinds of diabetes, we managed to trace 285 case notes. From 285, 241 subjects (84.6%) were diagnosed as DM type II and 44 patients were diagnosed with other forms of DM (24 patients diagnosed with DM type 1 and 20 patients with gestational DM).

From 241 patients with DM type II, 215 patients (89.2%) had been diagnosed with complications and only 26 subjects (10.8%), without any complications. The analysis and results displayed is only focused on DM type 2 with complications.

RESULTS

Socio-demographic data

Table I. Demographic variables and diabetic complications according to between genders

	Male N = 105	Female N = 110	Total N = 215
Age 25 - 44	10	10	20 (9.3%)
45 - 64	70	66	136 (63.3%)
≥ 65	25	34	59 (27.4%)
Race			
Malay	100	106	206 (95.8%)
Chinese	4	2	6 (2.8%)
Indian	1	0	1 (0.5%
Others	0	2	2(0.9%)
Diabetic complications			
Diabetic Ketoacidosis (DKA)	11	13	24 (11.2%)
Hyperosmolar non-ketotic (HONK)	3	4	7 (3.3%)
Hypoglycaemic Attack	13	25	38 (17.7%)
Ischaemic Heart Disease (IHD)	35	39	73 (34%)
Cerebrovascular Disease (CVD)	7	17	23 (11.2%)
Peripheral Vascular Diseases	3	0	3 (1.4%)
Diabetic Retinopathy	7	18	25 (11.6%)
Diabetic Nephropathy	30	45	75 (34.9%)
Diabetic Neuropathy	12	19	31 (14.4%)
Diabetic Foot Ulcer	46	27	73 (34%)
Diabetic Dermatopathy	10	6	16 (7.4%)
Death	1	2	3 (1.4%)
Number of Complications			
1 complication	55	49	104 (48.4%)
≥ 2 complications	50	61	111 (51.6%)

Table I shows demographic variables (age and ethnicity), types and number of diabetic complications according to gender. Majority of patients (63.3%) were in the age range 45 to 64 years old. Majority of the subjects were Malays (95.8%). This is corresponding to actual Kelantan population where 94% are constituted by Malays. However non-Malays especially Chinese were slightly under presented in this study.

DISCUSSION

This study shows that an enormous percentage of DM type 2 patients (89.2% from the total number of type 2 diabetes patients) were having at least 1 medical complication and half of these patients (51.6%) had more than one complication. Among the most common diabetic complications were diabetic nephropathy, ischemic heart disease and diabetic foot ulcer. These are considerable debilitating complications which require high cost health care expenditures and cause a long-term morbidity to these patients.

As shown in the result, majority of the subjects (63%) were middle aged. This indicates that although they were in early age group, many of them already developed complications related to diabetes. Studies in the past had shown that the prevalence of diabetic complications was increased with age.[8]

Results of this study provide valuable insights on the primary care of diabetes. Result of this study demonstrates that ninety-three percent of the subjects did not have good blood sugar control and half (48%) were having comorbid hypertension. These findings signify that an early intervention of DM especially among high risk groups is paramount important and therefore a good blood glucose control is essential. The comorbidities would definitely contribute to increasing in the prevalence of diabetes complications and indirectly would increase burden associated with preventable diabetes hospitalizations. Hence addressing this problem immediately is essential. A study in major government hospitals in Malaysia previously showed that the majority of patients had not been given adequate care.[9]

According to a study done in India, the most common complication among diabetic patients was diabetic retinopathy (23.7%). This figure is twice as recorded in this study (11.6%).[10] Similar finding was also found in a study done among general practitioners in Peninsular Malaysia which found diabetic neuropathy was the most common diabetic complication (30.1%).[11] The figure found in this study should be cautiously quoted

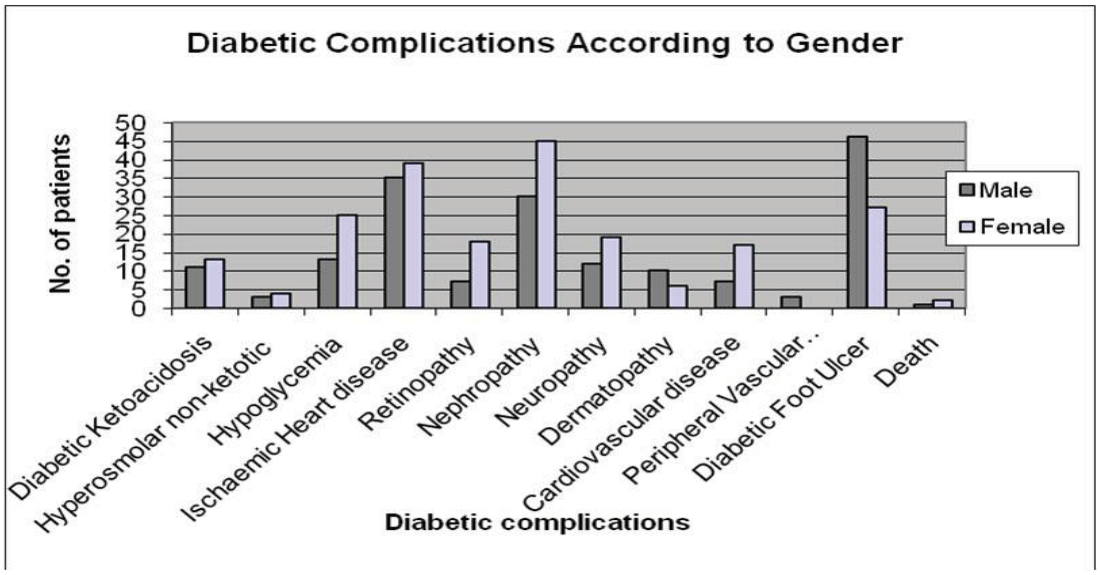

Figure 1. Diabetic Type 2 Complications According to Gender

Figure1 demonstrates the distribution of diabetic complications was varied according to gender.

Table II. Random blood sugar and comorbidity of hypertension according to gender.
^Yates' chi-square, #Chi-square

	Male n = 105	Female n = 110	Total n = 215	p values
Means random blood sugar (mmol/L)				
≤ 6	7	9	16 (2.7%)	0.027^
> 6	98	101	199 (92.6%)	
Comorbid of Hypertension				
Yes	53	50	103 (47.9%)	0.46#
No	52	60	112 (52.1%)	

Table II shows that majority of patients (92.6%) were having mean blood sugar more than 6 mmol/L and almost half of them (47.9%) were having comorbid of hypertension.

Figure 2. Smoking status among the subjects

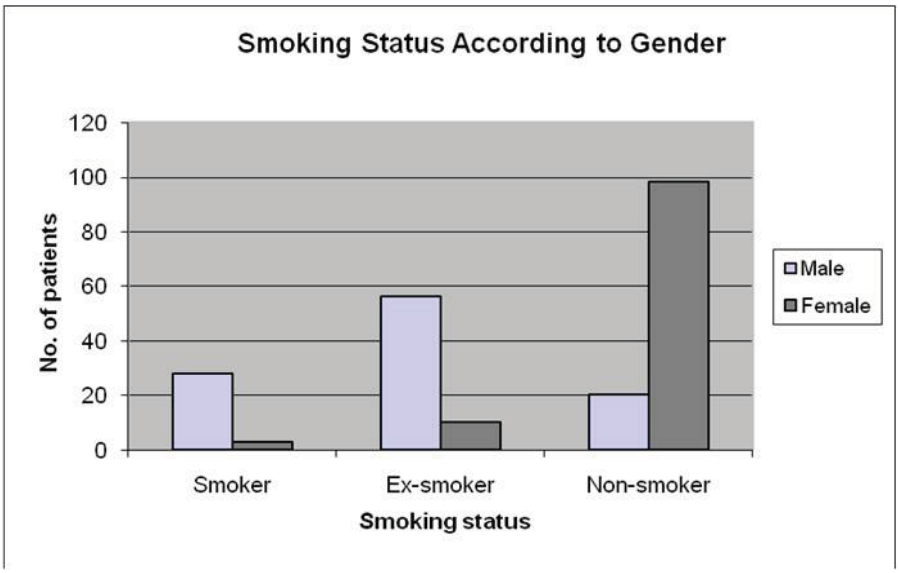

Figure 2 shows distribution of smoking status among the subjects. Majority of male subjects (80%) were either smokers (28 subjects) or ex-smokers (56 subjects).

as it was mainly based on funduscopy examination and documented in case notes. Proper and precise ophthalmologic examination would give an accurate prevalence of retinopathy among diabetic patients.

Previous studies had addressed the issue of the diabetes complications by doing a comparison between genders. As shown in the result of this study, we made comparisons on percentage of diabetic complications according to gender in line with the past studies. To compare with population in United Kingdom the prospective study reported that the prevalence of retinopathy was 39 percent in men and 35 percent in women.[12] There were a few similar findings found in this study as compared to a study done by Prasanna Kumar when we compared diabetes complications among genders.[13] In the latter study, diabetic dermatopathy and diabetic foot ulcer were common among male patients while hypoglycemic attack and nephropathy among females.

This study also had shown that a high proportion of patients (48 percent) had hypertension with distribution by gender were 50 percent of men and 46 percent of women. The prevalence of hypertension among diabetic patients was low in this study (48%) as compared to ninety-three percent obtained by a study done by Aziz et al.[14] However this figure is high when we compared with other study where the prevalence of hypertension among type 2 DM in Kelantan found to be between 26 to 37 percent.[15]

In this study we found that majority of the subjects (93 percent) were having high random blood sugar during their hospitalization and this is statistically significant. In other related study done among type II diabetic women in Kelantan, prevalence of poor HbA1c was between 9 to 12 percent.[15] To identify poor blood sugar control, HbA1c would be the ideal indicator. However in this study we found majority of case notes were not recorded the HbA1c value.

Men outnumbered women for smoker and ex-smoker status (80% vs. 10.9%). Smoking habit is strongly related to diabetic complications such as diabetic nephropathy, retinopathy or neuropathy.[6] Our prevalence was high compared to report by The Second Malaysian National Health and Morbidity Survey which was just about 30%.[2] Based on 3 main findings; there were high prevalence of poor blood sugar control, high prevalence of smoking among male patients and high comorbidity of hypertension, we can derive a conclusion that these patients were in a high risk group.

Limitations

There are several limitations that could be identified in this study. In any retrospective studies based on patients' case note, it is always subjected to inadequate and incomplete data in the case notes. This could be a major setback which could undermine the validity of the results. The study design which is retrospective in nature is also a weakness. Nevertheless in this study we found that most information needed were available in the case notes. Sample size of this study was relatively small due to short period of time. There was also a limitation pertaining to using of mean random blood sugar in order to indicate level of diabetes control. Other cross sectional studies used HbA1c as an indicator of diabetes control which is more accurate.

Implications of the study

A structured programme which includes health education, promotion of healthy lifestyle, proper diabetic management, dietary control and emphasizing the importance of smoking cessation are the key elements in proper management of DM. A special emphasis is needed among patients with poor diabetes control in order to prevent future medical complications.

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