ORIGINAL ARTICLE

Characteristic of Chronic Complications in Type 2 Diabetic Patients Based on Asian Perspective

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ABSTRACT

Introduction: Indonesia is in 6th place with the most diabetes mellitus cases globally. Long-term exposure to hyperglycemia that can be seen in chronic type 2 diabetes mellitus patients can cause macrovascular and microvascular complications. This complication contributes to the increased mortality rate in Indonesia.

Methods: This research uses a cross-sectional study by studying the medical record of type 2 diabetes mellitus patients, such as age, duration of diabetes mellitus, HbA1C levels, blood pressure, lipid profile, macrovascular and microvascular complication. The data obtained is reviewed descriptively.

Results: Most type 2 diabetes mellitus patient is between 55-64 years (39.4%), mean of 55.75[CW2] (SD=9.7). Most patients suffer from type 2 diabetes mellitus for ≥5 years (61%). Meanwhile, the number of type 2 diabetes mellitus patients with uncontrolled HbA1C levels (≥7.0%) is 79%, mean of 8.4 (SD= 1.8). Most type 2 diabetes mellitus patients do not experience hypertension [CW3] (77.8%) and experience dyslipidemia (94.3%), with the most prevalent lipid abnormality being high LDL (30.9%). Besides, most type 2 diabetic patients have microvascular complications (57%), with the most common complication being diabetic neuropathy (45.6%), and the other microvascular complications are diabetic nephropathy (33.7%) and diabetic retinopathy (20.7%). While macrovascular complications are 43%, the most common complication is a diabetic foot (29.9%), and the other macrovascular complications are coronary heart disease (27.8%), peripheral arterial occlusive disease (22.9%), and stroke (19.4%).

Conclusion: All variables, including age, HbA1C levels, blood pressure, and lipid profile comparison, show similar results with Asia's other countries. Meanwhile, the duration of type 2 diabetes comparison is not identical with the other country in Asia.

Keywords: Chronic complications, Type 2 diabetes mellitus, Asian perspective

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INTRODUCTION

Diabetes mellitus is a severe problem in the world, especially in Indonesia. In 2017, the International Diabetes Federation research results stated that the prevalence of people with diabetes mellitus in the world is 425 million people and will increase to 48%, which is 629 million people in 2045. Meanwhile, the prevalence of diabetes mellitus in Southeast Asia will increase to 84% in 2045. Indonesia is the 6th place with most diabetes mellitus sufferers globally, with 10.3 million people. In contrast, the population in Indonesia who has diabetes mellitus but has not been diagnosed with diabetes mellitus is 73.7%. In addition, the mortality rate of people with diabetes mellitus in Southeast Asia in 2017 reached 51.5%. This states that the problem of diabetes mellitus is still a severe problem in the community (International Diabetes Federation, 2017).

Diabetes mellitus is a metabolic disease characterized by hyperglycemia. Hyperglycemia can cause pathological conditions and severe physiological changes in various target organs. This is dangerous because hyperglycemia has not shown symptoms in the community (asymptomatic), so it can cause significant clinical symptoms (American Diabetes Association, 2017). Risk factors for diabetes mellitus can be divided into risk factors that can be modified and cannot be modified. Risk factors that can be modified include unhealthy behavior, such as excessive weight, abdominal or central obesity, lack of physical activity, hypertension, dyslipidemia, unhealthy and unbalanced diets, uncontrolled Impaired Glucose Tolerance (IGT), and smoking. At the same time, the risk factors that cannot be modified are race and ethnicity, age, gender, family history of diabetes mellitus, etc. (Health Ministry of the Republic of Indonesia, 2014). Long-term hyperglycemia without significant control of various risk factors can cause both macrovascular and microvascular complications. Macrovascular complications include coronary heart disease, stroke, peripheral arterial occlusive disease, and diabetic foot. While microvascular complications are diabetic nephropathy, diabetic retinopathy, diabetic neuropathy, erectile dysfunction, and periodontal disease (Permana, 2000).

Chronic complications in the community can add new problems, such as hemodialysis, heart bypass, etc. 13.9% of patients with diabetes mellitus have to undergo hemodialysis. Patients with diabetes mellitus have a higher risk of end-stage renal failure until 3.13 times (Taneva et al., 2016). Meanwhile, 25% of patients with diabetes mellitus have to undergo coronary artery bypass graft (CABG) therapy (Aronson and Edelman, 2014). Chronic complications due to type 2 diabetes mellitus also increase mortality worldwide. One of the chronic complications is

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cardiovascular complications. Cardiovascular complications can cause death in 27 people out of 1,000 who suffer from type 2 diabetes mellitus, where one-third of them suffer strokes. In contrast, one in four suffer from coronary heart disease (International Diabetes Federation, 2017). Therefore, it is important to determine the chronic complications of type 2 diabetes mellitus patients in Dr. Soetomo Hospital.

METHODS

This research uses a cross-sectional study by studying the medical record of type 2 diabetes mellitus patients, such as age, duration of diabetes mellitus, HbA1C levels, blood pressure, lipid profile, macrovascular and microvascular complication. The data obtained is reviewed descriptively. The population is all of type 2 diabetes mellitus patients treated in Endocrine Clinic, Dr. Soetomo Hospital, from July until September 2017. The sample uses a total sampling of type 2 diabetes mellitus patients who suffers macrovascular and microvascular complications. Criteria for inclusion in this study are all type 2 diabetes mellitus patients. Meanwhile, the criteria for exclusion are patients who do not suffer from type 2 diabetes mellitus. The data obtained is then analyzed correctly using SPSS software, Microsoft Excel, and Microsoft Word.

RESULTS

The total number of samples in this study is 1483 patients with type 2 diabetes mellitus in Endocrine Clinic, Dr. Soetomo Hospital. Based on Table 1, most type 2 diabetes mellitus patients are between 55-64 years, which is 584 patients (39.4%). While a minor type 2 diabetes mellitus patient is 15-24 years. The average age of type 2 diabetes mellitus patients treated at Dr. Soetomo from July to September 2017 was 55.75 (SD = 9.7).

Table 1. Type 2 Diabetes Mellitus Patients Based on Age

Age	n	%
15 - 24	5	0.3
25 - 34	21	1.4
35 - 44	141	9.5
45 - 54	477	32.2
55 - 64	584	39.4
65 - 74	234	15.8
>75	21	1.4
Total	1483	100
Average	55.75±9.7	

Among 1,483 outpatients with type 2 diabetes mellitus, the patient's medical record data about the duration of type 2 diabetes mellitus can be obtained in 220 patients. The number of patients that suffers type 2 diabetes mellitus with less than five years are 79 patients (35.9%), more than five years are 134 patients (61%), and no previous history of diabetes mellitus or just knowing the disease when visited Dr. Soetomo Hospital are seven patients (3.1%).

The patient's medical record data on HbA1C levels that can be obtained is 224 patients from 1483 outpatients. The number of patients that with HbA1C levels ≥7.0% are 177 patients (79%), <7% are 47 patients (21%). The average obtained is 8.4 ± 1.8. Meanwhile, the patients with hypertension are 196 patients (22.2%), while patients who do not have hypertension are 686 patients (77.8%) from 882 patients' medical record data on HbA1C levels.

Among 1,483 outpatients with type 2 diabetes mellitus, the patient's medical record data on HbA1C levels that can be obtained was 210 patients. The patients with dyslipidemia are 198 patients (94.3%), while patients who do not suffer dyslipidemia are 12 patients (5.7%). Meanwhile, among patients who experience dyslipidemia, the detail of lipid fraction abnormalities that can be known is 192 patients. Data provided in Table 6 shows that each patient could experience more than one lipid fraction abnormality. Based on Table 2, it can be seen that most patients with type 2 diabetes experience high LDL (30.9%).

Table 2. Type 2 Diabetes Mellitus Patients Based on Lipid Fraction Abnormalities

Lipid Fraction	N	%
High total cholesterol	102	26.9
High TG	108	28.5
High LDL	117	30.9
Low HDL	52	13.7
Total	379	100

Most type 2 diabetic patients have microvascular complications (57%), with the most common complication being diabetic neuropathy (45.6%), and the other microvascular complications are diabetic nephropathy (33.7%) and diabetic retinopathy (20.7%). While macrovascular complications are 43%, the most common complication is a diabetic foot (29.9%), and the other macrovascular complications are coronary heart disease (27.8%), peripheral arterial occlusive disease (22.9%), and stroke (19.4%).

DISCUSSION

Based on Basic Health Research in Indonesia, the most prevalent age in Indonesia that suffers diabetes is 55-64 years (4.8%), following after that is 65-74 (4.2%), and 45 - 54 years (3.3%) (RISKESDAS, 2013). Meanwhile, based on the Health Ministry of the Republic of Indonesia, the age group of 55 - 64 years is classified as a productive age population (Ministry of Health Republic of Indonesia, 2017). In Southeast Asia, the highest age group that suffers diabetes mellitus is 50 - 59 years in men and 60 - 69 years in women (International Diabetes Federation, 2017).

The highest proportion of type 2 diabetic duration is ≥5 years (61%). Meanwhile, research in Iraq shows that most type 2 diabetes mellitus duration is <5 years (Khudhair, 2009). The low awareness may cause this to do initial screening in patients with type 2 diabetes mellitus and the low level of public knowledge about the early clinical symptoms of type 2 diabetes mellitus.

Based on the HbA1C level of the patient with type 2 diabetes mellitus is ≥7% (79%), while the average is 8.4 (SD = 1.8). Meanwhile, the target of HbA1C levels in type 2 diabetes mellitus is <7% (PERKENI, 2015). It means most type 2 diabetic patient still does not fulfill the target of HbA1C levels. Research in Palestine shows similar results. The most prevalent HbA1C level is ≥7% (16.1%), while the average is 9.21 (SD = 2) (Al-Halaweh et al., 2017).

Most type 2 diabetic patients in Dr. Soetomo Hospital do not have hypertension (77.8%). Meanwhile, research in

Palestine shows similar results. The proportion of patients with type 2 diabetes mellitus in Palestine with hypertension is 23% (Al-Halaweh et al., 2017), which means most do not have hypertension (77%).

Meanwhile, most type 2 diabetic patients in Dr. Soetomo Hospital have dyslipidemia (94.3%), with the most prevalent lipid fraction abnormalities being high LDL (30.9%). Meanwhile, similar results are shown in Nepal. Research in Nepal shows that the percentage of type 2 diabetes mellitus patients who suffer dyslipidemia is 85.33%, with the most prevalent lipid fraction abnormalities being high LDL (55.33%) followed by low HDL (49.33%) (Shrestha HK and Khanal L, 2017).

The most common chronic complications in type 2 diabetes mellitus patients are microvascular complications (57.3%), while macrovascular complications are 42.7%. Similar results are also found in Saudi Arabia and Korea, that the most prevalent chronic complications are microvascular complications (Alaboud et al., 2016; Rhee et al., 2011). At the Dr. Soetomo Hospital, the most common complication of type 2 diabetic patients is diabetic neuropathy, 45.6%. Meanwhile, research in Saudi Arabia is diabetic nephropathy (Alaboud et al., 2016) and diabetic retinopathy in Korea (Rhee et al., 2011).

CONCLUSION

All variables, including age, HbA1C levels, blood pressure, and lipid profile comparison, show similar results with the other countries in Asia. Meanwhile, the duration of type 2 diabetes comparison is not identical with the other country in Asia.

CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

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