Research article

Characteristic and treatment overview of type 2 diabetes mellitus patients in hospital of University of Sumatera Utara Medan

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Abstract

Objective: To observe patient's characteristics based on sociodemography which includes age, sex, education level, occupation and type 2 diabetes mellitus treatment. **Method:** This descriptive study was conducted in August - November 2018 at the Hospital of University of Sumatra Utara Medan with a total of 30 respondents. Data obtained from questionnaires filled out by respondents. The data obtained was collected and analyzed using Microsoft Excel. **Results:** Based on the results, it was found that 16 female patients (53.33%) had more type 2 diabetes mellitus, in the range of 51 - 60 years patients there were 15 patients (50%), 18 patients (60%) with a higher education level and 22 patients (73.33%) from those who have occupational duty. **Conclusion:** Based on the results of the study, it can be concluded that the characteristics of patients and the treatment they undergo are very diverse, so it is necessary to adjust the treatment with the patient's condition.

Introduction

Diabetes mellitus (DM) is one of the metabolic diseases characterized by hyperglycemia. This condition is caused by abnormal insulin secretion, decreased insulin work or both [1]. Diabetes mellitus is a complex chronic disease, thus the impact is long-term damage such as interference with various organs, especially the eyes, kidneys, nerves, heart, and blood vessels [2].

The incidence of Type 2 Diabetes Mellitus (DM) in the world continues to increase every year. Type 2 diabetes mellitus is one of the most non-communicable diseases with the highest prevalence. Risk factors that influence the incidence of type 2 diabetes mellitus are family history, age ≥45 years, and sedentary lifestyle [3].

Based on the statement from WHO, the number of cases of diabetes mellitus in Indonesia in 2000 was 8.4 million and is expected to increase in 2030 by 21.3 million. This was also in line with the statement from (IDF) in 2009, which estimated that there was an increase in cases of diabetes mellitus from 2009 as many as 7 million to 12 million in 2030. Although there were differences in the number of cases in the second report, this could indicate that there is an increase of prevalence of diabetes mellitus 2-3 times in 2030. According to the report on the results of Basic Health Research in 2007, the prevalence of DM in Indonesia reached up to 57%. The high number of

cases of diabetes mellitus is almost entirely caused by type 2 diabetes mellitus.

Method

This is a descriptive research. The number of samples are 30 patients. Secondary data was taken from the medical records of DM patients. The research was conducted in August to November 2018 at the Outpatient Installation, Hospital of Universitas Sumatra Utara, Dr. T. Masur Street No. 66 Kampus USU, Medan City, Sumatra Utara Province. The research has been approved by Institution Health Research Ethical Committee No. 530/TGL/KEPK FK USU-RSUP HAM/2018

Results and discussion

Based on the data collected from patients, an overview of the characteristics of patients suffering from type 2 diabetes mellitus includes gender, age, level of education, occupation, and diagnosis will be explained below.

Gender-based characteristics

Type 2 diabetes mellitus is a disease that does not dependent on gender. Both men and women have the same risk of developing type 2 diabetes. Characteristics of patients with type 2 DM who undergo treatment based on gender are shown in Table 1.

Table 1. Characteristics of type 2 DM patients based on gender.

No.	Gender	Frequency	Percentage
1.	Female	16	53.33 %
2.	Male	14	46.67 %
Total		30	100 %

Based on the results of the study,it was found that female patients suffering from type 2 DM were 16 patients (53.33%) and male patients were 14 patients (46.67%). Thus, more female patients suffered from diabetes mellitus compared to male patients related to activity and lifestyle. In addition, the number of male patients who refused to become respondents lead touneven distribution of respondents.

Age-based characteristics

Age of patient affects the declining function in all body systems, including the endocrine system. Decreased insulin production and reduced insulin receptors sensitivity are examples of declining body function in old patients that lead to an increase in blood glucose levels which willcause diabetes mellitus. Characteristics of patients with type 2 DM who undergo treatment are shown in Table 2.

Table 2. Characteristics of type 2 DM patients based on age.

No.	Age	Frequency	Percentage
1.	40 - 50	6	20 %
2.	51 - 60	15	50 %
3.	> 60	9	30 %
Total		30	100 %

Based on the results of the study, it was found that patients suffering from diabetes mellitus were mostly in the age of 51 - 60 years, there were 15 patients (50%), following by 60 years old and above, there were 9 patients (30%) and the last was in the age of 40 - 50 years, there were 6 patients (20%).

According to the American Diabetes Asociation (2011), a person mostly suffering diabetes between the ages of 45 - 64 years. It is associated with various kinds of degenerative diseases. The decrease of various organs function including pancreas as an insulin secretory organ. Theoretically, it said that a person ≥ 45 years have a higher risk of developing DM and glucose intolerance, it is due to degenerative factors, which leads to the decreased of body function, specifically the ability of pancreatic β cells to produce insulin that metabolizes carbohydrates [4].

Characteristics based on education level

The level of education will affect the patient's knowledge and understanding of diabetes mellitus. Characteristics of patients with type 2 diabetes mellitus who underwent treatment based on education level are shown in Table 3.

Table 3. Characteristics of type 2 DM patients based on education level.

No.	Education level	Frequency	Percentage
1.	Middle	12	40 %
2.	High	18	60 %
Total		30	100 %

Based on the results of the study, it was found that the patientwith a high education level who underwent treatment were 18 patients (60%), this category includes both undergraduate and diploma patients. Followed by 12 patients (40%) with middle education level, this category includes patients whom their latest education was from junior high school or senior high school.

The level of education will influence the mindset of the patient, the higher the education level of the patient, the better the mindset and understanding related to the disease and the treatment. Groups of people with high level of education will usually have more knowledge about health, thus they have the awareness in maintaining their health and are more immediate looking for treatment compared to the patients who have a lower level of education. There is a correlation between people with higher education levels whom they capable of accepting themselves as a sick people when they experience symptoms related to illness compared to groups of people who are less educated [5].

Job-based characteristics

Type of work is very much related to the physical activity carried out by someone. Daily physical activity can prevent diabetes mellitus and reduce the risk of its complications. Physical activity also plays an important role in reducing insulin resistance and increasing the amount of insulin.It leads to a better performance of insulin and speeds up the transport of glucose into cells so that the glucose levels in the blood will decrease [6]. Job –Based Characteristics of type 2 DM patients are described in Table 4.

Table 4. Job-based characteristics of type 2 DM patients.

No.	Variable	Frequency	Percentage
1.	Employee	22	73.33 %
2.	Unemployment	8	26.67 %
Total		30	100 %

Based on the results of the study, it was found that patients suffering from Type 2 diabetes mostly were patients who have a job, there were 22 patients (73.33%), and those who were jobless, 8 patients (26.67%). Patients who have job were civil servants and entrepreneurs, while those who don't have job were housewives and retirees.

Based on patients interviews who have a job, they don't carry out much movement on day-to-day activities, for example, they go to work using a vehicle, and mostly they have a sedentary lifestyle at work, preferring to use an escalator or elevator instead of stairs. Retirees and housewives have lighter physical activity so that they have a higher risk factor for developing DM and there may be other risk factors such as stress that can trigger an increase in sympathetic nerve activity that caused blood pressure persistently higher than usual. high level of duty from a patient who has job leads them to irregular eating patterns that caused health problems. Usually, people with high activities often forget to eat meals and tend to consume more snacks. Alteration in lifestyle and eating habits, consumption of high caloric foods and less physical activity, will change the energy balance by storing energy into fat [7].

One of the suggested physical activities is exercise, regular exercise can reduce insulin resistance so that insulin works better and accelerates the transport of glucose into cells for energy needs. Regular exercise 3-4 times a week with a duration of approximately 30 minutes can maintain proper body fitness and weight. In addition, it can improve insulin sensitivity, which will improve blood glucose control. Aerobic physical exercise such as walking, cycling, jogging, and swimming. Patients with the right intensity of physical exercise can reduce the risk of complications of diabetes mellitus [6].

Characteristics by the duration of DM

The duration of patients suffering from diabetes mellitus is very helpful to patients knowledge of diabetes, treatment control, compliance in drug consumption, and the risk of complications. Characteristic overview of patients with type 2 DM who are undergoing treatment based on DM duration is shown in Table 5.

Table 5. Characteristics of type 2 DM patients based on DM duration.

No.	Duration of DM	Frequency	Percentage
1.	< 1Year	3	10 %
2.	1 – 5 Years	17	56.67 %
3.	6 – 10 Years	6	20 %
4.	>10 Years	4	13.33 %
Total		30	100 %

Based on the results of the study, it was found that patients suffering from type 2 diabetes mellitus for a span of 1-5 years were 17 patients (56.67%), followed by 6 patients (20%) who spent 6-10 years of the diseases, 4 patients (13.33%) with more than 10 years, and 3 patients (10%) with less than one year.

Experience and level of education will affect a person's knowledge. The longer the respondents suffer from diabetes mellitus, the experience of the disease will also increase. Experience will expand one's knowledge. The more experience a person has, the higher the knowledge [8].

Characteristics of treatment for type 2 DM patients

Treatment of type 2 DM requires appropriate pharmacological therapy to control blood glucose levels and to prevent the occurrence of complications both given single drug or in combination. The description of DM treatmein is shown in Table 6.

Table 6. Characteristics of Treatment of Type 2 Diabetes Mellitus Patients.

No.	Treatment	Number of patients	Percentage
1.	**Oral antidiabetics**		
	- Single	5	16.67 %
	- Combination	9	30 %
2.	**Insulin**		
	- Single	3	10 %
	- Combination	11	36.67 %
3.	**Oral antidiabetic + Insulin**	2	6.67 %
Total		30	100 %

Based on the results of research,there were 5 patientswho received single oral antidiabetic drugs (OAD) and there were 9 patients who received combined antidiabetic drugs, while the use of single insulin were 3 patients and insulin combination were 11 patients, and those who combined OAD with insulin are 2 patients. The drugs given to patients are biguanide, such as metformin, sulfonylureas, such as glyuidone and glimepiride, or a combination of both.Insulin used for the treatments are fast-acting insulin, short-acting, and long-acting.

Based on the mechanism of drug action, there are three kinds of antidiabetic drugs; increasing the sensitivity of insulin receptors, increasing insulin production in the pancreas, and inhibiting glucose absorption in the gastrointestinal tract. The choice of treatment depends on clinical conditions, comorbidities, and duration of the disease.

According to the American Diabetes Association (2018), metformin is recommended as monotherapy in patients with type 2 diabetes mellitus who are newly diagnosed as long as there are no contraindications to the patient's condition. If within three months the target of therapy is not achieved, it should be combined with one of the other drugs, such as sulfonylureas, thiazolidinedione, DPP-4 inhibitors, and insulin. If the target of therapy still failed, then it should be combined with three drugs from different groups [10].

Short term target of therapy for DM patients is to control blood glucose at normal levels, and in the long term is to prevent and reduce complications, and also to improve the quality of patients life. Based on the study, it is shown

that the treatment of diabetes mellitus was in accordance with the clinical conditions of the patient.

Conclusion

Based on the results of the study, it can be concluded that the characteristics of patients and the treatment they undergo are very diverse, it is necessary to adjust the treatment with the patient's condition.

References

1. Perkeni. Consensus on the management and prevention of type 2 diabetes mellitus in Indonesia. Jakarta: Perkeni; 2015.
2. Blair M. Diabetes Mellitus Review. Urologic nursing. 2016; 36(1):27-36.
3. Wicaksono, R. P. Factors associated with the occurrence of type 2 diabetes mellitus (case study in the internal medicine polyclinic of Dr. Kariadi Hospital). Faculty of Medicine; 2011.
4. Yanto and Setyawati. Family Support for Type 2 Diabetes Mellitus Patients in Semarang City. National Proceedings Seminar and Publication of Research and Community Service 2017; 45-49.
5. Irawan, D. Prevalence and risk factors of diabetes mellitus type two events in urban regions Indonesia. Thesis. Jakarta: Univesitas Indonesia; 2010.
6. Ilyas, E. Benefits of physical exercise for people with diabetes. In book of integrated management of diabetes mellitus. Jakarta: FKUI Publisher 2009; 261.
7. Gibney. M. J., Margetts, B. M., Kearney, J. M., and Arab, L. Public Health Nutrition. Jakarta: EGC; 2009.
8. Alarcon, L. C., Lopez, E. L., Carbajal, M. J., and Torres, M. O. Level of knowledege in patients with type 2 diabetes mellitus and it's relationship with glycemic levels and stage of grief according to kubler-ross. Journal of Diabetes and Metabolism 2015; 6(2): 1-5.
9. American Diabetes Association. Standards of medical care in diabetes. Diabetes Care Journal 2011; 34(1): S11-S13.
10. American Diabetes Association. Classification and diagnosis of diabetes mellitus: standards of medical care in diabetes. Diabetes Care Journal 2018; 41(1): S13-S25.