The Characterization and Treatment Overview of Type 2 Diabetes Mellitus Patients in Universitas Sumatera Utara Hospital Medan in September-October 2021

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ABSTRACT

One of the highly prevalent non-communicable diseases is type 2 diabetes mellitus and some of its risk factors include living a sedentary lifestyle, family history, and being 45 years or older. The disease was observed to have 57% prevalence in Indonesia according to the data provided in 2007 by the Basic Health Research. Therefore, this research was conducted to evaluate the socio-demographic attributes of diabetic patients using factors such as sex, age, occupation, level of education, and the type of treatment being received. It was conducted descriptively at the Universitas Sumatera Utara hospital Medan between September and October 2021 using a total of 30 patients as respondents. The research instrument used was a questionnaire and the data obtained were analyzed through the use of Microsoft Excel. Based on the result, it was found 16 male patients (53.33%) had more type 2 diabetes mellitus, >60 years patient there were 13 patients (43.33%), 16 patients (53.33%) with a middle education level, 20 patients (66.67%) from those who have no occupational duty, 1-5 years is the majority of patients suffer from diabetes mellitus, and the most common comorbid is heart disease. The findings showed a significant variation between the patients' attributes and their treatments, therefore, there is a need for adjustment in treating the patients based on their condition.

Keywords: Type 2 diabetes mellitus, descriptive study, sociodemography, questionnaires, patient

1. INTRODUCTION

One of the metabolic illnesses associated with hyperglycemia is diabetes mellitus. It is usually caused by the abnormal secretion of insulin, reduction of insulin activity, or the combination of both scenarios. This disease is very complex and chronic, thereby, causing long-term harm to the body by interfering with different organs such as the kidney, blood vessels, eyes, heart, and nerves [1], [2].

There is a continuous annual increase in the occurrence of type 2 diabetes mellitus throughout the globe. It has also been confirmed to be one of the highly prevalent non-communicable diseases and its risk factors include living a sedentary lifestyle, family history, and being 45 years or older [3].

The WHO showed that the number of diabetes mellitus cases in Indonesia was 8.4 million in 2000 with a projection of 21.3 million increment in 2030. This also agrees with the report of (IDF) in 2009 which showed the possibility of a double or triple increase in the number of diabetes mellitus cases in the country by 2030. Moreover, the disease was observed to have 57% prevalence in the country according to the data provided in 2007 by the Basic Health Research with the most prominent being type 2 diabetes mellitus.

2. METHOD

This is a descriptive method that the number of samples are 30 patients. Secondary data were taken from the medical records of diabetes mellitus patients. The research was conducted from September to October 2021 at the Outpatient Installation, Universitas Sumatera Utara

hospital, Jl. Dr. T. Mansur No. 66 USU, Medan City, Sumatera Utara.

3. RESULT AND DISCUSSION

The attributes of the type 2 diabetes mellitus patients are described as follows based on the information obtained through the questionnaires distributed to the patients.

3.1 Gender-based characteristics

The results showed that this disease is not gender-dependent with both the male and female patients discovered to have a similar risk of having the disease. Characteristics of patients with type 2 diabetes mellitus who undergo treatment based on gender are shown in Table 1.

Table 1. Characteristics of type 2 diabetes mellitus patients based on Gender

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

Regarding to the result of study, it was found that male patients suffering from type 1 diabetes mellitus were 16 patients (53.33%) and female patients were 14 patients (46.67%). Thus, more male patients suffered from diabetes mellitus comparatively to female patients related to activity and lifestyle.

3.2. Age-based characteristics

Another important attribute is age and it was observed to be affecting the declination in all the systems in the body, including the endocrine system. The reduction in the production of insulin and the decrease in the sensitivity of its receptors are the indicators of weak body function for patients that are advanced in age. This further increases their blood glucose levels, thereby, leading to diabetes mellitus. The age of the respondents is, therefore, presented in the following table.

Table 2. Characteristics of Type 2 diabetes mellitus patients based on age

No.	Duration of Diabetes Mellitus	Frequency	Percentage
1.	<1 year	4	13.33
2.	1-5 years	11	36.67
3.	6-10 years	7	23.33
4.	>10 years	8	27
Total		30	100

The data showed that most of the patients with type 2 diabetes mellitus are over 60 years of age as indicated by 13 patients which represent 43.33% followed by 51-60 years old which were 11 patients (36.6%), <40 years

which were 4 patients (13.33%) and the last was in the age of 40-50 years, there were 2 patients (7%).

This is in line with the reports of the American Diabetes Mellitus Association (2011) that the age range with the highest prevalence of diabetes mellitus is 45-64 years due to their vulnerability to several types of degenerative illnesses such as the reduction in the function of several organs including the pancreas which is the organ secreting insulin. Moreover, it has been theoretically discovered that an individual at 45 years and above is highly susceptible to glucose intolerance and diabetes mellitus due to the degenerative factors causing a decrease in the functionality of the body system, especially by reducing pancreatic β cells' capability to release insulin for carbohydrates' metabolization [4].

3.3 Characteristics based on the education level

Education level also influences the knowledge and information an individual has about diabetes mellitus. Therefore, the level of education of the respondents is presented in Table 3.

Table 3. Characteristics of type 2 diabetes mellitus patients based on Education Level

No.	Education Level	Frequency	Percentage
1.	Middle	16	53.33%
2.	High	14	46.67%
Total		30	100%

Based on the result of the study, it was found that patients with middle education level who underwent treatment were 16 patients (53.33%), this category includes patients whom their latest education was from junior high school or senior high school. Followed by 14 patients (46.67%) with a high education level, this category includes both undergraduate and diploma patients. This means the patients' mindset is determined by their level of education such that those with higher education understand the disease and treatment required better. Moreover, highly educated individuals are more knowledgeable and aware of the importance of their health and this means they seek treatment immediately when compared with those with low education levels. They also accept their status as sick when they see the signs and symptoms of disease when compared to those with less education [5]; [6].

3.4 Job-based characteristics

There is a high correlation between the type of work being done by individuals and their level of physical activity. It is important to note that it is possible to avoid diabetes mellitus and limit its complications through the conduct of physical activity on a daily basis. This is due to its ability to ensure better insulin performance and accelerate glucose transportation to the cells in order to reduce the blood glucose level [7]. The attributes of the

respondents in relation to work are, therefore, presented in the following table.

Table 4. Job-based characteristics of type 2 diabetes mellitus

No.	Variable	Frequency	Percentage
1.	Employee	10	33.33%
2.	Unemployment	20	66.67%
Total		30	100%

The data showed that 20 of the patients represented by 66.67% are jobless by being housewives and retirees while the remaining 10 represented by 33.33% are civil servants and entrepreneurs.

Based on patient interviews, retirees and housewives have lighter physical activity so that they have a higher risk factor for developing diabetes mellitus and they may be another risk factor such as stress that can trigger an increase in sympathetic nerve activity that causes blood pressure persistently higher than usual. The patients with a job do not usually conduct physical activities as indicated by their use of vehicles, sedentary lifestyle, and preference for escalator or elevator to the use of stairs. Moreover, their patterns of eating are not usually regular as indicated by their high tendency to eat snacks and skip meals due to high work duty, thereby, leading to health problems. It is also important to note that energy balance is normally altered as indicated by the conversion of energy to fat due to the change in eating habits and lifestyle, less participation in physical activity, and high caloric food consumption [9]; [10]; [11].

An example of the physical activities recommended is regular exercise due to its ability to decrease the resistance of insulin to ensure it performs effectively and accelerate glucose transportation into the cells to produce the energy needed. It is possible to ensure adequate body fitness and weight and enhance the sensitivity of insulin to improve the level of glucose in the blood by participating in regular exercise for 30 minutes a day and 3-4 times a week. Some of these exercises include cycling, walking, swimming, and jogging such as walking, cycling, jogging, and swimming. This means it is possible to limit the risk of complications for the patients by having the appropriate physical exercise intensity [7]; [12].

3.5 Characteristics by the duration of diabetes mellitus

The duration at which the patients have been experiencing the disease also has a significant influence on the knowledge they have about the disease, appropriate treatment methods, drug consumption compliance, and complication risk. Characteristics overview of patients with type 2 diabetes mellitus who are undergoing treatment based on diabetes mellitus duration is shown in Table 5.

Table 5. Characteristics of type 2 diabetes mellitus patients based on diabetes mellitus duration

No.	Duration of Diabetes Mellitus	Frequency	Percentage
1.	<1 year	4	13.33
2.	1-5 years	11	36.67
3.	6-10 years	7	23.33
4.	>10 years	8	27
Total		30	100

It was found the patient suffering from type 2 diabetes mellitus for spending about of 1-5 years were 11 patients (36.67%), followed by 8 patients (27%) who spent more than 10 years of the diseases, 7 patients (23.33%) who spent 6-10 years, and 4 patients (13.33%) who spent less than 1 year. A person's knowledge is usually influenced by the education level and experience and this means patients that have been suffering from diabetes mellitus for a longer period usually have a better experience of the disease, thereby, expanding their knowledge [13]; [14].

3.6 Characteristics of comorbid diseases of type 2 diabetes mellitus patients

Characteristics of comorbid disease of type 2 diabetes mellitus patients become supporting data to see the comorbidities commonly suffered by patients. The comorbid disease is shown in Table 6.

Table 6. Characteristics of comorbid diseases of type 2 diabetes mellitus patients

No.	Commorbid disease	Frequency	Percentage
1.	Heart diseases	5	33.33
2.	Hypertension	4	26.67
3.	Dyspepsia	3	20
4.	Neurologic disease	2	13.33
5.	Lung disease	1	6.67
Total		15	100

Table 6, it obtains data that heart disease is the most comorbid disease suffered by respondents as many as 5 patients (33.33%), followed by hypertension is suffered by 4 patients (26.67%); dyspepsia suffered by 3 patients (20%); neurologic disease is suffered by 2 patients (13.33%); and lung disease is suffered by 1 patient (6.67%).

3.7 Characteristics of treatment for type 2 diabetes mellitus

There is a need for adequate pharmacological therapy to ensure the level of glucose in the blood is normal in treating type 2 diabetes mellitus. This is necessary to avoid complications through a single or combination of drugs. The treatments given to the respondents are, therefore, described in the following table.

Table 7. Characteristics of treatment of type 2 diabetes mellitus patients

No.	Treatment	Number of patients	Percentage
1.	Oral antidiabetics:		
	- Single	9	30
	- Combination	16	53.33
2.	Insulin:		
	- Single	2	6.67
	- Combination	2	6.67
3.	Oral antidiabetic + Insulin	1	3.33
Total		30	100

Table 6 showed that 9 patients were given the single oral antidiabetic drugs (OAD), 1 had its combination, 2 had single insulin, 2 others had its combination, and only 1 had the combination of OAD and insulin. The patients were given different kinds of drugs including biguanide in the form of metformin and sulfonylureas in the form of glyuidone and glimepiride or the combination of the two drugs. It is important to note that the insulin applied in treating the patients are the types with fast, long, and short action. Moreover, there are three types of antidiabetic drugs in line with their action and these include those with the ability to improve insulin receptor sensitivity, those that produce insulin in the pancreas, and those that inhibit the absorption of glucose in the gastrointestinal tract. The selection of the appropriate method relies on the comorbidities, clinical conditions, and disease duration [15].

American Diabetes Association (2021) recommends the use of metformin as monotherapy for newly diagnosed Type 2 diabetes mellitus patients as long as they are not allergic to the drug. It is also to be combined with other OAD such as insulin, thiazolidinedione, sulfonylurea, and DPP-4 inhibitors in case there are no results within three months. Moreover, sulfonylurea is recommended to be combined with three other OADs from different groups in a situation the method did not also work [16].

The objective of the short-term therapy is to ensure the glucose in the blood is at a normal level while the long-term therapy is for the prevention and reduction of complications as well as to enhance the patients' quality of life. The findings from this research showed that the diabetes mellitus treatment applied was in line with the patients' clinical condition.

4. CONCLUSION

The results showed a significant variation between the patients' attributes and their treatments, therefore, there is a need for adjustment in treating the patients based on their condition.

AUTHORS' CONTRIBUTIONS

All authors shared equal responsibility in prepare this manuscript.

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REFERENCES

[1] Perkeni. Consensus on the management and prevention of type 2 diabetes mellitus in Indonesiaa. Jakarta: Perkeni: 2015.

[2] Horton ES. Prevention of type 2 diabetes mellitus. Principles of diabetes mellitus [Internet]. Springer International Pubslishing; 2017; 1031-44. Avaiabble from: http://dx.doi.org/10.1007/978-3-319-1-8741-9_50.

[3] Wicaksono, R. P. Factors associated with the occurance of type 2 diabetes mellitus (*case study in the internal medicine polyclinic of Dr. Kariadi Hospital*). Faculty of Medicine. 2011.

[4] Yanto and Setyawati. 2017. Dukungan keluarga pada pasien diabetes mellitus tipe 2 di kota Semarang dalam Prosiding Seminar Nasional dan Publikasi Hasil Penelitian dan Pengembangan Masyarakat. Semarang: Universitas Muhammadiyah Semarang. Halaman: 45-49.

[5] Irawan, D. 2010. Prevalence and risk factors of diabetes mellitus type 2 events in urban regions Indonesia. *Thesis*. Jakarta. Universitas Indonesia.

[6] Priharsiwi D, Kurniawati T. Gambaran Dukungan Keluarga Dan Kepatuhan Diet Pada Pasien Diabetes Mellitus Tipe 2: Literature Review. Prosiding Seminar Nasional Kesehatan [Internet]. Universitas Muhammadiyah Pekajangan Pekalongan; 2021 Nov 25;1:324-35. Available from: http://dx.doi.org/10.48144/prosiding.v1i.679.

[7] Ilyas, E. 2009. Benefit of physical exercise for people with diabetes. In book of integrated management of diabetes mellitus. Jakarta. FKUI Publisher. p. 261.

[8] Prevalence of Diabetes Mellitus among Sub-Urban Pulation in Makassar, Indonesia. International Journal of Science and Research (IJSR) [Internet]. International Journal of Science and Research; 2016 Jan 5;5(1):835–8.

Available from: http://dx.doi.org/10.21275/v5i1.nov152534.

[9] Gibney, M. J. Margaretts, B. Kearney, J. M. and Arab, L. 2009. Public health nutrition. Jakarta. EGC.

[10] Phadke U. Physical Activity and Exercise in Diabetes Mellitus. RSSDI Textbook of Diabetes Mellitus [Internet]. Jaypee Brothers Medical Publishers (P) Ltd.; 2014;509–509. Available from: http://dx.doi.org/10.5005/jp/books/12626_33.

[11] Talwalkar P. Role of Exercise in the Management of Diabetes Mellitus. Practical Diabetes Mellitus [Internet]. Jaypee Brothers Medical Publishers (P) Ltd.; 2015;78–78. Available from: http://dx.doi.org/10.5005/jp/books/12593_12

[12] Van Mil EG. Exercise, physical activity, and diabetes mellitus. Armstrong N, van Mechelen W, editors. Oxford Medicine Online [Internet]. Oxford University Press; 2017 Apr; Available from: http://dx.doi.org/10.1093/med/9780198757672.003.0023

[13] Alarcon, L. C. Lopez, E. L. Carbajal, M. J. and Torres, M. O. 2015. Level of knowledge in patient 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. p. 6 (2). 1-5.

[14] Gunawardena H. Knowledge and perceptions on diabetes self-management of people with diabetes mellitus and diabetes education team. Morressier; 2019 Nov 15; Available from: http://dx.doi.org/10.26226/morressier.5d9b6234ea541d6ca84942c5.

[15] American Diabetes Association. 2011. Standard of medical care in diabetes. Diabetes Care Journal. p. 34 (1): S11-13.

[16] American Diabetes Association. 2021. Classification and diagnosis of diabetes mellitus; standards of medical care in diabetes. Diabetes Care Journal.