

Difference Disease Knowledge Level in Type 2 Diabetes Mellitus Patients at Siloam Lippo Village General Hospital

Shirley Ivonne Moningkey¹, Iegreat Aprilyanri¹, Wahyuni Lukita Atmodjo²

¹Department of Public Health and Family Medicine, Faculty of Medicine, Pelita Harapan University, Karawaci, Tangerang, Banten, Indonesia

²Department of Anatomy, Faculty of Medicine, Pelita Harapan University, Karawaci, Tangerang, Banten, Indonesia

Abstract

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Correspondance: Shirley Ivonne Moningkey

E-mail: smoningkey@yahoo.com
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Background: In Indonesia, Diabetes Mellitus (DM) with complications is the third leading cause of death. Risk of complication increases tremendously in uncontrolled diabetes. The level of knowledge is one of the factors affect glycaemic control. However, little study has been done regarding the difference in disease knowledge level in type 2 DM patients. This study aims to find out the difference between the level of DM knowledge and glycaemic control in type 2 diabetes mellitus patients at Siloam Lippo Village General Hospital.

Methods: Analytical observational with a cross-sectional study was conducted. 46 type 2 diabetes mellitus patients qualified for the inclusion criteria and were given the self-administered Michigan Diabetes Knowledge Test (MDKT) for General Knowledge Part (GKP) questionnaire and HbA1c test results taken in the past six months to evaluate glycaemic control. Purposive sampling method was used in this study for data collection. Student T-test was done to measure the difference with 95% significancy.

Result: In 46 samples were shown that 60.90% women, a majority in the 50-59 age group, and 65.20% with more than 5 years of DM history. Among 46 samples, 26 have uncontrolled glycaemic with a mean score of 6.65 ± 1.83 in knowledge, and 20 have controlled glycaemic with a mean score 7.80 ± 1.61 . Student T-test showed significant difference in level of knowledge between controlled and uncontrolled glycaemic levels with $p = 0.032$.

Conclusions: It is concluded that there is a difference in disease knowledge level in type 2 DM patients at Siloam Lippo Village General Hospital.

Introduction

Diabetes Mellitus (DM) is estimated to affect 537 million adults globally, thus making it a main concern in public health today.¹ These numbers have persistently increased since 1980, with a total of 108 million patients diagnosed with DM. Type 2 DM amounted to a staggering 98% making up a ratio of 9:1 compared to type 1 DM.^{1,2} In 2014, it was found that 8.5% of adults aged above 18 had diabetes. Not only that, DM has affected a large portion of society today, but based on the data in 2019, diabetes was the direct cause of 1.5 million deaths, and 48% of all deaths due to diabetes occurred before the age of 70

years.³ Currently, Indonesia is placed fifth with the greatest number of people with diabetes at 20 – 79 years old in the year 2021, amounting to 19.5 million. These numbers are expected to inflate by 2045 to an astonishing 16.7 million. Based on IDF 2021, it is found there 73.7% of type 2 DM patients remain underdiagnosed.¹⁻⁵ Variation of DM's prevalence rate depends on several factors, including genetic susceptibility, social risk factors such as level of activity, and intrauterine growth.^{5,6}

DM is a complex, chronic disease that is caused by metabolic disorders. Several factors in type 2 DM patients, contribute to insulin resistance; thus, uncontrolled blood glucose levels result in

the early onset of DM complications.⁵ DM contributes to one of the main causes of blindness, renal failure, heart attack, stroke, and lower limb amputation.⁶⁻⁸ Several factors affect the level of glycaemic in type 2 DM patients, including medication adherence, age, diagnosis duration, knowledge level, and medication regimen.⁹ Therefore, the primary goal in managing diabetes mellitus is to maintain a near-normal glycaemic level.¹⁰ HbA1c (Glycosylated haemoglobin), the primary target in determining a controlled DM, is formed by the nonenzymatic covalent addition of glucose moieties to haemoglobin in red cells. HbA1c is used as an index to indicate the average blood glucose level during the past three months and is little affected by day-to-day variations.⁶ Consequently, the factors affecting glycaemic control are the major therapeutic target for preventing of organ damage caused by DM.

Poor disease knowledge is pivotal in the management of DM; thus, the self-care that plays a big role in disease management is often poorly done. The increased knowledge disparity regarding diabetes affects glycaemic control and disease control, whereby poor glycaemic control leads to increased mortality and early-onset of DM-related complications, as discussed above.¹¹⁻¹⁵ Knowledge of the disease plays a vital role in the management of type 2 DM patients. Although knowledge is an important part of disease care, educating patients regarding the knowledge of the disease itself is often neglected.¹² Many questionnaires have been formed to test disease knowledge of DM. In this study, MDKT is going to be used. The MDKT is a valid and reliable measuring tool for assessing DM knowledge. To assess knowledge of DM, the General Knowledge Part (GKP) is used, which consists of 14 questions regarding DM knowledge, namely 6 questions about food and nutrition, 2 questions about blood tests, 1 question about physical activity, 2 questions about self-care and, 3 questions about complications.¹⁶

Knowledge of disease plays a vital role in the management of type 2 DM patients and is an important part of the disease care, but educating patients regarding the knowledge of the disease itself is often neglected.^{10,17,18} Although the previous study by Thanh and Tien,¹⁹ reported that there was a difference in MDKT results between educated and not educated DM patients, however, the study between the difference in the level of knowledge and glycaemic control in controlled and uncontrolled type 2 DM patients has not yet been done clearly.

Material And Methods

This research had gone through ethical clearance that was released by Universitas Pelita Harapan Ethics Committee on 8th January 2020; 079/K-LKJ/ETIK/I/2020. A cross-sectional study was conducted to assess the level of knowledge and level of glycaemic control among type 2 DM patients at Siloam Lippo Village General Hospital from January 2020 to March 2020.

Patients were selected through purposive sampling and asked for sex, age, educational status, occupational status, and duration of diabetes mellitus. The level of knowledge was then assessed using the General Knowledge Part of Michigan Diabetes Knowledge Test 2 (MDKT 2), and the level of glycaemic control is based on the HbA1c level (NGSP) for the last 6 months that is measured in the hospital's laboratory. Patient with <7% of HbA1c is deemed as controlled glycaemic level. The MDKT 2 questionnaire will consist of self-care, diabetes, symptoms of diabetes complications, and blood glucose examinations.¹²⁻¹⁵

The inclusion criteria in this study are type 2 diabetes patients admitted to outpatient clinics with HbA1c results in the past 6 months. Meanwhile, the exclusion criteria include patients with a mental disorder or change in consciousness that could hinder the accuracy of the knowledge assessment results.

Data collected will then be analysed for normality distribution using Shapiro-Wilk and Student T-test to obtain the mean difference with 95% significance.

Result

From 59 samples obtained, 13 did not qualify for the criteria, thus only 46 samples were obtained in total that were included in this study. Sample characteristics of this study that qualified for the criteria are stated in table 1.

Table 1. Samples' Characteristics

Characteristic	N=67	Percent- age (%)
Gender	Male	18 39.10
	Female	28 60.90
Body Mass Index (BMI)	Normal	23 50.00
	Type 1 Obesity	19 41.30
	Type 2 Obesity	4 8.70
	Elementary	40 59.70
Education Status	Middle school	6 13.00
	High school	17 37.00
	Tertiary	19 41.30
	< 40	4 8.70
Age Groups (years)	40 – 49	3 6.50
	50 – 59	21 45.70
	60 – 69	13 28.30
	70 – 79	5 10.90
History of Diabetes (years)	< 5	16 34.80
	5 – 10	17 37.00
	> 10	13 28.20

Table 1 shows patients characteristics, among 46 patients, dominated by female amounting at 28 samples (60.90%). Most of the samples with normal body mass index as many as 23 samples (50%) followed by type 1 obesity as many as 19 samples (41.30%). The education level of the samples showed around 19 samples (41.30%) with a tertiary education background, followed by high school 17 samples (37.00%). Majority of the samples belongs to 50-59 years old with 21 samples (45.70%), followed by 60 – 69 years old amounting at 13 samples (28.30%). Majority of the samples have a history of diabetes ranging from 5 to 10 years with 17 samples (36.95%), followed by more than

10 years of history at 13 samples (28.26%).

Table 2. Samples' variable characteristics

	Mean	SD	Min	Max
HbA1c	7.55	1.60	4.90	11.20
GKP	7.15	1.81	3	11

Patients' variable characteristics that have been assessed can be found at table 2. Both variables are assessed with numeric data in which mean, standard deviation, minimal dan maximal values are stated. Based on table 2, mean of HbA1c 7.55 ± 1.60 and GKP 7.15 ± 1.81 .

Table 3. Samples' knowledge passing rate based on MDKT questionnaire (GKP)

	MDKT Items (GKP)	Percentage (%)
1.	The diabetes diet is: a healthy for most people	69.39
2.	Which of the following is highest in carbohydrate: baked potato	30.61
3.	Which of the following is highest in fat: low fat (2%) milk	44.90
4.	Which of the following is a "free food": any food that has less than 20 calories per serving	16.33
5.	HbA1c is a measure of your average blood glucose level for the past: 6-12 weeks	38.78
6.	Which is the best method for home glucose testing: blood testing	67.35
7.	What effect does unsweetened fruit juice have on blood glucose: raises it	16.33
8.	Which should <u>not</u> be used to treat a low blood glucose: 1 cup diet soft drink	34.69
9.	For a person in good control, what effect does exercise have on blood glucose: lowers it	71.43
10.	What effect will an infection most likely have on blood glucose: raises it	40.82
11.	The best way to take care of your feet is to: look at and wash them each day	46.94
12.	Eating foods lower in fat decreases your risk for: heart disease	69.39
13.	Numbness and tingling may be symptoms of: nerve disease	61.22
14.	Which of the following is usually <u>not</u> associated with diabetes: lung problems	63.27

From 46 samples, most of them are well informed about the questions complications symptoms of DM, ideal diet for DM, checking blood sugar at home and the effect of exercise on blood sugar. Most questions have a passing rate below 50% where there are only 6 questions with a passing rate above >50%.

Table 4. HbA1c categorical data

HbA1c level	N = 46	Percentage (%)
Uncontrolled (≥ 7)	26	56.50
Controlled (< 7)	20	43.50

Glycaemic levels are divided into two categorical groups that is identified as uncontrolled and controlled glycaemic levels. These two groups are based on the latest updated 2021 Type 2 DM guidelines released by Indonesian Endocrinology Association (PERKENI), whereby patients with glycemic levels higher than 7 is identified as uncontrolled and lower than 7 is identified as controlled.²⁰ As seen on table 4, majority of the samples obtained have uncontrolled glycemic level as many as 26 samples (56.50%), while the samples with controlled glycemic levels were only 20 samples (43.50%). The HbA1c Normality Test using the Shapiro-Wilk method shows a normal distribution, (p-value: 0.008).

Table 5. Differences in knowledge between two groups of glycaemic control

	N	Mean	SD	P value
Controlled glycaemic	20	7.80	1.61	0.032
Uncontrolled glycaemic	26	6.65	1.83	

As seen on table 5, mean and p value were obtained after analysed with Student T-test with 95% significancy. In patients with controlled glycaemic mean knowledge of 7.80 ± 1.61 in comparison to uncontrolled glycaemic patients with 6.65 ± 1.83 . P value of the difference were found to be 0.032.

Discussion

From the results obtained above, it can be concluded that most of the sample had a history of DM of more than 5 years, as much as 65.20%. Meanwhile, it is found that the amount of uncontrolled diabetes patients is also 56.50%. This result is most likely due to a low level of knowledge regarding a healthy diet. It can also be seen that although most of the sample has a long history of DM, they still lack disease knowledge and uncontrolled diabetes. The result of this study is similar to the study held by Phillips et al., 2018, which found a majority of the samples collected had uncontrolled glycemic level and low levels of knowledge.²¹

This study found a mean HbA1c of 7.55% and a GKP score of 7.15, similar to the study held by Phillips et al., 2018, mean HbA1c level of 9.30% with a mean GKP score of 8.30.²¹ Both studies indicated that level of knowledge plays a pivotal role in the management of type 2 DM patients as explained previously. A previous study has also reported multiple variables found to have an association with glycemic control, whereby these variables include employment status, social support, long duration of DM history, and poor knowledge of DM.²² It is also found that HbA1c level was positively related to medication persistence, this relationship goes both ways since it was also found patients with a high level of medication adherence were found less likely to have poor glycemic control.^{23,24}

Based on the patient's knowledge passing rate based on the MDKT questionnaire (GKP), it can be seen only 6 questions were answered with a >50% passing rate, depicting a majority of the questions to be most likely answered incorrectly. Two questions were answered least correctly, questions 4 and 7, regarding diet and nutrition. The results compiled are similar to the study held in Saudi Arabia, whereby questions regarding diet and nutrition were least understood, and questions regarding the effect of exercise and home blood glucose test were most correctly answered.¹⁷

This study shows a new finding that there was difference level of knowledge between controlled and uncontrolled type 2 DM patients.

Conclusion

There was a significant a different between knowledge about DM in the glycaemic controlled and uncontrolled groups.

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