Research Paper

Diabetes-Related Knowledge and Dietary In Patients With Type 2 Diabetes Mellitus at the Community Health Center (CHC) Pancoran Mas District, Depok, West Java

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Abstract

Diabetes mellitus is a degenerative disease that is a threat to world health at this time. This study aimed to determine the correlation between knowledge, diet, age, and the incidence of type 2 diabetes mellitus at the Pancoran Mas District Health Center, Depok. This type of analytic survey research uses a cross-sectional design. The population in this study were patients who visited the diabetes mellitus polyclinic in June-September 2022. The number of samples was 107 people, and the sampling technique used accidental sampling. The variables studied were knowledge, dietary habits, age group, and diabetes mellitus—common knowledge, including etiology, symptoms, and risk factors. Dietary habits include a person's lifestyle according to the amount, schedule, and type of food consumed. Data analysis uses the chi-square test and then the Multiple Logistic Regression test. This study showed that 22.4% had diabetes mellitus, 88.8% had good knowledge, 52.3% had good dietary habits, and 84.5% were aged less than 45 years. The bivariate analysis results showed that the knowledge variable was p-value = 0.001, an eating pattern was p-value = 0.001, age group was p-value = 0.003, and multivariate analysis proved that diet was the most dominant variable in the incidence of diabetes mellitus. It was concluded that the variables of knowledge, diet, and age group were related to type 2 diabetes mellitus, while the most dominant variable was diet. The recommendation from this study result is to keep blood sugar levels under control, patients should adjust their diet according to the schedule and the amount and type of food consumed by diabetic patients.

Keywords *Knowledge, Dietary Habits, Diabetes*

INTRODUCTION

Diabetes mellitus is a chronic disease with special characteristics of blood glucose levels exceeding normal and disruption of carbohydrate, fat, and protein metabolism caused by a relative or absolute deficiency of the insulin hormone (Aldino, 2021). According to the International Diabetes Federation, type 2 diabetes mellitus is the most common type of diabetes worldwide, accounting for more than 90%. Hyperglycaemia is the beginning of the inability of the body's cells to fully respond to insulin, a condition like this is called insulin resistance (International Diabetes Federation, 2021). Diabetes Mellitus is a degenerative disease that is an important concern and is included in the four priority non-communicable diseases because every year, it has increased and become a threat to world health. An estimated 537 million people have diabetes, and these numbers are projected to reach 643 million in 2030 and 783 million in 2045. In addition, it is estimated that more than 6.7 million people aged 20–79 will die from diabetes in 2021. The total Children and adolescents up to the age of 19 years living with diabetes are increasing every year. By 2021, more than 1.2 million children and adolescents will have type 1 diabetes (International Diabetes Federation, 2021). The IDF projects the number of diabetics aged 20-79 years in several countries worldwide and has identified ten countries with the highest number of sufferers. China, India, and the United States occupy the top three, with the number of people with diabetes 116.4 million, 77

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million, and 31 million. Indonesia is ranked seventh among ten countries with 10.7 million diabetics (Kemenkes RI., 2020). Riskesdas 2018 results prove that there is an increase in the prevalence of diabetes mellitus every year, based on a doctor's diagnosis at the age of 15, from 1,5% to 2% when compared to the 2013 (Kemenkes RI, 2018)

Age is a risk factor for diabetes mellitus with increasing age, the risk of glucose tolerance will increase, especially at the age of over 45 years (Perkeni, 2021), affected by diabetes mellitus (Utomo, 2020). The increasing increase in non-communicable diseases (NCD) needs to be balanced with education and guidance to the public in physical activities to prevent non-communicable diseases and increase knowledge, especially diabetes mellitus, especially for high-risk groups. The introduction of disease must be taught to the community. In the research conducted by Wigatiasari (2021) it was found that 27.2% of respondents had good knowledge of diabetes mellitus, and around 25.3% of respondents had sufficient knowledge of diabetes mellitus, while those who had less knowledge 47.5%. Patient knowledge of diabetes is very important because it is a means to assist people with diabetes mellitus in controlling their disease so that people with diabetes mellitus can live longer with a good quality of life. (Indirawaty et al., 2021). The incidence of diabetes mellitus is thought to have something to do with a person's lifestyle, especially in big cities; initially, a traditional diet that likes to consume vegetables and fibre, and carbohydrates have changed to a modern diet that tends to be instantaneous, contains lots of protein, fat, sugar, salt and is low in fibre (Tarihora, 2022). The research result conducted by Suiraoka (2012) was that sufferers of diabetes mellitus who cannot regulate their diet according to the amount, schedule, and type of food consumed would experience an increase in blood sugar levels.

The prevalence of diabetes mellitus in Depok City reached 27,000 people (Jasmine et al., 2020) based on the NCD surveillance report at the Community Health Center (CHC) Pancoran Mas District, Depok, in 2019, there were 2,832 patients suffering from diabetes mellitus, while in 2020 there were 2,931 people with diabetes mellitus and in 2021 the number of people with diabetes mellitus was 3,100 people if you look at the trend of cases of diabetes mellitus has increased every year (CHC Pancoran Mas District, 2021). Efforts have been made to prevent and reduce cases of diabetes mellitus which have been carried out properly, but the trend of diabetes mellitus is still increasing every year.

Diabetes is one of the non-communicable diseases with the highest death rate in the world, and these trends happen at the Community Health Center (CHC) Pancoran Mas District, Depok. This disease also reduces work productivity, income levels, and the quality of life of persons with it, leading to further complications. In tackling the challenges caused by diabetes, one way is through the revitalization of the Community Health Center (CHC) as the primary service level. Many factors affect the occurrence of diabetes, it is necessary to find out which factors are dominant. This is done to make it easier for us to carry out preventive and promotive efforts. Various studies found that knowledge about the disease and a person's diet is the most dominant factors in the incidence of type 2 diabetes mellitus. This study aimed to determine the relationship between knowledge, dietary habits, age, and the incidence of type 2 diabetes mellitus at the Pancoran Mas District Health Center, Depok. Based on the above background, research on the correlation of knowledge of diabetic patients with type 2 diabetes mellitus diet at the Pancoran Mas District Health Center, Depok, is essential so that people are concerned about diabetes in advanced conditions. The results expected that we could prevent and promote intervention using knowledge and healthy diet habits.

LITERATURE REVIEW

Diabetes Mellitus (DM)

Diabetes Mellitus (DM) is probably one of the oldest diseases known to man. It was first reported in an Egyptian manuscript about 3000 years ago. In 1936, the distinction between type 1

and type 2 DM was clearly made. Type 2 DM was first described as a component of metabolic syndrome in 1988. Type 2 DM (formerly known as non-insulin dependent DM) is the most common form of DM, characterized by hyperglycemia, insulin resistance, and relative insulin deficiency. Type 2 DM results from the interaction between genetic, environmental and behavioural risk factors (Chen et al., 2014). Type 2 diabetes mellitus is not dependent on insulin because the pancreas continues producing insulin, but the amount is insufficient. The insulin that is produced is absorbed by fat cells due to poor lifestyle and diet. The pancreas cannot produce enough insulin resulting in increased blood sugar levels. The insulin hormone in the body cannot function properly. Defects cause this in insulin production, insulin resistance, or reduced sensitivity of cells and body tissues to insulin. Type 2 diabetes mellitus usually occurs at the age of more than 30 years (Masriadi, 2016).

People living with type 2 DM are more vulnerable to both short- and long-term complications, which often lead to premature death. This tendency of increased morbidity and mortality is seen in patients with type 2 DM because of the commonness of this type of DM, its insidious onset and late recognition, especially in resource-poor developing countries. Besides, diabetes is a lifelong chronic disease, usually divided into type 1 and type 2 diabetes, with type 2 diabetes being the most common. In 2019, an estimated 463 million people were diagnosed with diabetes (Saeedi et al., 2019). Type 2 diabetes and hyperglycemia increase the complications of diabetes, including microvascular and macrovascular diseases, such as neuropathy, myocardial infarction, stroke, and premature death (Venguidesvarane et al., 2020). In addition, the incidence of DM2 has been found to be two to three times higher in South Asians in the US compared to the general population. The risk of premature death decreases in patients with good glycemic control and the absence of complications of kidney disease (Jamil et al., 2022)

Knowledge

Knowledge is the result of humans sensing or knowing someone about an object through their senses, such as their eyes, nose, and ears. Knowledge is a result that occurs after someone senses a particular object from experience gained. Knowledge is the most important thing in shaping everyone's behaviour, patient knowledge about diabetes mellitus is the most appropriate supporting factor in helping patients manage diabetes throughout their lives, so the more patients learn about their disease, the more they will understand how to change their behaviour properly. Health behaviour includes three aspects: disease prevention behaviour, health promotion behaviour, and nutrition behaviour (food and drink). These three behaviours must be supported by good knowledge (Notoatmodjo, 2012).

The patient's knowledge about diabetes mellitus is a tool that can help sufferers carry out the management of diabetes throughout their lives so that the more and better their knowledge about diabetes mellitus and the sufferer understand about the disease, the more diabetics can understand how to change their behaviour (Mulyani et al., 2023)

Dietary habits

Diabetes is a major public health problem emerging as a pandemic. The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and burned. Physical activity is one of the mainstay clinical interventions for preventing metabolic diseases, and dietary habits are the primary factor for the rapidly rising incidence of DM. Reducing and maintaining a healthy weight, reducing energy intake, and food intake high in vegetables, fruit, whole grains, legumes, nuts, and dairy products are core management parts. We performed a narrative literature review, a manual search of reference lists of included articles, and relevant reviews. The primary purpose of this review was to discuss the role of psychosocial factors and diet in the control of type

II Diabetes (Rajput et al., 2022)

If a person's diet contains much sugar, consumes fast food, and too many carbohydrates, and consumes foods processed by frying excessively, indirectly consuming high fat intake causes fat accumulation and will inhibit the pancreas from carrying out the insulin secretory function. Insulin is inhibited blood sugar levels in the body will increase which will later become diabetes mellitus (Oktavia et al., 2022). Lifestyle management, such as physical activity, diet, medication, and checking and controlling blood sugar is a strategic effort to reduce the risk of advanced complications in DM patients. In long-term management, it is important for patients to actively participate in controlling through participation in education, diet planning, physical activity and insulin drugs (Perkeni, 2015)

Age

Age has a strong contribution to type 2 diabetes mellitus because of increasing age, the risk of developing type 2 diabetes mellitus will increase, and the aging process can result in changes in the anatomy and physiology, and biochemistry of the body, one of which is decreased function of the pancreas in producing insulin and can cause insulin resistant (Perkeni, 2015)

Amongst middle-aged and older adults, the rising prevalence of T2DM, hypertension, and other conditions that comprise the metabolic syndrome is a global health epidemic, mainly attributed to sedentary lifestyles, poor diet, and lack of exercise. The rising prevalence of type 2 diabetes (T2DM) and hypertension in older adults, and the deleterious effect of these conditions on cerebrovascular and brain health, is creating a growing discrepancy between the "typical" cognitive aging trajectory and a "healthy" cognitive aging trajectory. These changing health demographics make T2DM and hypertension important study topics in their own right, and warrant attention from the cognitive aging neuroimaging research perspective. Without adequate screening, the inclusion of individuals with T2DM or hypertension in "healthy" samples may introduce unwanted variability and bias to brain and/or cognitive measures and increase the potential for error (Meusel et al., 2014).

Empirical Review

Empirical review Research has shown that patients with good self-management behaviour have a lower risk of complications and a higher quality of life (Emery et al., 2019). This philosophical problem is critical because it affects the theory that can be used, the attitude of health providers in providing education and care (knowledge, affective, and behavioural), and every material and interaction in the management of diabetes mellitus patients (Kalra, Baruah and Kalra, 2017). A community-based cross-sectional study was conducted to determine the knowledge and identify associated factors of the non-diabetic adult community members regarding diabetes mellitus in Gondar city. The conclusions were that 294 (51.4%) non-diabetic adult community members had good knowledge of diabetes mellitus. A significant number of study participants (9.6%) were unaware of diabetes mellitus. The odds of good knowledge regarding diabetes mellitus among study participants who had previous training on diabetes mellitus were five times greater than the odds of good knowledge for study subjects with no history of training on diabetes mellitus. Only about half the non-diabetic community in Gondar city had good knowledge regarding diabetes mellitus. Previous training on diabetes mellitus, educational status and monthly family income and being male were the factors associated with good knowledge of participants about diabetes mellitus (Alemayehu et al., 2020).

RESEARCH METHOD

This type of analytic survey research uses a cross-sectional design. The population in this

study were patients who visited the diabetes mellitus polyclinic because the incidence of diabetes mellitus at the Pancoran Mas District Health Center, Depok, is the highest compared to the existing health centres in all the working areas of the Depok City Health Service. The research was conducted in June-September 2022 at the Community Health Center (CHC) of Pancoran Mas District, Depok. The number of samples was 107 people out of the 3100 patients with diabetes mellitus. The Slovin formula was used to calculate the sample size and found 107 people as the sample in this study. Data was collected using a questionnaire, and first tested the validity and reliability of the questions in the questionnaire with a Cronbach's Alpha value = 0.987, and the sampling technique used accidental sampling. The variables in this study were knowledge, diet, and age group obtained through filling out questionnaires and interviews and categorized by cut-off point. While the diabetes mellitus variable was obtained from the health centre medical record data and categorized by physicians' diagnosis. Data analysis used the chi-square test and Multiple Logistic Regression test.

FINDINGS AND DISCUSSION

Based on the results of the univariate analysis of 107 patients who visited the Community Health Center (CHC) of Pancoran Mas District Depok, the following results were obtained :

Table 1. Recapitulation of Univariate Analysis

Variable	n	%
Diabetes Mellitus		
Diabetes	24	22,4
Not diabetic	83	77,6
Knowledge		
Not good	12	11,2
Good	95	88,8
Diet		
Not good	51	47,7
Good	56	52,3
Age group		
≥ 45 yo	23	21,5
< 45 yo	84	78,5

Based on Table 1, it can be seen that most of the patients did not suffer from diabetes mellitus as much as 77.6% while those who suffered from diabetes mellitus as much as 22.4%. In the knowledge variable, 88.8% of patients had good knowledge, while 11.2% had poor knowledge of diabetes mellitus. For the patient's eating pattern, 52.3% had a good diet, and 47.7% of patients had a poor eating pattern, while in the age group, most of the patients aged <45 years reached 78.5%, and patients aged > 45 years there were as many as 21.5%.

In Table 2, it can be concluded that the results of the recapitulation of bivariate analysis prove that there is a relationship between the variables of knowledge, eating patterns, and age groups on the incidence of type 2 diabetes mellitus at the at the Community Health Center (CHC) Pancoran Mas District, Depok. Whereas, through Table 3, it can be concluded that the variable that is most dominant in the incidence of type 2 diabetes mellitus is the diet variable with an OR value of 4.290, meaning that patients whose eating habits are not good to have a 4 times chance of being at risk of developing type 2 diabetes mellitus compared to patients who have a good diet.

Table 2. Summary of Bivariate Analysis Results

Variable	Diabetes Mellitus				*P value*
	Diabetic		Not Diabetic		
	N	%	N	%	
Knowledge					
Not good	8	66,7	4	33,3	0,001
Good	16	16,8	79	83,2	
Diet					
Not good	19	37,3	32	62,7	0,001
Good	5	8,9	51	91,1	
Age group					
≥ 45 yo	11	47,8	12	52,2	0,003
< 45 yo	13	15,5	71	84,5	

Table 3. Final Modelling Multivariate Analysis Results

Variable	P-Value	OR	95% CI	
			Lower	Upper
Knowledge	0,073	3,89	0,88	17,19
Dietary Habit	0,014	4,29	1,35	13,66
Age group	0,033	3,51	1,11	11,16

a. Relationship Between Knowledge and Diabetes Mellitus

The results of this study prove that patients' knowledge level about diabetes mellitus at the CHC Pancoran Mas District, Depok is mostly good knowledge, and the results of bivariate analysis prove that knowledge is related to the incidence of type 2 diabetes mellitus. Knowledge is the most important thing to shape everyone's behaviour people who have good knowledge will find it easier to control their blood sugar levels so that it is easier to understand what needs to be controlled and can motivate patients to control their blood sugar levels so that they are under control and no complications occur (Indirawaty et al., 2021). As well as the results of research conducted by Sohorah (2022) found that there is a relationship between knowledge and eating attitudes in people with diabetes mellitus, meaning that patients who have good knowledge will find it easier to control their eating patterns compared to patients who are knowledgeable enough (Sohorah, 2022)

Diabetes is a dangerous disease. People must comprehend how diabetes impacts one's wellness and the treatments available. Even if someone is feeling well now, it is crucial to understand how to deal effectively with diabetes to be healthy. A diabetes course is an important aspect of the care you should get as part of your treatment. Improving your knowledge of diabetes puts you in control and could transform your life. We can develop an effective way to gain more knowledge about managing diabetes to prevent or delay complications and manage knowledge by delivering a strategy to cover poor knowledge. The results of this study and based on previous theory and research can be concluded that although some poor knowledge was identified, most of the patient's knowledge of diabetes mellitus was good. This situation is possible because of easy access to information about diabetes mellitus obtained by diabetes mellitus patients, both from social media and in health care facilities, so it will indirectly increase patient knowledge. Directly later, diabetes

mellitus sufferers will find it easier to control their blood sugar levels and maintain their diet so that people with diabetes mellitus can maintain a good quality of life.

b. The Relationship Between Diet and Diabetes Mellitus

This study proves that half of the patients eat well, and diet is the most dominant variable in the incidence of diabetes mellitus. This research is in line with research conducted by Oktavia et al. (2022). People who live a lifestyle with certain eating patterns will affect their blood sugar levels. If they consume a lot of sugar, fast food, high carbohydrates, and processed frying food, excessively indirectly consuming high fat intake causes fat accumulation and will inhibit the pancreas from carrying out its insulin secretory function; if inhibited, insulin secretion causes blood sugar levels to increase diabetes mellitus (Oktavia et al., 2022). The results of a study conducted by Tarihoran, 2022 also proved that respondents with wrong eating patterns are 9.5 times at risk of developing diabetes mellitus compared to respondents who eat right. Irregular eating patterns and frequent consumption of sweet foods can trigger diabetes mellitus (Tarihora, 2022). The theory put forward by Waspadji (2018) is that food factors cause type 2 diabetes mellitus. Consuming food with high carbohydrates, fats, and proteins will harm the body. People who consume foods that contain high carbohydrates, such as chocolate, ice cream, and biscuits, have the potential to get diabetes mellitus, therefore limit consumption of white rice, pasta, soda, alcohol, and foods that contain sweeteners or excess sugar (Waspadji, 2018).

The results of this study, theory, and previous research can be concluded that diet is a risk factor for type 2 diabetes mellitus, lifestyle changes such as consuming instant or fast foods that contain high sweeteners or sugar will increase blood sugar levels in the body that it can increase blood sugar levels in the body risk of developing type 2 diabetes mellitus. Health care costs twice as much for people with diabetes as those who do not have diabetes. As a result, some people with diabetes often have to choose whether to treat their diabetes or put food on the table. To save money, people may consume whatever food they can afford. This can be dangerous and can lead to severe diabetes-related complications. A diet with plenty of vegetables, fruits, and lean proteins is essential for diabetes management. However, some of these foods can cost more than foods that are high in calories but low in nutrition. While lower nutritional foods can cost less and provide plenty of calories, they can cause frequent spikes in blood sugar levels (hyperglycemia), increasing the risk of diabetes-related complications like nerve damage or vision loss. Some people with diabetes may only be able to afford enough food to eat once a day, making it hard to manage their diabetes. Skipping meals can increase the risk of hypoglycemia (low blood sugar) and can be dangerous.

c. Relationship Between Age and Diabetes Mellitus

This study proves that most patients are <45 years old, and the bivariate analysis results prove a relationship between age and type 2 diabetes mellitus. Even though most age groups were younger, diabetes proportions were dominated by the older age group. Older age could lead to conditions more susceptible to experiencing several medical issues, including high blood pressure and high cholesterol. This might make it more difficult to keep diabetes under control. Diabetes, in turn, can lead to other health issues, such as heart disease. Hypoglycemia, or low blood sugar, is more frequent among older diabetic persons. According to the Indonesian Endocrinology Association (Perkeni, 2021), One of the risk factors for diabetes mellitus is age. As you get older, the risk of glucose tolerance will increase, especially at the age of over 45 years (Perkeni, 2021). This is evidenced by the

results of research conducted by Oktavia (2022), Komariah and Rahayu (2020), and Dafriani (2017), stated that diabetes mellitus occurs more frequently at older ages because, at old age, the ability of the pancreas to produce insulin will decrease. Likewise, the results of research conducted by Renata (2019) stated that age affects the incidence of diabetes type 2 mellitus due to the aging process, so there is a decrease in activity and other factors such as stress and the presence of other diseases (Kabosu et al., 2019). This study also aligns with the results of research conducted by Pahlawati & Nugroho (2019). So, it is clear that age group was a risk factor for type 2 diabetes mellitus. The older age group become more risk to type 2 diabetes mellitus compared to the young age group.

CONCLUSIONS

The overall results of this study have answered all the objectives of this research. Knowledge, dietary habits and age group are related to the incidence of type 2 diabetes mellitus, and dietary habits are the most dominant risk factor for the occurrence of type 2 diabetes mellitus, as also the amount and type of food consumed by patients with diabetes mellitus. The limitations of this study are that there are still many variables that cause diabetes that has not been studied, such as nutritional knowledge, age onset, and education level. The results focus on knowledge, diet, age group, and dietary habits; the researcher only asks for common knowledge about diabetes mellitus without nutritional knowledge. Dietary habits only ask what foods are consumed, so they cannot describe in detail the amount of nutrient content they eat and might bias about what time and amount of food. Suggestions for future research should be to use a case-control or experimental research design to clarify the specific knowledge and proper diet used to prevent type 2 diabetes mellitus by comparing two groups.

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