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Determinants of diabetes in prolanis patients

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A B S T R A C T

Diabetes is a major health problem because nearly half a billion people live with diabetes worldwide. The purpose of this study was to analyze the determinants of diabetes in prolanis patients in the working area of Tigapanah Public Health Center, Karo district. This research is an analytical research. The population of this study were 72 people and the number of samples was 42 people. Data collection was carried out using a questionnaire and then analyzed by univariate, bivariate, and multivariate. The chi-square test showed family history (p-value = 0.021), diet (p-value = 0.009), physical activity (p-value = 0.006), knowledge (p-value = 0.015). The dominant independent variable was diet (p-value = 0.010 (p <0.025); POR = 1.618; CI = 1.49 – 1.79). The conclusion of the study is that there is a relationship between family history, diet, physical activity, knowledge and diabetes mellitus. Suggestions for respondents to be able to adopt a healthy and balanced diet.

Kata kunci:

Aktivitas Fisik
Diabetes Mellitus
Pengetahuan, Pola Makan
Riwayat Keluarga

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A B S T R A K

Diabetes merupakan masalah kesehatan utama karena hampir setengah miliar orang hidup dengan diabetes di seluruh dunia. Tujuan penelitian ini adalah untuk menganalisis determinan diabetes pada pasien prolanis di wilayah kerja puskesmas Tigapanah kabupaten Karo. Penelitian ini adalah penelitian analitik. Populasi penelitian ini sebanyak 72 orang dan jumlah sampel sebanyak 42 orang. Pengumpulan data dilakukan dengan menggunakan kuesioner kemudian dianailisis secara univariat, bivariat, dan multivariat. Uji chi-square menunjukkan riwayat keluarga (p-value = 0.021), pola makan (p-value = 0.009), aktivitas fisik (p-value = 0.006), pengetahuan (p-value = 0.015). Variabel independen yang dominan adalah pola makan (p- value = 0.010 (p < 0.025); POR = 1.618; CI = 1.49 – 1.79). Kesimpulan dari penelitian adalah ada hubungan riwayat keluarga, pola makan, aktivitas fisik, pengetahuan dengan penyakit diabetes mellitus. Saran agar responden mampu menerapkan pola makan sehat dan seimbang.

INTRODUCTION

Diabetes mellitus is a disease characterized by an increase in blood sugar levels due to disturbances in the metabolic system in a person's body. This occurs due to the failure of the pancreas to produce the hormone insulin as needed. Diabetes mellitus is a degenerative disease, due to the structure of tissues and organs whose function will decrease from time to time due to a person's lifestyle. Today's lifestyle can be seen that the majority of people consume fast food, because it is considered more delicious

and practical, besides that it is also caused by a lack of physical activity (Suiraoka, 2012).

If blood glucose levels increase, it can cause serious damage to blood vessels, heart, eyes, kidneys, and nerves. Diabetes is divided into two types, namely type 1 diabetes and type 2 diabetes. Type 1 diabetes is a chronic condition in which the pancreas produces little or no insulin on its own. While type 2 diabetes is when the body becomes resistant to insulin or does not make enough insulin. Type 2 diabetes is the most common type of diabetes in adults. In the last three decades the prevalence of type 2 diabetes has increased drastically in countries around the world (WHO, 2021).

The International Diabetes Federation (IDF) in 2019 reported that diabetes is a major health problem that has reached an alarming level of nearly half a billion people living with diabetes worldwide. In 2019, an estimated 463 million people have diabetes and this number is projected to reach 578 million in 2030, and 700 million in 2045. Two-thirds of people with diabetes live in urban areas and three out of four are of productive age. More than four million people aged 20-79 years are expected to die from diabetes-related causes in 2019. The number of children and adolescents (i.e. up to 19 years) living with diabetes is increasing every year and an estimated 136 million people over 65 years have diabetes, and the prevalence of diabetes in this age group varies significantly (IDF, 2019). Currently diabetes mellitus is the third deadly disease in Indonesia after stroke and heart disease. In the next 10 years the number will continue to increase two to three times in Indonesia. According to the IDF, Indonesia is ranked 7th among the 10 countries with the most sufferers, namely around 10.7 million people. The results of Riskesdas in 2018 showed that the prevalence of diabetes mellitus in Indonesia based on a doctor's diagnosis at the age of ≥ 15 years was 2%. This shows that there is an increase when compared to the prevalence of diabetes mellitus from Riskesdas results, which is 1.5%. And based on the results of blood sugar checks, the prevalence of diabetes mellitus in 2013 was 6.9% and there was an increase in 2018 to 8.5%. This figure shows that around 25% of people with diabetes mellitus know that they have diabetes (Kemenkes, 2020).

Based on the 2018 Riskesdas data, the prevalence of diabetes mellitus by province in Indonesia in 2018 showed DKI Jakarta province as the province with the highest cases of diabetes mellitus, which was 3.4%, followed by East Kalimantan province, which was around 3.1%, and DI Yogyakarta, which was 3. .1%. The prevalence of diabetes mellitus in North Sumatra in 2013 was 1.8%, then there was an increase in 2018, which was 2%. This shows that in Indonesia every year the number of people with diabetes mellitus is increasing due to the current lifestyle which is very efficient and effective. Unhealthy lifestyles such as irregular eating patterns, very little physical activity, etc. (Ministry of Health, 2020).

Based on research (Etika & Monalisa, 2016) regarding Family History of Diabetes Mellitus using the correlational analytic research method with the method used is cross-sectional and using a sampling technique carried out by means of purposive sampling shows the results that there is a significant relationship between family history and the incidence diabetes mellitus with a coefficient correlation value of r = 0.679, this shows that there is a strong relationship with a positive direction. The prevalence of type 2 diabetes is increasing at an alarming rate. Because type 2 diabetes is a complex condition involving a combination of genetic and environmental factors (Harrison et al. 2003)

Diabetes mellitus is a complex condition that can result in environmental and multigenetic interactions. Diabetes mellitus genetic factors can make an ethnicity have a higher risk of diabetes than other ethnicities. This is influenced by psychosocial factors such as social support, self-efficacy, stress and depression which are felt to affect one's self-care and quality of life. Environmental factors can also influence, starting from food insecurity, social cohesion and discrimination can affect self-care and the psychological component of one's quality of life (Walker et al. 2016).

Based on research (Eltrikanawati, 2020) states that there is a significant relationship between diet and diabetes mellitus with a p value = 0.000. The habit of eating unhealthy food and supported by a lack of physical activity is the main cause of complications in people with diabetes mellitus. Therefore, it is necessary to regulate and maintain a diet early on, especially if you have a family history of diabetes mellitus (Sami et al. 2020). In the course of the disease, DM can arise due to both macro and micro. Macro consequences including ketoacidosis, hyperosmolar nonketotic coma and toxic acidosis can be overcome with appropriate treatment. Meanwhile, micro effects arise after several years such as microangiopathy, neuropathy, nephropathy, retinopathy, macro angiopathy cardiovascular, and peripheral vascular (Smeltzer & Bare, 2008).

Based on research (Arania et al. 2021) the results showed that there was a relationship between work and physical activity with the incidence of diabetes mellitus. Of the 126 respondents suspected of having diabetes mellitus, 93 respondents had diabetes mellitus (73.8%). Of the 93 respondents who had diabetes mellitus, 47 respondents had low physical activity (94.0%) with a value (p=0.000) and as many as 42 respondents (89.4%) did not have a job with a value (p=0.002) . Jobs that use light physical activity will result in a lack of burning energy in the body so that the body will have excess energy and will accumulate to form fat which will result in obesity over time where obesity is one of the triggers for diabetes mellitus.

Based on research (Arania et al. 2021) the results showed that there was a relationship between work and physical activity with the incidence of diabetes mellitus. Of the 126 respondents suspected of having diabetes mellitus, 93 respondents had diabetes mellitus (73.8%). Of the 93 respondents who had diabetes mellitus, 47 respondents had low physical activity (94.0%) with a value (p=0.000) and as many as 42 respondents (89.4%) did not have a job with a value (p=0.002) . Jobs that use light physical activity will result in a lack of burning energy in the body so that the body will have excess energy and will accumulate to form fat which will result in obesity over time where obesity is one of the triggers for diabetes mellitus. One of the efforts made by the government in tackling Diabetes Mellitus is by implementing a chronic disease management program (prolanis). PROLANIS is a health service system and a proactive approach that is carried out in an integrated manner involving Participants, Health Facilities and BPJS Health in the context of health care for BPJS Health participants who suffer from chronic diseases to achieve optimal quality of life with effective and efficient health care costs. The aim of Prolanis is to encourage participants with chronic diseases to achieve optimal quality of life with an indicator of 75% of registered participants visiting the First Level Health Facility having "good" results on specific examinations for Type 2 DM and Hypertension according to the relevant Clinical Guidelines so as to prevent disease complications (BPJS) Health, 2017).

The Tiga Panah Health Center has been running PROLANIS since 2017. PROLANIS activities at the Tiga Panah Health Center have been carried out, namely medical consultations, health monitoring through supporting examinations and routine drug services with all PROLANIS costs being borne by BPJS Health. Based on the initial survey that was carried out, data was obtained from the results of the recapitulation for non-communicable diseases at the Tiga Panah Health Center for the number of people with Diabetes Mellitus in 2021 as many as 152 cases. Where most of the registered Diabetes Mellitus sufferers are active Prolanis participants who run the program every month. Based on the number of cases above, it was found that the results of fasting blood sugar levels above 200 mg/dl occurred in the age group over 45 years. The villages in

Tigapanah District are located in a cold climate, so the people's habit of eating a lot of rice is added with sweet tea or milk tea. Most of the area's livelihoods are farming, so eating is often considered a source of energy to work in the fields, regardless of the number of calories in and out. Based on the results of observations, the people of the area often eat processed meat such as grilled meat which is commonly found in Karo restaurants. Karo's typical processed meat generally triggers to eat a lot because it tastes good. On the other hand, there is also one habit, namely the habit of relaxing in a coffee shop while playing chess. Usually at that time they drank coffee, sweet tea, milk and accompanied by bread. Diabetes Mellitus is a health problem that has reached an alarming level, nearly half a billion people suffer from diabetes mellitus worldwide. Currently diabetes mellitus is the third deadly disease in Indonesia after stroke and heart disease. Efforts made by the government in tackling Diabetes Mellitus by implementing the PTM POSBINDU program and implementing a chronic disease management program (prolanis). Prolanis' goal is to encourage participants with chronic illnesses to achieve optimal quality of life. Therefore this study was conducted to collect, critically evaluate, integrate, summarize, in order to draw conclusions about the factors associated with diabetes in prolanis patients.

Currently diabetes mellitus is the third deadly disease in Indonesia after stroke and heart disease. The government's efforts to tackle Diabetes Mellitus are by implementing the POSBINDU PTM program and implementing a chronic disease management program (prolanis). Prolanis' goal is to encourage participants with chronic illnesses to achieve optimal quality of life. Therefore this study was conducted to collect, critically evaluate, integrate, summarize, in order to draw conclusions about the factors associated with diabetes in prolanis patients. This condition is inseparable from the karo culture which is often carried out by the people in the area, namely weddings and work parties where at this event generally serve food made from processed meat and a lot of food. Based on the description above, researchers are interested in examining the determinants of diabetes in Prolanis patients..

METHODS

This research is an analytic survey with a cross sectional design. The research was conducted at the Tiga Panah Health Center in Karo Regency from January to August 2022. The population for this study were all Prolanis patients in the working area of the Health Center with a total of 72 respondents. Sampling technique in purposive sampling research. The sample size was calculated using the Slovin formula, totaling 42 people. Data collection by means of observation and document study. The primary data in this study were obtained from interviews using a questionnaire to respondents who visited the health center. The data that has been collected was analyzed using Univariate, Bivariate, and Multivariate.

RESULTS AND DISCUSSION

Tigapanah Health Center is located in Tigapanah District. Tigapanah Health Center is a First Level Health Facility (FKTP). The Tigapanah area is located at an altitude of 1,192-1,376 meters above sea level, belonging to a tropical climate area with an area of 8.78% of the total area of Karo Regency. The Tigapanah Health Center working area consists of 21 villages with a population of 28,788 people.

Table 1. Frequency Distribution of Prolanis Patient Characteristics

Characteristics of Respondents	Frequency	Percentage (%)
Umur		
Not at risk of DM (< 45 years)	30	71.4
At risk for DM (≥ 45 years)	12	28.6
Sex		
Man	8	19.0
Woman	34	81.0
Family History		
Yes	31	73.8
No	11	26.2
Dietary habit		
No Risk	16	38.1
At risk	26	61.9
Physical Activity		
No Risk	17	40.5
At risk	25	59.5
Knowledge		
Good	15	35.7
Not good	27	64.3

Based on table 1, it is known that the age characteristics of the Prolanis patient, the majority of patients <45 years, are not at risk of DM, as many as 30 people (71.4%); the majority are women, 34 people (81.0%); the majority had a family history of 31 people (73.8%); the majority had a risky eating pattern, 26 people (61.9%); the majority of physical activity, 25 people (59.5%); the majority of knowledge is not good, 27 people (64.3%).

Tabel 2. Relationship of Family History with Diabetes Mellitus

Riwayat Keluarga	Diabetes Mellitus				Total		*P- value*
	Yes		No				
	N	%	N	%	N	%	
Yes	22	71,0	9	29,0	31	100	0,021
No	6	54,5	5	45,5	11	100	

Based on table 2, it is known that of the 31 people who had a family history, the majority came from DM patients, 22 people (71.0%) and the minority came from patients without DM, 9 people (29.0%). Statistical test results showed p-value = 0.021 ($p<\alpha$) α=0.05, this shows that there is a relationship between family history and diabetes. Genetics can be expected to have an important role in the process of the emergence of insulin resistance. A person suffering from diabetes mellitus can be influenced by family history or heredity (Kaban 2007).

These factors have the possibility of giving birth to children who can develop diabetes mellitus. The risk of a child having a history of type 2 diabetes mellitus is 15% if one of the child's parents has diabetes mellitus. If both parents suffer from diabetes mellitus, the child's risk increases to 75%. Children whose mothers have diabetes mellitus have a 10-30% greater risk than those whose fathers have diabetes mellitus. This is due to a decrease in the gene when the child in the womb is bigger than the mother. if a sibling suffers from diabetes mellitus, the risk of the child suffering from diabetes mellitus is 10% and 90% if the sufferer is an identical twin (Diabetes UK, 2010).

Tabel 3. The Relationship between Diet and Diabetes in Prolanis Patients

Dietary habit	Diabetes Mellitus				Total		*P- value*
	Yes		No				
	N	%	N	%	N	%	
No Risk	12	75,0	4	25,0	16	100	0,009
At Risk	16	61,5	10	38,5	26	100	

Based on table 3 above, it is known that of the 26 people who have a risky diet, the majority came from DM patients, 16 people (61.5%) and a minority of patients without DM, 10 people (38.5%). Statistical test results showed p-value = 0.009 (($p<\alpha$) α=0.05, meaning that there is a relationship between diet and diabetes in Prolanis patients. In the midst of today's society, there has been a shift in the diet that used to be natural to now a modern diet. Today's society chooses food for daily consumption and an unhealthy way of life, which can lead to degenerative diseases, one of which is diabetes mellitus. During leisure time, people often gather in coffee shops while playing chess, while drinking coffee, sweet tea, milk and accompanied by bread. In addition, the Karo culture often carries out traditional parties which generally serve food made from processed meat. The community pays little attention to the need to regulate a healthy diet and balanced nutrition for each meal. The cold climate of the Tigapanah village area also triggers the community to eat more, even people who have farming livelihoods think that eating in large quantities is an additional energy to work in the fields. Dafriani's research (2017) showed that there was a relationship between diet and the incidence of DM in Padang. Patients with irregular eating patterns will have higher blood sugar levels. The lifestyle of today's society often consumes foods high in fat, sugar and carbohydrates which can lead to an increase in glucose levels in the blood. Many people today are very inclined to consume food excessively, and instant foods are popular, which can cause an increase in blood glucose levels. The emergence of changes in the pattern of this disease is related to the changing way of life of the community (Suyono, 2007). Daily intake of nutrients is an important factor in the onset of diabetes mellitus in a person. With balanced nutrition, one can avoid diabetes mellitus, so it is necessary to adopt a healthy and balanced diet, and maintain an ideal body weight (Yulianto, 2014).

Table 4. Relationship between Physical Activity and Diabetes in Prolanis Patients

Physical Activity	Diabetes Mellitus				Total		*P- value*
	Yes		No				
	N	%	N	%	N	%	
No Risk	13	76,5	4	23,5	16	100	0,006
At Risk	15	60,0	10	40,0	26	100	

Based on table 4 above, it is known that of the 25 people with less physical activity, the majority were DM patients, 15 people (60.0%). The results of statistical tests showed p-value = 0.006 ($p <\alpha$) α = 0.05, meaning that there is a relationship between physical activity and diabetes in Prolanis patients. When a person exercises, the muscles use the glucose in the muscles and if the glucose is reduced, the muscles will fill the void by taking glucose from the blood. This results in a decrease in blood glucose thereby increasing the control of glucose in the blood. Cycling, jogging and also swimming are aerobic exercises where the frequency of these exercises should be done 3 to 4 times per week (Irwan 2010).

The majority of people in Tigapanah sub-district spend more time working as farmers. This activity is carried out from morning to evening and there is an idea that working in the fields is also a physical activity. This makes people rarely provide special time for physical activity, at least walking or jogging. Apart from that, it is customary for the people, especially fathers or adult men, when they have time to relax after finishing work in the fields, they prefer to sit back and relax in a coffee shop while enjoying coffee or milk tea. The community does not have a specific time for physical activity, maybe because they are at a high altitude so the weather is always cold, this makes people reluctant to do physical activity. The effect of people's habit of not doing enough physical exercise results in no burning of calories and continuous accumulation of glucose.

The study conducted by Sari & Purnama (2019), showed that there was a relationship between physical activity and the incidence of diabetes mellitus. Physical exercise will help the process of burning certain calories in the body, excess calories in the body will be reduced (Afriwardi 2011).

A study conducted by Silalahi (2019) showed that there was a relationship between knowledge about type 2 diabetes mellitus and prevention of type 2 diabetes mellitus among Muhammadiyah 7 high school students in Surabaya. Knowledge will help society more easily towards a better direction (Achmadi 2013).

Table 5. Relationship between Knowledge and Diabetes in Prolanis Patients

Knowledge	Diabetes Mellitus				Total		*P- value*
	Yes		No				
	N	%	N	%	N	%	
Good	11	73,3	4	26,7	15	100	0,006
Not Good	17	63,0	10	37,0	27	100	

Berdasarkan tabel 5 di atas, diketahui dari 27 pasien yang mempunyai pengetahuan kurang, mayoritas berasal dari pasien DM, 17 orang (63.0%). Hasil uji statistik menunjukkan p-value = 0.015 (p<α) α=0.05, hal ini menunjukkan ada hubungan pengetahuan dengan Penyakit Diabetes pada Pasien Prolanis. Most of the people in Tigapanah sub-district who were diagnosed with Diabetes Mellitus already have knowledge of diabetes mellitus. They do not have the awareness to behave healthy every day.This behavior can be seen from the habits of the people who are still unable to manage a balanced diet, do not regularly take medicine or do not regularly take medication to the Tigapanah Health Center. Silalahi's research (2019) showed that there was a significant relationship between knowledge about type 2 diabetes mellitus and prevention of type 2 diabetes mellitus in Muhammadiyah 7 High School students, Surabaya with a p-value = 0.0001. Individuals with higher education can also be expected to have broad knowledge, but conditions like this are not absolute. The existence of a knowledge base will make a person's behavior last longer. Knowledge will be able to help society more easily towards a better direction (Achmadi 2013). Behavior to have the behavior to prevent diabetes can be influenced by several factors, one of which is one's knowledge because with the knowledge one has, one can know a lot of information, including information about what diabetes mellitus is, how to treat and prevent diabetes mellitus, and others (Conceicao 2017). The influence of family history, diet, physical activity, knowledge of diabetes mellitus in Prolanis patients obtained p-value <0.25, so that these four variables can be forwarded for multivariate analysis.

Table 6. Effect of Family History, Diet, Physical Activity, Knowledge on Diabetes in Prolanis Patients

Variabel	*p-value*	POR	Lower 95% CI	Upper
Riwayat Keluarga	0.023	1.491	1.60	1.88
Pola Makan	0.004	1.875	1.47	1.77
Aktivitas Fisik	0.012	2.167	1.44	1.75
Pengetahuan	0.010	1.618	1.49	1.79

The results of the analysis of family history variables obtained p-value = 0.023 (p <0.025); POR = 1,491; CI = 1.60 – 1.88, dietary pattern variable obtained p-value = 0.004 (p <0.025); POR = 1,875; CI = 1.47 – 1.77, the physical activity variable obtained p-value = 0.012 (p <0.025); POR = 2.167; CI = 1.44 – 1.75, the knowledge variable obtained p-value = 0.010 (p <0.025); POR = 1.618; CI = 1.49 – 1.79. The most dominant factor influencing diabetes mellitus in Prolanis patients is diet, which means that eating patterns that are not good are 1,875 times the risk of developing diabetes mellitus.Hasil analisis terhadap variabel riwayat keluarga didapatkan nilai *p-value* = 0.023 (*p* < 0.025); POR = 1.491; CI = 1.60 – 1.88, variabel pola makan didapatkan nilai *p-value* = 0.004 (*p* < 0.025); POR = 1.875; CI = 1.47 – 1.77, variabel aktivitas fisik didapatkan nilai *p-value* = 0.012 (*p* < 0.025); POR = 2.167; CI = 1.44 – 1.75, variabel pengetahuan didapatkan nilai *p-value* = 0.010 (*p* < 0.025); POR = 1.618; CI = 1.49 – 1.79. The most dominant factor affecting diabetes mellitus in Prolanis patients in 2022 is diet, meaning that an unhealthy diet has a risk of developing diabetes mellitus compared to other factors.

Dominant variables associated with diabetes in prolanis patients

The results of multivariate analysis showed that the most dominant factor in this study was diet (p-value = 0.004 (p <0.025); POR = 1.875; CI = 1.47 – 1.77). Poor diet has the potential to cause degenerative diseases. The eating habits of the people in Tigapanah sub-district consume too many sources of carbohydrates and fats so that there is an imbalance between consumption and energy needs. If this continues for a long time it can cause diabetes mellitus. The impact of irregular eating patterns can result in being overweight thereby inhibiting the work of the pancreas to carry out the function of insulin secretion which can increase blood sugar levels so that it has the potential to develop diabetes mellitus. Patients with diabetes mellitus must always manage their diet (diet) that is consumed daily because it can help sufferers improve their eating habits and prevent their calorie content (energy). If calorie input exceeds its use, if there are no other modifying factors, then this excess calorie will be directed to the body's energy storage, namely fat tissue. Therefore, an appropriate diet between calorie input and output is the key to preventing overweight and obesity, as well as diabetes. Foods that contain a lot of calories, such as foods that are high in fat content (cheese, ice cream, sweet pastries, syrups, jellies, rock sugar, preserved fruits, sweetened condensed milk, soft

drinks, fried foods, processed meats) is a common dietary component that leads to weight gain, obesity, and eventually diabetes (Bryer, 2012). Patients with diabetes mellitus can be repaired or maintained in good condition and reduce the possibility of complications, with the appropriate diabetes mellitus diet. In principle, people with diabetes mellitus should avoid foods that are quickly absorbed into blood sugar which are called simple carbohydrates but instead, people with diabetes mellitus are advised to consume complex carbohydrates, which contain more than one glucose chain (Irianto, 2014).

CONCLUSION

Based on the results and discussion in the study, the conclusion in this study is that there is a relationship between family history, diet, physical activity, knowledge and diabetes in Prolanis patients in the Working Area of the Tiga Panah Health Center, Karo Regency. The most dominant factor with the incidence of diabetes is diet.

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