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Analysis of Factors Associated with the Incidence of Diabetes Mellitus at Productive Age in the Work Area of the Lapadde Community Health Center, Parepare City

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ABSTRACT

Diabetes Mellitus is a non-communicable disease characterized by the body's inability to metabolize carbohydrates, fats and proteins which in turn leads to increased blood sugar levels. Diabetes mellitus (DM) is also a chronic disease that occurs because the pancreas cannot function properly. produce enough insulin (impaired insulin secretion) or when the body cannot effectively use the insulin it produces (insulin resistance). This study aims to determine the factors associated with the incidence of diabetes mellitus in productive age at the Lapadde Community Health Center, Parepare City. The type of research used was quantitative with a cross-sectional approach . The population in this study was the entire population of productive age (15-59) years in the working area of the Lapadde Community Health Center, Parepare City, totaling 26,168 people. The sample of this research is 100 people with accidental sampling technique . Data were processed using SPSS with the results of the chi-square test analysis obtained that there was a relationship between family history ($p=0.030$), diet ($p=0.000$), consumption of sweet drinks ($p=0.000$) and physical activity ($p=0.025$) with the incidence of diabetes mellitus in the productive age in the working area of the Lapadde Public Health Center, Parepare City. It is suggested that it is important to pay attention to a good diet, and sufficient exercise as well as an understanding related to the prevention of diabetes mellitus.

Keywords: D M , family history, diet.

INTRODUCTION

The World Health Organization reports that 70% of deaths in the world are caused by non-communicable diseases such as cardiovascular disease, chronic respiratory disease, cancer and diabetes mellitus ¹. Based on IDF data, the global prevalence of DM in 2019 is estimated at 9.3% (463 million people), increasing to 10.2% (578 million) in 2030 and 10.9% (700 million) in 2045 ¹.

Indonesia is ranked 7th among the 10 countries with the highest number of sufferers, namely 10.7 million. Indonesia is the only country in Southeast Asia on the list, so it can be estimated that Indonesia's contribution to the prevalence of diabetes cases in Southeast Asia ². Based on the results of the Riskesdes in 2018, the incidence of diabetes mellitus in people aged > 15 years and over is in Indonesia (6.9%). Several cities with a fairly high prevalence of diabetes mellitus include: Aceh (2.6%), West Sumatra (1.8 %), North Sumatra (2.3%) ³. The incidence of diabetes mellitus In South Sulawesi, it is still ranked second in non-communicable diseases after heart and blood vessel disease (PJPD), namely 15.79% ⁴.

According to the results of Riskesdas (2018), South Sulawesi province, the incidence of diabetes mellitus in the productive age group (15-59) is 10.41% ⁵. Based on data obtained from the Parepare City Health Service, the number of DM sufferers in Parepare City in 2020 was 933 cases, in 2021 it was 385 cases and in 2022 it was 4,464 cases. Based on data obtained at the Lapadde Community Health Center, Parepare City, the number of DM sufferers of productive age in 2020 was 49 cases, in 2021 it was 40 cases and in 2022 it was 741 cases. The productive age population is the population in the age range between 15-59 years. People of that age are considered capable of producing goods and services in the production process ⁶. This study aims to determine the factors associated with the incidence of diabetes mellitus in productive age at the Lapadde Community Health Center, Parepare City.

RESEARCH METHODS

This research uses quantitative methods, with a *cross sectional approach*. A research study with a *cross-sectional approach* is a research design that aims to analyze factors related to the incidence of diabetes mellitus in productive age ⁷. This research was carried out in the work area of the Lapadde Community Health Center, Parepare City. The population used is all people of productive age (15-59) years in the Lapadde Community Health Center working area of 26,168 people. The sample used was 100 people of productive age. This research uses an *accidental sampling technique* where the sampling technique is based on chance, that is, anyone who coincidentally/incidentally meets the researcher can be used as a sample, if it is deemed that the person who is accidentally met is suitable as a data source.

The research instruments are the tools used in the research, namely a questionnaire, a diabetes measuring tool called a glucometer or blood sugar check tool, as well as a 24-hour recall form, FFQ form, and physical activity form. The data collection method uses primary and secondary data. Data processing techniques used include *editing, coding, data entry, data cleaning*. The data analysis

technique uses hypothesis testing using univariate and bivariate analysis to assess the relationship or correlation between independent and dependent variables using *Chi-Square* and using the SPSS application. Interpreted by testing the hypothesis based on the level of significance (p =value), if the p value >0.05 then H_0 is accepted and H_a is rejected and vice versa.

RESULTS

Table 1. Distribution of Respondent Characteristics

Characteristics	n	%
Gender		
Man	47	47.0
Woman	53	53.0
Address		
Lapadde Village	63	63.0
Ujung Bulu Village	24	24.0
Ujung Sabbang Village	13	13.0
Age (years)		
< 20	3	3.0
20-30	35	35.0
>30	62	62.0
Work		
Civil servants	2	2.0
Teacher	5	5.0
IRT	32	32.0
Farmer	1	1.0
Self-employed	42	42.0
Student/Students	18	18.0
last education		
Never went to school	4	4.0
Elementary school/equivalent	9	9.0
Middle school/equivalent	19	19.0
High school/equivalent	50	50.0
S1	16	16.0
S2	2	2.0
Total	100	100.0

According to Table 1, the most dominant gender is female as many as 53 people (53.0%) while men are 47 people (47.0%). The respondents' addresses dominated Lapadde Village with 63 people (63.0%) and the fewest were Ujung Sabbang Village with 13 people (13.0%). The highest age characteristic was >30 years old, 62 people (62.0%), while the lowest was <20 years old, 3 people (3.0%). The most common occupation of respondents was self-employment as many as 42 people (42.0%), while the fewest were farmers as many as 1 person (1.0%). The highest number of respondents' last education was high school/equivalent as many as 50 people (50%), while the minimum was a master's degree as many as 2 people (2.0%) and there were also 4 people who had never been to school (4.0%).

Table 2. Distribution of Respondents Based on the Variables Studied In the Lapadde Community Health Center Working Area, Parepare City

Variables Studied	n	%
Has a family history		
Yes	22	22.0
No	78	78.0
Dietary habit		
<i>Energy intake</i>		

More	66	66.0
Enough	44	44.0
<i>Carbohydrate intake</i>		
More	54	54.0
Enough	46	46.0
<i>Protein intake</i>		
More	60	60.0
Enough	40	40.0
<i>Fat intake</i>		
More	59	59.0
Enough	41	41.0
Consume sweet drinks		
Often	56	56.0
Seldom	44	44.0
Physical activity		
Tall	28	28.0
Currently	29	29.0
Low	43	43.0
Total	100	100.0

According to Table 2, 22 people (22.0%) had a family history of DM, while 78 people (78%) did not. A total of 66 people (66.0%) had more energy. Respondents who had more carbohydrates were 54 people (54.0%). Respondents who had more protein were 60 people (60.0%). Respondents who had more fat were 59 people (59.0%). A total of 56 people (56.0%) often consumed sweet drinks. Meanwhile, 44 people (44.0%) rarely consume sweet drinks. Respondents who had high physical activity were 28 people (28.0%), while those who had moderate physical activity were 29 people (29.0%), and those who had low physical activity were 43 people (43.0%).

Table 3. Relationship between family history, eating patterns, consumption of sweet drinks, And Physical Activity with the Incidence of Diabetes Mellitus In the Lapadde Community Health Center Working Area, Parepare City

Variable	DM incident				Total		P
	DM		No DM		n	%	
	n	%	n	%			
Family history							
Yes	17	77.3	5	22.7	22	100.0	0.030
No	40	51.3	38	48.7	78	100.0	
Dietary habit							
<i>Energy intake i</i>							
More	55	96.5	1	2.3	56	56.0	0,000
Enough	2	3.5	42	97.7	44	44.0	
<i>Carbohydrate intake</i>							
More	54	94.7	1	2.3	54	54.0	0,000
Enough	3	5.3	42	97.7	46	46.0	
<i>Protein intake</i>							
More	53	93.0	7	16.3	60	60.0	0,000
Enough	4	7.0	36	83.7	40	40.0	
<i>Fat intake</i>							
More	52	91.2	7	16.3	59	59.0	0,000
Enough	5	8.8	36	83.7	41	41.0	
Consume sweet drinks							
Seldom	4	9.1	40	90.9	44	100.0	0,000
Often	53	94.6	3	5.4	56	100.0	
Physical activity							
Tall	10	35.7	18	64.3	28	100.0	0.018
Currently	17	58.6	12	41.4	29	100.0	

Low	30	69.8	13	30.2	43	100.0
Total	57	57.0	43	43.0	100	100.0

According to Table 3 regarding the relationship between family history, eating patterns, consumption of sweet drinks and physical activity with the incidence of diabetes mellitus in the Lapadde Community Health Center working area, it shows that the family history variable has $p=0.030$ ($p<0.05$), energy intake $p=0.000$ ($p<0.05$), carbohydrate intake $p=0.000$ ($p<0.05$), protein intake $p=0.000$ ($p<0.05$), fat intake $p=0.000$ ($p<0.05$), consumption of sweet drinks $p=0.000$ ($p<0.05$), and physical activity $p=0.018$ ($p<0.05$) which means there is a relationship between family history, diet, consumption of sweet drinks and physical activity with the incidence of diabetes mellitus.

DISCUSSION

Diabetes can occur due to a complex interaction between genetic tendencies and a person's unhealthy lifestyle behavior, thus strengthening the emergence of Diabetes Mellitus. This is proven by research by Rediningsih (2022) which has proven that people who have a family history of suffering from Diabetes Mellitus are predominantly inherited or inherited⁸. A family history of disease can identify someone at higher risk of developing a frequently occurring disease such as diabetes mellitus. By knowing a family history of disease, a person can take precautions and reduce the risk of experiencing a particular disease⁹.

Food plays an important role in increasing blood sugar levels. Eating excessively and exceeding the number of calories. If you put too much food into the body, it will be difficult for glucose to enter the cells and increase blood glucose levels¹⁰. Most respondents have a diet that consumes more without paying attention to the type of food they should consume. The type of food consumed by respondents, namely energy, carbohydrates, protein, fat, will have an effect on the incidence or occurrence of diabetes mellitus at the Lapadde Community Health Center, Parepare City.

The high calorie content of sweetened drinks can have a big impact on a person's daily calorie intake. If sweetened drinks are consumed excessively, they can increase the risk of developing diabetes mellitus¹¹. Excessive sugar consumption can cause insulin to become resistant, that is, it is unable to carry out its task in metabolizing sugar into energy, causing an increase in blood sugar levels, thereby increasing the risk of obesity and diabetes mellitus¹². Most respondents often consume excessive amounts of sweet drinks such as sweet tea, coffee, pop ice, boba etc. On average, respondents consume sweet drinks $>3-6x/week$, this can trigger diabetes mellitus due to frequent consumption of sweet drinks. This research is in line with research by Iga Dila (2018) that there is a relationship between consumption of sweet drinks and the incidence of diabetes mellitus¹³.

Lack of physical activity causes insulin to increase so that blood sugar levels decrease. In people who rarely exercise, the food substances that enter the body are not burned but are stored in the body as fat and sugar. The effect of physical activity or exercise is directly related to increasing the speed of muscle glucose recovery (how much the muscle takes up glucose from the bloodstream). When

exercising, muscles use glucose stored in the muscles and if glucose is low, muscles fill the gap by taking glucose from the blood. This will result in a decrease in blood glucose thereby improving blood glucose control. Lack of physical activity is an independent risk factor for chronic disease and is thought to cause overall mortality globally. In type II diabetes mellitus, exercise plays a role in regulating blood glucose levels¹⁴. On average, respondents have low physical activity, this is because many people do not exercise enough. Most of them choose to sit relaxed at home or at work, resulting in a lack of physical activity and causing food substances that enter the body not to be burned but instead to become fat and sugar. Regular physical exercise can control body weight, blood sugar levels, blood pressure, and most importantly, it can activate insulin production so that it works more efficiently. The main problem in type II diabetes mellitus is a lack of response to insulin (insulin resistance) so that glucose cannot enter the cells. Membrane permeability to glucose increases when muscles contract because muscle contraction has insulin-like properties. Therefore, during physical activity such as exercise, insulin resistance is reduced. Physical activity in the form of exercise is useful for controlling blood sugar and reducing weight in diabetes mellitus. Exercise or physical activity is an important part of treating diabetes sufferers. Exercise helps sufferers to increase insulin sensitivity, reduce the risk of heart problems, control body weight, and improve mental health¹⁴.

This research is in line with research by Purnama (2019) showing that there is a relationship between physical activity and the incidence of diabetes mellitus. Lack of physical activity causes insulin to increase so that blood sugar levels decrease. In people who rarely exercise, the food substances that enter the body are not burned but are stored in the body as fat and sugar. Someone who has low levels of fat in their body tends to have a lower risk of suffering from diabetes. So lack of physical activity makes the secretion system in the body run slowly. This results in excess body weight which can later lead to the onset of diabetes mellitus¹⁴.

CONCLUSIONS AND RECOMMENDATIONS

There is a relationship between family history ($p = 0.030$), diet ($p = 0.000$), consumption of sweet drinks ($p = 0.000$), and physical activity ($p = 0.018$) with the incidence of diabetes mellitus in the working area of the Lapadde Community Health Center, Parepare City.

The Lapadde Health Center in Parepare City is expected to provide routine education regarding risk factors for diabetes mellitus and routinely carry out DM *screening* in the community to prevent and control diabetes mellitus. People are expected to pay attention to their diet, exercise diligently to burn fat in the body, reduce excessive consumption of sweet drinks and often go to health services for routine check-ups. Future researchers are expected to conduct research with different variables, such as seeing whether there is a relationship between birth weight and gender on the incidence of diabetes mellitus.

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