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RISK FACTORS AFFECTING THE OCCURRENCE OF DIABETES MELLITUS (TYPE 2) AT SULTAN ISKANDAR MUDA HOSPITAL NAGAN RAYA DISTRICT

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Abstract

Diabetes Mellitus (type 2) is a metabolic disease characterized by an increase in blood sugar levels caused by a decrease in insulin secretion or impaired insulin function. The aim of the study was to determine the risk factors that influence the incidence of type 2 diabetes mellitus at the Sultan Iskandar Muda Hospital, Nagan Raya Regency. The method used is quantitative with a cross-sectional research design. The sample in the study was 77 people using a purposive sampling technique. The research instrument uses a questionnaire sheet. The research analysis used univariate and bivariate analysis with the chi square test. The results of the study based on bivariate analysis found that there was a relationship between age (p-value=0.000), hypertension status (p-value=0.043), obesity status (p-value=0.019), consumption of risky foods: sweet foods (p-value= 0.039), sweet drinks (p-value=0.003), fatty/cholesterol foods (p-value=0.002), seasonings (p-value=0.016), fast food (p-value=0.002) , physical activity (p-value=0.023), and there was no relationship between gender (p-value=0.102), family history (p-value=0.364) and the incidence of type 2 diabetes mellitus. This study found that age, sex, family history, hypertension status, obesity status, consumption of risky foods and physical activity are risk factors that influence the incidence of type 2 diabetes mellitus. Suggestions, it is expected that type 2 .

Keywords:***Diabetes mellitus, risk factors, Sultan Iskandar Muda Hospital.***

1. INTRODUCTION

The International Diabetes Federation (IDF) organization estimates that there are 463 million people aged 20-79 suffering from diabetes in the world in 2019 or 9.3% of the total population in that age group. Based on gender, IDF estimates that the prevalence of diabetes in 2019 is 9% for women and 9.65% for men. As the population ages, the prevalence of diabetes increases to 19.9% or 1112 million people aged 65-79 years. This number will continue to grow and it is estimated that by 2021 there will be more than half a billion people from all over the world living with diabetes, or 537 million people to be precise and this number is projected to reach 643 million in 2030 and 783 million in 2045. (RI Ministry of Health , 2021).

According to the World Health Organization (WHO) in 2030 the number of diabetics is expected to increase to 366 million people and Indonesia is one of the four countries with the highest number of DM sufferers along with China, the United States and India (Kusnadi G, 2017). According to WHO data, 422 million people worldwide suffer from diabetes mellitus, the increase is around 8.5% in the adult population and it is estimated that there are 2.2 million deaths with a percentage due to diabetes mellitus occurring before the age of 70 years, especially in countries with low economic status. and medium. In fact, it is estimated that by 2035 there will be an increase of around 600 million people. (RI Ministry of Health, 2018).

The 2018 Riskesdas results show that the prevalence of diabetes mellitus in Indonesia is 2%, this figure shows an increase compared to the prevalence of diabetes mellitus in 2013 of 1.5%. (Ministry of Health, 2020).

Almost all provinces show an increase in prevalence in 2013-2018, one of which is Aceh province which has a prevalence of 2.4% experiencing diabetes mellitus and Nagan Raya District with an incidence rate of diabetes of 1.7%. (RISKESDAS, 2018).

Diabetes mellitus is a chronic metabolic disease that occurs when insulin production in the pancreas fails to meet the body's needs and is not used effectively by the body (IDF, 2019). Type 2 diabetes mellitus is a condition characterized by an increase in blood sugar levels due to decreased insulin function or insulin resistance. (American Diabetes Association, 2019). Type 2 diabetes mellitus is a type of diabetes that often occurs in society and usually occurs in adults. (International Diabetes Federation, 2015). Symptoms of diabetes mellitus include weight loss, weakness, tingling, sores that don't heal, blurred vision, erectile dysfunction in men and in women, pruritus of the vulva. People with diabetes mellitus need glycemic control, nutritional management, or diet and physical activity. (Ardiani,

Diabetes mellitus has modifiable (changeable) risk factors and non-modifiable (unchangeable) risk factors. Risk factors for consumption of risky foods, education, fruit and vegetable consumption, physical activity and smoking behavior are risk factors that can be modified or changed. (Asri, Salamah et al, 2022). Meanwhile, genetic risk factors, gender and age are risk factors that cannot be modified or cannot be changed. (Kabosu, Adu et al, 2019).

Sultan Iskandar Muda Regional General Hospital (RSUD) is one of the advanced level health care institutions for diabetes mellitus patients who live in Nagan Raya District, Aceh Province. Based on medical record data at the Sultan Iskandar Muda Hospital in 2022, the number of diabetes mellitus patients was 2,322 outpatient cases and 456 inpatient cases. Even outpatient diabetes mellitus is one of the highest diseases that occur in the Sultan Iskandar Muda Nagan Raya Hospital.

Based on an initial survey at the Sultan Iskandar Muda Hospital, Nagan Raya Regency, the highest disease was type 2 diabetes mellitus which was a factor in the cause of diabetes mellitus due to age, gender, family history of DM sufferers, hypertension, obesity, physical activity and food consumption. risky.

The variety of risk factors that affect the incidence of diabetes mellitus, attracted researchers to find the distribution of the frequency of risk factors that influence the incidence of diabetes mellitus (Type 2) in the Sultan Iskandar Muda Hospital, Nagan Raya Regency.

1.1 Formulation of the problem

Diabetes mellitus is a chronic metabolic disease that occurs when insulin production in the pancreas cannot meet the body's needs and is not used effectively by the body. Type 2 diabetes mellitus is a disease characterized by an increase in blood sugar levels due to decreased insulin function or insulin resistance. In this case, researchers are interested in knowing the risk factors that influence the incidence of Diabetes Mellitus (Type 2) at Sultan Iskandar Muda Hospital, Nagan Raya Regency in 2022.

1.2 The scope of research

The scope of this study is regarding the risk factors that influence the incidence of type 2 diabetes mellitus at Sultan Iskandar Muda Hospital in 2022 which consists of the dependent/dependent variable, namely the incidence of type 2 diabetes mellitus and the independent/free variables, namely age, gender, family history of sufferers DM, hypertension, obesity, physical activity and consumption of risky foods.

1.3 Research purposes

This study aims to determine the risk factors that influence the incidence of Diabetes Mellitus (type 2) at Sultan Iskandar Muda Hospital, Nagan Raya Regency in 2022.

1.4 Benefits of research

It is hoped that this research can be used in efforts to prevent and improve health programs provided to the community, so that people's quality of life is increasing. As input in order to increase awareness about the health of diabetes mellitus, especially in the area of the Sultan

Iskandar Muda Hospital, Nagan Raya Regency. And as an additional reference in the Teuku Umar University FKM library, as well as input material for further research.

2. RESEARCH METHOD

2.1 Research design and types of research

This research is a quantitative study with a cross-sectional study design, a cross-sectional study design is a study to find out if health problems can occur, then analyzes the relationship between the independent variables and the dependent variable to determine the risk factors that influence the incidence of type 2 diabetes mellitus in RSUD Sultan Iskandar Muda, Nagan Raya Regency.

2.2 Location and time of research

This research was conducted at Sultan Iskandar Muda Hospital, Kuala District, Nagan Raya Regency, this research was carried out in December 2022 with the assistance of health workers at Sultan Iskandar Muda Hospital, Nagan Raya Regency.

2.3 Population and Sample

The population in this study were outpatients who had been clinically diagnosed with type 2 diabetes mellitus at the Sultan Iskandar Muda Hospital, Nagan Raya Regency. Based on medical record data at the Sultan Iskandar Muda Hospital, an average of 332 people visit each month with type 2 diabetes mellitus patients.

The sample collection technique uses a purposive sampling technique where the sample is selected from among the population according to what the researcher wants so that the sample can represent the characteristics of the desired population, so that the sample characteristics do not deviate from the desired population, then before sampling it is necessary to determine inclusion and exclusion criteria. Inclusion criteria are criteria that need to be met by members of the population that can be taken as a sample. While the exclusion criteria are the characteristics of members of the population that cannot be sampled. The inclusion criteria were as follows: patients with type 2 diabetes mellitus, outpatients at Sultan Iskandar Muda Hospital and willing to be respondents. Exclusion criteria were as follows: not a patient with type 2 diabetes mellitus, not an outpatient at Sultan Iskandar Muda Hospital and not willing to be a respondent. While determining the size of the research sample is based on the Slovin formula, the total sample is 77 respondents.

2.4 Data collection and analysis

Data collection was obtained secondary and primary where secondary data was taken from hospital medical record data and primary data was obtained by conducting interviews with the help of research instruments in the form of questionnaires then tested for validity and reliability. Analysis of the data obtained was carried out using univariate and bivariate methods. Univariate analysis was carried out by describing it descriptively to see the frequency distribution of the variables studied to see the size of the problem. Bivariate analysis was used to see the relationship between the dependent variable and the independent variable, namely the incidence of diabetes mellitus, age, gender, family history of diabetes, hypertension, obesity, physical activity and consumption of risky foods.

3. RESULTS AND DISCUSSION

3.1 Univariate analysis

The results of the univariate analysis included the variable incidence of type 2 DM, age, gender, family history of DM sufferers, hypertension, obesity, consumption of risky foods and physical activity.

Table 1. Frequency distribution of type 2 DM events

Distribution of Respondents	N	Percentage(%)
DM Type 2		
DM Type 2 Low Insulin	53	68.8%
DM Type 2 High Insulin	24	31.2%
Total	77	100.0%

Based on table 1 it can be seen that most of the respondents experienced low insulin type 2 diabetes mellitus as many as 53 respondents (68.8%) and high insulin type 2 diabetes mellitus respondents as many as 24 respondents (31.2%).

Table 2. Frequency distribution of respondents based on age, gender, family history of DM sufferers, hypertension status and obesity status in Sultan Iskandar Muda Hospital, Nagan Raya Regency.

Distribution of Respondents	n	Percentage(%)
Age		
20-40 Low Risk	7	9.1%
> 40 High Risk	70	90.9%
Gender		
Man	33	42.9%
Woman	44	57.1%
DM Suffering Families		
Yes	38	49.4%
No	39	50.6%
Hypertension Status		
> 140/90 mmHg Hypertension	51	66.2%
< 140/90 mmHg No Hypertension	26	33.8%
Obesity Status		
> 27.0 Obesity/overweight	30	39.0%
< 27.0 Not Obese	47	61.0%
Total	77	100.0%

Table 2 shows that of the 77 respondents, the majority are aged > 40, with a height of 70 respondents (90.9%), followed by those aged 20-40 years who are at low risk, namely 7 respondents (9.1%). There were 44 respondents (57.1%) with female gender and 33 respondents (42.9%) with male gender. Respondents totaling 38 people (49.4%) had a family history of suffering from DM and did not have a family history of suffering from DM totaling 39 respondents (50.6%). There were 51 hypertensive respondents (66.2%), 26 people (33.8%) not hypertensive, 40 obese respondents (51.9%) and 37 non-obese respondents (48.1%).

Table 3. Frequency distribution of respondents based on consumption of risky food/beverages at Sultan Iskandar Muda Hospital, Nagan Raya Regency.

Distribution of Respondents	N	Percentage(%)
Sweet Food		
Every day	54	70.1%
Seldom	23	29.9%
Sweet Drinks		
Every day	53	68.8%
Seldom	24	31.2%
Fatty Foods / Cholesterol		
Every day	54	70.1%
Seldom	23	29.9%
Seasonings		
Every day	53	68.8%
Seldom	24	31.2%
Fast food		
Every day	51	66.2%
Seldom	26	33.8%
Total	77	100.0%

Table 3 shows that there are respondents who consume sweet foods every day, namely 54 respondents (70.1%) and consume sweet foods with rare criteria, namely 23 respondents (29.9%). Respondents who consumed sweet drinks every day were 53 respondents (66.8%) and consumed sweet drinks with rare criteria, namely 24 respondents (31.2%). Respondents who consumed fatty or cholesterol foods every day were 54 people (70.1%) and rarely consumed, namely 23 people (29.9%). Respondents who consumed food using seasoning every day were 53 people (68.8%) and rarely consumed 24 people (31.2%). Respondents who consumed fast food every day were 51 respondents (66.2%) and consumed fast food with rare criteria, namely 26 respondents (33.8%).

Table 4. Frequency distribution based on physical activity at Sultan Iskandar Muda Hospital, Nagan Raya Regency.

Distribution of Respondents	n	Percentage(%)
Doing Physical Activity		
Currently	50	64.9%
Heavy	27	35.1%
Total	77	100.0%

Table 4 shows that 50 people (64.9%) did physical activity with moderate criteria and 27 people (35.1%) did heavy physical activity.

Based on the results of research conducted at the Sultan Iskandar Muda Hospital, Nagan Raya Regency, it was found that there were several risk factors for the occurrence of type 2 diabetes mellitus, namely age, gender, family history of DM sufferers, hypertension, obesity, consumption of risky foods and lack of physical activity.

3.2 Bivariate Analysis

Bivariate analysis was used to see the relationship between age, gender, hypertension, obesity, consumption of risky foods and lack of physical activity with the incidence of type 2 Diabetes Mellitus in patients at Sultan Iskandar Muda Hospital, Nagan Raya Regency in 2022.

The rlationship between age and the incidence of type 2 DM at the Sultan Iskandar Muda Hospital, Nagan Raya Regency.

Table 5. Relationship of age to the incidence of type 2 diabetes mellitus

Age	Type 2 DM events						Sig (P-Value)	OR (95%CI)
	DM Type 2 Low Insulin		DM Type 2 High Insulin		Total			
	f	%	f	%	f	%		
20-40 Low Risk	0	4,8	7	2,2	7	7.7	0.000	4,118 (2,723-
>40 High Risk	53	48,2	17	21,8	70	70.7		6,227

Table 5 shows that 53 (48.2%) respondents are aged >40 years or at high risk of developing type 2 DM with low insulin. The Fisher test results obtained a p-value of 0.000 <0.05, which means that there is a significant relationship between age and the incidence of type 2 diabetes mellitus. influence of 4.118 times on the incidence of DM.

In line with the research of Susanti, Hudiyawati et al, (2019) which stated that age is a risk factor for diabetes mellitus because increasing human age causes changes in the function and biochemistry of the body's organs. In general, people between the ages of 40 and 55 are at risk of developing diabetes. High risk age is above 40 years. And people under the age of 40 still have a lower risk of developing diabetes.

The relationship between gender and the incidence of type 2 diabetes mellitus at the Sultan Iskandar Muda Hospital, Nagan Raya Regency.

Table 6. Relationship of gender to the incidence of type 2 diabetes mellitus

Gender	Type 2 DM events						Sig (P-Value)	OR (95%CI)
	DM Type 2 Low Insulin		DM Type 2 High Insulin		Total			
	f	%	f	%	f	%		
Man	26	22,7	7	10,3	33	33.0	0.000	4,118 (2,723-
Women	27	30,3	17	13,7	44	40.0		6,227

Table 6 shows that 27 respondents (30.3%) had low insulin type 2 diabetes mellitus, while 17 respondents (13.7%) had type 2 diabetes mellitus with high insulin. Respondents with male sex experienced low insulin type 2 diabetes mellitus as many as 26 people (25.0%) and experienced high insulin type 2 diabetes mellitus 7 respondents (10.3%). The results of the Chi Square test obtained a p-value of 0.102 > 0.05, which means that there is no significant relationship between gender and the occurrence of type 2 diabetes mellitus.

In line with research (Isnaini and Ratnasari) which found that women suffered more type 2 DM than men (75% compared to 24.5%), and statistical tests also showed that there was no significant relationship between gender and DM type 2 (Isnaini and Ratnasari, 2018). The prevalence of women and men have different health problems due to differences in anatomy, physiology and behavior. Female sex is at risk for type 2 diabetes mellitus because physically women have a greater chance of increasing body mass index (more prone to obesity). Meanwhile, the male sex is also at risk of developing type 2 DM because men generally need more calories than women. And men have a lot of muscles, so it requires more calories for the burning process. (Syamsiah, 2017). However, if a man does not do enough physical activity and consumes high-calorie foods, there will be a buildup of glucose which triggers type 2 diabetes mellitus.

The relationship between family history and the incidence of type 2 diabetes mellitus at the Sultan Iskandar Muda Hospital, Nagan Raya Regency.

Table 7. Relationship of family history to the incidence of type 2 diabetes mellitus

Family History	Type 2 DM events						Sig (P-Value)	OR (95%CI)
	DM Type 2 Low Insulin		DM Type 2 High Insulin		Total			
	f	%	f	%	f	%		
Yes	28	26,2	10	11,8	38	38.0	0.364	---
No	25	26,8	14	12,2	39	39.0		

Table 7 shows that 28 respondents (26.2%) had a family history of low insulin type 2 diabetes mellitus, while 10 respondents (11.8%) had high insulin type 2 diabetes mellitus. Respondents had no family history of having low insulin type 2 diabetes mellitus 25 respondents (26.8%) and 14 respondents (12.2%) had high insulin type 2 diabetes mellitus. With the Chi Square test, the p-value was 0.364 > 0.05, which means that there is no significant relationship between family history and the incidence of type 2 diabetes mellitus.

The results of this study indicate that there is no relationship between family history of DM and the incidence of type 2 diabetes mellitus because the results obtained are not significant, possibly due to bias, because people who have a family history of diabetes mellitus know and are aware of health. They always control their blood sugar and also follow a healthy lifestyle. And groups with a family history of DM can also be diagnosed with DM, but because no screening is done, bias occurs.

The relationship between hypertension status and the incidence of type 2 diabetes mellitus at the Sultan Iskandar Muda Hospital, Nagan Raya Regency.

Table 8. Relationship of hypertension status to the incidence of type 2 diabetes mellitus

Hypertension status	Type 2 DM events: DM Type 2 Low Insulin		DM Type 2 High Insulin		Total		Sig (P-Value)	OR (95%CI)
	f	%	f	%	f	%		
>140/90 mmHg Hypertension	39	35,1	12	15,9	51	51.0	0.043	2,786 (1.018-7.622)
<140/90 mmHg No Hypertension	14	17,9	12	8,1	26	26.0		

Table 8 shows that there are 39 (35.1%) respondents with hypertension status who have low insulin diabetes mellitus. The Chi Square test with a pvalue of 0.043 <0.05 means that there is a significant relationship between hypertension and the incidence of type 2 diabetes mellitus and the risk factors for hypertension are known from the Odds Ratio (OR) value of 2.786 which means that hypertension has an effect of 2.786 times on the incidence of DM.

In line with Asmarani's research which showed that individuals with hypertension had a 4.166 times greater risk of suffering from type 2 DM than individuals without hypertension (Asmarani, Tahir, & Adryani, 2017). High blood pressure can cause the function of blood sugar distribution cells, conversely when blood pressure is in the normal range, blood sugar functions optimally because insulin acts as a regulator of the renin and angiotensin systems. Adequate sugar levels will maintain blood pressure, blood pressure above 120/90 mmHg has twice the risk of developing diabetes compared to people who have normal blood pressure (Brunner and Suddarth, 2013). Risk factors for hypertension can be prevented by increasing knowledge and following a healthy lifestyle, avoiding stress, reducing excessive salt consumption,

The relationship between obesity status and the incidence of type 2 diabetes mellitus at the Sultan Iskandar Muda Hospital, Nagan Raya Regency.

Table 9. Relationship of obesity status to the incidence of type 2 diabetes mellitus

Obesity Status	Type 2 DM events: DM Type 2 Low Insulin		DM Type 2 High Insulin		Total		Sig (P-Value)	OR (95%CI)
	f	%	f	%	f	%		
>27.0 Obesity/Obesity	16	20,6	14	9,4	30	30.0	0.019	0,309 (0.113-0.841)
<27.0 Normal	37	32,4	10	14,6	47	47.0		

Table 9 shows that the respondents were not obese and had low insulin type 2 DM, there were 37 (32.4%) respondents. Meanwhile, 10 (14.6%) respondents experienced high insulin type 2 DM. There were 16 respondents (20.6%) who were obese and had type 2 DM with low insulin, while those who had type 2 diabetes mellitus with high insulin were 14 respondents (9.4%).

The results of the Chi Square test obtained a pvalue of 0.019 <0.05, meaning that there is a significant relationship between obesity and the incidence of type 2 diabetes mellitus. has an effect of 0.0309 times on the incidence of DM.

Supported by his research (Kabosu et al, 2019), the results of the calculation of the odds ratio (OR) were 3.826 which explained that obese respondents had 3.826 times higher chances than respondents who were not obese.

Obesity is a condition in which the body increases the amount of fatty acids in the cells which causes a decrease in glucose uptake in the plasma membrane and causes insulin function to be impaired in muscle tissue. (Lemos, Nunes, Teixeira & Reis, 2011). Obesity is one of the main causes of death because obesity is known to be a major risk factor for several non-communicable diseases, especially type 2 DM. This relationship leads to the connotation of diabetes which highlights the fact that most patients with type 2 diabetes mellitus are people who are overweight/obese.

Relationship between risky food consumption and the incidence of type 2 diabetes mellitus in the Sultan Iskdandar Muda Hospital, Nagan Raya Regency

Table 10. Relationship between risky food consumption and type 2 diabetes mellitus

Consumtion of Risky Foods	Type 2 DM events						Sig(P-Value)	OR (95%CI)
	DM Type 2 Low Insulin		DM Type 2 High Insulin		Total			
	f	%	f	%	f	%		
Sweet Food								
Every day	41	37,2	13	16,8	54	54,0	0,0039	2,891 (1.033-
Seldom	12	15,8	11	7,2	23	23.0		8.089)
Sweet Drinks								
Every day	42	36,5	11	16,5	53	53.0	0,003	4,512 (1,592-
Seldom	11	16,5	13	7,5	24	24.0		12,790)
Fatty/Cholesterol Foods								
Every day	43	37,2	11	16,8	54	54.0	0.002	5,082 (1,765-
Seldom	10	15,8	13	7,2	23	23.0		14,631)
Seasoning								
Every day	41	36,5	12	16,5	53	53.0	0.016	3,417 (1,224-
Seldom	12	16,5	12	7,5	24	24.0		9,539)
Fast Food								
Every day	41	35,1	10	15,9	51	51.0	0.002	4,783 (1,698-
Seldom	12	17,9	14	8,1	26	26.0		13,473

Table 10 explains that respondents who consumed sweet foods with the incidence of type 2 diabetes mellitus low insulin totaled 41 (37.25) respondents with the chi square test pvalue 0.039 <0.05, which means that there is a significant relationship consuming sweet foods with the incidence of type 2 diabetes mellitus .

Respondents consuming sweet drinks with low insulin type 2 diabetes mellitus were 42 (36.5%) respondents with the chi square test obtained a pvalue of 0.003 <0.05, which means that there is a significant relationship between consuming sweet drinks and the incidence of type 2

diabetes mellitus.

Respondents consuming fatty/cholesterolized foods with low insulin type 2 diabetes mellitus were 43 (37.2%) respondents with a chi square pvalue test of 0.002 <0.05 which means that there is a significant relationship consuming fatty/cholesterol foods to the incidence of type 2 diabetes mellitus .

Respondents consuming seasonings with type 2 diabetes mellitus with low insulin amounted to 41 (36.5%) respondents with a chi square test with a pvalue of 0.016 <0.05, which means there is a relationship between consumption of seasoning spices and the incidence of type 2 diabetes mellitus.

Respondents who consumed fast food with low insulin type 2 diabetes mellitus were 41 (35.1%) respondents with a chi square test with a pvalue of 0.002 <0.05 meaning that there was a relationship between consuming fast food and type 2 DM.

Consumption of risky foods is divided into sweet foods, sweet drinks, fatty/cholesterol foods, foods with seasonings and fast food.

Based on data analysis, it is known that consumption of risky foods is one of the risk factors for diabetes mellitus. Respondents who consume food are at greater risk compared to respondents who rarely consume it. Previous studies have shown that diet is a risk factor for diabetes mellitus. High fat in the body can cause impaired insulin function which affects a person's glucose levels (Prawitasari 2019).

A risky eating pattern is the respondent's habit of consuming sweet foods, sweet drinks, fat/cholesterol, foods using seasonings and fast food. Consumption of risky foods has a significant relationship with the incidence of diabetes mellitus. Sweet food is at risk of 2,891, risky sweet food is 4,512, fatty food is at risk of 5,082, food with seasonings is at risk of 3,417 and fast food is at risk of 4,783. These risky foods can trigger an unbalanced intake, this imbalance will lead to obesity. Obesity is a trigger for various diseases, especially diabetes mellitus. In addition, the habit of consuming high-risk foods is three times more likely to have uncontrolled blood sugar levels.

The relationship between physical activity and the incidence of type 2 diabetes mellitus at the Sultan Iskandar Muda Hospital, Nagan Raya Regency.

Table 11. Relationship of physical activity to the incidence of type 2 diabetes mellitu

Physical Activity	Type 2 DM events: DM Type 2 Low Insulin		DM Type 2 High Insulin		Total		Sig (P-Value)	OR (95%CI)
	F	%	f	%	f	%		
Currently	30	34,4	20	15,6	50	50.0	0.023	0,261
Heavy	23	18,6	4	8,4	27	27.0		(0.078-0.869)

Table 11 explains that 30 (34.4%) respondents who have physical activity in the moderate category experience low insulin type 2 DM events, 20 (15.6%) have moderate physical activity categories.) respondents. The results of the chi square test obtained a pvalue of 0.023 <0.05, which means that there is a significant relationship between physical activity and the incidence of type 2 DM. The risk factor for physical activity on the incidence of type 2 diabetes mellitus is known to be the Odds Ratio (OR) value of 0.261, which means physical activity has an effect of 0.261 times on the incidence of DM.

In line with research (Cicilia et al.) shows that there is a relationship between physical activity and the prevalence of type 2 DM (0.026). (Cicilia, Kaunang & Langi, 2018). Doing regular physical activity can help prevent the risk of type 2 DM while reducing fat. Physical activity increases insulin which can lower blood sugar, if you rarely do physical activity it can cause nutrients that enter the body are not burned but are stored as fat and blood sugar, if this condition continues it will result in the pancreas not being able to produce enough insulin and converting glucose into energy so that type 2 DM occurs (Ministry of Health, Republic of Indonesia, 2010).

Heavy physical activity, during which the body sweats a lot, for example: walking very fast (speed of more than 5 km/hour), walking up a hill, walking with a load on the back, climbing mountains, jogging (speed of 8 km/hour) and running . Jobs such as carrying heavy loads, shoveling sand, moving bricks, digging ditches and hoeing. Homework such as moving heavy furniture and carrying children. Cycling more than 15 km/h with hiking trails, playing basketball, badminton and soccer. Moderate physical activity, namely when the body sweats a little, for example, such as: walking fast (speed of 5 km/hour) on a flat surface inside or outside the house, in class, to work or to the store, for leisurely walks and walks during work breaks, move light furniture, gardening, planting trees and washing cars. Carpentry, carrying and stacking logs, clearing grass with a lawn mower, recreational badminton, dancing, cycling on a flat track and sailing (Ministry of Health, 2018).

4. CONCLUSIONS AND SUGGESTIONS

4.1. CONCLUSION

The results of the research and description that have been described above can be concluded that age, gender, family history of DM sufferers, hypertension, obesity, consumption of risky foods and lack of physical activity are risk factors that influence the incidence of type 2 diabetes mellitus at Sultan Iskandar Muda Hospital, Nagan Regency Raya.

4.2. Suggestions

Type 2 DM sufferers are expected to carry out a healthy diet program so that blood sugar is more controlled and reduce consuming foods at risk of obesity, able to carry out good self-care in order to prevent type 2 diabetes mellitus and other diseases.

For hospitals conducting a workshop program to prevent DM with "TANYA" (Test blood sugar, Let's exercise regularly, No emotion and stress, Let's eat fruits and vegetables, Let's maintain an ideal body weight) using participatory methods, namely community participation in the prevention of type DM 2.

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