

Analysis Of Risk Factors For Events
Complications Cardiovascularpatients
Diabetes Mellitus (Dm) Type 2 In
Sikumana Community Health Center
Kupang City

By Irfan Irfan

ORAL

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**Analysis Of Risk Factors For Events Complications Cardiovascularpatients
Diabetes Mellitus (Dm) Type 2 In Sikumana Community Health Center
Kupang City
Case Control Study**

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Abstract

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Background. Diabetes mellitus (DM) is a chronic disease that if not treated properly will lead to complications in the form of damage to body organs, especially the heart (cardio) and vascular (blood vessel). **The aim.** The aim of this research is to analysis risk factors (age, sex, blood pressure, drug consumption, health checks, and diet) on the incidence of cardiovascular complications in patients with Type 2 Diabetes Mellitus in community health centers Sikumana Kupang. The research design is non-experimental analytic with case control design. The number of samples was 74 patients with type 2 DM divided into 37 cases and 37 control samples. The results of the research data were analyzed using logistic regression statistical tests with a significant value of $\alpha < 0.05$ and $OR > 1$. **Results.** The results showed that 51.4% of the case group respondents had vascular to brain complications or non haemorrhagic stroke (SNH), 37.8% had cardiac vascular complications or coronary artery diseases (CAD), and there were 8.1% case group respondents experienced vascular complications in the brain and heart (SNH + CAD). Risk factors for complications; age ($\alpha = 0.32$, $OR = 0.19$), gender ($\alpha = 0.14$, $OR = 13.2$), blood pressure ($\alpha = 0.034$, $OR = 0.02$), drug consumption ($\alpha = 0.34$, $OR = 43.9$), health check ($\alpha = 0.43$, $OR = 0.53$), diet ($\alpha = 0.009$, $OR = 3.29$). **Conclusion.** The results of the analysis can be concluded that there is no significant influence between age, sex, drug consumption, and health check on the incidence of cardio vascular complications in DM patients at the Sikumana community health center in Kupang City. There is a significant influence between blood pressure and DM diet on the incidence of cardio vascular complications in DM patients at Sikumana Public Health Center, Kota Kupang with the influence of 3.29 times greater diet on the incidence of cardio vascular complications in type 2 DM patients at Sikumana Community Health Center, Kupang City. Suggestions for health workers to continue to promote promotive, preventive, curative and rehabilitation efforts in an effort to overcome and prevent cardiovascular complications in patients with diabetes mellitus. **Keywords:** Type 2 DM, Complications, Risk Factors for Complications.

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BACKGROUND

Diabetes Mellitus or diabetes is one of the chronic diseases that increasingly threaten human health and life. Diabetes mellitus consists of four types, namely type 1 DM, type 2 DM, DM associated with other conditions or syndromes, and gestational DM that often occurs in pregnant women (Smeltzer, 2001). Approximately 90% - 95% of patients experience Type 2 DM, which is diabetes that is not insulin dependent. Type 2 diabetes occurs due to decreased insulin sensitivity (insulin resistance) due to a decrease in the amount of insulin. Factors associated with the incidence of type 2 DM are age, obesity, family history, and an unhealthy lifestyle. Type 2 diabetes can generally be prevented by healthy behaviors such as

diet and proper physical exercise (Smeltzer, 2001).

The World Health Organization (WHO) in 2013 predicts the increase in the number of people with diabetes mellitus in Indonesia from 8.4 million in 2000 will reach around 21.3 million by 2030. The International Diabetes Federation Agency (IDF) in 2009 estimated the number of people with diabetes mellitus from 7.0 million in 2009 it will increase to 12.0 million by 2030. In Indonesia, the Central Bureau of Statistics (BPS) data also shows that the number of diabetics in 2003 was 13.7 million, based on the pattern of population growth estimated at 2030 there will be 20.1 million people with diabetes with a prevalence rate of 14.7 percent. The Sikumana Community Health Center Kupang City also found an

increase in cases of Type 2 diabetes every year.

Diabetes that is not handled properly will result in hyperglycemia, which over time can cause complications in the form of damage to various body systems, especially the nervous system and blood vessels. Complications of diabetes mellitus are the risk of heart disease and stroke, neuropathy (nerve damage) in the feet which increases the incidence of foot ulcers, infections and even damage to amputations, diabetic retinopathy which is one of the causes of blindness in DM patients due to retinal damage, diabetes mellitus is one the main cause of kidney failure, and the risk of death from diabetes mellitus is generally twice that of non-diabetic mellitus (Indonesian Ministry of Health Infodatin, 2014).

The general cause of complications of diabetes mellitus is prolonged hyperglycemia caused by various factors. The risk of cardiovascular complications in type 2 DM patients will easily occur in patients who have high blood sugar levels, high blood pressure, cholesterol, smoking, age and sex (WHO

DM Complication Risk Prediction in the Indonesian Ministry of Health, 2104).

Cardiovascular complications that can occur in patients with type 2 DM are damage to various blood vessels / vascular blood flow to the heart resulting in coronary heart disease, and damage to blood vessels to the brain which results in non haemorrhagic stroke. The control of diabetes mellitus is carried out in an effort to prevent the risk of complications of Type 2 diabetes with a CERDIK and PATUH. CERDIK means Check health conditions regularly, Get rid of smoking, Diligent physical activity, Healthy diet with balanced calories, Get enough rest, and Control stress. PATUH means checking your health regularly and following the doctor's advice, Overcoming diseases with proper and regular treatment, Strive for safe physical activity, Avoid cigarettes, alcohol and other carcinogenic substances.

The purpose of this study was to analyze risk factors for age, sex, blood pressure, drug consumption, health control and diet on cardiovascular complications in type 2 DM patients at Sikumana Community Health Center

Kupang City, analyzing the dominant factors at risk for the incidence of cardiovascular complications in patients Type 2 DM at Sikumana Community Health Center Kupang City

METHODS

This study is a non-experimental analytical study with a design *case control*. The population in this study were all people with Type 2 diabetes in the work area of the Sikumana Community Health Center Kupang City with a total of 180 people. The study sample consisted of two samples, namely the case of 37 people who had cardiovascular complications and a control sample of 37 people who met the inclusion criteria as follows; suffer from Type 2 diabetes, have

not experienced complications, can read and write, are willing to be research respondents by signing consent information. Sampling was carried out on control samples by simple random sampling. The study was conducted in the work area of the Sikumana Community Health Center Kupang City in August - October 2018. The research data that was collected will be analyzed using logistic regression statistical tests with a significant value of $\alpha < 0.05$ and $OR > 1$. The characteristics of respondents in this study are age, gender and level of education. Characteristics of respondents are explained in the table below;

Table 1 Characteristics of Respondents

Characteristics of	Respondents				Number of	%
	Case		Controls			
	n	%	n	%		
Age						
<50 Years	0	0%	4	10.8%	4	5.4%
> 50 Years	13	35.1%	10	27.0%	23	31.1%
> 60 Years	24	64.9%	23	62.2%	47	63.5%
Sex						
Men	18	48.6%	14	37.8%	32	43.2%
Women	19	51.4%	23	62.2%	42	56.8%

Education Level						
SD	8	21.6	6	16.2%	14	18.9%
SMP	4	10.8%	7	18.9%	11	14.9%
SMA	15	40.5%	18	48.6%	33	44.6%
Bachelor	10	27,0%	6	16.2%	16	21.6%

Most of the respondents (63.5%) were high school education (44.6%), and were > 60 years old, and respondents who had complications were experienced complications were mostly high school educators (40, 5%) over the age of > 60 years (64.9%), most Table 2 below shows the types of respondents (56.8%) were female, and complications in DM patients at the respondents who experienced Sikumana Community Health Center complications were mostly female Kupang City in September - October (51.4%), most of the respondents had 2018.

Table 2 Distribution of respondents in explain the types of DM complications at the Sikumana Community Health Center Kupang City, September - October 2018

Complication Type	Respondent				Number	%
	Case		Control			
	n	%	n	%		
SNH	19	51.4%	0	0%	19	51.4%
CAD	14	37.8%	0	0%	14	37.8%
SNH + CAD	3	8.1%	0	0%	3	8.1%
Anggina	1	2.7%	0	0%	1	2.7%
No Complications	0	0%	37	100%	0	0%
	37	100%	37	100%	37	100%

Table 2 shows that the majority of and suffer from SNH and CAD as well as respondents who experienced 8.1%. complications were suffer from non Risk factors for the incidence of haemoragic or SNH strokes (51.4%), DM complications in this study were age, coronary artery diseases or CAD (37.8%), sex, blood pressure, drug consumption,

health control, and diet described in table 3 below.

Table 3 Risk Factors for DM

Characteristics	Complication Events				ml	%	Sig.	OR	95% CI	
	Case		Control						Low	Up
	n	%	n	%						
Age										
<50	0	0%	4	10.8%	4	5.4%	0.32	0.19	0.00	4,773
> 50	13	35.1%	10	27.0%	23	31.1%				
> 60	24	64.9%	23	62.2%	47	63.5%				
Gender										
Male	18	48.6%	14	37.8%	32	43.2%	0.141	13.24	0.42	413
Female	19	51.4%	23	62, 2%	42	56.8%				
Blood Pressure										
> 120	5	13.5%	21	56.8%	26	35.1%	0.034	0.020	0.00	0.74
> 140	15	40.5%	13	35.1%	28	37.8%				
> 160	12	32.4%	3	8.1%	15	20.3%				
> 180	5	13.5%	0	0%	5	6.8%				
Drug Consumption										
Compliant	7	18.9%	18	48.6%	25	33.8%	0.34	43.9	0.01	1,192
Not Compliant	12	32.4%	18	48.6%	30	40.5%				
No Consumption	18	48.6%	1	2.7%	19	25.7%				
Health Control										
Routine	6	16.2%	20	54.1%	26	35.1%	0.43	0.53	0.00	89.5
Sometimes	11	29.7%	16	43.2%	27	36.5%				
Never	20	54.1%	1	2.7%	21	38.4%				
Diet										
Good	0	0%	20	54, 1%	20	27.0%	0.009	3.29	7.75	1.40
Enough	7	18.9%	16	43.2%	23	31.1%				
Less	30	81.1%	1	2.7%	31	41.9%				
$\alpha = 0.05$										

Table 3 shows that the majority of respondents in the case group and the control group were > 60 years old. The results of the analysis using logistic regression statistical tests show Sig. 0.320 (> α). These results indicate that there is no significant effect between the age of the respondent and the incidence of DM complications in the work area of

the Sikumana Community Health Center Kupang City.

Most of the respondents in the case group were female control groups. The results of the analysis using logistic regression statistical tests showed Sig. 0.141 ($> \alpha$). These results indicate that there is no significant influence between the sex of the respondent and the incidence of DM complications in the work area of the Sikumana Community Health Center Kupang City.

Most respondents in the case group had blood pressure > 140 mmHg (40.5%) and > 160 mmHg (32.4%), while respondents in the control group mostly had blood pressure > 120 mmHg (56.8%) and > 140 mmHg (35.1%). The results of the analysis using logistic regression statistical tests show Sig. 0.034 ($< \alpha$). These results indicate that there is a significant influence between respondents' blood pressure and the incidence of DM complications in the work area of the Sikumana Community Health Center Kupang City.

Most respondents in the case group did not take drugs (48.6%) and did not comply with treatment (32.4%), while

the respondents in the control group were mostly obedient to treatment (48.6%). The results of the analysis using the logistic regression statistical test show Sig. 0.34 ($> \alpha$). These results indicate that there was no significant effect between medication adherence and the incidence of DM complications in patients at the Sikumana Community Health Center Kupang City.

Most of the respondents in the case group never had health control (54.1%) and sometimes (29.7%), while the respondents in the control group were mostly respondents who routinely exercised health control (54.1%). The results of the analysis using the logistic regression statistical test show Sig. 0.43 ($> \alpha$). These results indicate that there is no significant influence between health control habits and the incidence of DM complications in patients at the Sikumana Community Health Center Kupang City.

Most respondents in the case group had poor dietary habits (81.1%), while respondents in the control group mostly had good dietary habits (54.1%). The results of the analysis using the

logistic regression **statistical test** show Sig. **0.009** ($<\alpha$). These results indicate that there is a significant influence between the dietary habits of respondents and the incidence of DM complications in the work area of the Sikumana Community Health Center Kupang City.

DISCUSSION

DM is a metabolic disease with the characteristics of hyperglycemia which occurs due to abnormalities of secretions, insulin, insulin action or both. Poorly controlled diabetes mellitus will lead to various complications that can threaten the life of the sufferer. Complications of diabetes mellitus are a **cause of high morbidity and mortality.**

The results of this study showed that the majority of DM patients in the Sikumana Community Health Center Kupang City had experienced various cardiovascular complications with the most common being non haemorrhagic stroke vascular disease (51.4%) of the total case group respondents, followed by coronary artery diseases 37, 8%, 8.1%

haemorrhagic + coronary artery diseases, and 2.7% experienced angina pectoris. Complications of diabetes mellitus can occur by various factors. The level of complications of diabetes mellitus generally occurs due to various factors, namely age, gender, blood pressure, diet and nutritional status, and types of treatment.

Age is an important factor that affects the incidence of complications of diabetes mellitus. The higher the age, the more susceptible to organ decline, including the function of insulin secretion. The results of this study indicate that there was no significant effect between the age of the respondent and the incidence of DM complications in the Sikumana Community Health Center Kupang City ($p = 0.320 > \alpha = 0.05$). The results of this study are in accordance with the results of research conducted by Yuliani, et al 2014 which showed that there was no significant relationship between age and the incidence of CHD complications in patients with type 2 diabetes. Although it did not have a significant effect, this study can be seen

in Table 3 that most DM patients who experience complications aged over 60 years as much as 64.9%. More than 60 years of age is an advanced age where a person experiences a decrease in various organ functions or degenerative potential for various degenerative diseases including diabetes mellitus and its complications. This is consistent with what Smelzer, 2001, suggests that age > 60 years tends to result in increased insulin resistance. Increased uncontrolled insulin resistance in DM patients will result in chronic hyperglycemia which results in damage to various organ systems called DM complications.

Gender has a relationship related to DM disease and its complications. The results of this study indicate that there is no significant effect between the sex of the respondent and the incidence of DM complications in patients at the Sikumana Community Health Center Kupang City ($p = 0.14 > \alpha = 0.05$). The results of this study are not in accordance with the results of the study of Yuliani et al., 2014 which showed that there was a significant relationship between gender

and the incidence of CHD complications in patients with type 2 diabetes. Although it did not have a significant effect, it can be seen in table 3 shows that most people with disease DM experienced female complications (51.4%). This is in accordance with previous studies in Manado by William in Edwina (2015) that type 2 DM is more common in women than men. This is also supported by the results of Fathurohman's 2016 study which showed that diabetes mellitus was more common in women than men. The incidence of complications in DM patients that is more common in women is supported by the results of a study by Pratiwi (2010) in Lathifah (2017) which shows that women who suffer from DM have a greater risk of chronic complications 1,253 times greater than men. Female gender is the sex that is at risk of developing diabetes mellitus and the danger of its complications. Women tend to experience changes in hormonal function at the age of > 60 years. This reduction in various hormonal functions can result in changes in the function of the hormone

insulin which is responsible for the condition of diabetes mellitus.

Blood pressure has long been known as a risk factor that has an influence on the complications of various diseases including diabetes mellitus. The results of this study indicate that there is a significant influence between blood pressure and the incidence of type DM complications in the Sikumana Community Health Center Kupang City ($p = 0.034 < \alpha = 0.05$). Table 3 can be seen that most of the respondents in the case group had high blood pressure which was > 140 mmHg as much as 40.5%, > 160 mmHg 32.4% and there were 13.5% who had very high blood pressure which was > 180 mmHg. The results of this study are in accordance with the statement of the Ministry of Health of the Republic of Indonesia (2014) that the risk of complications will be very high in patients with diabetes mellitus accompanied by high blood pressure. The results of this study are also in accordance with the results of the study of Yuliani et al (2014) which showed a significant relationship between

hypertension and the incidence of CHD complications in patients with type 2 diabetes. Diabetes mellitus is a condition in which hyperglycemia or elevated blood glucose levels occur. Uncontrolled hyperglycemia will result in high blood viscosity in each blood stream. Increasing blood viscosity in patients with DM will result in an increase in the burden of the heart to pump blood throughout the body. Increased chronic blood pressure in people with DM results in decreased oxygen perfusion in various tissues and organs of the body. This decrease in tissue perfusion is exacerbated by the condition of hyperglycemia which ultimately results in tissue hypoxia. Hypoxia in brain tissue will result in complications of non-ahemoragic stroke, and hypoxia in heart tissue resulting in complications of coronary heart disease or coronaria artery diseases.

Treatment of DM has been established in efforts to overcome DM disease and prevent its complications. The results of this study indicate that there was no significant effect between

treatment and the incidence of DM complications in the Sikumana Community Health Center Kupang City ($p = 0.34 > \alpha = 0.05$). Although treatment does not have a significant effect on the incidence of DM complications, but in table 3 it can be seen that most DM patients who have complications do not take drugs (48.6%) and most others do not comply with treatment (32.4%). Distribution of DM treatment in this case study group is in accordance with the statement of the Ministry of Health of the Republic of Indonesia (2014) that prevention of complications and prolongation of the age of DM patients can be done with routine treatment therapy. If the patient is not compliant with the prescribed medication, the risk of complications will easily occur due to chronic uncontrolled hyperglycemia.

The results of this study indicate that there was no significant effect between adherence in health control and the incidence of complications in DM patients at the Sikumana Community Health Center Kupang City ($p = 0.43 > \alpha = 0.05$). Although it does not have a significant effect on the incidence of DM

complications, in table 3 it can be seen that most people with DM who have experienced complications have a history of never having sick or health check regularly (54.1%), and most others 29.7% are not routine in carrying out checks or health checks.

This distribution is in accordance with the statement of the Indonesian Ministry of Health (2015) that prevention and control of chronic diseases including DM can be carried out by CERDIK and PATUH which contains checks and health checks periodically and follow the doctor's recommendations. Periodic checks will find out health status and monitor the success of each treatment therapy that has been obtained. Early discovery of health conditions and successful treatment of DM can help patients and health workers to provide more intensive treatment in an effort to prevent complications of DM disease.

The right diet is an important indicator in efforts to prevent complications and control the risk of complications of diabetes mellitus. The results of this study indicate that there is a significant influence between diabetic

patients' diets and the incidence of complications in DM patients at the Sikumana Community Health Center Kupang City ($p = 0.00 < \alpha = 0.05$).

Table 3 shows that most DM patients who have experienced complications have a poor dietary history (81.1%). Poor diet can result in hyperglycemia in DM patients. Chronic hyperglycemia can cause damage to various organs of the patient or complications. Prevention of hyperglycemia can be done with the right diet. This is in accordance with the statement of the Ministry of Health of the Republic of Indonesia (2014) that efforts to overcome and prevent complications of DM can be done with a diet and adjust the right diet. This study was also supported by the results of a study conducted by Suprihatin (2012) which showed that there was a significant relationship between diets and the amount of normal fasting blood sugar levels ($p = 0,000$) which is an indicator of the risk of complications in DM patients.

CONCLUSION

Most DM patients in the Sikumana Community Health Center Kupang City in the case group experienced cardiovascular complications with the most common being vascular complications to the brain namely non haemorrhagic stroke or SNH (51.4%), followed by vascular complications to the heart namely coronary or coronary heart disease artery diseases or CAD 37.8%. There are 8.1% of people with DM who experience vascular complications in the brain and heart, namely SNH + CAD.

There was no significant effect between age, sex, drug consumption, and health check on the incidence of cardiovascular complications in DM patients at the Sikumana Community Health Center Kupang City. There is a significant influence between blood pressure and DM diet on the incidence of cardiovascular complications in DM patients at the Sikumana Community Health Center Kupang City.

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