Factors Affecting Peripheral Arterial Disease in Type 2 Diabetes Mellitus Patient

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Abstract. One of the complications of Diabetes Mellitus is that the leg pulse is not palpable due to interference with blood flow to the leg (Peripheral Arterial Disease (PAD)). Factors that affect PAD are age (over 50 years of age are at risk of PAD), hypertension (can cause arteries to dilate and cause endothelial injury), physical activity (lack of physical activity causes endothelial dysfunction,), duration of DM and diet. Based on a preliminary study at Pekanbaru Hospital, it was obtained from 5 patients, 80% were> 50 years old, 100% had diabetes> 5 years, 60% had hypertension, 80% had uncontrolled diet, 60% rarely did physical activity. The research objective was to determine the factors that influence PAD in clients with type 2 DM. This study was a quantitative study with a cross sectional design. The sample was 30 patients with type 2 diabetes mellitus. The sampling technique was accidental sampling. The research analysis was univariate and bivariate using the chi-square. Through the study, it was found that the age of PAD patients was adults (63.3%), DM> 5 years (63.3%), hypertension (83.3%), uncontrolled blood sugar (66.7%), uncontrolled diet (60%) and not doing physical activity (46.7%). Through statistical tests, it was found that there was a relationship between age (p value 0.000), there was no relationship for long suffering from diabetes (p value = 0.095), there was no relationship with hypertension (p value = 0.112), there was a relationship with blood glucose control (p value 0.003), there was a relationship diit (p value = 0.049) and there is a relationship between physical activity (p value = 0.000) to the occurrence of PAD.

Keywords: Peripheral Arterial Disease (PAD), Diabetes Mellitus Type 2

1 Introduction

Diabetes Mellitus (DM) is a disease in which the condition of glucose levels in the blood exceeds normal limits (Mahdiana, 2015). The Diabetes Federation (IDF, 2018) states that there are currently 415 million people in the world who experience diabetes.Indonesia is ranked 4th with the highest number of DM sufferers in the world, which is 15 million people and it is estimated that this number will continue to increase to 21.3 million in 2030. Hyperglycemia in diabetes mellitus, especially in type 2 diabetes mellitus causes complications of both microangiopathy and macroangiopathy (Black & Hawks, 2014), one of which is neuropathy and Peripheral Arterial Disease (PAD) (Ilminova, 2015). PAD is a disruption of blood supply to the upper or lower extremities due to obstruction caused by atherosclerosis, but can also be caused by thrombosis, embolism, vasculitis, or fibromuscular dysplasia (Aryani, 2016).

The prevalence of DM neuropathy in the world is 54,000 people per year and cases of PAD in the world are estimated that more than 202 million people in the world suffer from PAD (Fukrapti and Naqiyya, 2020). The prevalence of PAD in Indonesia is around 1,455,000 people. The risk of developing PAD increases with the severity and duration of diabetes, where those who suffer from DM have a 7-15-fold higher likelihood (Ilminova, 2015). Until now, there is no definite data regarding the number of PAD patients in Riau Province. Based on a preliminary study at the Awal Bros Hospital (RSAB) Pekanbaru, it was found that the number of DM patients was 300 people per month and there were 30 cases of peripheral arterial disease every month (Medical Record RSAB Pekanbaru, 2021).

The biggest cause of PAD is the presence of atherosclerosis, so it can be said that atherosclerosis risk factors are also a risk factor for PAD (Rooke, 2011). The prevalence of atherosclerosis increases in diabetes mellitus, hypertension, hypercholesterolemia, diabetes, physical activity and smoking (Antono & Hamonangani, 2014). Individuals with diabetes are at greater risk for developing PAD. The failure of efforts to control blood glucose levels in the long term has an impact on the emergence of various microvascular and macrovascular complications (Vienna, 2012).

About 15-20% of people over 50 years of age have a risk of suffering from PAD (Efi, 2012). The relationship between PAD and age reflects the longer exposure to atherogenic factors with the cumulative effect of aging in the blood vessels. In the aging process, which can naturally cause the blood vessels of the elderly to experience atherosclerosis and the potential for cell proliferation, DNA damage and the process of apoptosis. The amount of NO (Nitrogen Monoxide) and the vascular response to NO decreases with age. The decrease in NO results in impaired relaxation of blood vessels (Wang & Martin, 2012).

Physical activity can prevent the atherosclerosis process (Li and Siegrist, 2012). Physical activity in type 2 DM patients can improve glycemic control and reduce the risk of cardiovascular disease and death in type 2 DM patients. Lack of physical activity is a risk factor for endothelial dysfunction (Hamasaki, 2016). The results of Loprinzi and Abbott's (2014) research show that there is a relationship between physical activity and PAD as measured by checking ABI. Patients with type 2 diabetes have light physical activity with RR = 0.77, 95% CI: 0.62-0.96.

Another risk factor for atherosclerosis is hypertension. High blood pressure can cause the arteries to stretch and dilate excessively and cause injury to the endothelium. Abnormality of smooth muscle tone, blood vessels, coagulation disorders, proliferation of vascular smooth muscle cells, fibrinolysis and persistent inflammation caused by endothelial dysfunction. Hypertensive patients have an approximately 2-5% risk of developing PAD and hypertensive patients 35-55% are known to suffer from PAD. How to detect PAD in hypertensive patients is rarely done (Powell TM, 2011). This is in accordance with research conducted by Maria (2013) where it was found thatThere was a very significant relationship between blood pressure and the ABI value (P = 0.037). Chi-square test showed that there was a significant relationship between blood pressure and ABI value (P = 0.049), while the risk factors were age (P = 0.144), obesity (P = 0.488), LDL cholesterol (P = 0.197) and smoking history (P = 0.512) there was no relationship.

One of the risk factors for PAD is diet. A healthy diet for PAP sufferers is aimed at slowing down the atherosclerosis process, having a healthy ideal body, reducing the risk of PAD, heart disease, and stroke. A person who has DM and PAD is allowed to eat fatty foods, namely unsaturated fats, or foods that are low in fat and low in salt. Foods that contain unsaturated fats include canola, soybeans, nuts, vegetable oil, avocado, and fatty fish such as mackerel, herring, salmon, trout, and sardines.

Based on a preliminary study conducted at RSAB Pekanbaru, data were obtained from 5 patients, 4 of whom were> 50 years old, 5 patients had diabetes for more than 5 years. Of the 5 patients, 3 of them had grade 1 hypertension and 2 others had prehypertension, 4 patients said they had tried to adjust their diet but hypertension and diabetes were still not well controlled. 3 patients also said that they rarely do physical activities such as jogging, gymnastics, leg exercises and so on in their daily lives.

Based on the above background, the researchers are interested in conducting research on "factors that affect Peripheral Arterial Disease (PAD) in clients with type 2 diabetes mellitus in the internal disease polyclinic RSAB Pekanbaru".

2 Methods

This type of research is a descriptive correlative study with a cross-sectional research design. This research was carried out in the polyclinic room of RSAB Pekanbaru. The sampling method in this research is accidental sampling. The number of samples in the study were 30 respondents who matched the inclusion criteria (willing to be respondents, the patient had a diagnosis of type 2 diabetes mellitus, the patient was compos mentis) and exclusion criteria (respondents refused to be the object of the study, the patient had a history of heart disease, the patient was severe pain and there is an ulcer in the patient's leg). Researchers used a questionnaire sheet (containing the initials of the name, age, gender, education, occupation, vital signs, history of cholesterol, length of diabetes, history of hypertension, blood sugar control, diit and physical activity carried out daily) and the observation sheet for the Peripheral Arterial Disease level by using ABI measurements, then documenting. The data analysis of this research is univariate and bivariate. Bivariate data analysis was performed by using the Chi-square test with a confidence degree of 95%.

3 Results and Discussion

3.1 Research Result

a. Univariate Analysis

Table 1. Characteristics Clients with Type 2 Diabetes Mellitus at Internal Medicine Polyclinic RSAB Pekanbaru

No.	Characteristics of Respondents	Frequency	Percentage (%)
1	Age		
	a. Adult	19	63.3
	b. Elderly	11	36.7
2	Gender		
	a. Man	15	50
	b. Women	15	50
3	Education		
	a. Elementary School (SD)	1	3.3
	b. Senior High School (SMA)	16	53.3
	c. College (PT)	13	43.3
4	Profession		
	a. Does not work	4	13.3
	b. Private	11	36.7
	c. entrepreneur	2	6.7
	d. Housewife	10	33.3

	e. Government employees	3	10
5	History of Hypertension		
	a. Not	5	16.7
	b. Yes	25	83.3
6	Blood Sugar Control		
	a. Not controlled	20	66.7
	b. Controlled	10	33.3
7	Control Diit		
	a. Not controlled	18	60
	b. Controlled	12	40
8	Long Suffering from DM		
	a. ≤ 5 years	11	36.7
	b. > 5 years	19	63.3
9	Physical Activity		
	a. Are not done	14	46.7
	b. Done	16	53.3
	Total	**30**	**100**

Based on table 1, it is known that the majority of respondents' age is 19 respondents (63.3%), 15 respondents (50%) female, 16 respondents (53.3%) high school education level, the respondent's occupation is private as much as 11 people (36.7%), 25 respondents (83.3%) with a history of hypertension, 20 (66.7%) uncontrolled respondents' blood sugar, 18 uncontrolled respondents (60%) suffering from diabetes> 5 years as many as 19 respondents (63.3%) and respondents who do not do physical activity as many as 14 people (46.7%).

Table 2. Peripheral Arterial Disease (PAD) Clients with Type 2 Diabetes Mellitus at Internal Medicine Polyclinic RSAB Pekanbaru

No.	Peripheral Arterial Disease (PAD)	Frequency	Percentage (%)
1	1-1.4 (Normal peripheral arterial circulation)	17	56.7
2	0.91-0.99 (There is a slight decrease in peripheral arterial circulation, correlate with clinical assessment)	11	36.7
3	<0.90 (Decrease in peripheral arterial circulation)	2	6,7
	Total	**30**	**100**

Based on table 2, it is known that PAD clients with diabetes mellitus type II diabetes mellitus are in the category 1-1.4 (normal peripheral arterial circulation) as many as 17 respondents (56.7%), 0.91-0.99 (There is a slight decrease in peripheral arterial circulation, correlated with clinical assessment) as many as 11 respondents (36.7%) and <0.90 (decrease in peripheral arterial circulation) as many as 2 respondents (6.7%).

b. Bivariate Analysis

1) Relationship Age Against The Occurrence of PAD

Table 3. Relationship age against the occurrence of PAD

No.	Age	PAD						Total		*p value*
		1-1.4		0.91-0.99		<0.90				
		n	%	n	%	n	%	n	%	
1	Adult	16	84.2	3	15.8	0	0	19	100	0.000
2	Elderly	1	9,1	8	72.7	2	18.2	11	100	
	Total	17	56.7	11	36.7	2	6.7	30	100	

Based on table 3, it is known that from 19 respondents who have an adult age, 16 of them have a PAD value of 1-1.4 (84.2%) while of the 11 elderly respondents, 8 of them have a PAD value of 0.91-0.99 (72.7%). Chi square test results obtained p value = 0.000 (α <0.05), so there is a relationshipage towards the occurrence of Peripheral Arterial Disease (PAD) in clients with type 2 diabetes mellitus in internal medicine polyclinic at RSAB Pekanbaru.

2) Relationship long suffering from DM to the occurrence of PAD

Table 4. Relationship Long Suffering from DM to The Occurrence of PAD

No.	Long Suffering from DM	PAD						Total		*p value*
		1-1.4		0.91-0.99		<0.90				
		n	%	n	%	n	%	n	%	
1	≤5 years	9	81.8	2	18.2	0	0	11	100	0.095
2	> 5 years	8	42.1	9	47.4	2	10.5	19	100	
	Total	17	56.7	11	36.7	2	6.7	30	100	

Based on table 4, it is known that from 11 respondents who suffered from diabetes <5 years, 9 of them had a PAD value of 1-1.4 (81.8%) while of 19 respondents who had diabetes> 5 years, 9 of them had a PAD value of 0.91-0.99 (47, 4%%). Chi square test results obtained p value = 0.095 (α> 0.05), so there is no relationshiplong suffering from DM to the occurrence of Peripheral Arterial Disease (PAD) in clients with type 2 diabetes mellitus in internal medicine polyclinic at RSAB Pekanbaru.

3) Relationship Hypertension Against The Occurrence of PAD

Table 5. Relationship Hypertension Against The Occurrence of PAD

No.	Hypertension	PAD						Total		*p value*
		1-1.4		0.91-0.99		<0.90				
		n	%	n	%	n	%	n	%	
1	Not	4	80	0	0	1	20	5	100	0.112
2	Yes	13	52	11	44	1	4	25	100	
	Total	17	56.7	11	36.7	2	6.7	30	100	

Based on table 5, it is known that from 5 respondents who suffer from hypertension, 4 of them have a PAD value of 1-1.4 (80%) while of the 25 respondents who have hypertension, 13 of them have a PAD value of 1-1.4 (52%). Chi square test results obtained p value = 0.112 (α> 0.05), so there is no relationshiphypertension against the occurrence of Peripheral Arterial Disease (PAD) in clients with type 2 diabetes mellitus in internal medicine polyclinic at RSAB Pekanbaru.

4) Relationship Blood Glucose Control in The Presence of PAD

Table 6. Relationship blood glucose control in the presence of PAD

No.	Blood Glucose Control	PAD						Total		*p value*
		1-1.4		0.91-0.99		<0.90				
		n	%	n	%	n	%	n	%	
1	Not controlled	7	35	11	55	2	10	20	100	0.003
2	Controlled	10	58.8	0	0	0	0	10	100	
	Total	17	56.7	11	36.7	2	6.7	30	100	

Based on table 6, it is known that of the 20 respondents whose blood glucose was not controlled, 11 of them had a PAD value of 0.91-0.99 (55%), while of the 10 respondents whose blood glucose was controlled, 10 of them had a PAD value of 1-1.4 (58.8%). Chi square test results obtained p value = 0.003 (α <0.05), so there is a relationshipblood glucose control with the occurrence of Peripheral Arterial Disease (PAD) in clients with type 2 diabetes mellitus in internal medicine polyclinic at RSAB Pekanbaru.

5) Relationship Diit Against The Occurrence of PAD

Table 7. Relationship Diit Against The Occurrence of PAD

No.	Diit	PAD						Total		*p value*
		1-1.4		0.91-0.99		<0.90				
		n	%	n	%	n	%	n	%	
1	Not controlled	7	38.9	9	50	2	11.1	18	100	0.049
2	Controlled	10	83.3	2	16.7	0	0	12	100	
Total		17	56.7	11	36.7	2	6.7	30	100	

Based on table 7, it is known that from 18 respondents who were not controlled, 9 of them had a PAD value of 0.91-0.99 (50%), while of the 12 respondents who were controlled, 10 of them had a PAD value of 1-1.4 (83.3%). Chi square test results obtained p value = 0.049 (α <0.05), then there is a relationshipdiit against the occurrence of Peripheral Arterial Disease (PAD) in clients with type 2 diabetes mellitus in internal medicine polyclinic at RSAB Pekanbaru.

6) Relationship physical activity against the occurrence of PAD

Table 8. Relationship physical activity against the occurrence of PAD

No.	Physical activity	PAD						Total		*p value*
		1-1.4		0.91-0.99		<0.90				
		n	%	n	%	n	%	n	%	
1	Are not done	2	14.3	10	71.4	2	14.3	14	100	0.000
2	Done	15	93.8	1	6.3	0	0	16	100	
Total		17	56.7	11	36.7	2	6.7	30	100	

Based on table 7, it is known that from 14 respondents who did not do physical activity, 10 of them had a PAD value of 0.91-0.99 (71.4%) while of the 16 respondents who did physical activity, 15 of them had a PAD value of 1-1.4 (93.8%). Chi square test results obtained p value = 0.000 (α <0.05), so there is a relationshipphysical activity against the occurrence of Peripheral Arterial Disease (PAD) in clients with type 2 diabetes mellitus in internal medicine polyclinic at RSAB Pekanbaru.

4 Discussion

4.1 The Relationship of Age to The Occurrence of PAD

The average respondent in this study was classified as middle elderly with an age range of 45-65 years. Type 2 diabetes mellitus aged less than 70 years has a higher risk of experiencing

microvascular complications such as neuropathy, retinopathy, and nephropathy (Floch, Doucet, Bauduceu, & Verny, 2013).

Through research, it is known that the majority of respondents‘ age is early adulthood as many as 19 respondents (63.3%). Of the 19 respondents who had early adulthood to late adulthood, 16 of them had a PAD score of 1-1.4 (84.2%) while of the 11 elderly respondents, 8 of them had a PAD value of 0.91-0.99 (72.7%). Chi square test results obtained p value = 0.000 (α <0.05), so there is a relationship between age and the occurrence of peripheral arterial disease (PAD) in clients with type 2 diabetes mellitus in the internal medicine polyclinic at RSAB Pekanbaru.

Age is a factor in adults, with increasing age the ability of tissues to take up blood glucose decreases. This disease is more common in people aged over 40 years than in younger people. Conditions that occur in human life are like the aging process which is a natural process throughout life starting from the beginning of life. In the elderly, metabolic disease can occur mainly due to decreased hormone production, such as in women who are approaching the age of 50. Diabetes mellitus is often found in elderly people aged 70 years and over (Komsah, Sofiani and Irawati, 2019).

The relationship between PAD and age reflects the longer exposure to atherogenic factors with the cumulative effect of aging in the blood vessels. In the aging process, which can naturally cause the blood vessels of the elderly to experience atherosclerosis and the potential for cell proliferation, DNA damage and the process of apoptosis (Wang & Martin, 2012).

The results of this study are in accordance with the statement of the American College of Cardiology Foundation / American Heart Association (ACCF / AHA) (2017) that the age factor is a person‘s main risk for suffering from PAP. The risk of PAP increases with age, from 3% at <50 years of age to> 20% at ≥70 years of age. The relationship between age and PAP reflects a longer length of exposure to atherogenic factors along with the cumulative effects of aging.

4.2 Long Relationship Suffering from DM to The Occurrence of PAD

Through research, it is known that most of the people who suffer from diabetes> 5 years are 19 respondents (63.3%). It is known that of the 11 respondents who suffered from diabetes <5 years, 9 of them had a PAD value of 1-1.4 (81.8%) while of the 19 respondents who had diabetes> 5 years, 9 of them had a PAD value of 0.91-0.99 (47.4%). The results of the chi square test obtained p value = 0.095 (α> 0.05), so there is no long-term relationship with DM to the occurrence of Peripheral Arterial Disease (PAD) in clients with type 2 diabetes mellitus in the internal medicine polyclinic at RSAB Pekanbaru.

The length of time a person experiences Diabetes Mellitus can exacerbate the risk of complications of Diabetes Mellitus, one of which is the obstruction of peripheral vascularization so that it can reduce the value of the Ankle Brachial Index and foot sensitivity, and result in ulcers. The prolonged increase in blood sugar levels results in damage to the lumen of blood vessels which will affect peripheral circulation. Hyperglycemia in a long time will cause a buildup of glucose levels in certain cells and tissues which are then converted into sorbitol which causes damage and changes in cell function. Sorbitol is slow metabolized, plus the formation of Advanced Glycation End Products (AGEs),

Through this research, it can be seen that the number of respondents who have diabetes> 5 years is 19 respondents (63.3%) and <5 years as many as 11 respondents (37.7%). Not only the duration of DM that affects the incidence of PAD, such as controlled diets, controlled blood glucose, age etc. The duration of suffering from DM is one of the things that affects the severity of peripheral neuropathy in DM patients.

The results of this study are in line with the research of Lintang, et al. (2019) which shows that the average length of time for respondents suffering from diabetes is 9.8 years. Respondents who had normal degree of PAD were 52.5%, mild grade PAD was 12.5%, moderate PAD was 32.5% and severe degree PAD was 2.5%. The results of the Spearman test for the two variables obtained a p value of 0.651. This shows that there is no strong relationship between the duration of suffering from type 2 diabetes mellitus with the incidence of Peripheral Artery Disease in patients with type 2 diabetes mellitus at Kedaton Public Health Center, Bandar Lampung City.

4.3 The relationship of hypertension to the occurrence of PAD

Through research it is known that respondents who have a history of hypertension are 25 respondents (83.3%). Of the 5 respondents who suffered from hypertension, 4 of them had a PAD value of 1-1.4 (80%) while of the 25 respondents who had hypertension, 13 of them had a PAD value of 1-1.4 (52%). Chi square test results obtained p value = 0.112 ($\alpha > 0.05$), so there is no relationship between hypertension and the occurrence of Peripheral Arterial Disease (PAD) in clients with type 2 diabetes mellitus in the internal medicine polyclinic at RSAB Pekanbaru.

Patients with Type 2 diabetes also experience disruption of blood flow to the heart due to blood viscosity so that the burden on the heart to pump blood throughout the body increases and over time hypertension can occur. Hypertension is a disease caused by various causes. In patients with DM generally as a result of macrovascular complications. Meanwhile, PAD is a disease that generally occurs in DM sufferers due to microvascular complications. Both are diseases that complicate DM sufferers, but that does not mean that the two are always related, this is strongly influenced by other factors as well as the individual characteristics of DM sufferers themselves (Rihiantoro and Purbianto, 2012).

Hypertensive patients have an approximately 2-5% risk of developing PAD and hypertensive patients 35-55% are known to suffer from PAD. How to detect PAD in hypertensive patients is rarely done. Clinicians or patients often ignore the symptoms of PAD. Clinicians who can be aware of the symptoms of PAD in patients are about 49% and PAD patients diagnosed and undergoing treatment are less than 25% (Powell TM, 2011).

Based on the results of Jelantik's (2014) study of 50 respondents with Type 2 Diabetes Mellitus, it was found that 88% of respondents had hypertension and 12% of respondents did not suffer from hypertension. This study is not in line with Valliyot's (2013) study showing that people who have a history of hypertension have 5 times the risk of suffering from Type 2 Diabetes Mellitus compared to people who do not have a history of hypertension.

4.4 Relationship between blood sugar control and the occurrence of PAD

Through research, it is known that there were 20 respondents (66.7%) who had uncontrolled blood sugar, of the 20 respondents whose blood glucose was not controlled, 11 of them had a PAD value of 0.91-0.99 (55%) while of 10 respondents whose blood glucose was controlled, 10 among them have a PAD value of 1-1.4 (58.8%). Chi square test results obtained p value = 0.003 ($\alpha < 0.05$), so there is a relationship between blood glucose control and the occurrence of Peripheral Arterial Disease (PAD) in clients with type 2 diabetes mellitus in the internal medicine polyclinic at RSAB Pekanbaru.

High blood glucose levels have far-reaching negative impacts not only on carbohydrate metabolism, but also on protein and fat metabolism. As a result, atherosclerosis can occur in the tissues, especially in the peripheral areas of the legs. High blood glucose accelerates the process of atherosclerosis in large blood vessels such as the aorta, coronary arteries, or arteries that supply blood to the legs and brain. As a result, the risk of heart attack and stroke is much greater

in diabetics than non-sufferers of the same age, race, weight, and gender. In addition, blood circulation to the legs is also hampered (Widodo & Muzaky, 2017).

Endothelial dysfunction and atherosclerotic conditions that occur due to hyperglycemia cause narrowing of the lumen of blood vessels to the periphery. Lumen reduction causes circulation to the periphery to decrease, this circulation deficit causes a decrease from the ABI Score to below 0.9. According to the American Heart Association (AHA), a small ABI score indicates a peripheral circulation deficit resulting in PAD in these patients (AHA, 2018). The results of this study are in accordance with the research of Ezekia (2020) where there was a significant relationship between HbA1c ($p = 0.001$), fasting blood sugar ($p = 0.006$), blood sugar 2 hours post prandial ($p = 0.004$), and hypertension ($p = 0.047$) with PAP in patients with Type II diabetes in patients with Diabetes Polyclinic at Sanglah Hospital Denpasar.

4.5 The relationship between the diet and the occurrence of PAD

Through research, it is known that the uncontrolled number of respondents is 18 people (60%). Of the 18 respondents whose diet was uncontrolled, 9 of them had a PAD value of 0.91-0.99 (50%), while of the 12 respondents whose diet was controlled, 10 of them had a PAD value of 1-1.4 (83.3%). Chi square test results obtained p value = 0.049 ($\alpha < 0.05$), so there is a relationship between the diet and the occurrence of Peripheral Arterial Disease (PAD) in clients with type 2 diabetes mellitus in the internal medicine polyclinic at RSAB Pekanbaru.

Many factors affect the ABI value in DM sufferers, including blood glucose levels, given insulin therapy, diet therapy, physical activity, and age. ABI is used to support the diagnosis of vascular disease in DM by providing an objective indicator of arterial perfusion to the lower extremities. Rest / Diabetic diet 1500 kcal (carbohydrate 828 kcal, protein 60 g, fat 33 g), heart diet II, low salt diet II / oxygen 2 liters / minute. A low-salt diet is a diet containing foods consisting of low sodium food ingredients such as those found in table salt, baking soda, baking powder and fitsin (MSG) (Dalimartha, 2018). The results of this study are in line with Safitri's (2019) study where there is a relationship between levels of glycosylated hemoglobin (HbA1C) and the incidence of peripheral artery disease (PAP) in people with type 2 diabetes mellitus with a p value = 0.487.

4.6 The relationship of physical activity to the occurrence of PAD

Physical activity is a body movement produced by skeletal muscles that requires energy expenditure including activities performed while working, playing, doing household chores, traveling, and engaging in recreational activities (WHO, 2017). Physical activity in type 2 DM patients can improve glycemic control and reduce the risk of cardiovascular disease and death in type 2 DM patients. Lack of physical activity is a risk factor for endothelial dysfunction.

Through research, it is known that the respondents who do not do physical activity are 14 people (46.7%). Of the 14 respondents who did not do physical activity, 10 of them had a PAD value of 0.91-0.99 (71.4%) while of the 16 respondents who did physical activity, 15 of them had a PAD value of 1-1.4 (93.8%). Chi square test results obtained p value = 0.000 ($\alpha < 0.05$), so there is a relationship between physical activity and the occurrence of Peripheral Arterial Disease (PAD) in clients with type 2 diabetes mellitus in the internal medicine polyclinic at RSAB Pekanbaru.

Exercise therapy is recommended for symptomatic PAP patients. Exercise therapy is recommended for 30-45 minutes for each session and performed at least 3 times each week for up to 12 weeks. The effect of physical exercise on decreased afterload by improving endothelial function can be compared with the effects of well-known pharmacological therapies (eg, ACE inhibitors).

The results of the above research are also in accordance with the research conducted by Loprinzi and Abbott (2014) which examined physical activity using an accelerometer against peripheral artery disease assessed using ABI. The results showed that there was a relationship between physical activity and peripheral artery disease as measured by ABI checking. Patients with type 2 diabetes have light physical activity with RR = 0.77, 95% CI: 0.62-0.96.

5 Conclusion

a. The age of Peripheral Arterial Disease (PAD) patients was early to late adulthood as many as 19 respondents (63.3%)
b. The duration of the patient with Peripheral Arterial Disease (PAD) suffering from DM is> 5 years as many as 19 respondents (63.3%)
c. Peripheral Arterial Disease (PAD) patients suffering from hypertension were 25 respondents (83.3%)
d. Blood sugar in patients with uncontrolled Peripheral Arterial Disease (PAD) was 20 people (66.7%),
e. Diits of uncontrolled Peripheral Arterial Disease (PAD) patients were 18 people (60%)
f. There were 14 patients with peripheral arterial disease (PAD) who did not do physical activity (46.7%).
g. The analysis results showed that the p value = 0.000 (α <0.05) means that it can be concluded that there is a relationship between age and the occurrence of peripheral arterial disease (PAD).
h. The results of the analysis showed that the p value = 0.095 (α> 0.05) means that it can be concluded that there is no long association with DM to the occurrence of peripheral arterial disease (PAD).
i. The results of the analysis showed that the p value = 0.112 (α> 0.05) means that it can be concluded that there is no relationship between hypertension and the occurrence of peripheral arterial disease (PAD).
j. The results of the analysis showed that the p value = 0.003 (α <0.05) means that it can be concluded that there is a relationship between blood glucose control and the occurrence of peripheral arterial disease (PAD).
k. The results of the analysis showed that the p value = 0.049 (α <0.05) means that it can be concluded that there is a relationship between the diet and the occurrence of peripheral arterial disease (PAD).
l. The results of the analysis showed that the p value = 0.000 (α <0.05) means that it can be concluded that there is a relationship between physical activity and the occurrence of peripheral arterial disease (PAD).

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