

## HUBUNGAN AKTIVITAS FISIK DAN LAMA SAKIT DENGAN KEJADIAN LUKA DIABETES PADA PENDERITA DIABETES MELITUS TIPE 2 DI PUSKESMAS SEDAYU II BANTUL

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### Abstrak

Diabetes melitus (DM) tipe 2 merupakan gangguan metabolik yang disertai kenaikan gula darah yang diakibatkan adanya penurunan sekresi insulin oleh sel beta pankreas atau gangguan fungsi insulin. Penderita DM cenderung mengalami penurunan aktivitas fisik, aktivitas rendah bisa terjadi pada penderita yang sudah lama menderita DM. Lama sakit pada penderita berpotensi menimbulkan munculnya luka diabetes. Metode Penelitian: Penelitian ini merupakan penelitian kuantitatif korelasional dengan *survey cross sectional*. Pengambilan sampel menggunakan teknik *simple random sampling* dengan total sampel 61 orang. Instrument yang digunakan yaitu kuesioner Demografi, *International Physical Activity Questionnaire Short Form* (IPAQ-SF) dan ceklis observasi luka. Hasil Penelitian: Hasil penelitian menggunakan menggunakan uji korelasi *Chi Square* dengan melibatkan 61 penderita DM tipe 2 didapatkan hasil tidak ada hubungan aktivitas fisik dengan kejadian luka diabetes dan ada hubungan antara lama sakit dengan kejadian luka diabetes pada penderita DM tipe 2 di Wilayah Kerja Puskesmas Sedayu II Bantul. Analisis: Hasil analisis menunjukkan signifikansi ( $p$ ) dan korelasi ( $r$ ) yaitu aktivitas fisik  $p$  0,561;  $r$  0,337 dengan nilai (OR 1,410; *Lower-Upper limit* = 0,441-4,502) dan lama sakit  $p$  0,006;  $r$  7,478 dengan nilai (OR 6,000; *Lower-Upper limit* = 1,524-23,622). Kesimpulan: Tidak ada hubungan antara aktivitas fisik dengan kejadian luka diabetes dan ada hubungan antara lama sakit dengan kejadian luka diabetes pada penderita diabetes melitus tipe 2.

**Kata Kunci :** Aktivitas Fisik, Diabetes Melitus tipe 2, Lama Sakit, Luka Diabetes

**THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND DIABETES DURATION WITH INCIDENCE OF DIABETIC WOUNDS AMONG PEOPLE WITH TYPE 2 DIABETES MELLITUS IN SEDAYU II BANTUL PRIMARY HEALTH CENTER**

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**Abstract**

*Diabetes mellitus (DM) type 2 is a metabolic disorder characterized by an increase in blood sugar caused by a decrease in insulin secretion by beta pancreas cells or impaired insulin function. People with DM should experience a decrease in physical activity, low activity can occur in patients who have been suffering from DM for a long time. Long-term pain in patients has the potential to cause the appearance of diabetic wounds. Research Objectives: To determine the relationship between physical activity and duration of illness with the incidence of diabetes wounds in people with type 2 diabetes mellitus in the work area of the Sedayu II Bantul Health Center. Research Methods: This research is a correlational quantitative research with cross-sectional surveys. The Sampling was carried out using a simple random sampling technique with a total sample of 61 people. The instruments used are the demographic questionnaire, the International Physical Activity Questionnaire Short Form (IPAQ-SF), and the wound observation checklist. Research Results: The results of the study using the Chi Square correlation test involving 61 DM type 2 sufferers showed that there was no relationship between physical activity and the incidence of diabetic wounds, and there was a relationship between the duration of illness and the incidence of diabetic wounds in patients with type 2 DM in the working area of Sedayu II Bantul Health Center. Analysis : The results of the analysis showed significance (p) and correlation (r), namely physical activity p 0.561; r 0,337 with value (OR 1,410; Lower-Upper limit = 0,441-4,502) and long illness p 0.006; r 7,478 with value (OR 6,000; Lower-Upper limit = 1,524-23,622). Conclusion: There is no relationship between physical activity and the incidence of diabetic wounds and there is a relationship between the duration of illness and the incidence of diabetic wounds in the sufferers of type 2 diabetes mellitus.*

**Keywords : Physical Activity, Diabetes Mellitus type 2, Long Illness, Diabetic Wounds**

## INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disorder caused by high blood sugar levels as a result of impaired insulin function (Atlas, 2019). Dm sufferers in Indonesia amounted to 10.3 million people in 2017 and are predicted to increase to 16.7 million people by 2045. D.I Yogyakarta ranks 2nd with a prevalence of 3.1% after DKI Jakarta province with a prevalence of 3.4%. Data from the Bantul Health Office shows that the number of visits of dm type 2 sufferers to primary health center in 2020 was recorded at 31,973 patients. The highest number of visits of 1,552 patients was at the Sedayu II Bantul Health Center. Data at the Sedayu II Bantul Health Center showed that in January-October there were 2,738 patients with type 2 DM.

Type 2 DM is a metabolic disorder accompanied by an increase in blood sugar caused by a decrease in insulin secretion by beta pancreas cells or impaired insulin function. In people suffering from DM can affect their physical activity decreased (Kemenkes, 2020). Physical activity is the physical movement carried out by the muscles of the body and other supporting systems of every movement produced by the skeletal muscles to expend energy (Indradewi, 2020). Low activity can occur in people with DM who have been suffering from DM for a long time (Mulyadi, 2017).

Long illness in people with DM has the potential to cause the appearance of wounds. From the results of the research conducted, it was found that complications arise after the disease runs for approximately 10-15 years, because prolonged suffering from type 2 DM causes a continuous accumulation of glucose in the blood which results in complications (Desy Arifatul Hidayah, 2021). Diabetic wounds are one of the chronic complications of DM that people with DM are most afraid of because it can result in disability and even death. One of the complications of DM is a diabetic wound that causes 50% - 75% to be required to be amputated (Indradewi, 2020). Early detection and proper treatment of wounds can prevent 85% of amputations (Husniawati, 2015).

This study aims to determine the relationship between physical activity and duration of illness with the incidence of wounds in people with type 2 diabetes mellitus in the work area of the Sedayu II Bantul Health Center.

## RESEARCH METHODS

The research was conducted in the working area of puskesmas Sedayu II Bantul in June 2022. This research is a correlational quantitative study with a cross sectional approach. The population in this study was type 2 DM patients who visited the Sedayu II Bantul Health Center, which was 120 people. The sample in this study was 61 people based on the calculation results using the slovin formula (Soekidjo N., 2016). Samples were selected based on a simple random sampling technique by dividing the inclusion and exclusion criteria. The inclusion criteria are people with type 2 diabetes mellitus aged 50-70 years, willing to be respondents and can communicate with Indonesian / Javanese well. Meanwhile, the exclusion criteria in this study are patients who resigned at the time the study will be carried out and respondents who move or no longer live in the work area of the Sedayu II Bantul Health Center.

The free variables in this study were physical activity and length of illness, while the bound variables in this study were the incidence of diabetic wounds. Secondary data in this study are data obtained by researchers from second, third and so on sources. The primary data in this study are data obtained from researchers through survey results and filling out the Demographic questionnaire, International Physical Activity Questionnaire Short Form (IPAQ-SF) and wound observation checklists. The data collected in this study were analyzed using frequency distribution and chi square correlation test to determine the relationship between physical activity and duration of illness with the incidence of diabetic wounds.

## RESULT

### 1. Distribution of Respondent Characteristics

The research respondents in this study were 61 people spread across Argorejo, Bantul. The socio-demographic characteristics of the respondents studied in this study were gender, age, education, occupation, income, and long period of suffering from type 2 DM. The results of the analysis of the socio-demographic characteristics of respondents in this study are as follows:

**Table 1 Frequency Distribution of Respondent Characteristics in the Working Area of Puskesmas Sedayu II Bantul (n=61)**

Variabel	Kategori	Frekuensi	Persentase (%)
Umur	50-60 Tahun	30	49,2%
	61-70 Tahun	31	50,8%
	<b>Total</b>	<b>61</b>	<b>100%</b>
	<b>Rata-rata umur</b>	<b>61,32</b>	<b>Tahun</b>
Jenis Kelamin	Laki – laki	21	34,4%
	Perempuan	40	65,6%
	<b>Total</b>	<b>61</b>	<b>100%</b>
Pendidikan	Tidak sekolah/tidak tamat SD	2	3,3%
	Pendidikan dasar awal SD-SMP	37	60,7%
	Pendidikan dasar lanjut SMA-PT	22	36,1%
	<b>Total</b>	<b>61</b>	<b>Tahun</b>
Pekerjaan	Tidak bekerja	15	24,6%
	Buruh/petani	14	23,0%
	Wiraswasta	23	37,7%
	PNS/TNI/POLRI	9	14,8%
	<b>Total</b>	<b>61</b>	<b>100%</b>
Pendapatan	< UMR (Rp. 1.916.848)	22	36,1%
	> UMR (Rp. 1.916.848)	39	63,9%

	<b>Total</b>	<b>61</b>	<b>100%</b>
Lama sakit	0 – 1 tahun	0	0%
	2 – 5 tahun	40	65,6%
	6 – 10 tahun	16	26,2%
	>10 tahun	5	8,2%
	<b>Total</b>	<b>61</b>	<b>100%</b>
	<b>Rata-rata lama sakit</b>	<b>5,93</b>	<b>Tahun</b>

Table 1 of respondents' characteristics, based on age characteristics, shows that the most dm type 2 sufferers are in the age range of 61-70 years or the elderly category (elderly) as many as 31 people with a percentage of 50.8%, with an average of 61.32 years old patients. The gender of people with type 2 DM was the most, namely female respondents as many as 40 people (65.6%), while the male gender was 21 respondents (34.4%). Based on the distribution of education, elementary and junior high schools were 37 people (60.7%) while at least 2 respondents who did not go to school / did not finish elementary school were 2 respondents (3.3%). Based on the distribution of jobs, it shows that the majority of people with type 2 DM work as entrepreneurs as many as 33 people (37.7%). The distribution of income for people with type 2 DM shows that the majority have income > the Bantul UMR 2022 or above Rp. 1,916,848, - as many as 39 people (63.9%). The distribution of length of illness shows that 40 people with type 2 DM have suffered from type 2 DM in the range of 2-5 years (65.6%) with an average of 5.93 years of long-sick respondents.

## 2. Distribution by Physical Activity

**Table 2. Distribution of Physical Activity in people with Diabetes Mellitus in the Working Area of puskesmas Sedayu II Bantul (n=61)**

<b>Luka Diabetes</b>	<b>Frekuensi</b>	<b>Persentase (%)</b>
Tidak Ada Grade	23	37,7%
Grade 0	13	21,3%
Grade 1	15	24,6%
Grade 2	7	11,5%
Grade 3	3	4,9%
Total	61	100%

The distribution of physical activity of patients with type 2 DM in table 4.2 shows the value of physical activity in patients with type 2 DM at the Sedayu II Bantul Health Center. Of

the total 61 respondents who had moderate physical activity, 43 people (70.5%). Activities that are currently indicating that people with type 2 DM still have sufficient activity.

### 3. Distribution of The Incidence of Dibetes Wounds

**Table 3. Distribution of diabetic wounds in people with Diabetes Mellitus in the Working Area of the Sedayu II Bantul Health Center (n= 61)**

Luka Diabetes	Frekuensi	Persentase (%)
Tidak Ada Grade	23	37,7%
Grade 0	13	21,3%
Grade 1	15	24,6%
Grade 2	7	11,5%
Grade 3	3	4,9%
Total	61	100%

The Distribution of Diabetic Wounds for people with type 2 DM in table 4.3 shows that out of 61 respondents, 38 respondents (62.3%) obtained wound events. The results of this study showed that of the 38 respondents who had diabetic wounds caused by being exposed to sharp objects, 21.1% fell, 10.5% were exposed to wood and 36.8% were caused by other causes. In diabetic wounds, the wound grade level in this study showed a wound grade of 0 as many as 13 respondents (21.3%), grade 1 as many as 15 respondents (24.6%), grade 2 as many as 7 respondents (11.5%) and grade 3 as many as 3 respondents (4.9%).

### 4. Relationship between Physical Activity and Diabetic Wound Events

**Table 4. Bivariate Analysis of the Relationship Between Physical Activity and the Incidence of Diabetic Wounds in Dm Type 2 sufferers in the Working Area of the Sedayu II Bantul Health Center (n=61)**

Variabel	Luka Diabetes				Total		Nilai OR (CI)	p-value
	Tidak Ada Grade	%	Grade luka 0+1+2+3	%	N	%		
Aktivitas Fisik								
Tinggi	7	43,8%	9	56,3%	16	100%	<b>1,410</b>	<b>0,561</b>
Sedang+	16	35,6%	29	64,4%	45	100%	<b>(0,441-4,502)</b>	
Rendah								
Total	23	37,7%	38	62,3%	61	100%		

The results of the chi square test between physical activity and the incidence of diabetic wounds obtained a p-value of 0.561 ( $p > 0.05$ ) so that it can be concluded that there is no

significant relationship between physical activity and the incidence of diabetic wounds. The results of the statistical analysis in table 4. obtained the value of OR = 1.410. With a meaningfulness rate of 95%, this means that the moderate+ high physical activity group has a 1.4 times greater risk of developing a diabetic wound event compared to the high activity group. Considering the lower limit and upper limit values, which are stretched from 0.441-4.502, including one value, the research hypothesis is not accepted.

5. Diabetes Duration Relationship of Pain with The Incidence of Diabetic Wounds

**Table 5. Bivariate Analysis of the Relationship between Long Illness and The Incidence of Diabetic Wounds in Dm Type 2 sufferers in the Working Area of the Sedayu II Bantul Health Center (n=61)**

Variabel	Luka Diabetes				Total		Nilai OR (CI)	p-value
	Tidak Ada Grade	%	Grade luka 0+1+2+3	%	N	%		
<u>Lama Sakit</u>								
≤5 tahun	20	50,0%	20	50,0%	40	100%	<b>6,000 (1,524-23,622)</b>	<b>0,006</b>
>5 tahun	3	14,3%	18	85,7%	21	100%		
Total	23	37,7%	38	62,3%	61	100%		

The results of the Chi Square test between the duration of illness and the incidence of diabetic wounds obtained a p-value of 0.006 ( $p < 0.05$ ) so that it can be concluded that there is a significant relationship between the duration of illness and diabetic wounds in patients with type 2 DM in the Working Area of the Sedayu II Bantul Health Center. The correlation value is 7.478 which means that there is a very strong close relationship between the two variables.

**DISCUSSION**

1. Distribution of Respondent Characteristics

The number of DM sufferers in Indonesia is increasing with age. Blood sugar levels gradually increase after a person reaches the age of more than 50 years (Aprillia Boku, 2019). The penuan process in this age group is related to a decrease in the ability of pancreatic beta cells to produce insulin which can cause a decrease in body functions in controlling blood glucose (Desy Arifatul Hidayah, 2021). Based on the gender of people with type 2 DM, the most were female respondents as many as 40 people (65.6%), while the male gender was 21 respondents (34.4%). Almost the same as the research of Hidayah et al, (2021) that 58.3% of respondents are women (Desy Arifatul Hidayah, 2021). The majority of people with type 2 DM are women because women have a greater chance of increasing BMI than men, especially because women have a monthly cycle (premenstrual syndrome) and post-menopause which makes the distribution of body fat increase. Such hormonal changes can affect blood glucose levels (Livana et al., 2018).

The level of education is an indicator that a person has taken a formal education level in a certain field, but not an indicator that a person has mastered the field of science (Syamsunie, 2018). Based on the distribution of education, elementary and junior high schools were 37 people (60.7%) while at least 2 respondents who did not go to school / did not finish elementary school were 2 respondents (3.3%). Other studies have shown that people with type 2 DM are more at risk of occurring in people with low levels of education. The low level of education will affect a person's ability because sufferers have to adapt to the management of the disease they suffer from (Erna 2021). Meanwhile, people with higher education are likely to be better at preventing diseases including type 2 DM (Purwaningtyastuti R, 2016). Based on the distribution of jobs, it shows that the majority of people with type 2 DM work as entrepreneurs as many as 33 people (37.7%). The results of this study are in line with Aprilia's research (2018) showing that the percentage of respondents who work as entrepreneurs is 21% (Aprillia Boku, 2019) and the research of Hidhayah et al, (2019) shows respondents who work as entrepreneurs with a percentage of 20.2% (Desy Arifatul Hidhayah, 2021).

The distribution of income for people with type 2 DM shows that the majority have income > the Bantul UMR 2022 or above Rp. 1,916,848, - as many as 39 people (63.9%). The results of this study are in line with the research of Adam et al, (2021) showing the percentage of dm type 2 sufferers who have an income above the UMR, which is 75.8% (Rizka Kinanti, 2021). The distribution of length of illness shows that 40 people with type 2 DM have suffered from type 2 DM in the range of 2-5 years (65.6%) with an average of 5.93 years of long-sick respondents. This research is in line with the research of Indrdewi et al, (2020) the majority of lama suffered from 2-6 years with a percentage of 39.9% (Indradewi, 2020) as well as nisak research states that the majority of lama suffer from <5 years with a percentage of 58.9% (Nisak, 2021). Patients with type 2 DM who are diagnosed for at least 1 year will experience a decrease in quality of life because in that vulnerable time a person has experienced and felt some changes or physical and psychological complaints due to his illness (Adila, 2020).

## 2. Distribution by Physical Activity

Based on table 2 out of a total of 61 respondents had moderate physical activity, namely 43 people (70.5%). Activities that are currently indicating that people with type 2 DM still have sufficient activity. Judging from the majority of jobs for people with type 2 DM in the Sedayu II Bantul Health Center Work Area, many have jobs as entrepreneurs and farmers, so many dm type 2 sufferers have moderate physical activity. This is related to research conducted by trisnawati that if physical activity increases, blood glucose levels will decrease and vice versa (Setyorogo & Trisnawati, 2016)

## 3. Distribution of The Incidence of Dibeates Wounds

Based on the results of the study, it was found that the cause of the occurrence of diabetic wounds, namely being exposed to sharp objects, falls, exposed to wood, and so from the cause of



the cause, it can cause infectious wounds to become diabetic wounds because when the wound does not heal, microorganisms will easily enter and live for a long time in the wound which can cause microvascular damage or ganggun small blood vessels (Mita et al., 2016).

The results of this study are in line with the research of Indradewi et al, (2018) which states that the incidence of diabetic wounds with a percentage of 82.4% (Indradewi, 2020), the research of Wulandini et al, (2016) states the incidence of wounds as much as 68.7%, and the results of the study of Kurniasari et al, (2018) stated the incidence of diabetic wounds as much as 42.9% (Kurniasari et al., 2018). In patients with type 2 DM who experience diabetic wounds, many do not care about foot care that is not done regularly, it can cause diabetic wounds to get worse (Qurniawati et al., 2020). The Relationship between Physical Activity and the Incidence of Diabetic Wounds

The results of the statistical analysis in table 4. obtained the value of OR = 1.410. With a meaningfulness rate of 95%, this means that the moderate+ high physical activity group has a 1.4 times greater risk of developing a diabetic wound event compared to the high activity group. Considering the lower limit and upper limit values, which are stretched from 0.441-4.502, including one value, the research hypothesis is not accepted.

This research is in line with the research of Purnama et al, (2019) that respondents in their study had moderate activity when blood sugar levels were too low, which could result in people with type 2 DM easily experiencing diabetic wounds (Purnama et al, 2019). In patients with type 2 DM who have sufficient physical activity, it can reduce microvascular and macrovascular complications. Physical activity will trigger the use of blood glucose in the muscles so that blood glucose levels decrease and can be controlled. Regular activity can improve blood sugar control can prevent complications (Lufthiani, 2020).

This result is also inconsistent with the theoretical basis which states that the higher the physical activity, the more at risk of experiencing the incidence of diabetic wounds (Atika Maulida et al., n.d.). In this study, the results were obtained that there was no relationship between physical activity and the incidence of diabetic wounds because people who had good physical activity made controlled blood sugar levels that could not cause macroangiopathy complications (Husniawati, 2015).

#### 4. Diabetes Duration Relationship of Pain with The Incidence of Diabetic Wounds

The results of the analysis in table 5. obtained an OR value = 6,000 with a meaningfulness rate of 95%, this means that the long-sick group (>5 years) has a 6.0 times greater risk compared to the long-sick group ( $\leq 5$  years). Considering that the lower limit and upper limit values do not include one value, the research hypothesis is accepted, which is stretched from 1.524-23.622, which means that the duration of illness  $\leq 5$  years and >5 years is at risk and meaningful to the incidence of diabetic wounds in the Sedayu II Bantul Health Center Working Area.

This study is in line with the research of Suryati et al, (2019) showing a p-value of 0.036, there is a long-standing relationship of suffering from DM with the incidence of diabetic ulcers because

respondents who have suffered from DM for a long time cause a risk of experiencing peripheral neuropathy, where respondents cannot feel any injuries that occur in the legs (Suryati et al., 2019).

Research by Laksono et al, (2022) showed that the relationship between the duration of illness and the incidence of complications obtained a p-value of 0.011, so it can be concluded that the length of suffering is related to the incidence of diabetic wound complications (Laksono et al, 2022). The duration of DM disease for a long time is at risk of complications, one of which is the severity of type 2 DM is a factor that greatly influences the occurrence of complications, namely diabetic wounds. The risk of diabetic wound complications is closely related to the length of pain experienced by people with type 2 DM (Laksono et al, 2022).

## CONCLUSION

Based on the discussion and analysis of data in this study, it can be concluded that patients with type 2 DM in the Sedayu II Bantul Health Center Work Area, namely many patients who have moderate physical activity and at least light activity, most of them are stretched from 2-5 years and respondents who have diabetes wound events, namely as many as 38 respondents. The results of the analysis can be seen that there is no relationship between physical activity and the incidence of diabetic wounds and there is a relationship between the duration of illness and the incidence of diabetic wounds in people with type 2 DM diabetes.

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