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Patient Compliance Patterns on Therapeutic Success of Type 2 Diabetes Mellitus Medication at La Temmamala Hospital in Sopping, South Sulawesi

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ABSTRACT: Patient compliance is a determining factor for successful therapy, especially for long-term treatment such as diabetes mellitus. Purpose: The aim of this study was to determine the level of adherence and the influence of the characteristics of patients with type 2 diabetes mellitus in using drugs at the Regional General Hospital of La Temmamala, Soppeng. Thirty respondents who met the entry criteria in this study. Data were obtained prospectively. Respondents were interviewed using a demographic questionnaire and an MMAS-8 questionnaire (Morisky Medication Adherence Scale-8). The results of the study showed low compliance level of 43.3%, medium 36.7%, and high 20.0%. Exercising status, co-morbidities, regimen therapy, and checking fasting blood sugar gave significant results on the level of adherence ($p<0.05$). other factors such as level of educational factors, profession, duration of diagnosis, dietary pattern, smoking, and the varian drug had no effect on compliance ($p>0.05$). Compliance of most respondents was low (43.3%). Exercise status, comorbidities, regimen therapy, and fasting blood sugar test results are the factors that affect adherence.

KEYWORDS: Compliance, Diabetes Mellitus, MMAS-8 Questionnaire, La Temmamala Hospital

INTRODUCTION

Diabetes mellitus is a chronic disease characterized by increased blood sugar levels or hyperglycemia, due to decreased insulin secretion or insulin sensitivity produced by the pancreas. Diabetes mellitus itself cannot be cured but can only be managed to prevent further complications [1]. The prevalence of diabetes mellitus in Indonesia according to theresults of Riskesdas in 2018 based on doctor's diagnosis at the age of over 15 years is 2%. This figure shows an increase compared to the 2013 Riskesdas results of 1.5%. However, the prevalence of diabetes mellitus according to blood sugar test results increased from 6.9% in 2013 to 8.5% in 2018 and is expected to increase in the coming year [2]. Soppeng ranks 9th out of 24 districts and cities in South Sulawesi, Indonesia with the highest number of patients, which is 1.90% for patients diagnosed by doctors over the age of 15 years [3].

The Indonesian Endocrinology Society compiled 5 pillars of DM management, which are the first education with the aim of promoting healthy living consisting of support for patients to understand the course of their disease and its treatment, the second is medical nutrition therapy, the principle of eating management in people with diabetes, balanced diet based on the calorie needs of each individual, the third is physical activity or physical exercise 3-5 times a week, each about 30 minutes, along with pharmacological interventions in the form of oral antidiabetic drugs and / or injections accompanied by control of blood sugar levels. Oral antidiabetic drugs can be given as single or combination therapy [4]. However, to comply with these lifelong rules is certainly a stressor for patients so that many patients fail to comply [5].

The success of a DM therapy is not only influenced by the accuracy of diagnosis, selection and administration of appropriate drugs, but treatment compliance determines the success of therapy [6]. Treatment non-adherence will have an effect on the low clinical impact, risk of complications, poor quality of life, and increased risk of causes of mortality [7]. Adherence is very important in conducting treatment to reduce the risk of complications, eliminate complaints, and improve the patient's quality of life but in reality, patient compliance in taking DM medication is still low [6]. According to Alfian (2015), outpatient diabetes mellitus patients at Dr. H. Moch. Ansari Saleh Banjarmasin Hospital have a low level of compliance of 42.7% or 47 patients out of 110 respondents [8]. Based on research by Mokolomban et al., (2018) showed that of 45 inpatients at Baptist Hospital Batu, East Java, 27 patients were not adherent to taking medication [9]. Meanwhile, research by Djaelan et al., (2022) obtained data from 40 respondents at the Imanuel Clinic in Manado, North Sulawesi 52.5% still not obedient in taking medication [10]. The results of this study concluded that the level of compliance of patients with diabetes mellitus in taking medication is still lacking.

METHODS

Location and Research Time

This research was conducted at La Temmamala Hospital Soppeng, South Sulawesi during January 2023 to February 2023.

Population and Sample

1. Population

The population in this study were patients diagnosed with type 2 diabetes mellitus who received outpatient treatment at La Temmamala Hospital, Soppeng Regency.

2. Sample

Samples were taken from outpatients using oral antidiabetics as treatment therapy for type 2 diabetes mellitus at La Temmamala Hospital, Soppeng who met the inclusion and exclusion criteria.

The number of samples was calculated based on the equation [11].

$$n = \frac{Z\alpha^2 PQ}{d^2}$$

$$n = \frac{(1{,}96)^2(0{,}085)(0{,}915)}{(0{,}1)^2}$$

$$n = 29{,}878 \text{ sample (bullet to 30 respondents)}$$

Description:

n = The number of samples

Zα = normal standard derivative for the level of significance, α value is selected with the preferred IK, if IK 95% means α = 0.05 so that Zα = 1.96

P = Proportion or prevalence, the prevalence of diabetes mellitus based on Riskesdas 2018 is 8.5% = (0.085)

Q = 1-P (1 - 0.085 = 0.915)

d = The absolute level of precision desired (n = 10%)

a. Inclusion criteria

1. Outpatients diagnosed with type 2 DM using oral antidiabetics.
2. Patients who have medical record data with complete data in the form of medical record numbers, gender, age, diagnosis, blood glucose levels, and treatment therapy for at least 3 months.
3. Patients agreed to become respondents in the study.

b. Exclusion criteria

1. Patients who are not cooperative.
2. Patients with incomplete medical records.
3. Patients with coronary heart disease, cardiac arrhythmia, unstable angina pectoris and showing symptoms of other complications were excluded from the study.

INSTRUMENT AND MATERIALS

The instruments used in this study were a questionnaire of demographic data of patients with diabetes mellitus at La Temmamala Hospital Soppeng, South Sulawesi and a questionnaire of drug compliance using the MMAS-8 (Morisky Medication Adherence Scale) tools/instrument, which can be seen in the attachment. The materials used are data obtained from filling out questionnaires from respondents.

DATA ANALYSIS

Data analysis were performed in this study based on descriptive method with *Mann Whitney test* for groups with 2 variables and *Kruskal Wallis test* for groups with more than 2 variables .

RESULTS AND DISCUSSION

The sample of 30 people with an age range of 45-65 years who had met the inclusion criteria and were considered to have represented the prevalence of diabetes mellitus disease rates at La Temmamala Hospital was classified into several characteristics (education level, occupation, length of diagnosis, diet, exercise status, smoking, comorbidities, fasting blood sugar measurements and the number and type of oral antidiabetic drugs consumed) according to the demographic data of the respondents. The research sample mostly women with the age group mostly above 50 years. The average respondent's education level is elementary school graduate with a job as a housewife. Respondents on average have been diagnosed with type 2 DM for more than 2 years accompanied by comorbidities, have a regular diet, do not smoke, and rarely exercise. The most commonly oral antidiabetics prescribed are metformin and sulfonylurea group drugs.

The tool used in this study is the Morisky Medication-8 item Adherence Scale (MMAS-8) questionnaire, consisting of 8 questions that have been considered valid and reliable to measure the level of patient compliance in using drugs. Patient compliance scores were measured using the Guttman scale scoring method (Yes/No) for questions 1-7 and question 8 using a Likert scale (1, 0.75, 0.5, 0.25, and 0). To obtain results in the form of low compliance levels with scores of 0-5, moderate compliance with scores of 6-7 and high compliance with scores of 8 [12]. The first analysis to be carried out is to conduct a normality analysis to determine the level of compliance of the results of the research that has been carried out. The results of this analysis can be seen in Table 1.

Table 1. Patient Compliance Level Based on MMAS-8 Questionnaire

	Compliance level	Total	Percentage (%)	Shapiro-Wilk		
				Statistic	df	p-value
Normalitas	High	6	20	0.906	30	0.011
	Moderate	11	36.7			
	Low	13	43.3			

Description: Analyzed using the Shapiro-Wilk test.

Diabetes mellitus patients require pharmacological therapy in the form of oral antidiabetic drugs which must be consumed for a long period of time even for life. Compliance of DM patients when taking oral antidiabetic drugs is needed to achieve long-term treatment success [13]. Based on table 1, it was found that the level of compliance of respondents in using type 2 diabetes mellitus drugs at Soppeng Hospital was low compliance 43.3%. After knowing the level of respondents' compliance in using type 2 diabetes mellitus drugs at Soppeng Regional Hospital, further analysis was carried out regarding the level of respondents' compliance based on each characteristic that had previously been grouped.

Table 2. Relation between education level and compliance

			Compliance			Total	Mean	SD	p-value
			High	Moderate	Low				
Education Level	Not attending school	n	1	1	1	3	6.58	2.24	0.303
		%	33.30%	33.30%	33.30%	100.00%			
	Elementary School	n	1	3	6	10	6.05	1.26	
		%	10.00%	30.00%	60.00%	100.00%			
	Senior High School	n	0	3	5	8	4.97	2.02	
		%	0.00%	37.50%	62.50%	100.00%			
	Diploma 2	n	1	0	1	2	6.13	2.65	
		%	50.00%	0.00%	50.00%	100.00%			
	Diploma 3	n	1	1	0	2	7.63	0.53	
		%	50.00%	50.00%	0.00%	100.00%			
	Bachelor	n	1	3	0	4	6.5	1	
		%	25.00%	75.00%	0.00%	100.00%			
	Magister	n	1	0	0	1	8	0	
		%	100.00%	0.00%	0.00%	100.00%			

Description: Analyzed using the Kruskal Wallis test

According to Irawan (2010) respondents with higher levels of education will have broader knowledge about health, so they have awareness in maintaining their health [14]. But not all patients with low education have very little knowledge, because knowledge is not only obtained from formal learning. Knowledge can be obtained from experience and the five senses in processing information [15]. Based on the data obtained in table 2, the level of education has a significance value of 0.303, which means statistically there is no relationship between the level of education and patient compliance in using drugs ($p>0.05$). Meanwhile, the results of interviews conducted by researchers found that respondents felt bored to take medicine every day and the side effects of the drugs felt, so it is very important for patients to get drug information services in the form of massive education and counseling regarding DM therapy so that patients become more motivated to recover by complying with the treatment given.

Table 3. Relation between profession and compliance

Profession		Compliance			Total	Mean	SD	p-value
		High	Moderate	Low				
Entrepreneur	n	0	1	0	1	6.5	0	0.527
	%	0.00%	100.00%	0.00%	100.00%			
Housewife	n	1	3	7	11	5.45	1.82	
	%	9.10%	27.30%	63.60%	100.00%			
Pensioner	n	2	2	4	8	5.84	1.96	
	%	25.00%	25.00%	50.00%	100.00%			
Farmer	n	1	1	1	3	6.92	1.66	
	%	33.30%	33.30%	33.30%	100.00%			
PNS	n	2	3	1	6	6.75	1.16	
	%	33.30%	50.00%	16.70%	100.00%			
Journalist	n	0	1	0	1	7	0	
	%	0.00%	100.00%	0.00%	100.00%			

Description: Analyzed using Kruskal Wallis test

Profession is related to health behavior, which is treatment compliance. A person who has a job with quite dense activities tends to forget or be irregular in using drugs and does not have time for routine control to the hospital which results in patients being late in redeeming drugs. on the other hand, lack of physical activity can also be a risk factor for insulin resistance, a trigger for type 2 diabetes mellitus [13]. Based on the data shown in table 3, a significance value of 0.527 was obtained, which means statistically there is no relationship between work and compliance ($p>0.05$). The same results were obtained by Handayani, Nurhaini, & Aprilia (2019) with a p value = 0.934 so that it was found that there was no relationship between occupation and patient compliance in taking medication at the Jatinom Health Center [16]. The results of this study are in line with research conducted by Srikartika, Cahya, & Hardiati (2016) which states that work has no effect on patient compliance in drug use, but can be caused by patients who have good motivation from individuals, closest friends, family, and health workers to cure their illness [17].

Table 4. Relation between duration of diagnosis and compliance

			Compliance			Total	Mean	SD	p-value
			High	Moderate	Low				
Duration of Diagnosis	≤ 2 years	n	2	4	4	10	6.03	1.77	0.947
		%	20.00 %	40.00%	40.00%	100.00%			
	> 2 years	n	4	7	9	20	6.06	1.69	
		%	20.00 %	35.00%	45.00%	100.00%			

Description: Analyzed using Mann Whitney test

In this study, the duration of diagnosis of diabetes mellitus in patients at Soppeng Hospital was divided into two categories. Based on the data shown in table 4, a significance value of 0.947 was obtained, which means statistically there is no relationship between length of diagnosis and compliance ($p>0.05$). The results of this study are in line with research conducted by Julaiha (2019) and Wahyudi et.al., (2017) showing the results that there is no significant relationship between duration of diagnosis and treatment compliance [18][19]. According to Sailan et al., (2021), non-compliance is due to the experience of patients who have complied with the treatment process but the level of recovery achieved is not in accordance with the expected results, so that patients tend to be bored, resigned and do not comply with the treatment process that is being undertaken [20]. This also has an impact on the longer duration of the disease, so doctors will usually increase the dose or add treatment therapy to prevent complications that can occur at any time. The more diverse the types and frequency of drugs obtained and the more complex the therapy regimen, the worse the patient's drug compliance [21][22]. This mean, duration of diagnosis diabetes mellitus can be concluded to have little effect on the level of patient compliance due to several factors above.

Table 5. Relation between dietary patterns and compliance

			Compliance			Total	Mean	SD	p-value
			High	Moderate	Low				
Dietary Pattern	Reguler	n	3	6	10	19	5.71	1.85	0.172
		%	15.80%	31.60%	52.60 %	100.00 %			
	Irregule r	n	3	5	3	11	6.64	1.23	
		%	27.30%	45.50%	27.30 %	100.00 %			

Description: Analyzed using Mann Whitney test

The high number of people with Diabetes Mellitus in Indonesia is due to the dietary habits of Indonesians who consume too much carbohydrate and the imbalance of intake against energy needs, if these conditions continue, it can lead to the occurrence of Diabetes Mellitus. In addition, the meal times that have been determined by a nutritionist must also be adhered to in order to maintain blood sugar levels and prevent fluctuating conditions, people with DM are recommended to eat three large meals a day and 2-3 snacks a day. One of the pillars of controlling diabetes mellitus, which is diet in this study divided into two categories regular and irregular dietary patterns. Based on the results obtained, 19 patients had a regular diet and 11 patients had an irregular diet with a significance value of 0.172, which means statistically there is no relationship between diet and compliance ($p>0.05$). This can be caused because in addition to the meal schedule that needs to be considered, the type and amount of food consumed is in accordance with a healthy diet with a balanced calorie intake.

Table 6. Relationship between exercise status and compliance

			Compliance			Total	Mean	SD	p-value
			High	Moderate	Low				
Exercise Status	Frequently	n	3	2	1	6	7.25	1.07	0.032
		%	50.00%	33.30%	16.70%	100.00%			
	Rarely	n	3	9	12	24	5.75	1.7	
		%	12.50%	37.50%	50.00%	100.00%			

Description: Analyzed using Mann Whitney test

According to the American of Diabetes Association (2018), exercising regularly can reduce and keep blood sugar levels normal besides, exercise provides benefits in increasing insulin sensitivity, lowering blood glucose, improving blood circulation, and can relieve stress. So exercise is one of the pillars in the regulation of type 2 DM [23]. In this case, 6 patients exercised frequently and 24 patients rarely exercised. The number of patients who rarely exercise can be caused by busyness, not used to exercising or lack of facilities and infrastructure to do sports. The high number of patients with DM is influenced by food substances that enter the body that are not burned but will be deposited in the form of fat and sugar in people who rarely do physical activity or exercise. Based on the data shown in table 6, a significance value of 0.032 was obtained, which means that statistically there is a significant relationship between exercise status and the level of patient compliance using drugs ($p<0.05$). This study is in line with the research of Wiardani (2010) and Lay et al., (2019). Lack of exercise or physical activity can affect the level of patient compliance in using their medication. People who rarely do physical activity will be associated with laziness which affects compliance in using drugs [24][25].

Table 7. Relation between smoking and compliance.

			Compliance			Total	Mean	SD	p-value
			High	Moderate	Low				
Smoking Status	Yes	n	0	2	0	2	6.88	1.24	0.53
		%	0.00%	100.00%	0.00%	100.00%			
	No	n	6	9	13	28	5.99	1.72	
		%	21.40%	32.10%	46.40%	100.00%			

Description: Analyzed using Mann Whitney test

Smoking is often associated with the incidence of diabetes mellitus, because some cigarette content such as nicotine can damage the adrenal glands which can increase the risk of glucose disorders. In addition, smoking can also reduce insulin sensitivity and aggravate diabetes [13]. Based on the data obtained in the table, most patients do not smoke with a percentage of 93.3% or 28 out of 30 respondents with varying levels of compliance, namely 13 patients with low compliance, 9 patients with moderate compliance, and 6 patients with high compliance while respondents who smoke are 6.7%, totaling 2 patients with a moderate level of compliance with taking medication. Meanwhile, the significance value obtained is 0.530 so it can be concluded that smoking does not affect the level of compliance with taking medication for type 2 diabetes mellitus patients at Soppeng Hospital.

Table 8. Relation of comorbidities with compliance

			Compliance			Total	Mean	SD	p-value
			High	Moderate	Low				
Comorbid Diseases	Comorbid	n	3	5	13	21	5.55	1.73	0.009
		%	14.30%	23.80%	61.90%	100.00%			
	Non comorbid	n	3	6	0	9	7.22	0.8	
		%	33.30%	66.70%	0.00%	100.00%			

Description: Analyzed using Mann Whitney test

In this study, most respondents had comorbidities with a total of 21 people and non-comorbid 9 people. The number of cases of type 2 DM with comorbidities can be caused because diabetes is a chronic disease suffered for life so that the progressivity of the disease continues. If blood sugar levels are high and occur continuously, it can cause a state of disturbance in various organs of the body, due to this persistent poisoning, changes occur in the organs of the body so that various complications arise [26]. Based on the data shown in the table, a significance value of 0.009 was obtained, which means that statistically there is a significant relationship between comorbidities and the level of compliance ($p<0.05$). The results of this study are in line with the research of Sammulia, Rachmayanti, and Chintia (2022) and the research of Vrijens et al., (2017) showing that respondents who have experience in experiencing complications and accompanied by comorbidities will be more compliant in treatment than respondents who have never experienced complications at all. Therefore, comorbidity is a factor that encourages patients to recover and improve their quality of life by increasing their compliance in taking medication [27][28].

Table 9: Relation of therapy regimen to compliance

			Compliance			Total	Mean	SD	p-value
			High	Moderate	Low				
Therapy Regimen	Single	n	2	4	9	15	5.4	1.83	0.047
		%	13.30 %	26.70%	60.00%	100.00%			
	Combination	n	4	7	4	15	6.7	1.28	
		%	26.70 %	46.70%	26.70%	100.00%			

Description: Analyzed using Mann Whitney test

In this study, the antidiabetic drugs used by patients were oral antidiabetic drugs (ADOs). Based on the data obtained, the respondents who used single and combined oral antidiabetic drugs were 15 patients each. The level of compliance of patients who get a single regimen tends to have a low level of compliance while patients with a combination regimen tend to have a moderate level of compliance in taking oral antidiabetic drugs. The results of the Mann Whitney test analysis obtained a significance value of 0.047, which means that statistically there is a significant relationship between the therapy regimen and the level of compliance ($p <0.05$). This study is in line with the research of Yasin and Chaerani (2022) and the research of Utami, Hartini, and Prigita (2020) where the number of drugs consumed is part of the therapy regimen, which can be categorized as single, combination, or polypharmacy. The more drugs that patient receives, the more difficult to remember the schedule and there will be saturation of using drugs [29][30]. So it can be concluded that the ADO therapy regimen taken is proven to have an influence on the level of compliance with taking medication for type 2 DM patients at Soppeng Hospital

Table 10: Relation between variant drug and compliance

Variant Drug		Compliance			Total	SD	p-value
		High	Moderate	Low			
metformin	n	1	3	3	7	2.12	0.188
	%	14.30%	42.90%	42.90%	100.00%		
gliklazid	n	0	0	2	2	0.53	
	%	0.00%	0.00%	100.00%	100.00%		
glikuidon	n	0	0	2	2	0.18	
	%	0.00%	0.00%	100.00%	100.00%		
glimepirid	n	0	0	1	1	0	
	%	0.00%	0.00%	100.00%	100.00%		
akarbose	n	0	1	0	1	0	
	%	0.00%	100.00%	0.00%	100.00%		
vildagliptin	n	1	0	0	1	0	
	%	100.00%	0.00%	0.00%	100.00%		
pioglitazone	n	0	0	1	1	0	
	%	0.00%	0.00%	100.00%	100.00%		
metformin + glikuidon	n	0	0	1	1	0	
	%	0.00%	0.00%	100.00%	100.00%		
metformin + glimepirid	n	2	1	0	3	0.14	
	%	66.70%	33.30%	0.00%	100.00%		
metformin + gliklazid	n	1	2	2	5	1.46	
	%	20.00%	40.00%	40.00%	100.00%		
metformin + vildagliptin	n	1	4	1	6	1.09	
	%	16.70%	66.70%	16.70%	100.00%		

Description: Analyzed using Kruskal Wallis test

Based on the analysis of the relationship between the type of drug and the level of adherence using the Kruskal Wallis test in the table, a significance value of 0.188 (p>0.05) was obtained. The results of this study prove that the type of oral antidiabetic drug does not affect the level of compliance of type 2 DM patients at Soppeng Regional Hospital. However, interviews conducted with patients said that they did not use antidiabetic drugs because they fell asleep before taking the medicine at night, fearing the effects of dependence from drugs and laziness to routinely use drugs every day. In addition, patients experienced allergies when taking antidiabetic drugs and felt side effects such as dizziness, dyspepsia, bloating or diarrhea, so in the end patients chose to stop taking their drug. This is mean, the variant drug of diabetes mellitus received does not contribute with the patient's compliance.

Table 11. Relation between fasting blood sugar test results and compliance

			Compliance			Mean	SD	p-value
			High	Moderate	Low			
Fasting Blood Sugar Test Results	Normal	n	4	4	3	6.84	1.26	0.059
		%	36.40 %	36.40%	27.30 %			
	Abnormal	n	2	7	10	5.59	1.76	
		%	10.50 %	36.80%	52.60 %			

Description: Analyzed using Mann Whitney test

Compliance in treatment holds an important role in achieving the target success of diabetes mellitus therapy. High blood sugar levels can be caused by low patient compliance with diabetes mellitus treatment. Based on the data analyzed by the Mann

Whitney test, a significance value of 0.049 was obtained, which means that statistically there is a relationship between the results of fasting blood sugar examination and compliance (p <0.05). The results of this study are in line with the research of Husna et al., (2022) which obtained a value of p <0.05, meaning that there is a significant relationship between adherence to taking medication with blood sugar of type 2 DM patients at Tamalanrea Makassar Health Center [31]. Similar research at Puskesmas Dinoyo Malang City by Bulu, Wahyuni, and Sutriningsih (2019) obtained p-value 0.004 < 0.050 [32]. In this study, most of the fasting blood sugar test results of type 2 DM patients at Soppeng Hospital were abnormal, totaling 19 respondents who tended to have low compliance while patients with normal fasting blood sugar test results tended to have high or moderate compliance. This reflects that the success of patient therapy is influenced by glycemic levels which depend on the level of patient compliance in using drugs, seen in type 2 DM patients at Soppeng Hospital tend to have abnormal fasting blood glucose test results due to low patient compliance levels.

CONCLUSIONS

Based on the research that has been conducted, it can be concluded:

1. Patient compliance with the use of type 2 diabetes mellitus drugs at the Outpatient Installation of La Temmamala Hospital, Soppeng, South Sulawesi using the MMAS-8 questionnaire is low compliance 43.3%, moderate compliance 36.7%, and high compliance 20.0%.
2. Factors that are related to the compliance of patients use antidiabetec drugs at the Outpatient Installation of La Temmamala Hospital Soppeng, South Sulawesi are exercise status, comorbidities, therapy regimens, and fasting blood sugar test results with a significance p-value <0.05.

REFERENCES

1) International Diabetes Federation. 2021. *IDF Diabetes Atlas 12th ed.* ISBN: 978-2-930229-98-0.
2) Riset Kesehatan Dasar (Riskesdas). 2018. *Laporan Hasil Riset Kesehatan Dasar.* Jakarta: Departemen Kesehatan RI.
3) Balitbangkes. 2019. *Laporan Provinsi Sulawesi Selatan Riskesdas 2018*. Jakarta: Lembaga Penelitian Badan Penelitian dan Pengembangan Kesehatan.
4) PERKENI. 2021. *Pedoman Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 Dewasa di Indonesia*-2021. Jakarta: Persatuan Endrokinologi Indonesia.
5) Novitasari, R. 2012. *Diabetes Mellitus.* Yogyakarta: Nuha Medika., dalam Djaelan, S., Sih, A.L., dan Evi, D.P. (2022). Self-Efficacy Berhubungan dengan Kepatuhan Minum Obat dan Pola Diet pada Penderita Diabetes Mellitus Tipe 2. *Profesional Health Journal*, 03(02), hal. 150.
6) Ningrum, Deskasari Kurniyawati. 2020. Kepatuhan Minum Obat pada Penderita Diabetes Mellitus Tipe II. *Higeia Journal of Public Health Research and Development*, 4(3), pp. 492–505.
7) García-Pérez, L. E., Álvarez, M., Dilla, T., Gil-Guillén, V., & Orozco-Beltrán, D. 2013. Adherence to Therapies in Patients with Type 2 Diabetes. *Diabetes Therapy*, 4(2), pp.175–194.
8) Alfian, R. 2015. Korelasi Antara Kepatuhan Minum Obat dengan Kadar Gula Darah pada Pasien Diabetes Melitus Rawat Jalan di RSUD Dr. H. Moch Ansari Saleh Banjarmasin. *Jurnal Pharmascience*, 2(2), pp.15–23.
9) Mokolomban, C., Weny, I.W., dan Deby, A.M. 2018. Kepatuhan Minum Obat Pada Pasien Diabetes Mellitus Tipe 2 disertai Hipertensi dengan Menggunakan Metode MMAS-8. *Pharmacon: Jurnal Ilmiah Farmasi*, 7(4), pp.69-78. ISSN 2302–2493.
10) Djaelan, S., Sih, A.L., dan Evi, D.P. 2022. Self-Efficacy Berhubungan dengan Kepatuhan Minum Obat dan Pola Diet pada Penderita Diabetes Mellitus Tipe 2. *Profesional Health Journal*, 03(02), pp.149–160.
11) Sopiyuddin, M.D. 2011. *Besar Sampel Dan Cara Pengambilan Sampel Dalam Penelitian Kedokteran Dan Kesehatan, Edisi 3.* Jakarta: Salemba Medika.
12) Kusumaningrum, I.D., dan Khoirunnisa, I. 2013. Hubungan Tingkat Pendidikan Dengan Kepatuhan Minum Obat Pasien Diabetes Melitus Tipe 2 Pada Dokter Keluarga, *Jurnal Farmasetis*, 2(1), pp.13–18.
13) Fitriani, R., Masruhim MA., dan Rahmawati D. 2015. Analisa Tingkat Kepatuhan Penggunaan Terapi Obat Oral Antidiabetik (OAD) Pada Pasien Diabetes Mellitus Di Instalasi RSUD. A.W Sjahranie. *Prosiding Seminar Nasional Kefarmasian Ke-II,* Vol.2, pp.55-61.
14) Irawan, Dedy. 2010. *Prevalensi dan Faktor Risiko Kejadian Diabetes Melitus Tipe 2 di Daerah Urban Indonesia (Analisa Sekunder Riskesdas 2007).* Tesis dipublikasikan. Jakarta: Univesitas Indonesia.
15) Mathavan, J., Ngurah, G., dan Pinatih, I. 2017. Gambaran Tingkat Pengetahuan Terhadap Hipertensi dan Kepatuhan Minum Obat pada Penderita Hipertensi di Wilayah Kerja Puskesmas kintamani I, Bangli-Bali. *Intisari Sains Medis*, 8(3), pp.176–180.

16) Handayani, S., Nurhaini, R., dan Aprilia, T.J. 2019. Faktor-Faktor yang Mempengaruhi Kepatuhan Pasien dalam Mengkonsumsi Obat Antihipertensi di Puskesmas Jatinom. *Jurnal Ilmu Farmasi,* 10(2), pp.39–44.
17) Srikartika, V.M., Cahya, A.D., dan Hardiati, R.S.W. 2016. Analisis Faktor yang Memengaruhi Kepatuhan Penggunaan Obat Pasien Diabetes Mellitus Tipe 2. *Journal of Management and Pharmacy Practice,* 6(3), pp.205–212.
18) Julaiha, S. 2019. Analisis Faktor Kepatuhan Berobat Berdasarkan Skor MMAS-8 pada Pasien Diabetes Mellitus Tipe 2. *Jurnal Kesehatan,* 10(2), hal: 203.
19) Wahyudi, C. T., Ratnawati, D., dan Ayu Made, S. 2017. Pengaruh Demografi, Psikososial dan Lama Menderita Hipertensi Primer Terhadap Kepatuhan Minum Obat Antihipertensi. *Jurnal JKFT: Universitas Muhammadiyah Tangerang*, 2(2), pp.14–28.
20) Sailan, M.Z., Sari, L., dan Purba, R.P.K. 2021. Faktor-Faktor yang Berhubungan dengan Kepatuhan Minum Obat Pada Penderita Hipertensi. *Jurnal Kesehatan Poltekkes Kemenkes RI Pangkalpinang,* 9(2), pp.76–82.
21) Naghavi, S., Mehrolhassani, M. H., Nakhaee, N., dan Yazdi-Feyzabadi, V. 2019. Effective Factors in Non-Compliance With Therapeutic Orders of Specialists In Outpatient Clinics In Iran: A Qualitative Study. *BMC Health Services Research,* 19(1), pp.1–16.
22) Jasmine, N.S., Wahyuningsih, S., dan Thadeus, M.S. 2020. Analisis Faktor Tingkat Kepatuhan Minum Obat Pasien Diabetes Mellitus di Puskesmas Pancoran Mas Periode Maret – April 2019. *Jurnal Manajemen Kesehatan Indonesia,* 8(1), pp.61–66.
23) American of Diabetes Association (ADA). 2018. *Standards of Medical Care in Diabetes 2018*. USA: American of Diabetes Association, Inc.
24) Wiardani, N.K. 2010. Hubungan Antara Aktivitas Fisik dan Kejadian Diabetes Mellitus (DM) Tipe II. *Jurnal Skala Husada,* 6(1), pp.59–64.
25) Lay, G.L., Wungouw, H.P.L., dan Kareri, D.G.R. 2019. Hubungan Aktivitas Fisik Terhadap Kejadian Hipertensi Pada Wanita Pralansia di Puskesmas Bakunase. *Cendana Medical Journal*, 18(3), pp.464-471.
26) Utami, P.R., dan Fuad, K. 2018. Gambaran Kadar Hemoglobin Pada Penderita Diabetes Melitus Komplikasi Ginjal. *Jurnal Kesehatan Perintis,* 5(1), pp.99–105.
27) Sammulia, S.F., Rachmayanti, A.S., dan Chintia, E. 2022. Hubungan Karakteristik Penderita Hipertensi dengan Tingkat Kepatuhan Minum Obat di RSUD Embung Fatimah Kota Batam. *SEHATMAS: Jurnal Ilmiah Kesehatan Masyarakat,* 1(3), pp.257-265.
28) Vrijens, B., Antoniou, S., Burnier, M., de la Sierra, A., and Volpe, M. 2017. Current Situation of Medication Adherence in Hypertension. *Frontiers in Pharmacology,* 8:100, pp.1–8.
29) Yasin, D.D. Firman., dan Chaerani, E. 2022. Regimen Terapeutik Sebagai Prediktor Kepatuhan Minum Obat Pada Pasien Hipertensi. *Journal of Nursing Care & Biomoleculer,* 7(1), pp.105–110.
30) Utami, A.W., Hartini, W.M., dan Prigita, E.L. 2020. Hubungan Jumlah Obat Yang Diminum Dengan Tingkat Kepatuhan Minum Warfarin. *Journal of Pharmaceutical Science and Medical Research,* 3(2), pp.62–67.
31) Husna, A., Jafar, N., Hidayanti, H., Dachlan, D.M., dan Salam, A. 2022. Hubungan Kepatuhan Minum Obat Dengan Gula Darah Pasien DM Tipe II di Puskesmas Tamalanrea Makassar. *JGMI: The Journal of Indonesian Community Nutrition,* 11(1), pp.20–26.
32) Bulu, A., Wahyuni, T.D., dan Sutriningsih, A. 2019. Hubungan Antara Tingkat Kepatuhan Minum Obat Dengan Kadar Gula Darah Pada Pasien Diabetes Mellitus Tipe II. *Nursing News: Jurnal Ilmiah Keperawatan,* 4(1), pp.181–189.