

# Analysis the Compliance with Pill-Count Method and the Relationship between Knowledge and Compliance of Medication in Patients Type 2 Diabetes Mellitus in PRB Pharmacy Dr. Misbah 2 Pekanbaru City on December 2020-March 2021

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**Abstract:** -Diabetes Mellitus is a chronic disease that occurs because the pancreas doesn't produce enough insulin or cannot effectively use the insulin it produces. Knowledge is a factor that facilitates adherence. The purpose of this study was to determine the effect of the level of knowledge on adherence to medication use in patients with type 2 diabetes mellitus. This Cross Sectional Prospective study was conducted from December 2020 to March 2021 at the Apotek Program Rujuk Balik BPJS dr. Misbah 2 Pekanbaru with 98 respondents as a subject. The research instrument used was a knowledge questionnaire containing 16 questions about Diabetes Mellitus and the Pill Count Method to assess adherence. The results showed that there was a relationship between education level and knowledge and there was a relationship between gender, age and the number of drug combinations with compliance. The results of the chi square test of knowledge with compliance obtained a significance of 0.032 ( $p < 0.05$ ). So it can be concluded that knowledge has a relationship with drug use compliance in type 2 Diabetes Mellitus patients.

**Keywords:-** Type 2 Diabetes Mellitus, Knowledge, Adherence, Rujuk Balik Programme.

## I. INTRODUCTION

Diabetes Mellitus (DM) is a serious chronic disease that occurs when the pancreas does not produce enough insulin (a hormone that regulates blood sugar or glucose), or when the body cannot effectively use the insulin it produces. The number of cases and the prevalence of diabetes has continued to increase over the last few decades, where the majority of diabetics are type 2 diabetics. Type 2 diabetes is called non-insulin-dependent diabetes as a result of ineffective use of the body's insulin [1]. The International Diabetes Federation said that Indonesia as a country that has the 6th number of DM cases in the world in 2040 [2]. The results of national basic health research stated that there were several provinces with the highest increase in DM prevalence from 2013-2018, which was 0.9%, one of which

was the province of Riau, Indonesia [3]. And according to the health profile of Riau Province in 2019, the city of Pekanbaru was in second place with the highest number of DM sufferers, which was 17,393 people.

Knowledge is everything that is known based on human experience itself and knowledge will increase according to the process of experience experienced [4]. Good knowledge of when and how to carry out a therapy will help a person to always behave obediently to the therapy. According to Lawrence Green's theory in Notoatmodjo [5], knowledge is a pre-disposing factor or factor that facilitates compliance with one's behavior. The patient's adherence to taking antidiabetic drugs will determine the success of therapy and prevent complications from type 2 DM patients. Rujuk Balik Program (PRB) Pharmacy dr. Misbah 2 is one of 3 pharmacies appointed by BPJS in the service of the PRB in Pekanbaru City. According to data from the PRB Pharmacy, dr. Misbah 2, there are 11 First Level Health Facilities (FKTP) and public health center which they facilitate for the service of drugs for type 2 Diabetes Mellitus patients. participate without the need to return to the Specialist/Sub-Specialist in the Hospital [4]. The general objective of this study was to determine the relationship between knowledge and adherence to medication in patients with type 2 Diabetes Mellitus at the Pharmacy of the Referral Program (PRB) dr. Misbah 2 Pekanbaru city for the period December 2020-March 2021. While the specific objectives of this study were to describe the characteristics, to describe the level of knowledge and compliance, to determine the relationship of sociodemographic factors to the knowledge and compliance of type 2 Diabetes Mellitus patients at the Referral Program Pharmacy (PRB) dr. Misbah 2 Pekanbaru city for the period December 2020-March 2021.

## II. RESEARCH METHOD

The study was conducted from December 2020 to March 2021. This research is a quantitative descriptive study through a cross-sectional approach. Patients type 2 Diabetes Mellitus were selected by purposive sampling

method according to the applied criteria. The number of informants involved in this study was 98 people (Table 1), this research was conducted at the PRB Pharmacy dr. Misbah 2 Pekanbaru city, Riau Province, Indonesia.

The instrument used in this study is a questionnaire consisting of 3 parts. The first is the patient's sociodemographic data (name, age, gender, education, duration of DM). The second part of the knowledge questionnaire which contains 16 questions (Table 2) about Diabetes Mellitus which has been prepared by previous researchers and has been assessed for validity by 3 experts in their fields, 2 pharmacists and one linguist. The way to calculate the answer score for the questionnaire is to adjust it to the existing answer key. The scoring on the questionnaire is done with the provision of giving a score of 1 if the answer is correct and a score of 0 if the answer is wrong and

does not know. Determination of the criteria for low knowledge if the respondent can answer correctly <60% and highly knowledgeable if the respondent answers 60% of the total answers to the question. If it is changed to the sum of the score scores, it is grouped into low knowledgeable with a score of < 10 and high knowledge for a score of 10. The third part is the Pill count method used to measure respondent compliance by calculating the patient's remaining medication. From the calculation results, two categories will be obtained, namely if the calculation results <80% are included in the non-compliant category and if the calculation results are 80-100% included in the obedient category. The advantages of the Pill Count method include being easy, objective and quantitative. But the drawback is that it can be manipulated by the patient (pill dumping). [9] After the data is collected, the data is tabulated, coding and data analysis are carried out.

### III. DISCUSSION

Sociodemographic features in patients with type 2 diabetes mellitus can be seen in table 1.

TABLE 1. INFORMANT SOCIODEMOGRAPHIC CHARACTERISTIC

Demographic Information	Number (Person)	Percentage
Gender		
• Male	40	40.82%
• Female	58	59.18%
Age		
• 19-44 years old	7	7.14%
• 45-59 years old	49	50%
• > 60 Years old	42	42.86%
Education Background		
• Elementary	30	30.61%
• Junior High School	10	10.20%
• High School	50	51.02%
• Diploma (DIII)	1	1.02%
• Bachelor (S1)	6	6.12%
• Master (S2)	1	1.02%
Comorbidities		
• Hypertension	41	41.84%
• Heart Disease	5	5.10%
• Hypercholesterolemia	3	3.06%
Duration Of Illness		
• < 1 year	3	3.06%
• 1-5 years	36	36.73%
• 5-10 years	48	48.98%
• > 10 years	10	10.2%

The following is a list of questions on the knowledge questionnaire and their answers.

Table 2. Knowledge questionnaire

Number	Question	Answer
1	Diabetes Mellitus is a disease characterized by high levels of sugar in the blood.	True
2	There are 2 types of Diabetes Mellitus that are important to know, namely Diabetes Mellitus Type 1 and Diabetes Mellitus Type 2.	True
3	Common symptoms felt by people with Diabetes Mellitus are frequent eating, frequent drinking and frequent urination.	True
4	Diabetes Mellitus is a contagious disease	False
5	Fasting blood sugar measurement is usually done after fasting for 8 hours.	True
6	Normal blood sugar levels when fasting blood sugar (GDP) is less than 126 mg/dL	True
7	Normal blood sugar levels when normal blood sugar (GDS) is less than 200 mg/dL	True
8	Antidiabetic drug Metformin with a dose of 500 mg taken 3 (three) times a day.	True
9	Antidiabetic drug Glimperide with a dose of 2 mg taken 1 (one) time a day.	True
10	Diabetes Mellitus can be cured.	False
11	Taking medication is more important in treating Diabetes Mellitus than exercising and regulating diet.	False
12	Alcohol is used to clean wounds of people with diabetes mellitus.	False
13	Hypoglycemia is a state of high blood sugar above normal.	False
14	Children who have parents with diabetes mellitus are at high risk of developing diabetes mellitus.	True
15	Diabetes Mellitus can damage the kidneys	True
16	Antidiabetic drugs are taken regularly for life.	True

The following are the results of the level of knowledge of patients with type 2 diabetes mellitus and the sociodemographic relationship with the level of knowledge.s

Table 3. An overview of the knowledge level of diabetes patients

NO	Level Knowledge	Frequency	Percentage (%)
1	High ( $\geq 60\%$ )	66	67.35%
2	Low ( $< 60\%$ )	32	32.65%
	<b>Total</b>	<b>98</b>	<b>100 %</b>

Table 4. The Relationship of Sociodemographic Factors to the Knowledge Level of Type 2 DM Patients Chi Square test

Variable	Category	Knowledge Level				P-value
		High		Low		
		F	%	F	%	
Age (Years Old)	19-44	3	42.85%	4	57.14%	0.828
	45-59	21	42.85%	28	57.14%	
	$\geq 60$	8	19.05%	34	80.95%	
Education Background	Elementary	3	10%	27	90%	0.010
	Junior High	1	10%	9	90%	
	Senior High	21	42%	29	58%	
	Diploma	1	100%	0	0%	
	Bachelor	6	100%	0	0%	
	Master	0	0%	1	100%	
Duration of illness	< 1 year	1	33.33%	2	66.67%	0.778
	1-5 years	20	55.56%	16	44.44%	
	5-10 years	6	12.5%	42	87.5%	
	> 10 years	8	80%	2	20%	

From the results of the study, only the level of education has a significant relationship with the level of knowledge ( $0.010 < 0.05$ ). The level of education will affect the patient's mindset, the higher the patient's education level, the better the mindset and understanding of the disease and treatment being undertaken so that they have an awareness of maintaining health and seek help

from health workers more quickly than patients with lower education [6]. Low level of education is reported as a factor that can affect adherence to treatment, because drugs for the treatment of diabetes are considered complex and require an understanding of their use by patients [7].

The following are the results of the level of adherence of patients with type 2 diabetes mellitus and the sociodemographic relationship to patient compliance with type 2 diabetes mellitus.

Table 4. An overview of adherence level of diabetes patients

NO	Adherence Level	Frequency	Persentaga (%)
1	Obey (> 80 %)	58	59.18%
2	Not Obey (< 80 %)	40	40.82%
	<b>Total</b>	<b>98</b>	<b>100 %</b>

Table 5. Sociodemographic Relationship to Knowledge of Type 2 DM Patients with Chi Square Test

Variable	Category	Adherence Level				P value
		Obey		Not Obey		
		F	%	F	%	
Gender	Male	17	42.5%	23	57.5%	0.000
	Female	18	31.03%	40	68.96%	
Age (years Old)	19-44	3	42.85%	4	57.14%	0.027
	45-59	23	46.94%	26	53.06%	
	≥ 60	9	21.43%	33	78.57%	
Drugs Combination	One Combination	10	30.30%	23	69.69%	0.001
	Two Combination	39	73.58%	14	26.42%	
	Three Combination	9	75%	3	25%	

Based on the statistical results above, it is known that the sociodemographic factors that correlate with adherence are the number of drug combinations, age and drug combination ( $p < 0.05$ ). The results of this study are in accordance with the theory of Brannon & Feist [8] which states that treatment characteristics such as the number of drug combinations will affect a person's compliance, where the less the number of drugs taken, the more obedient a person will take his medication. From the results of the study, it is also known that the sociodemographic factor that correlates with compliance is gender, the results of this study are in accordance with the theory of Brannon & Feist [8] which says that Personal Factors will affect a person's compliance, including gender. Green's theory says that gender is a predisposing factor or enabling factor that contributes to a person's health behavior. It is said that the female gender tends to be more concerned about environmental conditions and their health.

From the results of the chi square test of the knowledge and compliance variables, a significance value of  $0.032 < 0.05$  was obtained, this means that there is a relationship between the knowledge variable and the compliance variable. The results of this study are in line

with several studies. Kassahun et al [3] said that a good level of knowledge from diabetic patients is a concept that can encourage adherence to medication, lifestyle including diet and physical activity so that patients have good glycemic control. Umayya [6] said that good knowledge regarding DM disease, symptoms and treatment will improve patient compliance, because with a good level of knowledge, patients can control and maintain their condition by regularly taking medication to avoid or reduce disease complications that aggravate the patient's clinical condition. Chawla [2] said that increasing knowledge of type 2 DM patients about their disease will lead to good attitudes and the application of good practices in treatment which ultimately leads to better glycemic control in patients with type 2 DM, thereby helping to slow progression and prevent complications.

Jackson [10] said that most patients consider doctors as the profession they trust the most in their treatment therapy, so most patients believe whatever doctors say or do is assumed to be the best and indisputable choice. This is in line with what researchers found in the field that patients only received information about their illness from doctors and they did not try to find out about their illness through

the media or other health workers. It is also possible that explaining the patient's knowledge is only limited to the doctor's opinion. In this case, there is a need for collaboration between doctors and other health workers through periodic education such as the profession of pharmacists, nurses or from nutritionists, so that patients can regulate their diet properly, can take care of themselves properly and can use medicines correctly. With the involvement of these health workers, it is hoped that the treatment therapy received by the patient will be successful, prevent disease complications and improve the patient's quality of life.

#### IV. CONCLUSION

Patients with type 2 diabetes mellitus at PRB pharmacy dr. Misbah 2 has a good level of knowledge about his disease and good adherence to the use of antidiabetic drugs. Sociodemographic factors of education level affect the level of patient knowledge. Sociodemographic factors of age, gender and number of drug combinations are related to the level of adherence.

#### ETHICS APPROVAL

Ethics approval was obtained from the respective ethics committees at the medical faculty of Andalas University, West Sumatra, Indonesia. All of the informants invited to participate in this study gave informed consent before taking part in this study. To protect the informant from any consequences, data were made anonymous (code) before analyses. The views and opinions of each informant were considered equally.

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#### REFERENCES

- [1]. PERKENI. Consensus on Management and Prevention of Type 2 Diabetes Mellitus in Indonesia 2015. Pengurus Besar Perkumpulan Endokrinologi Indonesia (PB Perkeni). Kensus Journal. Vol. 1. <https://doi.org/10.1017/CBO9781107415324.004>, 2015.
- [2]. Chawla, et al. *Impact Of Health Education On Knowledge, Attitude, Practices And Glycemic Control In Type 2 Diabetes Mellitus*. Journal of Family Medicine and Primary Care 8(1), 261-268. <https://doi.org/10.4103/jfmpe.288.18>, 2019.
- [3]. Kassahun et al. *Diabetes Related Knowledge, Self-Care Behaviours And Adherence To Medications Among Diabetic Patients In Southwest Ethiopia: A Cross-Sectional Survey*. BMC Endocrines Disorders 16:28. <https://doi.org/10.1186/s12902-016-0114-x>, 2016.
- [4]. Khan, A.R. et al. *Factors contributing to non-compliance among diabetics attending primary health centers in the Al Hasa district of Saudi Arabia*. Journal of Family and Community Medicine. <http://doi.org/10.4103/2230-8229.94008>, 2012.
- [5]. Notoatmodjo, S. *Ilmu Perilaku Kesehatan*. Jakarta : Rineka Cipta Publishing, 2014.
- [6]. Umaya, C. *The Effect of Medication Reminder (PMO) on the Compliance Level of Type 2 Diabetes Mellitus Patients at the University Hospital of North Sumatra, Medan City*. Thesis. Faculty of Pharmacy, University of North Sumatra, 2019.
- [7]. Pereira et al. *The effect of educational intervention on the disease knowledge of diabetes mellitus*. Journal Revista Latino-Emfenagen. <https://doi.org/10.1590/50104-1169201200030000-sourcePubmed>, 2014.
- [8]. Brannon & Feist. *Health Psychology an Introducing to Behaviour and Health*. California: Wadsworth Cengage Learning, 2014.
- [9]. Osterberg, L. & Blaschke, T. *Adherence to Medication*. The New England Journal of Medicine, 353, 487-97, 2005.
- [10]. Jackson, LL. et al. *Knowledge Of Self-Care Among Type 2 Diabetes Patients In Two States Of Nigeria*. Journal Pharmacy Practice 2014 Jul-Sep;12(3):404, 2014.