WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 16, 48-58. Research Article ISSN 2277–7105

CORRELATION OF THE LEVEL OF TREATMENT COMPLIANCE IN TYPE 2 DIABETES MELLITUS PATIENTS WITH BLOOD GLUCOSE LEVELS IN PADANG PASIR HEALTH CENTER

Widya Kardela, Putri Ramadhani*, Taufik Sunanda, Selvia Wiliantari, Fitratul Wahyuni and Vina Neldi

School of Pharmaceutical Sciences (STIFARM), Padang, West Sumatera, Indonesia.

Article Received on
02 July 2024,

Revised on 22 July 2024,
Accepted on 12 August 2024

DOI: 10.20959/wjpr202416-33648

***Corresponding Author**
Putri Ramadhani
School of Pharmaceutical Sciences (STIFARM), Padang, West Sumatera, Indonesia.
putriramadhaniapt@gmail.com

ABSTRACT

Type 2 diabetes mellitus requires patients to control blood glucose levels for life with the aim of improving quality of life to avoid complications. Controlled blood glucose can be influenced by the patient's level of medication adherence. This study aims to assess the level of treatment compliance and blood glucose levels in patients with type 2 diabetes mellitus and assess the relationship between the level of treatment compliance and blood glucose levels in patients with type 2 diabetes mellitus at the Padang Pasir Health Center, Padang City. This type of research is a non-experimental study with a cross-sectional research design and prospective data collection. Assessment of the level of compliance using the Adherence Refil Medication Scale in Diabetes (ARMS-D) questionnaire. A total of 40 patients who met the inclusion criteria showed results of 23 patients (57.5%) were not adherent to treatment with uncontrolled glucose levels and as many as3 patients (75%) with controlled glucose levels. While the number of patients who were compliant with treatment, both with uncontrolled and controlled glucose levels were 7 people (17.5%). Based on the results of the correlation test, the p-value is 0.012 ($p < 0.05$) so it can be concluded that there is a significant relationship between the level of medication compliance and blood glucose levels of patients with type 2 diabetes in the Padang Pasir Public Health Center.

INTRODUCTION

Diabetes Mellitus (DM) is one of the diseases most commonly suffered by people throughout the world and is the fourth national research priority for degenerative diseases. The increasing number of diabetes mellitus will indirectly result in morbidity and death due to complications from Diabetes Mellitus DM itself (Trisnadewi et al., 2018).

The prevalence of DM worldwide has reached 643 million people and as many as 6.7 million in the 20-79 year age group in 2021. The prevalence of diabetes mellitus in Indonesia in 2018 according to Basic Health Research (RISKESDAS) stated that diabetes mellitus sufferers had reached 10.9% (Kementerian Kesehatan RI, 2018). The prevalence of diabetes mellitus in West Sumatra province according to the results of the 2018 Basic Health Research (RISKESDAS) reached 1.3% (Kementerian Kesehatan RI, 2020).

Type 2 DM disease requires sufferers to control blood glucose levels throughout their lives with the aim of improving the quality of life so that complications do not occur (Perkumpulan Endokrinologi Indonesia, 2021).

Low compliance causes poor glycemic control, which can increase the risk of various chronic complications. The consequences will have a negative impact both economically, clinically and on the patient's quality of life (McAdam-Marx et al 2014). WHO report data in 2003 showed that only 50% of type 2 DM patients adhered to treatment, while the percentage in developing countries was lower than this figure (World Health Organization, 2003).

The results of research conducted by Risa Mulyani (2016) The results of the study showed that 43.60% of respondents were compliant with therapy while the other 56.40% were considered non-compliant with therapy. Apart from that, the success rate of the respondent's therapy was 35.90%, while the remaining 64.10% said their therapy was unsuccessful. Based on research conducted by Yulianti Tri and Anggraini Lusi (2020), 32 adult patients aged <60 years at the Sukoharjo Regional Hospital Outpatient Institution showed non-compliance with medical therapy.

The large percentage of non-compliance with type 2 DM treatment means it is necessary to assess the level of treatment compliance. This level of compliance is measured using the Adherence to Refill and Medication Scale (ARMS) questionnaire which has advantages compared to other questionnaires, namely that it is valid and reliable, used as an instrument to

measure the level of compliance in patients with chronic diseases and low literacy skills and has two measurement indicators, namely compliance. take medicine. (Kripalani et al., 2009).

Currently, the ARMS questionnaire has been developed to measure adherence in DM patients whose validity and reliability have been tested, namely the Adherence to refill and medication scale in Diabetes (ARMS-D) (Mayberry et al., 2013).

METHOD

This research is a type of non-experimental quantitative research with a cross-sectional design and prospective data collection.

RESULTS AND DISCUSSION

Results

Based on research that has been carried out, the total population obtained during 2023 is 129 patients. From this population, 40 patients were obtained as samples that met the inclusion criteria, while 89 patients did not meet the inclusion criteria.

The results obtained from this research are the validity and reliability values of the Adherence Refill Medication Scale in Diabetes (ARMS-D) questionnaire; data on patient sociodemographic characteristics based on gender, body mass index (BMI), age, duration of suffering and diabetes mellitus (DM) medication use profile; compliance profile based on level of education, family support, duration of suffering, frequency of DM drug use, and number of routine treatment regimens; as well as the relationship and potential risk value of the level of treatment compliance with blood glucose levels in type 2 DM patients at the Padang Pasir Health Center, Padang City.

1. Validity and Reliability Test Results of the ARMS-D Questionnaire

a. Validity

The results of the validity test on questions 1-11 show that the calculated r value r > r table (0.361), namely 0.594, 0.757, 0.863, 0.687, 0.732, 0.939, 0.846, 0.808, 0.933, 0.799, 0.822, means the statement is declared valid.

b. Reliability

The Cronbach's Alpha value obtained was 0.93. This figure shows that the ARMS-D questionnaire has excellent reliability, meaning that the measurement results remain

consistent after being carried out repeatedly on a subject and under the same conditions (Yusuf & Daris, 2018).

2. Sociodemographic Characteristics of Patients Based on Gender, Body Mass Index, Age, and Length of Suffering and Profile of Diabetes Mellitus Medication Use

a. By gender

Gender	Number (N=40)	Percentage (%)
Man	16	40.00%
Woman	24	60.00%

b. Based on Body Mass Index (BMI)

No	Category	BMI Reference Value (kg/m²)	Number (N=40)	Percent age (%)
1.	Underweight	≤18.5	3	7.50%
2.	Normal	18.5-22.9	13	32.50%
3.	Overweight	23-24.9	12	30.00%
4.	Grade 1 Obesity	25-29.9	5	12.50%
5.	Grade 2 obesity	≥30	7	17.50%

c. Long suffering

Long Suffering	Number (N=40)	Percentage (%)
1-5 years	30	75.00%
6-10 years	6	15.00%
>10 years	4	10%

d. Drug use profile

Drug use profile	Number (N=40)	Percentage (%)
Single Drug		
1. Glimepiride	6	15.00%
2. Metformin	27	67.50%
Total	33	82.50%
Combination drugs		
Metformin+Glimepiride	7	17.50%
Total	7	17.50%

This research began by identifying the characteristics of patients suffering from type 2 DM including gender, BMI, age, duration of suffering, and profile of DM drug use. The results showed that patients suffering from type 2 DM in this study were dominated by female patients, namely 24 patients (60%), while the number of male patients was lower, namely 16 patients (40%). This statement is in line with data from basic health research in 2018 which

shows that the prevalence of DM in women (1.8%) is higher than men (1.2%) (Kementrian Kesehatan Republik Indonesia, 2018). This is also supported by other research which states that women are 2.15 times more likely to suffer from type 2 DM compared to men and is also proven by the existence of a significant relationship between male gender and the incidence of type 2 DM with a p-value. = 0.12 ($p < 0.05$)(Rosita et al., 2022).

Women are more at risk of DM because physically women have a greater chance of increasing their BMI than men and there is a post-monopausal phase in elderly patients which causes fat distribution to accumulate easily due to this hormonal process so that women are more at risk of suffering from DM.

In this study, a normal Body Mass Index (BMI) was obtained, there were no very significant results from 13 patients (33.00%) who had a normal BMI and a BMI that was overweight was 12 patients (30.00%) while those who had overweight Type 1 obesity was 5 patients (12.50%) and level 2 obesity was 7 patients (17.50%), while for Underweight BMI there were 3 patients (7.50%). The absence of a relationship between BMI and the incidence of type 2 DM is proven by Sagita et al., (2020).

Based on age classification, patients in the Adult category (18-59 years) are the highest age range, namely 22 patients (55.00%), while in the young elderly category (60-69 years) there are 14 patients (35.00%). , and middle elderly (70-79 years) as many as 4 patients (10.00%). Based on age classification, patients in the Adult category (18-59 years) are the highest age range, namely 22 patients (55.00%), while in the young elderly category (60-69 years) there are 14 patients (35.00%), and middle elderly (70-79 years) as many as 4 patients (10.00%).

DISCUSSION

Age can also be related to the length of time a patient suffers from DM. This is shown by the number of patients suffering from DM for 6-10 years, namely 7 patients, of which 5 patients are young elderly (60-69 years) and 2 patients are middle elderly (70-79 years). On the other hand, patients suffering from DM with a range of 1-5 years are dominated by adult patients (18-59 years), namely 27 patients out of 30 patients, 2 patients are young elderly patients and 1 patient is middle elderly (70-79 years), and The number of patients who suffered for > 10 was 3 patients including 2 young elderly patients and 1 middle elderly patient. The longer the patient suffers from DM, the morewill increase the possibility of complications in the form of

damage to blood vessels throughout the body, thereby further aggravating the disruption of the function of vital organs and reducing the patient's quality of life.

The single use of Oral Antidiabetic (OAD) drugs in this study was 33 patients with the largest number being Oral Antidiabetic Drugs, namely metformin (82.50%), while 6 patients (15.00%) used Oral Antidiabetic (OAD) drugs of this type. Glimepiride medication with a combination of which 7 patients (17.50%) received combination therapy with a combination of Metformin + Glimepiride. Type 2 DM patients who have received single therapy for 3 months namIf the patient does not reach the target HbA1c ≤ 7% or if the patient is tested for HbA1c ≥ 7.5%, combination therapy with 2 types of drugs should be started and combination therapy with 3 types of drugs needs to be given if the patient on combination therapy with 2 types of drugs within 3 months does not reach the target HbA1c ≤ 7%.

1. **Compliance Profile Based on Education, Family Support, Length of Suffering, Frequency of Diabetes Mellitus Medication Use and Number of Routine Treatment Regimens**

Most of the patients in the obedient category had their last education at tertiary level, namely 5 patients (12.50%). while the majority of patients in the less compliant category had their last education at high school level, namely 10 patients (25.00%). The level of education can influence a person's ability and knowledge in implementing healthy living behavior, this is because they have broader knowledge compared to patients with a low level of education. The higher the level of education, the higher a person's ability to maintain a healthy lifestyle, however, patients with low education can behave well as a result of experience undergoing the treatment process (Ningrum, 2020), on the other hand, patients with higher education can also engage in non-compliance. There were 3 patients (7.50%) with higher education levels who were less compliant, this could be because the patient's awareness and self-motivation had not yet been formed in undergoing treatment.

The results showed that all patients in the adherent category, namely 13 patients (32.50%) received family support, while in patients in the less adherent category there were 15 patients (37.50%) who received family support and 10 patients (25.00%) did not get support from family After review, all patients with an adherence score of 40 received family support, while most patients with a score of <40 did not receive family support in undergoing treatment.

Based on the frequency of DM drug use, almost all patients who are compliant in undergoing treatment are patients with a frequency of once a day, while the majority of patients who are less compliant are patients with a frequency of once a day. This happened in research conducted by Scanlom and Vreenom 2013 Complexity Medication regimens, which include the number of medications and number of daily doses required, duration of therapy, therapy being uncomfortable or disrupting a person's lifestyle and side effects have been associated with decreased compliance.). In undergoing medical therapy, patientswill be more compliant with doses given once a day than doses given more frequently (BPOM RI, 2006).

2. Level of Treatment Compliance in Patients with Type 2 Diabetes Mellitus Based on the ARMS-D Questionnaire

Assessment of the level of treatment adherence was carried out using the ARMS-D questionnaire which has been tested for validity and reliability. The ARMS-D questionnaire consists of 11 questions with answer choices namely never (4), sometimes (3), often (2), and always (1). In question number 11 the opposite applies because this question is a favorable or unfavorable question.

The results showed that of the 40 patients, those in the adherent category (score 44) were 10 patients (25%), while in the less adherent category (score < 44) there were 30 patients (75%). This shows that there is still a high prevalence of patients who are less compliant. Assessment of the level of medication compliance with the ARMS-D questionnaire explores the causes of non-compliance with two indicators, namely the drinking compliance indicator and the medication readmission compliance indicator. The most common non-compliance factor is forgetting to take medication and forgetting to ask the doctor to write a prescription for diabetes medication for you, namely 21 patients (52.5%), where the majority of patients are not compliant when answering questions number 1 and 3, namely questions about forgetting to take medication. and forgot to ask the doctor for a prescription for diabetes medication.

Another non-compliance factor was that 21 patients (52.5%) forgot to ask the doctor to write a medication prescription for them. In this case, it is a patient who forgets to come for control at the Community Health Center, because the drug prescription is only obtained every time the patient comes for control, the absence of someone to remind the patient and take the patient for control is one of the causes of this non-compliance., as many as 18 patients (45.00%) stated that they did not take diabetes medication because they were careless and as many as 19 patients (47.50%) stated that they never took diabetes medication. They did not

take diabetes medication before going to see a doctor for treatment, this was because the patient forgot to bringing medication when traveling or because you have fallen asleep so the patient does not take the medication.

Apart from that, 15 patients (37.50%) stated that they forgot to take medication due to the frequency of taking medication more than once a day. Frequency of drug use is a factor that often causes patient non-compliance.

Based on these factors of non-compliance, the role and support of the family is very necessary in reminding patients to comply with treatment so that they can increase patient compliance with their treatment.

In this research, it was still found that patients ran out of diabetes medication, which occurred in 11 patients (27.50%). In addition, of the 29 patients (72.50%) who stated that they had planned and paid for repeat prescriptions before they ran out, 0 patients (0%) stated that they always did, while of the 11 patients, 6 patients (15.00%) often, and 5 patients (20.00%) sometimes, even 29 patients (72.50%) said never. This is because the patient did not carry out control according to the specified time.

Apart from that, pharmacists are expected to be able to write the date of the next control on the patient's medication label, considering that patients often forget, it is hoped that this can help patients undergo treatment regularly and according to the specified time.

3. Blood Glucose Levels in Patients with Type 2 Diabetes Mellitus

The blood glucose level data used in data analysis in this study were Fasting Blood Sugar (GDP) and Current Blood Sugar (GDS). This is because the examinations carried out at the Community Health Center to monitor the control of blood glucose levels in patients are GDP and GDS. The patient's blood glucose level is said to be controlled if the three glucose level data from the patient's last examination are within the normal range. Based on the research results, it was found that the majority of respondents showed uncontrolled blood glucose levels, namely 29 patients (72.50%).

Impaired control of blood glucose levels in the elderly includes three things, namely loss of first phase insulin release, insulin resistance, and increased postprandial blood glucose levels (Rochmah, 2009). Blood glucose levels fluctuate, meaning they go up and down throughout the day and at any time. depending on food intake and physical activity undertaken (Tandra,

2020). Considering that blood glucose levels in type 2 DM patients usually tend to be higher and increase based on the patient's food intake, monitoring the control of blood glucose levels in type 2 DM patients should be done by checking GDP levels.

4. Relationship between levels of medication compliance and blood glucose levels in patients with type 2 diabetes mellitus

Based on bivariate analysis with the Fisher Exact test, the p-value = 0.012 ($p<0.05$), which means there is a significant relationship between the level of treatment compliance and blood glucose levels in patients suffering from type 2 DM.

Based on the risk analysis, an Odds Ratio (OR) value of 7.67 with a CI of 95% (2.508-173.559) was obtained, indicating that patients who were less compliant with treatment were 18.9 times more likely to experience uncontrolled blood glucose levels compared to patients who were compliant with treatment. Therefore, it is important for patients to always comply with treatment therapy so that blood glucose levels can be controlled and prevent complications.

The results of the study showed that of the 40 respondents, 10 patients (25.00%) fell into the compliant category, while 30 patients (75.00%) fell into the less compliant category. This shows that the prevalence of patients who are less compliant is higher than patients who are compliant in undergoing treatment. Of the 10 patients (25.00%) who were compliant, there were 7 patients (17.50%) with uncontrolled blood glucose levels, while the other 3 patients (7.50%) had controlled blood glucose levels.

Of the 30 patients (75.00%) who were less compliant, there were 23 patients (57.50%) with uncontrolled blood glucose levels, while the other 7 patients (17.50%) had controlled blood glucose levels. Controlled blood glucose levels in patients who are less compliant can be caused by the patient modifying a healthy lifestyle and managing their diet well. Apart from that, non-compliance in these patients is mostly caused by accidental factors such as forgetting or skipping taking medication.

There is a lack of patient compliance in paying attention to conditions when controlling blood glucose levels at the Community Health Center, so that the examinations carried out at the Community Health Center to monitor the control of blood glucose levels in patients are Fasting Blood Sugar (GDP) and Current Blood Sugar (GDS). Therefore, the blood glucose

level data used in data analysis in this study uses two types of blood glucose level data, namely Fasting Blood Sugar and Temporary Blood Sugar (GDS) data which are based on examinations carried out at the Public Health Center so this is a limitation. in this research.

CONCLUSION

Based on an assessment of the level of treatment compliance with blood glucose levels in type 2 Diabetes Mellitus (DM) patients carried out at the Padang Pasir Community Health Center, Padang City for 40 research respondents, it can be concluded that:

1. Most of the type 2 DM patients at the Padang Pasir Community Health Center, Padang City were classified as non-compliant patients, namely 30 patients (75.00%) while undergoing treatment and the majority of patients have uncontrolled blood glucose levels.
2. There is a significant relationship between the level of treatment compliance andBlood glucose levels in type 2 DM at the Padang Pasir Health Center, Padang City.

REFERENCES

1. Kementrian Kesehatan RI. Hasil Riset Kesehatan Dasar Tahun, 2018.
2. BPOM RI. *Kepatuhan Pasien*: Faktor Penting Dalam Keberhasilan Terapi. Jakarta: Pusat Informasi Obat dan Makanan BPOM, 2006.
3. Trisnadewi, N. W., Adiputra, I. M. S., & Mitayanti, N. K. Gambaran Pengetahuan Pasien Diabetes Mellitus (Dm) Dan Keluarga Tentang Manajemen Dm Tipe 2. *Bali Medika Jurnal*, 2018; *5*(2): 165–187.
4. Perkumpulan Endokrin Indonesia. *Pedoman Pengelolaan Dan Pencegahan Diabetes Melitus Tipe 2 Di Indonesia.* Perkumpulan Endokrinologi Indonesia, 2021.
5. McAdam-Marx, C., Bellows, B. K., Unni, S., Mukherjee, J., Wygant, G., Iloeje, U., Liberman, J. N., Ye, X., Bloom, F. J., & Brixner, D. I. Determinants of Glycaemic Control In A Practice Setting: The Role Of Weight Loss And Treatment Adherence (The DELTA Study). *International Journal of Clinical Practice*, 2014; *68*(11): 1309–1317.
6. World Health Organization. *Adherence to long-term therapies.* Switzerland: WHO (*WORD*Library Cataloging), 2003.
7. Yusuf, M., & Daris, L *Analisis data penelitian: teori & Aplikasi dalam bidang perikanan.* Bogor: IPB Press, 2018.
8. Rosita, R., Kusumaningtiar, D. A., Irfandi, A., & Ayu, I. M. Hubungan Antara Jenis Kelamin, Umur, Dan Aktivitas Fisik Dengan Diabetes Melitus Tipe 2 Pada Lansia Di

Puskesmas Balaraja Kabupaten Tangerang. *Jurnal Kesehatan Masyarakat (Undip)*, 2022; *10*(3): 364–371.