

**Original Research Article****FACTORS AFFECTING MEDICATION ADHERENCE LEVEL IN DIABETES  
MELLITUS PATIENS: A LITERATURE REVIEW**

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**ABSTRACT**

**Introduction.** Diabetes Mellitus is a disease that affects many Indonesian people. This research aims to review articles regarding factors associated with the level of adherence to diabetes mellitus treatment. **Method.** The data was obtained from an electronic database of Google Scholar between 2015-2021, with the keywords "Diabetes Mellitus, medication adherence factor." From the 9950 articles found, 950 articles were relevant and 10 articles were selected for review. **Results & Analysis.** This literature study was obtained from 10 articles that met the inclusion and exclusion criteria. Based on the review of the article, it is known that there are factors related to the treatment of diabetes mellitus, including age, knowledge, motivation, social (family support and health workers), education, and psychological factors. **Discussion.** Family support, high level of knowledge, role of health workers, age, gender, and high motivation to conduct the treatment have an effect on treatment adherence of diabetes mellitus patients.

**Keywords:** Diabetes Mellitus, Treatment Adherence Factor, Motivation

**INTRODUCTION**

Diabetes Mellitus (DM) is a chronic disease that requires strategies and treatments to reduce the risks associated with elevated glycemic levels. Diabetes mellitus often goes undiagnosed for years since glycemic levels increase gradually and the symptoms felt by patients are mild. Patients with elevated glycemic levels have the risk for microvascular and macrovascular disease complications. The short-term complications that will be experienced by patients with DM are high glycemic levels that cause tissue and organ damage along with ketoacidosis which

occurs when the body is unable to use glucose as energy due to insulin deficiency. Meanwhile, the long-term complications of DM are eye damage, heart and blood vessel disorders, neuropathy, and stroke (ADA, 2015).

According to American Diabetes Association, diabetes mellitus is a metabolic disease characterized by hyperglycemia due to abnormalities in insulin secretion. Chronic hyperglycemia in diabetes is associated with long-term damage and dysfunction of several organs, especially eyes, kidneys, nerves, heart, and blood vessels, which causing various complications, including atherosclerosis, neuropathy, kidney failure, and retinopathy.

Unfortunately, the complications can caused treatment complexity since there are too many drugs, toxicity, and its side effects that can be factors that inhibit the treatment completion. The success of treatment is influenced by patient adherence during the treatment process as an effort to prevent complications in patients with diabetes mellitus.

The success of diabetes mellitus control process is determined by high adherence to treatment as an effort to prevent complications from the disease. Although the successful treatment of diabetes mellitus requires a high level of adherence, unfortunately, the patient's adherence in reality is not obedience enough.

The average of patient medication adherence rates for chronic disease processes in developing countries is 50%. Meanwhile, there are less than 2% of adults with diabetes mellitus in America that receive the entire range of prescribed therapy by American Diabetes association (2003). As in Aini, N., W. Fatmaningrum (2011) conducted at Dr. Ramelan Surabaya Hospital in 15 patients, it was found that patients with good knowledge about compliance with diabetes mellitus treatment was 100%, moderate attitudes were 47% (7 people) and good attitudes were 53% (8 people), minimum practice was 6% (1 person), moderate practice was 40% (6 people) and good practice was 54% (8 people). Although the patients' knowledge was good (This understanding might be the result of frequent hospital counseling for patients), but good patient practice was only 54%.

According to data from Ministry of Health of Republic Indonesia (2014), the minimum level of treatment adherence is influenced by several factors including

treatment and disease characteristics, intrapersonal factors, interpersonal factors, and environmental factors. Niven (2002) states that the level of treatment adherence is generally influenced by several factors such as education, knowledge, attitude, motivation, and the patient's perception of the disease's severity.

This literature review aims to determine the factors that influence diabetes mellitus patients on treatment adherence. The level of adherence is the major component that determines the success of therapy since there are various things that can affect it. Meanwhile, gender, level of knowledge, disease duration, motivation of the patient himself and the role of patients' family can affect the patient's adherence in the treatment of diabetes mellitus.

## **METHOD AND ANALYSIS**

This research uses the literature review method, which is the data collected obtained through a series of activities related to library data collection methods, reading, resuming, and managing writing materials related to factors that influence the level of treatment adherence in Diabetes Melitus patients.

Each of the 10 articles that met the inclusion criteria in this research are diabetes mellitus, medication adherence, and motivation. While the exclusion criteria found in the data search are articles that do not have a complete structure, review articles, and the articles that not discuss factors that affect the level of adherence in the treatment of diabetes mellitus.

The data were obtained from electronic database Google Scholar between 2015-2020. From the key words listed in the different databases, it was found 9,950 articles and the researcher self-

selected articles according to its title and abstract, along with the distinguished from its objectives purpose. Meanwhile, articles that were not related to the level of adherence to diabetes mellitus treatment were excluded. There were 950 relevant articles in a total of 10 selected journals.

Then, the selected articles are read and examined carefully from its abstract, objectives, and its data analysis from the research question to gather information about the factors that influence the level of treatment adherence in patients with diabetes mellitus.

## RESULTS

From 10 selected articles selected for review, all corresponded to quantitative research. Each of the 10 selected articles was examined carefully from the abstract,

objectives, to data analysis from research question to gather information about factors affecting the level of treatment adherence in patients with diabetes mellitus.

Medication adherence is one of the successes of diabetes mellitus treatment. This literature research obtained 10 articles that met the inclusion and exclusion criteria. Based on the article review, it is known that there are several factors that influence the level of patients' treatment adherence with diabetes mellitus including knowledge about the management of diabetes mellitus treatment regarding the patient's age, gender, level of knowledge about diabetes mellitus, disease duration, and motivation both from the patient himself and family support.

**Table 1.** Journal Review Literature List

No	Author	City	Objective	Design	Result
1	Vera Tombokan, A.J M Ratu, Ch.R. Tilaar (2015)	Manado	To determine the factors that influence DM treatment adherence	Cross-sectional	1. Patients with good knowledge will have a high level of adherence compared to those with less knowledge. 2. Patients who have high self-motivation have a high level of adherence during the treatment.
2	Nenny Triastuti, Detty Nur Irawati, Yelvi Levani, Rizky Dwi Lestari, (2020)	Surabaya	To explain the relationship between medication adherence in Jombang Regency RUD.	Cross-sectional	1. Patients with a high level of knowledge have a high level of adherence. 2. Patients with high motivation have a high level of adherence.
3	(Riza Alfian, 2015)	Banjarmasin	To determine the correlation between adherence to taking medication with blood sugar levels in diabetes mellitus patients at DR. H. Moch. Ansari saleh banjarmasin hospital.	Cross-sectional	Patients with a high level of knowledge have a high level of medication adherence
4	(Nur Rasdianah, Suwaldi Martodiharjo, Tri M. Andayani, Lukman Hakim, (2020)	Yogyakarta	To determine the overview of treatment adherence of type 2 diabetes mellitus patients at Yogyakarta Health Center.	Cross-sectional	1. Women have a high level of adherence compared to men. 2. The patient with high level of knowledge has a high level of compliance.
5	(Ayu Nissa Ainni, 2017)	Purworejo	To determine patients' adherence with the use of medicine with type 2	Cross-sectional	1. Patients with a high level of knowledge have a high level of adherence.

			diabetes mellitus' patients in the outpatient installation of RSUD dr. Tjitrowardojo		2. Working patients tend to have low medication adherence compared to non-working patients. 3. Patients with many medicine items will reduce the level of medication adherence.
6	(Much Ilham Novalisa Aji Wibowo, Nanang Munif Yasin, Susi Ari Kristina, dan Yayi Suryo Prabandari, 2022)	Indonesia	To determine the determinants of factors that influence treatment adherence of type 2 diabetes patients in Indonesia	Cross-sectional	1. Patients with good social or family support have high adherence rates. 2. Patients with a high frequency of taking medication have lower adherence rates.
7	Rizki Romadhon, Yardi Saibi, Narila Mutia Nasir, 2020)	East Jakarta	To determine adherence to treatment of type 2 diabetes mellitus patients at East Jakarta Health Center.	Cross-sectional	The long duration of treatment leads to low adherence to treatment.
8	Nadira Safa Jasmine, Sri Wahyuningsih, Maria Selvester Thadeus, 2020)	Tegal	To determine the factors of adherence level in taking medication for patients with diabetes mellitus at Pancoran Mas Community Health Center during March - April 2019.	Cross-sectional	1. Male gender tends to be non-compliant compared to women, because women are influenced by anxiety over the disease 2. High knowledge has a high level of adherence 3. Long duration of treatment causes a low level of adherence due to the boredom factor
9	(Nobuyuki Wakui, 2022)	Japan	Factors affecting patient medication adherence at shinagawa pharmacy in Tokyo	Cross-sectional	1. The average age of type 2 diabetes patients in Japan is above 70 years old. 2. Elderly patients tend to have poor medication adherence. Therefore, it is important to understand their individual situation to improve medication adherence, the diabetes treatment, and their quality of life (QOL).
10	(Rezki Marito,a Ira Cinta Lestari, 2021)	Central Tapanuli	To determine the relationship between knowledge level and adherence level in taking medication for type 2 diabetes mellitus patients	Cross-sectional	Patients with a high level of knowledge have a high level of compliance

## DISCUSSION

Factors that influence medication adherence in patients with diabetes mellitus are gender, knowledge level, disease duration, and motivation.

### 1. Age

From research conducted by Ayu Anissa, it states that there is a significant

value in age factor of 0.253 ( $p > 0.05$ ) which indicates that the correlation between age and medicine adherence is not significant. This means that there is no correlation in medicine adherence with patients' age factor. Meanwhile, according to (Brown, M. T., & Bussell, 2011), the patients' age will affect the

level of adherence compliance due to aging-related diminished physiological function (Rosyida, L., Yuni, P., Arie, S., Yunita, 2015).

Meanwhile, Nadira (2020) research showed that all age groupings, most respondents had a low level of adherence. The results of chi-square test found that there was no influence between age and adherence in taking the medication ( $p = 0.275$ ). The theory stated that patient with more than 45 years old has an increased risk of DM and glucose intolerance caused by degenerative factors, called the reduced ability of B cells that produce insulin to metabolize glucose. However, the statistical results stated that there was no significant relationship between age and the level of medication adherence. This could be due to the fact that patients with productive age (middle-aged and younger than 40 years old) have other priorities in their daily lives, such as work and other business. This could prevent patients in this productive age group from taking the prescribed medication or from attending their scheduled follow-up appointments at the clinic.

## **2. Gender**

From the research conducted by Ayu Anissa, it shows that there is an insignificant value in gender of 0.170 ( $p > 0.05$ ), which means that the correlation between gender and medicine adherence

is not significant. The results of Sweileh et al., (2014) in Palestine also stated that it did not show a significant relationship between adherence to taking medication against gender with a value of  $p = 0.58$  ( $p > 0.05$ ). This result is because gender is a risk factor for diabetes mellitus that cannot be modified (P. D. dan I. K. K. R. Indonesia, 2014). Then, there is no influence between the gender on the adherence level with taking medication. According to Smeltzer & Bare, men tend to be non-compliant due to activities in their productive age caused by memory decline and other degenerative diseases. Meanwhile, women also tend to have a higher level of adherence because women experience more anxiety about illness than men.

## **3. Knowledge level**

Rezki Marito's research found that the most respondent groups were respondents with moderate knowledge levels who had moderate levels of adherence as well with 12 people (20.7%). There was no group of respondents with a low level of knowledge who had a high level of adherence. Based on the results of Somer's D correlation test indicates that  $p \text{ value} = 0.001$  ( $p < 0.05$ ), which means that there is a significant relationship between the knowledge level and adherence with type 2 diabetes mellitus treatment. The correlation coefficient value  $r = 0.0468$  shows the strength of the

correlation between variables, called moderate correlation ( $r = 0.41 - 0.60$ ). The direction of the correlation is positive (+) indicating that the higher the level of patient knowledge, it will increase the level of patients' adherence in taking medication and vice versa.

#### **4. Disease duration**

The results of research from Ayu Anissa explained that type-2 diabetes mellitus most commonly lasted between one and five years. The population with DM is a chronic disease population (PERKENI, 2011). The results of statistical analysis found that the duration of type-2 DM disease has an insignificant value, namely  $p = 0.898$ , which indicates that the correlation between disease duration and adherence to taking medication is not significant ( $p > 0.05$ ). The results of this research are in line with the results by Ulum Z, Kusnanto, (2014), which states that there is no significant relationship between the duration of type-2 DM disease and medicine adherence with a value of  $p = 0.618$ . According to Ulum Z, Kusnanto (2014), it is possible that the disease duration is a factor that cannot be modified.

#### **5. Motivation or social support**

There was a positive correlation between social support to DM patients and their medication adherence. The social support refers to the involvement of others (family or non-family) to provide the

support needed by DM patients. This factor also influences the medication adherence of DM patients in China and Iran with 61,73. A systematic review of the relationship between social support and medication adherence found that eight of 12 researches identified a significant relationship between social support and medication adherence. Furthermore, social support is associated with encouragement, reducing patient depression, that may increase the medication adherence.

### **CONCLUSION**

Based on the review results of the articles, the factors that influence the adherence level with treatment level of diabetes mellitus (DM) patients for each age group, the majority of responders have low levels of adherence, with age under 60 years old that having low treatment adherence and age over 60 years having moderate treatment adherence. In addition, gender is a risk factor for diabetes mellitus that cannot be modified. Then, there is no significant relationship between gender and the adherence level of patients during the medication process. According to Smeltzer (2002), men tend to be non-adherence caused from his activities in their productive age due to memory decline or other degenerative diseases. Moreover, women also tend to have a higher level of adherence due to the higher level of anxiety

about disease than the men.

In addition, when the patient has a good knowledge about diabetes mellitus, they tend to have a good treatment, and vice versa. Furthermore, the result of this research regarding the disease duration is in line with the results of research by Ulum Z, Kusnanto (2014), which states that there is no significant relationship between the duration of type-2 DM disease and patients' adherence in taking the medication.

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