JURNAL AR RO'IS MANDALIKA (ARMADA)
Journal website: https://ojs.cahayamandalika.com/index.php/armada

ISSN: 2774-8499 Vol. 6 No. 1 (2026)

Research Article

Correlation between Knowledge and Attitude towards Compliance with Antidiabetic Use in Type 2 Diabetes Mellitus Patients at RS X

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Abstract
Diabetes Mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. The increasing prevalence of diabetes due to lack of knowledge that affects the attitude of patients so that they are not compliant in carrying out treatment. The aim of the study was to determine whether there is a relationship between knowledge and attitudes towards adherence to the use of antidiabetics in type 2 diabetes mellitus patients at Hospital X. The method used is descriptive analytic with cross sectional design. The population and research sample were 110 respondents using purposive sampling technique. The research instruments used were the knowledge questionnaire (DKQ-24), the attitude questionnaire and the compliance questionnaire (MMAS-8). The results showed that 15 people (13.6%) had good knowledge, 55 people (50.0%) had sufficient knowledge, and 40 people (36.4%) had less knowledge. Attitudes of type 2 diabetes mellitus patients were 72 people (65.5%) who had a positive (good) attitude and 38 people (34.5%) had a negative (bad) attitude. For compliance with the use of antidiabetics, 18 people (16.4%) had high adherence, 38 people (34.5%) had moderate adherence and 54 people (49.1%) had low adherence. The results of the Chi square statistical test showed a significant relationship between knowledge and compliance with a value of ρ=0.019 (ρ<0.05), and there was also a significant relationship between attitudes and compliance with a value of ρ=0.044 (ρ<0.05).
Keywords: Diabetes mellitus, Knowledge, Attitude, Compliance.

INTRODUCTION

Diabetes Mellitus is a group of metabolic diseases characterized by hyperglycemia that occurs due to abnormalities in insulin secretion, insulin action, or both (Perkeni, 2019). Diabetes is caused by a deficiency of the hormone insulin, produced by the pancreas to lower blood sugar levels. Normal blood sugar levels are random blood sugar (GDS) or non-fasting blood sugar, which is <200 mg/dL, and fasting blood sugar (FBS) which is <126 mg/dL (Ministry of Health, 2020).

The incidence of diabetes mellitus in 2021 globally reached 537 million adults aged 20-79 years, or 1 in 10 people living with diabetes, and it is a leading cause of death worldwide (International Diabetes Federation, 2021). The incidence of diabetes is predicted to continue to increase, reaching 578 million in 2030 and 700 million in 2045 (Indonesian Ministry of Health, 2020). Indonesia, in the Southeast Asia region, ranks third globally with a prevalence of 11.3%. China has the largest number of adults with diabetes mellitus in the world, with 140.87 million people living with the disease (International Diabetes Federation, 2021).

Indonesia ranks 5th among 10 countries in Southeast Asia with a diabetes prevalence of 10.6% of a population of 179.72 million, or 19.47 million Indonesians living with diabetes (International Diabetes Federation, 2021). Indonesia is the only Southeast Asian country on the list, thus estimating Indonesia's significant contribution to the prevalence of diabetes cases in Southeast Asia (Ministry of Health of the Republic of Indonesia, 2020). Based on doctors' diagnoses in the 2018 Basic Health Research (Riskesdas), the province with the highest number of diabetes mellitus sufferers is DKI Jakarta, with 2.6% of the population. In 2020, the incidence of diabetes mellitus in Jakarta was 15,233 cases. The prevalence of diabetes in Jakarta, based on the results of the 2018 Basic Health Research (Riskesdas), increased from 2.5% to 3.4% of a total of 10.5 million people, or approximately 250,000 residents in DKI Jakarta suffering from diabetes (Riskesdas, 2018).

Several studies have shown that the success of therapy in diabetes mellitus patients is influenced by knowledge, attitude, and compliance. Patient knowledge about diabetes mellitus can help sufferers carry out diabetes management, so that more and better diabetes mellitus patients know about diabetes mellitus, to change their behavior, and can control their condition so they can live longer with a good quality of life (Perdana et al., 2013). According to Muhibuddin et al., (2016), a good attitude can control and avoid complications of the disease. For example, they know that sufferers need to control their diet, therefore they are also willing to control the food they eat, invite regular check-ups to health facilities, exercise according to schedule and take medication regularly. Compliance is the suitability or adherence of patients to the agreed and prescribed treatment recommendations related to the time of taking medication, dosage, and side effects. The relationship between patients and health workers and social support are interpersonal determinants that are closely related to medication adherence. Low patient compliance with treatment has the potential to be a barrier to achieving successful therapy and can result in a person's condition worsening (Rasdianah et al., 2016).

The statement refers to a research study focusing on understanding how knowledge and attitudes affect compliance with the use of anti-diabetic medications among Type 2 Diabetes Mellitus patients at a specific hospital, Hospital X. The study

seeks to explore the connection between what patients know about their condition (knowledge) and how they feel about following medical advice and treatment regimens (attitudes). In essence, the study is interested in examining whether a patient's understanding of diabetes and the importance of medication influences their willingness or ability to take their prescribed anti-diabetic medication consistently.

For example, if patients know the risks associated with not taking their medication or if they have a positive attitude toward managing their health, they may be more likely to follow the prescribed medication regimen. On the other hand, if a patient lacks knowledge about diabetes or has a negative attitude towards treatment, they may be less likely to comply with the medication regimen, leading to worsened health outcomes.

METHOD

This research is an analytical descriptive study using a cross-sectional research design. The population in this study were all patients with type 2 diabetes mellitus recorded in the medical records at Hospital X Jakarta, who underwent treatment for one year. This study involved 110 respondents calculated using the Slovin formula with a 10% confidence level. Data collection was conducted in May-June 2023. The sampling technique used was a purposive sampling technique with inclusion and exclusion criteria applied. The research instrument used was a questionnaire on respondent characteristics covering age, gender, education level, occupation, income, and family history of diabetes mellitus. Knowledge level was measured using the Diabetes Knowledge Questionnaire (DKQ-24) questionnaire which includes 24 statement items to obtain information about general knowledge of diabetes, including causes, self-management skills, and complications of diabetes. Attitude measurement used an attitude questionnaire that has been tested for validity and reliability to assess attitudes towards the use of antidiabetic drugs in patients with type 2 diabetes mellitus, consisting of 9 statement items. The level of compliance of type 2 diabetes mellitus patients using the Modified Morisky Adherence Scale (MMAS-8) questionnaire, which consists of 8 statement items covering the frequency of forgetting to take medication, changing doses, skipping doses, using less medication than prescribed, deliberately stopping taking medication without the doctor's knowledge and their ability to continue taking medication, which is used to assess non-compliance behavior. The analysis technique uses univariate and bivariate analysis. Bivariate analysis using the chi-square test with the help of Statistical Product and Service Solution (SPSS) for Windows version 23.0 software.

RESULT AND DISCUSSION

Univariate Analysis

The characteristics of the respondents were collected from 110 questionnaires, including age, gender, education level, occupation, income, and family history of diabetes mellitus. The distribution of respondent characteristics is shown in Table 1.
Based on Table 1, it shows that the majority of respondents were aged between 59-64 years (26.4%) and the fewest were aged 47-52 years (11.8%). This study was dominated by female respondents (60.9%), while male respondents (39.1%). Furthermore, in terms of education level, the majority of respondents had an elementary school

education (34.5%), and the fewest number of respondents were uneducated (6.4%). The majority of respondents in this study were housewives (41.8%), and the fewest were in other job categories. It was also found that the majority of respondents had an income of <Rp. 3,500,000 (66.4%), and the fewest had an income of >Rp. 3,500,000 (33.6%). Meanwhile, as many as (52.7%) had no history of diabetes mellitus in the family and as many as (47.3%) respondents had a history of the disease in the family..

Table 1. Distribution of Demographic Characteristics of Respondents with Type 2 Diabetes Mellitus.

Characteristics Demographics	Number of Respondents n= 110	Presentation
Age		
35-40 years	14	12.7%
41-46 years	17	15.5%
47-52 years	13	11.8%
53-58 years	21	19.1%
59-64 years	29	26.4%
65-70 years	16	14.5%
Gender		
Man	43	39.1%
Woman	67	60.9%
Level of education		
No school		
Elementary School	7	6.4%
JUNIOR HIGH SCHOOL	38	34.5%
High School/Vocational	16	14.5%
School	28	25.5%
Diploma/Bachelor's Degree	21	19.1%
Work		
civil servant	22	20.0%
Private sector employee	14	12.7%
Self-employed	17	15.5%
Housewife	46	41.8%
Doesn't work	7	6.4%
Etc	4	3.6%
Income		
< Rp. 3,500,000	73	66.4%
> Rp. 3,500,000	37	33.6%
Family History of DM		
There is	52	47.3%
There isn't any	58	52.7%

Table 2 Distribution of Knowledge Level of Respondents of Type 2 Diabetes Mellitus Patients

Level of Knowledge	Number of Respondents	Presentation
Good	15	13.6%
Enough	55	50.0%
Not enough	40	36.4%
Total	110	100%

Based on Table 2. shows that the majority of respondents have a level of knowledge in

the sufficient category (50.0%), followed by the category of poor knowledge level (36.4%) and the category of good knowledge level (13.6%). The results of this study indicate that there are factors that influence a person's knowledge, including experience, education, age, and information facilities such as television, radio, newspapers, and others. The results of the study in (Table 1.) also show that most respondents do not all have a high educational background so this greatly affects a person's level of knowledge about the disease suffered by the patient. Knowledge itself is a very important domain for the formation of behavior, because behavior based on knowledge will be better in carrying out treatment. Good knowledge about the disease will influence patients to carry out management and undergo treatment for their disease well as well. The level of patient knowledge that patients have will encourage patients to comply with treatment and listen to instructions from health workers. A low level of knowledge can affect eating patterns, resulting in increased blood glucose levels. The results of this study are supported by previous research conducted by Marshal at the Endocrine Polyclinic RSUP. Prof. Dr. RD Kandou Manado, who stated that a person's level of knowledge is influenced by several factors, including education factors, work factors, experience factors, belief factors and socio-cultural factors (Marshal et al., 2015).

Table 3 Distribution of Respondents' Attitudes of Type 2 Diabetes Mellitus Patients

Attitude	Number of Respondents	Presentation
Positive	72	65.5%
Negative	38	34.5%
Total	110	100%

Based on Table 3, it shows that the majority of respondents with type 2 diabetes mellitus have a positive (good) attitude, as many as 72 respondents (65.5%). This indicates that respondents with a good (positive) attitude in carrying out the treatment of type 2 diabetes mellitus certainly have good behavior in carrying out their treatment. Positive attitudes are certainly shown by respondents with the aim of recovering quickly from the disease they suffer from. The results of this study are in line with research conducted by Lestarina (2017) which showed that the majority of respondents have a good (positive) attitude and view towards the treatment pattern of type 2 diabetes mellitus. A good (positive) attitude of an individual is influenced by several factors including personal experience, culture, other people who are considered important, mass media, educational institutions or institutions and religious institutions (Azwar et al., 2013).

According to Sunaryo (2013), attitudes are not innate but can be learned and formed based on an individual's experiences throughout their life. Attitude formation is influenced by external factors (experience, situations, norms, barriers, and drivers) and internal factors (physiological, psychological, and motives) (Lestarina, 2017). Notoatmodjo (2012) added that a person's positive attitude is influenced by positive knowledge, and vice versa.

In the results of this study, there were also several respondents who had negative attitudes (less good) as many as 38 people (34.5%) due to a lack of understanding in this case the lack of knowledge possessed by the respondents. According to Sonyo et al., (2016) attitudes are greatly influenced by a person's

knowledge regarding the disease they suffer from, this knowledge will lead sufferers to determine attitudes, think and try to avoid getting the disease or can reduce the condition of the disease. Good education will produce good attitudes so that they are more objective in receiving information, especially information about the management of diabetes mellitus. Conversely, if education is low, it will hinder the development of a person's attitude towards receiving newly introduced information.

Table 4 Distribution of Compliance Levels of Respondents with Type 2 Diabetes Mellitus Patients

Compliance Level	Number of Respondents	Presentation
Tall	18	16.4%
Currently	38	34.5%
Low	54	49.1%
Total	**110**	**100%**

Based on Table 5, it shows that the majority of respondents have low compliance (49.1%) more than the number of respondents who have moderate compliance (34.5%) and high compliance (16.4%). This study is in accordance with Rasdianah's (2016) study which shows that the level of compliance based on the MMAS-8 questionnaire results scores, namely the level of compliance of type 2 DM respondents is included in the low and moderate compliance categories, and only a portion of respondents have a high level of compliance.

There are several factors that can influence respondents' non-compliance in using or consuming drugs, namely low knowledge and poor attitudes related to diabetes mellitus, poor communication between health workers so that information cannot be conveyed properly, respondents often forget to take medication, do not want to continue treatment therapy in this case is stopping taking medication, and replacing other drugs such as herbal medicine without notifying the doctor or other health workers (Lestarina, 2017). The results of this study are in line with research conducted by Widyasari which states that one of the causes of low compliance that often occurs is that most patients forget, do not comply with treatment according to doctor's instructions, misread medication labels, in addition to the lack of knowledge and attitudes in carrying out treatment are also factors that trigger patient non-compliance in carrying out treatment (Widyasari, 2017).

This indicates that interventions are still needed to improve patient medication adherence. Outpatients with diabetes mellitus tend to be less compliant with treatment due to their better clinical condition compared to inpatients, making them more likely to forget and neglect their medication obligations. Diabetes mellitus is a degenerative disease that requires lifelong drug therapy, so patient adherence to medication must be maintained. Improved medication adherence can improve the ability to control blood sugar levels, keeping them within normal limits, thus achieving the desired goals of diabetes mellitus therapy (Ariani et al., 2022).

Bivariate Analysis

Table 5. Cross Tabulation of Knowledge Level with Compliance of Use Antidiabetics in Type 2 Diabetes Mellitus Patients

	Compliance			**Amount**	***P-Value***
Knowledge	**Tall**	**Currently**	**Low**		
	f %	**f %**	**f %**	**f %**	
Good	5 4.5	1 0.9	9 8.2	15 13.6	
Enough	10 9.1	17 15.5	28 25.5	55 50.0	**0.019**
Not enough	3 2.7	20 18.2	17 15.5	40 36.4	
Amount	18 16.4	38 34.5	54 49.1	110 100.0	

Based on Table 5. shows that respondents who have good knowledge are 15 respondents (13.6%), there are 5 respondents (4.5%) have a high level of compliance, there is 1 respondent (0.9%) has moderate compliance and there are 9 respondents (8.2%) have low compliance. For respondents who have sufficient knowledge are 55 respondents (50.0%), there are 10 respondents (9.1%) have a high level of compliance, there are 17 respondents (15.5%) have moderate compliance and there are 28 respondents (25.5%) have low compliance. While respondents who have less knowledge are 40 respondents (36.4%), there are 3 respondents (2.7%) have high compliance, there are 20 respondents (18.2%) have moderate compliance and there are 17 respondents (15.5%) have low compliance.

Based on the results of the Chi-Square statistical test, the p-value was 0.019. This shows that the p-value is smaller thanα(0.05) which means that the level of knowledge has an effect on adherence to taking medication in type 2 diabetes mellitus patients who come for treatment at Hospital X. The results of this study are in line with research conducted by Azyenela et al which states that there is a relationship between the level of patient knowledge and patient adherence in undergoing type 2 diabetes mellitus treatment (Azyenela et al., 2019).

Boyoh et al. also share the same opinion as the results of this study, where knowledge influences adherence to taking type 2 diabetes mellitus medication. A person's knowledge can influence adherence to taking medication, because the higher a person's education, the easier it is to receive information. The lack of information provided by health professionals can affect patient knowledge. Therefore, the important role of pharmacists is to provide health education to patients about proper medication consumption, the uses and benefits of treatment for patient safety and success of therapy, and the importance of family support to remind patients to take their medication. Knowledge is closely related to patient compliance in the use of antidiabetic drugs, where the higher a person's knowledge, the awareness of their disease, and the higher the level of compliance in carrying out their treatment.

The level of knowledge is one of the factors influencing the level of medication adherence in respondents, so providing in-depth information about diabetes mellitus is very important to increase the level of medication adherence and reduce the risk of disease severity and complications, and control blood sugar (Nazriati et al., 2018).

Based on the research results obtained from data collection conducted in the Endocrine Outpatient Room of Hospital X, it was found that the frequency distribution of respondents' ages with the majority of ages in the late elderly category, namely in the age range of 59-64 years as many as 29 respondents (26.4%) (Table 1.). Age factors are often associated with patient forgetfulness in taking medication, which is caused by the process of degeneration of human body organs, one of which is memory loss. Therefore, forgetting to take medication in the elderly is a complaint that is often complained of by elderly patients. This is supported by the results of research conducted by Mokolomban et al., (2018) which showed that 22.22% of patients aged 18-65 were more compliant in taking medication than patients aged > 65 years, where the average age of the study respondents was elderly, namely 40 years and above. Some of them admitted that they did not understand the medication they were taking, they only took it when their blood sugar increased. Besides limited knowledge, another factor contributing to the low level of respondent compliance is that the majority of respondents work as housewives and in other jobs, sometimes forgetting to take their medication due to fatigue from work or forgetting to bring it to work. Some also reasoned that sometimes they were already tired when they got home and immediately rested upon arrival, thus sometimes forgetting to take their medication. Furthermore, it is believed that another factor triggering patient compliance with treatment is the lack of personal financial support (income) that supports access to medical services and treatment. Due to a lack of understanding of diabetes mellitus, many type 2 DM sufferers are non-compliant and experience complications that cause their disease to worsen. The initial trigger for the emergence of chronic and fatal health problems is quite simple. The lack of compliance of type 2 DM sufferers in maintaining and undergoing various irregular treatments, which can ultimately lead to fatal complications and lead to amputation and death.

Table 6. Cross Tabulation of the Relationship between Attitudes and Compliance with Antidiabetic Use In Type 2 Diabetes Mellitus Patients

	Compliance			**Amount**	***P-Value***
Attitude	**Tall**	**Currently**	**Low**		
	f %	**f %**	**f %**	**f %**	
Positive	16 14.5	26 22.7	30 28.2	72 65.5	**0.044**
Negative	2 1.8	13 11.8	23 20.9	38 34.5	
Amount	**18 16.3**	**39 34.6**	**53 49.1**	**110 100.0**	

Based on Table 6 shows that respondents who have a positive attitude (good) are 72 respondents (65.5%), those who have high compliance are 16 respondents (14.5%), those who have moderate compliance are 26 respondents (22.7%), and those who have low compliance are 30 respondents (28.2%). Meanwhile, for respondents who have a negative attitude (less good) are 38 respondents (34%), those who have high compliance are 2 respondents (1.8%), those who have moderate compliance are 13 respondents (111.8%), and those who have low compliance are 23 respondents

(20.9%).

Based on the results of the Chi-Square statistical test, the p-value was obtained as 0.044. This shows that the p-value is smaller thanα(0.05) which means that the level of attitude influences adherence to taking medication in type 2 diabetes mellitus patients who come for treatment at Hospital X. In line with research conducted by Nainggolan (2019) which shows that the p-value is smaller than 0.05 so that there is a relationship between attitude and adherence to taking antidiabetic drugs in type 2 diabetes mellitus patients. The same results were also obtained in research conducted by Tombokan et al (2015) p-value = 0.001, which shows that there is a significant relationship between patient attitudes and adherence to treatment. Behavioral attitudes in individual health are also influenced by individual self-motivation to maintain health.

Individual health behaviors are also influenced by their self-motivation to maintain their health. Self-motivation is a drive, both internal and external, that drives attitudes and behavior change. This motivation is based on internal psychological factors and is the result of internalizing information and observations of an object, which creates perceptions that motivate individuals to act or do something (Bertalina et al., 2016).

The results of research by Lao et al., (2013) showed the influence of family support on treatment success in patients undergoing therapy or treatment. Compliance found in people undergoing long-term treatment can be linked to good family support. In other words, good family support can have a positive impact on adherence to treatment for diabetes mellitus sufferers. Lack of positive motivation in using medication, feelings of boredom with taking medication, laziness, and forgetting to take medication are problems that cause non-adherence to medication use in the long term, especially in the elderly (Makkulawu et al., 2019).

The results of research conducted by Laoh et al. (2013) demonstrated that good family support, or the presence of family support, is very powerful in fostering adherence to diabetes mellitus treatment. Family support can take the form of emotional, informational, and material support. This research aligns with research conducted by Triastuti et al. in 2020, which showed that knowledge, motivation, and attitude are the most influential factors in the level of adherence to treatment for type 2 diabetes mellitus.

CONCLUSION

Based on the results of research conducted at Hospital X with a sample of 110 respondents, it can be concluded that the knowledge of type 2 diabetes mellitus patients is generally at a sufficient level of knowledge, namely (50.0%) respondents, then for patient attitudes in taking medication, the majority of respondents have a positive attitude (good) as many as 72 people (65.5%) and for the level of patient compliance in the use of antidiabetics, it is included in the low compliance category, namely 54 people (49.1%). There is a significant relationship between knowledge and compliance in the use of antidiabetics with the results of the chi-square statistical test with a p value of 0.019 ($p < 0.05$). and there is also a significant relationship between attitudes towards compliance with the use of antidiabetics in type 2 diabetes mellitus patients seen from the results of the chi-square statistical test with a p value of 0.044 ($p < 0.05$). With these results, it shows that there is a unidirectional relationship between the two variables studied, thus it can be said that if knowledge

and attitudes are further improved, it will increase the level of patient compliance in the use of antidiabetic drugs properly.

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