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Relationship Between the Level of Knowledge and Medication Adherence Level in Diabetes Mellitus Patients in Advent Medan Hospital

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Abstract

Hyperglycemia or elevated blood sugar levels due to decreased pancreatic insulin productin, is a sign of a metabolic disorder that leads to diabetes mellitus (DM). One crucial factor in managing diabetes mellitus is the patient's knowledge and adherence to treatment. Patients with adequate knowledge are more likely to comply with therapy, which helps control the disease. This study aims to determine the relationship between the level of knowledge and the level of medication adherence in diabetes mellitus patients in Advent Hospital Medan. This research employed a quantitative approach with a cross-sectional design and a purposive sampling technique. The research involved 90 patients who were selected and agreed to participate as respondents. Data were collected using a validated Diabetes Knowledge Questionnaire (DKQ-24) and Medication Adherence Report Scale (MARS-5). Data analysis was conducted using a non-parametric statistical test, specifically the Chi-Square test. The study found that the majority of patients had a high level of knowledge (48,9%) but were non-adherent to medication (56,7%). The Chi-Square test showed a significance of 0.001 < 0.05, indicating a significant relationship between the level of knowledge and medication adherence among diabetes mellitus patients at Advent Medan Hospital.

Keywords: Diabetes Mellitus, Knowledge, Adherence, DKQ-24, MARS-5

Abstrak

Hiperglikemia atau peningkatan kadar gula darah akibat penurunan produksi insulin oleh pankres merupakan indicator gangguan metabolic yang menyebabkan penyakit diabetes melitus. Salah satu factor penting dalam pengelolaan diabetes melitus adalah Tingkat pengetahuan dan kepatuhan pasien. Pasien dengan pengetahuan baik cenderung lebih patuh menjalani terapi, sehingga penyakit dapat dikontrol dengan lebih baik. Penelitian ini bertujuan untuk mengetahui adanya hubungan tingkat pengetahuan terhadap tingkat kepatuhan minum obat pasien diabetes melitus di Rumah Sakit Advent Medan. Penelitian ini melibatkan 91 pasien yang dipilih dan setuju untuk berpartisipasi sebagai responden. Data dikumpulkan dengan menggunakan Diabetes Knowledge Questionnaire (DKQ-24) dan Medication Adhrence Report Scale (MARS-5). Analisis data dilakukan dengan uji statistic non- parametrik menggunakan uji Chi-Square. Hasil penelitian menunjukan bahwa Sebagian besar pasien memiliki tingkat pengetahuan tinggi (48,9%) dan sebagian besar tidak patuh minum obat (56,7%). Uji chi-square menunjukan nilai signifikansi 0.001 < 0.05, yang berarti terdapat hubungan yang signifikan antara tingkat pengetahuan dan kepatuhan minum obat pasien diabetes melitus di Rumah Sakit Advent Medan.

Kata kunci: *Diabetes melitus, Pengetahuan, Kepatuhan, DKQ-24, MARS-5*

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INTRODUCTION

Hyperglycemia is a condition where blood glucose levels exceed normal values, specifically >126 mg/dl (fasting blood glucose level) or >200 mg/dl (blood glucose level after administration of a 75 gram glucose solution)[1] due to an absolute or relative deficiency of insulin in the body. This is a sign of diabetes mellitus (DM), a group of metabolic diseases[2]. Diabetes mellitus is a chronic disease, causes an increase in blood sugar levels and problems with the metabolism of carbohydrates, fats, and proteins. Abnormal pancreatic secretion also causes glucose to accumulate in the blood[3]. Polydipsia, polyuria, polyphagia, significant weight loss, and tingling in the abdomen are some symptoms of diabetes mellitus[4,5].

World Health Organization (WHO) reports that 422 million people worldwide suffer from diabetes mellitus, an increase of about 8.5% in the adult population, and an estimated 2.2 million deaths are caused by

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this disease before the age of 70, especially in countries with low and middle economic status. Even around 600 million people will be affected by 2035[6].

International Diabetes Federation (IDF) estimates that in 2019, at least 436 million people aged 20 to 70 worldwide suffered from diabetes, equivalent to 9.3% of the total population in this age group. With increasing age, the prevalence of diabetes is expected to rise to 111.2% million people aged 65 to 79 years. This number is expected to continue rising, reaching 578 million by 2030 and 700 million by 2045. Among the ten countries with the highest number of diabetes patients in the world, Indonesia ranks seventh with 10.7% million people. It is also only country in Southeast Asia on the list of the top 10 countries with the highest number of diabetes sufferers in the world. This shows the extent of Indonesia's contribution to the prevalence of diabetes in Southeast Asia. In North Sumatra Province, there are 228.551% diabetes mellitus patients in 2023, 146.447% of them or 64.08% of the total, have received medical treatment, and 82.104 of them have not seen a doctor[5,7].

One of the main factors influencing patients' knowledge about the appropriate treatment is their level of adherence to the treatment of the disease they are suffering from. Knowledge about diabetes patients is very important to take actions that can reduce the risk of complications. If patients know about diabetes well, they will be better at taking care of themselves. Knowledge itself is the result of the process of seeking information from the unknown to the known, from the unable to able. This process can be achived thorugh education and experience, and it greatly helps patients manage their illness[8].

In addition to having high morbidity and mortality rates, chronic diseasse such as type 2 diabetes mellitus require long-term management. Therefore, not only do healthcare professionals play an important role, but active patient pasrticipation is also crucial, especially in terms of adherence to the treatment regimen[9].

Obedience is defined as a disciplined attitude or behavior of adhering to commands and rules with full awareness. Obedience is considered a good choice[10]. Patient adherence to medication is very important to maintain blood glucose levels within the normal range. The goal of diabetes mellitus treatment is to avoid complications and improve therapy outcomes. However, most diabetes mellitus patients do not know the purpose of their therapy. Although medication management programs require a high level of adherence, many patients are non-compliant[11]

A good level of knowledge in patients with diabetes mellitus contributes to increased adherence to the treatment process, thereby allowing better control of the disease condition. Adherence to diabetes mellitus treatment is very important because it can ensure that the treatment is successful. High adherence allows for optimal treatment of diabetes mellitus and stable health quality. Compliance is defined as the extent to which patients follow the treatment and behavioral advice given by doctors or their healthcare professionals[12].

Based on the above explanation, the researcher is interested in conducting a study on "The Relationship Between Knowledge Level and Medication

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Adherence Among Diabetes Patients at Advent Hospital Medan"

METHODOLOGY

Planing Research

This study is a quantitative research with a cross-sectional design, conducted at Advent Hospital Medan from December 2024 to February 2025. The sample used consists of patients who meet the inclusion criteria, namely outpatient diabetes mellitus patients receiving treatment at Advent Medan Hospital, patients aged >17 years, and those willing to be respondents. As for the exclusion criteria, they are patients who cannot communicate well and those who are not willing to become respondents. The sample was determined using the Slovin formula, resulting in a total of 90 respondents for this study using a purposive sampling technique.

Measuring Instrument

This study uses primary data obtained directly from respondents by distributing questionnaires to diabetes mellitus patients. The questionnaire instruments used are DKQ-24 and MARS-5.

Knowledge

DKQ-24 (Diabetes Knowledge Questionnaire 24) is used to measure a person's level of knowledge. Star Country developed an adaptation of the original DKQ-60 questionnaire, which has a Cronbach's Alpha value of 0.78 and consists of 24 questions. There are three question options : "Yes", "No", and "Don't Know". The level of knowledge can be categorized as high if the score is between 17 - 24, moderate if 10 – 16, and low if the score is between 0 - 9. The total score is calculated from the number of correct answers given by the respondents[13]

Adherence

MARS-5 (Medication Adherence Report Scale 5) is used to measure adherence levels. This questionnaire has 5 questions to assess non- adherence behaviors (forgetting to take medication, missing doses, and taking less medication than prescribed). MARS-5 is part of MARS-10, created by Rob Horne [14] has been validated and translated into Indonesian, and has a Cronbach's Alpha value of 0.803 [15]. The level of respondent compliance is calculated based on the total score from the questions. A score above 25 indicates high compliance, while a score below 25 indicates low compliance[16]

Data Analysis

The data in this study were processed using SPSS (Statistical Package for the Social Sciences) software version 29. Analysis to determine the relationship between the level of knowledge and the level of compliance using the Chi-square test. If the p value <0.05 is stated as significant.

RESULT AND DISCUSSION

Demographic Characteristics

Out of respondents, the majority were female with the common age group being 56 – 65 (38%). Almost the majority of respondents have a senior high school education and on average are unemployed or retired. And as many as 52 respondents (57%) have suffered from diabetes mellitus for more than 5 years.

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Table 1. Demographic Characteristics

Characteristic	Total (N = 90)	Percentage (%)
Gender		
Male	38	42.2
Female	52	57.8
Age (years)		
17 – 25	1	1.1
26 – 35	3	3.3
36 – 45	12	13.3
46 – 55	18	20.0
56 – 65	35	38.9
> 65	21	23.3
Education background		
Primary school	4	4.4
Junior high school	10	11.1
Senior high school	33	36.7
Diploma/Bachelor/Master degree	43	47.8
Occupation		
Not working/Retiree	25	27.8
Civil servant/Army/Police	9	10.0
Entrepreneur/Merchant	18	20.0
Private Employee	20	22.2
IRT	18	20.0
Long Suffering		
< 5 years	38	42.2
> 5 years	52	57.8

Table 1 shows the highest number of women. Differences in body composition and sex hormone levels between adult women and men can lead to more cases of diabetes mellitus in women. Women's fat tissue is more than men's. The increase in free fatty acid release is caused by the increase in body fat reserves especially in the abdominal area, due to the decrease in estrogen hormone in monopausal women. Because the hormones estrogen and progesterone have the ability to enchance insulin response in the blood, insulin response decreases during menopause

In the Internal Medicine Polyclinic of Advent Hospital Medan, there are more type 2 diabetes patients aged >45 years, totaling 74 patients, and fewer type 2 diabetes patients aged <45 years totaling 18 patients, according to Table 1. According to previous research, people >45 years have a higher risk of developing type 2 diabetes mellitus compared to those
<45 years. This is due to glucose intolerance caused by degenaritve factors, which disrupt the body's ability to regulate glucose[17]

Research conducted by Sidiq Rapitos found that most patients have had diabetes mellitus for a long time. Experience indirectly increases a person's knowledge, so the more experience a person has, the more knowledge they possess[18].

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Knowledge of Diabetes Mellitus

Patient knowledge about their condition is a crucial factor in supporting treatment adherence and effective management of chronic diseases such as diabetes mellitus. In this study, the respondents' knowledge levels were categorized into three groups: low, medium, and high. The distribution of respondents based on their knowledge level is presented in Table 2 below:

Table 2. Knowledge of Diabetes Mellitus Patients

Category	Total (N = 90)	Percentage (%)
Low	10	11,1
Medium	36	40,0
High	44	48,9

Based on Table 2, the majority of respondents have a high level of knowledge, with 44 people (48,9%). Meanwhile, respondents with a moderate level of knowledge are 36 people (40,0%), and those with low knowledge are 10 people (11,1%). These findings are consistent with previous research titled "The Influence of Age, Knowledge, and Education Level on Medication Adherence in Diabetes Mellitus Patients," which showed that the majority of respondents had a high level of knowledge, amounting to 71.6%

Knowledge is the result of sensing a particular object. According to experience and research, behavior based on knowledge lasts longer than behavior not based on knowledge[6]

In this study, it was found that the majority of diabetes mellitus patients at Advent Hospital Medan have a relatively high level of education, namely having graduated from college. Basically, education level is one of the factors that influence a person's knowledge and actions, because knowledge directly impacts behavior. This indicates that someone with a higher education will find it easier to understand and grasp the information they receive for their health[19].

Medication Adherence Diabetes Mellitus Patients

Adherence to medication is a key factor in achieving optimal therapeutic outcomes for patients with chronic diseases, including diabetes mellitus. In this study, respondents were categorized into two groups based on their level of medication adherence: compliant and non-compliant. The distribution of medication adherence among diabetes mellitus patients is presented in Table 3 below:

Table 3. Medication Adherence Diabetes Mellitus Patients

Category	Total (N = 90)	Percentage (%)
Non-compliant	51	56,7
Compliant	39	43,3

Based on Table 3, it was found that the majority of patients' compliance levels were categorized as non-compliant, with 51 respondents (56.7%) being non-compliant,

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and 39 respondents (43.3%) being compliant. The results of this study are in line with the research conducted by Yulianti Tri and Lusi Anggraini, which showed that 56.5% of patients were non-compliant[20].

The results of the data analysis obtained from the MARS-5 questionnaire indicate a low level of medication adherence among diabetes mellitus patients in this study, caused by patients intentionally reducing or stopping their medication use. During the study, there were several patients who felt they had no health complaints, so the respondents chose not to take the medication as instructed by the doctor or health care staff.

Most respondents have a higher education background, with 43 respondents (47.8%) having completed university. Higher education can influence a person's intellectual ability to make decisions, such as deciding to adhere to medication. Diabetes mellitus patient therapy is a treatment that requires patience and perseverance, as the patient must be able to understand the medication therapy to keep blood sugar levels under control[21].

More than half of the respondents have siblings with a history of diabetes mellitus, totaling 54 respondents (60.0%). Compliance based on family history or lineage characteristics plays a very strong role in the management of diabetes mellitus therapy[22].

The Relationship Between Knowledge Level and Adherence

Bivariate analysis with the chi-square test was conducted to analyze the relationship between the level of knowledge and medication adherence among diabetes mellitus patients at Advent Hospital Medan. The results of the cross-tabulation and chi-square test can be seen in Table 4.

Table 4. The Relationship Between Knowledge Level and Medication Adherence

Variable		Medication Adherence		Total	ϱ value
		Non-Compliant	Compliant		
Knowledge	Low	8	2	10	0.001
	Medium	27	9	36	
	High	16	28	44	
Total		51	39	90	

Based on Table 4, it can be seen that the majority of patients with moderate knowledge are categorized as non-compliant, totaling 27 respondents. Then, patients with low knowledge are categorized as non- compliant, totaling 8 respondents. However, patients with high knowledge are categorized as compliant in taking their medication. This indicates that the level of knowledge is in line with the level of patient medication adherence. The significance value obtained from 90 respondents shows a result of ϱ = 0,001, which means the value ϱ < α = 0,05. The results of the correlation analysis with the test can be interpreted as indicating a significant relationship between the level of patient knowledge and the level of medication adherence among diabetes mellitus patients at Advent Hospital Medan.

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The results of this study are relevant to previous researchers (Ramadhani & Hati, 2024) who also found that there is a correlation between the level of knowledge and the medication adherence of diabetes mellitus patients at Puskesmas X, Batang Regency. This indicates that medication adherence in diabetes mellitus patients is influenced by the patient's knowledge, which can be obtained through healthcare workers during routine check-ups and when collecting diabetes medication at the hospital.

Knowledge is very important in shaping behavior, and behavior based on knowledge is expected to be more consistent. Good knowledge about the disease will influence patients to be more compliant with undergoing treatment and listening to the doctor's instructions for better therapy. Non- compliance with treatment can cause patients to lose the benefits of therapy and risk worsening their health condition. In the case of diabetes mellitus, non-compliance with treatment can lead to failure in blood sugar control[15].

CONCLUSION

The research results show that the majority of type 2 diabetes mellitus patients at Advent Hospital Medan have a high level of knowledge category, with 44 respondents (48.9%), and a non-compliance category with 51 respondents (56.7%). Through chi-square test analysis, it was concluded that there is a relationship between knowledge level and medication adherence level in diabetes mellitus patients at Advent Hospital Medan with a significance value of $\varrho = 0{,}001$, which means $\varrho < \alpha = 0.05$.

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