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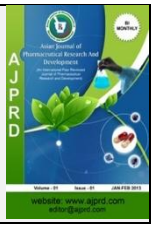

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Research Article

The Correlation of Characteristics of Type 2 Diabetes Mellitus Patients and Medication Adherence Level: A Case Study in Community Pharmacy

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A B S T R A C T

Background: Patients with diabetes mellitus (DM) are patients with a low level of medication adherence. Low adherence causes poor glycemic control, thus increasing the risk of various chronic complications (microvascular and macrovascular).

Objective: This study aims to determine the correlation between patient characteristics including gender, age, education level, occupation, duration of illness, and comorbidities on medication adherence to type 2 diabetes mellitus patients at the pharmacy. Methods: This study used an observational method with a cross-sectional study design. The study involved 40 DM type 2 patients who met the inclusion criteria at one of the pharmacies in Medan in August-September 2020. Data on the level of treatment adherence were obtained using the MMAS-8 questionnaire (Morisky Medication Adherence Scale-8). Data were analyzed using the Chi-Square statistical test.

Results: The results showed that the majority of patients involved in this study were women (57.5%), aged 45-65 years (92.5%), high school education level (47.5%), and private employees/ traders/ labor (45%). This study also showed that the majority of patients had a low level of adherence (55%), duration of suffering from type 2 diabetes, 1-5 years (18%), and with comorbidities (75%). The relationship between patient characteristics and adherence level was gender (p = 0.636); age (p=0.922); education level (p=0.275); work (p=0.241); duration of illness (p=0.629); and with comorbidities (p=0.752) the level of treatment adherence was not significant (p>0.05).

Conclusion: Based on the results of the study it was concluded that there was no significant relationship between patient characteristics including gender, age, level of education, occupation, duration of disease, and comorbid diseases on the level of medication adherence of type 2 DM patients at the community pharmacy.

Keywords: Characteristics, Adherence, Diabetes mellitus type 2

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INTRODUCTION

Hyperglycemia is a medical condition in the form of an increase in blood glucose levels above normal which is characteristic of several diseases, especially diabetes mellitus in addition to various other conditions. Diabetes mellitus (DM) is currently a global health threat. Based on the cause, DM can be classified into 4 groups, namely type 1 DM, type 2 DM, gestational DM, and other types of DM. Various epidemiological studies have shown an increasing trend in the incidence and prevalence of type 2 diabetes mellitus in various parts of the world. The WHO organization predicts a fairly large increase in the number of people with type 2 diabetes in the coming years.[1]

The prevalence of the number of people with diabetes globally increased by 51% with the composition of the number of diabetics in 2019 as many as 463 million people, estimated to be 578 million people in 2030, and 700 million people in 2045.[2] The number of deaths caused by DM was 1.6 million people in 2016[3]and more than 4 million people in 2019.[2] In Indonesia, based on Basic Health Research data, DM sufferers increased from 6.9% in 2013 to 10.9%

in 2018[4] and according to IDF Indonesia is the seventh-highest rank in the world with DM sufferers. with a total of 10.7 million sufferers in 2019.[2]

The main goal of DM therapy is to control glycemic levels, so this therapy needs to be done intensively. However, DM patients include patients with a low level of treatment adherence. Treatment adherence is one of the important factors that significantly affect the control of blood glucose. Low adherence causes poor glycemic control, thus increasing the risk of various chronic complications (microvascular and macrovascular). The consequences will have a negative impact both economically, clinically, and on the quality of life of patients due to frequent relapses and re-hospitalization.[5]

This study aims to determine the correlation of patient characteristics including gender, age, education level, occupation, duration of illness, and comorbidities on medication adherence to type 2 diabetes mellitus patients at the community pharmacy.

MATERIAL AND METHODS

Study design

This study used an observational method with a cross-sectional study design. The study was conducted at one of the community pharmacy in the city of Medan in August-September 2020. This study was approved by the University of Sumatera Utara Faculty of Nursing Health Research Ethics Commission Number 2177/VII/SP/2020. All patients who participated in this research signed and informed consent as evidence of willingness to become respondents.

Participants

The subjects of this study were 40 patients with type 2 diabetes mellitus. Inclusion criteria for patients who were respondents included: 1) patients with a diagnosis of type 2 diabetes mellitus for more than 3 months, 2) male and female patients aged>18 years, 3) patients with type 2 diabetes mellitus with or without complications and comorbidities, 4) willing to take part in the research by signing informed consent. Patient exclusion criteria included: 1) patients who were not willing to be research subjects, 2) patients with mental disorders and pregnant women, 3) patients with complications from chronic kidney disease (CKD), liver disease, Human Immunodeficiency Virus-Acquired Immunodeficiency Syndrome (HIV/AIDS), and Tuberculosis (TBC), 4) patients cannot communicate with pharmacists.

Data collection

Patient characteristic data collected included gender, age, educational status, employment status, duration of illness, and comorbidity. Data on medication adherence were obtained through interviews with patients when taking medication at a community pharmacy.

Instrument

Medication adherence was assessed using an eight-item Morisky Medication Adherence Scale (MMAS).[6] The MMAS scale has been used for many chronic diseases including diabetes, as a self-reported measure of adherence to prescribed medication. MMAS-8 is available in language version andshowed good validity (r=0.869) and reliability internal consistency with a Cronbach's alpha of 0.806.[7]Respondents wereclassified as having low adherence if their scorewas less than 6, medium adherence if their scorewas 6 or 7, and high adherence if their score was8.

Statistical analysis

Each patient characteristic consisting of gender, age, educational status, employment status, duration of illness, and comorbidity was analyzed using the univariate analysis to describe descriptively the frequency distribution of each variable. Chi-square statistical test was used to see the correlation between patient characteristics and the level of adherence to the treatment of type 2 DM patients.

RESULT

Patient characteristics

This study involved 40 patients with type 2 diabetes who were carried out at one of the community pharmacies in Medan City for the period August-September 2020 who met the inclusion criteria. Characteristics of type 2 DM patients based on gender, age, education level, occupation, duration of illness, and comorbid diseases can be seen in Table 1.

Table: 1 Characteristics of type 2 DM patients

Variable	Category	Frequency (n = 40)	Percentage (%)
Gender	Male	17	42.5
	Female	23	57.5
Age	<45 years	2	5.0
	45-65 years	37	92.5
	>65 years	1	2.5
Educational status	Primary education	3	7.5
	Secondary school	6	15.0
	Higher education	19	47.5
	University	12	30.0
Employment status	Civil servant/Government	7	17.5
	employed	18	45.0
	Private/Merchant/Laborer	10	25.0
	unemployed	5	12.5
	Retired		
Duration of illness	<1 year	7	17.5
	1-5 years	18	45.0
	>5 years	15	37.5
Comorbidity	Present	30	75.0
	Absent	10	25.0

The results showed that the majority of type 2 DM patients were women (57.5%) with the productive age group 45-65 years (92.5%). Most of the respondents' education level has high school education (47.5%) and tertiary education (30%) with the majority of jobs as private employees, traders, or laborers (45%). The percentage of people with type 2 diabetes who had a duration of illness less than 5 years was more (45%) compared to those who had a duration of more than 5 years (37.5%) and had comorbidities as much as 75%.

The Correlation between Patient Characteristics and Treatment Adherence Level

The correlation between patient characteristics and medication adherence levels can be seen in Table 2.

Table: 2. The correlation between patient characteristics and medication adherence levels

Variable	Medication Adherence Level				Asymp.Sig. (2-sided)
	Low (%)	Moderate (%)	High (%)	Total	
Gender					
Male	9 (52.94)	8 (47.05)	0 (0)	17	0.636
Female	13 (56.52)	9 (39.13)	1 (4.34)	23	
Age					
<45 years	1 (50)	1 (50)	0 (0.00)	2	0.922
45-65 years	20 (54.05)	16 (43.24)	1 (2.70)	37	
>65 years	1 (100)	0	0	1	
Educational status					
Primary education	1 (33.33)	2 (66.67)	0 (0)	3	
Secondary school	5 (83.33)	1 (16.67)	0 (0)	6	0.275
Higher education	7 (36.84)	11 (57.89)	1 (5.26)	19	
University	9 (75)	3 (25)	0 (0)	12	
Employment status					
Civil servant/Government employed	6 (85.71)	1 (14.28)	0 (0)	7	
Private/Merchant/Laborer	6 (33.33)	11 (61.11)	1 (5.55)	18	0.241
Unemployed	6 (60)	4 (40)	0 (0)	10	
Retired	4 (80)	1 (20)	0	5	
Duration of illness					
<1 year	3 (42.85)	4 (57.16)	0 (0)	7	
1-5 years	10 (55.55)	8 (44.45)	0 (0)	18	0.629
>5 years	9 (60)	5 (33.33)	1 (6.67)	15	
Comorbidity					
Present	17 (56.67)	12 (40)	1 (3.33)	30	0.752
Absent	5 (50)	5 (50)	0 (0)	10	

Based on Table 2, it is found that there is 1 person who has high compliance with female characteristics, aged 45-65 years, high school education level, work as a private employee, duration of type 2 DM for>5 years, and has comorbid diseases. The medication adherence level for men (47.05%) was higher than that of women (39.13%), the level of adherence for age <45 years (50%) was higher than for those aged 45-65 years (43.24%). Based on the level of education, basic education (66.67%) has a higher level of compliance than higher education (57.89%), university (25%), and secondary education (16.67%). Based on work, private/merchant/laborer (61.11%) has a higher level of compliance than unemployed (40%), retired (20%), and civil servant/government employed (14.28%). Based on the duration of the illness, the compliance rate of patients suffering from disease <1 year (57.16%) was higher than patients suffering from 1-5 years (44.45%), and patients suffering from>5 years (33.33%). The medication adherence level of patients without the comorbid disease (50%) was higher than that of patients with the comorbid disease (40%).

Based on the results of the chi-square statistical test, the effect of gender, age, level of education, occupation, duration of illness, and comorbid diseases, on the compliance level of type 2 DM patients showed no significant difference (p>0.05).

DISCUSSION

Diabetes mellitus (DM) patients are patients with a low level of medication adherence. Low adherence is often the cause of failure of therapy so that the risk of complications is higher and can affect the patient's quality of life. Non-adherence to DM therapy is a major factor that hinders controlling blood sugar levels so that it affects the results of therapy. The causes of noncompliance are very complex, including the complexity of drug regimens, behavior, drug costs, age, low social support, and cognitive problems.[8]

The level of adherence is an assessment of the patient that is used to determine whether a patient has followed the rules for using drugs in undergoing therapy. The level of compliance based on characteristic factors can be seen in Table 2. The level of compliance was measured using the MMAS-8 questionnaire which consisted of 8 question items.

The results of the chi-square statistical test in this study showed that gender had no effect on the level of patient medication adherence (p=0.636). This result is in line with research conducted by Rasdianah et al. (2017), which showed that the patient's gender had no effect on medication adherence with a significance value (p=0.275).[9] According to Ramadona (2011), male patients have a good attitude than women and male patients are more concerned about their disease so that the attitude of men is more diligent in exercising, adjusting dietary patterns, and taking medication more regularly.[10]

Based on the level of education, basic education (66.67%) has a higher level of compliance than higher education (57.89%), university (25%), and secondary school (16.67%). According to research conducted by Ponnusankar et al. (2004) show that improvement in medication adherence can be achieved through patient education about their illness, socioeconomic improvement, encouragement to monitor blood sugar levels regularly, simplifying the number of drugs, and reducing drug costs.[11] The patient's knowledge of the disease and its treatment is inadequate and the patient's lack of understanding of

therapy in treatment causes the patient to have low motivation to change behavior or less adherence to taking medication. Patients have no knowledge of disease and do not know the consequences of non-adherence.[9] The results of the chi-square statistical test showed that the effect of age (p=0.992), education level (p=0.275), occupation (p=0.241) on adherence in this study was not significant (p>0.05).

The duration or duration of illness affects medication adherence.[12] Barriers to adherence can be caused by complex treatment regimens, length of treatment, multiple therapies, drug side effects, and lack of information provided by health care providers. Other barriers are related to socioeconomic problems, memory disorders, psychological problems, and personal beliefs.[13] Patients who have comorbidities are most likely to have complex treatments. Complex treatment is believed to affect patient compliance. Adherence was correlated with the number of daily doses of all the drugs prescribed.[14] The level of adherence decreases as the number of daily doses increases. Simplifying drug dosage frequency can improve adherence. Patients with type 2 DM with comorbid diseases will indirectly consume more complex types of drugs. Complex types of drugs such as the amount of drug, frequency of administration, dosage form, as well as specific drug administration instructions can trigger non-compliance.[15] The results of the chi-square statistical test showed that the effect of disease duration (p=0.629), comorbid disease (p=0.752) on the level of adherence was not significant (p>0.05), this indicates that all variables used in this study did not affect treatment adherence.

CONCLUSION

Based on the results of the study, it was concluded that there was no significant relationship between patient characteristics including gender, age, level of education, occupation, duration of disease, and comorbid diseases on the level of adherence to treatment of type 2 DM patients at the pharmacy.

Conflict of Interest

The authors have no conflict of interest to declare.

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