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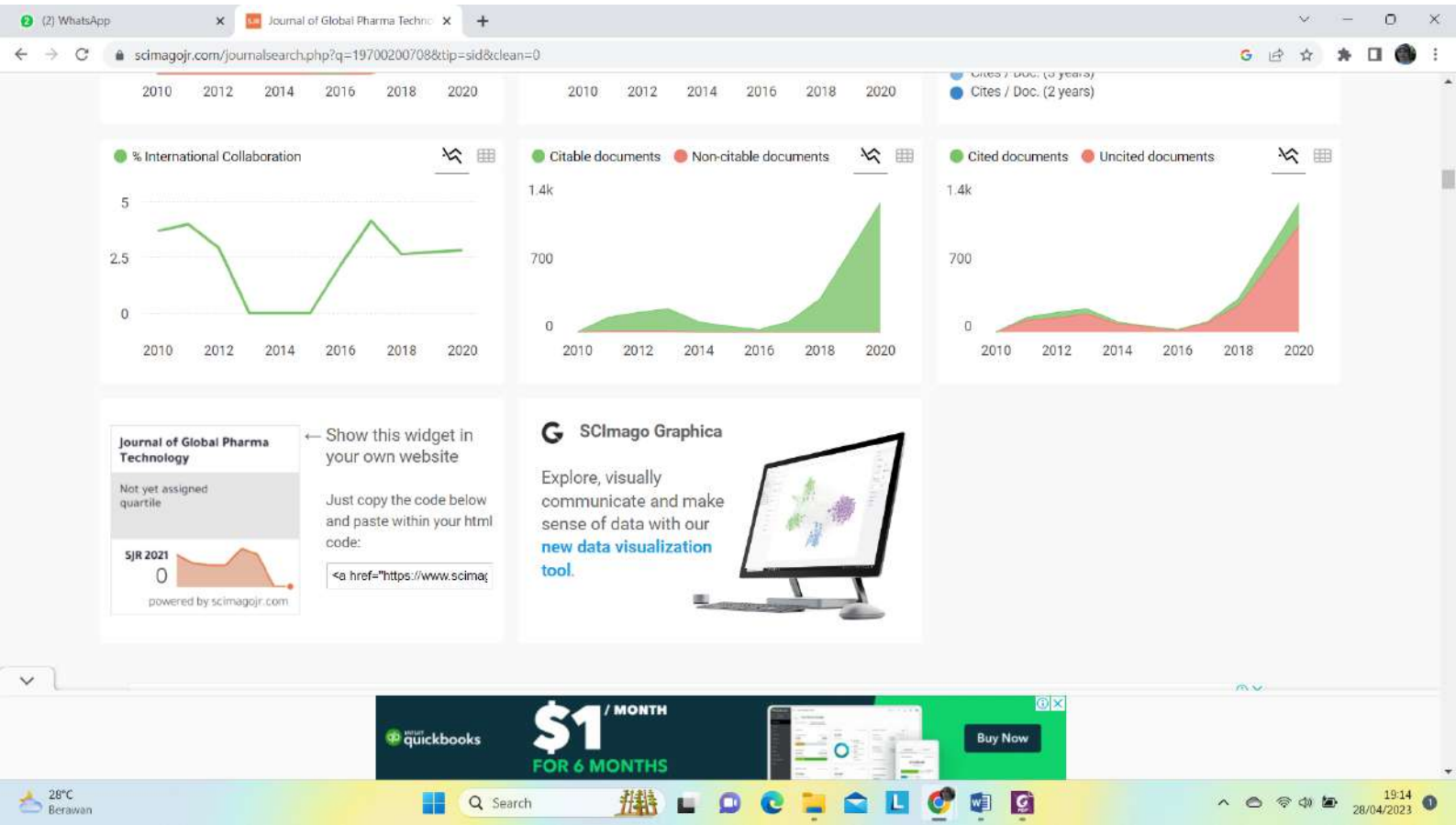
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RESEARCH ARTICLE

Behavioral Factors Affecting Patient's Compliance in Consuming Anti-diabetic Oral Drugs

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Abstract

Introduction: Treatment compliance is a major problem in overcoming diabetes mellitus. This case inhibits the achievement of optimal levels of health for people with diabetes mellitus. However, various types of factors that enable patients to be disobedient to treatment have not been widely studied in terms of pharmacy. Objective: This study aimed to identify behavioral factors that influence diabetes mellitus patient compliance in taking oral antidiabetic drugs. Methods: This study was observational analysis using cross-sectional design. Sampling was obtained by accidental sampling method. The independent variables in this study were the knowledge and attitudes of patients; availability of health care facilities, and behavior of pharmaceutical officers. Whereas, the dependent variable was the compliance of the patients with diabetes mellitus taking antidiabetic drugs. Data were collected using valid questionnaires then analyzed using correlational analysis. Results: The results of this study indicated that the support of pharmacists had significant effect on patient compliance ($p = 0.006$). Whereas, knowledge, behavior, and availability of health service facilities had no significant effect on patient compliance in taking oral antidiabetic drugs (results in sequence: $p = 0.642$; $p = 0.379$; $p = 0498$). Conclusion: The role of pharmacist is very important in efforts to provide information and motivation for the treatment of diabetes mellitus, especially the consumption of oral antidiabetic drugs. This research is expected to improve pharmacy services related to the accuracy of providing information to patients. It will also have an impact on improving the quality of life of patients and providing quality services.

Keywords: *Behavioral factors, Diabetes mellitus, Patient compliance.*

Introduction

Disobedience of patients with diabetes mellitus on treatment increases the prevalence of mobility and mortality [1]. This is because diabetic patients tend not to comply with the treatment recommendations when they are not under the supervision of health workers [2]. Compliance in treatment plays a role in achieving optimal glucose levels so as to reduce diabetes complications and reduce medical costs [3]. This is a challenge for health workers and public health policy makers to reduce the prevalence of morbidity and mortality [2].

The prevalence of diabetes mellitus in the world at the age of 20-79 years reaches 415 million people [4]. Diabetes mellitus is considered as one of the non-communicable diseases that can cause death [5]. Factors that influence the high number of cases are due to cultural and social changes.

As many as 87-91% of the adult population in high-income countries have type 2 diabetes mellitus [4]. Individuals with diabetes mellitus in the long term are often accompanied by other chronic diseases, such as hypertension, heart disease, kidney disease, nerve complications, and an increased risk of cancer that affects life expectancy [6,7]. During patients that undergo a therapy, problems related to drug therapy (Drug Therapy Problem) cannot be prevented.

Some causes of DTP include unneeded or improper drug therapy, additional therapeutic needs, ineffective medication, drug side effects, and too low or too high dosages [6,8]. The disobedience of patients in taking the drug is also the biggest cause of DTP of 26.1%, followed by the use of improper medication as much as 22.8%, and additional therapeutic needs of 20.3% [9].

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The average compliance of long-term therapy patients in chronic diseases in developed countries reaches 50%, while in developing countries it is lower [10]. Patients with high medication adherence have good awareness and management of diabetes mellitus [11]. Treatment compliance has an impact on the economy and quality of life of diabetic patients [11]. Low levels of adherence lead to the patient's clinical condition getting worse [11]. Compliance can be triggered, one of them, by individual's behavior when undergo a therapy [12].

Lawrence Green [13] mentions that behavioral factors are formed by predisposing factors (knowledge and attitude), enabling factors (physical environment, availability of health services), and reinforcing factors (behavior of health workers). Based on this, compliance with the use of antidiabetic drugs is considered very important so that the success of therapy can be achieved and prevent the occurrence of complications. This study aimed to determine the factors that influence the adherence of diabetes mellitus patients to oral antidiabetic treatment.

Methods

This was an observational study by means of cross-sectional design. The study was conducted in a Surabaya Health Center in February to June 2016. A total of 47 patients with diabetes mellitus were the study samples, the data were obtained using the accidental sampling method of non-random sampling technique. The chosen respondents were patients with diabetes mellitus who came to seek treatment at least 2 times in the health center and received a combination of metformin and glutinous medicine/glimepiride drugs at least two months earlier/more. Samples were obtained incidentally by researchers at the health center. Researchers coordinated with pharmacists to condition diabetic patients who would get antidiabetic drugs metformin and glibenclamide/glimepiride.

The researchers came to the patients who took the drug directly and identified the patients. Furthermore, patients were identified as being compatible with the inclusion criteria. Patients who met the criteria fill out informed consent before filling out the questionnaire. This study examined the effect of predisposing factors (knowledge and attitudes), enabling factors, and reinforcing factors on the compliance of patients with diabetes mellitus in taking antidiabetic drugs. Enabling factors were examined in terms of health facilities and advice which includes the availability of drugs, affordability of health care facilities, the comfort of waiting rooms, and availability of information. Behavior of pharmacists was also investigated as reinforcing factors, such as friendliness and courtesy of service, simple information delivery, and information clarity.

In addition, patient compliance was seen from the accuracy of the dose; accuracy of duration, interval, and method of administration of drugs; and awareness of the side effects of the drug. Data sources used were in the form of primary data and secondary data. Primary data obtained from filling out questionnaires and secondary datain the form of patient visits were obtained from the health center. The instrument used was questionnaire sheet developed by researchers based on the variables specified, and had been tested for its validity and reliability.

The questionnaire sheet filled out directly by the respondent consisted of informed consent, identity sheet and medication record, as well as a question sheet. Measurement of research variables was performed using a Likert scale and dichotomy. The knowledge variable presented in questions related to the causes and symptoms of diabetes mellitus, symptoms of hypoglycemia, treatment of people with diabetes mellitus, routine controls, and side effects of drugs. Attitude variable was made to determine the duration of medication time and suitability of drug consumption. The collected data was analyzed for its descriptive and inferential statistics which were then analyzed by using Pearson analysis (normally distributed) and Spearman analysis (not normally distributed).

Results

Respondents' Demographic Data

Most diabetes mellitus patients were 50-59 years old (40.4%). The majority of patients were female (80.9%) and housewives (63.8%). Nearly half the number of patients had a primary education level (42.6%). More than half of the total number of respondents had diabetes for 1-5 years (66%) (See Table 1).

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Table 1: Respondents' demographic data

Demographics	Classification	n (%)
Gender	Male	9 (19.1)
	Female	38 (80.9)
Age	<40 year	2 (4.3)
	40-49 year	4 (8.5)
	50-59 year	19 (40.4)
	60-69 year	18 (38.3)
	>70 year	4 (8.5)
Education Level	Not attending school	8 (17.0)
	Elementary school	20 (42.6)
	Middle school	8 (17.0)
	High school	9 (19.1)
	Associates degree and more	2 (4.3)
Occupation	Retired/not working	11 (23.4)
	Entrepreneur/merchant	3 (6.4)
	Housewife	30 (63.8)
	Private sector worker	1 (2.1)
	Etc	2 (4.3)
Period of Suffering from Diabetes Mellitus and Consumption of Antidiabetic Drugs	<1 year	4 (8.5)
	1-5 years	31 (66.0)
	6-10 years	8 (17.0)
	11-15 years	2 (4.3)
	>20 years	2 (4.3)
Total		47 (100%)

Data on Anti-diabetic Drugs Used

Most of the respondents consumed 500 mg metformin with the rules of consuming 2 times a day and as they received 10 tablets (85.1%). Whereas, the glimepiride which was mostly consumed by respondents was2 mg glimepiride with dosage of 1 tablet per day and as the patients received 4 tablets (51.1%). In addition, most patients also received additional drugs, such as vitamin B complex, amlodipine, and simvastatin.

Table 2: Data on anti-diabetic drugs used

Antidiabetic Drugs Used	Classification	n (%)
Metformin	500 mg metformine, 1x1[a], 6[b]	5 (10.6)
	500 mg metformine, 2x1[a], 10[b]	40 (85.1)
	500 mg metformine, 3x1[a], 10[b]	2 (4.3)
Glimepiride	2 mg glimepiride, 1x1[a], 4[b]	24 (51.1)
	2 mg glimepiride, 1x1/2[a], 4[b]	22 (46.8)
	2 mg glimepiride, 1x1[a], 6[b]	1 (2.1)

Note: a: with dosage of 1tablet/day, for example; b: number of tablets received

Variable Analysis

As many as 57.4% of patients had moderate level of knowledge about diabetes mellitus (36.2%).However, 74.5% of respondents showed a positive attitude in the treatment process of diabetes mellitus. Patients tended to follow the advice of health workers (pharmacists) in taking antidiabetic drugs. In addition, the majority of respondents also assessed the healthiness of the health center (63.8%) and the behavior of pharmacy officers (61.7%) as not good. More than half of the respondents (55.3%) showed the level of compliance in the medium category. This indicates that the patients took the medication but sometimes did not follow the recommendation or forgot not to take medicine.

Table 3: Respondents' variable data

Variables	Score	n (%)	Category
Patients' knowledge	5-7	17 (36.2)	Good
	3-4	27 (57.4)	Moderate
	0-2	3 (6.4)	deficient
Patients' attitude	11-16	35 (74.5)	Positive
	4-10	12 (25.5)	Negative
Health Facilities	11-16	17 (36.2)	Good
	4-10	30 (63.8)	Poor
Behavior of Pharmaceutical Officers	11-16	18 (38.8)	Good
	4-10	29 (61.7)	Poor
Patient compliance	25-32	21 (44.7)	High
	17-24	26 (55.3)	Moderate
	8-16	0 (0)	Low

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Correlation Analysis

The results of the correlation analysis illustrated the significant effect of health care behavior on patient compliance ($p = 0.006$; $r = 0.396$). Whereas, the variable knowledge and attitudes of patients and the availability of health facilities had no significant effect on patient compliance (p and r values in sequence: $p = 0.642$ ($r = 0.070$); $p = 0.379$ ($r = 0.131$); $p = 0.498$ ($r = 0.101$)).

Discussion

Patient compliance with treatment is needed to improve the quality of life of patients with diabetes mellitus [11]. This study found a significant effect of the behavior of pharmacists on patient compliance in taking oral antidiabetic drugs. The behavior of pharmacists was considered to be inadequate, especially in terms of providing information related to drug side effects and less in listening to patient complaints. Thus, most patients took the drug which was not in accordance with the recommendations. Patient compliance is related to information from health workers [14]. Information provided by health workers is one of the most important factors in increasing patient adherence to taking recommended drugs. Providing sufficient information allows patients to be motivated to undergo treatment.

Patients who acquire adequate information tend to be more obedient to the pattern of treatment [14]. Information about the disease and matters related to treatment is important to be known by patients to achieve therapeutic success. This shows that patients, especially elderly patients, need the role of pharmacy officers in monitoring drug use. Limitations of human resources or health care facilities that do not support cause a lack of performance by pharmaceutical officers. On the other hand, compliance with drug consumption is not only influenced by the behavior of health workers. Patients who have good knowledge will adhere to drug therapy, physical activity, and medical nutrition therapy [15].

Logically statistical, high knowledge makes patients tend to obey the treatment process, and vice versa. In addition, good and adequate education has an impact on one's awareness in maintaining their health. This study found that the knowledge of patients with diabetes mellitus was in the moderate category. However, there was no significant influence between the level of knowledge and patient compliance. These findings indicate that not all patients with low education ignore their health. In addition to education, patients' knowledge can be increased due to adequate treatment experience and information from health workers and the social environment. Health education programs help diabetics improve their insight. In this case, health workers play an active role in increasing patient knowledge about diseases, especially diabetes mellitus.

The activeness of patients to the advice of health workers also triggers patient compliance [16]. Advice from health workers becomes a stimulus to carry out reactions from patients in the form of attitudes [13]. Trust and evaluation of an object and the tendency to act will support an attitude as a whole [13]. However, this study found no significant effect of attitudes towards patient compliance. This illustrates that patients who follow the recommendations of health workers may not necessarily take oral antidiabetic drugs regularly. This relationship can be caused by personal views on the influence of drugs to cure the disease. Family support and social environment factors also motivate patients to consume oral anti-diabetic drugs regularly.

The majority of respondents also assessed the lack of availability of drugs and written information about diabetes mellitus. However, this did not affect the patients' compliance with taking the drug. Patients could access information related to treatment from various media. Patients also got antidiabetic drugs from pharmacies or other health clinics. The possibility of respondents giving less score because most patients with diabetes mellitus were elderly and had decreased visual function. Respondents of this study generally suffered from diabetes for 1-5 years so that the number of programs in various types of health services was a factor in improving respondents' information.

Previous research has found that there was high compliance of people with diabetes mellitus over the age of 44 in the treatment process [17]. The anti-diabetic drugs available at the health center during the study were only glimepiride and metformine in accordance with the Decree of the Minister of Health [18].

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The use of oral antidiabetic drugs in patients with diabetes mellitus is something that needs to be done if they apply healthy lifestyle. Oral antidiabetic combination therapy is given if there is no improvement in blood sugar levels within 3 months after using single oral antidiabetic [19]. In this study, antidiabetic drugs were given only for 5 days with the aim of the patients' blood sugar being controlled and it was expected that patients would come routinely to health services.

Besides diabetes mellitus, patients also experienced other health problems, such as hypertension and cholesterol. In patients with diabetes mellitus the use of several drugs is also unavoidable and is likely to lead to Drug Therapy Problems (DTPs). DTPs that may occur in this study were side effects and disobedience due to excessive use of drugs so that patients forgot to take medication or forgot the rules for using the drug [8]. This study found that diabetes mellitus affected more females than males. Women physically have the opportunity to increase body mass index.

In addition, working as a housewife allows a lack of physical activity, such as exercise, so the risk of suffering from diabetes mellitus increases. Lack of physical activity causes excessive amounts of energy consumed. The low physical activity of a person leads to a risk of 2.68 times higher of experiencing diabetes mellitus [20]. Most people with diabetes mellitus are elderly who are a risk group for glucose intolerance. The limitation of this study was that sampling was only done when collecting data so that the situation at different times may give different results. This research was also not supported by the results of the patients' blood sugar laboratory examination which can lead to potential bias between the patients' condition and the medication received.

Conclusion

This study concludes, the most dominant factors were the behavior of pharmacy officers that affect on patient compliance in taking oral antidiabetic drugs.The role of health workers, especially pharmacists, is very important in providing clear information regarding drug consumption in accordance with the recommendations. Pharmacy officers are expected to always provide counseling to patients with diabetes mellitus regarding information on how to use the drug as well as potential side effects. The pharmacy officers are expected to be able to monitor the treatment used because many patients buy drugs at a pharmacy other than health center.

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