Drug Information for Diabetes Mellitus Outpatients at RSUD X Surabaya: What Was Provided and What Was Known?

(Informasi Obat pada Pasien Diabetes Mellitus Rawat Jalan di RSUD X Surabaya: Apa yang Diberikan dan Apa yang Diketahui?)

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Abstract: The prevalence of Diabetes Mellitus (DM) in Indonesia has increased 0.5% in the last five years. This study aimed to evaluate information provided and level of knowledge among DM patients on their treatment at the outpatient clinic at the X Public Hospital (*Rumah Sakit Umum Daerah*, RSUD), Surabaya, Indonesia. This was a cross-sectional study using a checklist developed by The Indonesian Food and Drug Authority which consists of 11 types of information. The data were analysed descriptively; to test the relationship between the amount of information provided and the patient's level of knowledge, Spearman correlation analysis was used. A total of 110 patients were included in this study (response rate 90.91%). The mean of information provided and understood by patients was $6.48/11\pm0.73$ and $7.48/11\pm0.90$, respectively. There was a significant relationship between information provided to and known by patients ($p=0.001$). Characteristic factors such as age ($p=0.001$), education level ($p=0.001$), and sources of information related to DM ($p=0.014$) were shown to influence DM patients' knowledge of their treatment. This study indicated the importance of providing clear and complete drug information, especially for patients on long-term therapy, to improve their knowledge, thus potentially increasing adherence and optimizing therapy outcomes.

Keywords: Diabetes mellitus, drug information, hospitalization, knowledge

Abstrak: Prevalensi *Diabetes Mellitus* (DM) di Indonesia mengalami peningkatan sebanyak 0,5% dalam lima tahun terakhir. Tujuan dari penelitian ini adalah untuk melihat informasi yang diberikan dan tingkat pengetahuan pasien DM terkait pengobatan yang diterima di klinik rawat jalan di Rumah Sakit Umum Daerah (RSUD) X, Surabaya, Indonesia. Penelitian ini merupakan penelitian *cross-sectional* dengan menggunakan *checklist* yang dikembangkan dari Badan Pengawas Obat dan Makanan (BPOM) dimana terdiri dari 11 jenis informasi. Data dianalisis secara deskriptif, dan untuk melihat hubungan antara informasi yang diberikan dan tingkat pengetahuan pasien digunakan analisis korelasi *Spearman*. Terdapat 110 pasien yang bersedia berpartisipasi di dalam penelitian ini (*response rate* 90,91%). Rata-rata jumlah informasi yang diberikan dan dipahami adalah $6,48/11\pm0,73$ dan $7,48/11\pm0,90$. Terdapat hubungan yang signifikan antara jumlah informasi yang diberikan dan yang diketahui pasien ($p=0,001$). Faktor karakteristik seperti usia (nilai $p=0,001$), tingkat pendidikan (nilai $p=0,001$), dan sumber informasi terkait DM (nilai $p=0,014$) dapat mempengaruhi pengetahuan pasien DM terhadap pengobatannya. Penelitian ini menunjukkan pentingnya pemberian informasi yang jelas dan lengkap terutama pada pasien yang menjalani pengobatan jangka panjang karena dapat meningkatkan pengetahuan, sehingga diharapkan dapat meningkatkan kepatuhan dan mengoptimalkan keberhasilan terapi.

Kata kunci: Diabetes mellitus, rawat jalan, informasi obat, pengetahuan

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INTRODUCTION

DIABETES Mellitus (DM) is a chronic disease that occurs due to the pancreas' inability to produce insulin which causes the blood glucose sugar level to increase and is uncontrolled[1]. Based on the data from World Health Organization (WHO) in 2015, as many as 422 million people had DM and International Diabetes Federation (IDF) estimated there would be an increase as many as 642 million in 2040[2,3]. The prevalence of diabetes patients in Indonesia based on the Basic Health Research (*Riskesdas*) data has increased from 1.5% in 2013 to 2.0% in 2018[4,5]. In East Java, as many as 113 thousand (2.6%) patients were diagnosed with DM in 2018 with the highest prevalence between the ages of 55-64 years, women, low education levels, working as civil servants and live in urban areas[5].

Uncontrolled diabetes mellitus can cause macrovascular and microvascular complications. Based on research at a hospital in Padang, Indonesia, it was discovered that 81.7% of patients had microvascular complications and 66.5% of patients had macrovascular complications. The most common microvascular complication was diabetic nephropathy (42.6%), while the macrovascular complication was coronary heart disease (33.0%)[6]. In addition, uncontrolled DM can cause an increase in mortality. Based on WHO data in 2016, there were 3.7 million deaths due to DM[4]. Data from the IDF also estimates that as many as 5 million deaths are due to DM[3].

Based on the 2018 *Riskesdas* data, there are several reasons why patients do not take medication, with them often forgetting to take it, medication not being available at health services, using herbal medicines, being uncomfortable with drug side effects, not being able to buy medicine, not routinely doing regular control, feeling better without medication, and others. In East Java, the three causes patients did not comply with their medications were they felt better (55.0%), not having regular control (29.1%), and using herbal medicines (17.5%)[5]. In addition, there are studies that find about 80% of patients injected insulin inappropriately, 75% did not follow dietary recommendations, and 58% of patients used the wrong dosage[7].

Knowledge of treatment can prevent complications and reduce mortality. There are several factors that can affect the level of knowledge, such as age, education level, experience, employment, economic status, and information. Health workers, print media (newspapers, magazines), and electronic media (television, radio, internet) can be sources of information seeking[8]. A study at a health centre in Malang discovers that 85.0% patients had good knowledge of the dosage, 66.7% knew how to use it, and 76.7% knew about the treatment's side effects, with *p* value for each, before and after being given the information is 0.001[9].

Another study conducted at a hospital in Philadephia, USA, shows that 60% of patients did not receive information about their treatment. This study also finds that there was a relationship between the provision of information and the patient's level of knowledge (*p* value=0.001). Thus, it can be concluded that it is important to provide information about treatment to patients at the hospital[10]. Based on this background, a study was conducted with the aim of looking at the information provided by pharmacists and information known to DM patients regarding their treatment at the outpatient installation of RSUD or Public Hospital (*Rumah Sakit Umum Daerah*) X in Surabaya.

MATERIALS AND METHODS

METHODS. Research Design. DM patients who visited the outpatient clinic at RSUD X during the study period and met the inclusion and exclusion criteria were included in the study. Based on the sample calculations using the Lemeshow formula, the minimum sample size is n=100 patients[13]. The inclusion criteria were patients aged between 18-65 years who visited the outpatient clinic with a diagnosis of DM and received at least one type of anti-diabetic drug. Exclusion criteria were patients not taking their own medications or unable to answer questions independently (e.g.: patients with mental disorders).

Data Collection. The outpatient clinic officers will select DM patients who meet the inclusion and exclusion criteria by marking them on the prescription. When the patient in question takes the drug, one data taker would record any information given to the patient. This information can be in the form of information on the label, other oral or written information provided by the pharmacist when dispensing the drug. Next, the patient would be directed to meet the main researcher in another room, where the patient would be explained about the research to be carried out and asked for his willingness to participate. If the patient was willing, then he/she would be asked to fill out an informed consent form; if not willing, then the data related to the patient would not be used. Patients who were willing were then asked to fill out a demographic data sheet which included patient's name and address, age, gender, occupation, monthly income, education, medical history, and sources of obtaining information about DM and its treatment. After that, the patient would be asked about 11 types of essential information related to the antidiabetic drug he/she was receiving. Recording was carried out by two people (one main researcher and one data taker).

Table 1. Data of DM patients' characteristics at RSUD X Surabaya (n=110).

Variables	Description	n (%)
Socioeconomic		
Age (year)	18-40	2 (1.82)
	41-60	65 (59.09)
	61-65	43 (39.09)
Sex	Male	39 (35.45)
	Female	71 (64.55)
Education	Primary School	54 (49.09)
	Junior High	25 (22.73)
	Senior High	28 (25.45)
	University	3 (2.73)
Occupation	Employed	44 (40.00)
	Unemployed	66 (60.00)
Monthly Income	≤2,000,000	85 (77.27)
	>2,000,000 – 3,500,000	15 (13.64)
	>3,500,000 – 5,000,000	5 (4.55)
	>5,000,000 – 7,000,000	3 (2.73)
	>7,000,000	2 (1.82)
Drug Use History	Yes	105 (95.45)
	Never	5 (4.55)
Information Sources regarding DM	Printed Media	0 (0.00)
	Electronic Media	0 (0.00)
	Doctors	107 (97.27)
	Nurses	3 (2.73)

Research Instruments. The instrument used was a checklist to see the information given to the patient and what the patient knows about the antidiabetic drug received. The checklist was prepared based on the guidelines from The Indonesian Food and Drug Authority (*Badan Pengawas Obat dan Makanan*), where there are eleven types of essential information, namely: drug name, dosage form, composition, indication, side effects, frequency of administration, dosage, route of use, method of storage, duration of use, and method of drug disposal[11]. Checklist validation was carried out by involving two pharmacists at the Drug Information Centre (face-validity) to ensure that the checklist could retrieve the expected data; while the reliability of the checklist was carried out by collecting data on 10 patients, carried out by 2 data takers (inter-rater reliability). The inter-rater reliability results obtained were 92.27%; the percentage value of agreement between 0.81-1.00 indicates perfect agreement[12].

Data Analysis. Data were analysed descriptively by displaying mean±SD for continuous data and percentages for categorical data. For each type of information provided, a score=1 was given, and it the information was not provided, a score=0 was given. As for patient knowledge, if the patient could reiterate the information provided correctly, then a score=1 was given, and if the patient could not mention or mentioned it incorrectly, then a score=0 was given. To see the relationship between the provision of information and the level of patient knowledge of treatment, Spearman's correlation analysis was used. In addition, the Mann-Whitney U test was conducted to see the relationship between characteristic factors (consisting of age, occupation, income, education, medical history, and sources of information) on knowledge of treatment.

RESULTS AND DISCUSSION

The number of DM patients in the outpatient clinic of RSUD X Surabaya who were willing to participate in this study were 110 out of 121 patients who met the inclusion and exclusion criteria (response rate 90.91%). Based on the patient demographic data, >50% of patients are female with an age range of 41-60 years. Complete demographic data can be seen in Table 1. The characteristic data of DM patients in this study are in accordance with the 2018 *Riskesdas* data that the majority of DM patients are women with an age range between 55-64 years (6.29%)[5] and unemployed (2.90%)[5]. Meanwhile, >50% of patients had a low level of education. The level of education can generally affect the ability to receive information which causes the level of knowledge to be reduced[8]. As for the drug use profile of DM patients, 36.36% used metformin, 17.27% used insulin lantus, and 14.55% used novorapid insulin. For more detailed drug use profiles, see Table 2. Out of 110 patients, 51 patients received 1 drug, 54 patients received 2 types, 4 patients received 3 types, and 1 patient received 4 types of drug.

Regarding the information provided to DM outpa-

Table 2. Treatment profile of DM patients at RSUD X Surabaya (n=110).

Drug Types	n (%)
Metformin	40 (36.36)
Acarbose	9 (8.18)
Glimepirid	3 (2.73)
Pioglitazone	1 (0.91)
Insulin Levemir	12 (10.91)
Insulin Lantus	19 (17.27)
Insulin Novorapid	16 (14.55)
Insulin Apidra	8 (7.27)
Insulin Novomix	2 (1.82)

tients at RSUD X Surabaya, 100% of patients received information regarding drug names, indications, dosages, frequency of administration, and routes of drug use. Meanwhile, only 89.09% of patients obtained information regarding dosage forms (Table 3) with an average score of information provided to DM patients of 6.48 ± 0.73 out of 11 points of minimum information that must be provided. Good and sufficient information sharing can increase patients' knowledge of the disease and its treatment. Thus, the patients in this study were given interventions in the form of written/etiquette information and oral information. As a lot of information

should be given to patients, the information must be brief and clear to assist with their understanding[14]. In addition, some general information should be given to patients, namely information about drugs (names and indications), how to use it (dosage and frequency of use), and drug side effects[15].

Only a small proportion of patients received information regarding how to store the drugs (20.91%) and the duration of drug use (19.09%). Furthermore, the patients did not receive any information about the drug composition, side effects and methods of disposal. Information about drug composition is important to provide for the patients to know the therapeutic effect to be achieved in their treatment[15]. The duration of drug use is also important for the patients to know when they can return to the doctor and to see patients adherence to treatment[16].

How to store drugs is one of the important information to give, especially to DM patients because 46.28% of patients used insulin. Preferably, insulin pens are stored in the refrigerator with a temperature between 2-8° C at room temperature between 15-20º C without being exposed to sunlight because sunlight

Table 3. Drug information given to and known by DM patients at RSUD X Surabaya (n=110).

Types of Information	Observation Result	Information Given n (%)	Information Known n (%)	
Drug Names	Yes	110 (100.00)	110 (100.00)	
	No	0 (0.00)	0 (0.00)	
Dosage Forms	Yes	97 (88.18)	98 (89.09)	
	No	13 (11.82)	12 (10.91)	
Drug Composition	Yes	0 (0.00)	0 (0.00)	
	No	110 (100.00)	110 (100.00)	
Drug Indications	Yes	110 (100.00)	110 (100.00)	
	No	0 (0.00)	0 (0.00)	
Drug Side Effects	Yes	0 (0.00)	0 (0.00)	
	No	110 (100.00)	110 (100.00)	
Drug Dosages (milligram/gram/unit)	Yes	110 (100.00)	110 (100.00)	
	No	0 (0.00)	0 (0.00)	
Frequency of Administration	Yes	110 (100.00)	110 (100.00)	
	No	0 (0.00)	0 (0.00)	
Route of Administration	Yes	110 (100.00)	110 (100.00)	
	No	0 (0.00)	0 (0.00)	
Drugs Storage	Yes	45 (40.91)	23 (20.91)	
	No	65 (59.09)	87 (79.09)	
Drug Duration of Use	Yes	34 (30.91)	21 (19.09)	
	No	76 (69.09)	89 (80.91)	
Drug Disposal	Yes	0 (0.00)	0 (0.00)	
	No	110 (100.00)	110 (100.00)	
Amount of information[a] (mean±SD; possibility range 0-11)		$6.48/11\pm0.73$	$7.48/11\pm0.90$	$p = 0.001$[b]

[a]The amount of information is calculated from the total score of each type of information (score=1 if given/understood and score=0 if not given/understood); possible range of amount information 0-11
[b]Analysis is using Spearman correlation

can accelerate the loss of its potency[17]. For oral dosage forms, it can be stored at room temperature in the shade and protected from sunlight, stored in the original container and out of reach of children[18]. Based on a research conducted at pharmacies in Yogyakarta, it was also discovered that patients did not receive information about drug ingredients, side effects and methods of disposal. In this study, patients needed information such as drug side effects, storage methods and possible drug interactions[19].

Hypoglycaemia is a side effect that often occurs in the treatment of DM patients. Information about side effects is important for patients to know, especially for patients with long-term treatment, because if hypoglycaemia occurs in the long period, it can cause allergies, coma, seizures to death[20,21]. There are studies that find misperceptions due to the little information that patients receive about the side effects of DM drugs. Four out of 17 patients had the perception that DM drugs used in the long term could cause damage to the kidneys, and this could be prevented by drinking lots of water[19].

After receiving information about treatment, the patient's level of knowledge was assessed using an 11-point checklist. It was found that the mean score of DM patients' knowledge of treatment was 7.48±0.90 out of 11. Providing complete information and accompanied by an explanation from the pharmacist or Pharmaceutical Technical Personnel (*Tenaga Teknis Kefarmasian*) can increase patient knowledge of the medication being used. Based on the results of statistical calculations using Spearman's correlation, it was found that providing information had a significant relationship in increasing patient knowledge with p=0.001.

Prior studies reported that DM patients still have low level of knowledge regarding self-management (47%), drugs used (49%), and blood sugar level monitoring (46%); patients have moderate knowledge of diet (42%) and physical exercise (49%)[22]. Other studies reported on how providing information can increase patient knowledge that give them high adherence to treatment. This study discovers that the results of the pretest (mean±SD: 5.87±0.75) and post-test (mean±SD: 6.15±0.83) reflected an increase in knowledge after patients receiving information that affects adherence to treatment (p=0.001)[23].

Other studies provide interventions in the form of booklets to increase the knowledge of DM patients about the disease and its treatment. There was a significant increase in knowledge before (mean±SD: 53.25±10.03) and after (mean±SD: 76.50±6.90) giving the intervention in the intervention group with p=0.001, but there was no significant difference in the control group with a value of p=0.830[24].

In addition, the Mann-Whitney U test was calcu-

Table 4. The influence of characteristic factors on the knowledge of DM patients at RSUD X Surabaya (n=110).

Variables	Description	Knowledge Mean	p^a value
Socioeconomy			
Age (years)	18-40	8.0	
	41-60	7.8	0.001
	61-65	7.1	
Sex	Male	7.6	0.749
	Female	7.5	
Education	Primary School	7.0	
	Junior High	7.6	0.001
	Senior High	8.2	
	University	8.7	
Occupation	Employed	7.6	0.566
	Unemployed	7.4	
Monthly Income	≤ 2,000,000	7.4	
	> 2,000,000 – 3,500,000	7.6	
	> 3,500,000 – 5,000,000	8.0	0.137
	> 5,000,000 – 7,000,000	8.7	
	> 7,000,000	7.0	
Drug Use History	Yes	7.5	0.078
	Never	6.8	
Information Sources regarding DM	Printed Media	0.0	
	Electronic Media	0.0	0.014
	Doctors	7.4	
	Nurses	9.0	

[a]The amount of information is calculated from the total score of each type of information (score=1 if given/understood and score=0 if not given/understood); possible range of amount of information 0-11
[b] Analysed using Spearman correlation

lated to see the effect of patient characteristic factors on treatment knowledge. The results showed that the characteristic factors that influence patient knowledge of treatment are age (*p* value=0.001), education level (*p* value=0.001), and sources of information related to DM (*p* value=0.014). Details regarding the mean score of knowledge and the *p*-value for characteristic factors can be seen in Table 4. In this study, 97.07% of patients obtained information from doctors. This is in accordance with research that 82.5% of patients obtain information from health workers[25]. There is research to observe the factors that can affect the level of knowledge in DM patients. The results of the study found that age (*p*=0.003) and experience related to DM (*p*=0.004) affected patient knowledge of treatment[26].

The level of education and age were found as factors contributed to the level of patient knowledge of the disease and their treatment. The higher the level of education, the more it affects changes in attitudes and understanding of the information received. In addition, the age factor increases awareness of the disease by affecting thinking and memory, but it is different from patients who are elderly[27]. Meanwhile, the awareness to obtain legit information (for instance, through newspapers, electronic sources, and health workers) is also an important factor that can influence knowledge despite having a low level of education[28].

There are some limitations in this study. This a cross-sectional data hence the absence of continuous data might limit the ability to observe changes in patient knowledge from time to time. Second, a causal relationship cannot be concluded with certainty using the cross-sectional method. Third, this study was only carried out at one of the public hospitals in Surabaya, thus further research is needed to get a broader picture of knowledge. This research can also be a first step to conduct research regarding the relationship between knowledge and adherence, especially in patients receiving long-term treatment.

CONCLUSION

This study indicates the importance of providing information regarding treatment to DM patients, both through written information/label and oral information, in accordance with The National Agency of Food and Drug Control (*Badan Pengawas Obat dan Makanan*) guidelines. Providing complete and clear information has a significant effect on patient knowledge of the treatment received. In addition, this study also discovers 3 characteristic that contributed to knowledge, namely age, education level, and patient sources in obtaining information related to

DM. The results of this study are expected to be a basis in developing strategies to improve the quality of drug information provided to patients, especially to outpatients at the hospital, thus optimising patient adherence.

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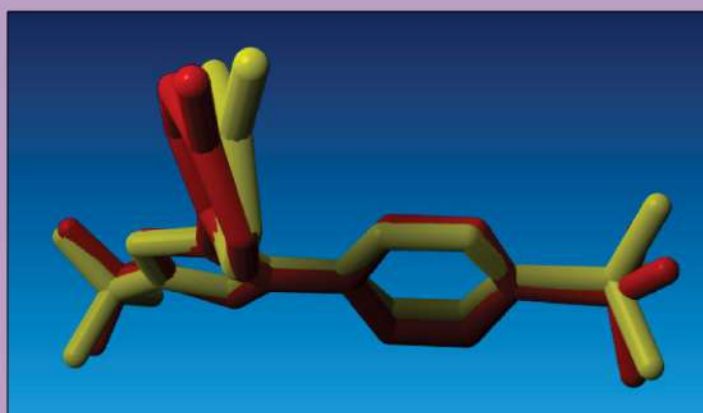
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Informasi Obat pada Pasien Diabetes Mellitus Rawat Jalan di RSUD X Surabaya: Apa yang diberikan dan apa yang diketahui?

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