

# The Effect of Advocacy on Understanding and Levels of Blood Glucose in Diabetes Mellitus Patients

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## Abstract

**Introduction:** Diabetes mellitus (DM) is a serious health problem worldwide. The unhealthy lifestyles, such as smoking, lack of physical activity, high glucose/calories intake, and alcohol consumption, are thought to be the risk factors for diabetes. Uncontrolled blood glucose level will increase the risk of complications such as microvascular and neuropathy. Patient's knowledge of DM and medication administration is required to prevent the complication of diabetes. Patient advocacy can increase the patient's knowledge. **Materials and Methods:** The purpose of this study was to determine the influence of patient advocacy on their knowledge of medication administration and decrease in blood glucose levels. This pre-experimental one-group pretest-posttest study was conducted on 58 patients with DM. The collected data were including blood glucose level and patient's knowledge. A questionnaire was used to collect the data of patient's knowledge. Data were analyzed using paired *t*-test. **Results:** The results showed the average knowledge before advocacy was 7.07, while the average blood glucose level was 239.48 mg/dL. After patient advocacy program, average knowledge was 7.95, while the blood glucose level was 208.52 mg/dL. **Discussion and Conclusion:** It can be concluded that patient advocacy increases patient's knowledge of drug administration and influences the decrease in blood glucose levels.

**Key words:** Advocacy, blood glucose level, diabetes mellitus, knowledge

## INTRODUCTION

Health advocacy is very important to achieve better health outcomes.<sup>[1]</sup> The first step in the advocacy process is identifying problems and identifying potential interventions and for their sustainability, seeking better advocacy with the government.<sup>[2,3]</sup> The World Health Organization defines advocacy for health as "an individual combination and social action designed to gain political commitment, policy support, social acceptance, and a system for specific health goals or programs."<sup>[4]</sup> This emphasizes the responsibility of health professionals as supporters of health at all levels in society.

Despite the paradox that health professionals still associate themselves more with the treatment of disease than with prevention of disease, their role as defined in primary health care is more related to the prevention of disease. Advocacy requires technical knowledge, evidence-based information, identification of stakeholders, and opponents.<sup>[5]</sup> Along with advocacy needs, we

need to understand and recognize that the sustainability and effectiveness of any program can only be enhanced by the commitment of policy-makers. Given this diabetes mellitus (DM) disease is now very visible in all parts of communities in Madura Island, especially Pamekasan regency, there is now a demand for urgent advocacy activities at regional levels to try to mitigate a potentially predictable increase in diabetes disaster for years to come.

DM is a collection of metabolic symptoms that arise in a person caused by an increase in blood glucose due to lack of insulin secretion or insulin resistance or both and will cause damage to some tissues and organs such as nerves, blood vessels, kidneys, and eyes.<sup>[1]</sup> In patients with DM, there is a disruption of the balance of glucose transport into cells,

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glucose in the liver, and glucose released by the liver. As a result, glucose levels in the blood increase. In general, the cause is that the pancreas is unable to produce insulin, the body cells do not respond to insulin work so that glucose cannot enter the target cell.<sup>[6]</sup>

According to Moodley in Tamunopriye 2014, the incidence of DM is growing rapidly in several parts of the world, especially in developing countries that affect both children and adults. In Africa, 12.1 billion are estimated to have diabetes in 2010 and are predicted to increase to 23.9 billion by 2030.<sup>[7]</sup> It is estimated that by 2030, 70% of those with diabetes will be in developing countries. Of these, more than 85% are people with Type II DM.<sup>[8]</sup> According to Shaw<sup>[6]</sup>, it is estimated that sufferers are in the age range of 20–75 years in 2030,<sup>[1]</sup> mostly around 80% in developing countries and 20% in developed countries.

The case of DM in Indonesia was ranked 7<sup>th</sup> of 10 countries with the most people with DM, with a total population of 8.5 million people. The country that occupies the top level is China with 98.4 million people; then, the second place is India with 65.1 million people and America as many as 24.4 million people. The 8<sup>th</sup> edition of the International Diabetes Federation at the 2017 edition revealed that the number of diabetics in Indonesia had reached 10.3 million people.<sup>[9]</sup>

One of the causes of the high prevalence of DM is a low understanding and non-compliance of patients in taking antidiabetic mellitus drugs.<sup>[10]</sup> The occurrence of changes in unhealthy lifestyles in the community, such as smoking, lack of physical activity, high glucose and calorie foods, and alcohol consumption is thought to be risk factors for diabetes. Prevention of complications in diabetics is required for patient compliance with the use of drugs and how to use the correct antidiabetic drugs. The non-compliance and incompatibility of patients in the use of antidiabetes drugs can have a huge negative effect.

The correct use of antidiabetic drugs and their compliance is one of the main points of concern for the successful control of glucose levels for diabetics. Therefore, researchers feel that they really need to contribute to provide an understanding of the use of correct antidiabetic drugs to improve adherence to antidiabetic drug use through advocacy by pharmacists on diabetics in Pamekasan regency. With the correct understanding, it is expected that patient adherence to the use of the drug arises as recommended. This study aims to analyze the effect of advocacy on the understanding of diabetics about DM and drug use and aims to analyze the effect of advocacy on decreasing blood glucose levels in DM patients.

## MATERIALS AND METHODS

### Ethical approval

Ethical clearance was taken and passed from the Health Research Ethics Commission of the Faculty of Public Health,

Airlangga University. Informed consent was taken from all the subjects. A questionnaire that contained detailed personal and medical history was used. Respondent's data were collected from Pamekasan regency in East Java Province, Indonesia.

### Research design

This study uses a pre-experimental design one-group pretest-posttest study.

### Population

As respondents were DM patients, with the following inclusion criteria: Patients with participants in the Chronic Disease Management Program (Prolanis) in some public health center (puskesmas) closest to the city, in Pamekasan regency, can read and write; can speak Indonesian; willing to become research respondents; residence in Pamekasan regency; and taking medicine either from the puskesmas or by buying it at the pharmacy.

The sample size was done using the following formula:

$$S = \frac{N}{1 + N \cdot e^2}$$

Information:

S = sample = 57.3875 and 58 patients were obtained

N = population = 67

e = Errors that can still be tolerated 0.05.

The number of diabetics who meet the requirements as the target population in some puskesmas is 67 people, after sample calculation using the formula above, the sample is 58 people.

### Research variable

As the independent variable in this study was advocacy. Advocacy is the provision of education in the form of counseling about DM and treatment, and how to use the drug correctly. After education is carried out, patients are monitored through telephone communication and home visits to ensure they are using the drug correctly.

As the dependent variable in this study is the level of understanding of diabetes mellitus patients with diabetes mellitus and its treatment, including the correct use of drugs. In addition, as a fixed variable was the level of glucose in the blood.

### Research instrument

The instrument used in this study was a questionnaire about understanding about DM and its treatment by the patient

and a blood glucose test to determine blood glucose levels. Before being used, the questionnaire was first tested for empirical validity and reliability. Questionnaires were tested on DM patients who were not included in the study (excluding samples).

Questionnaire results of empirical tests on patients outside the respondents, statistical tests were conducted to determine the validity and reliability. The instrument is declared valid if the correlation coefficient  $> 0.3$  and declared reliable if the Cronbach's alpha value  $> 0.6$ .

The reliability and validity test results have the lowest correlation value of 0.423 and the highest of 0.811, which means that all items in the questionnaire were declared valid and Cronbach's alpha value was 0.726 which means that the questionnaire was declared reliable. To find out the effect of advocacy on respondents' understanding and to decrease blood glucose levels, it was analyzed by paired *t*-test.

## RESULTS AND DISCUSSION

The advocacy of patients of DM is presented in Tables 1-8.

The majority of female respondent sexes were 74% as shown in Table 1. This condition was different from the research conducted by Konduru *et al.* who stated that the majority of diabetic respondents in male Indian multispecialist

**Table 1: Sex of respondents**

| Respondent's sex | <i>n</i> | %    |
|------------------|----------|------|
| Male             | 15       | 25.9 |
| Female           | 43       | 74.1 |
| Total            | 58       | 100  |

**Table 2: Age of respondents**

| Age   | <i>n</i> | %    |
|-------|----------|------|
| 23–32 | 2        | 3.4  |
| 33–42 | 8        | 13.8 |
| 43–52 | 14       | 24.1 |
| 53–62 | 27       | 46.6 |
| 63–72 | 7        | 12.1 |
| Total | 58       | 100  |

**Table 3: Long suffering from diabetes mellitus**

| Period has diabetic (years) | <i>n</i> | %    |
|-----------------------------|----------|------|
| <5                          | 27       | 46.6 |
| 5–10                        | 12       | 20.7 |
| >10                         | 19       | 32.7 |
| Total                       | 58       | 100  |

hospitals were 64%;<sup>[11]</sup> besides, other studies have shown that male sufferers outnumber women.<sup>[12]</sup> The differences in these characteristics are likely to occur because respondents were taken from the puskesmas patients who were Prolanis participants, so the possibility of female sufferers being more orderly in control to the puskesmas and more interested in attending the counseling conducted by researchers. While

**Table 4: Drugs used by respondents**

| Medication used         | <i>n</i> | %    |
|-------------------------|----------|------|
| Forgot name the drug    | 17       | 29.3 |
| Metformin               | 10       | 17.2 |
| Glibenklamid            | 17       | 29.3 |
| Glimepiride             | 1        | 1.7  |
| Glucovance              | 1        | 1.7  |
| Metformin+Glibenklamid  | 10       | 17.2 |
| Glimepirid+Glibenklamid | 2        | 3.4  |
| Total                   | 58       | 100  |

**Table 5: Drug stores**

| Drug store      | <i>n</i> | %    |
|-----------------|----------|------|
| Box of medicine | 30       | 51.7 |
| Refrigerators   | 2        | 3.4  |
| Dining table    | 4        | 6.9  |
| Wardrobe        | 7        | 12.1 |
| Other places    | 15       | 25.9 |
| Total           | 58       | 100  |

**Table 6: Obstacles to compliance with taking medication regularly**

| Type of constraints       | <i>n</i> | %    |
|---------------------------|----------|------|
| Unpleasant stomach        | 3        | 5.2  |
| Forgot to take medication | 24       | 41.4 |
| Running out of medication | 6        | 10.3 |
| Forgotten control         | 2        | 3.4  |
| Bored                     | 2        | 3.4  |
| Total                     | 37       | 100  |

**Table 7: Understanding of respondents**

| Understanding      | Before   |      | After    |      |
|--------------------|----------|------|----------|------|
|                    | <i>n</i> | %    | <i>n</i> | %    |
| Less (2–4)         | 4        | 6.8  | 1        | 1.7  |
| Sufficient (5–7)   | 27       | 46.6 | 18       | 31.0 |
| Good (8–10)        | 27       | 46.6 | 39       | 67.3 |
| Total              | 58       | 100  | 58       | 100  |
| Average            | 7.07     |      | 7.95     |      |
| Standard deviation | 1.46     |      | 1.48     |      |
| <i>P</i>           | 0.000    |      |          |      |

**Table 8: Respondents' blood glucose levels**

| Blood glucose levels (mg/dL) | Before |      | After  |      |
|------------------------------|--------|------|--------|------|
|                              | n      | %    | n      | %    |
| <140                         | 15     | 25.9 | 12     | 20.7 |
| 140–200                      | 7      | 12.1 | 10     | 17.2 |
| 201–300                      | 19     | 32.7 | 33     | 56.9 |
| 301–400                      | 12     | 20.7 | 3      | 5.2  |
| 401–500                      | 5      | 8.6  | 0      | 0    |
| Total                        | 58     | 100  | 58     | 100  |
| Average                      | 239.48 |      | 208.52 |      |
| Standard deviation           | 109.02 |      | 63.18  |      |
| <i>P</i>                     | 0.026  |      |        |      |

research conducted by Konduru is a patient of a hospital. Therefore, the result is not similar due to Konduru done the research in hospital.

The age of the majority of respondents in the range of 53–62 years as many as 27 people (46.6%) as Table 2. What needs to be watched out and get serious attention, especially by the government, in the data of this study are the presence of young people under the age of 40 years, this is in line with several studies others such as those conducted by Abdelaziz *et al.*, in 2017, that diabetics under the age of 40 start a lot,<sup>[13]</sup> therefore, that strategic steps are needed for prevention.

The duration of the majority of patients with diabetes is <5 years, which is 46.5%, meaning that being diagnosed as diabetics is mostly <5 years, as described in Table 3. This shows that there are more new patients with diabetes than old patients. In line with the research conducted by Gebremedhin *et al.*, in 2014, which states that the majority of diabetics are diagnosed with <3 years,<sup>[14]</sup> it means that diabetics are very fast growing, both in Indonesia and in other countries.

In Table 4 of this research data, it shows that oral antidiabetic drugs used by respondents, the majority of single glibenclamide amounted to 29.3%, but the concern of this data is that the same number of respondents, 29.3%, could not name the drugs they obtained. Indeed, at that time, the respondents were not carrying drugs, but they had used the drug for more than 1 year. Therefore, education and assistance to all sufferers of chronic diseases including DM is very important, to help control their blood glucose levels and improve their quality of life, considering that DM cannot be cured, which can only be controlled by improving lifestyle and using drugs for lifetime. In some studies, most people with DM have low knowledge, so education is their hope to be able to increase their knowledge.<sup>[15]</sup>

In this study, the majority of respondents used to store drugs had used a medicine box of 51.7%, as shown in Table 5. There were respondents who stored drugs at the dinner table. After doing the deepening by interviewing diabetics

who store drugs at the dinner table, they reasoned that the use of drugs has to do with eating time, which is before food or after food. Due to that reason to make it easier to remember and use drugs stored at the dinner table. They only understood their mistakes after being educated and assisted. An understanding of disease, drug use, drug management, and lifestyle is a determinant of the success of controlling DM because understanding or knowledge has an influence on attitudes, which ultimately affects their behavior.<sup>[16]</sup> Besides being stored in medicine boxes and dining tables, 15% was stored elsewhere.

Of the 58 respondents who experienced problems or difficulties in taking medication regularly, there were 37 respondents. Of the 37 respondents who experienced barriers to taking medication regularly, 41.4% of respondents reasoned because they forgot to take medication as presented in Table 6. It is very important to get advocacy reminders to take pharmaceutical drugs and home care, can improve medication compliance, and can improve quality of life in diabetics.<sup>[17]</sup>

Understanding of patients about DM and its treatment as presented in Table 7 has increased from before being carried out with assistance with an average score of 7.07 and after advocacy an average of 7.95. Statistical test results with *t* paired with respondent data understanding before and after advocacy is considered to be very significant difference with a value of  $P = 0.001$ . This shows the influence of advocacy on increasing respondents' understanding of DM and its treatment. Education has an influence on understanding, then it can influence their attitudes and behavior and their adherence to taking medication<sup>[18]</sup> because the respondents' lack of understanding is related to their disobedience to treatment, and understanding in the end also affects the success of therapy.<sup>[8]</sup> This research is in line with what was done by Tamunopriye, in 2015, that education affects the understanding of sufferers of diabetes.<sup>[7]</sup>

The respondent's blood glucose levels as presented in Table 8 decreased from before advocacy with an average value of 239.48 mg/dL–208.52 mg/dL after advocacy. The results of statistical analysis with paired *t*-test obtained a value of  $P = 0.026$ . The statistic test results showed significant differences in blood glucose levels before and after advocacy, which meant that assistance had an effect on reducing blood glucose levels. If it is associated with the constraints of regular medication compliance experienced by patients forgetting to take medication, then assisting can help sufferers to improve adherence to taking medication so that it can reduce blood glucose levels. This research is in line with other researches conducted by Kaskurthy *et al.* that education will improve understanding of patients and adherence to treatment so that education is related to the control of blood glucose levels,<sup>[19]</sup> with assistance patients have sufficient understanding and can self-manage their diabetes. By being able to manage it yourself will improve the quality of life and blood glucose

levels become controlled.<sup>[20]</sup> In addition, counseling is very important to improve understanding and health status of people with diabetes<sup>[21]</sup> because patients who have low knowledge and attitudes, it will be difficult to independently check their health and carry out routine treatment, eventually impacting uncontrolled blood glucose.<sup>[22]</sup>

### Strength and limitation of the study

There was a significant decrease in blood glucose level in diabetics from Prolanis participants. Hence, we can suggest to do the advocacy on diabetics from other than Prolanis participants for improving the research which further research is required. Sample size is small. The correlation of the duration of diabetes and blood glucose levels requires further research.

## CONCLUSION

Diabetes management remains a challenge for developing countries and developed countries. Awareness of the availability of health-care services was done with advocacy of pharmacists. Advocacy affects the increase in respondents' understanding of DM, treatment, how to use the drug, and advocacy also affects the decrease in blood glucose levels.

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