International Journal of Multidisciplinary and Current Educational Research (IJMCER)
ISSN: 2581-7027 ||Volume|| 1 ||Issue|| 6 ||Pages|| 11-16 ||2019||

The Effectivity Analysis of Booklet on Adherence Level of Patient with Type 2 Diabetes Mellitus in Lepo-Lepo Public Health Center of Kendari

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ABSTRACT : Diabetes mellitus (DM) is a chronic metabolic disease characterized by increased Blood Glucose Levels in the blood. Non-adherence to treatment therapy DM type 2 (DMT2) patients is one of the causes of uncontrolled Blood Glucose which increases the risk of complications. Education is one way to improve adherence. Education can be done in various ways, one of which is through the provision of booklets. This study aims to determine the level of adherence to taking medication for DM type 2 (DMT2) patients before and after booklets giving and to know the correlations between Blood Glucose (RBG) and MMAS-8 scores on the level of adherence to taking medication for DMT2 patients in 2018. This research is a type of quasi experimental research with a total sample of 40 patients consisting of 20 test groups and 20 control groups. The mean RBG and MMAS-8 score were measured before and after giving the booklet. The results stated that there were differences in the level of adherence to taking medication for type 2 DM patients at Lepo-Lepo Public Health Center of Kendari before and after the booklet was given. Based on Blood Glucose Levels, the control group before and after the booklet administration was 257.05 mg/dL to 205.25 mg/dL while the intervention group was 275.7 mg/dL to 195.7 mg/dL. Based on the MMAS-8 score in the control group before and after the booklet was 2.65 to 1.65, the intervention group was 2.95 to 0.6. The results of statistical analysis showed that there was an adequate relationship ($r = 0.575$) between decreased RBG with MMAS-8 scores in type 2 DM patients in describing the level of patient's adherence with the level of trust $p = 0.008$ ($p < 0.05$), where p value shows that DM education through effective booklets helps improve patient's adherence.

KEYWORDS: Adherence, Booklet, Diabetes Mellitus Type 2 (DMT2), MMAS-8 Score

I. INTRODUCTION

Diabetes mellitus is a disease characterized by the occurrence of hyperglycemia and impaired metabolism of carbohydrates, fats, and proteins associated with an absolute or relative deficiency of work and / or insulin secretion. Symptoms complained of in patients with diabetes mellitus are polydipsia, polyuria, polyphagia, weight loss, and tingling [1]. IDF (International Diabetes Federation) estimation in 2012 shows that China is the country with the highest prevalence of diabetes in the world with 92.3 million sufferers, followed by India with 63 million, and the United States 24.1 million [2]. Based on the reports of the World Health Organization (WHO), the number of people with diabetes mellitus in Indonesia ranks fourth largest in the world. WHO predicts an increase in the number of people with diabetes mellitus in Indonesia from 8.4 million in 2000 to around 21.3 million in 2030 [3].

Based on the result of research from the Central Statistics Agency (CSA) of Southeast Sulawesi Province in 2015, Diabetes Mellitus ranks fifth in the number of cases of 10 most diseases in Southeast Sulawesi Province with 3,206 people [4]. Particularly at the Lepo-Lepo Public Health Center in Kendari City on 2016, the number of patients with type 2 DM was 103 patients and increased to 161 patients in 2017. The proportion of type 2 diabetes mellitus is 95% of the world population suffering from diabetes mellitus and only 5% of the number suffers from type 1 diabetes mellitus [1].

The high incidence rate and the importance of proper treatment of Diabetes Mellitus and its complications, then Diabetes Mellitus therapy must be performed rationally [5]. Rational use of drugs is very important to increase the success of therapy [6]. Besides the rationality factors, non-adherence patient with treatment plays role in the failure of controlling Blood Glucose level. Non-adherence to therapeutic treatment is a factor that inhibits the control of Blood Glucoseso that it requires intervention to improve therapy adherence [7].

Nowadays, more objective measurement methods have been developed to evaluate adherence, namely The New 8 Item Self Report Morisky Medication Adherence Scale (MMAS). MMAS is a questionnaire used to

measure adherence to the use of oral anti-diabetic drugs. The MMAS questionnaire can identify problems of adherence and monitor patient's adherence during therapy more simply and practically [8]. Morisky Medication Adherence (MMAS-8) is a questionnaire used to measure adherence using an eight-item scale [3]. One way to improve patient's adherence is by providing education about diabetes, thereby making patients aware of the disease and changing behavior such as self-management during treatment. This can reduce health care costs because it minimizes complications. In conducting this education, it can use tools or media, both audio, visual and audio visual media. One example of visual media is the booklet [9].

Booklet is a printed mass media that aims to disseminate information in the form of text and images. Booklets have several advantages which can be learned at any time because of the form of books, besides booklets can contain a lot of information. The existence of a booklet that becomes a handle also influences the knowledge of the respondent so that education does not only take place when face to face but can be done independently by the respondent.

II. MATERIALS AND RESEARCH METHODS

The study population was all patients with type 2 diabetes mellitus who came for treatment at the Lepo-Lepo Health Center in Kendari City. The number of type 2 diabetes mellitus patients in the January-December 2017 period was 161 patients. The sample used in this study was 40 samples with 20 control groups and each intervention group. The inclusion criteria in this study were patients with type 2 DM who used oral antidiabetic drugs for at least 2 months or more, with or without concomitant diseases, aged ≥45 years and were able to read and write. Exclusion criteria were pregnant female patients, patients with insulin and patients with herbal treatments or other alternatives.

Instruments are all tools used to collect, examine, investigate a problem or to manage, analyze and present data systematically and objectively with the aim of solving a problem or testing a hypothesis. The instrument used in this study was a Blood Glucose device such as the Auto Check, MMAS-8 Questionnaire, and Booklet. Univariate analysis used descriptive test. Bivariate analysis used shapiro-Wilk test, McNemar test, Wilcoxon test, Mann-Whitney test and Spearman test.

III. RESULT AND DISCUSSION

Data collection was started with record the identity of patients with type 2 diabetes who seek treatment at the general polyclinic, elderly polyclinic from Lepo-Lepo Health Center in Kendari City who meets the criteria. Subjects who have agreed to be respondents to fill out the availability form to join the study. Pretest was given to the respondents by completing the MMAS-8 questionnaire and Blood Glucoselevels of the respondents were measured to assess adherence in using oral antidiabetic drugs. Subjects were given a DM treatment booklet. After 4 weeks of the pretest, posttests were given to the respondents. Posttests were carried out by filling in the MMAS-8 questionnaire and respondents' Blood Glucose was re-measured to assess changes in adherence between the pretest and posttest after the booklet was given. Data were analyzed and conclusion was drawn.

Table 1. Chracteristics of Patient with Type 2 DM

No	Characteristics	Frequency (n=40)	Percentage(%)
1.	**Gender**		
	Man	15	38
	Woman	25	62
2.	**Age**		
	45-59 old	24	60
	≥ 60 old	16	40
3.	**Education Level**	8	
	Elementary	12	30
	Junior	13	32
	High	15	38
4.	**Occupation**		
	Employed	17	43
	Unemployed	23	57

Table 2. Characteristics of Disease and Drugs use of Patient with Type 2 DM

No	Characteristics	Frequency (n = 40)	Percentage (%)

1.	**Complication Disease**		
	Not Complication	22	55
	DM with Hypertension	13	32.5
	DM with Cholesterol	4	10
	DM with Hypertension and Cholesterol	1	2.5
2.	**Administered Oral Antidiabetic Drugs**		
	Metformin	24	60
	Glimepiride	7	17.5
	Metformin and Glimepiride	7	17.5
	Metformin and Glibenclamide	2	5
3.	**Receiving Another Drugs**		
	Not receive another drugs	22	55
	Amlodipine	13	32.5
	Simvastatin	4	10
	Amlodipine and simvastatin	1	2.5

Adherence Level of Type 2 DM Patients Based on Blood Glucose Levels

The level of adherence is the ability to carry out treatment methods recommended by health workers. The ability of people with DM to control their lives can affect the level of adherence [10]. Someone who is health-oriented tends to adopt all habits that can improve and restore their health. In this study for the measurement of Blood Glucose DM type 2 patients are divided into 2 groups: the control group and the intervention group.

The results of measurements of blood glucose levels of patients in the control group and intervention group can be seen in Fig.1 below.

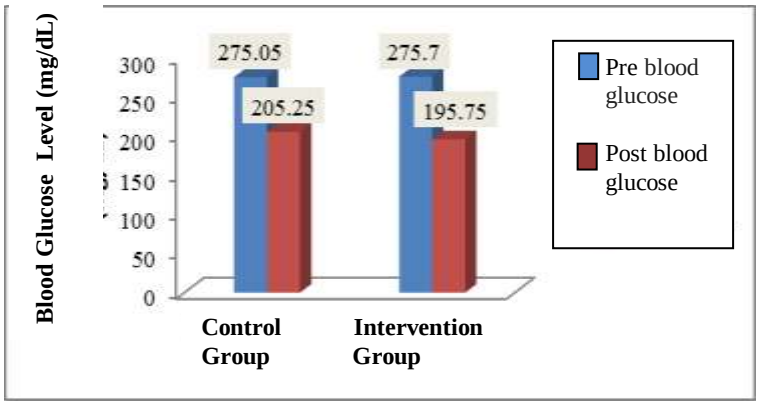

Figure 1. Graph of Blood Glucose Levels during Patients in the Control and Intervention Groups

Based on the graph above it can be seen that the mean value of blood glucose levels in the control group initially was 275.05 mg/dL down to 205.25 mg/dL while in the intervention group the average value of blood glucose was initially 275.7 mg / dL down to 195.75 mg/dL. From these results, the difference between the decreases in the mean value of Blood Glucose Levels in the control group was 69.8 while in the intervention group the difference in the decrease in the average value of blood glucose levels was 79.95. Then McNemar statistical test was performed to see the difference in the number of patients who experienced a decrease in blood glucose levels in the control group with a significant value of $p = 0.001$ ($p < 0.05$) and the intervention group $p = 0,000$ ($p < 0.05$). So, if it is seen from the significant value of the two groups show that there are significant differences in the number of patients who have decreased levels of blood glucose before and after 4 weeks.

Adherence Levels for Type 2 DM Patients Based on MMAS-8 Scores

Measurement of the level of adherence in patients in addition to using Blood Glucose values, also carried out using the Morisky Medication Adherence Scale (MMAS) -8 questionnaire. MMAS is a questionnaire used to measure adherence with oral antidiabetic drugs. This MMAS questionnaire can identify

problems with patient's adherence during therapy more simply and practically. This MMAS questionnaire was chosen because it is cheap and easy to use in health services. MMAS-8 consists of 8 questions with yes and no answers. The MMAS-8 assessment score is divided into 3 categories, namely low adherence with a score of more than 2 moderate adherences with a score of 1-2 and a high adherence with a score of 0. Measurement of patient's adherence level is assessed from the results of the MMAS-8 questionnaire assessment score of the control group and the intervention group at the beginning and end scores for 4 weeks. For the results, the MMAS-8 score of the control and intervention groups can be seen in the following Fig.2

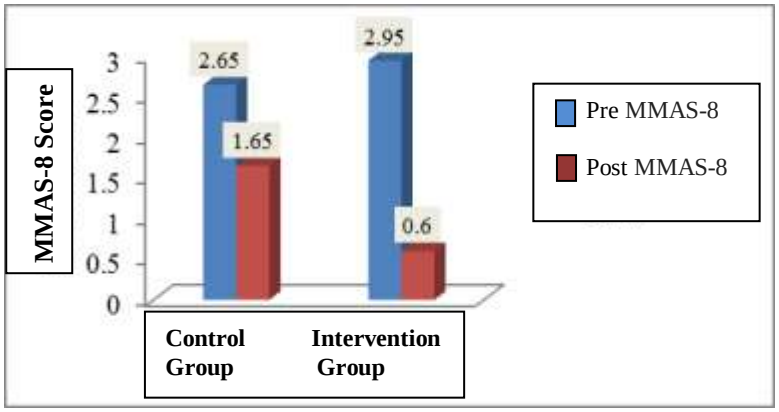

Figure 2. MMAS-8 Score Chart for Patients in the Control and Intervention Groups

Based on the Fig.2, it can be seen that the mean MMAS-8 score in the initial control group was 2.65 (moderate adherence) dropped to 1.65 (moderate adherence level) whereas in the intervention group the mean MMAS-8 score was initially 2.95 (level moderate adherence) drops to 0.6 (high level of adherence). From this result, the difference between the decreases in the mean value of MMAS scores in the control group is 1, while in the intervention group the difference in the decrease in the mean score is greater, 2.34. The smaller decrease in mean MMAS-8 score in the control group is likely due to the lack of patient knowledge about treatment and DM disease so they are less likely to comply with treatment. Thus, from the MMAS-8 score, it can be concluded that the administration of booklets increases medication adherence to type 2 DM patients at the Lepo-Lepo Health Center in Kendari City.

The Wilcoxon statistical test was then performed to see any significant difference in the high, medium and low adherence categories before and after 4 weeks of treatment in the control group and the intervention group. For the control group, a significance value of $p = 0.302$ ($p < 0.05$) was obtained, which means that there was no significant difference. For the intervention group there was a significant difference at the beginning and end of the study with a significance value of $p = 0.001$ ($p < 0.05$) which means there was a significant difference in the number of patients based on the level of adherence of the number of patients after providing standard information and booklets on the level of patient's adherence. Based on these results, it can be said that the administration of booklets can improve medication adherence for patients with type 2 DM.

Comparison of Adherence Levels of Patient with Type 2 DM between Control Groups and Intervention Groups Based on Blood Glucose Levels and MMAS-8 Scores

Besides assessing the patient's adherence level at the beginning and the end of the study, this study also tested the difference between the control group and the intervention group with the non-parametric test using the Mann-Whitney test. The Mann-Whitney test is a type of nonparametric analysis which is an alternative to the Independent sample t test. The Mann-Whitney test is a comparative test of two free samples to see the difference in results between the control group and the intervention group by using the blood glucose difference value and the difference in MMAS-8 score.

The results of the analysis of the difference in blood glucose levels showed that there were no significant differences between the control group and the intervention group. Although there was no significant difference between the control group and the intervention group, there was a decrease in the average Blood Glucose level on the intervention group that was higher than the control group. In the intervention group, the mean value of 275.7 dropped to 195.75 while in the control group the mean value of 275.05 dropped to 205.25.

The results of the analysis of the difference in MMAS-8 scores showed that there were no significant differences between the control group and the intervention group. Although there was no significant difference between the control group and the intervention group, there was a decrease in the average MMAS-8 score in

the intervention group which was higher than the control group. In the intervention group the mean value of 275.7 dropped to 195.75 while in the control group the mean value of 275.05 dropped to 205.25.

Relationship between Blood Glucose Levels and Adherence Level

Relationship (correlation) is a term used to measure the strength of relationships between variables. Correlation analysis is a way to find out whether there is a relationship between variables or not. Relationship measurement is a general term that refers to a group of techniques in bivariate statistics that is used to measure the strength of a relationship between two variables. Two variables are said to be related if the behavior of one variable influences the other variable [11].

The correlation test used in this study is the Spearman correlation test which is an alternative to the Pearson test. The Spearman test was used to determine the relationship between Blood glucose levels and the adherence level based on MMAS-8 scores.

Table 3. Spearman Correlation Test Results in the Intervention Group

		Adherence
Blood Glucose Level	*r*	0.575
	P	0.008
	N	20

Correlation test between Blood Glucose Levels with the level of adherence based on MMAS-8 scores resulted in a value of 0.008 or smaller than ($p < 0.05$) which showed that there was a significant relationship between variables. Spearman's correlation coefficient value indicates a value of 0.575, which means the strength of the relationship between Blood Glucose Levels and the level of adherence based on MMAS-8 scores is quite strong, marked with a value of $r = 0.575$. Positive correlation values indicate that the direction of a positive relationship means, if Blood Glucose of the patient is low, then patient's adherence increases, and vice versa if Blood Glucose of the patient is high, then patient's adherence decreases.

The significant relationship between Blood Glucose levels and medication adherence in patients with type 2 DM at Lepo-Lepo Public Health Center in Kendari shows that the more the patient is adherent to medication, the lower the Blood Glucose levels become. A similar study was also conducted by Jacob Purnama (2015) who stated that there was a relationship between Blood Glucose Levels with MMAS-8 scores in patients with type 2 DM at the Lepo-Lepo Public Health Center in Kendari City. In addition, adherence also affects the reduction in HbA1c levels, where in Puspitasari's research (2012), she states that there is a relationship between HbA1C levels and MMAS scores in patients with type 2 DM towards patient's adherence levels [12].

IV. CONCLUSIONS

Based on the research that is carried out on patients with type 2 DM at the Lepo-Lepo Public Health Center in Kendari, the following conclusions are obtained:

1. There is a difference in the level of medication adherence on patients with type 2 DM at the Lepo-Lepo Public Health Center in Kendari before and after the administration of the booklet. Based on the level of blood glucose , the control group before and after the administration of the booklet was 257.05 mg / dL to 205.25 mg / dL, while the intervention group was 275.7 mg / dL to 195.7 mg / dL. Based on MMAS-8 scores in the control group before and after the administration of the booklet is 2.65 to 1.65 while the intervention group is 2.95 to 0.6.
2. There is a fairly strong relationship ($r = 0.575$) between a decrease in Blood Glucose Levels with MMAS-8 scores in patients with type 2 DM in describing the level of patient's adherence with a level of confidence $p = 0.008$ ($p < 0.05$).

Conflict of Interest

Authors declare no conflict interest.

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