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THE EFFECT OF DMPATIENTCONTROL BEHAVIOR ON BLOOD SUGAR LEVELS IN ANUTAPURA GENERAL HOSPITALPALU

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ABSTRACT

Diabetes Mellitus is a disease where the condition of blood sugar level exceeds normal limits. Globally by 2017 about 425 million people worldwide suffer from Diabetes Mellitus and the highest prevalence of Diabetes Mellitus in Indonesia is in Central Sulawesi about 3.7%. 43% or 3.7 million death due to high blood Sugar to patients with Diabetes Melitus in 2016. Cases of patients with Diabetes Mellitus in Anutapura Palu hospital reported in 2017 as many as 4177 patients. The objective of this research is to find out the effect of controlling behavior of Diabetes Mellitus on blood sugar level of patients at Anutapura general hospital of Palu City. The type of research is quantitative method with comparative study approach method, which is method that compares two or more variables. The number of sample is 116 respondents. Sampling is done by accidental sampling technique. Data source use primary data that is using questioner. Data were analyzed using independent sample T Test at 95% confidence level (p<0.05). The results of this research show that medication adherence (p = 0.004), sleep quality (p = 0.008), blood glucose examination (p=0.028) and physical activity (p=0.020) affect blood glucose level. Conversely for patients with Diabetes Mellitus to apply the controlling behavior of Diabetes Mellitus in order to improve the control of good blood sugar levels.

INTRODUCTION

Diabetes Mellitus (DM) is a disease where the condition of blood sugar levels exceeds the normal limit. In 2017, around 425 million people worldwide suffer a diabetes mellitus. China has the most DM patients in the world with 114 million sufferers. While Indonesia ranks seventh for most DM patients in the world with 10.3 million sufferers (International Diabetes Federation, 2017). Indonesian Basic Health Research (RISKESDAS) in 2013 found that the prevalence of DM in Indonesia was based on the highest in Central Sulawesi (3.7%) and the lowest in the Lampung region (0.9%) (Ministry of Health Republic of Indonesia, 2013). While cases of DM at Anutapura General Hospital in Palu City based on annual hospital report were 4570 casesin 2015, then this number decreasedwere3977casesin2016anduntilNovember2017the caseofDManincreasedto4177patients(Rekam Medik, 2017). DM control behavior optimally can reduce the rate of this disease frequency.

Where the frequency of DM will increase with life expectancy, reduced mortality due to infectious diseases and increased risk factors due to lifestyle and unhealthy diet, obesity, lack of physical activity, and stress(Haskas, 2017). In controlingblood sugar levels properly and accurately,it is necessary to know the causes of uncontrolled sugar levels by looking at how the DM patientsbehavior in controlling their blood sugar levels. DM is a disease that closely related to lifestyle, the unsuccessful filtering this disease is highly dependent on the patient himself in changing his behavior.DM control behaviors included diabetes drug consumption compliance, physical activity, food regulation, a sleep quality and periodic blood glucose checking (Dewi, 2013). Based on the description above, the authors are interested in examining the Effect of Diabetes Mellitus Control Behavior on Patient Blood Sugar Levels in Anutapura General Hospital, in Palu City.

METHODS

The research design is quantitative with a comparative study approach using the *Independent Samples T Test*. This research was conducted through 3 stages, namely: (1) Determining

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sample groups based on independent variables; (2) Determining the blood sugar levels of DM patients in each group based on the independent variable category; (3) Test statistically the effect of independent variables on the dependent variable using an *independent sample T test*. The sample used in this study is a portion of the diabetes mellitus outpatient population who visited the Internal Medicine Poly. Samples were included in the study as many as 116 respondents who were taken with Accidental Sampling techniques. The number of samples is determined based on the Leme show standley formula:

$$n = \frac{Nz^2P(1-P)}{d^2(N-1) + z^2P(1-P)}$$

$$n = \frac{(4177)(1,96)^2(0,5)(1-0,5)}{(0,09)^2(4177-1) + (1,96)^2(0,5)(1-0,5)}$$

$$n = \frac{4010.96}{34,79} = 115,29 = 116$$

Notes:

n= Sample size
N= Population size
Z= Standard value of normal distribution (1,96)
P= Estimates of the proportion of the variables (0,5)
d= Level of accuracy 0,09

RESULTS

In this study the test was conducted on 116 samples consisting of 49 males and 67 females, while the distribution of respondents ages in range 39-70 years old, and the majority of respondents were at 51-54 years old. The results of the 95% *Independent Sample T Test* showed the influence of medicine adherence ($\rho = 0.004$), sleep quality ($\rho = 0.008$), blood sugar checking ($\rho = 0.028$), and physical activity ($\rho = 0.020$) as shown in Table 1.

Table 1. Effect of Diabetes Melitus Patient Control Behavioron Blood Sugar Levels in Anutapura General Hospital, Palu City

Diabetes Melitus Behaviour Control	n	Averages of Blood Sugar Level (mg/dl)	Deviation Standard	*P Value*
Medicine Adherence				**0,004**
Good	42	280,36	55,343	
Low	74	315,09	65,398	
Quality of Sleep				**0,008**
God	36	279,31	59,303	
Bad	80	312,96	65,535	
Blood Sugar Check				**0,028**
Reguler	47	286,81	60,378	
Irreguler	69	313,22	64,498	
Physical Activity				**0,020**
Enough	37	282,46	62,971	
Less	79	211,91	62,584	

Table 1 illustrated that the average blood sugar level of DM patients who have high medication adherence is 280.36 mg/dl (SD 55,343 mg/dl). While the average blood sugar level of patients who have low medication adherence is 315.09 mg/dl (SD 65,398 mg/dl). This means that blood sugar levels of DM patients who have low medication adherence are higher than those who have high adherence. The results of the statistical test obtained ρ value(0.004 <0.05), it is meaning that taking medication compliance affected the blood sugar level of patients. Furthermore, the averages blood sugar level of DM patients with good of sleep quality is 279.31 mg/dl (SD 59.303 mg/dl). While the average blood sugar level of DM patients with poor of sleep quality is 312.96 mg/dl (SD 63.535 mg/dl). This means that blood sugar levels of DM patient with poor sleep quality are higher than patients with good sleep quality. The results of the statistical test obtained of ρ *value* (0.008 <0.05), it is meaning that the quality of sleep affects blood sugar levels in DM patients. The Table 1 also described that the average blood sugar level of DM patients who regularly check blood sugar levels is 286.81 mg/dl (SD 60,387 mg/dl). While the average blood sugar level of patients who do not regularly check blood sugar level is 313.22 mg/dl (SD 64,498 mg/dl). This means that blood sugar levels of people with DM who check irregular blood sugar levels are higher than they do regular checks. The results of statistical tests obtained of ρ *value* (0.028 <0.05), meaning that the blood sugar checking affects blood sugar levels in DM patients. For the variable physical activity showed that the average blood sugar level of DM patients who did enough physical activity was 282.46 mg/dl (SD 62,971 mg/dl). While the average blood sugar level of patients with less physical activity is 311.91 mg/dl (SD 62.584 mg/dl). This means that blood sugar levels of DM patients with less physical activity are higher than those with sufficient physical activity. The results of statistical tests obtained the value of ρ (0.020<0.05), it is meaning that physical activity affects blood sugar levels in DM patients.

DISCUSSION

One factor that plays a role in the failure of blood glucose control in DM patients is the patient's noncompliance with the treatment. The level of adherence is an assessment of the patient used to determine whether a patient has followed the rules of drug uses during therapy (Rasdianah *et al.,* 2016).The results of research conducted at Anutapura General Hospital found that from the results of statistical tests obtained the value of ρ (0.004<0.05), it is means that there are differences in the average blood sugar levels of DM patients based on medication adherence, or in other words adherence to taking medication affects blood sugar levels of DM patients. DM patients who do not adhere to their treatment will result in a low ability of the pancreas to secrete insulin and the sensitivity level of insulin receptors will decrease, thus affecting their blood sugar levels (Alfian, 2015). Compliance of DM patients in taking drugs is influenced by many factors such as age, education level, work status, information, motivation and family support (Tjandra, 2014). Sleep quality is a condition of one's satisfaction with sleep, so that a person does not show tired feeling, arousedeasily and anxious, lethargic and apathetic, blackness around the eyes, swollen eyelids, red conjunctiva, sore eyes, fragmented attention, headaches and often yawning or drowsiness (Tentero *et al.,* 2016). The results of research conducted at Anutapura General Hospital found that from the results of statistical tests obtained ρ value (0.008 α 0.05), which indicates that there are differences in the averages blood sugar levels of DM patients, it is means that sleep quality can affects blood sugar levels in DM patients.

Loss of sleep can affect hormone involvement in regulating appetite. After bed restriction, the level of lept in which is a factor that makes a person become full decreases and ghrelin

levels which are appetite stimulation increase. Lack of sleep also increases a person's chance to eat. So that losing sleep will increases appetite and food intake which can lead to obesity and increased blood glucose levels (Knutson and Van Cauter, 2008). Controlling blood sugar levels regularly is an effort to prevent complications from DM patients. The Ministry of Health provides a standard for examining blood sugar levels which should ideally be carried out at least 3 months after the first visit (Rachmawati and Dyan, 2015). People with DM must routinely control blood sugar levels according to a prescribed schedule, so that the value of blood sugar levels is known to prevent disturbances and complications that may arise, so that there is a fast and appropriate treatment (Tandra, 2008). The results of the research conducted at Anutapura General Hospital found that the results of statistical tests obtained ρ value(0.028 <0.05), this is indicated that there were differences in the average blood sugar level of DM patients, it is means examination of blood sugar affects blood sugar levels in DM patients.If people with DM are not obedient to what is taboo and if they are not diligent in checking blood sugar levels then there is a possibility that it will become the basis of complications of the disease. Acute complications include hypoglycemia, ketoacidosis, non ketotic hyperosmoral coma. In the brain, for example strokes occur and in the eye cause cataracts. Chronic complications of DM include nerve damage, heart disease, liver disease, kidney disease, digestive tract disorders, skin diseases and are susceptible to bacteria and viruses (Wardani and Isfandiari, 2014). Physical activity is any movement in the body that is stimulated by skeletal muscle that requires energy. Lack of physical activity is an independent risk factor for chronic diseases and overall is expected to cause death globally (Nurayati and Adriyani, 2017).

The results of the research conducted at Anutapura general hospital found that from the statistical test results obtained a value of ρ (0.020 <0.05), which indicates that there are differences in the average blood sugar level of DM patients based on physical activity, it is means physical activity affects blood sugar levels of DM patient Physical activity is directly related to the speed of recovery of muscle blood sugar. When physical activity is carried out, the muscles in the body will react using glucose stored so that stored glucose will decrease. In these circumstances there will be a muscle reaction in which the muscle will take glucose in the blood so that glucose in the blood decreases and this can improve blood sugar control (Barnes, 2011).Muscle contraction and dilation during exercise stimulates the pancreas gland, so that relaxation, deep breathing, bending and twists and turns of the spine where the pancreas is located, directly stimulates pancreatic cells, thereby increasing insulin secretion (Rast *et al.,* 2014).

CONCLUSION

Medicine adherence, sleepquality, blood sugar checking and physical activity affected the patient's blood sugar levels at the Anutapura General Hospital in Palu City. In an effort to control blood sugar levels of DM patients, it is expected to be able to apply these control behaviors on an ongoing basis to prevent complications.

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