

## Original Research Article

# Relationship of diet and exercise compliance with blood sugar stability in diabetes mellitus type 2

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### ABSTRACT

**Background:** Diabetes mellitus (DM) is a health problem that has become a threat. Prevalence DM based on the symptoms increases with age. The prevalence of women tends to be higher than that of men. The purpose of this study was to look at the relationship between diet and exercise compliance with blood sugar stability.

**Methods:** This type of research is a cross sectional study carried out in the Kuranji public health center in Padang city from March to April 2020 with the sample in this study all patients with type 2 diabetes mellitus who went to Kuranji health center and did not come again in the last 3 months totaling 30 people. with the sampling technique purposive sampling. Statistical test using chi-square.

**Results:** The results of this study show that as many as (50%) of respondents obey the diet and (15%) of the respondents do not obey the diet. With the obtained value of  $p=0.021$ . while as many as (60%) of respondents obeyed sports and (40%) did not obey sports, with a value of  $p=0.018$ .

**Conclusions:** There is a relationship between diet and exercise adherence to blood sugar stability in type 2 DM patients.

**Keywords:** Adherence to diet, Obedience to sports, Blood sugar stability

### INTRODUCTION

Diabetes mellitus or commonly known as diabetes is a health problem that has become a threat. The danger is that diabetes cannot be cured and if it is not treated immediately, it will have an impact on other health problems. The increasing number of people with diabetes mellitus can cause a decrease in productivity. In addition, the costs for treatment have also increased. Therefore, it is very important to apply preventive measures. This preventive step should be included by various parties, health workers, and the government. One of the preventive steps is to introduce to the public what diabetes mellitus is, what causes, symptoms, and effects, and how to prevent and control it.<sup>1</sup>

The number of DM sufferers in the world from year to year shows an increase. Based on data from the international diabetes federation (IDF, 2014) the number of DM sufferers was 366 million in 2011, increasing to 387 million in 2014 and is estimated to increase to 592 million in 2035. According to WHO (2013) as many as 80% of sufferers DM in the world comes from developing countries, one of which is Indonesia.<sup>2,3</sup>

The phenomenon in today's life, DM is one of the non-communicable diseases that has become a serious public health problem, not only in Indonesia but also in the world, Saifunurmazah. According to Riskesdas the number of DM sufferers in Indonesia in 2018 was 1,017,290 people. The prevalence of diabetes in Indonesia, according to data from Riskesdas, DKI Jakarta

is the highest with 2.6% DI Yogyakarta reaching 2.4% and Java reaching 2.0%.<sup>4</sup>

Meanwhile, West Sumatra province is ranked 14th out of 33 provinces with a total prevalence of sufferers of 1.3%. Diabetes mellitus sufferers mostly occur in the age range of 56-64 years with a prevalence of 4.8%, this figure shows that West Sumatra is still one of the provinces in Indonesia that has the highest diabetes sufferers. This percentage should be a reference for all parties including health services to carry out proper management to reduce the number of people with diabetes, especially type 2 diabetes mellitus, where 90% of diabetes sufferers in the world are type 2 diabetes mellitus (ministry of health. Padang city with a total of 60,854 people. The number of DM sufferers who received standard services reached 33,439 patients and coverage was 54.9%.<sup>5</sup>

From data taken from the Padang city health office in 2018, the highest DM patients who received health services were Kuranji health center at 136.9%, Ikur Koto health center 100.0% and Alai health center 83.2%.<sup>5</sup>

The involvement of people with type 2 diabetes mellitus in everyday life to treat the disease they suffer is very important. Diabetics are required to carry out various arrangements related to eating, controlling blood glucose so that their metabolism can be properly controlled. Things that are felt by the handling and the high demands for doing it, such as: diet, weight management, checking blood sugar levels, and regular exercise. Diet in maintaining the food consumed is often an obstacle for people with type 2 diabetes mellitus, because they are still tempted by all forms of food that can worsen health, this is also balanced with regular exercise because they feel lazy in themselves. The things that have been mentioned are what make them disobedient.<sup>7-9</sup>

The initial survey conducted by researchers at the Kuranji health center on February 18, 2020, of 10 people with type 2 diabetes with interview techniques obtained 6 out of 10 respondents who had not fully exercised and had a perfect diet. The purpose of this study was to see the relationships of diet and sport compliance with blood sugar stability in diabetes mellitus type 2.

Based on the description of the data above, the researcher has conducted research on the relationship between diet and exercise adherence to blood sugar stability in diabetes mellitus sufferers at the Kuranji health center, Padang city in 2020.

## METHODS

This research is quantitative with an analytic approach with a cross sectional research design. Research has been at Lakukan in Puskesmas Kuranji Padang in year 2020. The research is implemented in March-April

2020. The population in this study were all patients with type 2 diabetes mellitus who numbered 30 people. The sampling technique in this study was purposive sampling. This method used inclusion criteria in this study type 2 DM patients who visited the health center in 2019 and did not come again for the last 3 months. This study used a questionnaire. Data processing used bivariate and univariate analysis to see the relationship between diet and exercise adherence to blood sugar stability in type 2 diabetes mellitus patients in the working area of Kuranji health center, Padang city, so a statistical significance test was carried out using the chi square test.

## RESULTS

Based on Table 1 there were 15 respondents (50, 0%) in the category of devout diet and 15 other respondents (50, 0%) in the category disobedient diet. Based on Table 2, there were 18 respondents (60, 0%) who were in the sport's obedient category and 12 other respondents (40, 0%) were in the sport's disobedient category. Based on the Table 3 there were 11 respondents (36, 7%) in the category of blood sugar stable and 19 other respondents (63, 3%) in the category of blood sugar is not stable. Based on Table 4 above, it can be seen that of the 15 people who adhere to a diet as many as 9 people (60.0%) have stable blood sugar and 6 people (40.0%) have unstable blood sugar. And of the 15 people who were not following the diet, 2 (13.3%) had stable blood sugar and 13 (86.7%) had unstable blood sugar. The results of statistical tests using the chi-square test obtained a value of p value =0.021 because p value of <0.05, it is said that there is a relationship between dietary adherence and blood sugar stability in patients with DM type 2 in the working area of Kuranji health center, Padang city. Based on Table 5 above, it can be seen that of the 18 people who obeyed sports, 10 (55.6%) had stable blood sugar and 8 (44.4%) had unstable blood sugar. And of the 12 people who did not obey sports, 1 person (8.3%) had stable blood sugar and 11 people (91.7%) had unstable blood sugar. The results of statistical tests using the chi-square test obtained p value=0.018 because p value of <0.05, it is said that there is a relationship between exercise obedience and blood sugar stability in patients with DM type 2 in the working area of Kuranji health center, Padang city.

**Table 1: Distribution of diabetes mellitus client diet compliance frequency in the working area of the Kuranji health center, Padang city.**

Diet	Frequency	Percentage (%)
Follow a diet	15	50.0
Not following a diet	15	50.0
Total	30	100.0

**Table 2: Distribution of diabetes mellitus clients' exercise compliance frequency in the working area of the Kuranji health center, Padang city.**

Sports	Frequency	Percentage (%)
Obey sports	18	60.0
Not obedient to sports	12	40.0
<b>Total</b>	<b>30</b>	<b>100.0</b>

**Table 3: Blood sugar frequency distribution of diabetes mellitus clients in the working area of Kuranji health center, Padang city.**

Blood sugar	Frequency	Percentage (%)
Stable	11	36.7
Unstable	19	63.3
<b>Total</b>	<b>30</b>	<b>100.0</b>

**Table 4: The relationship between diet adherence and blood sugar stability in clients with diabetes mellitus in the working area of the Kuranji public health center, Padang city.**

Diet	Diet adherence				Total		P value
	Stable		Unstable		F	%	
	F	%	F	%			
Stick to a diet	9	60.0	6	40.0	15	100	0.021
Not following a diet	2	13.3	13	86.7	15	100	
<b>Total</b>	<b>11</b>	<b>36.7</b>	<b>19</b>	<b>63.3</b>	<b>30</b>	<b>100</b>	

**Table 5: The relationship between exercise obedience and blood sugar stability in diabetes mellitus clients in the work area of Kuranji health center, Padang city.**

Sports	Diet adherence				Total		P value
	Stable		Unstable		F	%	
	F	%	F	%			
Obey sports	10	55.6	8	44.4	18	100	0.018
Not following sports	1	8.3	11	91.7	12	100	
<b>Total</b>	<b>11</b>	<b>36.7</b>	<b>19</b>	<b>63.3</b>	<b>30</b>	<b>100</b>	

## DISCUSSION

### *The relationship between diet compliance and blood sugar stability in diabetes mellitus clients*

Based on research conducted found statistical test  $p=0.021$  significant  $p<0.05$  so that it can be concluded that there is a significant relationship anta ra adherence to a diet with a stable blood sugar in patients with type 2 diabetes Kuranji Puskesmas Padang 2020.

The results of this study are in line with and strengthen previous research conducted by Ren entitled the relationship of dietary adherence to blood sugar levels while in type 2 diabetes mellitus patients in hospitalized RSUD Sukoharjo concluded that showed a significant relationship between dietary adherence and measured glycemic control. with FBS (fasting blood sugar) with a value ( $p=0.001$ ).<sup>10</sup>

A person is said to have diabetes mellitus if they have been diagnosed with diabetes mellitus by a doctor or experience symptoms of easy hunger, frequent thirst and urination, their body weight has dropped dramatically without any reason, and their blood sugar levels are above normal limits based on examination. High levels of blood sugar over a long period of time can damage several body systems, such as blood vessels, heart, kidneys, eyes resulting in blindness, kidney failure, nerve damage (stroke), and death. Death due to this disease is also quite large, even the risk of death is twice as big as that of non-diabetes mellitus sufferers.<sup>11</sup>

Researchers assume that some of the respondents who have stable blood sugar are respondents who carry out a diet with good dietary adherence such as eating on time, eating the appropriate portion for DM sufferers, not consuming foods that contain lots of sugar and replacing regular sugar consumption with other alternative sugars such as Tropicana or Diabetasol. because adherence to a person's diet greatly affects the stability of blood sugar in patients with DM type 2. From the results of the study, it appears that many respondents ignore the dietary recommendations that have been set, such as eating 3x a day but not at the same time and at the same time interval. Some respondents also eat in excess, because maybe the respondent's heavy work factors such as laborers and farmers require a fairly large portion of food.<sup>12,13</sup>

Types of food that do not vary is also not a healthy diet. The types of food you need to know are sources of carbohydrates, animal protein, vegetable protein, vegetables, fruit, and milk. Each type of food contains different main nutritional values and all nutrients should be met according to our needs. These foods that are high on the glycemic index, high in fat, and salt can increase the risk of diabetes. Foods that contain a high glycemic index include white rice, donuts, cupcakes, watermelon, burgers, pizza, jelly beans, chips, and pancakes.<sup>14,15</sup>

Based on the research, it was found that there was a correspondence between the theory and the results obtained, where people who had diabetes turned out to have the habit of not being obedient to the DM diet.

### *The relationship between exercise obedience and blood sugar stability in diabetes mellitus clients*

Based on research conducted with a statistical test, the  $p=0.018$  means  $p<0.05$ , so it can be concluded that there

is a significant relationship between exercise obedience and the stability of virgin sugar in type 2 diabetes mellitus sufferers in the Kuranji health center, Padang city in 2020.

The results of this study are in line with and strengthen previous research conducted by Syarifah entitled the relationship between diet and exercise adherence to blood sugar levels in the internal medicine polyclinic of RSUD Kab Siak concluded that there was a relationship between exercise and blood sugar levels in DM patients with a  $p=0.010$ . It can be concluded that not exercising can affect changes in sugar levels.<sup>16-19</sup>

Exercise is very useful for controlling blood sugar levels and preventing complications. Exercise in diabetics must be done with due observance of the principles of CRIPE and FIDT. CRIPE principles include continue, rhythmic, interval, progressive, endurance. While the principles of FIDT are paying attention to frequency, intensity, duration/time, and type. Safety and security during sports are aimed at preventing injury and hypoglycemia. Sports are not concerned with weight but more concerned with the type of sport chosen and the regularity of its implementation.<sup>20-22</sup>

Researchers assume that most of the respondents who suffer from DM are women because maybe women have more activities than men. Women do many activities at home as housewives and outside the home. Some women also work to earn a living, while men have more free time than women. Women are tired of doing work as housewives, of course they prefer to use their spare time to rest instead of exercising.<sup>23-25</sup>

## CONCLUSION

There is a significant relationship between exercise obedience and stability in patients with type 2 diabetes in the work area of the Kuranji health center, Padang city, 2020.

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