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The effectiveness Self-ACU yoga towards fasting blood sugar levels in type ii diabetes mellitus patients

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ABSTRACT

Background

Diabetes mellitus is a metabolic disease characterized by an increase in blood sugar levels (hyperglycemia). Type II diabetes mellitus can cause various complications such as hypertension, stroke, kidney failure, coronary heart disease, retinal damage and long-healed wounds leading to amputation especially in the legs. To reduce the complications caused by type II diabetes mellitus, it needs to be done conservatively, one of them is Self-Acu Yoga. Self Acu-Yoga which is a combination of breathing, relaxation and meditation techniques can stimulate the pancreas to increase the ability of the pancreas to produce insulin so that it can reduce blood sugar levels.

Method

The type of research used is Quasy Experiment with a pretest-posttest control group design. This study arranged two groups, namely the intervention group and the control group. Technique Non probability sampling with purposive sampling method was used to get 32 respondents divided into 2 groups. The intervention group was given Self Acu-Yoga, while the control group was given acupressure 3 times a week for 4 weeks.

Result

The result Paired t test showed a p-value value 0.001 which indicates that there are significant differences between the intervention and control groups.

Conclusion

The results of study after being given an intervention that there was a decrease in fasting blood sugar levels in patients who received Self-Acu Yoga, so that this action was effectively implemented for patients who experienced increased blood sugar levels, especially in patients with type II diabetes mellitus.

Keywords: *Self-Acu Yoga, Fasting Blood Sugar Levels, Type II Diabetes Mellitus.*

INTRODUCTION

Diabetes mellitus is a metabolic disease characterized by an increase in blood sugar levels (hyperglycemia) which occurs due to abnormalities in insulin secretion, insulin action or both. [1] According to the WHO (World Health Organization) people with diabetes mellitus in the world will double by 2030. Data on the incidence of diabetes mellitus in 2014 amounted to 9.1 million and to 14.1 million in 2035. WHO predicts an increase in the incidence of diabetes mellitus in Indonesia in 2000 as many as 8.4 million and in 2030 to 21.3 million. [2, 3]

IDF data (International Diabetes Federation) in 2017 that the incidence of diabetes mellitus as many as 451 million people and will continue to increase until 2045 is estimated at 693 million people. [4] The results of basic health research (Riskesdas) in 2013 stated that the prevalence of diabetes mellitus in residents aged ≥15 years was 6.9% while in 2018 there was an increase of 8.5%. [5]

The incidence of diabetes in Indonesia from year to year continues to increase Indonesia has now occupied the fourth position with the highest number of diabetics after the United States, China and India. Diabetics will be found with various symptoms such as polyuria, polidipsi and polyphagia. In patients with type II diabetes mellitus there is an increase in resistance to the effects of insulin, where insulin resistance is the main sign of type II diabetes mellitus. [6]

Type II diabetes mellitus can cause various complications such as hypertension, stroke, kidney failure, coronary heart disease, damage to the retina of the eye which can cause blindness, cataracts, impaired liver function, and wounds that are long healed resulting in an infection that leads to amputation especially in the legs. [7] To reduce complications caused by type II diabetes mellitus, conservative treatment needs to be carried out including education, diet management, physical activity and pharmacological therapy. Besides alternative medicine that can be done for people with diabetes mellitus, namely yoga, hypnotherapy, cupping and acupressure. [8, 9]

Acupressure is a traditional Chinese therapy that is believed to help the healing process of the disease. Acupressure is a derivative science of acupuncture, where acupressure is a term used to provide stimulation (stimulation) using the hands or fingers with compression techniques, massage and sequencing along the body's meridians or energy flow. [10]

The results of Robiul's study of the effect of acupressure therapy on blood sugar levels of type II diabetes mellitus patients were carried out in the internal medicine clinic at the hospital Dr. Soedjono Magelang found that acupressure therapy had an effect on reducing blood glucose levels in patients with type II diabetes mellitus. [11] Acupressure can activate glucose-6 phosphate (one of the enzymes that play a role in carbohydrate metabolism) that has an effect on the hypothalamus, so it can stimulate the pancreas to increase insulin synthesis, increase the number of receptors on target cells and accelerate glucose utilization to reduce blood glucose levels. [12]

To prevent the occurrence of these complications, four pillars of the management of diabetes mellitus can be done, one of which is physical exercise. Physical exercise with yoga is useful for reducing blood chemistry, losing weight, reducing blood sugar, cholesterol and improving sensitivity to insulin. Intan's research on the effect of yoga exercises on blood glucose and cholesterol levels in patients with type II diabetes mellitus showed that yoga exercises can have a good influence on reducing blood chemistry. [13]

Yoga and acupressure have different working mechanisms, acupressure provides stimulation at the point acupoint so that it can stimulate the glycogen (yin) and insulin (yang) hormones when yin and yang in the body are balanced so it can affect blood sugar levels while yoga works by giving a relaxing effect in the body by stimulating the release of endorphins. Endorphrine hormones cannot be stimulated by acupressure because of the different working mechanisms. Acupressure and yoga are combined to get results that are more effective in reducing fasting blood sugar levels, blood pressure and total cholesterol.

The combination of acupressure at points SP 3, SP 6, LV 3 and ST 40 and yoga is called Self Acu-Yoga, Self Acu-Yoga is a breathing control technique with a specific body position then continued by stimulating theat the acupoint meridian lines of the body to balance vital energy body. [9, 14]

Self Acu-yoga which is a combination of breathing, relaxation and meditation techniques can stimulate the pancreas to increase the ability of the

pancreas to produce insulin so it can reduce blood sugar levels and can stimulate the release of endorphins which can only be produced when the body relaxes in a relaxed state blood vessels become elastic so that blood circulation smoothly has an effect on decreasing blood pressure. [14]

METHODS

The type of this study used research Quasy Experiment with a pretest-posttest control group design. The researcher arranged two groups, namely the intervention group given the Selft-Acu Yoga action and the control group was given acupressure. Measuring fasting blood sugar levels of respondents using an digital blood sugar measuring instrument using easy touch the Kiosherbalku KH89 model which is done 12 times, the intervention group was given Self Acu-Yoga 3 times a week for 4 weeks, then the control group was given acupressure 3 times a week for 4 weeks.

The population in this study were all subjects with type II diabetes mellitus who received out patient treatment at the Puskesmas Srondol Semarang in Central Java. Determination of the minimum number of samples using techniques non-probability sampling with purposive sampling method and based on inclusion and exclusion criteria as many as 32 respondents divided into 2 groups with each of the 16 respondents in the intervention group and 16 respondents in the control group.

In this study researchers conducted data collection by observing, identifying, interviewing and filling out the questionnaire. The collected data was analyzed through the IBM SPSS program version 21.0, and continued with a different test namely parametric test (Paired T test). The processed data is used as the basis for discussing problem statements, which are then presented in table form so conclusions can be drawn.

RESULTS

Table 1 Frequency distribution of respondents in the intervention group and control based on demographic characteristics (n=32)

Characteristics	Interventions		Control		P value
	N	%	N	%	
Gender					
1. Male	3	18.8			<0.000*)
2. Female	13	81.8	16	100	
	Mean	SD	Mean	SD	
Age	58.50	4.953	60.25	3.215	0.91**)

*) chi square **) t-test

Table 1 shows that the average age of respondents was 58.50 years intervention group and the control group 60.25 years. The sex of the most respondents is women as many 29 (90.625%) people and male respondents as many as 3 (9.375%) people.

Table 2 Effectiveness of Self-Acu Yoga on fasting blood sugar levels in the intervention group and control group

Variable GDP	Pre Test	Post Test	Δ	P
	Mean (SD)	Mean (SD)		
Intervention	218.25 (±46.313)	125.38 **(**±24.116)	92.875	0.0001
Control	222.75 (±34.522)	186.50 **(**±30.202)	36.250	0.0001

* Paired T test

From table 2 above, shows a decrease in blood sugar levels in the intervention group and the control group after treatment, the intervention and control groups before and after treatment showed a

significant value 0.0001. The decrease in fasting blood sugar levels was more in the intervention group with the mean value before giving Self Acu-Yoga amounting to 218.25 after 12 times conducted mean values was the Self-Acu Yoga 125.38 mg/dL, while in the control group the mean value before acupressure is 222.75 after 12 times acupressure, the mean value was 186.50 mg/dL.

DISCUSSION

Characteristics Respondents

The results of the study showed that the age of the respondents was in the range of 46 years to 64 years, obtained the results of statistical tests on the mean age value of respondents is 59.38 years. According to Irawan, the older a person, the higher the risk of developing type II diabetes mellitus. Someone aged 26-35 years has a risk of 2.32 times, the age of 36-45 years has a risk of 6.88 times, and the age of more than 45 years is at risk of 14.99 times when compared to the age group 15-25 years. In addition, the majority of respondents were women at 90.6%, the high incidence of diabetes mellitus in women was due to differences in body composition and differences in sexual hormone levels between women and men. Women have more adipose tissue than men, this can be seen from the difference in normal fat levels between male and female adults where in men it ranges from 15-20% while in women it ranges from 20-25% of the weight body. [15]

The results of a study conducted by Isviyanti found that the age group with the most diabetes mellitus was between 51-55 years of age because this age began to increase glucose intolerance. [16] In a person aged 40 years and over, the aging process begins which is significant with a decrease in physiological conditions that decline rapidly so that the ability of pancreatic β cells is reduced in producing insulin. [17] In older individuals there is a decrease of 35% mitochondrial activity in muscle cells associated with an increase in fat levels in muscle cells by 30% and trigger insulin resistance. This is in line with Musmuliadin's research that with increasing age the ability of tissues to take glucose in the blood decreases. [18]

Women are also more susceptible to diabetes mellitus, although some studies reveal that women pay more attention to health and more health services than men, this is caused by different hormonal factors in the body and also more men doing activities or exercise so that the body is able to maintain the stability of blood glucose levels in the body. [18]

Diabetes mellitus is more common in women aged 40-70 years, where as in men it occurs more at a younger age. This is triggered by hormonal fluctuations during the monthly cycle syndrome (pre-menstrual syndrome) and post-menopause in women which make the distribution of fat easily accumulate in the body so that the body mass index (BMI) increases with a higher percentage of fat which ranges from 20-25% from total body weight and high LDL levels compared to men who generally have 15-20% of the amount of fat from total body weight. This condition results in a decrease in sensitivity to the workings of insulin in the muscles and liver, consequently women have a risk factor for the occurrence of DM 3-7 times higher. [19]

Effectiveness Self-Acu Yoga on fasting blood sugar levels in the intervention group and control group

The results of the research conducted on patients with type II diabetes mellitus with hypertension and cholesterol showed a p value of 0,0001 which means that was H_a accepted and H_o rejected, meaning that Self Acu-yoga was carried out in the intervention group for 30 minutes and continued with emphasis on 4 points, namely SP 3, SP 6, LV 3 and ST 40 for 2-3 minutes at one point 3 times a week for 4 weeks can reduce fasting blood sugar levels in patients with type II diabetes mellitus.

The intervention of fasting blood sugar levels in the intervention group was seen from the mean value before treatment, which was 218.25 mg / dL after intervention for 4 weeks. The mean value changed to 125.38 mg / dL.

Self Acu-Yoga which is a combination of breathing, relaxation and meditation techniques can stimulate the pancreas to increase the ability of the pancreas to produce insulin so that it can reduce blood sugar levels. Research conducted by Malhotra states that there is a significant reduction in fasting blood sugar levels with yoga causing the muscles to absorb excess glucose in the blood. Yoga helps the pancreas and liver to function effectively, by regulating blood sugar levels. [20, 21]

Movements Self Acu-Yoga is the new movements that aim to stimulate the function of the pancreas. The function of these movements will increase blood flow to the pancreas, rejuvenate organ cells and increase the ability of the pancreas to produce insulin. [19, 21]

Self Acu-Yoga works by giving a relaxing effect on the body by stimulating the release of endorphins. Endorphrine hormone was not able to be stimulated with acupressure so that in the control group there was a decrease in fasting blood sugar levels but not as much as in the intervention group. Fihayati's research on acupressure therapy at the meridian points can make the body feel comfortable, improve blood circulation and improve insulin secretion function. [22]

When the body is relaxed there is a change in nerve impulses on the afferent pathway to the brain where activation becomes inhibition. This change in nerve impils can cause feelings of being calm both physically and mentally such as reduced heart rate, decreased speed of the body's metabolism in this case preventing an increase in blood glucose. In addition, the anterior pituitary is inhibited so that ACTH which secretes cortisol decreases so that the process of gluconeogenesis, protein catabolism and fat which play a role in increasing blood glucose also decreases. [12, 23]

Test results in the control group show p value of 0.0001 which means that H_a is accepted and H_o rejected. It can be concluded that acupressure at 4 points is SP 3, SP 6, LV 3 and ST 40 for 2-3 minutes at one point 3 times a week for 4 weeks can reduce fasting blood sugar levels. This can be seen in the mean value before treatment 222.75 mg/dL after acupressure fasting blood sugar levels were also changed with a mean value of 186.50 mg/dL.

According to research Nakamura explains that acupressure can activate glucose 6 enzymes phosphate (one of the most important enzymes in carbohydrate metabolism) that has an effect on the hypothalamus, so it can stimulate the pancreas to increase insulin synthesis, increase the number of respectors in target cells and accelerate glucose utilization so as to reduce blood glucose levels. [24]

The results of the Musmuliadin study showed that acupressure can reduce blood sugar levels through massage at the meridian points which can trigger a calming and arousing response in the body, have a positive effect on emotions, cause relaxation and normalization of bodily functions. [18]

Pressing the meridian points as high as the pancreatic organs will increase insulin secretion function and cause blood glucose levels to be controlled systemically while improving hemodynamics. Acupressure can stimulate the release of neurotransmitters that carry signals along the nerves or through glands that then activate the hypothalamus gland under the brain of the adrenal axis to regulate the function of the endocrine glands. This is in accordance with Fitrullah's research. It was found that acupressure was effective in reducing blood sugar levels for patients with diabetes mellitus. [25]

CONCLUSION

The provision of interventions Self Acu-Yoga for 30 minutes and continued with emphasis on 4 points namely SP 3, SP 6, LV 3 and ST 40 for 2-3 minutes at one point 3 times a week for 4 weeks in patients with type II diabetes mellitus effective against decreasing fasting blood sugar levels with a mean value after 12 times treatment is 125.38 mg/dL, value Δ 92.875 and value p 0.0001.

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