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THE USE OF TRADITIONAL DHSP BALI YOGA AND MEDITATION PRACTICES ON REDUCING BLOOD GLUCOSE LEVELS

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ABSTRACT
The practice of yoga and meditation at Dharma Hidup Singin Prana Bali has a deep meaning in maintaining physical and mental balance, as well as supporting mental health in the midst of the dynamics of modern life. Yoga has been shown to be effective in helping to manage blood sugar levels through meditation and yoga practices. This study uses quantitative research methods, specifically using a quasi-experimental design with pre-test and post-test, to assess the results before and after the intervention for the purpose of evaluating blood sugar levels from the results of yoga and meditation exercises. Descriptive analysis of 32 samples showed that the mean glucose values after the intervention showed a decrease. Statistical analysis of Kolmogorov-Smirnov pre-test with P = 0.183 data showed normal and homogeneous distribution. The test of the difference in the results of the pre-test and post-test research using the Paired sample T-test analysis with 95% confidence showed significance = **0.000** Because the significance result of 0.000 which means < 0.001 where 0.001<0.05 so that there is a statistically significant difference. Traditional Dhsp Bali yoga and meditation exercises involving breathing exercises, postures and Yoga have been shown to be effective against the balance and decrease of glucose levels in the blood

Keywords: Meditation, Traditional Yoga, Blood Glucose During

Introduction

Healthy management of blood glucose levels is essential for maintaining body function, especially for individuals with diabetes. Blood glucose is the level of sugar in the blood that is a source of energy in the body. After eating, blood sugar rises, called postprandial blood sugar. Monitoring these levels is important, especially for people with diabetes, to prevent complications. According to the latest data from the Ministry of Health (Kemenkes) through the 2023 Indonesian Health Survey (SKI) report, the prevalence of diabetes mellitus in Indonesia in the population aged 15 years and over reaches 11.7%. This figure increases compared to data from Basic Health Research (Riskesdas) 2018, which recorded a prevalence of 10.9%. Glucose monitoring technology now makes it easier to monitor and detect changes in sugar levels early. This monitoring helps determine the need for medication or lifestyle changes, such as diet or

physical activity. For diabetics, keeping blood glucose levels within normal limits can prevent long-term complications. Additionally, continuous monitoring technology provides real-time data, allowing for a faster response to blood sugar levels that are too high or too low. (Pugle, 2024)

The Ministry of Health of the Republic of Indonesia shows that traditional medicine in Indonesia continues to develop with efforts to integrate into the national health service system (Ministry of Health of the Republic of Indonesia, 2023). Law Number 36 of 2009 mentions traditional medicine as part of 17 comprehensive health efforts, providing a strong legal foundation for the development and implementation of traditional medicine in Indonesia. There are many ways and methods to control and regulate blood glucose, one of which is by applying Yoga practice.

Yoga, which originated in India, is a holistic practice that has existed since around 3000 BC. As a blend of breathing exercises (pranayama), physical postures (asanas), and meditation, yoga aims to harmonize the body, mind, and emotions in order to achieve physical, emotional, and spiritual well-being. Since ancient times, yoga has been used in daily life by many Indian societies. In the last two decades, interest in evaluating the role of yoga in non-communicable diseases has been growing. Yoga has been shown to have a positive impact on mental health, stress reduction, and musculoskeletal and cardiovascular function. (Dutta et al., 2021)

Apart from India, yoga has also begun to develop and spread throughout the world. One of them is in Bali, there is a community called Dharma Hidup Singin Prana (DHSP) Bali. Yoga and meditation have been widely recognized as beneficial health practices in supporting physical and mental balance. Dharma Hidup Singin Prana (DHSP) Bali is a form of traditional yoga and meditation that integrates breathing exercises, postures, as well as spiritual elements to improve the quality of life. Amid the increasing prevalence of metabolic diseases such as diabetes mellitus, lifestyle-based interventions, including yoga and meditation, are a major concern in efforts to manage blood sugar levels. Some studies suggest that yoga and meditation can affect endocrine function and improve insulin sensitivity, ultimately lowering blood glucose levels. However, specific research evaluating the effectiveness of traditional DHSP Bali yoga on blood glucose levels is still limited. (Setiabudi, 2024)

Research Methods

Yoga and Meditation

Before the implementation of the research, participants were given education about the research process the day before and explained about the practice of Yoga DHSP Bali and the benefits of meditation that will be carried out. Before starting the activity, participants were instructed to eat breakfast, calorie intake adjusted to energy needs of about 500 calories 1-2 hours before participating in research activities. After that, participants were given instructions to carry out research before the pre-test test began. Blood glucose level measurements are carried out using a glucometer and recorded in a study form. Next, participants performed a full cycle of meditation and yoga DHSP Bali which involved a series of exercises. After the yoga and meditation sessions are over, blood glucose measurements are done again using a glucometer to see changes in blood sugar levels.

Research Design

The type of research used in this study is quantitative research. Quantitative research is a method that uses a systematic, planned, and well-structured approach from the initial stage to the design of the research. Data analysis in quantitative research is quantitative and statistical, with the main goal of testing predetermined hypotheses. The research design used is *Quasi-Experimental Design* with a pre-test and post-test approach. In this study, the initial stage serves as a control evaluation, which allows for a comparison of the results of the experiment after the intervention. The population studied was all participants in the DHSP Bali Yoga and Meditation community. With inclusion criteria, members who attend on time and agree to fully participate in the research process. The exclusion criteria are members who do not come and do not fully participate in the research process.

Data Analysis

The data analysis method used in this study is statistical analysis, which is carried out using the software *Statistical Package for Social Science* (SPSS) computer application. This study uses a descriptive statistical test to describe the data obtained and an inferential statistical test which is useful to see the research data conducted on a sample whose results can be used in the population. The normality and homogeneity of the data used the Kolmogorov-Smirnov statistical test. The difference test used the Paired sample T-Test to test the difference in the significance of the evaluation results before and after the treatment statistically.

Ethical considerations

This research has been approved by the Research Ethics Committee of the Faculty of Dentistry, Mahasaraswati University, Denpasar with Number: K.911/A.17.01/FKG-Unmas/XI/2024

Results and Discussion

The respondent criteria in this study were all participants in the DHSP Bali Yoga and Meditation community who followed the research process fully and on time (Table 1).

Gender	Total	Percentage (%)
Man	16	50
Woman	16	50
Total	32	100

Table 1 Gender Characteristics of Respondents

Descriptive analysis provides an overview of the basic characteristics of patients and the frequency distribution of various variables (Table 2).

Blood Sugar (mg/dL)	Pre-test (Person)	Post-test (Person)
<100	11	20
100-120	13	5
>120	8	7

Average	114,34	101,63

Table 2 Descriptive Analysis Before and After Evaluation

The Kolmogorov-Smirnov *homogeneity normality test* obtained a value of P = 0.183 which was carried out in this study showing that the data were normally distributed. the researcher used the T-test Sample Test for statistical analysis to assess the difference in pre-test and post-test scores. The results of parametric statistical analysis showed significant differences. The obtained p-value is less than 0.05 ($p < 0.05$), exactly equal to 0.000, which indicates a statistically significant difference.

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 PRETEST - POSTEST	12.719	13.240	2.341	7.945	17.492	5.434	31	.000

Table 3 Paired Sample Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Perbedaan	.130	32	.183	.950	32	.148

a. Lilliefors Significance Correction

Table 4 Normality Test

DISCUSSION

Factors Causing Glucose Decline and Yoga Collaboration Mechanism in Optimizing Body Performance

Decreased blood glucose levels are often associated with increased parasympathetic nerve activity that reduces stress hormones such as cortisol and adrenaline. Yoga movements that involve stretching, strengthening, and coordinated breathing can stimulate the body's metabolic processes. For example, certain asanas (yoga postures) can improve blood circulation, which serves to transport oxygen and nutrients to various body tissues, including muscles and other metabolic organs. This physical activity increases the use of glucose by the muscles and reduces blood sugar levels (Ramamoorthi et al., 2019). Yoga, in particular with *pranayama* exercises and postures such as *padmasana,* helps reduce physiological stress and improve insulin sensitivity through the following mechanisms:

1. Deep breathing exercises *(Pranayama)* increases tissue oxygenation and reduces systemic inflammation. (Setiabudi, 2024)
2. Activation of the parasympathetic nervous system during yoga lowers levels of stress

hormones, helping to optimize glucose regulation. (Chang et al., 2016)

In the practice of yoga DHP Bali, using body movements that resemble yoga movements in general, instantly in one cycle is enough to have a significant impact. Instant physical movements such as intense, short workouts can activate metabolic pathways that regulate glucose quickly. Physical exercise increases the activity of enzymes involved in glucose metabolism, which helps reduce blood sugar levels in a relatively short time. This happens because exercise increases the use of glucose by active muscles, which increases the overall metabolic efficiency of the body (Deichman et al. 2023).

Mechanism of Yoga Collaboration with *Pranayama* and *Padmasana*

Yoga holistically combines physical, mental, and spiritual exercises to optimize bodily function. This is found in the concept of traditional meditation and yoga of DHSP Bali which involves mental control patterns and positioning postures. In the context of the treatment of chronic low back pain and decreased blood glucose:

Pranayama:

a. Practicing respiratory control through three main stages (*Puraka, Kumbhaka, Recaka)* which affects the balance of the nervous system and improves blood circulation. (Setiabudi, 2024)
b. Helps reduce psychological stress, which plays a role in lowering blood glucose levels through stress reduction. (Chang et al., 2016)

Padmasana:

a. Improve posture and relieve pressure on the spine, and reduce back pain. (Setiabudi, 2024)
b. This position also increases the flow of energy (prana) through the body's chakras, harmonizing the body's systems to support metabolic balance. (Setiabudi, 2024)

Implications for the Treatment of Low Back Pain and Glucose Reduction

Studies show that yoga is effective in reducing chronic low back pain by:

a. Improves flexibility, balance, and muscle strength, especially in the back area.
b. Reduces anxiety and depression, which are often associated with chronic pain. (Chang et al., 2016)
c. Yoga exercises such as *padmasana* helps maintain spinal alignment, while *Pranayama* supports muscle relaxation. (Setiabudi, 2024)

Yoga combinations that involve *Pranayama* and *padmasana* Not only does it help reduce chronic lower back pain through improved flexibility and posture, but it also reduces metabolic stress that contributes to high glucose levels. Systematic research supports that yoga has anti-inflammatory effects and effectively modulates stress hormone responses. (Setiabudi, 2024)

Mechanism of Elevated Glucose While can occur due to Increased Adrenaline

Elevated glucose levels are the body's metabolic response to physiological or psychological stress. This condition is often mediated by the release of the hormone adrenaline (epinephrine) from the adrenal medulla as part of the *"fight or flight" response system.*This mechanism is important for ensuring the rapid availability of energy for the body's tissues that

need it, especially skeletal muscles and the brain, during periods of acute stress.

1. **Stress Stimulus and Sympathetic Activation**

When the body encounters stressors, the sympathetic nervous system is activated, causing the adrenal medulla to release adrenaline into the blood circulation. (Zheng et al., 2019)

2. **Glycogenolysis and Gluconeogenesis**
    a. Adrenaline stimulates the liver to break down glycogen into glucose through the process of glycogenolysis.
    b. Simultaneously, adrenaline increases the production of new glucose through gluconeogenesis from non-carbohydrate precursors such as lactic acid and amino acids. (Zhu, An, et al., 2020)
3. **Insulin Release Inhibition**

Adrenaline also inhibits insulin secretion from the pancreas, reducing the absorption of glucose by non-essential peripheral tissues, so more glucose is available in the bloodstream. (Marciniak et al., 2020)

4. **Increased Lipolis**

In addition to the direct effect on glucose metabolism, adrenaline breaks down triglycerides in adipose tissue into free fatty acids, which can be used as an alternative energy source, thus supporting the efficiency of energy metabolism. (Zhu, Li, et al., 2020)

After a momentary increase in glucose, glucose will drop. This decrease in glucose levels occurs because by doing physical activity, insulin sensitivity will increase, glucose will be brought into cells to be metabolized into ATP or energy so that blood glucose levels will decrease (Little et al, 2011). In addition, physical activity will also increase glucose uptake into cells to be stored in the form of glycogen in the liver and improve blood sugar control (Kurniawan & Wuryaningsih, 2016). Heavier yoga activities will lower blood glucose levels faster because the intensity of physical activity increases, the body will use more carbohydrates as fuel for muscle work so that there is an increase in glucose absorption into the muscles which lasts for several hours after the activity. This moderate-intensity yoga activity also increases insulin sensitivity to carry glucose into cells and will lower HbA1C levels (Van Djik et al, 2013)

Yoga Collaboration with Pranayama and Padmasana Techniques

Yoga, especially through the practice of *pranayama* and *padmasana techniques,* can play a role in reducing the hyperactivation response of adrenaline and optimizing the regulation of blood glucose levels.

***Pranayama* (Breath Regulation):**

This technique stimulates the parasympathetic nervous system, reduces the release of adrenaline, and improves blood glucose control. Techniques such as *Anulom* and *ujjayi* helps lower oxidative stress and improves insulin sensitivity. (Setiabudi, 2024)

Padmasana (Lotus Pose)

This meditation position affects the body's energy center *(chakra)* to improve hormonal balance, including stabilizing cortisol and adrenaline levels. *Padmasana* Supports good posture, improves blood circulation, and supports liver activity in metabolic regulation. (Hosakote, 2023)

Conclusion

Yoga and traditional meditation Dharma Hidup Singin Prana (DHSP) Bali have significant effectiveness in lowering blood glucose levels. The results of this study were supported by quantitative data that showed a decrease in the average glucose level from 114.34 mg/dL to 101.63 mg/dL after the intervention. The use of quasi-experimental methods with pre-test and post-test designs strengthens the validity of the findings. This decrease in blood glucose levels can be explained through physiological mechanisms such as increased insulin sensitivity, reduction of stress hormones, and increased body metabolism through structured yoga practice. The weakness of this study without a control group limits the ability to draw causal conclusions. The sample population is limited to a specific yoga community, so the generalization of the results of the study is limited. Future research suggestions need to conduct studies with control groups to compare the effects of yoga with other interventions. Consider evaluating the long-term impact of yoga and meditation on other metabolic parameters, such as HbA1c

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