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Autogenic Relaxation Therapy In Controlling Blood Sugar Levels Of Patients With Type 2 Diabetes Mellitus

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Abstract. Diabetes mellitus (DM) is one of the global health problems whose prevalence continues to increase so that if not controlled it can cause serious complications, such as retinopathy, nephropathy, neuropathy, and cardiovascular disease. The purpose of this study was to analyze the effect of autogenic relaxation on reducing blood sugar levels in patients with type 2 diabetes. The research method used is pre-experimental with a one-group pre-test post-test design approach and the sampling technique is accidental sampling. The research sample was all type 2 DM patients who were treated at Batara Guru Belopa Hospital as many as 30 people. The results of the study found that the average value of blood glucose levels in patients with type 2 DM before autogenic relaxation intervention was 257.50 mg/dl and after autogenic relaxation intervention was 192.27 mg/dl. The results of statistical tests using the Wilcoxon test are known as p = 0.000 so it is concluded that there is an effect of autogenic relaxation techniques with a decrease in blood sugar levels in patients with type 2 diabetes. Therefore, it is recommended that autogenic relaxation be a form of independent nursing intervention for a nurse in providing nursing care to patients with type 2 diabetes.

Keywords: Autogenic Relaxation, Blood Sugar Levels, DM Type 2

INTRODUCTION

Diabetes Mellitus (DM) is a chronic disease that occurs when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin produced [1]. DM is one of the global health problems whose prevalence continues to increase from year to year. According to the International Diabetes Federation (IDF) report in 2021, more than 537 million adults in the world are living with diabetes, and this number is expected to increase to 783 million by 2045. Type 2 diabetes mellitus, which accounts for more than 90% of diabetes cases, is a chronic condition characterized by insulin resistance and impaired insulin secretion, ultimately leading to chronic hyperglycemia [2,3]. If not controlled, type 2 DM can lead to serious complications such as retinopathy, nephropathy, neuropathy, and cardiovascular disease [4].

In Indonesia, the prevalence of DM shows a significant increasing trend. Based on data from the Ministry of Health of the Republic of Indonesia (2018), the prevalence of DM diagnosed by doctors increased from 1.5% in 2013 to 2.0% in 2018 [4]. South Sulawesi Province alone recorded a DM prevalence of 1.6% based on physician diagnosis, with higher rates in some areas such as Pinrang Regency (2.8%), Makassar City (2.5%), and Palopo City (2.1%). Palopo City is one of the areas that requires special attention in DM prevention and management efforts [5].

The management of type 2 DM requires a holistic approach that includes both pharmacological and non-pharmacological therapies. Pharmacological therapies, such as the administration of insulin or oral antidiabetic drugs, are often the mainstay. However, non-pharmacological interventions such as lifestyle modification, exercise, dietary management, and relaxation techniques are increasingly recognized for their role in supporting optimal glycemic control [6]. One non-pharmacological technique that has begun to be widely developed is autogenic relaxation, a simple method that utilizes verbal affirmations, breathing control, and focused attention to create a relaxed state in the body and mind [7,8].

Autogenic relaxation has great potential in helping to lower blood sugar levels in patients with type 2 diabetes, especially since psychological stress is known to contribute to increased blood sugar levels. Stress-induced activation of the hypothalamic-pituitary-adrenal (HPA) axis can increase the secretion of the hormone cortisol, which in turn exacerbates insulin resistance and increases gluconeogenesis [9]. Previous studies have shown that psychological stress plays an important role in elevated blood sugar levels through the mechanism of hypothalamic-pituitary-adrenal (HPA) axis activation, which increases cortisol levels. Excessive cortisol can exacerbate insulin resistance and promote gluconeogenesis, ultimately worsening hyperglycemia [10].

Research by Kanji et al. (2006) showed that autogenic relaxation techniques are effective in reducing anxiety and physiological stress, which play an important role in the management of chronic diseases such as DM. The decrease in cortisol levels through autogenic relaxation helps improve insulin sensitivity and control blood sugar levels [11]. Meanwhile, Setyawati's (2010) study on type 2 DM patients in hospitals in Yogyakarta and Central Java found that autogenic relaxation training not only lowered blood sugar levels but also reduced patients' anxiety. This strengthens the argument that stress management is an important component of glycemic control [12].

In addition, research by Limbong, Jaya, and Ariani (2015) also confirmed that autogenic relaxation techniques help improve blood circulation to muscles and important organs such as the pancreas. This allows the body to distribute insulin better so that blood sugar levels can be controlled more effectively. The study also highlighted the impact of autogenic relaxation in lowering sympathetic nervous system activity, which supports the body to achieve metabolic balance [13].

Although scientific evidence regarding the effectiveness of autogenic relaxation continues to grow, research related to this technique in Indonesia is still limited. Most of the non-pharmacological interventions conducted focus more on physical activities, such as exercise or diet modification, without considering the importance of stress management as one of the main triggers of hyperglycemia [14]. Therefore, this study aims to explore the effect of autogenic relaxation techniques on blood sugar levels in patients with type 2 diabetes who are treated at Batara Guru Hospital Belopa, South Sulawesi.

With strong scientific evidence, it is hoped that the results of this study can be the basis for integrating autogenic relaxation techniques as one of the independent nursing interventions in the management of type 2 DM. In addition, these results are also expected to contribute to developing a more holistic and affordable diabetes management strategy, especially in resource-limited areas such as South Sulawesi.

METHODS

This study was conducted at Batara Guru Belopa Hospital, using a pre-experimental design with a one-group pre-test post-test design approach. The study population was type 2 DM patients who were treated at Batara Guru Belopa Hospital. The number of research samples was 30 people selected by accidental sampling. This research instrument is a guidebook for technical instructions for the implementation of autogenic relaxation, observation sheets, and blood sugar measuring devices independently. Data collection was carried out by taking blood samples to check blood glucose levels before and after the autogenic relaxation action was carried out. The implementation of autogenic relaxation was carried out 2 times a day for 2 days. Furthermore, the data were analyzed univariately to see the frequency distribution of the respondents' characteristics and each research variable. Wilcoxon test was used in bivariate analysis to analyze the effect of autogenic relaxation on blood sugar levels in patients with type 2 diabetes mellitus.

RESULTS AND DISCUSSION

Demographic characteristics of respondents

Table 1. Distribution of Gender, Age, Education, Occupation, and Family Income

Characteristics	n	%
Gender		
Male	11	36.7
Female	19	63.3
Age		
31-40 years	1	3.3
41-50 years	8	26.7
51-60 years	12	40.0
> 60 years	9	30.0
Education		
Elementary school	4	13.3
Middle school	8	26.7
High school	13	43.3
Diploma/Higher Education	5	16.7
Work		
Civil servants	4	13.3
Self-employed	4	13.3
Labor	4	13.3
Fisherman	2	6.7
Farmers	3	10.0
Housewife	13	43.3
Family Income		
< IDR. 1 million/month	6	20.0
IDR. 1-3 million/month	15	50.0
> IDR. 3 million/month	9	30.0
Total	**30**	**100**

Source: Primary Data, 2024

Based on Table 1 above, it is known that most of the respondents found were female (63.3%) and most had an age range of 51-60 years (40.0%). In the distribution of education, respondents were found to have the highest level of high school education (43.3%), while the distribution of occupations was known to be mostly housewives (43.3%) and had the highest family income of IDR. 1-3 million / month (50.0%).

Univariate Analysis

Table 2. Distribution of Blood Glucose Levels in Patients with DM Type 2

Blood Sugar Levels	Mean (Min-Max)	Std. Deviasi
Before autogenic relaxation	257.50 (186-345)	45.026
After autogenic relaxation	192.27 (145-256)	32.974

Description: n=30
Source: Primary Data, 2024

Based on Table 2 above, it is known that the average score (mean) of glucose levels in DM Type 2 patients is higher before the action of autogenic relaxation techniques (257.50) than after the action of autogenic relaxation techniques (192.27).

Bivariate Analysis

Table 3. The Effect of Autogenic Relaxation on Decreasing Blood Sugar Levels in Patients with DM Type 2

		n	Mean Rank	Sum of Ranks	Nilai *p*
DBS value after Autogenic Relaxation Technique – DBS value before Autogenic Relaxation Technique	Negative Ranks	25	15.00	375.00	0.000
	Positive Ranks	2	1.50	3.00	
	Ties	3			
	Total	30			

Description: p = probability of Wilcoxone Test results
Source: Primary Data, 2024

Based on Table 3 above, it is known that there are 25 people whose blood sugar levels decreased, 2 people whose blood sugar levels increased and 3 people whose blood sugar levels remained after the action of autogenic relaxation techniques. While the results of statistical tests using the Wilcoxone test known p value = 0.000. Because the value of $p < \alpha = 0.05$ means that there is an effect of autogenic relaxation techniques on reducing blood sugar levels in patients with type 2 diabetes in Batara Guru Belopa Hospital.

Demographic Characteristics of Respondents

This study provides important insights into differences in demographic characteristics, such as gender, age, education level, employment type and family income, which may affect the effectiveness of this intervention. In this study, the majority of respondents were female (63.3%). This is consistent with epidemiological data showing that women are often more diagnosed with type 2 diabetes mellitus than men, partly due to hormonal differences and physiological changes that occur during pregnancy or menopause, which can increase insulin resistance [15]. In addition, women also tend to be more sensitive to stress and have a higher risk of anxiety, which can worsen blood sugar levels through activation of the hypothalamic-pituitary-adrenal (HPA) axis. Autogenic relaxation techniques work by reducing stress and anxiety, thus having a more significant impact on women. This response supports the importance of a holistic approach that focuses not only on physiological but also psychological aspects, especially in women who tend to experience more stress related to chronic disease management [10,16].

In this study, most respondents were in the 51-60 years (40%) and >60 years (30%) age groups, which are age groups with a higher risk of diabetic complications. The significant reduction in blood sugar levels in this group reinforces the finding that relaxation-based interventions can be effectively applied even in the elderly population. This supports the research findings by Zeng et al. (2018), who stated that relaxation techniques have great benefits for diabetic patients in the middle to advanced age group [17]. In addition, autogenic relaxation techniques are easy to perform, inexpensive, and do not require specialized equipment. In the context of a population with lower-middle economic status (50% of respondents earning IDR 1-3 million/month), this intervention is a feasible solution. As a cheap and easy-to-do method, autogenic relaxation can be a self-intervention that helps patients manage diabetes at minimal cost while still providing optimal results. Gill et al. (2020) showed that relaxation techniques can be widely applied in resource-constrained communities [14].

At the education level, the majority of respondents had a high school education (43.3%), followed by junior high school (26.7%), college/university (16.7%), and elementary school (13.3%). The level of education has an important role in influencing patients' understanding of the importance of diabetes management and the application of relaxation techniques. Patients with higher education levels generally understand the benefits of interventions such as autogenic relaxation more easily and tend to be more compliant in implementing them regularly. However, these findings also suggest that simple interventions such as autogenic relaxation can be effectively implemented in groups with low education levels. With clear guidance and brief training, all patients can be taught to practice the technique without the need for specialized skills or knowledge. This reinforces the potential of autogenic relaxation to be widely applied in communities with diverse educational backgrounds [8,18].

In this study, most respondents were housewives (43.3%), followed by civil servants, self-employed, laborers (13.3% each), farmers (10%), and fishermen (6.7%). The high proportion of housewives reflects that this group is often more exposed to domestic stress and has limited access to adequate health services. Autogenic relaxation techniques offer a highly relevant solution for housewives, as they do not require high costs, specialized equipment, or long periods to implement. Housewives can easily practice the technique at home while carrying out their daily responsibilities. In working groups, such as civil servants and the self-employed, this technique also has great potential as it helps to overcome work stress that often contributes to elevated blood sugar levels. Laborers, farmers, and fishermen, who tend to have physically strenuous work patterns and more limited access to health facilities, can also utilize this technique as a practical solution to maintain their health [11,19].

These findings suggest that interventions such as autogenic relaxation are not only physiologically effective but also flexible to be applied to various demographic groups. Differences in gender characteristics, education level, and type of employment provide insight into the specific needs of patients that can be accommodated through tailored educational approaches. In women, education can emphasize the benefits of relaxation to manage stress, anxiety and hormonal conditions that affect blood sugar. For patients with low education, visual education and practice-based training can help improve their understanding of how to perform relaxation techniques. As for the working group, interventions can be tailored to the patient's work schedule, such as implementing relaxation in the morning or evening.

Blood Sugar Levels of Type 2 DM Patients

The results of research conducted at Batara Guru Belopa Hospital showed that the average value of blood glucose levels in patients with type 2 diabetes before the autogenic relaxation technique was 257.50 mg/dl and after the autogenic relaxation technique was 192.27 mg/dl. The results of the same study by Setyawati (2010) showed that the average value of blood glucose levels before the intervention was 302.60 mg/dl and after the intervention was 25.73 mg/dl. Based on the results of these studies, it is assumed that patients with type 2 DM tend to experience an increase in blood glucose levels. This situation occurs due to excessive insulin secretion and glucose levels will be maintained at normal or slightly elevated levels. However, beta cells are unable to compensate so glucose levels will increase and type 2 diabetes mellitus occurs.

According to Smeltzer & Bare (2012), the increase in blood glucose levels in patients with DM is due to insulin problems. There are two main problems associated with insulin, namely insulin resistance and impaired insulin secretion. Normally insulin will be related to special receptors on the cell surface, but in this case the receptors are lacking and even though insulin levels are high in the blood, glucose does not enter the cells so the cells will lack glucose. This mechanism is said to be insulin resistance [7].

In patients with type 2 DM there are problems with the effect of insulin work, in this case the entry of sugar into the cells is not perfect so blood sugar remains high. This can poison and cause a sense of weakness and unhealthy and cause complications and other metabolic disorders. If the body cannot get enough energy from sugar, it will process other substances in the body to convert them into energy. These substances are fat and protein. The use or destruction of fat and protein leads to weight loss [13].

Effect of Autogenic Relaxation Technique with Decreased Blood Sugar Levels in Type 2 DM Patients

The results of a study conducted at RSUD Batara Guru Belopa clearly show that the autogenic relaxation technique can have a significant impact on reducing blood sugar levels in patients with type 2 diabetes mellitus (DM). With an average reduction in blood sugar levels from 257.50 mg/dL to 192.27 mg/dL ($p = 0.000$), this technique proved itself as an effective non-pharmacological approach in supporting diabetes management. This reduction not only demonstrates statistical effectiveness but also reinforces the theoretical basis that psychological stress has a major role in increasing blood sugar levels through the mechanism of stress hormones, especially cortisol.

The main mechanism of autogenic relaxation techniques lies in its ability to decrease the activity of the hypothalamic-pituitary-adrenal (HPA) axis, resulting in decreased cortisol production. High cortisol hormone in the body is known to cause insulin resistance and promote gluconeogenesis, two major factors in chronic hyperglycemia. By activating the parasympathetic nervous system, autogenic relaxation creates optimal physiological conditions for improving insulin sensitivity [9,10]. This condition allows the body to control glucose levels more efficiently, as also revealed by Setyawati's (2010) study. These findings provide a strong scientific foundation to support the use of autogenic relaxation as a therapeutic intervention [12].

In addition to providing physiological benefits, autogenic relaxation also has a great impact on the psychological aspects of patients. As is well known, psychological stress affects not only glycemic regulation but also the patient's quality of life. This relaxation technique has been

shown to reduce anxiety, improve sleep quality, and enhance patients' emotional well-being. In this context, autogenic relaxation serves as a holistic approach that not only addresses the physical aspects of diabetes but also pays attention to the mental and emotional balance of patients [20,21]. This is consistent with the study of Ryu et al. (2014), which showed that a holistic approach to diabetes management can significantly improve quality of life [10].

The reduction in blood sugar levels that occurred in 83.3% of respondents in this study also provides additional evidence that stress management is an important element in diabetes control. Research by Lasselin et al. (2016) highlights how high cortisol levels can worsen insulin sensitivity and increase the risk of metabolic complications. With autogenic relaxation techniques, cortisol levels can be significantly lowered, thus helping the body restore glucose homeostasis and prevent long-term complications [9,22,].

In addition to its effectiveness, this technique also has great potential to be integrated into national programs such as PROLANIS (Chronic Disease Management Program). By providing appropriate education to patients, autogenic relaxation can become part of the daily routine of patients with type 2 diabetes. Community-based education or primary healthcare facilities can increase patient adherence to this practice, so that the benefits can be widely felt. With this approach, autogenic relaxation techniques can become one of the key components in holistic and sustainable diabetes management. However, there are several challenges in implementing this technique. One of the main obstacles is the level of patient compliance in carrying out relaxation exercises consistently. Many patients may find it difficult to make time or prioritize these exercises in their daily activities. Therefore, creative approaches are needed, such as group training in the community or integration of relaxation exercises into health education programs in healthcare facilities. Support from health professionals and families is also an important factor to ensure the success of this technique.

This study also opens up opportunities for further studies to explore the application of autogenic relaxation in a wider population and over a longer time. By combining autogenic relaxation with pharmacological interventions and healthy lifestyle education, diabetes management can be more effective and comprehensive. As a simple yet impactful technique, autogenic relaxation has the potential to be a solution that is accessible to all, while providing long-term sustainable benefits. With these results, it is clear that the autogenic relaxation technique is an innovative approach that is not only effective but also economical and easy to implement. With better stress management, patients with type 2 diabetes mellitus can achieve optimal blood sugar control, reduce the risk of complications, and improve their overall quality of life. This technique provides new hope in diabetes management, especially for vulnerable populations who have limited access to expensive health services.

CONCLUSIONS

The results showed that there was an effect of autogenic relaxation techniques on reducing blood sugar levels in patients with type 2 diabetes, where the average value of blood glucose levels in patients with type 2 diabetes before and after autogenic relaxation intervention decreased from 257.50 mg/dl to 192.27 mg/dl. It is recommended that autogenic relaxation be one form of independent nursing intervention for a nurse in providing nursing care to patients with type 2 diabetes.

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