

THE EFFECT OF PROGRESSIVE MUSCLE RELAXATION THERAPY IN DIABETES MELLITUS PATIENTS ON REDUCING BLOOD SUGAR LEVELS

Irpan Ali Rahman

Prodi Ners, STIKES Muhammadiyah Ciamis
Jl. Kh. Ahmad Dahlan No.20 Ciamis, Indonesia
Email : van.vinnot@gmail.com

Abstract

The increase in the number of Diabetes Mellitus sufferers will have an impact on physical and psychological conditions. The physical impacts are diabetic retinopathy, diabetic nephropathy, and diabetic neuropathy. Meanwhile, the psychological impact is the emergence of anxiety, anger, grief, shame, guilt, loss of hope, depression, loneliness, and hopelessness towards treatment. One non-pharmacological therapy to overcome the above phenomenon is the application of progressive muscle relaxation. Progressive muscle relaxation carried out continuously has a good impact on reducing blood glucose levels in Diabetes Mellitus patients. This study aims to identify a decrease in blood glucose levels in Diabetes Mellitus patients by implementing Progressive Muscle Relaxation. The research method used is a descriptive case study. The population and sample in this study was 1 Diabetes Mellitus patient. The results of the study showed that the patient experienced a decrease in blood glucose levels after Progressive Muscle Relaxation from 372 mg/dl to 240 mg/dl. This research concludes that there is an effect of Progressive Muscle Relaxation on reducing blood glucose levels in Diabetes Mellitus patients.

Keywords: Blood Glucose, Diabetes Mellitus, Progressive Muscle Relaxation

Introduction

Diabetes mellitus (DM) is a metabolic disease characterized by increased blood glucose levels (hyperglycemia) due to a progressive decrease in insulin secretion due to insulin resistance. This condition is characterized by the organ's inability to use insulin so insulin cannot function optimally in regulating glucose metabolism. ^[1] Diabetes Mellitus (DM) is a chronic metabolic disorder with various causes characterized by high levels of glucose in the blood ^[2].

Diabetes mellitus is currently a global health problem in society. Diabetes Mellitus is a disease that continues to increase from year to year in various countries in the world, both in developed and developing countries. Based on data from the 2017 8th edition of the Diabetes Atlas released by the International Diabetes Federation (IDF) in 2018, there were 382 million people in the world experiencing Diabetes Mellitus in 2013, and in 2017 this increased to 425 million people, and in 2045 it is predicted that this will increase reaching 629 million people in the world ^{[3], [4]}.

The number of diabetes mellitus sufferers in Indonesia has increased from 8.5 million in 2013 to 10.3 million in 2017 and is expected to increase to 16.7 million in 2045, while the number of patients suffering from diabetes mellitus in Indonesia is very high. many, so that Indonesia is in fourth position in the world after other countries such as; the United States, India, and China ^{[5], [6]}. West Java Province also had an increase in prevalence of 2% in 2013 ^[7].

Based on data from the Pangandaran Regency Health Service, in 2020 the number of Diabetes Mellitus sufferers was 16,376 people. Data on Diabetes Mellitus sufferers in Parigi District in October 2020 was 487 people.

Based on the etiology of the disease, Diabetes mellitus is divided into several types, namely; Type 1 Diabetes Mellitus is Referred to as "Insulin Dependent Diabetes Mellitus". Related to genetic factors and the immune system, which results in damage to the cells that produce insulin, so that the cells are unable to produce the insulin needed by the body. The group of people who most often suffer from this disease are children and adolescents, who represent 3% of all existing patients. Type 2 Diabetes Mellitus is called "Insulin-Independent Diabetes Mellitus", which represents more than 90% of diabetes mellitus cases. It is related to factors such as unhealthy diet, obesity, and lack of exercise. The body's cells become resistant to insulin and cannot absorb and use dextrose and the resulting excess blood sugar effectively. This type of diabetes mellitus has a higher genetic predisposition than Type 1.

Gestational Diabetes Mellitus is mainly caused by hormonal changes produced during pregnancy and usually reduces or disappears after delivery. Studies in recent years have shown that women who have experienced gestational diabetes mellitus have a higher risk of developing type II diabetes mellitus, so these women must pay more attention to a healthy diet to reduce this risk. Other Types of Diabetes Mellitus There are several other different causes of the three types of diabetes mellitus above, including inadequate insulin secretion caused by certain genetic diseases, caused indirectly by other diseases (for example pancreatitis, namely inflammation of the pancreas), which is caused by drugs or other chemicals. It is estimated that 5%-10% of sufferers have type I diabetes and approximately 90%-95% of sufferers have type II diabetes. Gestational Diabetes Mellitus is mainly caused by hormonal changes produced during pregnancy and usually reduces or disappears after delivery. Studies in recent years have shown that women who have experienced gestational diabetes mellitus have a higher risk of developing type II diabetes mellitus, so these women must pay more attention to a healthy diet to reduce this risk. Other Types of Diabetes Mellitus There are several other different causes of the three types of diabetes mellitus above, including inadequate insulin secretion caused by certain genetic diseases, caused indirectly by other diseases (for example pancreatitis, namely inflammation of the pancreas), which is caused by drugs or other chemicals. It is estimated that 5%-10% of sufferers have type I diabetes and approximately 90%-95% of sufferers have type II diabetes. ^[8]

Increased blood sugar levels in DM patients can result in peripheral neuropathy and a decrease in the sensation of protection in the legs. Neuropathy is progressive nerve damage that causes loss of nerve function. Neurological damage can be triggered by hypoxia and lack of glucose entering the cells. Hyperglycemia conditions will aggravate nerve damage, due to the conversion of excess glucose into sorbitol which accumulates in the nerves and changes the conduction of the nerves. Nerve damage can result in loss of pain sensation or other sensory damage. ^[9]

Disorders that are often experienced by diabetes sufferers include the nervous system, including: decreased sensation, pain and paresthesia ^[10]. Complementary therapy is additional therapy along with conventional treatment. One of the efforts to prevent neuropathy or instability in blood sugar levels is through complementary therapy, one of which is progressive muscle relaxation therapy ^[11].

Progressive muscle relaxation (PMR) is relaxation therapy with movements that tighten and relax the muscles in one part of the body at a time to provide a feeling of physical relaxation. Progressive tightening and relaxing movements of these muscle groups are carried out successively ^[12]. When the body and mind are relaxed, the tension that often causes muscles to tighten will automatically be ignored ^[13].

According to research ^[14], states that progressive muscle relaxation is a relaxation technique that is easy and simple and has been widely used. Progressive muscle relaxation is a procedure to get relaxation in the muscles through two steps, namely by applying tension to a muscle group, stopping

the tension, and then focusing on how the muscle relaxes, feeling a relaxed sensation, and the tension disappears.

According to the author, nurses have a very important role in diabetes mellitus patients. To prevent complications, by carrying out the role of nurses as care providers, researchers, and innovators. The role of nurses in providing nursing care is to carry out independent and collaborative nursing interventions. Implementation of the role of nurses as researchers includes the author implementing nursing interventions that are based on research results or based on evidence (evidence-based) and carrying out a reformer role to improve nursing care for patients with Diabetes Mellitus. Apart from being given pharmacological therapy by doctors, nurses also teach patients innovative complementary interventions in overcoming problems with blood sugar levels with progressive muscle relaxation therapy. ^{[15], [16]}

The results of Karokaro and Riduan's (2019) research show the influence of progressive muscle relaxation techniques on reducing blood sugar levels. Rustono and Prasetawati's (2021) research shows that progressive muscle relaxation is effective in reducing blood sugar levels. Research by Siswati and Kulsum (2019) shows that progressive muscle relaxants given to patients can help reduce blood sugar levels. Yuliana's research (2021) shows that providing progressive muscle therapy to DM patients can reduce blood sugar levels.

Based on this aim, the author is interested in applying the results of this research through a study on "The Effect of Progressive Muscle Relaxation Therapy in Diabetes Mellitus Patients on Reducing Blood Sugar".

Metode

The design used in the research is a descriptive case study with a comprehensive nursing care method approach. The sample in this research is Mrs. K, a sufferer of diabetes mellitus since 8 years ago in the Parigi Community Health Center working area. Data collection was carried out using comprehensive interview techniques with clients and families. This research was carried out from June 19 to June 23, 2022.

The research began for 5 days, with an assessment process on the first day and measuring the patient's blood sugar levels, on the second day, third day, and fourth day implementing progressive muscle relaxation for 15-20 minutes by first explaining the benefits and objectives as well as providing examples of movement and the patient is advised to drink water, then on the last day with an evaluation, measure the patient's blood sugar level again.

Results

1. Assessment

The assessment was carried out on Mrs. K on June 19 2022 at 13.00 WIB. The data that the author obtained was obtained through interviews, physical assessment, and observation. The client is 67 years old, when the check was carried out the client's blood sugar was 372 mg/dl, namely > 200 mg/dl. From the interview results it was found that the client's eating pattern was 3x/day with an irregular eating schedule. BAK clients with a frequency of 9 x/day

Table.1 Data Analysis

No	Data	Etiologi	Problem
1	<p>Ds:</p> <ul style="list-style-type: none"> - The client complains of weakness - The client says he is dizzy - The client said he often felt thirsty - The client said he frequently urinated with a frequency of 9 times/day - Clients say they rarely measure blood sugar - The client said he had a history of DM since 8 years ago <p>Do:</p> <ul style="list-style-type: none"> - General condition: Moderate - Awareness: Composmentis GCS = 15 (E4V5M6) - The client looks weak - The client's mouth appears dry - The client appears to urinate frequently - urinating 9 times in one day - appeared to drink frequently - CRT \geq 2 second - vital signs: <ul style="list-style-type: none"> • TD : 150/90 mmHg • N : 75 x/ minute • RR : 20 x/ minute • S : 36,5 °C - blood sugar check : 372 mg/dl - Thrapy obat: Forbetes 850 mg 	<p>Lifestyle</p> <p>↓</p> <p>Decreased Insulin Sensitivity</p> <p>↓</p> <p>Resistensi Insulin</p> <p>↓</p> <p>Blood Glucose Entry into Cells</p> <p>Decreases</p> <p>↓</p> <p>Increased Blood Glucose</p> <p>↓</p> <p>Hipergliemia</p> <p>↓</p> <p>Unstable blood sugar levels</p>	<p>unstable blood sugar levels</p>
2.	<p>Ds:</p> <ul style="list-style-type: none"> - The client complains that his feet often tingle - Clients say that if their feet trip on objects, sometimes they don't feel pain <p>Do:</p> <ul style="list-style-type: none"> - The client's mouth appears dry - CRT \geq 2 second - TTV : <ul style="list-style-type: none"> • TD :150/90 mmHg • N : 75x / minute • RR : 20x / minute • S : 36,5 °C - blood sugar check : 372 mg/dl 	<p>Hyperglycemia</p> <p>↓</p> <p>Increased glucose use</p> <p>↓</p> <p>Blood viscosity increases</p> <p>↓</p> <p>Blood flow slows</p> <p>↓</p> <p>Peripheral perfusion is ineffective</p>	<p>Peripheral perfusion is ineffective</p>
3.	<p>Ds:</p> <ul style="list-style-type: none"> - The client said the body was weak - The client says he is dizzy - The client said his body felt weak and dizzy if the activity was too heavy <p>Do:</p> <ul style="list-style-type: none"> - The client looks weak - The client looks tired when carrying out activities - Muscle strength: 4444/4444 	<p>Fat metabolism</p> <p>↓</p> <p>Free fatty acids increase</p> <p>↓</p> <p>There is a decrease in muscle mass</p> <p>↓</p> <p>Weakness</p> <p>↓</p> <p>Activity intolerance</p>	<p>Activity intolerance</p>

2. Nursing Diagnosis

The diagnosis that can be made to the client based on the results of the anamnesis is unstable blood sugar levels, ineffective peripheral perfusion, and activity intolerance. Of the three diagnoses

found, in this scientific work, the author focuses on one diagnosis, namely blood sugar instability, to help clients improve the client's health condition and maintain blood sugar within normal limits.

3. Nursing Intervention

The nursing care plan for the client is based on the three diagnoses raised, namely unstable blood sugar levels, ineffective peripheral perfusion, and activity intolerance, adjusted to each diagnosis that arises.

The first diagnosis is the instability of blood sugar levels with the aim that after nursing action is carried out for 3x24 hours, it is hoped that the blood sugar instability will improve. Interventions given to improve blood sugar levels include identifying possible causes of hyperglycemia, monitoring signs and symptoms of hyperglycemia, providing oral fluid intake, consulting with a doctor if signs and symptoms of hyperglycemia persist or worsen, recommending avoiding exercise when blood glucose levels are more than 250 mg/ dL, recommend monitoring blood glucose levels independently, encourage adherence to diet and exercise, teach diabetes management (oral medication), provide support to carry out the treatment program properly and correctly, involve the family to provide support to the patient during treatment, explain the benefits and effects In addition to treatment, recommend taking medication as indicated and providing progressive muscle relaxation therapy to lower blood sugar.s

The 2nd diagnosis is Ineffective Peripheral Perfusion with the aim that after nursing action is carried out for 3x24 hours it is hoped that Peripheral Perfusion will increase. Interventions given to improve peripheral perfusion include checking peripheral circulation (for example, peripheral pulse, edema, capillary refill, color, temperature, ankle-racial index), identifying risk factors for circulation disorders (smoker's diabetes, hypertension), encouraging regular exercise, and encouraging exercise. proper skin care (moisturize dry skin on the feet) recommend a diet program to improve circulation, identify the cause of changes in sensation, check for sharp or dull sensations, check for differences in hot or cold sensations, monitor for paraesthesia if necessary, monitor for skin changes, avoid use objects that are too hot, recommend wearing soft, low-heeled shoes, administering analgesics if necessary, administering corticosteroids if necessary.

The third diagnosis is Activity Intolerance with the aim that after carrying out nursing actions for 3 x 24 hours, it is hoped that Activity Tolerance will increase. Interventions given for activity tolerance include identifying body function disorders that cause fatigue, monitoring physical fatigue, monitoring sleep patterns and hours, providing a comfortable and low-stimulus environment, providing calming distraction activities, facilitating sitting on the side of the bed if you cannot move or walk , encourage bed rest, encourage carrying out activities in stages, teach coping strategies to reduce fatigue, collaborate with nutritionists on how to increase food intake, identify readiness and ability to receive information, provide Health Education materials and media, schedule Health Education according to agreement, provide opportunities to ask questions, explain the health benefits and physiological effects of exercise, explain the type of exercise that suits your health condition, explain the desired frequency, duration and intensity of the exercise program, teach appropriate warm-up and cool-down exercises, teach techniques to avoid injury during exercise, teach appropriate breathing techniques appropriate for maximizing oxygen absorption during physical exercise.

4. Nursing Implementation

Implementation of nursing care for clients is carried out for 5 days, 3 days for nursing care, and 2 days for monitoring the client's progress after the intervention. Intervention-related meetings are held every day when the client's family has free time for 15-30 minutes. The total meeting with the client is 5 days starting from the time contract to monitoring progress notes.

During the first meeting, the author conducted an assessment of the client's basic needs, a physical examination, examination regarding the client's blood sugar. The implementation of nursing for instability of blood sugar levels was carried out on the second day for two consecutive days. The intervention carried out was providing progressive muscle relaxation therapy. Before taking action, it is first explained to the family and client about the purpose and benefits of carrying out progressive muscle relaxation therapy. In its implementation, the author first gives an example of the progressive muscle relaxation movement and then the client follows. Progressive muscle relaxation therapy is adjusted to the client's ability to do it. Before carrying out progressive muscle relaxation therapy, clients are advised to drink water because water will conduct electricity to the brain so that the brain can receive stimulation easily.

Implementation of ineffective peripheral perfusion and activity intolerance is carried out in one meeting, namely at the second meeting by providing an explanation to the client and family regarding circulation care and energy management to minimize the client's ability to overcome weakness.

5. Nursing Evaluation

The author outlines three main diagnoses, namely instability of blood sugar levels, ineffective peripheral perfusion, and activity intolerance. The author uses evaluation with SOAP analysis. Evaluation is seen to assess the level of success of the actions that have been taken. The client said he did not have any complaints but when the assessment was carried out the client had high blood sugar levels.

The first diagnosis is unstable blood sugar levels. Interventions that have been carried out for three consecutive days include monitoring signs and symptoms of hyperglycemia, recommending avoiding exercise when blood glucose levels are more than 250 mg/dL, recommending monitoring blood glucose levels independently, recommending adherence to diet and exercise, providing support to undergo treatment program properly and correctly, involving the family to provide support to the patient during treatment, recommending taking medication as indicated.

The next intervention to reduce blood sugar levels appropriately is to carry out progressive muscle relaxation therapy, for 15-20 minutes. At first, the client felt confused, but after giving an example by the author and doing it together, the client seemed enthusiastic about the various movements carried out. In carrying out this progressive muscle relaxation therapy there were no obstacles for the patient.

Progressive muscle relaxation therapy is carried out over three meetings lasting 15-20 minutes depending on the client's condition at that time. After implementing three meetings, an evaluation was carried out by measuring blood sugar levels again to see the patient's blood sugar levels using a glucometer. After the progressive muscle relaxation therapy was carried out there were changes, namely before the progressive muscle relaxation therapy the client's blood sugar level was 372 mg/dl, and after the progressive muscle relaxation therapy the client's blood sugar was 240 mg/dl.

The second and third interventions related to ineffective peripheral perfusion and activity intolerance include providing health education regarding activity tolerance to stimulate physical weakness and carry out activities gradually. The family's response was positive to the explanation made by the author. The intervention was carried out only once and on the same day, namely at the second meeting.

Discussion

1. Nursing Assessment

From the results of the study conducted on Mrs. K found that the cause of blood sugar that occurred in Mrs. K is caused by an unhealthy lifestyle, namely the client always drinks coffee and sweet tea 3x/day and is over 40 years old. According to the author in the nursing study of Mrs. All bio, psycho, social, spiritual, and cultural aspects must be studied and involve family collaboration to obtain complete and accurate data. Because each individual responds differently to both internal and external stimuli, it requires carefulness in assessing each response or symptom displayed by the client and requires special sensitivity and ability in interpreting and analyzing data on clients with diabetes mellitus.

From the results of the study conducted on Mrs. K from the client's identity, it was found that the client had entered old age at the age of 67 years.

Elderly (elderly) is the final stage in human life which generally begins at the age of 60 years. The elderly phase is characterized by a decline in body function making it susceptible to disease ^[17].

The results of this study are in accordance with the theory found. According to ^[18] Diabetes Mellitus often appears after a person reaches the age of 45 years. The risk of diabetes increases with age, especially at ages over 45-60 years, because at that age glucose intolerance begins to increase. The aging process causes a reduction in the ability of pancreatic cells to produce insulin. In addition, in older individuals, there is a 35% decrease in mitochondrial activity in muscle cells. This is associated with an increase in fat levels in the muscles by 30% and triggers insulin resistance ^[19].

In this case, it is known that the client rarely checks his blood sugar levels, and the client's lifestyle is not good, the client always drinks sweet things such as coffee and sweet tea which causes the client's blood sugar levels to be high. From the family health history, based on the case found in Mrs. K said there was no history of hereditary diseases such as hypertension, DM, heart disease, etc. According to the author, there is a gap between theory and cases, where one of the factors causing diabetes is heredity ^[20]

2. Nursing diagnoses

Based on the results of the history taken, three diagnoses were obtained, namely instability of blood sugar levels, ineffective peripheral perfusion, and activity intolerance, but the main priority for this problem was instability of blood sugar levels. Based on data found on Mrs. K can make a nursing diagnosis of unstable blood sugar levels caused by the age factor of over 40 years which causes the pancreatic beta cells to experience a decrease in function so that the insulin produced is disturbed and ultimately there is a decline. This decrease in insulin ultimately cannot carry glucose in the blood into intracellular cells, resulting in hyperglycemia. This is also triggered by dietary factors, the client's previous habit history of frequently consuming high levels of glucose, namely drinking coffee and sweet tea excessively as one of the triggers, which can increase high blood glucose levels. ^[21]

To confirm the diagnosis of unstable blood sugar levels, it is necessary to measure blood sugar using a glucometer. The results of the blood glucose examination were 372 mg/dl.

3. Nursing Planning

DM patients who have problems with unstable blood sugar levels are given interventions that help lower blood sugar levels. The intervention provided by the author is progressive muscle relaxation therapy to reduce blood sugar levels. Progressive muscle relaxation (PMR) is a relaxation therapy with movements that tighten and relax the muscles in one part of the body at a time to provide a

feeling of physical relaxation. This therapy can also provide satisfactory results in therapy programs for muscle tension, reducing anxiety, facilitating sleep, and depression, reducing weakness, muscle cramps, neck and back pain, and lowering high blood pressure [22].

Progressive muscle relaxation therapy is carried out over two meetings lasting 15-20 minutes. Before progressive muscle relaxation therapy, clients are advised to drink water, because water will conduct electricity to the brain so that the brain can receive stimulation easily. By carrying out progressive muscle relaxation therapy, it is hoped that the client's blood sugar levels will decrease [23].

4. Implementation of Nursing

Activity training is one of the therapies that can overcome the client's blood sugar levels. For three days the client is guided in carrying out progressive muscle relaxation therapy to help reduce blood sugar levels slowly. Starting with the movement of holding the right hand while making a tighter fist, feel the tension, then release the fist and feel relaxed for 10 seconds. Once finished with the right hand then continue with the left. Second movement: Bend the arm backward at the wrist so that the muscles in the back of the hand and forearm lift, fingers facing the ceiling. The third movement begins with holding both hands into fists and then bringing both fists to the shoulders so that the biceps muscles become tense. Fourth movement: Raise both shoulders as high as possible as if the shoulders are brought up to touch the ears. The focus of this movement is the contrast of tension that occurs in the shoulders, upper back, and neck. Fifth movement: Wrinkle the forehead and eyebrows until the muscles feel and the skin wrinkles. The sixth movement closes the eyes tightly so that you can feel the tension around the eyes and the muscles that control eye movements. Seventh movement: Clench the jaw, followed by biting the teeth so that you feel tension around the jaw muscles. Eighth movement: The lips are pursed as hard as possible so that you feel tension around the mouth. Ninth movement Place the head so that it can rest, then ask to press the head on the surface of the chair cushion in such a way that the respondent can feel calm in the back of the neck and upper back. Movement 10: Bring your head to your face, then ask you to sink your chin into your chest, so you can feel the tension in the neck area on the face. 11th Movement: Lift your body from the back of the chair, then arch your back, then stick out your chest. When relaxed, put your body back in the chair, while allowing the muscles to relax. 12th Movement Take a deep breath to fill your lungs with as much air as possible. Hold for a few moments, while feeling the tension in the chest and then down to the stomach. When the tension is released, the client can breathe normally with relief. 13th Movement: Pull your stomach hard inwards, then hold until your stomach becomes tight & hard. 14th Movement: Straighten the soles of your feet so that your thigh muscles feel tense. 15th Movement: Straighten the soles of your feet so that your thigh muscles feel tense. This movement is continued by locking the knees [24].

5. Nursing Evaluation

Implementation of nursing care is carried out for 5 days starting from assessment to progress notes. Nursing implementation was carried out 3 times in 3 consecutive days and then blood sugar levels were measured at 240 mg/dl, meaning there were changes before and after the intervention. The author provides intervention in the form of progressive muscle relaxation therapy to reduce blood sugar levels. Progressive muscle relaxation is a therapy that can be done to focus attention on a muscle activity, by identifying tense muscles and then reducing the tension by doing relaxation techniques to get a relaxed feeling. In progressive muscle relaxation therapy, 15 movements must be done and the client can do them. all movements are relaxed without obstacles [25] [26]

In this study, the client reported that when doing Progressive muscle relaxation there were two different sensations, namely feeling muscle tension when the muscles of the body were tensed

and feeling something that made the client more relaxed, comfortable, comfortable, and relaxed when previous body muscles the tension is relaxed. Another possibility is that even though Progressive muscle relaxation has been implemented correctly if the client is unable to focus his mind during the intervention, it will produce less than optimal results.

After carrying out Progressive muscle relaxation, it is hoped that the client will be able to manage the body's stress condition. This ability to manage stress can manage stress levels which will have an impact on the client's emotional stability ^[27].

Relaxation can reduce subjective tension and influence other physiological processes. Muscle relaxation goes together with the autonomic response of the parasympathetic nerves and mental relaxation. Subjective feelings of anxiety can be reduced or eliminated by indirect suggestions or removing and eliminating the autonomic component of those feelings ^[28].

Progressive Muscle Relaxation was carried out for three consecutive days and then it was evaluated that there was an effect of reducing blood glucose after the Progressive Muscle Relaxation therapy was carried out ^[29].

In line with the results of research conducted by Rika 2016, there is an effect of physical exercise in reducing blood glucose levels in type 2 DM patients by stretching and flexibility training for 10 minutes, then walking for 30 minutes with an increase in the maximum intensity of heart rate of 60%, then stretch in a sitting position for 10 minutes, all the movements above are done 3 times a week for 8 weeks ^[30]

According to the author, the problem of unstable blood sugar levels in clients requires continuous intervention to be carried out so that blood sugar levels within normal limits are achieved, for this reason, the participation of patients and families is needed, so that problems arising from hyperglycemia can be prevented. The role of the family is quite important in providing support and motivation to clients, especially Diabetes Mellitus patients, in complying with diet and progressive muscle relaxation therapy because the better the role played by the family in managing medical rehabilitation for patients, the faster the patient's healing process will be and lifestyle changes will be better. healthy for the future. Controlling Diabetes Mellitus is an important goal in controlling blood sugar levels ^[31].

The success of the DM management program is independently determined by the performance and active role and motivation of the patient and family ^[32].

Conclusion

The conclusion from the research results shows that there is an influence of Progressive Muscle Relaxation on reducing blood glucose levels in Diabetes Mellitus patients.

References

- [1] W. Safitri and R. Putriningrum, "Pengaruh Terapi Relaksasi Progresif Terhadap Kadar Gula Darah Pasien Diabetes Mellitus Tipe 2," *PROFESI (Profesional Islam): Media Publikasi Penelitian*, vol. 16, no. 2, pp. 47–54, 2019.
- [2] R. Yosmar, D. Almasdy, and F. Rahma, "Survei Risiko Penyakit Diabetes Melitus Terhadap Masyarakat Kota Padang," *Jurnal Sains Farmasi & Klinis*, vol. 5, no. 2, pp. 134–141, 2018.
- [3] International Diabetes Federation, "IDF Diabetes Atlas: Global Estimates of Diabetes Prevalence For 2017 and Projections For 2045," *Diabetes Res Clin Pract*, vol. 138, pp. 271–281, 2018, doi: 10.1016/j.diabres.2018.02.023.
- [4] G. Suheriono, "Kalibrator Tensimeter Dilengkapai dengan Pengukuran Suhu dan Kelembaban," *Jurnal Teknokes*, vol. 9, no. 1, p. 2, 2016.

- [5] S. D. E. U. Sitepu, T. M. Karokaro, P. C. Simarmata, A. E. P. Silalahi, K. Hayati, and S. T. Sipayung, "Penyuluhan Teknik Relaksasi Otot Progresif untuk Menurunkan Kadar Gula Darah pada Pasien Diabetes Mellitus Tie 2 di Rumah Sakit Grandmed," *Jurnal Pengmas Kestra (JPK)*, vol. 1, no. 1, pp. 168–172, 2021, doi: 10.35451/jpk.v1i1.760.
- [6] International Diabetes Federation, "IDF Diabetes Atlas: Global Estimates of Diabetes Prevalence For 2017 and Projections For 2045," *Diabetes Res Clin Pract*, vol. 138, pp. 271–281, 2018, doi: 10.1016/j.diabres.2018.02.023.
- [7] RISKESDAS, "Riset Kesehatan Dasar," *Jakarta: Badan Penelitian dan Pengembangan Kesehatan Departemen Kesehatan Republik Indonesia*, no. Penyakit Menular, p. 103, 2013, doi: 10.1007/s13398-014-0173-7.2.
- [8] A. Nur'aini, "Teknik Progressive Muscle Relaxation (PMR)," *Jurnal Keperawatan*, 2018.
- [9] M. Eppang and D. Prabawati, "Efektivitas Massage Effleurage Terhadap Sensori Proteksi Kaki pada Pasien Diabetes Melitus," *Jurnal Ilmiah Kesehatan Keperawatan*, vol. 16, no. 1, pp. 1–7, 2020.
- [10] L. R. N. Fitriani and N. I. Aderita, "Perawatan Kaki Spa Kaki Atasi Masalah Ketidakefektifan Perfusi Jaringan Perifer Pada Pasien Diabetes Millitus Tipe II," *Indonesian Journal On Medical Science*, vol. 8, no. 1, pp. 25–31, 2021.
- [11] N. L. Prasetawati and Rusnoto, "Pengaruh Progressive Muscle Relaxation Terhadap Penurunan Kadar Gula Darah Sewaktu pada Pasien Diabetes Mellitus di Puskesmas Keling 1 Kabupaten Jepara," *Jurnal Ilmu Keperawatan dan Kebidanan*, vol. 12, no. 2, pp. 411–417, 2021.
- [12] S. D. E. U. Sitepu, T. M. Karokaro, P. C. Simarmata, A. E. P. Silalahi, K. Hayati, and S. T. Sipayung, "Penyuluhan Teknik Relaksasi Otot Progresif untuk Menurunkan Kadar Gula Darah pada Pasien Diabetes Mellitus Tie 2 di Rumah Sakit Grandmed," *Jurnal Pengmas Kestra (JPK)*, vol. 1, no. 1, pp. 168–172, 2021, doi: 10.35451/jpk.v1i1.760.
- [13] R. Meilani, F. Alfikrie, and A. Purnomo, "Efektivitas Relaksasi Otot Progressive Terhadap Kadar Gula Darah: Penelitian Quasi Eksperimen pada Penderita Diabetes Militus Tipe 2 Usia Produktif," *Borneo Nursing Journal (BNJ)*, vol. 2, no. 2, pp. 22–29, 2020.
- [14] H. Siswanti and U. Kulsum, "Progressive Muscle Relaxation (PMR) terhadap Perubahan Kadar Glukosa Darah (KGD) pada Pasien Deabetes Melitus (DM)," *Jurnal Ilmu Keperawatan dan Kebidanan (JIKK)*, vol. 1, no. February, pp. 206–212, 2021, doi: 10.26751/jikk.v10i1.640.
- [15] I. A. Rahman, I. Inayah, L. Rohayani, S. Keperawatan, S. Jenderal, and A. Yani, "Pengembangan Rancangan Aplikasi Perhitungan Indikator Pelayanan Rawat Inap Berbasis Komputer di Rumah Sakit Ciamis," *Health Information : Jurnal Penelitian*, vol. 12, no. 1, pp. 53–62, Apr. 2021, doi: 10.36990/hijp.vi.161.
- [16] I. A. Rahman, H. Marliany, L. Lismayanti, and A. Gunawan, "Implementation Of Nursing Care Documentation In The Inpatient Room," *JURNAL VNUS (Vocational Nursing Sciences)*, vol. 1, no. 2, pp. 39–44, Nov. 2019, doi: 10.52221/JVNUS.V1I2.155.
- [17] R. Novitasari, "Hubungan Antara Pengetahuan dan Sikap dengan Kepatuhan Diit Diabetes Mellitus (DM) pada Lanjut Usia (Lansia) di Kelurahan Gayam Kecamatan Sukoharjo," *Jurnal Keperawatan*, 2015.
- [18] S. Kristina, F. Sri, MAN, and W. Widi, "Asuhan Keperawatan pada Klien Diabetes Mellitus dengan Masalah Ketidakstabilan Gluosa Darah di Rumah Sakit Panti Waluyo Sawahan Malang," *Jurnal Keperawatan*, 2019.
- [19] S. Imelda, "Faktor-Faktor yang Mempengaruhi Terjadinya Diabetes Melitus di Puskesmas Harapan Raya Tahun 2018," *Scientia Journal*, vol. 8, no. 1, pp. 28–39, 2019.
- [20] "Diabetes Tipe 2 Bisa Diwariskan Secara Genetis - Direktorat P2PTM." <https://p2ptm.kemkes.go.id/artikel-ilmiah/diabetes-tipe-2-bisa-diwariskan-secara-genetis> (accessed Jan. 05, 2023).

- [21] S. M. S. DR. Jenita DT Donsu *et al.*, “Buku Panduan Praktek Kebutuhan Dasar Manusia I”.
- [22] W. Astuti, K. R. Ependi, N. D. Ayu, T. Emiliyasi, and I. K. Allooh, “Pengaruh Relaksasi Otot Progresif Terhadap Penurunan Kadar Glukosa Darah : A Literature Review,” *Jurnal of Bionursing*, vol. 3, no. 1, pp. 72–84, 2021.
- [23] A. Retno Suryatika and W. Heru Pramono, “Penerapan Senam Otak Terhadap Fungsi Kognitif Pada Lansia Dengan Demensia,” *Jurnal Manajemen Asuhan Keperawatan*, vol. 3, no. 1, pp. 28–36, 2019.
- [24] J. Kusumawaty, I. Ali Rahman, D. Supriadi, F. Dwi Lestari, T. Hidayati, and J. K. Kusumawaty STIKes Muhammadiyah Ciamis Jl Ahmad, “The Effect of Progressive Muscle Relaxation Using Audio-Visual Media on Blood Pressure Reduction in Elderly Hypertension Patients,” *International Journal of Nursing and Health Services (IJNHS)*, vol. 4, no. 5, pp. 569–574, Oct. 2021, doi: 10.35654/IJNHS.V4I5.501.
- [25] N. L. Prasetawati and Rusnoto, “Pengaruh Progressive Muscle Relaxation Terhadap Penurunan Kadar Gula Darah Sewaktu pada Pasien Diabetes Mellitus di Puskesmas Keling 1 Kabupaten Jepara,” *Jurnal Ilmu Keperawatan dan Kebidanan*, vol. 12, no. 2, pp. 411–417, 2021.
- [26] I. A. Rahman, “PENERAPAN APLIKASI SISTEM INFORMASI INDIKATOR PELAYANAN RAWAT INAP BERBASIS WEBSITE DI RUMAH SAKIT,” *Jurnal Pelayanan dan Pengabdian Masyarakat (Pamas)*, vol. 6, no. 1, pp. 65–71, Apr. 2022, doi: 10.52643/PAMAS.V6I1.2126.
- [27] U. Herlambang, Kusnanto, L. Hidayati, H. Arifin, and R. O. Pradipta, “Pemberian Progressive Muscle Relaxation terhadap Stres dan Penurunan Gula Darah pada Pasien Diabetes Mellitus Tipe 2,” *CRITICAL MEDICAL AND SURGICAL NURSING JOURNAL*, vol. 8, no. 1, pp. 45–55, 2019, doi: 10.33655/mak.v6i1.127.
- [28] S. Maghfirah, I. K. Sudiana, and I. Y. Widyawati, “Relaksasi Otot Progresif Terhadap Stres Psikologis Dan Perilaku Perawatan Diri Pasien Diabetes Mellitus Tipe 2,” *Jurnal Kesehatan Masyarakat*, vol. 10, no. 2, p. 137, 2015, doi: 10.15294/kemas.v10i2.3374.
- [29] M. A. Koniyo, R. F. Zees, and L. Usman, “Effectiveness of Progressive Muscle Relaxation and Autogenic on Reducing Blood Glucose Levels in Type 2 Diabetes Mellitus Patients,” *Jambura Journal of Health Sciences and Research*, vol. 3, no. 2, pp. 218–225, 2021.
- [30] R. Lisiswanti and R. N. Cordita, “Aktivitas Fisik dalam Menurunkan Kadar Glukosa Darah pada Diabetes Melitus Tipe 2,” *Jurnal Majority*, vol. 5, no. 3, pp. 140–144, Sep. 2016, Accessed: Jan. 05, 2023. [Online]. Available: <https://juke.kedokteran.unila.ac.id/index.php/majority/article/view/1051>
- [31] T. Alawiyah, “Penatalaksanaan DM Sesuai Konsensus Perkeni 2015,” *Jurnal Keperawatan*, 2015.
- [32] PERKENI, “Konsensus Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 di Indonesia 2011 Perkumpulan Endokrinologi Indonesia,” *Perkumpulan Endokrinologi Indonesia*, 2011.