

## DIABETES MELLITUS GYMNASTICS IMPACTS RESILIENCE AND STRESS LEVELS: FACT OR MYTH?

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### ABSTRAK

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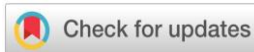
Diabetes Mellitus,  
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#### Abstract:

Diabetes Mellitus type II is a condition of increased blood glucose caused by disturbances in insulin resistance and insulin secretion that causes metabolic disorders of the body, is a silent killer disease. Living with DM causes stress in a person because most of the patient's time is spent on treatment. It is estimated that around 1.6 million deaths are caused by diabetes globally. Decreased quality of life often occurs in patients with chronic diseases, one of which is DM which has an impact on stress and resilience. The purpose of this study was to determine the effect of Diabetes Exercises on the level of stress and resilience of DM sufferers. This study used a Quasy Experimental design (Pre & Post test), involving 20 intervention groups and 20 control groups taken with purposive sampling techniques. The paired sample t-test results showed a p-value of 0.448 which means there was no difference before and after DM Exercise to stress and resilience. DM Exercise indirectly does not affect the resilience and stress of DM sufferers, it contributes to reducing the stress of DM patients. In future studies, it is expected that Diabetes Resilience Training and Mindfulness actions in DM patients to improve quality of life.

#### Abstrak:

Diabetes Mellitus tipe II adalah kondisi peningkatan glukosa darah yang disebabkan gangguan pada resistensi insulin dan sekresi insulin yang menyebabkan gangguan metabolisme tubuh, merupakan penyakit silent killer. Hidup dengan DM mengakibatkan stress pada seseorang karena sebagian besar waktu pasien di gunakan untuk perawatan. Ditaksir sekitar 1,6 juta kematian diakibatkan oleh diabetes secara global. Penurunan kualitas hidup sering terjadi pada penderita dengan penyakit kronis, salah satunya DM yang berdampak pada keadaan stress dan resiliensi. Tujuan penelitian ini adalah untuk mengetahui pengaruh senam DM terhadap tingkat stress dan resiliensi penderita DM. Penelitian ini menggunakan desain Quasy Experimental (Pre & Post test), melibatkan 20 orang kelompok intervensi dan 20 kelompok kontrol yang diambil dengan tehnik purposive sampling. Hasil uji paired Sample t-test menunjukkan p-value 0.448 yang berarti tidak ada perbedaan sebelum dan setelah senam DM terhadap stress dan resiliensi. Senam DM secara tidak langsung tidak pengaruh terhadap resiliensi dan stress penderita DM., hal tersebut berkontribusi dalam menurunkan stress pasien DM. Pada penelitian selanjutnya diharapkan tindakan Diabetes Resilience Training dan tindakan Mindfulness pada pasien DM untuk meningkatkan kualitas hidup.



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## INTRODUCTION

Type II Diabetes Mellitus is a condition of increased blood glucose caused by disturbances in insulin resistance and insulin secretion that causes metabolic disorders of the body, is a silent killer disease. Living with DM causes stress in a person because most of the patient's time is spent on treatment. It is estimated that around 1.6 million deaths are caused by diabetes globally [1]. DM includes diseases that require prolonged treatment so that it can have an impact on increasing psychological problems, decreased physical function, non-adherence to drugs and treatments, impaired glycemic control, and an increased risk of diabetes complications [1]. This triggers stress and survival of patients in their lives. The results of Riskesdas show a significant increase in the prevalence rate of DM, from 6.9% in 2013 to 8.5% in 2018, so that the estimated increase in the number of DM sufferers in Indonesia reaches more than 16 million people in 5 years. The prevalence of DM in Indonesia was 10.3 million in 2018 and is number six in the world [2]. Riskesdas recorded an increase from 6.9% to 8.5% in 2018 [4]. Ironically, this is inversely proportional to the efforts made by the Government in reducing the incidence of DM in Indonesia.

Physical exercise can increase metabolism or the formation and expenditure of body energy, resulting in oxygen and energy consumption increased 20 times, so that the use of glucose can also be used in large quantities by not requiring large amounts of insulin because muscle fibers become more permeable to glucose due to contraction of the muscle itself [3]. Regular physical activity practice can improve the fitness and sensitivity of insulin in the body so that blood glucose control becomes better.

The purpose of this study is to explain and analyze the effect of Diabetes Exercises on the stress level of diabetes mellitus patients before and after the intervention.

## RESEARCH METHOD

The research design to be used is Quasi Experimental (pre & post-test) Design. The study population was all type II DM patients in Sukosari Village, Ngrandu Health Center. Samples were taken by purposive sampling technique, then divided into an intervention group of 20 respondents and a control of 20 respondents. The Stress level assessment was assessed twice, namely before intervention and after Exercises was carried out for 3 weeks intensity 1 time a week, Diabetes Exercises Exercise was performed for +- 15 minutes. The study instrument used the DM and DASS patient resilience questionnaire for stress. Data analysis with paired sample t-test [3]. Inclusion criteria: DM patients aged 36 – 65 years, mild-moderate stress, long illness 1 – 5 years, not experiencing musculoskeletal disorders. In the intervention group, a protocol was carried out between vital sign tests including blood pressure and pulse, random blood sugar tests, free of musculoskeletal complaints.

The independent variable is Diabetes Exercises and the dependent variable is resilience and stress level. The data collection instruments are the Resilience Questionnaire and DASS questionnaires [7]. Data collection will be taken Sukosari Village in June–September 2023.

The hypothesis of this study is: there is an influence of Diabetes Exercises on resilience and stress levels. Data were analyzed statistically using frequency and crosstab descriptive statistical tests, as well as non-parametric correlation tests Data analysis using paired sample t-test with significance 0.05.

**RESULTS AND ANALYSIS**

**Table 1.**  
**Karakteristik Responden**

Characteristic	Group			
	Interventio n (n:20)		Control (n:20)	
Age (tahun)	Qty	%	Qty	%
26 – 35	2	10	1	5
36 – 45	3	15	1	5
46 – 55	8	40	9	45
56 – 65	6	30	5	25
> 65	1	5	4	20
<b>Gender</b>				
Male	7	35	5	25
Fremale	13	65	15	75
<b>Education</b>				
Senior High School	3	15	3	15
Yunior High School	8	40	3	15
Elementary School	6	30	9	45
No School	3	15	5	25

Based on table 1 above shows the characteristics of respondents based on age, the most respondents in the intervention group were in the age range of 46 – 55 years as much as (40%) while in the control group there were in the age range of 46 – 55 years as much as (45%). In the characteristics of Gender, the most respondents were female, namely 13 respondents (65%) in the intervention group and 15 respondents (75%) in the control group. The most education respondents were 8 respondents (40%) in the intervention group and 9 respondents (45%) in the control group (40%) in the intervention group and 9 respondents (45%) in the control group.

**Table 2.**  
**Differences Before and After Diabetes Exercises on Resilience**

Test Statistics <sup>a</sup>		
	Post Test Eksperimen - Pre-Test Eksperimen	Post-Test Kontrol - Pre- Test Kontrol
Z	-1.581 <sup>b</sup>	-.748 <sup>b</sup>
Asymp. Sig. (2- tailed)	.114	.454

Based on table 2 above shows the value of the *Wilcoxon test* results known to Asymp. Sig. (2-tailed) is 0.114. Since 0.114 is greater than > 0.05, it can be concluded that H0 is accepted meaning that there is no difference before and after Diabetes Exercises on resilience.

**Table 3.**  
**Paired Samples Test**

		t	df	Sig. (2- tailed)
Pair 1	Pre-Test Eksperimen Stres - Post Test	.774	19	.448
	Eksperimen Stres			
Pair 2	Pre-Test Kontrol Stres - Post-Test Kontrol Stres	-.782	19	.444

Table 3 shows that the level of stress after data analysis with paired samples test ( $\alpha$  0.05) in the treatment group obtained a p-value of 0.448, then a p-value of >0.05 which means there is no effect of Diabetes Exercises intervention on stress levels. In the treatment group, a p-value of 0.444 was obtained, which means that there was no difference in Diabetes Exercises intervention on the stress level of DM patients.

**DISCUSSION**

**The Effect of Diabetes Exercises on the Resilience of Type 2 Diabetes Mellitus Patients**

Based on the data above, it shows that there is no significant effect of Diabetes Exercise on the resilience of type 2 diabetes mellitus patients. In data analysis, the value of Asymp is obtained. Sig. (2-tailed) is 0.114 so the value is greater than > 0.05. According to Yi Frezer (2010), resilience is defined as a person's ability and adaptive personality to maintain his psychological well-being in the face of difficulties. [6]

Resilience does not have to be defined as a character that has been attached to the individual, but rather the

result of a process. Resilience is an individual's capacity to survive stressful situations if an individual is said to be resilient, then the individual can find a way to survive and adjust himself even in difficult situations [2]. Perkeni (2021) stated that physical exercise is one of the divisions in the management of type 2 DM [8]. Program regular physical exercise of 30 – 45 minutes during the week for a total time of 150 minutes. Physical activity is useful for maintaining fitness, besides that it can also lose weight and improve or increase insulin sensitivity in the body so that it will be able to improve blood glucose control.

DM exercise can increase the body's muscle activity up to three times when doing moderate-intensity physical activity for a period of more than 20 minutes [3]. The regularity of DM exercise can increase the sensitivity of receptors in producing insulin in the body. Increased insulin receptor sensitivity can increase 12-24 hours after doing Diabetes exercise activities for two consecutive days because blood sugar control in the body is done less than optimal [3].

Some factors that affect a person's resilience are social support, namely social support concerning; Care and attention to people around him, cognitive skills include; how to find solutions to problems, avoidance skills from self-blame, self-control and spirituality, and psychological resources including empathy, flexibility in any condition, and being able to take lessons from every Sarafino event [4]. From this information, Diabetes Exercises has not had a resilience impact on sufferers, while in addition to physical activity, there are still other factors so that a DM sufferer is able to have resilience in facing his pain. In line with this, research [11] states that resilient conditions can also be achieved by DM sufferers, namely by adapting to a healthy lifestyle according to the DM pillar.

A qualitative study also states that resilience, support and self-care ability are important to achieve resilience in people

with DM [6]. So the participation of health workers in providing comprehensive health services is very important in increasing the resilience of DM sufferers. Providing knowledge and understanding of DM disease's physical and psychological aspects will contribute to increasing the resistance of DM sufferers.

### **The effect of Diabetes Exercises on the stress level of type 2 diabetes mellitus patients**

Table 4.7 shows that the stress level after data analysis with paired samples test ( $\alpha$  0.05) in the treatment group obtained a p-value of 0.448, then a p-value of  $>0.05$  which means there is no effect of Diabetes exercise intervention on stress levels. In the treatment group, a p-value of 0.444 was obtained, which means that there is no effect of DM Exercise intervention on the stress level of DM patients

Diabetes is very sensitive to the effects of stress. Stress in many diabetic patients interferes with the process of controlling blood glucose. Studies have revealed that poor diabetes control and stressful events are positively correlated. Davydov (2010) in [7]. Similarly, other research findings show that resilience-based diabetes self-management education improves psychological and physiological health in type 2 diabetes patients cited by Steinhardt [7]. DM sufferers have mild stress levels because they begin to feel the impact since being diagnosed with DM and continue with DM treatment [15].

Stress is the body's response, both physical and psychic, to the demands of the environment that cause tension and disruption to daily life [11]. Reciprocity is a coexistence that describes an individual's ability to maintain his psychological and/or physical well-being. In undergoing the DM prolanis program, DM sufferers must have excellent resilience, because DM sufferers undergo prolanis in a long span of time. This condition certainly causes boredom and even stress easily occurs so that it interferes with the success of the DM

treatment program [8]. The environment described can be as a stressor (stimulus), the environment as a stimulus can be both internal and external. Internal stimulus is a state of mental processes in the human body such as experience, emotional ability, personality. While external stimuli include physical, chemical, psychological that a person receives as a threat [9]. Aspects of resilience include emotional regulation. This emotional regulation is the ability to remain calm even in a depressed position. The emotions felt by a person tend to influence the condition of that person [11].

According to Stuart [9] a person's coping mechanisms are influenced by an assessment of stress and coping sources. Coping mechanisms are the way a person handles situations against stress determined by himself or herself including physical health, positive beliefs, problem-solving skills, social skills, social support. In line with Stuart, coping mechanisms are efforts directed at managing stress, including direct problem solving and defense mechanisms in self-protection. Divided into innate coping mechanisms (genetic owned) and learned obtained through the process of learning and experience in everyday life.

By being disciplined in carrying out the five pillars of DM, namely education, medication, blood sugar control, physical activity, and diet. When patients follow the DM prolanis program regularly get this, for example education on DM handling and efforts to increase self-resilience and reduce stress during illness [2]. In addition, interaction with other DM sufferers and health workers will increase their confidence in recovery, so this will help reduce stress levels [8]. The importance of knowledge and understanding of individuals about their illness and efforts during the face of illness will have a positive influence in living daily life.

## CONCLUSION

In this study, there was no difference between giving DM gymnastics before and after to the resilience and stress level of

DM sufferers". DM sufferers who are able to adapt to a healthy lifestyle according to the DM pillars can provide resilient conditions and stress levels, as well as being influenced by social support, cognitive skills and psychological resources.

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## REFERENCES

- [1] WHO, "Global Report on Diabetes," WHO, Geneva, 2016.
- [2] H. Rohmah, Faktor Yang Mempengaruhi Resiliensi Klien Dengan Diabetes Mellitus Yang Menjalani Perawatan Di Rumah Sakit PHC Surabaya, Surabaya: Universitas Airlangga, 2020.
- [3] IDF, "International Diabetes Federation. In The Lancet (Vol. 266, Issue 6881).," Diakses 20 November 2022, 2019.
- [4] Riskesdas, "Badan Penelitian dan Pengembangan Kesehatan," Kementria Kesehatan RI, Jakarta, 2018.
- [5] Nugraha, "Kadar Gula Darah Sebelum Dan Sesudah Melaksanakan Senam Diabetes pada Pasien Senam Diabetes tipe II," *Jurnal Ilmiah Kesehatan*, vol. 9 (2), 2016.
- [6] Nursalam, Konsep dan Penerapan Metodologi Penelitian Ilmu Keperawatan: Pedoman Skripsi, Tesis, dan Instrumen Penelitian Keperawatan, Jakarta: Salemba Medika, 2015.
- [7] Basha E, Kaya M. Depression, Anxiety, and Stress Scale (DASS): The Study of Validity and Reliability. *Universal Journal of Educational Research*. 2016; 4 (12); 2701-5.
- [8] L. H. Fadila U, "Perbedaan

- Resiliensi Pada Penderita Diabetes Mellitus Tipe II Berdasarkan Jenis Kelamin," *Character: Jurnal Penelitian Psikologi*, p. Vol 3 No 2, 2014.
- [9] PERKENI, Pedoman Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 Dewasa DI Indonesia (1st Ed.), PB PERKENI, 2021.
- [10] D. H. Apriliyani, "Pengaruh Senam DIabetes Terhadap Kadar Gula Darah Pasien Diabetes Melitus: Literature Review," *Jurnal Penelitian Kesehatan Suara Forikes*, pp. 51-56, 2022.
- [11] E. Yunitasari, The Development of Coping-Roy's Adaptation Nursing Care Model To Increase The Resiliency of Post Radical Hysterectomy+ BSO Cervical Cancer Patients Who Received Chemotherapy, Surabaya: Universitas Airlangga, 2016.
- [12] Purwaningsih, Y, Hartanto, A.E, Hendrawati, G.W, (2022)., Intervensi Relaksasi: Hipnosis Modifikasi Lima Jari untuk Mengatasi Stres dan Resiliensi Penderita Diabetes Melitus, Pekalongan: Penerbit NEM, 2022.
- [13] A. W. Kusnanto, "A qualitative study exploring diabetes resilience among adults with regulated type 2 diabetes mellitus," *Diabetes & Metabolic Syndrome: Clinical Research & Reviews Vol. 14, Issue 6*, pp. Pages 1681-1687, 2020.
- [14] A. P. Z. & S. M. Torabizadeh. C, "The Effects of Resilience Training on the Self-Efficacy of Patients with Type 2 Diabetes: A Randomized Controlled Cloinical Trial," *International journal of community based nursing and midwifery*, pp. 211-221, 2019.
- [15] H. L. Nursucita. A, "Factors Causing Stress in type 2 Diabetes Mellitus Patients," *Jambura Journal Of Health Science and Research*, Vols. Vol. 3, No 2, 2021.
- [16] D. K. P. B. Kusumawati, "Perbandingan Efektivitas Mindfulness Based Intervention Terhadap Diabetes Resilience Training pada," *Jurnal Penelitian Kesehatan Suara Forikes*, pp. 24-33, 2022.