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The Effect of Progressive Muscle Relaxation (PMR) on Stress Level of Diabetes Mellitus Patients



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Abstract

Diabetes mellitus is a chronic condition that occurs when there is an increase in glucose levels in the blood because the body cannot produce enough insulin or use insulin effectively. In stressful conditions, it can increase the hormone adrenaline which can convert glycogen reserves in the liver into glucose and increase blood sugar in diabetes mellitus patients. The objective of this research was to prove the effect of Progressive Muscle Relaxation (PMR) on stress levels in Diabetes Mellitus patients. Research design pre-post test control group design. The experimental group was given treatment in the form of progressive muscle relaxation (PMR) while the control group received treatment as usual/conventional. The samples in this research were some DM patients at the Mentikan Community Health Center, Mojokerto City, totaling 35 respondents. The results of the pre-test and post-test in the treatment and control groups showed that there was a reduction in stress. It was found that there was a significant decrease in stress in both the treatment group, this was indicated by $p=0.001$ for the treatment group, while in the control group it was found to be $p=0.303$, so the decrease stress is not significant. After carrying out PMR, it is hoped that the client will be able to manage the body's condition in response to stress.

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INTRODUCTION

DM is a multifactorial disease with genetic and environmental components that are equally strong in the process of causing the disease. The influence of genetic factors can be seen by the high number of diabetics who come from parents who have a history of diabetes before. Type 2 DM is also called lifestyle diabetes because the causes apart from heredity, environmental factors including age, obesity, insulin resistance, food, physical activity, and unhealthy lifestyle of sufferers also play a role in the occurrence of this diabetes (Betteng, Pangemanan, 2014). The preliminary research conducted by researchers at the Mentikan Health Center in Mojokerto City obtained data on the number of DM patients for the period January to October 2022 as many as 895 patients.

The results of interviews with DM patients through interviews found that some patients experienced increased blood sugar even though they had maintained their diet and daily activities, after being traced it turned out that patients experienced stress both from their physical problems and problems in their life. This shows that stress factors affect the patient's blood sugar levels. The handling of stress and blood sugar reduction that has been carried out by the Puskesmas is gymnastics once a week and routine blood sugar checks every month. insulin effect and causes high blood glucose levels (Pratiwi, 2014). Glucose/blood sugar is the simplest form of carbohydrates which is absorbed into the blood fluids through the digestive system. Blood glucose levels increase after meals and fall to their lowest level the day before meals. (Prince & Wilson, 2008) In Hilliard's research, et al (2016) stated that patients who experience DM have increased stress levels ranging from 20 - 40%. According to (Sofiana & Utomo, 2016), of the 30 type 2 DM patients studied, 12 respondents (40%) experienced low levels of stress, 2 moderate levels of stress (6.7%) and 16 respondents experienced high levels of stress.

(53.3). Stress is the body's reaction or response to psychosocial stressors (mental pressure/burden of life) which causes excess production of cortisol, cortisol is a hormone that counteracts the effects of insulin and causes high blood glucose levels (Pratiwi, 2014). Glucose/blood sugar is the simplest form of carbohydrates which is absorbed into the blood fluids through the digestive system. Glucose levels rise after meals and fall to their lowest blood level the day before meals (Prince & Wilson, 2018).

METHODS

This research used a pre-post test control group design. The experimental group was given treatment in the form of progressive muscle relaxation (PMR) while the control group received treatment as usual/conventional. In both groups it started with a pre-test and after giving the treatment a post-test was again measured (Nursalam, 2017). The independent variable was Progressive Muscle Relaxation (PMR), the dependent variable used in this research was the level of stress in DM sufferers. The samples in this research were some DM sufferers who were undergoing treatment at the Mentikan Community Health Center, Mojokerto City, 35 respondents in the treatment group and 35 respondents in the control group. There were 2 instruments in this research, namely: 1) **Progressive Muscle Relaxation (PMR)**; SOP Progressive Muscle Relaxation (PMR) which consists of 13 steps in doing relaxation movements, 2) **Stress**; The instrument used to determine stress is using the DASS 42 questionnaire by Lovibond & Lovibond (1995) in (Crawford, J., Henry, 2013). DASS 42 has been validated so there is no need to test the validity and reliability. To determine the level of stress, the instrument used is a questionnaire that takes 14 items specifically for measuring stress levels. Analysis of the effect of PMR on the stress variable using the Wilcoxon Rank Test nonparametric test.

RESULTS

The Effect of Progressive Muscle Relaxation on Stress in DM Patients

Table 1: Distribution of Respondents Effect of PMR on stress in DM patients

Stres	Treatment Group				Control Group				
	Pre Intervention		Post Intervention		Pre Intervention		Post Intervention		
	f	%	f	%	f	%	f	%	
Normal	1	2.8	6	17.3	0	0	0	0	
Light	9	25.7	12	34.2	9	25.8	10	28.6	
Currently	25	71.5	17	48.5	26	74.2	25	71.4	
Heavy	0	0	0	0	0	0	0	0	
Very Heavy	0	0	0	0	0	0	0	0	
Total	35	100%	35	100%	35	100	35	100	
<i>Wilcoxon signed rank test</i>				<i>p=0.001</i>		<i>p=0.303</i>			
<i>Mann whitney test</i>					<i>p=0.001</i>				

Table 1 shows that there are differences in the pre-test and post-test results for each group. The results of the pre-test and post-test in the treatment and control groups showed that there was a reduction in stress. Based on the results of the Wicoxon Signed Rank Test statistical test (with a significance of $p < 0.05$) it was found that there was a significant decrease in stress in the treatment group, this was indicated by $p = 0.001$ for the treatment group, whereas in the control group it was found $p = 0.303$, so that the decrease in stress not significant. From these data, in the treatment group there was a decrease in stress before and after being given the Progressive Muscle Relaxation intervention in DM patients. The Mann Whitney Test results were used to determine the difference in stress scores between the treatment group and the control group after receiving the Progressive Muscle Relaxation intervention in DM patients. This is shown by $p = 0.001$, meaning there is a significant difference in scores between the treatment group and the control group.

DISCUSSION

The effect of progressive muscle relaxation on stress in DM patients at the Mentikan Health Center, Mojokerto City

Based on the results of the research on the effect of PMR on the stress level of DM sufferers according to the Wicoxon Signed Rank Test statistical test, it was found that there was a significant decrease in stress in the treatment group, this was indicated by a p value = 0.001 for the treatment group, while in the control group it was obtained p value = 0.303 so that the decrease stress is not significant. PMR is a relaxation therapy by tightening and relaxing the muscles in one part of the body at a time to provide a feeling of physical relaxation. Movements to progressively tighten and relax these muscle groups are performed successively. When performing PMR the patient's attention is directed to distinguish the feelings experienced when muscle groups are relaxed and compared when the muscles are tense (Molassiotis et al. 2002; Smeltzer et al. 2013 in (Nuwa, M.S., Kusnanto and Utami, 2018). PMR has a relaxing effect and self-management ability and is able to reduce muscle tension, stress, lower blood pressure, increase tolerance for daily activities,

increase immunity so that the quality of life of DM patients increases (Bare and Smeltzer, 2018).

Signs of stress experienced by respondents were mostly caused by difficulty falling asleep, frequently waking up at night to urinate and not being able to sleep again, concerns about long-term complications and concerns about an increase in their blood sugar levels which caused respondents to feel disturbed in their daily activities. This is in line with Nash, (2014) stating that the specific causes of stress experienced by DM patients are fear of long-term complications, worry about hypoglycemia, fear of needles and worry about the influence of DM on the family. This is also consistent with Sullivan, (2016) that DM patients have signs of stress such as headaches, muscle aches, sleeping too much or too little, tiredness, feeling unmotivated, depressed and anxious. Post test results after being given the Progressive Muscle Relaxation intervention, in the treatment group there were 17 respondents with moderate stress, 12 respondents with mild stress and 6 people with normal stress. In the control group, there were 25 respondents with moderate stress and 10 respondents with mild stress.

The results obtained from this research showed that stress levels in the treatment group had

decreased. This is in line with (Najafi Ghezljeh *et al* (2017) where after carrying out PMR it is hoped that clients will be able to manage their body condition against stress. The ability to manage stress is expected for clients to be able to manage their stress which will have an impact on the client's emotional stability. This is also in accordance with Prasetyo, (2016) that relaxation can reduce subjective tension and influence other physiological processes. Muscle relaxation goes together with the autonomic response of the parasympathetic nerves. Muscle relaxation goes hand in hand with mental relaxation. Subjective feelings of anxiety can be reduced or eliminated by indirect suggestions or removing and eliminating the autonomic component of those feelings.

CONCLUSION

Based on the results of the research on the effect of PMR on the stress level of DM sufferers according to the Wicoxon Signed Rank Test statistical test, it was found that there was a significant decrease in stress in the treatment group, this was indicated by a p value = 0.001 for the treatment group, while in the control group it was obtained p value = 0.303 so that the decrease stress is not significant. after doing PMR it is expected that the client is able to manage his stress

SUGGESTION

The Progressive Muscle Relaxation (PMR) intervention for DM patients can be carried out independently by the respondent while at home so that they can manage stress and hopefully reduce blood sugar levels. For future researchers, it is hoped that when administering the Progressive Muscle Relaxation (PMR) intervention, respondents will be accompanied by their family to maintain concentration and precision of movement. PMR can be modified with other relaxation, especially for psychology so that the results obtained are maximized.

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CONFLICTS OF INTEREST

The author declares that there are no conflicts of interest with the topic or any associated objects upon the publication of this research.

AUTHOR CONTRIBUTIONS

In this research the first author as a correspondence author who is responsible for the research process to publication by writing articles that have been adjusted to journal guidelines. The second author assisted in the research process and data analysis. The third author helps research in the data collection process.

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