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Original Article

The effect of Jacobson's progressive muscular relaxation on the stress level of final year students of the medical education study program at Nusa Cendana university

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ABSTRACT

Background: Students have stress from a variety of sources, both academic problems related to failures in academic achievement, health problems, and writing final projects. This comes from the burden of the amount and complexity of the material to be studied, the hectic lecture schedule, and the piling up of tasks. Therefore, the higher the incidence of stress, the more appropriate treatment is needed in terms of pharmacological and non-pharmacological aspects. Non-pharmacological treatment to overcome stress has many benefits, including Jacobson's Progressive Muscular Relaxation (JPMR). JPMR is an option because it is the cheapest relaxation therapy, simple, and easy to do independently. **Objective:** This study aims to determine the effect of JPMR on the stress level of final-year students of the Medical Education Study Program at Nusa Cendana University. **Methods:** This study used a quasi-experimental research design with pretest-posttest control of group design. Sampling uses a non-probability sampling technique with a total type of sampling with a complete sample of 30 people. The data were collected using a questionnaire on Depression Anxiety Stress Scales 42. The data analysis used is a Wilcoxon signed-rank test. **Results:** From the test results using the Wilcoxon signed rank test, there was a significant effect that can lower the stress level of the final level of the Medical Education Study Program at Nusa Cendana University with $P = 0.000$. **Conclusion:** JPMR has a significant influence can reduce the stress level of final year students of the Nusa Cendana University Medical Education Study Program

Keywords: Jacobson's Progressive Muscular Relaxation, Stress Levels, Jacobson's technique

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INTRODUCTION

Stress can occur due to an imbalance between reality and desired expectations.[1] Data from the World Health Organization state that nearly more than 350 million of the world's population experience stress and it occurs more in women (54.62%) than in men (45.38%).[2] Based on Riset Kesehatan Dasar (Riskesdas) data, there was an increase in stress levels in 2013 by 6–9.8% in 2018. By province, East Nusa Tenggara is ranked third with a stress prevalence of 15.7%.[3]

Stress can occur in all circles without exception, including students. Students experience stress from a variety of sources, both academic problems related to student failure in low academic performance, health problems, and in writing final projects.[4] The prevalence of students in the world experiencing stress is 38–71%, in Asia by 39.6–61.3% and in Indonesia by 36.7–71.6%.[5]

Medical students are one of the easiest to experience stress. This comes from the burden of the amount and complexity of the material to be studied, the busy lecture schedule, piling up assignments, and plus the writing of the final project which is one of the requirements for completing the study.[6] Final year students when undergoing the end of the study period have problems. The problems experienced by final year students

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come from academic and non-academic.[7] The stress level becomes higher because not only the course assignments but also because they have to complete the final project. In fact, quite a lot of students experience various obstacles, including a repeated revision process, difficulty getting references, the length of feedback from the supervisor when completing the thesis, limited research time, busy, and difficult to find supervisors.[8]

The study conducted by Gazzaz *et al.* reported stress in medical students as low as 25.6–78%.[9] This is supported by study conducted by Yohanes Lolan at the Faculty of Medicine, Nusa Cendana University in 2021 showed that out of 149 respondents, 6.8% experienced mild stress, then 88.6% experienced moderate stress, and 4.6% experienced severe stress.[10] A similar study conducted by Agusmar *et al*. regarding the description of stress in students who are working on a thesis at the Faculty of Medicine, Baiturrahmah University got results where 12.24% of final year students experienced severe stress, 69.39% of students experienced moderate stress, and 18.37% of students experienced mild stress.[11]

Based on the description above, the higher the incidence of stress, the more appropriate treatment is needed both in terms of pharmacological and non-pharmacological aspects. Stress management from a pharmacological point of view can be given drugs to reduce stress symptoms such as antidepressant drugs and sedative drugs that are good if used in a short period of time but if used for a long period of time can cause side effects of dependence on drugs.[12] Treatment from a non-pharmacological point of view to overcome stress that has many benefits, one of which is Jacobson's progressive muscular relaxation (JPMR).

JPMR was developed by Edmun Jacobson in 1920 at Harvard University which focused on systematic muscle toning and relaxation by creating calmness. JPMR is an option because it is the cheapest, simple, and easy type of relaxation therapy to do independently. The effect of JPMR on stress levels has been shown to have an influence in many studies. The study by Sari and Masnina conducted at the Muhammadiyah University of East Kalimantan in 2020 which showed results where out of 16 respondents, 11 respondents experienced a decrease in stress levels in prisoners in the Samarinda class III narcotics prison.[13-16]

The study from Sari and Masnina with the title of the influence of progressive muscle relaxation techniques on stress levels in STIKes Yatsi Tangerang staff involving 35 respondents, obtained before being given muscle relaxation interventions, most of them were classified as mild stress, namely, 21 respondents (60.0%), while moderate stress was 14 respondents (40.0%) then after muscle relaxation interventions were mostly classified as normal, namely, as many as 20 respondents (57.1%), in the mild stress group of 12 respondents (34.3%) and a small percentage classified as moderate stress, namely, about 3 respondents (8.6%) so there was an effect of progressive muscle relaxation on stress levels.[14] The results obtained in a study conducted by Pratiwi and Haryanto at Pamulang University in 2019 showed the effect of progressive muscle relaxation on reducing stress levels before mild stress intervention by 62 respondents (48.8%), moderate stress by 62 respondents (48.8%), and severe stress by 3 respondents (2.4%). After the intervention found that mild stress was 121 respondents (95.3%) and moderate stress as many as respondents (4.7%).[15] Based on the description of the problem above, researchers were interested in conducting a study on "The Effect of JPMR on the Stress Level of Final Year Students of the of the Medical Education Study Program at Nusa Cendana University".[17-24]

RESEARCH METHODS

The type and design of research used by researchers are quasi experimental with pretest-posttest control group design. Where in this study, there were two groups, namely, the intervention group and the control group. In this study, a measurement of pre-test values was carried out and then a post-test was carried out to determine the difference in the stress level of final year students of the Medical Education Study Program at Nusa Cendana University. The sample in this study was final year students of the Medical Education Study Program at Nusa Cendana University class of 2019 who met the inclusion criteria. Sample selection using non-probability sampling method with total sampling technique.

This research was conducted at Nusa Cendana University located on Adisucipto Penfui street, Lasiana Village, Kelapa Lima District, Kupang City. Onsite in the campus building within a period of 1 week, namely, in September 2022.

The number of respondents in this study was 30 respondents obtained from final year students of the Medical Education Study Program at Nusa Cendana University, totaling 58 people.

Data analysis was carried out in two stages, namely, univariate analysis which aimed to get an idea of respondents' characteristics which included age and gender. Moreover, the bivariate analyses used are the Wilcoxon Signed Rank Test and the Mann–Whitney Test.

RESULTS

Characteristics of Respondents

The results of sample characteristics based on gender were most present in women as many as 23 samples (76.7%) while in men as many as 7 samples (23.3%).

The age group of respondents shows that this study was followed more at age 20 years with 16 people (53.3%), followed by age 21 years with 9 people (30%), age 19 years and 22 years with 2 people (6.7%), and age 18 years with 1 person (3.3%).

Univariate Analysis

Knowledge can be obtained. The following is a univariate analysis carried out to see an overview of the distribution of stress levels in the research sample who were final year students of the Medical Education Study Program at Nusa Cendana University before and after being given treatment in the form of JPMR.

Table 1 shows that from 15 samples of final year students of the of the Medical Education Study Program at Nusa Cendana before being given treatment in the form of JPMR, there were 4 people (26.7%) experiencing mild stress levels, 6 people (40%) experiencing moderate stress levels and 5 people (33.3%) experiencing severe stress levels. The most experienced stress level of the sample was a moderate stress level of 6 people (40%), while the least experienced by the sample was a mild stress level of 4 people (26.7%).

Table 2 shows that from 15 samples of final year students of the Medical Education Study Program at Nusa Cendana after being given treatment in the form of JPMR 7 times during the week, there were 13 people (86.7%) who were normal and 2 people (13.3%) who experienced mild stress levels.

The following is a univariate analysis carried out to see an overview of the distribution of stress levels in the research sample who were final year students of the Medical Education Study Program at Nusa Cendana before and after in the control group.

Table 3 shows that from 15 samples of final year students of the Medical Education Study Program at Nusa Cendana in the control group, 4 people (26.7%) experienced mild stress levels, 6 people (40%) experienced moderate stress levels and 5 people (33.3%) experienced severe stress levels. The level of stress most experienced by the sample was a moderate stress level of 8 people (40%), while the least experienced by the sample was a mild stress level of 4 people (26.7%).

Bivariate Analysis

Bivariate analysis is an analysis used to find the influence between two variables, namely, one free variable and one bound variable. Bivariate analysis in this study to find out whether there is an influence of JPMR on the stress levels of final year students of the Medical Education Study Program at Nusa Cendana. Wilcoxon Signed Rank test is used with $P < 0.05$ showing the influence of JPMR on reducing stress levels.

Table 1: Distribution of stress levels before JPMR in intervention group

Stress levels	Frequency	Percentage
Mild stress	4	26.7
Moderate stress	6	40
Severe stress	5	33.3
Total	15	100

JPMR: Jacobson's progressive muscular relaxation

Table 2: Distribution of stress levels after JPMR in intervention group

Stress levels	Frequency	Percentage
Normal	13	86.7
Mild stress	2	13.3
Total	15	100

JPMR: Jacobson's progressive muscular relaxation

Table 3: Distribution of stress levels before JPMR in control group

Stress levels	Frequency	Percentage
Mild stress	4	26.7
Moderate stress	6	40
Severe stress	5	33.3
Total	15	100

JPMR: Jacobson's progressive muscular relaxation

Based on Table 4, it shows that there were significant differences and average differences in the results of the intervention group that received JPMR treatment ($P = 0.001$), while in the control group that did not receive treatment there was no significant difference and average difference ($P = 0.732$).

The independent sample mean difference test was used to test the mean difference between two unpaired data groups, namely, post-test differences in the control and intervention groups. The Mann–Whitney test used with a result of $P = 0.000$ ($P < 0.05$) meaning that there is a difference in the mean of the two groups.

DISCUSSION

Based on Table 5, it is known that the age with the most number of samples was at the age of 20 years with the number of 16 people (53.3%), followed by the age of 21 years with the number of 9 people (30%), the age of 19 years and 22 years with the number of 2 people (6.7%), and the age of 18 years with the number of 1 person (3.3%). According to the Badan Kependudukan dan Keluarga Berencana (BKKBN), the vulnerable age of adolescents is 10–24 years old and unmarried. Adolescents are divided into three stages, namely, pre-adolescence (11–14 years), early adolescence (13–17 years), and late adolescence (17–21 years).[25] Students belong to the

Table 4: Dependent bivariate analysis

Groups	Type of stress	Pretest (%)	Posttest (%)	*P*
Control	Mild	4 (26.7)	3 (20)	0.732
	Moderate	6 (40)	8 (53.3)	
	Severe	5 (33.3)	3 (20)	
	Very Severe	0 (0)	1 (6.7)	
Intervention	Normal	0 (0)	13 (86.7)	0.001
	Mild	4 (26.7)	2 (13.3)	
	Moderate	6 (40)	0	
	Severe	5 (33.3)	0	

Information : *Signification ($P \leq 0.05$) ; Wilcoxon Signed Rank test, JPMR: Jacobson's progressive muscular relaxation

Table 5: Distribution of stress levels after JPMR in control group

Stress levels	Frequency	Percentage
Mild stress	3	20
Moderate stress	8	53.3
Severe stress	3	20
Very severe stress	1	6.7
Total	15	100

JPMR: Jacobson's progressive muscular relaxation

group of late adolescents, in this group, there is an increase in stress caused at this age is a time filled with conflicts and mood swings where thoughts, feelings, temptations, and joys and sadness, which make someone who experiences it think and try to solve a problem so that can have an effect on daily life and obligations as a student.[26]

The results of sample characteristics based on gender were most abundant in women as many as 23 samples (76.7%) while in men as many as 7 samples (23.3%). This is because there are differences in response between men and women when facing problems. In men, they generally think that conflict can provide a positive impulse, while women have a tendency to be more thinkers than men where women often think about things excessively which makes them prone to stress and have a negative awareness of conflicts.[27]

Jacobson's technique or better known as progressive muscle relaxation is a combination of controlled breathing exercises with a series of contractions and relaxation of muscle groups from head to toe that are systematically arranged to train the muscles of the arms, hands, shoulders, neck, face, abdomen, and legs so as to create a sensation in releasing discomfort and stress.[28]

Based on the study conducted, after being given JPMR for 7 consecutive days for 1 week with a duration of 25–30 min was proven to reduce the level of stress experienced by the sample. In the intervention group, it was found that there was a significant influence of JPMR on reducing stress levels with a value of $P = 0.001$ or $P < 0.05$ so that answering the H1 hypothesis was acceptable, namely, that there was a significant influence of JPMR effect on reducing the stress level of final year students of the Nusa Cendana University Medical Education Study Program.

The results of this study are supported by a study conducted by Sari and Masnina entitled "The Effect of Progressive Muscle Relaxation on Women Prisoners's Stress Levels at Prison Class IIA Jember which conducts JPMR for 6 consecutive days has a significant influence on reducing stress levels.13 Based on another study conducted by Pratiwi and Haryanto at Pamulang University with the title of the effect of progressive muscle relaxation on stress levels on S1 students in the final semester of the Faculty of Economics majoring in financial management, Pamulang University, there was a significant decrease in stress levels with $P = 0.000$.[15]

In the control group, the value of $P = 0.732$ where $P > 0.05$ so that it can be concluded that there was no significant difference in the stress level of the control group during pre-test and post-test. This happened due to the absence of JPMR treatment in the control group so that the influencing factors remained disturbing, especially the sample in this study was a final medical student who had a college load and a final project, namely, a thesis that could trigger stress levels. In the control group, there is an increase in stress levels where this can occur due to environmental factors both in lectures and outside lectures, of course, also affecting student stress levels. The physical environment consists of temperature, humidity, and learning conditions. This environment makes the student learning process more conducive. On the other hand, if the environmental conditions are not supportive, then the student's learning process will not be conducive so that students will be more easily stressed. Therefore, the results showed no significant changes in the control group when post-tested.[29]

Based on the results of the analysis of the influence of JPMR on the stress level of final year students of the Nusa Cendana

University Medical Education Study Program, there was a difference in the average (mean) stress level of the control group of 22.8 while the intervention group was 8.2 where the higher the score obtained, the worse a person's stress level would be. The results of a statistical test using the Mann–Whitney test showed that there was a significant effect of JPMR on reducing the stress level of final year students with $P = 0.000$ ($P < 0.05$).

The mechanism of action of JPMR in lowering stress levels is by lowering the stimulation of the sympathetic nervous system and increasing the stimulation of the parasympathetic nerves.[30-33] The activity of the parasympathetic nervous system (trophotropic) causes a relaxation response by stimulating the nerves so that in a relaxed state, it will be passed on to the hypothalamus which then produces corticotropin releasing factor (CRF). Furthermore CRF stimulates the pituitary gland to increase some hormones, such as β-endorphin, encephalin, and serotonin. Endorphin hormones can suppress the production of the hormone cortisol known as the stress hormone and activate the pain regulation system so that the body becomes relaxed and calm. In addition, serotonin helps regulate mood by binding to glucocorticoids, including cortisol, so that cortisol levels in the blood decrease. Cortisol levels make it a little easier for a person to feel relaxed, comfortable, and calm. The presence of a feeling of relaxation and calm will affect stress levels.[34]

CONCLUSION

After conducting research, it can be concluded that JPMR has a significant influence can reduce the stress level of final year students of the Nusa Cendana University Medical Education Study Program and There was a difference in stress levels in the intervention group experienced a decrease in stress levels with a significant value of $P = 0.000$ compared to the control group that experienced an increase in stress levels.

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CONFLICTS OF INTEREST

There are no conflicts of interest found during this study.

ETHICS

This study has received ethical approval from the Health Research Ethics Commission of the Faculty of Medicine, University of Nusa Cendana.

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