Medica Hospitalia
Journal of Clinical Medicine
Med Hosp 2024; vol 11 (2) : 150–154

OPEN ACCESS

Original Article

Differences in Effectiveness between Progressive Muscle Relaxation Therapy and Slow Deep Breathing Therapy on Elderly Sleep Quality

Wajihahni Rodiyah[1], Novita Sari Dewi[2], Bintang Tatius[1]

[1]Medical Education Program, Faculty of Medicine, Muhammadiyah University of Semarang, Indonesia
[2]Physical Medicine and Medical Rehabilitation, Faculty of Medicine, Muhammadiyah University of Semarang, Indonesia

p-ISSN: 2301-4369 e-ISSN: 2685-7898
https://doi.org/10.36408/mhjcm.v11i2.1015

Accepted: August 10th, 2023
Approved: April 26th, 2024

Author Affiliation:
Medical Education Program,
Faculty of Medicine,
Muhammadiyah University of Semarang,
Indonesia

Author Correspondence:
Wajihahni Rodiyah
Kedungmundu Street No. 18 Semarang,
Central Java 50273, Indonesia

E-mail:
wajihahnirodiyah.unimus@gmail.com

Abstract

Background : Every individual has a lifetime, starting from the womb, born into the world, to becoming elderly. Aging is a process of gradual loss of tissue's ability to repair itself, maintain its normal structure and function so that it cannot defend the tissue from injury (including infection), and repair the damage that occurs. In the elderly, there are various kinds of health problems such as sleep disorders. Sleep disorder or insomnia is a person's inability to sleep. Poor sleep quality can be improved in various ways such as relaxation techniques. This study was aimed to compare the effectiveness of Jacobson's Progressive Muscle Relaxation (JPMR) and Slow Deep Breathing Therapy in improving sleep quality in the elderly.
Methods : This type of research was a quantitative quasi-experiment with pretest and post-test methods (one group pre-test and post-test design). Respondents involved 49 people while research data were processed with the Mann-Whitney and Wilcoxon tests. The Sleep Quality Questionnaire used the PSQI questionnaire.
Results : The Wilcoxon test with an alternative to the Mann-Whitney test showed no significant difference in effectiveness between the two therapies with p-value = 0.274.
Conclusion : Both therapies had almost the same level of effectiveness; there was no significant difference between the two, so progressive muscle relaxation therapy and Slow Deep Breathing were equally effective in treating anxiety and improving sleep quality.

Keywords : Elderly, Sleep Quality, Progressive Muscle Relaxation, Slow Deep Breathing

INTRODUCTION

Every individual has a period of life from the womb to becoming elderly or aging. Aging can be defined as the process of slowly losing the ability of tissues to repair themselves and maintain their normal function.[1] Based on data, several provinces in Indonesia in 2021 have experienced an old population structure, including 8 provinces with more than 10 percent of the population aged. One of these provinces is Central Java with a percentage of 14. Seventeen percent of the elderly population. The elderly population is dominated by the female population and is more numerous in urban areas. In terms of age, the elderly are divided into three types. This makes, in 2021 alone, there are more than 17 percent of people included in the pre-elderly group. This data showed that pre-elderly group who will enter the old age population needs to receive more attention.[2]

Sleep disorder or insomnia is one of the various health problems that can threaten the health of the elderly. Insomnia itself is also often defined as a person's inability to sleep.[3] In elderly patients, insomnia can be divided into three types, namely Sleep Onset Problems, Deep Maintenance Problems, and Early Morning Awakening.[4] According to several studies that have been conducted related to insomnia in elderly patients, the results showed that the risk of elderly people experiencing insomnia is higher than patients who are still young.[5,6] Sleep disorders like this can be addressed in two ways, one of which is non-pharmacological therapy in the form of relaxation that can reduce anxiety, muscle tension, and reduce pain.[7] JPMR or Jacobson's Progressive Muscle Relaxation can be an option in performing relaxation techniques. This technique can reduce tension, pain, relieve pain, and reduce anxiety.[8]

In addition to JPMR relaxation techniques, Slow Deep Breathing therapy can also be performed to train the body and mind comprehensively based on diaphragmatic breathing,[9] so that it is expected to improve the quality of sleep of the elderly. Based on several previous studies, it is concluded that the quality of sleep of the elderly often decreases with age. Therefore, this study would be conducted to examine the difference in effectiveness between progressive muscle relaxation therapy and Slow Deep Breathing therapy on the quality of sleep of the elderly. The purpose of this study was to examine whether there is a difference between the use of progressive muscle therapy and Slow Deep Breathing therapy on elderly sleep quality variables. In addition, it is also to examine the effectiveness of each technique on the quality of elderly sleep.

METHODS

This research was conducted at the Pucang Gading Social Service House Semarang in June 2023. The research was carried out after obtaining approval from the Health Research Ethics Commission (KEPK) of the Faculty of Medicine, Muhammadiyah University, Semarang. The type of research conducted was a quantitative quasi-experiment. The research subjects consisting of 49 elderly people were divided into two groups with different treatments. The first group would be given progressive muscle relaxation therapy. Meanwhile, the second group would be given Slow Deep Breathing therapy. The elderly involved in this study were selected through several inclusion and exclusion criteria. Some of the inclusion criteria include elderly ≥ 60 years old, residing in the Pucang Gading Semarang Social Service House, and willing to become respondents. Meanwhile, the exclusion criteria included elderly with language and communication disorders or aphasia, hearing impairment, chest pain symptoms, and symptoms of shortness of breath. Through the calculation of Slovin, the number of samples in this study was 53 samples. After the research was conducted, there was 4 samples who dropped out because they did not take part in the study twice in a row. The sampling technique used was Non-Probability Sampling, namely Purposive Sampling. The independent variables in the study were progressive muscle relaxation therapy and Slow Deep Breathing therapy and the dependent variable was the quality of elderly sleep.

The tools used in the study included a tensimeter, stopwatch, respondent form data, and other tools. Meanwhile, the materials used were 49 samples of elderly patients at the Home of Social Service Pucang Gading in Semarang. Data processing started with coding data, transferring data to a computer, cleaning data, to presenting data in numerical, graphical, and pictorial forms.[10] Data analysis techniques that would be used were Univariate Analysis and Bivariate Analysis.

ANALYSIS

Univariate Analysis

Based on the table above, the characteristics of respondents involved in this study include type of therapy, gender, age, latest education, marital status, occupation, and sleep quality before and after therapy. This study provided progressive muscle relaxation therapy to 49% of respondents, namely 24 elderly people. Meanwhile, the rest were given Slow Deep Breathing therapy. This study also found that there were more elderly women than elderly men, as many as 29 people. Respondents were dominated by elderly people who did not work as much as 98%. The last education of respondents was dominated by elementary school graduates as many as 22 people or 45%, elderly who were married as many as 46 people or 94%, good elderly sleep quality as much as 22% and poor as much as 78%. This data showed that the majority of elderly people still had

TABLE 1
Characteristics of Elderly Respondents at the Home of Social Service Pucang Gading, Semarang Based on Variables

Variable		Progressive Muscle Relaxation Therapy	Slow Deep Breathing Therapy	%
Gender	Male	10	10	41%
	Female	14	15	59%
Age	60 – 70	8	17	51%
	71 – 80	16	8	49%
Latest education	SD	13	9	45%
	SMP	6	12	37%
	SMA	5	4	18%
Marriage status	Married	23	23	94%
	Unmarried	1	2	6%
Work	Not Working	24	24	98%
	Retired	0	1	2%
Pre-test sleep quality	Good	9	11	40%
	Poor	15	14	60%
Post-test sleep quality	Good	17	21	78%
	Poor	7	4	22%
Total		24	25	100%

TABLE 2
Wilcoxon Test Analysis Results Pre-test sleep quality to Post-test Progressive Muscle Relaxation Therapy

Variable	n	Mean	Standard deviation	Minimum	Maximum	*p value*
Pre-test	24	7.08	2.545	4	15	0.000
Pos-test	24	4.92	1.840	2	10	

TABLE 3
Results of Wilcoxon Test Analysis of Sleep Quality Pre-test against Post-test Slow Deep Breathing Therapy

Variable	n	Mean	Standard deviation	Minimum	Maximum	*p value*
Pre-test	25	6.6	2.309	4	12	0.000
Pos-test	25	4.4	1.443	3	8	

difficulty or sleep disorders.

Before conducting a sleep quality questionnaire interview, respondents were given a sleep hygiene questionnaire to change their lifestyle and environment to improve sleep quality.[11] Based on the sleep hygiene homogeneity test, a significance of 0.789 was found which showed a value greater than 0.05 as a significant level. Therefore, it was concluded that the groups with the therapy technique had the same variance.

Bivariate Analysis

Bivariate analysis in this study was carried out with the Wilcoxon test because the research data was included in non-parametric data or categorical data. Tabel 2 shows

TABLE 4
Mann-Whitney Test Analysis Results of Progressive Muscle Relaxation Therapy and Slow Deep Breathing Therapy on Elderly Sleep Quality

Variable	n	Mean Ranks	*p value*
Progressive Muscle Relaxation Therapy	48	52.66	0.274
Slow Deep Breathing Therapy	50	46.47	

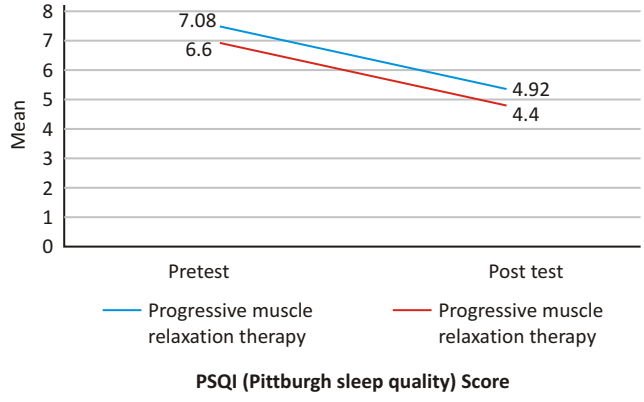

Figure 1. Average of Pre-Test and Post-Test PSQI Score

the test results.

Based on the two tables above, the results showed that there was an effect caused by progressive muscle relaxation therapy and Slow Deep Breathing therapy on the quality of elderly sleep at the Home of Social Service House Pucang Gading Semarang. Both techniques had a significant effect on the quality of sleep of the elderly in the location of this study (Table 3).

Based on the results of the table above, it was found that there was no significant difference between progressive muscle relaxation therapy and Slow Deep Breathing therapy. This was indicated by the *p-value* >0.274 (Table 4).

DISCUSSION

Progressive Muscle Relaxation Therapy on Elderly Sleep Quality

In general, the elderly experience a shortening of sleep time due to the aging process which results in a decrease in sleep quality. This leads to worsening sleep quality. Based on the table previously presented, it was found that the quality of sleep of the elderly who received progressive muscle relaxation therapy has improved. Before the therapy, the mean was 7.08 which then became 4.92 after completion of therapy. This figure shows an increase in sleep quality in the elderly. This is in line with several previous studies, such as those conducted by Rostinah and Tri and Heba Abdel Fatah Ibrahim. Both studies found that progressive muscle relaxation therapy had a positive impact on improving sleep quality and reducing anxiety.[12]

This technique can make a person relax their muscles and feel more comfortable. This will then put the individual in a relaxed stage, resulting in a decrease in emotional reactions.[13] The results of paired t-test research found that paired t-test of elderly sleep quality before and after therapy got $p = 0.0000$, because $p < 0.005$, there is an influence caused by progressive muscle relaxation techniques on the quality of sleep of the elderly.

Slow Deep Breathing Therapy on Elderly Sleep Quality

Slow deep breathing therapy can cause a decrease in sympathetic and increased cardiac output which ultimately results in a decrease in heart rate, cardiac output, vascular tone, and blood pressure. Other impacts that arise are stress reduction and increased positive emotions.[14] In the previous table, it was shown that the quality of elderly sleep has improved after the elderly get this therapy. Based on the table, the average result obtained before therapy was 6.6 and changed to 4.4 after receiving therapy. Research conducted by Febriansyah said that 16 respondents (80%) had good sleep quality after being given slow deep breathing therapy. According to Yanti, it shows that there is an effect of slow deep breathing therapy on headaches and vital signs in hypertension sufferers.[15]

This technique can also increase the interaction

between the brain with psychological flexibility, connecting the parasympathetic with the central nervous system, and activities related to emotional control. This can result in increased positive emotions and reduced anxiety.[16] A decrease in pulse rate, respiration, and blood pressure may also occur.[17] The results of the paired t-test research found that, the *p-value* = 0.000. Because the *p-value* <0.005, there was an influence between Slow Deep Breathing therapy and the quality of elderly sleep.

Deep Breathing Therapy on Elderly Sleep Quality

In progressive muscle relaxation therapy, the mechanism of action was based on the sympathetic and parasympathetic nervous systems. A relaxed state makes a person secrete CRH and ACTH. Thus, the activity of the sympathetic nerves decreased, followed by a reduction in adrenaline and non-adrenaline hormones. The work of the heart would also slow down which makes blood pressure decrease. Meanwhile, in Slow Deep Breathing therapy, there was an increase in baroreflex sensitivity that controls heart rate, heart contraction strength, and blood vessel size. This therapy could also reduce blood pressure.[14]

In Table 4, it is explained the calculation of the different test results between the two techniques. The results obtained were the mean results of the pre-test and post-test sleep quality of progressive relaxation muscle therapy was 52.66. Meanwhile, Slow Deep Breathing gets a score of 46.47. It was found there was no significant difference between progressive muscle relaxation therapy and Slow Deep Breathing therapy, this was indicated by the *p-value* >0.274. Through these scores, it is concluded both types of therapy had the same level of significance and effectiveness in terms of improving the quality of sleep of the elderly.

CONCLUSION

Based on the research that has been performed, it can be concluded that progressive muscle relaxation therapy and Slow Deep Breathing therapy both influenced improving the quality of sleep of the elderly at the home of Social Service Pucang Gading Semarang. Furthermore, there was no significant difference between the two types of therapy in improving the quality of sleep of the elderly at the home of Social Service Pucang Gading Semarang.

REFERENCES

1. R.Boedhi Darmojo, H.Hadi-Martono. Ageing Process Theory: Textbook Boedhi-Darmojo Geriatri (Geriatric Health Science). 2015. p. 7–8.
2. Elderly Society 2021. Badan Pusat Statistik; 2021.
3. Herrera CO. Sleep Disorders. In: The Merck Manual Geriatrics, Volume 1. South Tangerang: Binarupa Aksara Publisher; 2013. p. 164–76.
4. Karjono BJ, Rahayu RA. Elderly Sleep Disordersa. In: Textbook Boedhi Darmojo Geriatri (Elderly Health Science). Edition 5. Jakarta; 2014. p. 319.
5. Kim KW, Kang SH, Yoon IY, Lee SD, Ju G, Han JW, *et al*. Prevalence and clinical characteristics of insomnia and its subtypes in the Korean elderly. Arch Gerontol Geriatr [Internet]. 2017;68:68–75. Available from: http://dx.doi.org/10.1016/j.archger.2016.09.005
6. Rosa EF, Rustiaty N. Affective Disorders in The Elderly: The Risk of Sleep Disorders. Int J Public Heal Sci. 2018;7(1):33.
7. Solehati T, Rustina Y. Benson relaxation technique in reducing pain intensity in women after cesarean section. Anesthesiol Pain Med. 2015;5(3).
8. Devmurari D, Nagrale S. Effectiveness of J acobson' s progressive muscle relaxation technique for pain management in post-cesaerean women. 2018;5(2):228–32.
9. Liu Y, Jiang T tong, Shi T ying, Liu Y ning, Liu X mei. The effectiveness of diaphragmatic breathing relaxation training for improving sleep quality among nursing staff during the COVID-19 outbreak: a before and after study. Sleep Med. 2021;78:8–14.
10. Priyono M. Qualitatif Research Method. Revision Edition. Chandra T, editor. 1999. Sidoarjo: Zifatama Publishing; 2016. 123–129 p.
11. Shriane AE, Ferguson SA, Jay SM, Vincent GE. Sleep hygiene in shift workers: A systematic literature review. Sleep Med Rev [Internet]. 2020;53:101336. Available from: https://doi.org/10.1016/j.smrv.2020.101336
12. Ibrahim HAF, Elgzar WT, Hablas RM. The effect of jacobson's progressive relaxation technique on postoperative pain, activity tolerance, and sleeping quality in patients undergoing gynecological surgery. Iran J Nurs Midwifery Res. 2021;26(4):295–302.
13. Herawati I, Hapsari DO. The Effect of Jacobson's Relaxation Therapy on Shortness of Breath In Patients With Bronchitis Chronic. 3rd Int Conf Sci Technol Humanit. 2017;57–63.
14. Gholamrezaei A, Van Diest I, Aziz Q, Vlaeyen JWS, Van Oudenhove L. Psychophysiological responses to various slow, deep breathing techniques. Psychophysiology. 2021;58(2):1–16.
15. Aritonang YA. The Effect of Slow Deep Breathing Exercise on Headache and Vital Sign in Hypertension Patients. J Keperawatan Padjadjaran. 2020;8(2):166–74.
16. Zaccaro A, Piarulli A, Laurino M, Garbella E, Menicucci D, Neri B, *et al*. How Breath-Control Can Change Your Life: A Systematic Review on Psycho-Physiological Correlates of Slow Breathing. Front Hum Neurosci. 2018;12(September):1–16.
17. Bahtiar Y, Isnaniah, Yuliati. The Application of Slow Deep Breathing to Blood Pressure of Hypertentiona patients: Literature Review. J IMJ Indones Midwifery J [Internet]. 2021;4(2):18–23. Available from: http://jurnal.umt.ac.id/index.php/imj/article/view/4272