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THE EFFECT OF PROGRESSIVE MUSCLE RELAXATION (PMR) ON SLEEP QUALITY IN ELDERLY

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ABSTRACT

Introduction: Sleep disturbances are a common and pressing health issue among the elderly, significantly impacting their overall well-being and quality of life. **Purpose:** To examine the effect of Progressive Muscle Relaxation (PMR) on sleep quality in elderly individuals. A quantitative pre-test and post-test design was employed with 20 elderly participants aged 60 to 90 years. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI) before and after the PMR intervention. **Method:** Results showed that prior to the intervention, 90% of participants experienced mild sleep disturbances and 10% had moderate disturbances. Following the intervention, 20% of participants reported good sleep quality, and none remained in the moderate disturbance category. The Wilcoxon signed-rank test revealed a significant difference between pre- and post-intervention PSQI scores ($Z = -3.920$, $p = 0.000$), indicating a significant reduction in sleep disturbances after PMR. **Conclusion:** These findings suggest that PMR is effective in improving sleep quality among the elderly. The study recommends further development of PMR programs as a non-pharmacological intervention to enhance sleep health in older populations across various settings.

Keywords: Elderly, Progressive Muscle Relaxation, Sleep disturbance

INTRODUCTION

Sleep plays a crucial role in maintaining physical and psychological health, especially in older adults whose physiological changes make them more susceptible to sleep disturbances (Rodiyah, Tatius and Dewi, 2021). Aging is often associated with changes in sleep architecture, such as decreased deep sleep, increased nighttime awakenings, and difficulty falling asleep. These disturbances significantly impact the overall quality of life and increase the risk of chronic health conditions, emotional disorders, and cognitive decline (Özlü, Öztürk, Karaman Özlü, Tekin and A Gür, 2021). As the global elderly population continues to grow, addressing sleep quality in this demographic has become an important public health concern (Karimi *et al.*, 2024).

In response to these challenges, both pharmacological and non-pharmacological interventions have been explored to improve sleep in the elderly. While medications are commonly used, they often come with side effects such as dependence, dizziness, and impaired cognitive function (Mueller *et al.*, 2024). Non-pharmacological approaches, particularly relaxation techniques, offer a safer alternative. Among them, Progressive Muscle Relaxation (PMR) has gained attention for its ability to reduce muscle tension and induce relaxation by alternating between muscle contraction and release (Özlü, Öztürk, Karaman Özlü, Tekin and A. Gür, 2021). Several studies have reported the positive effects of PMR on reducing anxiety and improving sleep, but most of this research has focused on general or clinical populations.

Despite existing evidence, there is limited research specifically targeting the elderly population in diverse settings, especially in community-based environments

or elder care institutions. Moreover, many studies lack a focus on practical, easily applicable techniques that can be implemented without professional medical supervision (Sayed, S. M. and Younis, 2023). This study aims to fill that gap by investigating the effect of PMR on sleep quality among the elderly, using a structured and replicable intervention model suitable for non-clinical settings.

This research offers a novel contribution by emphasizing the use of PMR as a low-cost, non-invasive, and practical method to improve sleep quality specifically in older adults. By focusing on this population, the study not only addresses a critical and underserved area but also provides evidence for incorporating PMR into holistic elderly care strategies (Baklouti *et al.*, 2023). The findings are expected to inform future interventions and guide healthcare providers in adopting more accessible and effective approaches to improve sleep health in aging populations (Kondo *et al.*, 2023).

METHODS

This section should be described with sufficient details to allow others to replicate and build on published results.

Study design

The research design used in this study was a one-group pre-test and post-test design, which is a type of pre-experimental design where a single group is observed before and after the implementation of an intervention, without the use of a control group (Nursalam, 2020). In this study, the sleep quality of elderly participants was measured prior to the intervention (pre-test), followed by the administration of Progressive Muscle Relaxation (PMR) as the treatment. After completing the intervention period, the same group was assessed again (post-test) to determine any changes in sleep quality. This design allows researchers to evaluate the effect of the intervention by comparing the outcomes within the same group before and after the treatment.

Population and sample

The study involved 20 elderly participants selected using simple random sampling from a community health center. This sampling method was chosen to ensure that each eligible individual had an equal chance of being included, minimizing selection bias. Participants were required to be aged 60 years or older, able to communicate clearly, and experiencing sleep disturbances based on their Pittsburgh Sleep Quality Index (PSQI) scores (Firmansyah and Dede, 2022). Individuals currently using sleep medication or with severe cognitive or physical impairments were excluded. The sample size of 20 was determined based on the study's exploratory nature and the availability of eligible participants, providing an initial assessment of the intervention's effect. All participants gave informed consent before joining the study.

Data collection

A total of 25 elderly individuals were assessed for eligibility. Of these, 5 were excluded due to not meeting the inclusion criteria (n=3) or declining to participate (n=2). Twenty participants were enrolled through simple random sampling and completed the pre-test assessment using the Pittsburgh Sleep Quality Index (PSQI). Each participant then received Progressive Muscle Relaxation (PMR) sessions for four

weeks. There were no dropouts during the intervention, and all 20 participants completed the post-test assessment. All data were included in the final analysis using the Wilcoxon signed-rank test to assess changes in sleep quality before and after the intervention.

Stage	Number of Participants	Description
Assessed for eligibility	25	Elderly individuals assessed using inclusion and exclusion criteria
Excluded	5	- Did not meet inclusion criteria (3) - Declined to participate (2)
Enrolled in study	20	Participants who met criteria and gave informed consent
Pre-test (baseline PSQI assessment)	20	All participants completed PSQI before intervention
Received intervention (PMR)	20	All received Progressive Muscle Relaxation over 4 weeks
Lost to follow-up	0	No participants dropped out during the intervention
Post-test (follow-up PSQI assessment)	20	All participants completed the PSQI after the intervention
Analyzed	20	All included in final statistical analysis using Wilcoxon signed-rank test

Data analysis

The data analysis in this study was conducted using the Wilcoxon signed-rank test, a non-parametric statistical method used to compare paired data. This test was chosen to analyze the differences in sleep quality scores of the same participants before and after the intervention with Progressive Muscle Relaxation (PMR), as the data did not meet the assumptions for normal distribution. The analysis aimed to determine whether there was a statistically significant improvement in participants' sleep quality following the intervention. A significance level of $p < 0.05$ was used to interpret the results, indicating that any observed differences would be considered meaningful if the p-value was below this threshold (Adiputra *et al.*, 2021).

Ethical statement

This research has been tested ethically by the KEPK ITSKes Insan Cendekia Medika Jombang and was declared to have passed with No.200/KEPK/ITSKES-ICME/IX/2024.

RESULTS

Table 1 Characteristics of respondents based on age

Age	Frequency	Percentage (%)
60-74 year	15	75.0
75-90 year	5	25.0
Total	20	100.0

Table 1 shows that almost all respondents aged 60-74 years, amounting to 15 people (75%).

Tabel 2 Respondent characteristics based on gender.

Sex	Frequency	Percentage (%)
Male	6	30.0
Female	14	70.0
Total	20	100.0

Table 2 shows that the majority of respondents were female, amounting to 14 people (70%).

Table 3 Characteristics of respondents based on education

Education	Frequency	Percentage (%)
No school	12	60.0
Elementary school	7	35.0
High school	1	5.0
Jumlah	20	100.0

Table 3 shows that the majority of respondents had no education, namely 12 people (60%).

Table 4 Sleep quality before and after intervention

Sleep Disturbance Level	**Score Range (PSQI)**	**Number of Participants (Pre-test)**	**Number of Participants (Post-test)**
Good Sleep Quality	0–5	0	4
Mild Sleep Disturbance	6–10	18	16
Moderate Sleep Disturbance	11–15	2	0
Severe Sleep Disturbance	>15	0	0
Total		**20**	**20**

Table 4 presents the changes in sleep disturbance levels among 20 elderly participants based on Pittsburgh Sleep Quality Index (PSQI) scores before and after the implementation of Progressive Muscle Relaxation (PMR). Prior to the intervention, the majority of participants (90%) experienced mild sleep disturbances (PSQI score 6–10), while 10% were categorized as having moderate sleep disturbances (PSQI score 11–15). After the intervention, a notable improvement was observed: 4 participants (20%) achieved good sleep quality (PSQI score 0–5), and none remained in the moderate disturbance category. No cases of severe sleep disturbance (PSQI >15) were found in either the pre- or post-test phases. These results indicate that PMR effectively contributed to improving sleep quality in the elderly population.

Table 5 Test Statistics – Wilcoxon Signed-Rank Test

	Post-test – Pre-test
Z	-3.920
Asymp. Sig. (2-tailed)	**0.000**

The Wilcoxon signed-rank test was conducted to evaluate the effect of Progressive Muscle Relaxation (PMR) on sleep quality among 20 elderly participants. The test revealed a statistically significant difference between pre-test and post-test

PSQI scores (Z = -3.920, p = 0.000). The negative Z value indicates a consistent decrease in scores, suggesting improved sleep quality after the intervention. Since the p-value is less than 0.05, it can be concluded that PMR had a significant positive impact on sleep quality.

DISCUSSION

The findings of this study underscore the significant influence of demographic factors—age, gender, and education—on sleep quality among older adults. The majority of participants were aged 60–74 years (75%), predominantly female (70%), and had limited formal education (60%). These characteristics are closely linked to variations in sleep patterns and disturbances, as supported by recent literature. Advancing age is associated with notable changes in sleep architecture, including reduced total sleep time, increased sleep fragmentation, and decreased time spent in deep sleep stages. These alterations are attributed to both biological aging processes and the higher prevalence of sleep disorders such as sleep apnea and restless leg syndrome in the elderly population (Li *et al.*, 2020). Consequently, older adults often experience diminished sleep quality, which can adversely affect cognitive function and overall health (Beswick *et al.*, 2023).

Gender differences significantly impact sleep quality in older adults. Studies have consistently shown that women report poorer sleep quality than men, characterized by longer sleep latency, increased sleep disturbances, and higher incidence of insomnia. Factors contributing to these disparities include hormonal fluctuations, particularly during menopause, and psychosocial elements such as caregiving responsibilities and social expectations (Gharehbaghi *et al.*, 2024).

Educational attainment plays a crucial role in sleep quality among older adults. Higher education levels are associated with better sleep quality, likely due to increased health literacy, better access to healthcare, and healthier lifestyle choices. Conversely, lower educational levels are linked to poorer sleep quality, possibly due to limited knowledge about sleep hygiene and fewer resources to address sleep-related issues (McLay *et al.*, 2024).

Given the significant impact of age, gender, and education on sleep quality, interventions aimed at improving sleep in older adults should be tailored to address these factors. For instance, programs that provide education on sleep hygiene and stress management may be particularly beneficial for older adults with lower educational levels. Additionally, gender-sensitive approaches that consider the unique challenges faced by older women, such as hormonal changes and caregiving roles, are essential for effective sleep interventions (Cuenca-Martínez *et al.*, 2023).

The results of this study demonstrate that Progressive Muscle Relaxation (PMR) significantly improved sleep quality among elderly participants. Before the intervention, 90% experienced mild sleep disturbances and 10% had moderate disturbances based on the Pittsburgh Sleep Quality Index (PSQI), but after PMR, 20% reported good sleep quality and none remained in the moderate category. The Wilcoxon signed-rank test confirmed this improvement as statistically significant (Z = -3.920, p = 0.000), indicating a notable downward trend in PSQI scores. These findings suggest that PMR is an effective non-pharmacological approach for enhancing sleep quality in older adults. This intervention is particularly valuable due to its simplicity, cost-effectiveness, and ease of implementation in both clinical and community settings. The underlying mechanism of PMR involves systematic tensing and relaxing of muscle groups (Hajibashi *et al.*, 2023), which reduces physical tension

and activates the parasympathetic nervous system (Han *et al.*, 2024), thereby lowering stress levels and promoting a state conducive to sleep (Rosdiana and Cahyati, 2021). This is supported by recent literature indicating that muscle relaxation techniques like PMR reduce physiological arousal and improve sleep outcomes in older populations (Talo and Turan, 2023).

CONCLUSION

The findings of this study indicate that Progressive Muscle Relaxation (PMR) contributes to improved sleep quality in elderly individuals, as evidenced by a significant reduction in Pittsburgh Sleep Quality Index (PSQI) scores following the intervention. Most participants who initially experienced mild to moderate sleep disturbances showed measurable improvement after undergoing PMR sessions, suggesting that PMR may serve as a beneficial non-pharmacological strategy to enhance sleep among older adults, particularly those with limited access to conventional therapies. Demographic factors such as age, gender, and education may influence individual responsiveness to the intervention, pointing to the importance of personalized approaches. Future research should examine the long-term effects of PMR across diverse elderly populations, explore its comparative effectiveness with other techniques, and identify optimal frequency and duration of practice, as well as its integration into broader geriatric care frameworks.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest related to this study. All procedures and analyses were conducted objectively and transparently, without any financial, personal, or professional influences that could have affected the outcomes or interpretations of the research.

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