

## Effectiveness of progressive muscle relaxation in reducing anxiety among the elderly: A case study from Urban Indonesia

Tri Utami Ningsih, Musrifatul Uliyah, Siswanto Agung Wijaya and A. Aziz Alimul Hidayat \*

*Department of Nursing, University Muhammadiyah of Surabaya, Surabaya, East Java, Indonesia.*

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### Abstract

Anxiety is a prevalent psychological issue among older adults and significantly contributes to a decline in their quality of life. Progressive Muscle Relaxation (PMR) is recognized as a safe and effective non-pharmacological approach for reducing anxiety. This study aimed to evaluate the effectiveness of PMR in alleviating anxiety in two older adults residing in a long-term care facility in Surabaya, Indonesia. The intervention was administered over six consecutive days, with each session lasting 15–20 minutes. Anxiety levels were measured using the Hamilton Rating Scale for Anxiety (HRSA). Results indicated a significant reduction in anxiety levels in both participants from moderate and mild anxiety to mild and no anxiety, respectively. Additionally, participants reported increased relaxation, reduced muscle tension, and improved sleep quality. These findings suggest that PMR is an effective and scalable intervention that can be applied in community settings to enhance the mental well-being of older adults.

**Keywords:** Older adults; Anxiety; Progressive muscle relaxation; Non-pharmacological intervention

### 1. Introduction

Aging is a physiological process characterized by a gradual decline in the functional capacity of the body, encompassing physical, emotional, social, and cognitive dimensions. One of the most significant consequences of aging is the increased vulnerability to psychological disorders such as anxiety<sup>1, 2</sup>. Anxiety in older adults is often underdiagnosed due to overlapping symptoms with other medical conditions; however, it can severely impact well-being, increasing the risk of depression, psychosomatic disorders, and overall decline in quality of life<sup>3, 4</sup>.

Global data indicate that anxiety disorders are relatively common in the elderly population. Welzel et al. (2019) reported that approximately 14.5% of individuals over the age of 82 exhibited symptoms of anxiety. Similarly, Videbeck (2011) estimated that up to 50% of older adults particularly those in developing countries experience varying levels of anxiety. A local survey conducted in the Tanah Kali Kedinding area of Surabaya, Indonesia revealed that 9 out of 13 elderly residents experienced mild to moderate anxiety. These findings underscore the urgent need for safe, accessible, and community appropriate psychological interventions<sup>3, 5</sup>.

Progressive Muscle Relaxation (PMR) is a non-pharmacological intervention that has been shown to be effective in reducing anxiety. The technique involves systematic contraction and relaxation of muscle groups to reduce physiological tension, which subsequently improves emotional states<sup>6, 7</sup>. A study by Eli (2019) demonstrated that consistent implementation of PMR significantly reduced anxiety levels in elderly participants. These findings are supported by additional research confirming that relaxation-based therapies have a significant impact on anxiety reduction among older populations<sup>8, 9</sup>.

\* Corresponding author: A. Aziz Alimul Hidayat

Despite its potential, the application of PMR in urban community settings, such as in Surabaya, remains underexplored—particularly through in-depth case study designs. Therefore, this study aims to explore the effectiveness of progressive muscle relaxation in reducing anxiety among older adults, with a focus on individual experiences within an urban community setting.

## 2. Methods

This study employed a case study design involving two older adult participants, aged 67 and 69, respectively, both of whom were experiencing symptoms of anxiety and residing in the Panti Griya Werdha Surabaya, East Java, Indonesia. Neither participant exhibited physical limitations or restrictions in daily activities, making them eligible to receive progressive muscle relaxation (PMR) therapy. Anxiety levels were assessed using the Hamilton Rating Scale for Anxiety (HRSA), with score categories as follows: <14 = no anxiety, 14–20 = mild anxiety, 21–27 = moderate anxiety, 28–41 = severe anxiety, and 42–56 = very severe anxiety. Each participant received PMR intervention once daily for six consecutive days, with each session lasting approximately 15–20 minutes. The intervention followed standardized procedures consisting of three main phases: preparation, positioning, and sequential muscle relaxation exercises

- Preparation Phase

The intervention was conducted in a quiet and calm environment, equipped with a chair and pillow to optimize comfort. Prior to the session, participants were informed about the goals, benefits, and procedures of the intervention to ensure understanding and compliance. Participants were asked to remove personal accessories (e.g., glasses, watches, shoes) and to loosen any tight clothing such as belts or ties.

- Positioning

Participants were instructed to assume a comfortable position—either lying down with a pillow placed beneath the head and knees or sitting in a chair with head and back support. Standing positions were avoided to minimize muscular strain and ensure stability during relaxation.

- Relaxation Procedure

Fifteen PMR movements were delivered in sequence, each designed to target specific muscle groups. The procedure for each movement involved deliberate tensing of the muscle group for several seconds, followed by a relaxation phase of approximately 10 seconds. Each movement was repeated twice.

- Hands:
  - Form a tight fist with the left hand.
  - Intensify the clench while observing the sensation of muscular tension.
  - Release the fist and note the contrast in relaxation for 10 seconds.
  - Repeat on the right hand.
- Posterior Forearms:
  - Flex both wrists backward so that the forearm muscles tighten.
  - Fingers should point upward toward the ceiling.
- Biceps:
  - Clench both hands into fists.
  - Pull fists toward the shoulders to contract the biceps.
- Shoulders:
  - Elevate both shoulders as high as possible toward the ears.
  - Focus on the sensation of tension in the upper back and neck.
- Facial Muscles:
  - Furrow the brow and raise the eyebrows to create forehead wrinkles.
  - Tightly close the eyes to activate tension around the eye muscles.
- Jaw:
  - Tightly clench the jaw by bringing upper and lower teeth together.
- Mouth:
  - Pucker the lips forcefully to create tension in the area around the mouth.
- Neck (Posterior and Anterior):
  - First, press the back of the head into the cushion to engage the posterior neck muscles.

- Then, tuck the chin toward the chest to activate the anterior neck muscles.
- Anterior Neck:
  - Continue the forward motion of the head, bringing the chin firmly into the chest.
- Back:
  - Arch the back forward by lifting the torso from the chair.
  - Expand the chest and maintain the tension for 10 seconds before relaxing.
- Chest:
  - Inhale deeply to expand the lungs and hold the breath momentarily, creating tension in the chest and abdomen.
  - Exhale slowly and return to normal breathing. Repeat once more.
- Abdomen:
  - Pull in the abdominal muscles tightly.
  - Hold the contraction for 10 seconds, then release.
  - Repeat the movement once.
- Legs (Thighs and Calves):
  - Extend both legs fully so that the thighs are engaged.
  - Lock the knees to transfer the tension to the calves.
  - Hold for 10 seconds, then release. Repeat both movements twice.

### 3. Results and Discussion

The anxiety levels of both participants showed a notable decrease following six consecutive sessions of Progressive Muscle Relaxation (PMR). Based on assessments using the Hamilton Rating Scale for Anxiety (HRSA), Participant A's score decreased from 16 (mild anxiety) to 10 (no anxiety), while Participant B's score decreased from 26 (moderate anxiety) to 18 (mild anxiety). These improvements became consistently evident from the fifth day onward, suggesting a progressive and sustained therapeutic response to the intervention (see Table 1).

**Table 1** Anxiety levels before and after PMR intervention (HRSA scores)

Day	Case A: Pre (score)	Case B: Pre (score)	Case A: Post (Score)	Case B: Post (Score)
Day 1	Mild (16)	Moderate (26)	Mild (15)	Moderate (25)
Day 2	Mild (15)	Moderate (26)	Mild (15)	Moderate (24)
Day 3	Mild (15)	Moderate (25)	Mild (14)	Moderate (23)
Day 4	Mild (15)	Moderate (26)	Mild (14)	Moderate (21)
Day 5	Mild (14)	Moderate (23)	No Anxiety (12)	Mild (20)
Day 6	No Anxiety (12)	Mild (20)	No Anxiety Mild (10)	Mild (18)

The implementation of Progressive Muscle Relaxation (PMR) over six consecutive days resulted in a significant reduction in anxiety levels among two elderly participants. Based on the Hamilton Rating Scale for Anxiety (HRSA), Participant A's score decreased from 16 (mild anxiety) to 10 (no anxiety), while Participant B's score dropped from 26 (moderate anxiety) to 18 (mild anxiety). The reduction in anxiety became consistently evident from day five, indicating a stable and progressive therapeutic response to the intervention.

Participants reported subjective improvements such as increased calmness, reduced muscle tension in the neck and chest, and enhanced sleep quality. These outcomes demonstrate that PMR not only influences psychological well-being but also has measurable physiological benefits, aligning with previous research indicating a direct correlation between muscular tension and anxiety responses<sup>10,11</sup>.

Adaptation to the 15-step PMR routine also yielded positive outcomes. While participants initially experienced difficulty engaging specific muscle groups, they gradually became more proficient in performing the exercises. This indicates improved motor learning and self-regulation, both of which are essential for enhancing physical self efficacy among older adults. Furthermore, family involvement during the intervention appeared to strengthen motivation and social support, which in turn amplified the therapeutic effect. The presence of caregivers or relatives likely contributed to emotional reassurance, improved adherence, and broader community awareness regarding the importance of elderly mental health.

Physiologically, PMR operates by activating the parasympathetic nervous system and suppressing sympathetic arousal, thereby reducing the production of stress-related hormones such as cortisol and adrenaline. This mechanism helps lower heart rate and blood pressure and diminishes the "fight-or-flight" response typically triggered by anxiety<sup>12</sup>. In this way, PMR mimics the function of beta-blockers without the pharmacological side effects, making it particularly suitable for older adults with medication sensitivities or comorbid conditions<sup>13</sup>.

These findings are consistent with previous studies. Maret (2016) and Yuliandarwati (2018) both reported significant anxiety reduction following PMR in older adults. Likewise, Hikmah (2021) confirmed the effectiveness of this technique during the COVID-19 pandemic, a period marked by heightened psychosocial stress among the elderly<sup>14-17</sup>. Rani (2020) further demonstrated a statistically significant difference in anxiety levels between intervention and control groups, reinforcing the measurable impact of PMR as a therapeutic modality.

PMR is especially appropriate for older populations due to its simplicity and minimal cognitive demand. It does not require imagination, focused attention, or suggestion factors that are often barriers for seniors experiencing mild cognitive impairment. With simple instruction and guidance from facilitators or caregivers, PMR can be practiced independently or in small groups. This opens the door for broader integration of PMR into community-based programs, elderly care facilities, and geriatric nursing practice.

Overall, the findings of this study reinforce the role of PMR as an effective, low-cost, and low-risk non-pharmacological intervention for anxiety management in older adults. PMR may serve as a first-line or complementary approach within community-based mental health initiatives. Further research employing quantitative methods, including randomized controlled trials, is recommended to enhance the generalizability of findings and inform evidence-based policy and clinical practice in geriatric mental health care.

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#### **4. Conclusion**

The six-day application of Progressive Muscle Relaxation (PMR) was found to be effective in reducing anxiety levels among older adults, as demonstrated in two case studies conducted at the Panti Griya Werdha Surabaya, Indonesia. The intervention not only resulted in reduced HRSA anxiety scores but also produced notable improvements in participants' physical and psychological well-being, including enhanced relaxation, reduced muscle tension, and improved sleep quality. PMR is easy to implement, requires no specialized equipment, and offers a practical non-pharmacological option for promoting mental health in older adult communities. The findings of this study reinforce prior evidence supporting PMR as an effective, feasible, and scalable approach suitable for integration into gerontological nursing practice.

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#### **Compliance with ethical standards**

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##### *Disclosure of conflict of interest*

The authors declare no conflict of interest

##### *Statement of ethical approval*

The study was approved by the Ethical Review Board (ERB) of Muhammadiyah University, Surabaya (ERB No. 661/2024). Participation was voluntary, and informed consent was obtained after participants were provided with a detailed explanation of the study. Confidentiality and anonymity of participant data were ensured, and data were used exclusively for research purposes

##### *Statement of informed consent*

All participants were informed about the purpose, procedures, potential risks, and benefits of the study. Written informed consent was obtained from all individuals prior to participation, in accordance with the Declaration of Helsinki. For participants unable to provide written consent due to physical or cognitive limitations, consent was obtained from legal guardians or representatives.

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