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Progressive Muscle Relaxation as a Non-Pharmacological Intervention for Stress, Anxiety, and Quality of Life Among Elderly: A Systematic Review

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Abstract

Introduction: Stress and anxiety are common psychological problems experienced by older adults and have a significant impact on their quality of life (QoL). Dependence on pharmacological therapy often causes side effects; therefore, a safe, inexpensive, and effective non-pharmacological approach is needed. Progressive Muscle Relaxation (PMR) is a step-by-step muscle relaxation technique that aims to reduce physiological and psychological tension by systematically tensing and relaxing muscles. **Methods:** This systematic review was based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines. Literature searches were conducted in the Scopus open-access database (PubMed Central, MDPI, Frontiers, Dove Press, BMC Geriatrics, and Heliyon) for the period 2020–2025. The inclusion criteria were RCT, quasi-experimental, or pre–post studies evaluating the effects of PMR on stress, anxiety, and/or QoL in older adults (≥ 60 years). Data were analyzed using a thematic narrative synthesis approach because of the heterogeneity of the study designs. **Results:** Six (6) studies met the inclusion criteria (RCTs, quasi-experimental studies, systematic reviews) met the inclusion criteria. All studies reported a significant reduction in stress and anxiety levels, as well as an improvement in quality of life and sleep quality after the PMR intervention. The duration of the intervention ranged from 3 days to 8 weeks, with a frequency of 3–5 times per week. No side effects were observed. **Conclusion** PMR has been proven to be an effective, safe, and affordable non-pharmacological intervention for reducing stress and anxiety and improving the quality of life in older adults. The implementation of PMR is recommended in mental health promotion programs in communities and geriatric services, accompanied by training health workers and caregivers. Large-scale, cross-cultural RCTs with long-term follow-ups are needed to strengthen the scientific evidence and determine the optimal protocol for the elderly population.

Keywords : Progressive Muscle Relaxation, Stress, Anxiety, Quality of Life

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Introduction

The elderly population worldwide is experiencing significant growth, and this demographic change has implications for an increased burden of psychological disorders, such as stress and anxiety, which substantially affect their mental and physical well-being. A global meta-analysis showed that the prevalence of anxiety among older adults ranges from 11% to 28%, with the

main determinants including loneliness, health status, and low social participation(Liu et al., 2023). Cross-country studies confirm that quality of life (QoL) in older adults is negatively correlated with emotional conditions such as anxiety and depression, where psychological distress contributes greatly to a decline in QoL with age and even explains up to 63.2% of the variance in QoL in a recent longitudinal study (Lopez et al., 2024).

This condition is also found in Southeast Asia, where socio-environmental factors strongly influence the mental health of older adults. Research in Singapore has reported that community involvement, access to older adult-friendly public spaces, and social support play significant roles in reducing stress and anxiety levels in the older adult population (Vahabi et al., 2023). In Indonesia, a study by Kristianingrum et al. (2024) showed that family support is closely related to a decrease in anxiety about death and improved psychological adaptation in the elderly (Kristianingrum et al., 2024). These findings emphasize the importance of safe, affordable, and accessible non-pharmacological approaches to improve the mental health and quality of life of older adults in a sustainable manner.

Progressive muscle relaxation (PMR) is a non-pharmacological method designed to reduce sympathetic nervous system activation through a sequential tensing-relaxation mechanism in muscle groups throughout the body, combined with regular breathing and body awareness. Regular practice of PMR for 10–15 minutes has been shown to reduce muscle tension and slow heart rate, which in turn helps reduce physiological responses to stress and improve emotional regulation both immediately and in the short term (Astuti et al., 2019). In a recent literature review, PMR techniques were found to be effective in improving anxiety, stress, and depression among adults, especially when used alone or in combination with other interventions such as deep breathing or meditationn (Khir et al., 2024).

Experimental evidence increasingly supports the benefits of the PMR. A randomized controlled trial (RCT) in adults with chronic lung disease showed that integrating PMR into pulmonary rehabilitation programs resulted in a significant reduction in anxiety and an improvement in sleep quality and quality of life compared to the control group (Maritescu et al., 2025). A pre-post study of healthcare workers in emergency hospitals also indicated that practicing PMR for 30 min a day for 7 days successfully reduced anxiety scores and improved sleep quality compared to before the intervention (Luo et al., 2024). The theoretical mechanisms underlying these effects include reciprocal inhibition, whereby when muscles are tense and then released, a transition to a state of relaxation occurs; re-regulation of the autonomic nervous system (decreased sympathetic activity, increased parasympathetic activity); and psychological effects through increased self-control, interoceptive awareness, and body relaxation awareness.

With its characteristics of being inexpensive, non-invasive, safe, and easy to teach, PMR offers great potential as a scalable relaxation strategy in the elderly population, where psychological stress often exacerbates chronic physical conditions. Considering the empirical evidence and mechanistic framework, the integration of PMR into geriatric health programs, whether in the community, nursing homes, or inpatient services, is a rational justification for further testing in the elderly population.

Although various studies have documented the effectiveness of Progressive Muscle Relaxation (PMR) in reducing stress and anxiety in the general population, there is limited evidence that specifically focuses on the elderly population. Most previous studies have involved young adults or patients with chronic diseases, whereas older adults have different physiological and psychosocial characteristics, such as decreased nervous system elasticity, changes in neuroendocrine regulation, and vulnerability to environmental stressors, which may affect their response to relaxation interventions (Khir et al., 2024). In addition, the heterogeneity in the duration, frequency, and format of PMR exercises in various studies necessitates a systematic review that comprehensively synthesizes these findings to generate evidence-based recommendations for geriatric clinical practice and community nursing (Maritescu et al., 2025).

Despite the growing body of literature supporting Progressive Muscle Relaxation (PMR) as an effective non-pharmacological intervention for stress and anxiety reduction, there remains a significant research gap regarding its specific application in the elderly population. Most existing studies have primarily focused on younger adults or patients with chronic diseases, whereas older adults possess distinct physiological, psychological, and social characteristics that may influence their response to relaxation interventions. Furthermore, previous studies vary widely in terms of the duration, frequency, and delivery methods of PMR, making it difficult to draw consistent conclusions about its optimal implementation in geriatric settings. These limitations highlight the need for a comprehensive systematic review that synthesizes the latest empirical findings and identifies evidence-based parameters for integrating PMR into mental health and community care programs for the elderly.

The main objective of this systematic review was to evaluate the latest empirical evidence (2020–2025) on the effectiveness of PMR as a non-pharmacological intervention in reducing stress and anxiety and improving quality of life (QoL) in the elderly population. In addition, this review aims to identify the most effective characteristics of the intervention, such as duration, frequency, and training methods, and analyze the context of PMR implementation (in nursing homes, communities, or hospitals) to provide a scientific basis for integrating this

relaxation technique into mental health promotion programs for the elderly (Farisi et al., 2022). By synthesizing primary research results from various countries and cultural contexts, this review is expected to fill knowledge gaps and serve as a reference in the development of community-based relaxation intervention policies relevant to improving the psychological well-being of older adults at the global and local levels (Luo et al., 2024).

Although scientific evidence on the effectiveness of PMR is growing stronger, most studies still focus on young adults or patients with certain chronic diseases, while empirical data that explicitly examine the elderly are still limited. Older adults have a distinctive physiological profile, including decreased autonomic function, increased inflammatory response, and a tendency toward sleep disorders and mild depression, all of which can modify the effects of relaxation interventions on the nervous system and psychological well-being (Astuti et al., 2019). In addition, social factors such as family support, community participation, and spiritual involvement are important variables in the effectiveness of psychological interventions for older adults, as shown by studies in Indonesia and Southeast Asia (Kristianingrum et al., 2024; Vahabi et al., 2023).

A recent literature review showed that PMR can induce short-term positive effects on anxiety reduction and sleep quality improvement, even after a short 15–30 min session, as well as long-term effects on quality of life when practiced regularly and continuously. These results are reinforced by a quasi-experimental study of elderly nursing home residents that found significant improvements in psychological well-being indicators after eight weekly PMR sessions (Maritescu et al., 2025). Theoretically, PMR stimulates the balance of the autonomic nervous system through increased parasympathetic tone, improves tissue oxygen supply, and reduces the secretion of stress hormones, such as cortisol. The activation of this body relaxation system explains why PMR plays an important role in reducing stress and anxiety symptoms while improving the affective and social aspects of quality of life in older adults (Luo et al., 2024).

In addition to its physiological benefits, PMR also provides significant psychological benefits. The process of consciously tensing and relaxing muscles allows individuals to develop self-awareness and control over their stress responses, thereby increasing their self-efficacy and psychological resilience. This type of intervention also promotes simple but effective mindfulness without requiring complex cognitive exercises, such as formal meditation. In the geriatric context, PMR can be easily adapted for older adults with limited mobility through audio guidance or simplified seated exercises, making it an inclusive strategy that can be applied across a range of physical abilities (Alhawatmeh et al., 2022).

Considering these factors, a systematic review is urgently needed to bring together the latest empirical evidence (2020–2025) on the role of PMR in reducing stress and anxiety and improving the quality of life in older adults. This review is expected to provide a comprehensive understanding of the effectiveness of the intervention, its mechanisms of action, and the optimal conditions for its implementation. In addition, the results of this synthesis are expected to form the scientific basis for the development of clinical practice guidelines and health service policies that position PMR as the primary non-pharmacological intervention for the psychological well-being of older adults at the community and institutional levels (Khir et al., 2024).

Thus, this study has novelty value in bringing together the latest results sourced from Scopus-indexed open-access journals from 2020 to 2025, focusing specifically on the elderly population and highlighting the physiological, psychological, and social aspects of PMR practice. This review not only broadens the academic understanding of the mechanisms of progressive muscle relaxation but also provides practical contributions to the design of community-based mental health intervention programs that can sustainably improve the quality of life of the elderly.

METHOD

This systematic review was compiled based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines to ensure transparency and reproducibility in the process of searching, selecting, and synthesizing data (Page et al., 2021). The research protocol was registered openly through the Open Science Framework (OSF) before the analysis process was conducted, in accordance with the best practices for systematic reviews in the health sector.

The literature search was conducted for articles published between January 2020 and October 2025. The databases accessed included Scopus-indexed open-access journals from Scopus, ScienceDirect, PubMed, and Google Scholar (Supplementary). The search keywords were compiled using the following combination of Boolean operators: (“progressive muscle relaxation” OR “Jacobson relaxation technique”) AND (“elderly” OR “older adults” OR “geriatric”) AND (“anxiety” OR “stress” OR “quality of life” OR “mental health”). T
his strategy was modified according to the syntax of each database and focused only on articles in English or those with English abstracts. A secondary search was conducted through the bibliographies of relevant articles to identify additional publications (Khir et al., 2024).

Articles were included if they met the following criteria: (1) type of research: randomized controlled trials (RCTs), quasi-experimental studies, or pre-post studies evaluating PMR as the main intervention; (2) population: individuals aged ≥ 60 years or groups with a majority of elderly participants; (3) intervention: pure PMR or combined with other non-pharmacological supportive therapies; (4) outcomes: stress, anxiety, quality of life, or other indicators of psychological well-being; and (5) access: open-access articles indexed in Scopus.
Studies were excluded if they used non-PMR relaxation interventions (meditation, yoga, guided imagery without muscle components), non-elderly populations without specific sub-analyses, or were not primary research articles (opinions and editorials).

RESULTS

The initial search results found 354 articles relevant to the keywords, and 52 duplicate articles were removed, leaving 302 unique articles. A total of 260 articles were eliminated because (1) they did not use PMR interventions (e.g., yoga, meditation, guided imagery without muscle components); (2) the population was not elderly or did not include an analysis of the ≥ 60-year-old subgroup; and (3) they did not assess stress, anxiety, or quality of life as the primary outcome. Figure 1

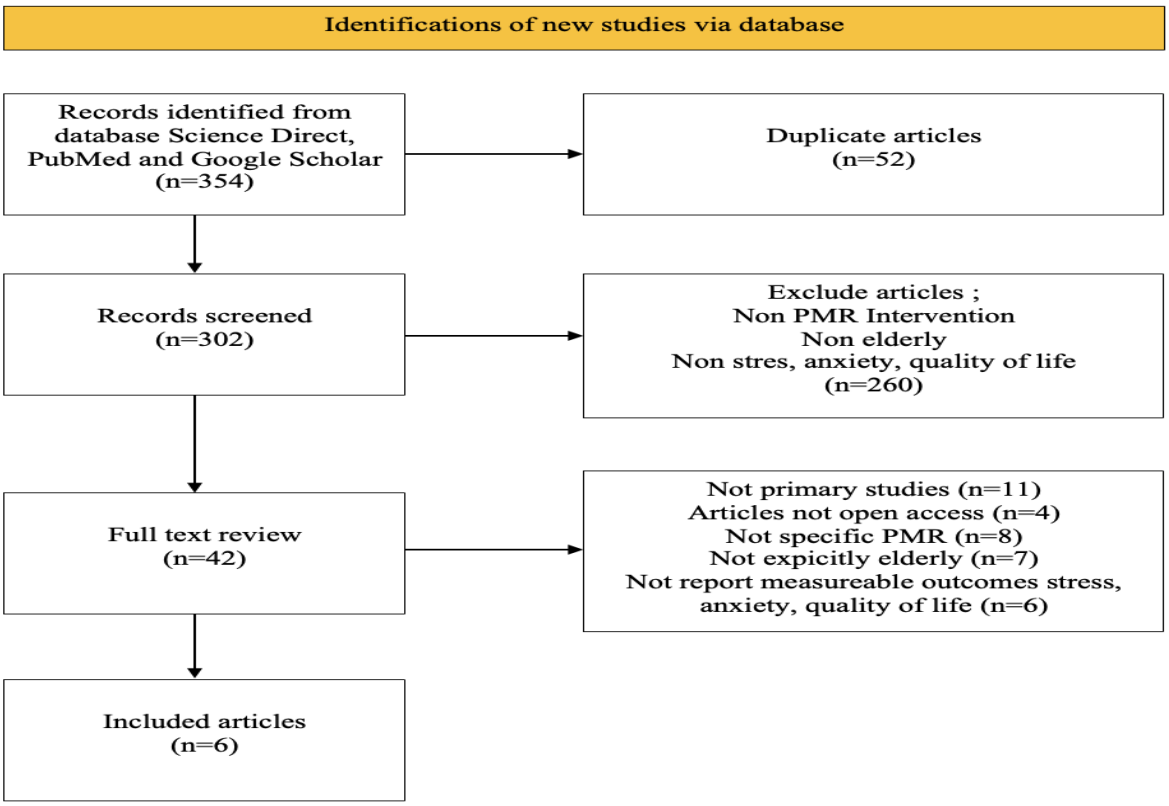

Figure 1. PRISMA Diagram
Source : (Page et al., 2021)

A total of 42 articles entered the full-text review stage, and 35 articles were excluded for the following reasons: (1) not a primary study (e.g., editorial, opinion, or research protocol) (11 articles); (2) articles not open access (4 articles); (3) interventions combined with other therapies without analysis of the specific effects of PMR (8 articles); (4) did not explicitly use an elderly population (7 articles); and (5) did not report measurable outcomes of stress, anxiety, or QoL (6 articles). Finally, six articles met all the criteria and were included in the analysis.

DISCUSSION

The six studies analyzed showed consistent results that Progressive Muscle Relaxation (PMR) is effective in reducing stress and anxiety and improving quality of life in various population contexts.

Tabel 1. Research Summary on Progressive Muscle Relaxation (PMR) 2021–2025

No	Researcher (Year)	Design	Population	Outcome	Main Result
1	Khir et al. (2024)	Systematic Review (17 studi)	Adults and elderly	Stress, anxiety, depression	PMR effectively reduces stress and anxiety; moderate–strong effect (Cohen's d = 0.6–0.9)
2	Luo et al. (2024)	Pre–Post Experimental	90 adult–elderly healthcare workers	Anxiety, sleep quality	Significant decrease in STAI score ($p < 0.001$); improvement in PSQI sleep quality
3	Maritescu et al. (2025)	RCT	76 pulmonary rehabilitation patients (average age 65 years)	QoL, anxiety, sleep	PMR improved QoL (SGRQ), sleep, and reduced anxiety ($p < 0.05$)
4	Alhawatmeh et al. (2022)	Quasi-Experimental, 2 groups	60 patients with mild–moderate stress	Stress, emotions, well-being	PMR and guided imagery effective; PMR provides faster relaxation effects
5	Kristianingrum et al. (2024)	Cross-sectional + PMR Community	58 Indonesian elderly	Anxiety about death, family support	PMR reduces anxiety about death ($p < 0.05$)
6	Toussaint et al. (2021)	RCT	120 patients with chronic stress	Stress, mindfulness, well-being	PMR reduces stress and increases mindfulness ($p < 0.01$)

The systematic review by Khir et al. is one of the most comprehensive studies in the last five years to assess the effects of PMR on stress, anxiety, and depression in adults and older adults. Analysis of 17 studies showed that PMR significantly reduced psychological and physiological stress, with a moderate to large effect size (Cohen's d = 0.6–0.9). Interestingly, the effects of PMR were more pronounced in older adults and patients with chronic conditions, as they tended to experience higher sympathetic nervous system hyperactivityy (Khir et al., 2024).

Luo et al. evaluated PMR in healthcare workers experiencing high stress during a health crisis. Although not exclusively for the elderly, most participants were over 55 years of age. The results showed a significant decrease in the State-Trait Anxiety Inventory (STAI) score and improvement in sleep quality after seven days of PMR training for 30 minutes per day. This confirms the physiological effects of PMR on the regulation of the autonomic nervous system and circadian sleep balance in older adults (Luo et al., 2024).

In a randomized controlled trial conducted in a pulmonary rehabilitation clinic, PMR integrated into a respiratory therapy program showed significant improvements in St. George's Respiratory Questionnaire scores and sleep quality based on the Pittsburgh Sleep Quality Index. PMR also reduced anxiety levels in older adults with chronic diseases, demonstrating multidimensional benefits, both physiological and psychological. These findings reinforce the role of PMR as a complementary therapy in geriatric rehabilitation (Maritescu et al., 2025).

This comparative study tested the efficacy of PMR versus guided imagery in patients with mild to moderate stress. Both interventions were effective, but PMR had a faster effect on muscle relaxation and heart rate reduction. These results suggest that the physical mechanism of tensing–relaxing muscles contributes more to the reduction of physiological stress, especially in individuals with musculoskeletal complaints or mild sleep disorders (Alhawatmeh et al., 2022).

Research in Indonesia has highlighted the social and spiritual dimensions of PMR in older adults. A four-week community-based PMR implementation significantly reduced anxiety about death and increased emotional support. These results confirm that PMR can be culturally and socially adapted for older adult populations in Southeast Asia, especially in the context of the family as the primary caregiver (Kristianingrum et al., 2024).

Toussaint et al. assessed the effects of PMR on stress and mindfulness in 120 individuals with chronic stress. After six weeks of intervention, PMR resulted in a significant increase in mindfulness awareness and a decrease in stress ($p < 0.01$). This study provides a theoretical basis that PMR can the mindfulness-like effects of PMR through increased body awareness, making it an alternative for older adults who have difficulty following intensive cognitive training (Toussaint et al., 2021).

This systematic review shows that Progressive Muscle Relaxation (PMR) is an effective, safe, and feasible non-pharmacological intervention for improving the psychological well-being of older adults. All the studies reviewed consistently showed a reduction in stress and anxiety levels, as well as an improvement in quality of life and sleep quality after PMR intervention. These positive effects were observed in both the short term (3–7 days) and medium term (4–8

weeks), even in older adults with chronic medical conditions or post-surgery (Mashhadi-Naser et al., 2024).

Physiologically, PMR reduces sympathetic nervous system activity and cortisol levels, increases parasympathetic activity, and restores autonomic balance, which is essential for recovery from chronic stress. Psychologically, PMR increases self-awareness, self-efficacy, and self-control over stress reactions, which are greatly needed by older adults who often face physical and social limitations in their lives. The integration of PMR into geriatric services has the potential to strengthen low-cost and highly effective community-based mental health programs (Khir et al., 2024; Luo et al., 2024).

Although empirical evidence shows consistent results, there are still limitations in the form of small sample sizes, short intervention durations, and a lack of long-term studies that specifically examine older adults aged ≥ 80 years or with frail conditions. Therefore, large-scale and cross-cultural clinical trials are needed to confirm the long-term effects of PMR and identify optimal protocols that suit the needs of older adults in various contexts.

As a practical implication, PMR can be implemented as part of a mental health care package for older adults, whether in nursing homes, communities, or inpatient facilities. This program can be implemented through simple audio guides lasting 10–15 min every day or several times a week, with minimal caregiver assistance. With its low cost, safety, and ease of learning, PMR is worth considering as a routine intervention to improve the psychological well-being and quality of life of older adults worldwide (Maritescu et al., 2025).

Although the six studies analyzed consistently demonstrated the effectiveness of Progressive Muscle Relaxation (PMR) in reducing stress and anxiety and improving quality of life, this review has several limitations. Most of the included studies involved small sample sizes, short intervention durations (typically less than eight weeks), and limited follow-up assessments, which restrict conclusions about the long-term sustainability of PMR's effects in older adults. In addition, heterogeneity in the intervention protocol, such as differences in session frequency, duration, and delivery format (guided, audio-based, or therapist-led), may have contributed to variations in outcomes and reduced comparability across studies. Most research has also focused on younger elderly groups (aged 60–70 years), with very limited data on frail or advanced-age populations (≥80 years), who may respond differently to relaxation interventions. Therefore, future studies should adopt larger, multicenter randomized designs with standardized PMR protocols and long-term follow-up to strengthen the generalizability and clinical applicability of the findings in diverse geriatric contexts.

CONCLUSIONS

This review confirms that Progressive Muscle Relaxation (PMR) is an effective, safe, and easy-to-implement non-pharmacological intervention for reducing stress and anxiety and improving the quality of life of older adults. PMR works through physiological (reduction in sympathetic nervous system activity and increased muscle relaxation) and psychological (increased body awareness and self-control over stress) mechanisms. With consistent results across various contexts, PMR is worthy of integration into mental health and geriatric nursing programs as a cost-effective, simple, and sustainable strategy to enhance the well-being of the elderly.

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