

Original Research

Changes in Anxiety Levels Following Diaphragmatic Deep Breathing Relaxation Among Institutionalized Older Adults

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ABSTRACT

Background: Anxiety is a common problem among older adults and can negatively affect their quality of life. Deep breathing relaxation is a simple, safe, and non-pharmacological intervention that may help reduce anxiety. However, evidence regarding the effectiveness of diaphragmatic breathing among older adults living in nursing homes remains limited. Therefore, this study aimed to determine the effect of deep breathing relaxation techniques on anxiety levels among older adults at Dharma Bhakti Kasih Nursing Home, Surakarta.

Methods: A quantitative pre-experimental study with a one-group pretest-posttest design was conducted on 30 older adults selected through purposive sampling. Anxiety levels were assessed using the Geriatric Anxiety Scale (GAS). Data were analyzed using the Paired Sample T-test and Cohen's *d* to analyze the effectiveness of the intervention.

Results: Most participants were female (73.3%), aged 75–90 years (56.7%), had secondary education (60%), and had no comorbidities (63.6%). Following the intervention, the proportion of participants with mild anxiety increased from 60% to 86.7%, while moderate anxiety decreased to 13.3%. A significant reduction in anxiety levels was observed after the intervention ($p < 0.001$), with a moderate effect size (Cohen's $d = 0.478$).

Conclusion: The deep breathing relaxation techniques significantly reduce anxiety levels among older adults and can be recommended as an effective non-pharmacological intervention for anxiety management.

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INTRODUCTION

Aging is a natural and inevitable process characterized by progressive physical, psychological, and social changes that interact with one another and may affect the overall well-being of older adults (Susanti & Hasrianto, 2021). Older adulthood generally begins at the age of 60 years and continues throughout the remaining lifespan (Hildawati, 2021). Indonesia has entered an aging population phase since 2021, with older adults accounting for more than 10% of the total population. In 2024, the proportion of older adults reached 12%, increasing from 11.75% in the previous year

(Badan Pusat Statistik, 2024). Central Java is among the provinces with the highest proportion of older adults, accounting for approximately 15.46% of the population. Furthermore, the number of older adults in Indonesia is projected to continue increasing in line with population aging trends in Asia and globally (Susanti & Hasrianto, 2021).

The growing elderly population is accompanied by various health-related challenges, including physical, cognitive, social, and economic problems. Among these, psychological disorders such as stress, depression, dementia, and anxiety are commonly experienced by older adults (Susanti & Hasrianto, 2021). Anxiety is one of the most prevalent psychological problems among older adults, with a global prevalence estimated at approximately 15%. In Indonesia, the prevalence of anxiety among older adults has increased from 3.2% to 14.2% and continues to rise annually. Age-related changes, including declining health conditions, memory problems, experiences of loss, and concerns about dependence, loneliness, and death, may contribute to the development of anxiety in later life (Hildawati, 2021). In addition, factors such as gender, age, life experiences, chronic illnesses, functional limitations, relocation to nursing homes, and family visitation patterns may also influence anxiety levels among older adults (Belen et al., 2023).

Anxiety has substantial negative consequences for older adults. It may reduce physical activity and functional status, resulting in negative perceptions of personal health (Lestari et al., 2024). Anxiety also affects psychological well-being by increasing emotional distress and stress levels, thereby reducing quality of life (Utami & Silvitasari, 2022). Moreover, higher anxiety levels are associated with decreased independence in daily activities and sleep disturbances, including difficulty initiating sleep and poor sleep quality, which may further impair both physical and mental health (Nur Dewi Sulastris Basarewan et al., 2022; Utami & Silvitasari, 2022).

Management of anxiety in older adults can be categorized into pharmacological and non-pharmacological approaches. Although pharmacological treatment may be beneficial, non-pharmacological interventions are increasingly recommended due to their safety and ease of implementation. Several approaches have been used to reduce anxiety among older adults, including nature sound therapy, progressive muscle relaxation, meditation, acupuncture, laughter therapy, Cognitive Behavioral Therapy (CBT), and deep breathing relaxation techniques (Praptomo et al., 2024). Deep breathing relaxation is a breathing technique performed slowly, rhythmically, and comfortably through diaphragmatic breathing patterns (Aisyah et al., 2024). Previous studies have demonstrated that deep breathing relaxation can reduce blood pressure in patients with hypertension (Andri et al., 2021), alleviate preoperative anxiety (Zakia et al., 2024), reduce anxiety during childbirth (Diana Ulfah et al., 2024), and decrease anxiety levels among older adults (Aisyah et al., 2024; Rizki et al., 2023; Saseno et al., 2013; Widiani et al., 2024).

Nursing homes play an important role in supporting the welfare and daily needs of older adults by providing accommodation, social protection, and healthcare support (Putri & Lestari, 2023). However, the availability of nursing home services does not automatically eliminate psychological problems experienced by residents, including anxiety. Although Deep breathing relaxation has been widely used as a non-pharmacological intervention to support psychological well-being and reduce anxiety in older adults; however, further evidence is needed regarding the application of diaphragmatic breathing as a specific deep breathing relaxation technique for reducing anxiety among older adults. The novelty of this study lies in the use of diaphragmatic

breathing as a form of deep breathing relaxation to reduce anxiety levels among older adults. Based on the literature review, various studies have employed deep breathing techniques as non-pharmacological interventions to address anxiety; however, the approaches used vary according to the specific breathing techniques applied. In the present study, the researchers selected diaphragmatic breathing because this technique emphasizes the optimal use of the diaphragm, thereby promoting pulmonary ventilation, slowing the respiratory rate, and eliciting a relaxation response that may help reduce anxiety.

MATERIALS AND METHOD

This study employed a quantitative experimental approach using a pre-experimental one-group pretest-posttest design. In this design, a single group of participants received the intervention and was assessed before and after treatment without the inclusion of a control group (Sukmawati et al., 2024). Anxiety levels were measured prior to the intervention (pre-test) and after completion of the intervention (post-test) to evaluate the effect of deep breathing relaxation on anxiety among older adults.

The study was conducted from July to August 2025 at Dharma Bhakti Kasih Nursing Home, Surakarta, a social care institution under the Dharma Bhakti Kasih Surakarta Foundation that provides residential care and support for older adults. The study population consisted of 46 older adults residing in the nursing home. A total of 30 participants who met the inclusion criteria were selected using purposive sampling, a sampling technique that involves selecting subjects based on predetermined criteria relevant to the research objectives (Widodo, 2021). Eligible participants were older adults who had anxiety levels measurable using the Geriatric Anxiety Scale (GAS) with a score greater than 19, were able to communicate and understand study instructions, had no chronic respiratory disorders or severe medical conditions that could affect the implementation of deep breathing relaxation, and were willing to participate by providing informed consent.

The intervention consisted of deep breathing relaxation exercises performed through slow and controlled breathing. Participants inhaled deeply through the nose, held their breath briefly, and exhaled slowly through the mouth. The intervention was administered for eight sessions with a frequency of two sessions per week. Each intervention session lasted approximately 15 minutes. The independent variable in this study is the deep breathing relaxation technique and the dependent variable is the anxiety level of the elderly at Panti Wredha Dharma Bhakti Kasih Surakarta.

Data were collected through observation, interviews, and questionnaires. Observation and interviews were conducted to obtain participant characteristics and supporting information, while anxiety levels were assessed using the Geriatric Anxiety Scale (GAS) questionnaire (Widodo, 2021). The GAS is a specific instrument designed to assess affective, somatic, and cognitive symptoms of anxiety among older adults (Daturrahmah & Tobing, 2023). The instrument consists of 25 items rated on a four-point Likert scale ranging from 0 (never) to 3 (always), with total scores ranging from 0 to 75. Scores are categorized as no anxiety (0–18), mild anxiety (19–37), moderate anxiety (38–55), and severe anxiety (56–75) (Hidayati et al., 2021). Previous studies have demonstrated excellent psychometric properties of the GAS, with Cronbach's alpha values ranging from 0.92 to 0.93, indicating high validity and reliability for

measuring anxiety among older adults (Daturrahmah & Tobing, 2023; Sovianti et al., 2025).

Statistical analyses were performed using IBM SPSS software. Descriptive statistics were used to summarize participant characteristics, including sex, age, education level, comorbidity history, and anxiety levels. Prior to hypothesis testing, data normality was assessed using the Shapiro–Wilk test because the sample size was fewer than 50 participants. Since the transformed data met the normality assumption, differences in anxiety levels before and after the intervention were analyzed using the paired-sample t-test. The effectiveness of the intervention was further evaluated using Cohen’s d effect size analysis. Cohen’s d values of 0.2, 0.5, and 0.8 indicate small, moderate, and large effects, respectively (Aarts et al., 2014; Cohen, 1988; Schäfer, 2025).

Ethical approval was obtained from the Health Research Ethics Committee of Dr. Moewardi General Hospital, Surakarta (No. 1.429/VII/HREC/2025). Written informed consent was obtained from all participants before data collection.

RESULTS

A total of 30 older adults participated in this study. Following the implementation of the deep breathing relaxation intervention over four weeks, anxiety levels were reassessed using the Geriatric Anxiety Scale (GAS). The results showed a decrease in anxiety levels after the intervention. Participant characteristics, anxiety level distributions, and the outcomes of the statistical analyses are presented in the following tables.

Table 1. Characteristics of the Study Participants (n = 30)

Characteristics	Frequency (n)	Percentage (%)
Gender		
Female	22	73,3
Male	8	26,7
Total	30	
Age		
Elderly (60-74)	13	43,3
Old – elderly (75-90)	17	56,7
Total	30	
Education Level		
Primary education	6	20
Secondary education	18	60
Higher education	6	20
Total	30	
Comorbidity History		
Present of comorbidity	11	36,7
No Comorbidity	19	63,3
Total	30	

Table 1 shows that most participants were female (73.3%), aged 75–90 years (56.7%), had a secondary education level (60.0%), and had no history of comorbidities (63.3%).

Table 2. Changes in Geriatric Anxiety Scale (GAS) Categories Following Deep Breathing Relaxation (n =30)

Anxiety Level (GAS Score)	Pre-test	Post-test
	f (%)	f (%)
No Anxiety (0-18)	-	-
Mild Anxiety (19-37)	18 (60%)	26 (86,7%)
Moderate Anxiety (38-55)	12 (40%)	4 (13,3%)
Severe Anxiety (56-75)	-	-
Total	30 (100%)	30 (100%)

Based on the Geriatric Anxiety Scale (GAS) classification, most participants were categorized as having mild anxiety (60.0%) before the intervention. After the intervention, the proportion of participants with mild anxiety increased to 86.7%, while the proportion with moderate anxiety decreased from 40.0% to 13.3%. No participants were classified as having no anxiety or severe anxiety in either assessment.

Table 3. Comparison of Anxiety Scores Before and After the Intervention (n = 30)

Variable	Min	Max	Mean ± SD
Pre-test	21	51	33,57 ± 8,908
Post-test	19	45	29,53 ± 7,943
Mean Difference	2	6	4,03 ± 1,245

Table 3 demonstrates a reduction in anxiety scores following the intervention. The mean anxiety score decreased from 33.57 ± 8.91 before the intervention to 29.53 ± 7.94 after the intervention, with an average reduction of 4.03 points.

Prior to hypothesis testing, data normality was assessed using the Shapiro–Wilk test. The initial analysis indicated that the post-test data were not normally distributed ($p = 0.049$). After data transformation, both pre-test ($p = 0.078$) and post-test ($p = 0.060$) data met the assumption of normality and were subsequently analyzed using a paired-sample t-test.

Table 4 . Effect of Deep Breathing Relaxation on Anxiety Levels

Statistical Test	Value
T-value	20.455
p-value	0.001
Cohen's d	0.478
Interpretation	Moderate Effect

The paired-sample t-test revealed a statistically significant difference between pre-test and post-test anxiety scores ($p = 0.001$), indicating that deep breathing relaxation significantly reduced anxiety levels among older adults. Furthermore, the Cohen's d value of 0.478 indicated a moderate effect size, suggesting that the intervention had a moderate level of effectiveness in reducing anxiety.

DISCUSSION

The findings of this study indicate that deep breathing relaxation significantly reduced anxiety levels among older adults residing at Dharma Bhakti Kasih Nursing Home, Surakarta. The participants in this study were predominantly female, aged 75–90

years, had a secondary education level, and reported no history of comorbidities. The predominance of female participants is consistent with national demographic data indicating that the proportion of older women in Indonesia is higher than that of older men (Badan Pusat Statistik, 2025). This phenomenon is often referred to as the feminization of aging, whereby women tend to have a longer life expectancy and higher survival rates than men (Costa et al., 2026). In addition, the majority of participants belonged to the old-old age group (75–90 years), reflecting the increasing number of older adults in Indonesia as a consequence of population aging (Badan Pusat Statistik, 2025). Older individuals in this age category generally experience greater physical and psychosocial changes, which may increase their vulnerability to psychological problems, including anxiety (Sumartini, 2025).

The findings showed that most participants experienced mild anxiety before the intervention, while the remaining participants experienced moderate anxiety. After receiving the deep breathing relaxation intervention, the proportion of participants categorized as having mild anxiety increased, whereas the proportion categorized as having moderate anxiety decreased. These findings indicate an improvement in anxiety status following the intervention. Anxiety in older adults is commonly associated with declining physical health, loss of social roles, reduced independence, fear of illness, and concerns regarding death and dependency (Hildawati, 2021). In nursing home settings, anxiety may also be influenced by environmental adaptation, separation from family members, and limited social interactions (Belen et al., 2023).

The statistical analysis demonstrated a significant difference between anxiety levels before and after the intervention ($p = 0.001$). This result indicates that deep breathing relaxation significantly reduced anxiety among older adults residing at Dharma Bhakti Kasih Nursing Home. Deep breathing relaxation is considered a simple and practical non-pharmacological intervention because it can be performed independently, requires no special equipment, and is relatively easy for older adults to learn and practice (Aisyah et al., 2024). The findings of the present study support the growing body of evidence that breathing-based relaxation techniques can be used as an effective strategy to manage anxiety in older populations.

The results of this study are consistent with previous research. Noorrahman & Pratikto (2022) reported that deep breathing relaxation reduced anxiety levels among older adults living in a nursing home setting. Similarly, Sari et al. (2023) found a significant decrease in anxiety levels among older adults after the implementation of deep breathing relaxation techniques. Widiani et al. (2024) also demonstrated improvements in anxiety responses among older adults who participated in a structured deep breathing relaxation program. Although differences exist in sample size, study setting, and intervention procedures, these studies consistently indicate that deep breathing relaxation contributes to anxiety reduction among older adults. The consistency of findings across studies strengthens the evidence supporting the use of breathing-based relaxation interventions in geriatric populations.

The effectiveness of deep breathing relaxation can be explained through physiological mechanisms. Anxiety activates the sympathetic nervous system and triggers the body's stress response, resulting in increased heart rate, elevated blood pressure, rapid breathing, and muscle tension (Goutama & Chandra Widjanantie, 2023). Prolonged activation of this response may intensify feelings of worry and psychological distress (Akmal Subarjah et al., 2024). During deep breathing relaxation, individuals are encouraged to inhale slowly and deeply, allowing greater expansion of the diaphragm

and more efficient oxygen exchange within the lungs (Tinah & Wahyuni, 2023). Improved oxygen delivery supports optimal brain function and contributes to emotional regulation (Liu et al., 2024). Deep and controlled breathing also stimulates the vagus nerve, which increases parasympathetic nervous system activity and suppresses excessive sympathetic activation (Noble & Hochman, 2019). This physiological response promotes relaxation by reducing heart rate, lowering blood pressure, and decreasing muscle tension (Laborde et al., 2022). Consequently, individuals experience a greater sense of calmness and reduced anxiety.

In addition to its statistically significant effect, the intervention demonstrated a moderate level of effectiveness, as indicated by a Cohen's *d* value of 0.478. According to Cohen (1988), an effect size approaching 0.5 is categorized as a moderate effect. This finding suggests that deep breathing relaxation provides a meaningful clinical benefit in reducing anxiety among older adults. Although the magnitude of the effect was not classified as large, the intervention remains valuable because it is safe, inexpensive, easy to implement, and does not require pharmacological treatment. Therefore, deep breathing relaxation may be recommended as a complementary intervention for anxiety management in nursing homes and other geriatric care settings.

The findings of this study provide additional empirical evidence regarding the potential of reminiscence group therapy to support self-esteem and cognitive function among older adults. Given its group-based and accessible nature, this intervention may be considered for integration into community-based programs for older adults, particularly as a non-pharmacological approach to support psychological and cognitive well-being. Future studies are encouraged to involve larger and more diverse samples, include a control group, and examine the long-term outcomes of reminiscence group therapy.

This study has several limitations. First, the sample size was relatively small, consisting of 30 older adults, with an unequal distribution of participant characteristics, particularly by sex and age group. Male participants were underrepresented, and only one participant belonged to the older age category, which may limit the representativeness of the findings. Second, some participants, particularly those with lower educational levels, experienced difficulties in understanding several items in the assessment instruments. In addition, limited openness in responding to some questions may have affected the accuracy of the collected data. These limitations should be considered when interpreting and generalizing the findings of this study.

CONCLUSION

Deep breathing relaxation significantly reduced anxiety levels among older adults. Following the intervention, the proportion of participants categorized as having mild anxiety increased, while the proportion with moderate anxiety decreased. These findings suggest that deep breathing relaxation may serve as a practical and safe non-pharmacological intervention for anxiety management among older adults. Future studies are recommended to include larger sample sizes and control groups to further evaluate the effectiveness of this intervention.

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CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest regarding the publication of this article. Furthermore, the authors declare that there are no financial or non-financial interests that could have influenced the design, conduct, results, or interpretation of this study.

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