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Effectiveness of Butterfly Hug Therapy in Reducing Anxiety Symptoms Among Older Adults: A Systematic Review

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ABSTRACT

Introduction: Anxiety is a prevalent mental health concern among older adults, often triggered by chronic illness, cognitive decline, and social isolation. Left untreated, anxiety can significantly impair quality of life and exacerbate physical health issues. While pharmacological treatments exist, they pose potential side effects, especially for the elderly. Therefore, non-pharmacological approaches such as Butterfly Hug Therapy (BHT), a technique involving bilateral self-stimulation to promote emotional regulation, have gained attention as alternative interventions.
Objective: This systematic review aims to evaluate the effectiveness of Butterfly Hug Therapy in reducing anxiety levels among older adults.
Method: Following PRISMA 2020 guidelines, a literature search was conducted across PubMed, ProQuest, Garuda, and JSTOR from 2015 to 2024. Eligible studies involved elderly participants, reported measurable anxiety outcomes, and were published in English or Bahasa. Quality was assessed using the Critical Appraisal Skills Programme (CASP).
Result: Out of 350 initial studies, three met the inclusion criteria. Sample sizes ranged from 2 to 60 participants, with therapy sessions lasting approximately 30 minutes over 1 to 2 weeks. Anxiety levels, measured using GAD-7 or GAI, consistently decreased after the intervention. Despite limitations such as small sample sizes and lack of rigorous controls, the findings support BHT as an effective strategy for anxiety reduction in the elderly.
Conclusion: Butterfly Hug Therapy is a simple, non-invasive, and accessible intervention that shows potential for reducing anxiety in older adults. Further research through randomized controlled trials is recommended to confirm long-term benefits and establish standardized clinical guidelines.

Keywords: anxiety level, butterfly hug therapy, elderly

Introduction

Anxiety is one of the most prevalent psychological issues experienced by older adults and can significantly affect their physical, emotional, and social well-being (Setiawan et al 2017). Age-related factors such as chronic illness, cognitive decline, loss of a spouse, and social isolation contribute to increased levels of anxiety in the elderly. It is estimated that 55.5% of the elderly population experience stress, 24% suffer from anxiety, and 15.5% experience depression (Khan et al., 2023). Anxiety in older adults is often described as a subjective experience of discomfort arising from nonspecific causes (Firmansyah et al 2021). If not properly managed, anxiety can lower the quality of life, increase the risk of mental health disorders, and worsen physical health conditions (Hohls et al 2021).

Uncontrolled anxiety in the elderly may also lead to physiological complications such as elevated blood pressure, disrupted sleep patterns, and decreased immune function due to heightened stress hormone activity (Febriyona & Harisa 2023). It can reduce social interaction, increase vulnerability to depression, and exacerbate chronic diseases such as heart disease and diabetes (Rismawati 2022).

Pharmacological treatment options for anxiety, though available, are associated with risks of side effects and drug interactions, particularly in older populations (Girianto 2021). Consequently, non-pharmacological approaches are increasingly being explored as safer alternatives. One such intervention is Butterfly Hug Therapy (BHT), a technique developed within the framework of Eye Movement Desensitization and Reprocessing (EMDR) that utilizes bilateral stimulation to promote emotional regulation and relaxation (Sesilia et al 2024; Mahyuvi 2025). This method is simple, non-invasive, cost-effective, and does not require specialized equipment, making it suitable for older adults with physical or cognitive limitations (Ramdhani & Soleman 2023).

BHT can be self-administered or guided by healthcare professionals and has been reported to stimulate both hemispheres of the brain, helping to process emotions and restore psychological balance (Rhamdiani 2023). Its effects are thought to mimic those of rapid eye movement (REM) sleep in supporting emotional integration (Rahmi et al 2024). Additionally, it has been applied in various settings, such as homes, nursing homes, and clinics, offering flexibility and adaptability in practice (Kurniawan & Sudarta 2024).

The technique is further recognized for its practicality, as it does not require a specific time or place, making it accessible for elderly individuals with limited mobility or healthcare access. Studies have shown that BHT can calm the nervous system, improve emotional stability, and significantly reduce anxiety symptoms (Aulia & Astuti 2024). Furthermore, it can be integrated into holistic therapy programs alongside cognitive-behavioral therapy, deep breathing, and mindfulness-based interventions to optimize treatment outcomes (Draptomo et al 2014; Amanullah et al 2023).

With increasing empirical support, BHT presents an innovative and accessible strategy to enhance psychological well-being in older adults (Nadidah & Chairini 2024). Therefore, this systematic review aims to synthesize current literature regarding the effectiveness of Butterfly Hug Therapy in reducing anxiety symptoms among the elderly.

Objective

This systematic review aims to evaluate the effectiveness of Butterfly Hug Therapy in reducing anxiety levels among older adults.

Method

Study Design

This systematic literature review adhered to the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. To increase the comprehensiveness of the review, the search timeframe was extended to include studies published between 2015 and 2024. The primary databases utilized for the search were PubMed, ProQuest, Garuda, EBSCO, and JSTOR. While these databases provided substantial coverage, the inclusion of additional sources such as Scopus and CINAHL is recommended for future systematic reviews to capture a broader scope of relevant literature.

The search was conducted for studies published from January 1, 2021, to December 31, 2024. This five-year restriction was applied to prioritize the most current and relevant research, reflecting the dynamic and evolving nature of scientific knowledge. Limiting the timeframe also allows for more manageable data screening and synthesis.

The search strategy incorporated Medical Subject Headings (MeSH) and keyword-based queries using advanced search functionalities across the selected databases. The full list of search terms and strategies is detailed in Appendix Table 1. The literature search was independently conducted by two authors (DLPA and DF) to minimize selection bias. Discrepancies in study selection were resolved through discussion or consultation with senior reviewers.

Table 1. Mesh Term On Search Strategy Phase

Source	Link	Keywords	Num
Pubmed	https://tinyurl.com/bdh2cs98	(Butterfly Hug[MeSH Terms]) OR (Anxiety[MeSH Terms)	150
ProQuest	https://tinyurl.com/mrwsa432	(butterfly hug) AND anxienty OR elderly	100
Garuda	https://tinyurl.com/3fzrcrfk	butterfly hug AND Anxiety	35
JSTOR	https://tinyurl.com/yfk9zdns	(((Butterfly hug) AND (Anxiety)) AND (Elderly)) AND la:(eng OR en)	65

Inclusion Criteria

Articles were included only if they reported quantifiable outcomes. While the CASP tool was employed for quality appraisal, future reviews should consider using tools such as RoB 2.0 to provide a more comprehensive assessment of risk of bias.

Participant

The participants involved in this study are elderly individuals. There are no restrictions based on gender, religion, or race.

Intervention

Butterfly Hug Therapy is an intervention designed to reduce anxiety, particularly among the elderly. This technique involves crossing the arms over the chest in a manner that resembles butterfly wings, combined with deep breathing exercises. The therapy's efficacy is attributed to its stimulation of the parasympathetic nervous system, which promotes relaxation of both the body and mind.

The effectiveness of Butterfly Hug Therapy in alleviating anxiety symptoms in elderly individuals has been demonstrated through measurable reductions in anxiety following therapy sessions. Typically, each session lasts approximately 30 minutes, a duration sufficient to induce a calming effect without causing participant fatigue or overwhelm.

To correctly perform the Butterfly Hug, individuals should first assume a comfortable seated position. They begin by practicing deep breathing, inhaling through the nose and exhaling slowly through the mouth. During inhalation, the hands are raised and placed on the chest; during exhalation, the hands are slowly lowered. Bilateral stimulation is achieved by alternately moving the hands over the chest, a process believed to enhance neural connectivity and facilitate a calming response. This technique is simple, accessible, and can be practiced independently, making it a practical tool for elderly individuals to manage anxiety effectively.

Control

Eligible controls were required to receive standard care or usual care, or placebo.

Outcomes

We included studies that measure anxiety intensity using various instruments, such as the Generalized Anxiety Disorder-7 (GAD-7) and Geriatric Anxiety Inventory (GAI).

Study Design

We will include a quasy-experimental, Cross sectional, pre-experimental to assess the effect of butterfly hug Therapy. Article based on single case study, literature review, systematic review and opinion articles will be excluded. Only studies written in English in Bahasa will be included.

Exclusion Criteria

Studies were not published in english and Bahasa. Individuals under the age of 12 years and families with chronic illnesses or mental disorders in individuals over 65 years old were excluded from the study. Articles focusing on single case report, editorial, Letter to Editor, correspondence, narrative review, scoping review, literature reviews, systematic reviews, proceeding abstract, book chapter and opinion articles were excluded from consideration in this analysis.

Study Selection And Data Extraction

Three authors (DN, DLPA, ARF) independently screened all titles and abstracts based on the predefined inclusion criteria. In cases where consensus could not be reached between the two reviewers, senior researchers (HS, DNF) made the final decision regarding the inclusion of disputed articles. Subsequently, two additional authors (DF, LL) independently extracted data from each included study. The extracted data encompassed authorship, publication year, country, study design, sample size, interventions, assessment instruments, results, and key findings.

Assessment Of Quality

Two researchers (DN, LL) independently performed quality assessments of the included studies. Any discrepancies between their evaluations were resolved through discussion, and

if consensus was not reached, senior researchers (HS, DNF) were consulted for further clarification. This thorough process ensures that the quality appraisal is conducted rigorously and aligns with established scientific standards.

CASP Evaluation

We used the Critical Appraisal Skills Programme (CASP) to assess the quality of both primary and secondary outcomes based on the following domains: study design, risk of bias, inconsistency, indirectness, imprecision, and other considerations.

Result

Study Selection

Sample sizes across studies ranged from 2 to 60 participants. Intervention durations varied between 1 and 2 weeks, with each session lasting approximately 30 minutes. Reporting standards were inconsistent; some studies did not include statistical analyses, which limits the comparability and generalizability of the findings.

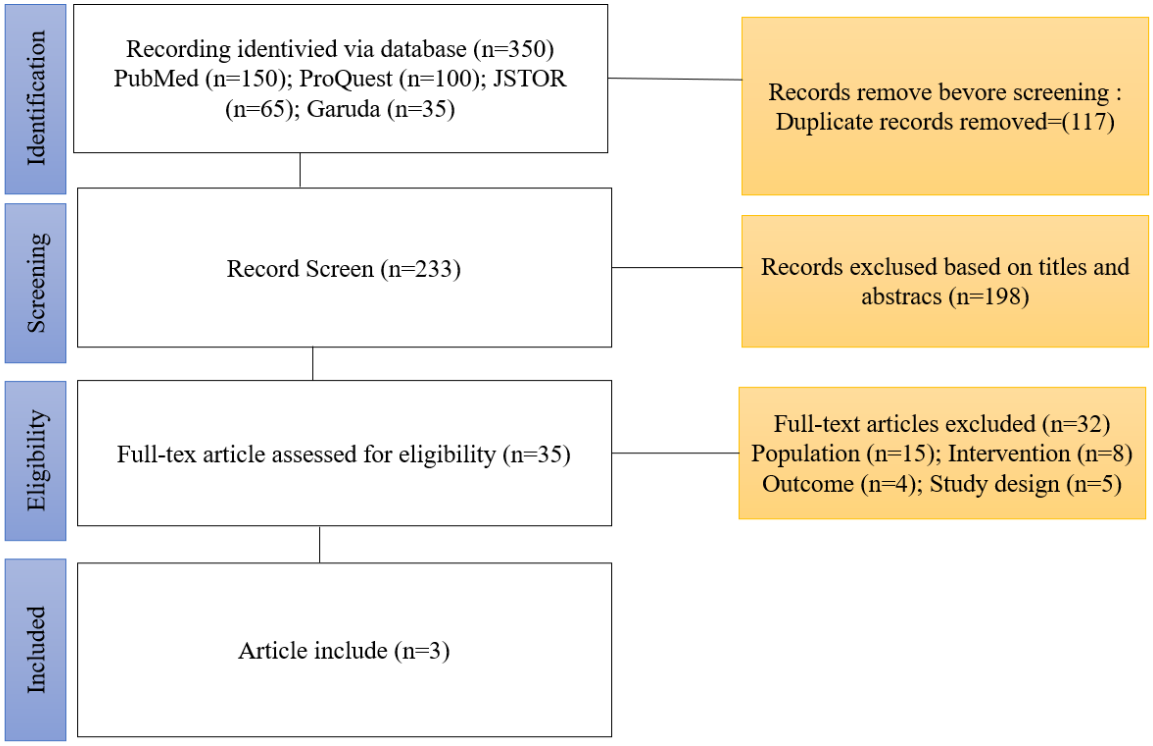

Figure 1. Screening process flowchart by PRISMA

In the initial search phase, a total of 350 relevant articles were identified. After removing 117 duplicates, 233 articles remained for subsequent screening. Three researchers (DN, DF, ARF) independently screened titles and abstracts, resulting in 35 articles selected for full-text review. Following this, full-text screening based on the inclusion and exclusion criteria led to the inclusion of only 3 articles. A detailed overview of the selection process is presented in Figure 1.

Study Characteristics

Table 2. Characteristics of The Studies

Author, year, country	Design (Sample size)	Intervention (Case)	Instrument (outcomes)	Findings
Girianto et al. (2021) Indonesia	Pre-experimental 60	(Butterfly hug)	GAI for Anxiety	Butterfly Hug is effective in reducing anxiety in the elderly at UPT PSTW Jombang-Kediri, with a decrease in anxiety levels from moderate-severe to mild-moderate after one week of intervention.
Cagaoan et al. (2023) Filipina	Quasy eksperimental 10	(Butterfly Hug)	GAD-7 for Anxiety	The Butterfly Hug Method is effective in reducing anxiety levels among elderly individuals in healthcare facilities. Before the intervention, most elderly participants in the experimental group experienced anxiety levels, and it provided additional benefits in alleviating anxiety among them.
Ramdhani (2023) Indonesia	Kualitatif Deskriptif 2	(Butterfly Hug)	GAI for anxiety	The Butterfly Hug Technique is effective in reducing anxiety levels among the elderly at 'Aisyiyah Surakarta Elderly Home. Before the intervention, both respondents had moderate anxiety, with scores of 10 and 9 based on the Geriatric Anxiety Inventory (GAI). After receiving the intervention for three consecutive days, their anxiety levels decreased to the mild category, with scores of 3 and 4. This result indicates that the Butterfly Hug Technique can be a beneficial non-pharmacological method for reducing anxiety in the elderly.

Three studies from Southeast Asia examined the effectiveness of Butterfly Hug Therapy in reducing anxiety among the elderly. Girianto et al. (2021) conducted a pre-experimental study in Indonesia with 60 participants, finding a significant reduction in anxiety levels—from moderate-severe to mild-moderate—after one week of Butterfly Hug intervention, as measured by the Geriatric Anxiety Inventory (GAI) (Girianto et al 2021). Similarly, Cagaoan et al. (2023) carried out a quasi-experimental study in the Philippines involving 10 elderly participants, using the Generalized Anxiety Disorder-7 (GAD-7) scale. The results showed a marked improvement in anxiety symptoms among the intervention group, indicating the method's potential efficacy in institutional care settings (Cagaoan et al 2023). Ramdhani (2023) employed a qualitative descriptive design with two elderly

participants in Indonesia. Using the GAI, the study reported a decline in anxiety scores from moderate to mild after three days of intervention, further supporting the effectiveness of Butterfly Hug Therapy as a simple and accessible non-pharmacological approach to anxiety management in older adults (Rhamdhani & Soleman 2023).

Tabel 3. Characteristics Of Intervention

Author (Year) Country	Intervention, Fasilitator, Setting	Number Of Session	Duration	Method or Media	Topic
Girianto et al. (2021) Indonesia	Butter fly Hug Therpy, peneliti, UPT PSTW jombang kediri	1 week, 3 meetings.	30 minutes.	Education (Lecture, Demonstration, Evaluation)	Butterfly Hug on reducing anxiety levels in the elderly.
Cagaoan et al. (2023) Filipina	Butterfly Hug Therpy, Healthcare facility in Caloocan City	6 (2 weeks, 3 times a week).	30 minutes.	Direct education and demonstration.	Butterfly Hug terhadap status kesehatan mental warga senior di fasilitas kesehatan..
Ramdhani (2023) Indonesia	Butterfly Hug Therpy, Panti Jompo 'Aisyiyah Surakarta	1 week, 3 meetings.	30 minutes or until calm	Not listed.	Not listed.

The table presents three studies examining the use of Butterfly Hug Therapy to address anxiety and mental health in elderly populations across Indonesia and the Philippines. Girianto et al. (2021) conducted the intervention at UPT PSTW Jombang Kediri over one week with three 30-minute sessions, using lectures, demonstrations, and evaluations to educate and apply the technique, showing its potential in reducing anxiety among older adults. Cagaoan et al. (2023) carried out six sessions over two weeks in a healthcare facility in Caloocan City, Philippines, using direct education and demonstration to improve the mental health status of senior citizens. Ramdhani (2023) implemented Butterfly Hug Therapy at the 'Aisyiyah nursing home in Surakarta over one week with three sessions, although details regarding method and topic were not clearly reported. Overall, these studies suggest Butterfly Hug Therapy is a feasible intervention for elderly mental health support, though standardization in reporting and implementation varies.

Table 4. CASP Cheklist For the quality Of studies

Author/year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Girianto et al. (2021)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Cagaoan et al. (2023)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Ramdhani et al. (2023)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y

The CASP checklist results for the three Butterfly Hug Therapy studies—Girianto et al. (2021), Cagaoan et al. (2023), and Ramdhani et al. (2023)—show consistently strong methodological quality, with "Yes" responses for 9 out of 10 criteria. All studies met key aspects related to study design, clarity, and validity (Q1–Q4, Q6–Q10). However, each received a "No" for Q5, indicating that considerations such as ethical approval or addressing potential harms may not have been clearly reported. Despite this, the studies are generally reliable in demonstrating the effectiveness of Butterfly Hug Therapy for elderly mental health.

Discussion

This review supports the potential of Butterfly Hug Therapy (BHT) as an effective non-pharmacological intervention for reducing anxiety symptoms among older adults. Its non-invasive and accessible nature makes it particularly suitable for geriatric populations. However, the current evidence base is limited by small sample sizes, lack of rigorous controls, and inconsistent reporting standards. Notably, only one study employed an experimental control group. To strengthen the evidence, future studies should incorporate standardized protocols and larger randomized controlled trials. Instruments such as the Generalized Anxiety Disorder-7 (GAD-7) and Geriatric Anxiety Inventory (GAI) enhance the reliability of findings across studies, though long-term effects remain underexplored.

This systematic review includes studies that examined the effectiveness of BHT in reducing anxiety levels in the elderly. Findings indicate that Butterfly Hug interventions significantly reduce anxiety symptoms. The implementation of non-pharmacological techniques such as BHT is therefore recommended as a viable approach for addressing anxiety in older populations. Short but consistent application of the therapy has shown significant results even with limited sample sizes. Girianto et al. (2021) found that BHT activates the limbic-hypothalamic-pituitary-adrenal (LHPA) axis, stimulating the secretion of hormones linked to comfort and relaxation (Girianto et al 2021). This is supported by Hidayat and Wahyuni (2024), who reported that BHT increases the production of serotonin and endorphins, contributing to feelings of relaxation and safety (Hidayat & Wahyuni 2024). Furthermore, the technique is effective in stabilizing emotions and promoting a sense of security in individuals with traumatic experiences.

Several studies, such as Ramdhani et al. (2023), describe the use of deep breathing combined with bilateral stimulation—key components of BHT—as effective strategies for anxiety reduction in the elderly . Pristianto et al. (2022) emphasized that deep breathing calms the mind, alleviates anxiety, and reduces physical tension, while bilateral stimulation through BHT provides a calming effect by engaging both hemispheres of the brain, aiding emotional regulation . Hamdani et al. (2023) similarly concluded that deep breathing helps soothe the mind and relieve anxiety . Elvrinica (2025) also supported the effectiveness of BHT, describing it as a bilateral hand-tapping technique combined with deep breathing that calms the nervous system and enhances emotional regulation. The technique is believed to activate both hemispheres of the brain, reduce stress responses, and instill a sense of security.

Based on these comparisons, each technique offers distinct advantages. Deep breathing is more flexible and suitable for elderly individuals with physical limitations. However, Pristianto et al. (2023) note that BHT may have superior effects in enhancing emotional regulation by engaging both hemispheres of the brain. Therefore, a combined application of both techniques may be more effective for anxiety reduction in elderly individuals than either method alone.

One major contributing factor to anxiety in the elderly is the onset of physical and health-related changes. Yati et al. (2017) reported that chronic conditions such as diabetes, hypertension, and arthritis can lead to anxiety due to diminished physical well-being and fear of future decline. In addition, cognitive changes, including memory loss and reduced concentration, may further exacerbate anxiety, creating a persistent and challenging cycle. According to Hidriyani and Zuliana (2018), anxiety commonly leads to sleep disturbances, characterized by difficulty falling asleep or frequent nocturnal awakenings, resulting in poor sleep quality. Ramdani and Yuningsih (2017) observed that chronic anxiety adversely affects cardiovascular health by elevating stress hormones like adrenaline and cortisol, which increase heart rate and blood pressure. Setiawan et al. (2018) found that anxiety exacerbates psychological complications in individuals with chronic illnesses such as diabetes. Siregar and Hidajat (2017) also noted that anxiety-induced stress hormones promote gluconeogenesis in the liver, thereby increasing blood glucose levels in patients with diabetes mellitus. Furthermore, Kristina et al. (2024) reported that chronic anxiety may contribute to the development of neurodegenerative conditions such as Alzheimer's disease and dementia, as prolonged stress can damage brain cells and impair cognitive function.

Multiple studies—such as those by Cagaoan et al. (2023), Girianto et al. (2021), and Ramdhani et al. (2023)—demonstrate consistency in using validated instruments to measure anxiety and depression in the elderly. Cagaoan et al. (2023) utilized the Patient Health Questionnaire-9 (PHQ-9) to assess depression and the GAD-7 to measure anxiety, reporting significant post-intervention reductions in both outcomes. Meanwhile, Girianto et al. (2021) and Ramdhani et al. (2023) applied the GAI to assess anxiety levels. Girianto et al. used the Wilcoxon test to evaluate pre- and post-intervention anxiety categories, while Ramdhani et al. (2023) observed a reduction from moderate to mild anxiety in participants after three days of intervention. Collectively, these studies confirm that BHT is an effective non-pharmacological approach for enhancing elderly mental health by reducing anxiety and depression.

Zhai et al. (2022) emphasized that both the GAD-7 and GAI are widely used to assess anxiety, each offering specific benefits depending on the target population. Jordan et al. (2017) described the GAD-7 as a 7-item self-report instrument designed to assess the severity of generalized anxiety disorder over the past two weeks, using a Likert scale ranging from 0 to 3, with total scores categorized from minimal (0–4) to severe (15–21) anxiety. The GAD-7 is widely used due to its high validity and reliability across diverse populations. Conversely, the GAI, developed by Champagne et al. (2024), consists of 20 binary ("Yes"/"No") items, making it more accessible for older adults, particularly those with cognitive impairments. Its scoring range of 0 to 20 categorizes anxiety as minimal (0–5), mild (6–10), moderate (11–15), or severe (16–20), and avoids items focused on physical symptoms that may overlap with common geriatric health conditions. Thus, while GAD-7 is appropriate for broader populations, the GAI is specifically tailored to the needs of elderly individuals.

Each study reviewed began with a baseline assessment of anxiety using validated instruments, including the GAI in the studies by Girianto and Soleman, and the GAD-7 in the study by Cagaoan. Interventions typically consisted of three consecutive sessions lasting 30 minutes. Participants were instructed to cross their arms over their chest and perform gentle bilateral tapping while engaging in deep breathing to promote relaxation. Girianto et al. (2021) reported that most participants experienced a reduction from moderate to mild anxiety. Similar outcomes were found by Soleman (2023), with both participants exhibiting decreased anxiety levels after three sessions. Cagaoan et al. (2023) also reported a significant reduction

in anxiety as measured by the GAD-7. These consistent procedures and outcomes across studies reinforce the effectiveness of BHT in managing anxiety among elderly populations.

In addition to anxiety reduction, BHT has been found beneficial for other psychological conditions. Endah et al. (2025) highlighted its role in managing post-traumatic stress disorder (PTSD) symptoms. BHT is employed in Eye Movement Desensitization and Reprocessing (EMDR) therapy as a bilateral stimulation method to help patients process traumatic experiences and reduce PTSD symptoms. Basyaharil (2024) noted that BHT also functions as a grounding technique, helping individuals remain connected to the present moment during episodes of intense emotional distress or dissociation.

Despite the strengths of studies such as that by Ramdhani (2023), including the use of a validated GAI instrument and targeted populations, their generalizability is limited by small sample sizes and the absence of control groups. Girianto's (2021) study, though statistically stronger due to its pre-experimental design and use of the Wilcoxon test, also lacks a control group and does not account for potential external influences. Cagaoan's (2023) study employs a true experimental design with a control group and multiple assessment tools but has a small sample size and no significant differences between groups, indicating that the effectiveness of BHT requires further investigation.

Lazzaroni et al. (2021) concluded that sensory stimulation-based therapies like BHT may benefit elderly individuals with anxiety, especially when combined with other approaches such as cognitive behavioral therapy. Conversely, Ramdhani et al. (2023) suggested that traditional relaxation techniques yield more consistent results than newer methods lacking strong empirical support. Therefore, additional research employing rigorous methodologies—such as randomized clinical trials with appropriate control groups—is essential to validate the effectiveness of BHT across various clinical settings.

From a clinical standpoint, this review suggests that BHT can be integrated into holistic nursing care for older adults. The technique is simple, non-pharmacological, and can be taught to patients for independent practice. It is suitable for use in diverse healthcare settings, including nursing homes, hospitals, and community health services. Nurses can educate patients and their families on BHT as part of a comprehensive stress management and mental health promotion strategy. BHT may also be effectively combined with cognitive therapy, counseling, or deep breathing techniques to enhance its impact on anxiety management. Considering the growing prevalence of anxiety among the elderly, the integration of BHT into geriatric nursing care may contribute significantly to improving mental well-being and quality of life. Nonetheless, further research with robust study designs is needed to confirm long-term effects and to develop standardized implementation guidelines for its use in gerontological practice.

Conclusion

Butterfly Hug Therapy (BHT) is a simple, safe, and effective non-pharmacological intervention for reducing anxiety in older adults, offering particular advantages due to its ease of use, self-application, and suitability for individuals with physical limitations. Clinical evidence indicates that short, consecutive BHT sessions can significantly reduce anxiety, and its integration into broader psychological interventions such as cognitive-behavioral therapy or breathing exercises may further enhance treatment outcomes. In gerontological nursing practice, BHT can be implemented across various care settings, empowering patients and caregivers to manage anxiety independently while supporting holistic, evidence-based care.

Nevertheless, the current body of research is limited by small sample sizes and methodological weaknesses, underscoring the need for further high-quality randomized controlled trials to validate long-term efficacy and inform standardized clinical guidelines.

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Authors' contribution

Each author contributed equally in all the parts of the research. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Conflict of interest

The researchers stated that there is no conflict of interest related to the implementation and publication of the results of this research. The entire research process, from planning, data collection, analysis, to report preparation, was carried out independently without any influence or pressure from any third party. A commitment to research ethics is upheld throughout the research process, ensuring transparency, accuracy and honesty in reporting results. Respondents' participation was voluntary with informed consent, and their confidentiality and privacy were maintained in accordance with applicable research ethics standards. With this statement, researchers hope that the research results can be trusted and used as a valid reference for the development of science and health practices related to ethnomedicine and reproductive health.

Ethical consideration

Not applicable.

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