



Brain Gym as a Sustainable Care Intervention for Anxiety and Life Satisfaction among Older Adults at Rumah Lansia Atmabrata: A Quasi-Experimental Study

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Abstract. Residential care facilities need practical interventions that support psychological well-being without placing substantial demands on staff, equipment, or space. This study evaluated the effects of a four-week Brain Gym program on anxiety and life satisfaction among older adults at Rumah Lansia Atmabrata. We used a quasi-experimental pre-test and post-test control group design involving 26 participants aged 60-74 years. Thirteen participants attended eight supervised Brain Gym sessions, each lasting 20 minutes, while 13 control participants received an educational leaflet. Anxiety was assessed using the Geriatric Anxiety Inventory, and life satisfaction was measured using the Satisfaction with Life Scale. Anxiety decreased significantly in the intervention group ($p = 0.002$), while life satisfaction increased significantly ($p = 0.003$). Post-test comparisons also favored the intervention group for anxiety ($p = 0.013$) and life satisfaction ($p = 0.001$). These findings indicate that Brain Gym can support psychological well-being through a brief and adaptable group program that requires no specialized equipment. From a sustainable-care perspective, its low resource requirements and potential for routine delivery make it a relevant adjunct to residential elder-care services, although its long-term implementation and cost-effectiveness require further evaluation.

Keywords: Brain Gym, Anxiety, Life Satisfaction, Sustainable Care, Residential Elder Care.

Introduction

Population ageing is increasing the demand for care models that support both physical function and psychological well-being. The WHO Decade of Healthy Ageing emphasizes person-centred, integrated, and long-term care that helps older adults maintain their functional ability and dignity [25]. At the same time, sustainable health systems are expected to improve health while using resources efficiently and minimizing avoidable environmental burdens [26]. These priorities are particularly relevant in residential facilities, where interventions must be safe, affordable, adaptable, and feasible for repeated use.

Anxiety in later life rarely develops from a single cause [3,4]. Physical changes associated with ageing, chronic illness, altered stress responses, and limited social contact may occur at the same time. Previous research has linked persistent stress and anxiety with changes in hypothalamic–pituitary–adrenal axis activity and cortisol regulation [5,6]. Social conditions may further affect psychological health in later life.

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Older adults who feel lonely or isolated, or who rarely participate in social activities, commonly report poorer psychological well-being and lower life satisfaction [7,8].

Brain Gym consists of simple coordinated movements that engage the eyes, head, arms, and legs. The exercise sequence combines bilateral movement, attention, relaxation, and awareness of body position [9,10]. Because the activities require no special equipment and may be completed while sitting or standing, the program can be adjusted to the physical ability of individual participants. Earlier studies have reported improvements in anxiety, depression, stress, sleep, cognitive function, and quality of life following Brain Gym or related brain-exercise programs [11–17]. Nevertheless, few studies have examined anxiety and life satisfaction together among older adults living in residential care. Because it requires no specialized equipment and can be performed in sitting or standing positions, Brain Gym may also offer practical advantages for sustainable care delivery. Its potential sustainability lies in its low material requirements, adaptability, and suitability for repeated delivery within existing residential-care routines.

This study investigated the effects of Brain Gym on anxiety and life satisfaction among older adults at Rumah Lansia Atmabrata. We also reviewed the program's resource needs, adaptability, and practical fit within routine residential care. The study did not measure sustainability as a separate outcome. Anxiety and life satisfaction remained the primary outcomes.

Methods

a. Study Design and Setting

We conducted a quasi-experimental study with pre-test and post-test assessments in an intervention group and a control group. Data collection was carried out at Rumah Lansia Atmabrata in Cilincing, North Jakarta. Both groups completed baseline assessments before the intervention began and were assessed again at the end of the four-week study period. The sequence of the study procedures is presented in Figure 1.

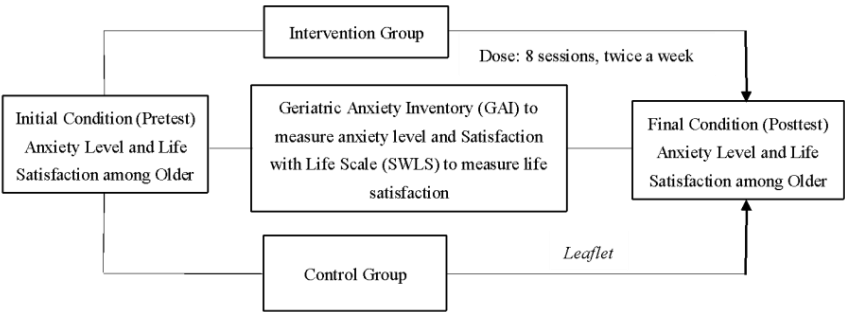


Figure 1. Overview of the study design and intervention flow.

b. Participants

Recruitment was limited to participants who met criteria established before data collection. Twenty-six residents were included, with 13 participants in the intervention group and 13 in the control group. Eligible residents were between 60 and 74 years old, had anxiety symptoms based on GAI screening, could communicate verbally, understood simple instructions, cooperated during the assessment, and agreed to participate. Residents were excluded when severe neurological, cardiovascular, respiratory, visual, or hearing problems could interfere with the study procedures. Those who were fully dependent, confined to bed, unable to understand instructions, or unable to complete the interview were also excluded. Since recruitment focused on residents with characteristics relevant to the study objective, purposive sampling was applied [18].

c. Intervention

The intervention group received supervised Brain Gym for four weeks, twice weekly, for a total of eight sessions. Each session lasted approximately 20 minutes and was guided directly by the researcher as the instructor. The Brain Gym protocol included preparation activities, midline movements, lengthening activities, and energy exercises. The selected movements were Cross Crawl, Lazy Eight, Neck Roll, The Owl, The Active Arm, The Gravitational Glider, Earth Button, Brain Button, Energetic Yawn, and The Thinking Cap [11]. Vital signs were checked before each session to ensure participant safety. Movements were modified when needed according to the participants' physical ability without changing the core purpose of the exercise. The sessions used the facility's existing space and did not require specialized exercise equipment. Control group received an educational leaflet and did not participate in supervised Brain Gym sessions during the intervention period.

d. Instruments and Analysis

Anxiety and life satisfaction were measured before the intervention began and again after the four-week period. Anxiety scores were obtained from the 20-item Geriatric Anxiety Inventory. The items used a two-option response format, and the responses were combined into a total score. A higher GAI score indicated a higher level of anxiety symptoms. Life satisfaction was measured through the five-item Satisfaction with Life Scale. Participants rated each statement on a seven-point scale. The item scores were added to produce a total score, with higher values indicating greater life satisfaction. Previous studies have reported evidence of validity and reliability for both instruments [19-21].

We analyzed the data using IBM SPSS. Descriptive statistics summarized participant characteristics and outcome scores. The Wilcoxon signed-rank test examined changes between pre-test and post-test scores within each group. The Mann-Whitney U test compared the intervention and control groups. Statistical significance was set at $p < 0.05$. The Ethics Committee of the Vocational Education

Program, Universitas Indonesia, approved the study under registration number KES-68/01/2026 on 15 January 2026. Each participant provided written informed consent. A responsible guardian provided consent when necessary. Because sustainability was not measured quantitatively, we described relevant implementation features, including session duration, equipment needs, adaptability, and feasibility for routine use.

Results

All 26 participants were included in the final analysis. Most participants were women (80.8%), and 80.8% were between 70 and 74 years of age. Senior high school was the most reported educational level, accounting for 46.2% of the sample. Before entering the residential facility, the largest occupational group consisted of participants who were not working (38.5%) (Table 1).

Table 1. Characteristics of the study participants (N = 26).

Characteristic	Category	n	%
Sex	Male	5	19.2
	Female	21	80.8
Age group	60-64 years	3	11.5
	65-69 years	2	7.7
	70-74 years	21	80.8
	Elementary school	7	26.9
Education	Junior high school	7	26.9
	Senior high school	12	46.2
	Civil servant	3	11.5
Previous occupation	Entrepreneur	6	23.1
	Not working	10	38.5
	Others	7	26.9

Descriptive results showed that the two groups entered the study with nearly identical anxiety scores. The mean GAI score was 7.46 ± 3.79 in the intervention group and 7.38 ± 3.54 in the control group. Four weeks later, the intervention-group mean had fallen by 3.85 points to 3.61 ± 2.63 . Little change was observed in the control group, where the mean decreased by only 0.15 points to 7.23 ± 3.46 .

A different pattern was found for life satisfaction. The intervention-group mean increased by 3.15 points, from 14.46 ± 3.17 at pre-test to 17.61 ± 2.72 at post-test. In the control group, the mean SWLS score decreased slightly from 13.61 ± 2.59 to 13.23 ± 2.42 . These descriptive results are reported in full in Table 2.

Table 2. Descriptive scores for anxiety and life satisfaction.

Outcome	Time point	Intervention group Mean +/- SD	Control group Mean +/- SD
GAI	Pre-test	7.46 +/- 3.79	7.38 +/- 3.54
	Post-test	3.61 +/- 2.63	7.23 +/- 3.46
SWLS	Pre-test	14.46 +/- 3.17	13.61 +/- 2.59
	Post-test	17.61 +/- 2.72	13.23 +/- 2.42

GAI: Geriatric Anxiety Inventory; SWLS: Satisfaction with Life Scale; SD: standard deviation.

The inferential findings were consistent with the descriptive pattern. Anxiety scores in the intervention group decreased significantly from pre-test to post-test ($p = 0.002$), whereas the control group showed no statistically significant change during the same period ($p = 0.527$). At baseline, the two groups had similar anxiety scores, with no significant difference between them ($p = 1.000$). By the post-test assessment, however, anxiety scores were significantly lower in the Brain Gym group than in the control group ($p = 0.013$).

The analysis of life satisfaction produced a comparable result. Participants in the Brain Gym group experienced significant improvement from pre-test to post-test ($p = 0.003$), whereas the change in the control group did not reach statistical significance ($p = 0.129$). At baseline, the SWLS scores of the two groups were not significantly different ($p = 0.502$). By the end of the intervention period, the intervention group had significantly higher life-satisfaction scores than the control group ($p = 0.001$). Table 3 presents the complete within-group and between-group comparisons.

Table 3. Within-group and between-group comparisons of anxiety and life satisfaction.

Outcome	Test and comparison	Statistic	p-value	Interpretation
GAI	Wilcoxon, intervention pre-post	$Z = -3.125$	0.002	Significant decrease
	Wilcoxon, control pre-post	$Z = -0.632$	0.527	Not significant
	Mann-Whitney, baseline	$U = 84.500$	1.000	Comparable groups
	Mann-Whitney, post-test	$U = 36.500$	0.013	Intervention lower
SWLS	Wilcoxon, intervention pre-post	$Z = -2.980$	0.003	Significant increase
	Wilcoxon, control pre-post	$Z = -1.518$	0.129	Not significant
	Mann-Whitney, baseline	$U = 71.500$	0.502	Comparable groups
	Mann-Whitney, post-test	$U = 18.500$	0.001	Intervention higher

Discussion

This study found a clear difference between the two groups after four weeks. Participants who completed Brain Gym reported less anxiety and greater life

satisfaction, while the control group showed little change. The two groups had comparable scores before the intervention, but their post-test results differed. This pattern suggests that the supervised movement program produced greater psychological benefits than leaflet-based education alone. The short sessions and lack of specialized equipment also support the practical use of Brain Gym in residential care.

The reduction in anxiety is consistent with earlier findings on Brain Gym and related brain-exercise programs involving older adults [12-15]. Several elements of the intervention may have contributed to this change. Each session combined light movement, bilateral coordination, breathing, stretching, and relaxation. Together, these activities may reduce bodily tension and physiological arousal. Neck Roll, The Owl, and Energetic Yawn focus on the neck, shoulders, and jaw, which may become tense during anxiety. Cross Crawl and Lazy Eight require attention and cross-body coordination. These movements may help participants focus on the activity rather than on anxious thoughts.

From a physiological perspective, anxiety in later life is associated with dysregulation of stress-response systems, including the HPA axis and autonomic nervous system [5,6]. Brain Gym should not be overclaimed as directly normalizing cortisol or neurotransmitters because these biomarkers were not measured in the present study. However, the program contains components of light physical activity and relaxation that are plausibly linked to decreased arousal, improved comfort, and better mood regulation. Therefore, the mechanism is best interpreted as a biopsychosocial process: movement-based activation, perceived safety, relaxation, attention engagement, and social participation may collectively contribute to reduced anxiety.

The improvement in life satisfaction also has an important practical implication. The intervention group improved from a low level of life satisfaction toward a better category, although not all participants reached a fully satisfied category. This indicates that Brain Gym may improve older adults' evaluation of daily life but should not be viewed as a stand-alone solution for all determinants of life satisfaction. Life satisfaction in older adults is influenced by social participation, perceived support, functional ability, economic context, living arrangement, and self-evaluation [8,22-24]. In this study, Brain Gym may have contributed by providing a structured, meaningful, and repeatable group activity that allowed participants to move, participate, interact, and experience successful task completion.

In this study, sustainable care refers to the potential for an intervention to be maintained within routine services with limited material and operational demands. Brain Gym was delivered in 20-minute sessions, used the facility's existing space, and required no specialized equipment. The movements could also be adjusted to each participant's physical ability. These features suggest that trained staff may be able to repeat the program within routine residential care. However, the study did not directly evaluate sustainability. It did not measure cost-effectiveness, environmental effects, staff workload, implementation fidelity, or long-term adherence. The sustainability of the program should therefore be considered a preliminary interpretation rather than a confirmed outcome.

Brain Gym may complement geriatric physiotherapy by adding a low-resource group activity to existing care routines. However, the findings require careful interpretation. The study involved a small sample from one residential facility. The control group received a leaflet rather than another supervised activity, and the study

did not include biomarkers or long-term follow-up. Future multicentre studies should use an active control group and assess clinical outcomes alongside adherence, staff time, training needs, costs, resource use, and long-term implementation.

The control group showed no significant change in anxiety or life satisfaction. Unlike the Brain Gym sessions, the leaflet did not provide guided movement, relaxation, supervision, or group interaction. This contrast suggests that the active and supervised components of the intervention may be important. Physiotherapists may therefore use Brain Gym as an adjunct activity, provided that staff supervise each session and adapt the movements to the physical condition of individual residents.

Conclusion

Brain Gym significantly reduced anxiety and improved life satisfaction among older adults at Rumah Lansia Atmabrata. The intervention group showed greater improvement than the leaflet control group, indicating that a supervised and structured movement program may support psychological well-being in residential elder care. From a sustainable-care perspective, its brief duration, adaptability, and lack of specialized equipment make Brain Gym a potentially feasible adjunct to routine care. However, sustainability was not directly measured and should not be interpreted as a confirmed environmental or economic outcome. Further studies should examine long-term adherence, cost-effectiveness, staff workload, resource use, and clinical effectiveness across multiple residential facilities

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