

Square Stepping Exercise for Stress Management in Among Elderly: An Experimental Study

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Abstract

Background : Stress is a common psychological issue among older adults, particularly those residing in nursing homes. This condition can negatively affect both physical and mental health. Physical activity-based interventions, such as Square Stepping Exercise (SSE), have been explored as a potential strategy to alleviate stress in the elderly. This study aims to analyze the effect of Square Stepping Exercise on stress levels among older adults living in nursing homes.

Objective: This study aims to evaluate the effect of Square Stepping Exercise (SSE) on stress levels in elderly people living in nursing homes.

Method: The method used in this research is an experiment with a pre-test and post-test design. A total of 33 elderly people in nursing homes took part in the SSE program. The stress scale was measured before and after the intervention using a measuring tool, the Perceived Stress Scale (PSS). **Result:** The results of the analysis show that there is a significant decrease in the stress scale after SSE training, with a p value <0.05 and $\Delta = 10,7$. This may indicate that SSE training is effective in reducing stress levels in the elderly. This reduction in stress is associated with increased physical activity, improved balance, and social interaction during exercise. **Conclusion:** Square Stepping Exercise can be used as an alternative intervention to reduce stress in elderly people in nursing homes, which has a positive impact on their quality of life.

Conclusions : The study confirms that Square Stepping Exercise is a helpful and practical way to reduce stress among older adults living in nursing homes. This activity encourages movement, concentration, and interaction with others, which together support emotional and physical well-being. Because it is easy to carry out, low in cost, and does not require special equipment, SSE can be recommended as a non-medical option to improve the quality of life for elderly residents.

Keywords: Square Stepping Exercise, stress, elderly, nursing home

INTRODUCTION

Stress is a common problem experienced by the elderly, especially those living in nursing homes. Various factors such as environmental changes, loss of family members, and lack of social interaction can increase stress levels in this age group. Prolonged stress can have a negative

impact on the physical and mental health of the elderly, such as increasing the risk of depression, anxiety and decreased cognitive function (1). Seniors report feeling more interpersonal stress when they spend time in silence and doing only light physical activity but stress is reduced when they are more physically active during the day (2). One approach that can be used to reduce

stress is through physical activity, namely the Square Stepping Exercise (SSE), which is a form of exercise that involves structured leg movements and aims to improve balance, coordination and physical strength. Previous research shows that physical activity, including SSE exercise, can help improve mental health and reduce stress symptoms (3).

In nursing homes, the implementation of SSE may be an effective alternative intervention to reduce stress in the elderly. Through this exercise, the elderly are expected to not only increase their physical strength, but also gain mental benefits such as improving mood and reducing depression (4). Although the benefits of SSE have been researched, few studies have specifically examined the effects of this exercise on stress levels in seniors in nursing homes. Therefore, this study aims to determine the effect of square stepping exercise on the stress scale of the elderly in nursing homes, so as to increase insight into the importance of physical activity in improving the quality of life of the elderly.

METHODS

Study Design

This research employed a quasi-experimental design with a pre-test and post-test approach to evaluate the effectiveness of the Square Stepping Exercise (SSE) in reducing stress among older adults residing in a nursing home setting.

Sample

The sample consisted of 33 elderly individuals who met the inclusion criteria and agreed to participate in the intervention program. All participants were assigned to the intervention group and voluntarily took part in the SSE sessions. Sampling was conducted purposively based on their willingness, physical ability to perform mild exercises, and cognitive capacity to follow instructions.

Instrument

The primary outcome—stress level—was assessed using the Perceived Stress Scale (PSS), a validated and widely used instrument that measures the degree to which individuals perceive situations in their lives as stressful. The PSS was administered before and after the intervention to evaluate changes in perceived stress.

Data Collection Procedure

1. Pre-Intervention Phase

During the initial phase, researchers developed a structured intervention module along with detailed standard operating procedures (SOPs) to ensure uniform delivery. Materials, including a custom-designed stepping mat, were prepared in advance. Data enumerators were carefully selected from senior nursing students who had successfully completed coursework in gerontological, community, and family nursing with a minimum grade of B+, and who demonstrated effective communication skills. Prior to implementation, enumerators received standardized training to ensure consistency in data collection and facilitation techniques.

2. Intervention Phase

Participants engaged in Square Stepping Exercise sessions twice per week over a period of two weeks, with each session lasting approximately 5 to 10 minutes. Prior to the commencement of the intervention, baseline assessments were conducted, which included evaluations of perceived stress, self-esteem, mood, and cognitive function.

Before each session, participants were briefed on the exercise procedures and safety guidelines. To enhance engagement and motivation, background music was played during the activities. The facilitator arranged footstep-pattern cards on the mat in a sequential order, and participants were instructed to observe, memorize, and perform the step sequences accordingly. The level of difficulty was gradually increased, tailored to each individual's cognitive ability.

Data Analysis

Collected data were analyzed using appropriate statistical tests to compare pre- and post-intervention stress levels. The analysis aimed to determine the significance of changes in perceived stress following the SSE intervention. Statistical tools such as paired t-tests or non-parametric equivalents (e.g., Wilcoxon signed-rank test) were employed, depending on data distribution.

Ethical Considerations

Ethical clearance for the study was obtained from the relevant institutional review board. Prior to participation, each respondent received detailed information about the study and signed

a written informed consent form. The confidentiality and anonymity of all participants were strictly maintained throughout the research process, and participation was entirely voluntary, with the right to withdraw at any point without consequence.

RESULTS

The results of the demographic characteristics of the respondents in this study were based on gender, education level, work experience, marital status and reasons for entering a nursing home.

Tabel 1. Demographic characteristic (n : 33)

Variables	Frequency	%	
Sex			
male	10	30.3	
female	23	69.7	
Level of education			
Not attending school	5	15.2	
Primary School	13	39.4	
Secondary school	4	12.1	
High school	10	30.3	
College	1	3	
Occupation experience			
PNS/TNI/POLRI	1	3	
Private employees	6	18.2	
Self-employed	8	24.2	
Workers/Farmers	2	6.1	
ART	4	12.1	
IRT/not working	12	36.4	
Marital status			
Single	7	21.2	
Married	4	12.1	
Widowed	22	66.7	
Reason to enter nursing home			
Own reason	15	45.5	
Family wishes	18	54.5	
	Min - max	Mean	SD
Age (year)	57 – 91	74.5	7.1
Duration of stay (year)	1 - 16	3.8	3.4

Based on table 1 with a total of 33 elderly people, it shows that there are more women with 23 elderly people (69.7%), more elementary education levels with 13 elderly people (39.4%), more housewives with 12 elderly people (30.3%), and More were widows, namely 22 elderly people (66.7%), and 18 elderly people (54.5%) were in nursing homes because of their families.

Tabel 2. Respondent's characteristic based on variables at baseline

Variables	Min - Max	Mean	SD
PSS_score	10 – 29	31.2	2.13

Based on table 2, it shows that the characteristics of respondents are based on variables with a mean of 31.2 (SD = 2.13).

Tabel 3. Distribution of variables before and after intervention

Variables	Test	x	SD	Δ	Statistic	Sig.
PSS 10_score	Pretest	31.2	2.13	10.7	-3.550	0.000**
	Posttest	20.5	5.18			

Based on table 3, using paired t-test calculations, it shows that there are changes in stress levels in the elderly before and after being given the Square Stepping Exercise intervention.

DISCUSSION

In this study, there were 33 elderly respondents, with more female respondents, namely 23 elderly and 10 male elderly in the intervention group, primary school education levels were greater with 13 people, most of the elderly did not have previous jobs or were domestic workers. As many as 18 elderly people are in institutions because of their families. According to research conducted by Pratiwi (1), stress in the elderly can be caused by several trigger factors such as missing family, feeling abandoned, not feeling free, fear of the disease they are suffering from, and fear of death which can have an impact on the decline in the health of the elderly. Every individual certainly has different problems, when individuals cannot solve existing problems it will cause tension or feelings of pressure which is often called stress (5,6).

Stress can also be influenced by the environmental conditions in which they live, especially elderly people who live in nursing homes because there are stressors such as loneliness, sadness because they don't live with their family, which elderly people feel while living in nursing homes (7). The solution that can be used to overcome stress in the elderly is by doing physical activities such as square stepping exercise. Engaging in physical activity is associated with better mood and less stress/negative affect during the following hours of daily life (8–10). Therefore, prevention efforts may benefit from focusing on increasing physical activity, especially during times of stress (11). The results of the study showed that the intervention group produced improvements in reducing stress levels by implementing the pretest and post-test Square stepping exercise interventions, namely with a p value of 0.000. This also shows that the Square stepping exercise can be done by elderly people in nursing homes to help reduce the stress they experience. Square stepping exercise is a training program that requires physical exertion and cognitive function specifically concentrated on attention, memory, mental flexibility and executive function (12,13).

Physical activity has great potential in alleviating psychological stress and improving overall well-being (14,15). Laboratory-based research shows that elderly people who are physically active or frequently engage in physical activity experience fewer increases in negative affect that can cause stress. Physical activity can increase psychological resilience, which can help elderly people overcome anxiety, stress and other challenges. Physical activity can help seniors reduce the likelihood of depression and delay dementia (2,16). In research conducted by Astuti (17) said that every individual has a vulnerability to experiencing stress in their life, this vulnerability can be experienced in all age ranges, occupations, gender. Exercise is one way that many people do to manage feelings of boredom, depression and stress. One exercise that can be done by elderly people in nursing homes is the Square Stepping Exercise (SSE).

Regular physical activity is one of the best ways to reduce stress levels. By doing physical activity such as the Square Stepping Exercise (SSE) which is structured and regular, it can help reduce mood disorders related to stress, including depression and anxiety in the elderly, where this can occur because of the relationship between chemical changes in the brain after exercise or activity, chemical changes. What happens is an increase in neurotransmitters, namely serotonin and dopamine, as well as the secretion of endorphins which are responsible for feelings of pleasure after doing activities (18,21)

CONCLUSION

Based on the research results, it can be concluded that the Square Stepping Exercise (SSE) has a significant effect in reducing the stress scale in elderly people living in nursing homes. The Square Stepping Exercise intervention shows that physical exercise carried out in a structured manner not only improves physical fitness, but also contributes to improving the mental well-being of the elderly. The reduction in stress levels recorded after the SSE program shows that this activity is effective to implement as a strategy in stress management in the elderly. Therefore, it is recommended that SSE can be made part of rehabilitation programs and routine activities in nursing homes to improve the quality of life of the elderly.

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Author Contribution

VL : Conceptualization and Study Design, Methodology, Data Curation, Writing – Original Draft, Writing – Review & Editing

GDP : Conceptualization and Study Design, Methodology, Formal Analysis,

Conflict of Interest

The authors declare that there are no conflicts of interest.

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