

THE EFFECTIVENESS OF TAI CHI ON STRESS LEVELS IN OLDER ADULTS

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ABSTRACT

Background: Stress is one of the most common psychological problems among older adults and contributes to various health disorders, such as hypertension, sleep disturbances, cognitive decline, and an increased risk of mortality. Chronic stress in older adults is also known to be closely associated with a decline in psychological well-being and quality of life. In addition, stress can exacerbate the degenerative diseases commonly experienced by older adults. Research shows that stress contributes to the onset of chronic diseases such as hypertension in older adults, making it a complex and multidimensional health issue

Purpose: To analyze the effectiveness of Tai Chi exercises on stress levels in older adults

Methods: A pre-experimental, single-group pretest-posttest design was conducted on 28 older adults using the PSS-10. The Tai Chi intervention consisted of 40-minute sessions, three times per week for 21 days. Analysis was performed using a paired t-test based on the study results

Results: The mean stress score decreased from 15.96 ± 5.71 to 12.46 ± 3.47 . The paired t-test revealed a statistically significant difference ($t = 4.274$; $p < 0.001$).

Conclusion: Tai Chi is effective in reducing stress levels in the elderly and should be considered as a community nursing intervention.

Keywords: Elderly; Stress; Tai Chi.

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BACKGROUND

The natural aging process brings about various changes physical, psychological, and social that increase vulnerability to mental health disorders, particularly stress (Yang et al., 2024). Stress in older adults is often triggered by a decline in physical function, loss of social roles, chronic illness, and social isolation, which, if not properly managed, can significantly reduce quality of life (Wu et al., 2024)

Stress is one of the most common psychological problems among older adults and contributes to various health issues, such as hypertension, sleep disorders, cognitive decline, and an increased risk of mortality (Kemenkes & Cirebon, 2021). Chronic stress in older adults is also known to be closely associated with a decline in psychological well-being and quality of life (Yang et al., 2024). Additionally, stress can exacerbate degenerative diseases commonly experienced by older adults. Research shows that stress contributes to the onset of chronic diseases such as hypertension in older adults, making it a complex and multidimensional health issue (Kemenkes & Cirebon, 2021).

Globally, the prevalence of mental disorders among older adults is quite high and continues to rise in tandem with the growth of the older adult population. The World Health Organization reports that approximately 14% of older adults worldwide experience mental disorders, with depression and anxiety being the most prevalent conditions (World Health Organization, 2023). Furthermore, recent global studies indicate that the prevalence of stress, anxiety, and depression among older adults can reach 30–50%, and is even higher among those living alone, experiencing functional limitations, or living with chronic illnesses (Wu et al., 2024). In Indonesia, the number of older adults continues to rise significantly. Data from the Central Statistics Agency (BPS) indicate that the proportion of older adults reached approximately 10.48% of the total population in 2022 and is projected to continue rising over the coming decades (BPS, 2022). In line with this, results from the Basic Health Research (Riskesdas) indicate that the prevalence of emotional and mental disorders among individuals aged ≥ 15 years reached 9.8%, with higher rates observed in the elderly population (Indonesian Ministry of Health, 2018; further confirmed in the latest health report). Studies in several regions of Indonesia also report that approximately 35–55% of older adults experience mild to severe stress, particularly among those with chronic illnesses and limitations in daily activities (Kemenkes & Cirebon, 2021).

If stress is not managed effectively, it can develop into chronic stress, which has farreaching effects on the health of older adults. Physiologically, chronic stress can increase cortisol levels, which contribute to elevated blood pressure, a weakened immune system, and the worsening of chronic conditions such as hypertension and cardiovascular disease (Salini, 2025). In addition, stress also causes sleep disturbances, fatigue, and accelerates the decline in overall health. From a psychological perspective, prolonged stress contributes to the onset of anxiety disorders, depression, and cognitive decline, such as memory and concentration problems. International research indicates that older adults with chronic stress are at higher risk of experiencing cognitive decline and a reduced quality of life (Park et al., 2023). This aligns with research in Indonesia showing that older adults with high stress levels tend to experience a reduced quality of life and increased dependence in daily activities (Munawaroh et al., 2024).

Stress management in older adults requires a comprehensive approach that encompasses promotive, preventive, and rehabilitative aspects, with an emphasis on non-pharmacological interventions that are safe, easy to implement, and evidence based. One intervention that has proven effective is mind-body exercise, such as Tai Chi, which integrates physical movement, breathing techniques, and mental concentration. Physiologically, Tai Chi reduces activation of the sympathetic nervous system and increases parasympathetic activity, thereby helping to lower stress hormones such as cortisol and promote physical relaxation. Experimental studies show that Tai Chi significantly reduces stress levels in older adults, with a meaningful decrease in stress scores following regular practice (Subramanian et al., 2024). Furthermore, Tai Chi also offers long-term benefits, not only in reducing stress but also in improving cognitive function and balance, as well as preventing physical decline in older adults (Iqhrammullah & Yufika, 2024). This demonstrates that Tai Chi is a holistic intervention capable of comprehensively improving the quality of life for older adults.

The urgency of this study stems from the fact that treatment remains dominated by pharmacological therapy, and the limited availability of non-pharmacological interventions in the community indicates a gap in nursing practice. Tai Chi, as a safe and easily implemented mind-body intervention, has the potential to be an effective solution; however, empirical evidence in the Indonesian context remains limited, making this study important. This study is expected to serve as the basis for the development of evidence-based nursing interventions to reduce stress in older adults, particularly through the implementation of Tai Chi at the community level

OBJECTIVE

This study aims to analyze the effectiveness of Tai Chi in reducing stress levels among older adults. Specifically, this study aims to identify differences in stress levels before and after the Tai Chi intervention among older adults.

METHODS

This study was conducted in Balonggarut Village, Krembung Subdistrict, Sidoarjo Regency, East Java, in January 2026. The study employed a quantitative pre-experimental method with a one-group pretest-posttest design, involving 30 older adults selected through simple random sampling. A total of 28 older adults met the inclusion criteria, namely: being over 50 years of age, having no history of heart, muscle, or mental health problems, and having never practiced tai chi before (Dinani et al., 2019).

The intervention, consisting of tai chi exercises, was administered by the researcher for 40 minutes, three times a week, over a period of 21 days. Data collection was conducted in two stages: a pretest before the intervention and a posttest after the intervention was completed. During the pretest stage, data were collected to determine the initial condition of the research subjects before they received the treatment. After the intervention was carried out, the post-test phase was conducted to evaluate the changes or effects resulting from the intervention. Prior to the 21-day intervention, the researcher administered an initial pre-test and a final post-test using the 10-item Perceived Stress Scale (PSS-10) questionnaire developed by Sheldon Cohen in 1983. The scale for each PSS item ranges from 0 to 4, with a score of 0 meaning "Never Feel" and a score of 4 meaning "Very Often Feel." To obtain the total perceived stress score, the scores for each PSS item are summed, taking into account the positive items (items 1, 3, 4, 5, 7, 8, and 9) and the negative items (items 2, 6, and 10). The positive items are summed according to their assigned scale values, while the negative items

are summed by reversing their scale values.
 Perceived Stress Scale (PSS-10) Measurement tool.

No	Question	0	1	2	3	4
1	Over the past month, how often have you gotten angry over something unexpected?	0	1	2	3	4
2	Over the past month, how often have you felt unable to control the important things in your life?	0	1	2	3	4
3	Over the past month, how often have you felt anxious and stressed?	0	1	2	3	4
4	Over the past month, how often have you felt confident in your ability to handle personal problems?	0	1	2	3	4
5	Over the past month, how often have you felt that everything that happened went according to your expectations?	0	1	2	3	4
6	Over the past month, how often have you felt unable to complete the tasks you needed to do?	0	1	2	3	4
7	Over the past month, how often have you been able to control your irritability in your daily life?	0	1	2	3	4
8	Over the past month, how often have you felt more capable of handling problems compared to others?	0	1	2	3	4
9	Over the past month, how often have you gotten angry because of problems you couldn't control?	0	1	2	3	4
10	Over the past month, how often have you felt overwhelmed by difficulties to the point that you were unable to cope?	0	1	2	3	4
	Score					

Source (Cohen in (Salfia, 2019)

Tai Chi exercises follow standard operating procedures (SOPs). Tai Chi is a form of Chinese martial arts that consists of meditation exercises breathing techniques, and a combination of martial arts movements such as circular motions, gentle stretches, and balanced body postures (Serikali, 2006). The goals of Tai Chi are (1) to reduce anxiety and depression, (2) to improve sleep quality, (3) to improve balance, flexibility, and muscle strength, (4) to reduce the risk of falls, (5) to maintain the highest possible quality of life, (6) Stabilizing blood pressure, (7) Preventing osteoporosis (Faula & Rhosma, 2023). The tai chi sessions are held at the Balonggarut Village Hall in Krembung Subdistrict, Sidoarjo Regency, East Java. Each. session lasts approximately 40 minutes, three times a week for 21 days.

RESULTS

Univariate Analysis

Table 1 Frequency distribution of respondent data based on age in Balunggarut Village, Krembung Subdistrict, Sidoarjo Regency, in January 2026

Age	Frequency	Percentage (%)
45 - 59 tahun	3	11%
60 - 69 tahun	11	39%
> 70 tahun	14	50%
Total	28	100%

Based on Table 1 regarding respondent characteristics by age, it was found that the largest group of respondents was those aged over 70 years, consisting of 14 older adults, representing 50% of the total and falling into the high-risk elderly group. Age is a factor that influences stress levels among older adults.

Table 2: Frequency Distribution of Respondent Data by Gender in Balunggarut Village, Krembung Subdistrict, Sidoarjo Regency, January 2026

Gender	Frequency	Percentage (%)
Male	3	11 %
Female	25	89%
Total	28	100%

Based on Table 2 regarding gender, the results show that the majority of respondents were female, totaling 25 elderly individuals, representing 89%

Table 3 Frequency Distribution of Respondent Data Based on Educational Level in Balunggarut Village, Krembung Subdistrict, Sidoarjo Regency, January 2026

Educational Level	Frequency	Percentage (%)
Elementary School	22	78%
Junior High School	2	7%
High School	1	4%
No schooling	3	11%
Total	28	100%

Bivariat Analysis

Table 1: Frequency distribution of respondents' data based on stress levels among the elderly before the Tai Chi exercise intervention in Balunggarut Village, Krembung Subdistrict, Sidoarjo Regency, in January 2026

Stress Level	Frequency	Percentage (%)
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Low	8	28,6%
Moderate	20	71,4%
High	0	0%
Total	28	100%

Based on Table 1, it was found that the stress levels among the elderly before receiving the Tai Chi exercise intervention were predominantly in the moderate stress category, with 20 elderly individuals (71.4%)

Table 2 Frequency Distribution of Respondent Data Based on Stress Levels Among the Elderly After Receiving Tai Chi Exercise in Balunggarut Village, Krembung Subdistrict, Sidoarjo Regency, January 2026

Stress Level	Frequency	Percentage (%)
Low	18	64.3%
Moderate	10	35.7%
High	0	0%
Total	28	100%

Based on Table 2, it was found that the stress levels of the elderly after receiving the Tai Chi exercise intervention were predominantly in the low-stress category, with 18 elderly participants (64.3%)

Table 3: Frequency Distribution of the Effectiveness of Tai Chi Exercise on Stress Levels Among the Elderly in Balunggarut Village, Krembung Subdistrict, Sidoarjo Regency, January 2026

Variable Stress Level Among the Elderly	Pre Test		Post Test		<i>P</i>
	Frequency	Percentage (%)	Frequency	Percentage (%)	
Stres Rendah	8	28.6	18	64.3	
Stres Sedang	20	71.4	10	35.7	0.001
1Stres Tinggi	0	0	0	0	
Total	28	100 %	28	100 %	

Table 3 shows that of the 28 respondents, the majority of older adults—20 older adults (71.4%)—had moderate stress levels before receiving the Tai Chi exercise intervention, and 18 older adults (64.3%) had low stress levels after receiving the Tai Chi exercise intervention. This is consistent with the p-value of the paired t-test (0.001, $\alpha = 0.05$), indicating that Tai Chi

exercise is effective in reducing stress levels among the elderly in Balunggarut Village, Krembung Subdistrict, Sidoarjo Regency, East Java.

DISCUSSION

According to the World Health Organization (WHO) in 2023, stress is defined as a state of anxiety or mental tension caused by difficult situations. Stressful situations activate the hypothalamus, which in turn controls two neuroendocrine systems—the sympathetic nervous system and the adrenal cortex system—that stimulate the release of a group of hormones, including cortisol, when the body experiences stress. Stress hormones suppress the immune system; if stress is not managed, it will have an impact on health and quality of life (Panti et al., n.d.). According to Stress Adaptation Model Gail W, Stuart stated that stress is influenced by predisposing and precipitating factors (Faula & Rhosma, 2023). Based on the Stress Adaptation Model theory, Gail W. Stuart states that stress is influenced by predisposing and precipitating factors (Faula & Rhosma, 2023). Predisposing factors include biological factors (genetics, nutritional status, biological sensitivity, general health status, and exposure to toxins), psychological factors (knowledge, verbal ability, past experiences, morale, self-concept, and psychological defenses), and sociocultural factors (age, gender, education, occupation, position, religion, cultural background, and social connections). The findings indicate that stress levels among older adults were in the moderate category prior to the tai chi exercise intervention; this is due to several factors, such as the fact that older adults experience higher stress levels as they age. Stress can be managed through adaptive coping mechanisms, enabling individuals to adapt to stress-inducing factors. Coping mechanisms represent an individual's defensive response to a problem, whether that response is adaptive or maladaptive. To avoid prolonged stress and maintain the psychological and physical well-being of older adults, one way to improve their health is through exercise and physical activity, such as Tai Chi. Physical exercises such as Tai Chi have also been shown to effectively increase stress tolerance and reduce anxiety, although their effects may not be equivalent to pharmacological interventions (Faula & Rhosma, 2023).

The results of this study indicate that the Tai Chi exercise intervention is effective in reducing stress levels among older adults, as evidenced by a significant decrease in scores ($P = 0.001$). Tai Chi exercise has been shown to help reduce stress levels, although it does not have a strong enough effect to significantly lower them. It was found that not all older adults who received the Tai Chi exercise intervention experienced a reduction in stress; some older adults still exhibited moderate stress levels.

CONCLUSION

Based on the research findings, it was concluded that the stress levels of older adults in Balongagarut Village, Krembung Subdistrict, Sidoarjo Regency, prior to the Tai Chi exercise intervention were mostly in the moderate stress category, involving 20 older adults (71.4%), whereas after the Tai Chi exercise intervention, nearly half of the older adults 18 older adults (64.3%) experienced low stress levels. It can be concluded that the Tai Chi exercise intervention proved effective in reducing stress levels among the elderly in Balunggarut Village, Krembung Subdistrict, Sidoarjo Regency, East Java. This reduction was demonstrated by a significant decrease in stress scores following the Tai Chi exercise intervention. Thus, it can be concluded that Tai Chi can serve as a non-pharmacological intervention option to maintain the mental health of the elderly, particularly in managing stress levels.

These findings are consistent with various previous studies indicating that Tai Chi can have a positive impact on psychological well-being, reduce stress hormones, and improve neurological and cognitive function. The effect of Tai Chi on stress levels among older adults in this study is also consistent with Sister Callista Roy's Adaptation Theory, which posits that the presence of an input or stimulus prompts an individual to develop a coping mechanism or control mechanism. Control mechanisms are divided into regulatory and cognitive subsystems. The end result of the input and process is an output. The output referred to in is behavior that can be observed, measured, or subjectively reported. Roy divides output into two responses: adaptive and maladaptive.

However, this study has limitations, including: a limited number and homogeneous characteristics of respondents, an intervention duration that was too short, the absence of a control group, and the fact that most older adults complained of forgetting the movements of Tai Chi (the majority of whom were over 70 years old).

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CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest in this study.

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