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# THE EFFECT OF OCCUPATIONAL GARDENING THERAPY ON BLOOD PRESSURE AND ANXIETY OF ELDERLY HYPERTENSION IN BADUNG

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## ABSTRACT

Controlling blood pressure and anxiety is essential for the elderly with hypertension. This can impact their physical, psychological, and social well-being. Lifestyle modifications are recommended for people with hypertension, and one of these interventions is occupational gardening therapy. Occupational gardening therapy at home involves engaging the elderly in activities such as planting and tending to plants. This study aims to determine the effect of occupational gardening therapy on blood pressure and anxiety in the elderly with hypertension. The research methodology employed was quantitative with a pre-experimental one-group pretest-posttest design. The study includes a total of 30 elderly participants who met eligibility criteria using purposive sampling techniques. Research instruments used consist of questionnaires, a sphygmomanometer, and a stethoscope, supplemented with standardized operational procedures of occupational gardening therapy and measuring blood pressure. Paired t-test analysis indicates that there is an effect of occupational gardening therapy on blood pressure and anxiety in the elderly with hypertension ($p<\alpha$). In collaboration with community health workers, primary health care nurses can offer guidance for implementing home-based occupational gardening therapy as an alternative complementary treatment for elderly with hypertension to control blood pressure and anxiety.
**Keywords:** Anxiety; Blood Pressure; Occupational gardening therapy

## INTRODUCTION

The COVID-19 pandemic has compelled us, particularly healthcare professionals, to find new accessible and home-based treatment methods to preserve and improve the health status of patients. The elderly, being a vulnerable group, need to engage in non-pharmacological efforts from their homes.Hypertension ranks among the most common chronic medical conditions, characterized by a consistent increase in arterial pressure [(1)]. Hypertension is a condition where blood vessels experience a persistent elevation of pressure ([1,2)], specifically 140/90mmHg or higher. Hypertension arises due to decreased arterial vessel elasticity attributed to aging. Common symptoms in hypertensive patients include headaches and fatigue. Uncontrolled hypertension can lead to severe conditions in the elderly such as vascular damage, stroke, and even death. Hypertension is a serious medical condition that heightens the risk of heart, brain, kidney, and other diseases. Often referred to as a "silent killer," it is a leading cause of premature death globally, affecting over 1 in 4 men and 1 in 5 women, or more than one billion individuals [(2)].

Elderly with hypertension typically experience anxiety [(3)]. Several studies have found a connection between hypertension and anxiety Studies examining anxiety in the elderly found a significant occurrence of moderate anxiety among hypertensive elderly. Individuals coping with an illness experience more stressors and inadequate coping mechanisms compared to physically healthy individuals. Diseases such as hypertension can contribute to anxiety. Unfortunately, anxiety is often perceived as normal.

Anxiety is an emotion characterized by tension, worrisome thoughts, and physical changes like increased blood pressure. Individuals with anxiety disorders usually have disturbing recurring thoughts or worries. Physical symptoms include sweating, trembling, dizziness, or rapid heartbeats [(7).] Anxiety due to the pandemic is also felt by the elderly, who are notably at higher risk of COVID-19 exposure. Research has shown that anxiety and fear of adverse events have affected anxious elderly with comorbidities during the pandemi[c (8)]. Untreated anxiety can lead to negative physical and psychological consequences.

Lifestyle modifications are recommended for the elderly to promote a healthy lifestyle [(9)] including those with hypertension. One therapeutic approach that can aid in lifestyle changes is occupational therapy, such as gardening. Gardening therapy offers emotional satisfaction during harvest, a sense of ownership, and encourages communication when done collectively. It provides a form of self-expression that enables emotional release and induces comfort. Feelings of comfort, calmness, and happiness activate the HPA axis. This, in turn, stimulates the hypothalamus, reducing CRH (Corticotropin Releasing Hormone) secretion, leading to decreased ACTH (Adrenocorticotropic Hormone) and stimulating POMC (Pro-opiomelanocortin), which in turn reduces ACTH and cortisol production, thus promoting endorphin production. Endorphins lead to vascular dilation. The decrease in cortisol and ACTH, coupled with an increase in endorphins, relaxes blood vessels, affecting peripheral resistance and cardiac output, ultimately impacting blood pressure [(10)].

Occupational gardening therapy is a physical activity of low to moderate intensity lasting for 20 minutes ([11]). It is a physical exercise program involving nurturing plants that can assist in improving relationships (12), fostering positive psychosocial well-being (13,14), and reducing cortisol levels ([15]). The benefits of nature contact (plants) have been well-documented for the elderly (16,17). Literature study findings demonstrate that gardening activities lower blood pressure in elderly with hypertension. Several studies indicate a positive correlation between gardening activities and decreased blood pressure in elderly with hypertension (18,19). Additionally, this therapy also proves beneficial for the cognitive function of the elderly (20).

One advantage of gardening therapy is its ease of implementation within one's home area. Furthermore, this therapy is known to be devoid of side effects. As a vulnerable group with comorbidities, the elderly with hypertension are advised to minimize outdoor activities and avoid crowds. Therefore, home-based occupational therapy aligns with government efforts to protect vulnerable populations. This study aims to determine the effect of occupational gardening therapy on blood pressure and anxiety in the elderly with hypertension

## MATERIAL AND METHOD

This study was quantitative research with a pre-experimental one-group pretest-posttest design. The study population comprises all elderly from Banjar Jerowan, Tumbak Bayuh Village, Mengwi. The sample for this study includes elderly with hypertension residing in Banjar Jerowan, Tumbak Bayuh Village, Mengwi.

The sampling technique employed in this research is non-probability sampling, specifically purposive sampling with clearly defined inclusion and exclusion criteria.

The researcher initially conducted a preliminary survey in collaboration with local community health workers to identify potential participants in Banjar Jerowan, Tumbak Bayuh Village, Mengwi. Inclusion criteria were: (1) elderly individuals aged 60 years and above; (2) officially diagnosed with hypertension by a healthcare professional; (3) registered and receiving regular care at the primary healthcare facilities (Puskesmas); (4) capable of performing independent activities of daily living; and (5) permanent residents of Banjar Jerowan for at least six months prior to the study. Exclusion criteria included: (1) severe comorbidities such as end-stage renal disease, heart failure, or terminal illness; (2) current participation in other intervention studies; and (3) planned relocation during the study period.

Recruitment was conducted through a combination of primary healthcare facilities (Puskesmas) referrals and door-to-door visits guided by community health records. Drop-out criteria included non-participation in the intervention program for three or more sessions. The required sample size for this study is 30 respondents (21).

The instruments in this study consist of a questionnaire comprising demographic data, pretest and posttest data including blood pressure and GAI-SF. Measuring anxiety in the elderly is done using the GAI-SF. This instrument exhibits strong psychometric properties for identifying anxiety in geriatric patients and serves as a useful alternative screening tool (22). The GAI-SF is a shorter version of the GAI, developed for broader usage, particularly in epidemiological research on anxiety. It has shown success in measuring anxiety among elderly women with a Cronbach's alpha of 0.81 (23). It consists of five questions related to anxiety, each scored 0-1. The total score is accumulated and categorized as anxious (≥3) or not anxious (<3) (24).

The occupational gardening therapy intervention is classified as a physical activity of low to moderate intensity, lasting for 20 minutes (25). The intervention follows the standardized operational procedure consists of eight sessions, including sowing seeds, monitoring seedling growth, transplanting, fertilization, plant care, re-fertilization, harvesting, and evaluation. Another instrument is the standardized operational procedure for measuring blood pressure in the elderly, equipped with a sphygmomanometer and stethoscope. This research has been approved by the Research Ethics Committee of STIKES Bina Usada Bali with ethical clearance number 132/EA/KEPK-BUB-2023.

## RESULT

The first analysis conducted was univariate analysis of the age, blood pressure, and anxiety variables before and after the intervention. The analysis results for all interval-scaled variables can be observed in the following table:

**Table 1.** Descriptive analysis (n= 30)

| Variable | Min-Max | Median | Mean (± SD) |
|---|---|---|---|
| Age | 60-85 | 65 | 66.67 (7.038) |
| Systole pre-test | 120-160 | 140 | 137.17 (10.313) |
| Systole post-test | 100-180 | 115 | 118.33 (16.626) |
| Diastole pre-test | 70-95 | 80 | 80.83 (10.313) |
| Diastole post-test | 50-90 | 70 | 74 (10.034) |
| Anxiety pre-test | 0-5 | 4 | 3.67 (1.583) |
| Anxiety post-test | 0-2 | 0 | 0.3 (0.535) |

**Age of Respondent**

The average age of the respondents in this study was 66.67±7.038 years old, with the youngest being 60 years old and the oldest being 85 years old. The dominant age group among the respondents was 65 years old, comprising 6 (20%) respondents.

**Systole BP**

Table 1 shows that there was a change in systolic blood pressure. Before the occupational gardening therapy, the mean systolic blood pressure was 137.17±10.313 mmHg, while the mean systolic blood pressure after the occupational gardening therapy was 118.33±16.626 mmHg.

**Diastole BP**

The univariate analysis results illustrated that there was a change in systolic blood pressure. Before the occupational gardening therapy, the mean diastolic blood pressure was 80.83±10.313 mmHg, while the mean diastolic blood pressure after the occupational gardening therapy was 74±10.034 mmHg.

**Anxiety**

The results of the univariate analysis revealed that there was a change in anxiety level. Before the occupational gardening therapy, the mean anxiety was 3.67±1.583, while the mean anxiety after the occupational gardening therapy was 0.3±0.535.

**Table 2.** Bivariate analysis of occupational gardening therapy on blood pressure and anxiety (n= 30)

| Variable | Mean | 95% CI | | t | p |
|---|---|---|---|---|---|
| Systole | 18.833 | 12.224 | 5.828 | 25.442 | 0.000 |
| Diastole | 6.833 | 2.958 | 3.606 | 10.709 | 0.001 |
| Anxiety | 3.367 | 2.743 | 11.036 | 3.991 | 0.000 |

The results of the normality test using the Kolmogorov-Smirnov test indicated that the data followed a normal distribution. Therefore, the bivariate analysis proceeded with the paired t-test. Table 2 shows the mean differences in systolic blood pressure before and after the occupational gardening therapy, amounting to 18.833 with a calculated t of 5.828 and a p-value of 0.000 at α 0.05. Consequently, the null hypothesis (H0) is rejected, signifying an effect of the occupational gardening therapy on systolic blood pressure. The mean difference in diastolic blood pressure before and after the occupational gardening therapy is 6.833, with a calculated t of 3.606 and a p-value of 0.001 at α 0.05. This leads to the rejection of the null hypothesis (H0), indicating an effect of the occupational gardening therapy on diastolic blood pressure. The mean difference in anxiety levels before and after the occupational gardening therapy is 3.367, with a calculated t of 11.036 and a p-value of 0.000 at α 0.05. Consequently, the null hypothesis (H0) is rejected, revealing an effect of the occupational gardening therapy on anxiety.

**DISCUSSION**

The classification of hypertension in Indonesia can refer to the guidelines by the Ministry of Health Kemenkes (2021), allowing us to understand that the mean systolic blood pressure before the intervention was 131.17±10.313 mmHg indicating that the dominant systolic blood pressure was in the high-normal category. Similarly, dominant (40%) blood pressure among the respondents before to the intervention was 130 mmHg, which also falls into the high-normal category.

A different category is observed for diastolic blood pressure before the intervention. The analysis of diastolic blood pressure before the intervention showed that the mean was 80.83±10.313 mmHg, indicating that the diastolic pressure predominantly falls into the normal category. Likewise, the average diastolic blood pressure before the intervention is categorized as normal.

The respondents in this study are elderly with hypertension who have an average blood pressure that tends to be normal. This may be due to the elderly's active participation in posyandu lansia. Studies have proven a relationship between active attendance at posyandu and the behavior of controlling hypertension (26). A study on the blood pressure of the elderly in a Social Institution for the Elderly found factors that influence high systolic blood pressure to be age, daily living activities, depression status, and spiritual activities, while for high diastolic blood pressure, the factors are age and education (27). It is expected that the elderly can maintain their daily activities to control their blood pressure within normal limits.Following the intervention conducted with 30 respondents, it was discovered through univariate analysis that there was a change in the average values; the mean systolic blood pressure became 118.33±16.626 mmHg, while the mean diastolic blood pressure became 74±10.034 mmHg. Both of these values fall within the optimal classification according to the Ministry of Health guidelines (25).

The average anxiety level before the intervention was 3.67±1.583, whereas after the intervention, it dropped to 0.3±0.535. Referencing (24), the average anxiety level of respondents before the intervention fell into the anxious category, with the majority (40%) of respondents scoring a total of 5. Following the intervention, the average anxiety level of respondents fell into the not anxious category, with a majority (73.3%) of respondents scoring a total of 0.

The paired t-test analysis revealed that there is a significant effect of occupational gardening therapy on systolic blood pressure with a p-value of 0.000 ($p<\alpha$). Systolic blood pressure tends to decrease after the intervention, with an average decrease of 18.833 (95% CI 12.224-25.442). Similarly, the analysis of the difference in diastolic blood pressure found a significant effect of occupational gardening therapy with a p-value of 0.001 ($p<\alpha$). Diastolic blood pressure tends to decrease after the intervention, with an average decrease of 6.833 (95% CI

2.958-10.709). The effect of occupational gardening therapy was also found on the anxiety variable with a p-value of 0.000 ($p<\alpha$). Anxiety tends to decrease after the intervention, with an average decrease of 3.367 (95% CI 2.743-3.991).The findings of this study are consistent with related research that has found positive benefits of occupational gardening therapy on blood pressure. A study by Magrifah and Alifariki (2018) discovered the impact of gardening therapy on changes in blood pressure among elderly with hypertension at the first, third, and fourth meetings for systolic blood pressure and at the third and fourth meetings for diastolic blood pressure. In this study, the occupational gardening therapy intervention was conducted eight times. Therefore, compared to the previous study's sessions, there is a high likelihood that the intervention provided had a positive impact.

The findings of this study also align with related research in the field of mental health. Han's study discovered the potential of horticultural therapy to improve stress levels and physical functional abilities among elderly with mental health issues. Additionally, research by (28) found that participants who had engaged in gardening for at least 15 years and those who spent more than 8 hours gardening over two weeks had lower anxiety scores. Moreover, spending more time outdoors on weekdays was associated with decreased anxiety scores. These findings suggest the positive impact of gardening activities on mental well-being, which corroborates the results of the current study.Gardening therapy offers emotional satisfaction during harvest, a sense of ownership, and encourages communication when done collectively. It provides a form of self-expression that enables emotional release and induces comfort. Feelings of comfort, calmness, and happiness activate the HPA axis. This, in turn, stimulates the hypothalamus, reducing CRH (Corticotropin Releasing Hormone) secretion, leading to decreased ACTH (Adrenocorticotropic Hormone) and stimulating POMC (Pro-opiomelanocortin), which in turn reduces ACTH and cortisol production, thus promoting endorphin production. Endorphins lead to vascular dilation. The decrease in cortisol and ACTH, coupled with an increase in endorphins, relaxes blood vessels, affecting peripheral resistance and cardiac output, ultimately impacting blood pressure (10).

## SIMPULAN DAN SARAN

The blood pressure before the occupational gardening therapy was in normal high (systolic) and normal category (diastolic), and after the occupational gardening therapy, it was optimal category (both systolic and diastolic). The anxiety level was categorized as anxious before the occupational gardening therapy, while after the occupational gardening therapy, it was not anxious. It can be concluded that there is an effect of occupational gardening therapy on blood pressure and anxiety in elderly with hypertension before and after the occupational gardening therapy.

Elderly with hypertension are encouraged to engage in occupational gardening therapy twice a week to control blood pressure and anxiety. Healthcare providers, particularly primary health care nurses, along with community health workers, can provide guidance for implementing home-based occupational gardening therapy as an alternative complementary treatment for elderly with hypertension.

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