

# Comparison of the Effectiveness of Lavender and Chamomile Herbal Tea on Anxiety and Depression in Postmenopausal Women: a Randomized Controlled Trial

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## Abstract

**Background:** One of the treatments for depression and anxiety which has significantly increased in recent years in most countries is drinking lavender and chamomile herbal tea. The current study aimed to compare the result of these two types of herbal drinks on anxiety and depression in the postmenopausal women.

**Methods:** The present study is a randomized clinical trial conducted in 2020. It was recorded with the code of IRCT20090304001742N6 in the Iranian Registry of Clinical Trials. The total sample size was 96 people. In the current study, the depression questionnaire (created by Beck) and anxiety questionnaire (created by Spielberger) were used to assess the contributors. Each intervention group received 2 g of dried lavender and chamomile leaves, which were cooked twice daily—once in the morning and once at night—in 300 ml of boiling water for 10 to 15 minutes—as part of the intervention. The data were analyzed using one-way ANOVA, paired t-tests, and chi-square.

**Results:** The average score of depression in the lavender tea group was reduced from  $21.00 \pm 4.10$  to  $18.56 \pm 3.24$  ( $P < 0.001$ ). In the group which consumed chamomile herbal tea, the average score of depression in the pre-intervention stage was  $22.00 \pm 3.97$ , while after consuming chamomile herbal tea, it decreased to  $18.31 \pm 3.05$  ( $P < 0.001$ ). The mean score of depression among the groups that used lavender and the control group showed a significant difference. Although there was a non-significant difference between the average anxiety (state and trait) scores in the control group at the start and end of the study ( $P = 0.058$ ,  $P = 0.083$ ), there was a significant difference between the mean anxiety (state and trait) scores in the intervention groups before and after the intervention ( $P < 0.001$ ). Furthermore, the average score of depression between the group that used lavender and the control group displayed a significant difference ( $P = 0.021$ ).

**Conclusions:** In general, drinking lavender or chamomile herbal tea could alleviate the level of anxiety and depression in postmenopausal women.

**Keywords:** Lavandula, Chamomile, Complementary therapies, Anxiety, Depression

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## 1. Introduction

A variety of physical symptoms, including flushing, night sweats, irregular and rapid heartbeat, atrophy of the vaginal mucosa, irritability of the bladder, sleep disorders, headache, muscle aches, joint pain, difficulties concentrating, and memory problems, are caused by decreased levels of ovarian hormones, such as estrogen and progesterone hormones, around menopause (1). Moreover, according to the evidence, menopause is associated with various psychological changes, the most common of which are signs such as depression and anxiety (1). According to many studies, it is

assessed that 26-33% of women experience their first depressive attack during menopause (2-4). Depression and anxiety in the postmenopausal women are related to consequences such as disability (5), significant disruption of interpersonal, social, and occupational functions, as well as the high cost of health care (1). Therefore, diagnosis and treatment of anxiety and depression in postmenopausal women is one of the priorities and challenges of the health system (6). In general, two types of pharmacological and non-pharmacological ways are used to decrease anxiety and depression in persons. Non-pharmacological methods, due to their small side effects, can be used alone or in

combination with other treatments. (7). The studies showed that using lavender has relaxing effects (8-10). Lavender has flavonoid compounds that act on benzodiazepine receptors (11), and linalool in lavender affects the level of norepinephrine and dopamine and rises them, which may be among the probable mechanisms of the antidepressant effect of lavender (12).

Chamomile, like lavender, has sedative, anti-anxiety and anti-depressant properties (13, 14). Like lavender, chamomile contains flavonoid compounds that affect benzodiazepine receptors which are among the most important active compounds in chamomile (15). Chamomile has antioxidant properties (16). In the physiological situations, there is a balance among the oxidant-antioxidant systems in living organisms, but in oxidative stress, a number of neuropsychiatric illnesses, including depression have a pathogenesis where the balance is tipped in favor of oxidants (14). Inhibiting the primary enzyme that catalyzes the conversion of monoamines into their respective neurotransmitters, noradrenaline, dopamine, and serotonin, chamomile also affects the way that these neurotransmitters work (15). In a systematic review (2018) on clinical trials of various researchers who studied the effects of various herbs on the treatment of anxiety and depression, lavender and chamomile were two of the most important medicinal plants which had comparable benefits with anxiolytic and antidepressant medications (17). According to WHO, most people in the third world countries use herbal remedies because of the low cost of herbs (18); in terms of the side effects of antidepressants and anti-anxiety drugs and because no study was designed to determine the effect of lavender and chamomile tea on anxiety and depression in postmenopausal women, this study designed to determine the effect of these two types of herbal tea on anxiety and depression score in postmenopausal women.

## 2. Methods

### 2.1. Type of Study

The current randomized clinical trial study was designed in 2020. The current study was recorded with the code of IRCT20090304001742N6 in the Iranian Registry of Clinical Trials.

### 2.2. Research Community

The study population consisted of postmenopausal women referring to community health centers in Larestan city, south of Fars province, south of Iran.

### 2.3. Sample Size

To determine the sample size, we used a similar study (19) (Mean 1: 45.26, Mean 2: 40.30, SD 1: 5.72, SD 2: 5.18) and the formula to determine the sample size with an error level of 1% and power of 80%; it was estimated 96 subjects (32 in each group).

### 2.4. Sampling Method

First, a list of community health facilities in the city of Larestan that provided services to postmenopausal women was compiled. Next, the names of each facility were placed in separate envelopes, and a plain envelope was chosen at random. Using the systematic random sample approach and referring to the chosen health facility, the researcher helped with the sampling of postmenopausal women. In the selection center, there was a list of covered people who were selected using the formula of systematic sampling method.

In the above center, 3620 people were covered, of which 288 were menopausal women. In this study, using systematic random sampling, 96 people were selected to enter the study.

### 2.5. Random Allocation

Random allocation of randomized blocks was used to equalize the number of people in each group. The selected samples were divided into two groups through randomized blocks. Thus, 8 blocks of 12 were used based on the expected sample size which was 96 individuals. In the next step, each block's name was written individually on the envelope, and one of them was then chosen at random. Inside each block there were 12 cells that were randomly named with three letters A, B and C, meaning cell A: intervention group with lavender, cell B: intervention group with chamomile and C: control group. After selecting the block, subjects were placed in one of cells A, B and C, respectively. Sampling continued until 8 blocks were completed. Finally, 32 subjects in each group were assigned in randomized blocks.

The single blinding method was used. The research assistant who assigned individuals to the intervention and control groups was blinded to the type of intervention and treatment each group was receiving. After completing the blocks, the principal investigator began to intervene.

## 2.6. Inclusion Criteria

- Age over 45 years
- Lack of using alternative therapies such as hormone therapy
- A mild to moderate score of depression (scores 14 to 28)
- Voluntary willingness to participate in the plan
- Ability to swallow and no oral or digestive problems that interfere with drinking
- The existence of necessary vigilance to complete the questionnaires
- Depression and anxiety disorders not resulting from physical problems such as hypothyroidism
- Not being contributors in equivalent studies which may interfere with the treatment program of the current plan
- Regular use of tea according to the treatment plan

## 2.7. Exclusion Criteria

- Reluctance to continue participating in research
- Background of allergy to herbal medicines
- Addiction to drugs, alcohol, and painkillers
- Administration of psychiatric drugs
- Affliction of severe depression or anxiety

## 2.8. Tools

The depression questionnaire (created by Beck) and anxiety questionnaire (created by Spielberger) and a demographic characteristics checklist were used to assess the contributors.

The second version of Beck Depression questionnaire was designed for rapid screening of depressed people by Beck and Beck (20). The intensity of depressive symptoms, which are graded from zero to three, is used to split the 21-item questionnaire into four categories. The lowest and greatest levels of depressive symptom severity are indicated by scores of zero and three, respectively. Therefore, in general, each person's score can vary from zero to 63. Persian version of this questionnaire shows good reliability and validity (21).

In 1970, a 40-item Spielberger state and trait anxiety questionnaire was developed (22). In answer to the state anxiety measure, the individuals should describe their feelings in the current moment of time to complete the questionnaire; however, in answer to the trait measure, they should mention their normal and frequent feelings. Each query has a ranking gage (almost never, sometimes, often, almost always). Depending on the answer to each question, the person will receive a score between 1 and 4. The higher a person's score, the higher the level of anxiety would be.

## 2.9. Intervention Group

After preparing the lavender and chamomile plants, the researchers referred to the Larestan Community Health Center and selected the postmenopausal women who were suitable for the study and informed about the study and its objectives. Postmenopausal women who were willing to participate were randomly assigned to one control group and two intervention groups, one of which received chamomile herbal tea and the other received lavender herbal tea. Then, the levels of anxiety and depression in postmenopausal women in the control and intervention groups were evaluated. The intervention included using 2 g dried leaves of lavender and 2 g dried leaves of chamomile in each intervention group; they were boiled twice in the morning and night (dried flowers of lavender and chamomile in 300 ml of boiling water for 10-15 minutes and were consumed daily with the candy in the form of 2 cups of lavender herbal tea and 2 cups of chamomile herbal tea daily (13, 19, 23). The women were taught to drink the tea completely and avoid taking other herbs simultaneously. According to previous research, the period of this treatment plan was 2 weeks (13, 24).

### 2.10. Control Group

Women in the control group didn't consume any intervention or treatment.

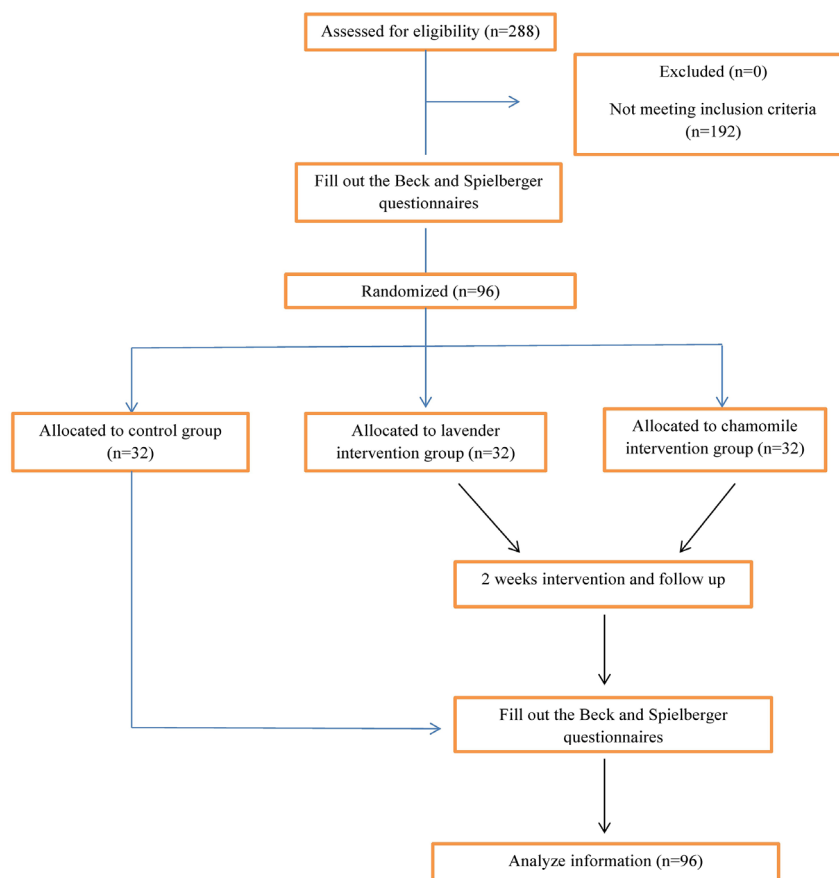
### 2.11. Ethical Considerations

The present study with the ethics code of IR.LARUMS.REC.1399.006 was confirmed by the ethics committee of Larestan University of Medical Sciences, Fars province, Iran. At first, the researchers obtained informed written consent from the participants. Individuals' private information remained confidential throughout the research.

## 3. Results

32 subjects in the lavender tea group, 32 in the chamomile tea group, and 32 in the control group participated in the study. Eligible members were randomly divided into control and intervention groups (Figure 1). There was no significant difference between the intervention and control groups in terms of quantitative and qualitative characteristics ( $P > 0.05$ ) (Table 1).

Table 2 shows the finding of comparing the means of anxiety and depression among the intervention groups (lavender and chamomile) and controls in the pre-intervention and post-intervention stages. According to the results shown in Table 2, the average score of depression in the lavender tea group was reduced from  $21.00 \pm 4.10$  to  $18.56 \pm 3.24$  ( $P < 0.001$ ). In the group that consumed chamomile herbal tea, the mean score of depression in the pre-intervention stage was  $22.00 \pm 3.97$ , while after consuming chamomile herbal tea, it decreased to  $18.31 \pm 3.05$  ( $P < 0.001$ ). However, the mean score of depression in the control group at the beginning and end of the study did not show a significant difference ( $P = 0.839$ ). Prior to and following the intervention, the mean score of anxiety (state and trait) in the intervention groups showed a significant difference ( $P < 0.001$ ), but the mean score of anxiety (state and trait) in the control group at the start and end of the study did not show a significant difference ( $P = 0.058$ ,  $P = 0.083$ , respectively). On the other hand, comparison of the average score of depression after the intervention in the groups of lavender and chamomile presented no significant difference ( $P = 0.928$ ), while the average score of



**Figure 1:** The figure shows the CONSOERT flow chart of the study.

**Table 1:** Comparison of demographic characteristics of the people in the intervention and control groups

Variables	Lavender	Chamomile	Control	P value
Age, y, mean±SD	58.62±5.93	60.06±6.14	59.68±5.77	0.607 <sup>a</sup>
Job, n (%)				0.751 <sup>b</sup>
Housewife	28 (87.5)	29 (90.6)	27 (84.3)	
Employee	4 (12.5)	3 (9.4)	5 (15.7)	
Education level, n (%)				0.482 <sup>b</sup>
Elementary	4 (12.5)	7 (21.8)	6 (35.3)	
Guidance	20 (62.5)	19 (59.3)	16 (18.8)	
Diploma	8 (25.0)	5 (15.8)	7 (21.8)	
Academic	0 (0.0)	1 (3.1)	3 (9.4)	
Marital status, n (%)				0.955 <sup>b</sup>
Married	30 (93.8)	28 (87.5)	29 (90.7)	
Single	1 (3.1)	2 (6.3)	1 (3.1)	
Widow	0 (0.0)	1 (3.1)	1 (3.1)	
Divorce	1 (3.1)	1 (3.1)	1 (3.1)	

<sup>a</sup> Results of One-way ANOVA, <sup>b</sup> Results of the  $\chi^2$  test

**Table 2:** Evaluation of the mean scores of anxiety (trait and state) and depression in the intervention (Lavender and Chamomile) and control groups before and after the intervention

		Before intervention (Mean±SD)	After intervention (Mean±SD)	P value*
Depression	Lavender	21.00±4.10	18.56±3.24	<0.001
	Chamomile	22.00±3.97	18.31±3.05	<0.001
	Control	20.91±4.44	20.88±4.60	0.839
Anxiety (state)	Lavender	39.41±8.04	34.31±8.22	<0.001
	Chamomile	42.41±8.72	34.78±8.82	<0.001
	Control	39.19±9.59	39.44±9.41	0.058
Anxiety (trait)	Lavender	40.13±9.01	35.78±8.78	<0.001
	Chamomile	40.66±7.59	35.34±7.84	<0.001
	Control	39.63±7.35	40.09±7.33	0.083

\* Results of paired sample t-test

**Table 3:** Comparison of the mean differences between the treatment groups and the control group after the intervention

	Intervention group	Comparison group	Mean Difference	P value*
Depression	Lavender	Chamomile	0.25	0.928
		Control	-2.31	0.021
	Chamomile	Lavender	-0.25	0.862
		Control	-2.56	0.010
Anxiety (state)	Lavender	Chamomile	-0.46	0.914
		Control	-5.12	0.015
	Chamomile	Lavender	0.46	0.944
		Control	-4.65	0.036
Anxiety (trait)	Lavender	Chamomile	0.43	0.985
		Control	-4.31	0.028
	Chamomile	Lavender	-0.43	0.971
		Control	4.31	0.012

\* Results of One way ANOVA (Bonferroni test)

depression between the group used lavender and the control group displayed a significant difference ( $P=0.021$ ). Moreover, comparing the mean score of depression in the chamomile and control groups showed a significant difference ( $P=0.010$ ) (Table 3).

#### 4. Discussion

The main findings of this study showed that consumption of chamomile and lavender can be effective to reduce the score of depression and

anxiety in postmenopausal women. In herbal medicine, many plant components including leaves and roots, as well as various prescription techniques including herbal tea are used. In the current research, the impact of lavender and chamomile on postmenopausal women's levels of anxiety and depression was studied. So far, no study has compared the results of lavender and chamomile on depression and anxiety, but the impact of these plants was investigated in various studies (25-28). Kianpour and colleagues showed that lavender aromatherapy for 4 weeks can reduce anxiety, stress, and depression in postpartum women (25); aromatherapy with the extract of this plant has reduced depression in postmenopausal women (26). These findings are consistent with the finding of the current research. The findings of a review study show that aromatherapy with lavender extract can be used as a complementary medicine in persons with depression (mild to moderate) (29).

However, another research indicated that applying the extract of this plant to pregnant women's skin in the form of a lotion had anti-stress and anti-depressant effects (27). Another study showed that drinking lavender herbal tea may help women who have just given birth; they feel less tired, have better sleep, and are less depressed (28). The effect of this plant has not been studied only in pregnant women or during pregnancy; Bazrafshan and colleagues showed that drinking this herbal tea can reduce the rate of depression in the elderly (28). This plant was used to reduce depression in hemodialysis patients and people with migraines. All these studies emphasized the effect of the extract of this plant on reducing depression in patients (30, 31).

Other studies have examined the effectiveness of lavender extract on depression in combination with other complementary medicine methods; a study combining yoga and inhalation of lavender extract confirmed the effects of these two on depressive signs in older women (32). In another study, postmenopausal women were given oral capsules containing extracts of lavender and bitter orange. The findings of this study suggested that this combination may help this group of patients with their depressed symptoms (33). Another plant used in this study was chamomile extract. Chang and Chen showed that consuming this plant in postpartum women can reduce sleep disorders and their depressive symptoms (13). In another study,

which was given 1500 mg of chamomile daily for 8 weeks to people with depression and anxiety, the results revealed the impact of this plant on reducing anxiety and depressive symptoms in patients (33). Moeini Ghamchini and co-workers studied the effects of chamomile in patients undergoing chemotherapy. The results showed that the use of chamomile tea could be effective to reduce the depressive symptoms in these people (34).

In addition to research on humans demonstrating the beneficial benefits of this plant, a study on rats showed that inhaling chamomile extract might lessen depressive-like behaviors in rats as well as decrease plasma corticosteroid levels in the chamomile-treated rats compared to the control group (35). Based on a search on databases, no study has compared chamomile and lavender tea, but some studies examined the effectiveness of the combination of these two plants; Rafii and colleagues showed that Aromatherapy Massage with chamomile oil and lavender can be useful to decrease the anxiety of burn patients (36). Another research presented that the mixture of aromatherapy with lavender- chamomile and music can reduce the anxiety of clinical nurses in the hospital (35). Another research discovered that myocardial infarction patients' anxiety levels might be decreased by breathing a mixture of chamomile, lavender, and bitter orange (36). Mohammad Aliha and co-workers surveyed the physiological effects of these three plant extracts on myocardial infarction patients and found that inhalation of these extracts reduced the heart rate, respiration rate and pulse rates of patients (37). These findings may be related to the reduction of the patients' anxiety levels and are in line with the finding of the current research.

#### *4.1. Limitations*

One of the most important limitations of this study was that it was conducted at the same time as the start of the Covid-19 pandemic that the psychological and social effects of this epidemic may have affected the results of this study and caused the results to be distorted.

#### **5. Conclusions**

In general, consuming chamomile and lavender herbal tea might help postmenopausal women feel less anxious and depressed, but testing the efficacy of these two varieties of tea revealed no discernible

difference and, to some degree, they had the same impact. According to the findings of this study, it can be suggested that these plants should be used as a complementary medicine along with modern medicine.

### Ethical Approval

This study was approved by the Ethics Committee of Larestan University of Medical Sciences with the code of IR.LARUMS.REC.1399.006. Also, written informed consent was obtained from the participants.

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**Conflict of Interest:** None declared.

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