Effect of Aromatherapy Massage on Depression and Anxiety of Elderly Adults: a Randomized Controlled Trial

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Introduction: This study investigated the effect of aromatherapy massage with lavender, chamomile, and rosemary oils on the depression and anxiety of elderly adults living in nursing homes.

Methods: This randomized controlled trail was conducted on elderly adults living in nursing homes in Kerman, Iran. Through convenience sampling, 38 elderly adults were recruited and assessed using demographic questionnaire and Hospital Anxiety Depression Scale (HADS), respectively. Then, elderly adults were randomly allocated to either a control (19) or an intervention (19) group through block randomization. Elderly adults in the intervention group received aromatherapy massage using lavender, chamomile, and rosemary. Each massage session lasted 20 min and was performed three times per week for two three-week periods with an intervening one-week break, while their counterparts in the control group solely received routine nursing homes care services. HADS Scale completed with repeated measurements before the intervention, at the end of the third week, at the beginning of the fifth week and at the end of the seventh week.

Results: According to the results, mean anxiety in the intervention group went from 11.9 ± 4 to 6.26 ± 3.38 (*p* <.0001), and the mean depression went from 9.94 ± 3.2 to 4.15 ± 2.14, indicating that anxiety and depression were significantly reduced compared with before intervention (*p* <.0001).

Conclusion: Aromatherapy massage with lavender, chamomile, and rosemary oils is effective in significantly reducing anxiety and depression of elderly adults living in the nursing homes.

KEYWORDS: anxiety; aromatherapy massage; depression; elderly

INTRODUCTION

Aging is the result of the natural course of time that leads to physiological, possibly psychological, and social changes.[1] Today, the elderly population has become a major global phenomenon, and their number has increased due to increased life expectancy and better health outcomes.[2] The global growth of the elderly population has been predicted to increase from 9% to 16% during 1995–2030, and this figure is anticipated to be from 5.6% to 17.5% in Iran.[3]

Older adults are generally considered as being among the most vulnerable groups of the population,[4] and providing psycho-physical health for them requires special attention.[5] In addition to experiencing physiological changes, elderly adults face significant events such as retirement, the death of friends and family members, separation from social activities, and changes in social and economic relations, which affect their mental health, happiness, and compatibility.[6] Older people often like to live in their own homes, and their private life, friends, and acquaintances are very important for them.[7]

Admission to the nursing home will have psychological consequences, including a sense of rejection, mental stress, depression, in addition to loss of home.[8] The transition to a nursing home has been known as the most important relocation affecting an older person.[9] Therefore, the evaluation of health interventions should not be limited to the physical problems of the elderly, but

it should include attention to all aspects of the health of an older person.[10]

One of the important dimensions of health in the elderly is mental health, which requires attention and prevention of disorders such as depression and anxiety.[11] Tabei et al.[5] stated that depression is the most common psychological disorder of the elderly; as a result, depression in the elderly, after physical problems, is the second cause of disability in this period of life.[5] A person with depression manifests symptoms such as changes in appetite or weight, sleep, psychomotor activity, reduced strength, sense of worthlessness, difficulty in thinking, lack of concentration in decision-making, repeated thoughts of death, and suicide attempts.[2]

Anxiety is also a common problem of aging because this period is associated with many disabilities.[11] Anxiety is a vague and unpleasant feeling that has always been accompanied by one or more physical signs such as tachycardia, sweating, headache, and dyspnea, and it is not specific to a particular time or culture.[12] It should be noted that the elderly adults are at higher risk of depression and anxiety due to reduced self-esteem, decreased motor activity, loss of friends and relatives, reduced physical and financial autonomy, and chronic diseases.[11]

Treatment for depression and anxiety involves pharmacological and non-pharmacological interventions.[13] For example, benzodiazepines, the main treatments of anxiety, are associated with complications such as headache, drowsiness, lethargy, fatigue and ataxia, as well as risk of dependence. These symptoms are usually more prominent in the elderly populations because of the metabolic changes associated with normal aging. Other drugs are used to minimize the side effects of this category of medications and control anxiety, one of which is essential oils of aromatic herbal compounds.[14,15]

Aromatherapy, as one of the complementary medicine methods, is the use of essential oils of aromatic herbs for the treatment and adjustment of mind, body, and spirit, which combines the physiological effects with the use of massage with specific oils.[16]

The most obvious effect of the essential oils is their stimulation of the smell sense. Smells affect the brain. The olfactory system is connected to the limbic system, which is the emotional control center—hence involved in controlling stress and hormone balance. Depending on the type of aroma, nerve cells release different neurotransmitters. These neurotransmitters include enkephalins, endorphins, noradrenaline, and serotonin. On the other hand, according to the relationship between the sense of smell with the spirit and human feelings, essential oils can have an effect on the spirit and the body. In fact, odors are able to change the emotions in human.[17]

Aromatherapy is used in conjunction with conventional treatments for modifying or treating diseases, and includes two methods: inhalation aromatherapy and aromatherapy massage.[16] In aromatherapy massage, aromatic oils get absorbed through the skin in to the blood and exert their therapeutic effects such as vasodilation, increased skin temperature, pain relief, body relaxation, reduced anxiety, and depression.[16]

Lavender therapeutic benefits include sedative, pain reliever, antidepressant, antiepileptic, and antiheadache effects.[18] The benefits of rosemary include antispasmodic, analgesic, antimicrobial, antidepressant, anti-inflammatory, reduced menstrual bleeding, improve general weakness and fatigue.[19] Chamomile health benefits include antianxiety, antispasmodic, sedative, anti-inflammatory, antipeptic ulcer, antibacterial, antifungal, and antiviral.[18] Due to the limited clinical studies regarding the therapeutic effects of aromatherapy massage, especially on depression and anxiety in the elderly population, this study aimed to evaluate the effect of aromatherapy massage with lavender, chamomile, and rosemary oils on the depression and anxiety of elderly adults living in nursing homes.

METHODS

DESIGN

This is a two-armed, multicenter, randomized controlled trial utilizing an herbal intervention with repeated measures. This study was conducted at the four elderly facilities (Mohammad Morsel, Baharestan, Amiralmomenin, and Mehrazin) in Kerman, the second largest city in southeast Iran. These facilities serve a total statistical population, and provide curative, preventative, and rehabilitative care.

Sample

According to Rho et al.[20] (in study on elderly women) and Hur et al.[21] (in study on menopausal women), regarding the standard deviation of anxiety in the intervention group (5.99) and in the control group (3.60), the type 1 error of 0.05 and power of 80%, 17 people were included in each group to determine the between-group difference in anxiety variations (μ_1 - μ_2 = 5).[20,21] The goal was to recruit 20 participants in each group based on power analysis and attrition rate. Stratified randomization method was used to allocate the participants to the intervention and control groups, so that men and women were divided into groups separately; then in each group of men and women, block randomization design was used. R for Windows 3.5.1 software was used for random block design. Each block also included four people, two of whom were from the intervention group and two from the control group. Half of the men were entered in the intervention group and the other half in the control group. The same method was used for women. Statistician was responsible for randomization. It should be noted that, although he was involved in the entire study, he did not know who were in the intervention group; assigning people in the control and intervention group was noted as "A" and "B" by the statistician.

Inclusion criteria were ages between 65 and 85 years, ability to speak Persian, participation in the study design for seven weeks, and toleration of aromatic oils. Exclusion criteria include a history of skin allergy to aromatic substances, cognitive disorders (delirium & dementia), having mental disorder diagnosed by a psychiatrist, using antianxiety and antidepression drugs, as well as participants who were directly self-reporting and having a problem with the sense of smell (checked by a researcher with rose flower scent).

Instrument

Demographic questionnaires included variables such as age, gender, marital status, education, and satisfaction from the nursing home.

The Hospital Anxiety and Depression Scale (HADS) is a valid and reliable self-rating scale that measures anxiety and depression in both hospital and community settings. The HADS has 14 items (7 for anxiety symptoms and 7 for symptoms of depression). This instrument is based on a four-point Likert scale (0, 1, 2, 3), where score zero is related to the absence of a symptom in a person and a score of three is in perfect agreement with the target item. Twenty-one scores will be obtained from each part. In both scales, a score of 0–7 means healthy (without clinical symptoms), 8–10 means mild anxiety or depression, and a score of 11–21 is severe anxiety or depression (clinical).[22,23] In Iran, the validity and reliability of this questionnaire were determined by Kaviani and colleagues.[24] Its reliability coefficient using Pearson's correlation coefficient for anxiety and depression was 0.73 and 0.79, respectively.[24]

Intervention

The intervention included combined aromatherapy massage. Different procedures are used to deliver aromatherapy such as inhalation, massage, baths, and compresses. Aromatherapy massage is the most widely used complementary therapy. In the present study, aromatherapy was provided in the form of massage with essential oils of lavender, chamomile, and rosemary in a 4:3:2 ratio and diluted in jojoba oil at 3%.[20] The lavender, chamomile and rosemary essences and jojoba oil had been produce by Barij Essence Pharmaceutical Company (producer of herbal medicines in Iran) of Kashan, Iran. Concentration of essential oil used in this study was determined on the basis of a review of the literature[20,21] and in consultation with the traditional medicine specialist (third author). Ten drops of the above combination were poured over the back of the legs, foot, and knees. Each 20-min massage began with the foot, leg, and knee with light and heavy rubbing and vibration at a speed of 20 times per min.[20] Participants in the control group did not receive any intervention from the research team. The first researcher, who carried out the massage, trained under the supervision of a traditional medicine specialist who had obtained a certificate of massage therapy.

The fourth author studied aromatherapy massage theoretically based on a technique from a basic aromatherapy textbook,[25] and as a specialist in traditional medicine, trained the first author how to apply and massage the participants. Aromatherapy massage was performed for the intervention group in 20-min sessions

three times per week for two three-week periods separated by a one-week break,[20] for a total of 18 treatments. Rationale for the one-week break between treatment periods was evaluation of longer duration effect of aromatherapy massage.

Data Collection

Sampling was started after receiving the code from the Ethics Committee of Kerman University of Medical Sciences and obtaining written informed consent from eligible elderly from the four nursing homes in Kerman. Data were collected by convenience sampling method from the four elderly facilities and the samples were randomly divided into two groups of intervention and control. Demographic questionnaire and HADS scale were used for data collection.

The first researcher presented the HADS for each time point and each participant completed the questionnaire individually through the self-report. Data were collected at four time points for two groups. The first point of time was before the intervention when the demographic questionnaire and HADS were administered to the participants in each group. The next points of time for data collection for two groups were the end of the third week, at the beginning of the fifth week, and the end of the seventh week after the intervention, respectively.[20] The dates of data collection were from 28.8.2019 to 16.10.2019, and all participants across the treatment and control groups completed the study at the same time.

Data Analysis

Data were analyzed using statistics[19] and descriptive and analytical statistics. For comparing demographic variables between two groups, independent t test, chi-squared test, and Fisher exact test were used. Repeated measures ANOVA were used to assess anxiety and depression between the two groups across times. Also, independent t test was used as a post hoc analysis to compare the mean scores between the intervention between the two groups. The a priori alpha level was set at 0.05.

Ethical Considerations

The code of ethics (IR.KMU.REC.1397.192) was received from the Ethics Committee of Kerman University of Medical Sciences. After obtaining written informed consent from each elderly individual, the research objectives were explained and they were assured that the information would be kept confidential. They were also informed that the participation was optional, and they were allowed to withdraw from the study. The results were reported to authorities and participants at the end of the study.

RESULTS

Descriptive Results

It should be noted that one participant in the control group was excluded due to stroke and one in the intervention group because of the discontinuation of the study, so the study continued with 19 participants in each group.

Based on the results, independent t test showed there is not a significant difference in age between the two groups. According to chi-squared test, there was no significant difference between the two groups in terms of gender, marital status, and level of education. Also, the Fisher exact test showed there was no significant difference between the two groups in terms of level of satisfaction from the nursing home (Table 1).

Depression & Anxiety

Results of the anxiety and depression HADS assessments are presented in Figures 1 and 2. At baseline, scores on the HADS anxiety and depression subscales for the control group were rated as mild and healthy, respectively. For the intervention group baseline scores were categorized as severe anxiety and mild depression. According to the results, depression (t = 2.80, p = .008) and anxiety (t = 2.80, p = .008) scores revealed a significant difference between the two groups at baseline (Table 1). Repeated measures ANOVA were used to compare the change in anxiety and depression scores across the seven weeks of the study (Figures 1 and 2). Repeated measures ANOVA results showed the anxiety mean score at the end of the third week (7.94 ± 3.70), at the beginning of the fifth week (7.94 ± 3.27), and at the end of the seventh week (6.26 ± 3.38) had decreased in the interven-

TABLE 1. Comparison of Demographic Variables, Anxiety and Depression Between Groups

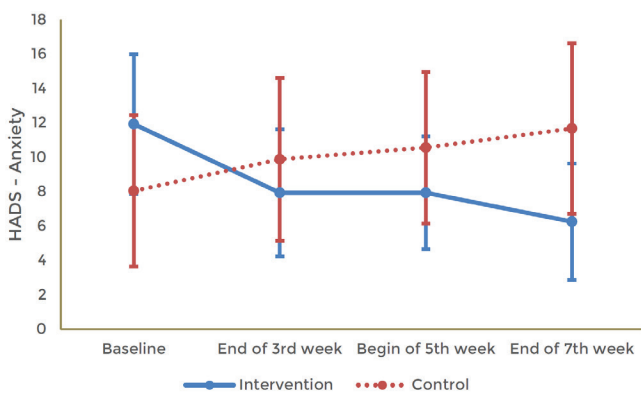| Variable		Control N (%)	Intervention N (%)	Statistic	p
Gender	Male	10 (52.6)	9 (47.4)	$\chi^2 = 0.10$	.74
	Female	9 (47.4)	10 (52.6)		
Marital status	Single	6 (31.6)	4 (21.1)	$\chi^2 = 0.54$	.46
	Married	13 (68.4)	15 (78.9)		
Education level	Uneducated	13 (68.4)	10 (52.6)	$\chi^2 = 0.99$	.31
	Educated	6 (31.6)	9 (47.4)		
Satisfaction from the nursing home	Very low	1 (5.3)	3 (15.8)	$\chi^2 = 7.99$	
	low	1 (5.3)	0(0)		.07
	Moderate	4 (21.1)	3 (15.8)		
	High	2 (10.5)	8 (42.1)		
	Very high	11 (57.9)	5 (26.3)		
Age		M±SD 72.4±7.70	M±SD 71 ±7.60	t=0.50	.57
Anxiety		8±4.40	11.9±4.00	t=2.80	.008
Depression		6.20±3.30	9.90±.20	t=3.50	.001

FIGURE 1. Anxiety scores (mean ± SD) on the HADS assessment are presented for intervention and control groups across the duration of the study. Repeated measures ANOVA indicated a significant interaction, indicating the two groups responded differently across time (F(3, 36) = 29.39; p < .001).
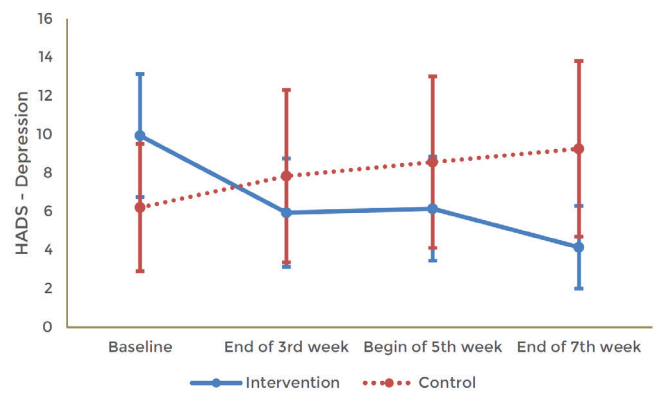

FIGURE 2. Depression scores (mean ± SD) on the HADS assessment are presented for intervention and control groups across the duration of the study. Repeated measures ANOVA indicated a significant interaction, indicating the two groups responded differently across time (F(3, 36) = 17.23; p < .001). The asterisk (*) indicates a significant difference between groups at the respective time point (p < .05).

tion group, while it had increased in the control group (p < .0001). Also, repeated measures ANOVA results showed the depression mean score at the end of the third week (5.94 ± 2.81), at the beginning of the fifth week (6.15 ± 2.69), and the end of the seventh week (4.15 ± 2.14) had significantly decreased in the intervention group, while it had increased in the control group (p < .0001).

DISCUSSION

The results showed that elderly adults who received aromatherapy massage with lavender, chamomile, and rosemary in 20-min sessions three times per week for two three-week periods separated by a one-week break showed reduction in

depression and anxiety than those in the control group. Similar studies that examined the effect of aromatherapy massage on depression in the elderly were not observed, but the results are consistent with the results of some studies that investigated the effect of similar scents, with or without massage, on depression reduction in menopausal women,[26] and cancer[27] and hemodialysis patients. Also, result of present study is consistent with the results of the Rho et al.[20] study that examined the aromatherapy massage with a combination of three oils similar to the present study (lavender, chamomile, and rosemary) and lemon oil on the anxiety and self-esteem of the elderly. They reported that anxiety of the elderly significantly decreased after the intervention.[20]

The effect of lavender, chamomile, and rosemary oil on the depression and anxiety of elderly adults can be attributed to the stimulation of the olfactory system and neurobiological changes. The limbic system as the stress control center is connected to the olfactory system. Depending on the type of aroma, several neurotransmitters can be released by neurons. Neurotransmitters play a role in nearly every function in the human body. A balance of neurotransmitters is necessary to prevent certain health conditions, such as depression and anxiety. After topical application, the essential oils also get absorbed into the blood and exert their effect through the blood stream.[17]

Aromatherapy massage has been shown to relieve self-reported symptoms of anxiety, and patients perceive aromatherapy massage as positive and beneficial. Aromatherapy oils administered by inhalation without massage do not appear to reduce anxiety.[28,29] Massage is a technique which provides both mental and physical relaxation. It is a direct form of non-verbal communication since it requires touching. Furthermore, it supports the communication between the nurse and the individual.[30] The main mechanism of massage includes increasing lymph flow throughout the body, shifting the autonomic nervous system from a state of sympathetic response to a state of parasympathetic response, and increasing blood lactate clearance. In general, massage potentially decrease anxiety, depression, and pain by increasing serotonin and endorphin.[31]

According to the demographic questionnaire and Hospital Anxiety Depression Scale (HADS) results, the elderly had a high degree of depression before intervention. This is consistent with previous studies.

In a study by Ranjan[32] nearly half of the elderly, and in the study of Ahmed[33] more than one-third of the elderly, in nursing homes suffered from depression. Abbasi et al.[2] described depression as one of the major issues of aging in Iran. The number of elderly adults has increased in different societies because of the tremendous advances in the prevention and treatment of diseases in today's world and consequently, the incidence of mental and physical illnesses, including depression, has increased in this period. Praveen Kumar et al.[34] believe that a global increase in the elderly population causes health problems for them. The authors go on to say that mental illness is not usually identified and treated in the elderly, as the prevailing thinking in developing countries is that the psychiatric problems of the elderly due to chronic diseases, loss of family members or changes in a social situation are natural reactions.

The results of our current study also showed that the anxiety level of the elderly under study was high before intervention. This result is consistent with previous results.

Marsa et al.[35] reported higher anxiety levels among older people living in a nursing home than those living at home in Iran. Ahmed et al.[33] reported that anxiety levels among people living in nursing homes was 80%. The incidence of anxiety in the elderly is not unexpected because people in nursing homes are faced with factors such as dependency, sense of loneliness, financial dependence, chronic illness, fear of death or absence of someone at the time of death. Andreescu and Varon[36] wrote that anxiety in the elderly is usually chronic, and its diagnosis and treatment is not well done.

According to the results of our study, the important issue from the therapeutic point of view is the difference in the trajectory of the improvements between the elderly people in the two groups. Those receiving aromatherapy massage experienced a significant improvement in anxiety and depression after intervention. By contrast, the severity of anxiety in the control group went from subclinical to severe between the baseline measure and the second measured time point. Depression went from mild to moderate.

High appreciation of family support within the social and cultural structure of

Iranian society has led to negative views of nursing homes within Iranian society. In Iranian culture, living in a nursing home is a stigma for the older person, and can cause a great amount of tension, feelings of isolation and rejection from family, and ongoing stress and reduced mental health. This stigma arises from the deep-rooted culture of family cohesion and belonging, which is outlined in the Koran: "If one of them [parents] or both of them reached their old age while staying with you, do not utter a word of disrespect such as "Oh" nor irritate them, but address them in terms of respect and kindness and be humble out of compassion and pray.[37]

Our results showed aromatherapy massage could significantly reduce depression and anxiety in the elderly, given that essential oils can be absorbed into the body via the skin or the olfactory system. Olfactory stimulation produces immediate changes in physiological and psychological parameters.[20] According to the relationship between the sense of smell with the spirit and human feelings, essential oils can have an effect on the spirit as well as the body.[17] Ventola[38] wrote that many patients find it easier to use aromatherapy than conventional medicine. Since the elderly are looking for solutions to their problems due to losing or reducing their physical and cognitive activities, training the elderly in aromatherapy massage as an easy way to reduce anxiety and depression, and also involves them in health-related activities.[39]

Frequent measurements during the intervention can be considered as the strengths of this study compared with other studies.

One limitation of this research was the lack of an equivalent-treatment control group to estimate the superior effectiveness of aromatherapy massage. Therefore, it is not clear whether the positive effects were due to the aromatherapy, the massage, or both (e.g., identical results may have been achieved by using only massage, or by using aromatherapy and massage). According to the previous evidence given, massage alone showed benefit for both anxiety[28,40] and depression,[30] and inclusion of the massage without aromatherapy would have allowed for aromatherapy comparison while potentially decreasing symptomology in the control participants.

Massage is also one of the complementary therapies used in health care as an adjunct therapy. Massage can stimulate the central nervous system and create a sense of calm. Different procedures are used to deliver aromatherapy such as inhalation, massage, baths, and compresses. If massage is performed along with aromatic oils, it is called aromatherapy massage. Aromatherapy massage is the most widely used complementary therapy, in which case these oils can quickly get absorbed by skin and enter the bloodstream. Therefore, there is no proof that aromatherapy made the difference and more study is needed.

Other limitations include the small sample size, the impossibility of blindness of the researcher, and the research participants. In this study, the self-report approach was used to collect data. In this method, anxiety and depression may be reported to be less than they actually are. Therefore, for the results of the current study to be confirmed, it is suggested that further research be done with different designed method for gathering data, larger sample size, and provision of blindness conditions. Also, the lack of a control group receiving any kind of attention was a limitation. To overcome this limitation, the opportunity was given to the control group participants to receive intervention after the completion of the study, if they wanted. Another limitation with the study is the statistically significant baseline differences.

It is recommended that nurses who take care of elderly can use the aromatherapy massage with lavender, chamomile, and rosemary oils to reduce depression and anxiety. Also, that the managers of the nursing homes take an effective step in improving the mental health of the elderly with the inclusion of this intervention in the care program. Future clinical studies that include larger samples, equivalent-treatment control group, and long-term follow-up are needed to determine the effects of aromatherapy massage on other psychological variables in the elderly adults.

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CONFLICT OF INTEREST NOTIFICATION

The authors declare there are no conflicts of interest.

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