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ORIGINAL ARTICLE

Effect of Lavender Oral Drops in Reducing Dental Anxiety Among Patients Requiring Endodontic Treatment: A Randomised Clinical Trial

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ABSTRACT

Objective: Patients requiring endodontic treatment often experience high levels of anxiety. The aim of this research is to investigate the effect of oral administration of lavender on the anxiety score of these patients.

Methods: In this double-blinded randomized clinical trial conducted in 2021, 64 patients with symptomatic irreversible pulpitis were recruited using a simple random sampling technique. Blinding was achieved for both the patients and the evaluators. The samples were split into intervention and control groups using a table of random integers to randomize them. An hour before the commencement of the procedure, the patients filled out the dental anxiety questionnaire. Twenty drops of water in 250 ml of water were given to the control group, whereas 20 drops of lavender extract added to 250 ml of water were given to the intervention group. Two groups completed the anxiety questionnaire 60 minutes after ingesting the remedies. To analyze the data, paired and independent t-tests, and multiple regression analysis were used.

Results: 64 patients were randomized and analyzed. Thirty-two of them who were in the control group experienced a substantially smaller decrease in their dental anxiety score compared to those 32 patients who were in the control group (p=0.001). This difference persisted even after grouping individuals by age, sex, and weight.

Conclusion: The administration of oral lavender extract drops to individuals requiring endodontic treatment appeared to significantly reduce their dental anxiety scores. The research registration number in the Iranian Registry of Clinical Trials is IRCT20120908010773N2, which is available at https://irct.behdasht.gov.ir/.

Keywords: Dental anxieties, Lavandula angustifolia, Lavender extract, root canal therapies

HIGHLIGHTS

- While previous studies have primarily investigated the effects of lavender aromatherapy, the present study focused on evaluating the impact of its oral liquid form.
- To examine the effect of oral lavender, an intervention group of 32 individuals and a control group of 32 individuals who required root canal treatment were selected, and changes in their anxiety scores before and after consuming the lavender extract and placebo were determined.
- The study showed that oral lavender drops can significantly reduce the anxiety of patients needing root canal therapy.

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INTRODUCTION

Anxiety induced by dental procedures, such as anesthetic injections and endodontic treatments, represents a significant challenge encountered by patients requiring dental care. Many issues, such as decreased patient compliance, have been brought on by this fear, which may harm the patient's dental health (1–5).

Anxiety exacerbates irritability, restlessness, and difficulties in concentration (6–8). According to Åstrøm et al. (9), female individuals experience more anxiety than male during dental procedures. Dental pulp inflammation necessitates urgent root canal therapy because of various factors, including caries and defective repairs. The procedure itself can make the patient extremely anxious (10, 11).

The use of natural and herbal medications in various forms, such as oral drops and inhalation, is one of the suggested methods for reducing patients' anxiety (12). Iranians have a long tradition of using plants for therapeutic purposes, and studies have revealed that they have a strong propensity for using herbal and natural remedies (13, 14). Lavandula angustifolia, the scientific name for lavender, is a perennial and evergreen plant from the mint family. Its name in English is Lavender (15). Many research studies have tested and confirmed lavender extract's analgesic and anti-anxiety properties and its primary active component, linalool (16, 17). Lavender aromatherapy has been tested in a variety of clinical and medical settings, and studies have shown that it can reduce the patient's anxiety before breast surgery, coronary artery bypass graft surgery, and for those requiring dental work (18–20). Lehrner et al. (21) reported that the administration of lavender and orange aromas dramatically reduced anxiety levels and enhanced mood among dental patients.

Though less effective than the aroma of orange and lavender, playing music in the waiting area of the dental office can also help patients feel less anxious. Venkataramana et al. (22) observed that a group of dental patients who received lavender aromatherapy exhibited lower anxiety levels in comparison to those who did not undergo aromatherapy. In a related study, Zabirunnisa et al. (23) reported that dental patients' anxiety was significantly reduced by inhaling lavender perfume. The prevalence of anxiety among patients referred to dental centres, especially patients who need endodontic treatments, is high (2). This research aims to investigate the effect of oral administration of lavender on the anxiety score of patients with irreversible pulpitis requiring endodontic treatment who have been referred to the Endodontic Department of Isfahan University of Medical Sciences.

MATERIALS AND METHODS

This research is a randomized clinical trial with parallel double-blinded groups. The research samples were patients who needed endodontic treatment and were referred to the general endodontic department of the Medical University of Isfahan School of Dentistry in 2021. In this study, 32 patients were in the control group, and 32 were in the intervention group. The Iran National Committee for Ethics in Biomedical Research approved the procedure of this research, which gave the ethical code as follows: IR.MUI.RESEARCH.REC.1399.837. The informed consent form, approved by the Iran National Committee for Ethics in Biomedical Research, was used in this research.

The research registration number in the Iranian Registry of Clinical Trials is IRCT20120908010773N2, which is available at https://irct.behdasht.gov.ir/.

Eligibility Criteria for Participants Were:

- The patients requiring root canal treatment of a vital tooth due to either trauma or caries with irreversible pulpitis, experiencing moderate to severe pain and had a prolonged response to cold testing with Endo-Ice spray and their endodontic care could be handled by the dentistry school's general endodontic department.
- Being able to answer questionnaires.
- Being in a sound mental state.
- Had no prior use of Benzodiazepines or other anti-anxiety medications that depress the central nervous system.
- No experience of sensitivity or dermatitis after ingesting lavender extract.
- Not being pregnant or breastfeeding for female patients.

Exclusion Criteria

- Poor cooperation.
- Wanted to withdraw from the trial at any time.
- An operator, who was a fifth-year dentistry student, was assigned. The operator selected a dental assistant who was an employee of the endodontics department of the dentistry school as the evaluator.

Among 80 assessed patients, ten didn't meet inclusion criteria, and six declined participation. 64 eligible patients, who were selected by the convenience method, were divided into two equal groups—intervention and control—using a table of random integers to randomize them. Patients whose numbers were odd were placed in the intervention group, and patients whose numbers were even were placed in the control group based on the table of random numbers (24). The evaluator and patients did not know about the groups in the following stages, and only the operator knew about the patients' groups.

The study's objectives and criteria were explained to the patients by the evaluator verbally and in writing after the operator had approved their participation in the study. Patients who agreed to take part in the study signed informed consent forms. Patients answered questions about their age, gender, weight, and contact information on a questionnaire. The validity and reliability of the Modified Dental Anxiety Scale (MDAS) had previously been approved (2). MDAS is a survey that concludes five questions about how patients would feel about these situations:

1. Anticipating a dental visit,
2. Waiting in the dentist's office for treatment,
3. Waiting in the dental chair for drilling of teeth,
4. Waiting in the dental chair for scaling the teeth,
5. Waiting in the dental chair to receive a local anesthetic injection.

MDAS, which includes simple Likert scoring, is similar to Corah's Dental Anxiety Scale (CDAS) but consists of an extra question about a local anesthetic injection (25). MDAS would indicate whether patients are 'not anxious,' 'slightly anxious,' 'fairly anxious,' 'very anxious,' or 'extremely anxious.' The total score is a sum of all five items and ranges from 5 to 25. The cut-off for high anxiety is considered to be a score of 19 or above (2, 25).

TABLE 1. Frequency of gender in the intervention and control groups

	Intervention		Control		Total		p
	n	%	n	%	n	%	
Gender							
Male	14	43.8	13	40.6	27	42.2	0.8
Female	18	56.3	19	59.4	37	57.8	
Total	32	100	32	100	64	100	

n: Number

TABLE 2. Comparison of demographic variables between intervention and control groups

Variables	SD	Mean	Group n=32	p
Age	11.49	38.38	Intervention	0.84
	13.88	37.75	Control	
Weight	8.25	68.19	Intervention	0.87
	10.01	67.72	Control	

SD: Standard deviation

TABLE 3. Mean and standard deviation of anxiety in the two groups before and after the intervention

	Group	n	Mean	SD	p
Before intervention	Intervention	32	11.09	4.560	0.53
	Control	32	11.16	2.952	
After intervention	Intervention	32	8.75	4.732	0.001
	Control	32	11.09	3.640	
Changes	Intervention	32	-2.34	2.824	0.002
	Control	32	-0.06	3.131	

n: Number, SD: Standard deviation

An evaluator who provided the patients with oral medicine drops or placebos documented the data before and after the intervention of both groups. One hour before the start of the root canal procedure, patients in the intervention group were given a disposable plastic cup with a lid that concealed the contents of 20 oral drops of lavender extract in 250 ml of water. Elice was the brand name of the lavender extract made by Eadeh Darui e Pars (Tehran, Iran) Pharmaceutical Company. It is registered by the Food and Drug Administration of Iran with license number 133665/36 and is available at pharmacies. The extract quantity was utilized by the manufacturer's recommendations and those of the European Medicines Agency's Committee on Herbal Medicinal Products (26). Patients in the control group were given a disposable plastic cup with a lid the same size, shape, and colour as the cup containing 250 ml of water with 20 drops of water. A cotton ball soaked in two drops of lavender extract was used to rub the plastic cup's lid since the substance had a distinct aroma and smell in both groups. The participants of the two groups refilled the anxiety questionnaire under normal circumstances and with no time constraints an hour after consuming the remedies. It should be highlighted that during these 60 minutes, no dental work was done, and the patients underwent the same admissions process as other patients.

The main objective of this study was to compare patients' MDAS scores in intervention and control groups. The effect of age, sex, and weight on the change in anxiety scores in different groups was also investigated.

Data of every patient, such as MDAS scores, sex, age, and weight, were labelled by codes assigned by the operator and collected by the evaluator.

According to the range of changes in the MDAS score and using the formula $n=\frac{\left(Z_{1-\frac{\alpha}{2}}+Z_{1-\beta}\right)^2(\sigma_1^2+\sigma_2^2)}{d^2}$, taking into account the standard deviation of σ=3.3 and the sample size of 64 people, 32 in the intervention group and 32 in the control group, there is a probability of 0.80 that a difference equal to d=3.2 between the average anxiety score of the groups will be significant when α<0.05 level (27).

The SPSS software version 20.0 (IBM Corp., Armonk, NY, USA) was used to analyze the data. The mean anxiety scores in the two groups were compared using an independent t-test before and after the intervention. The mean anxiety scores in each group were compared using a paired t-test. Multiple regression analysis was used to compare the anxiety scores of the two groups, considering other characteristics such as weight, age, and sex. The error level for each test was two-sided, and it was considered to be significant at 0.05.

RESULTS

As displayed in Figure 1, 80 patients participated in this study. Ten patients didn't meet the inclusion criteria, and six declined to take the medicine. Thirty-two patients were allocated in the control and 32 in the intervention group. The average age of the patients was 38.06±12.64 years (18 to 68 years). Out of 64 patients, 27 (42.2%) were male, 37 (57.8%) were female, and their average weight was 67.95 Kg. As shown in Table 1, there was no statistically significant gender frequency difference in the two groups (p=0.8). As given in Table 2, intervention and control groups' mean ages and weights did not differ statistically (0.05<p<1).

The procedure, which included eligibility assessment, filling out informed consent and MDAS by patients, taking oral drops, and answering MDAS for a second time for each patient, took about 80 minutes.

It took nearly six months to complete this research. The results of this study, as given in Table 3, revealed that patients

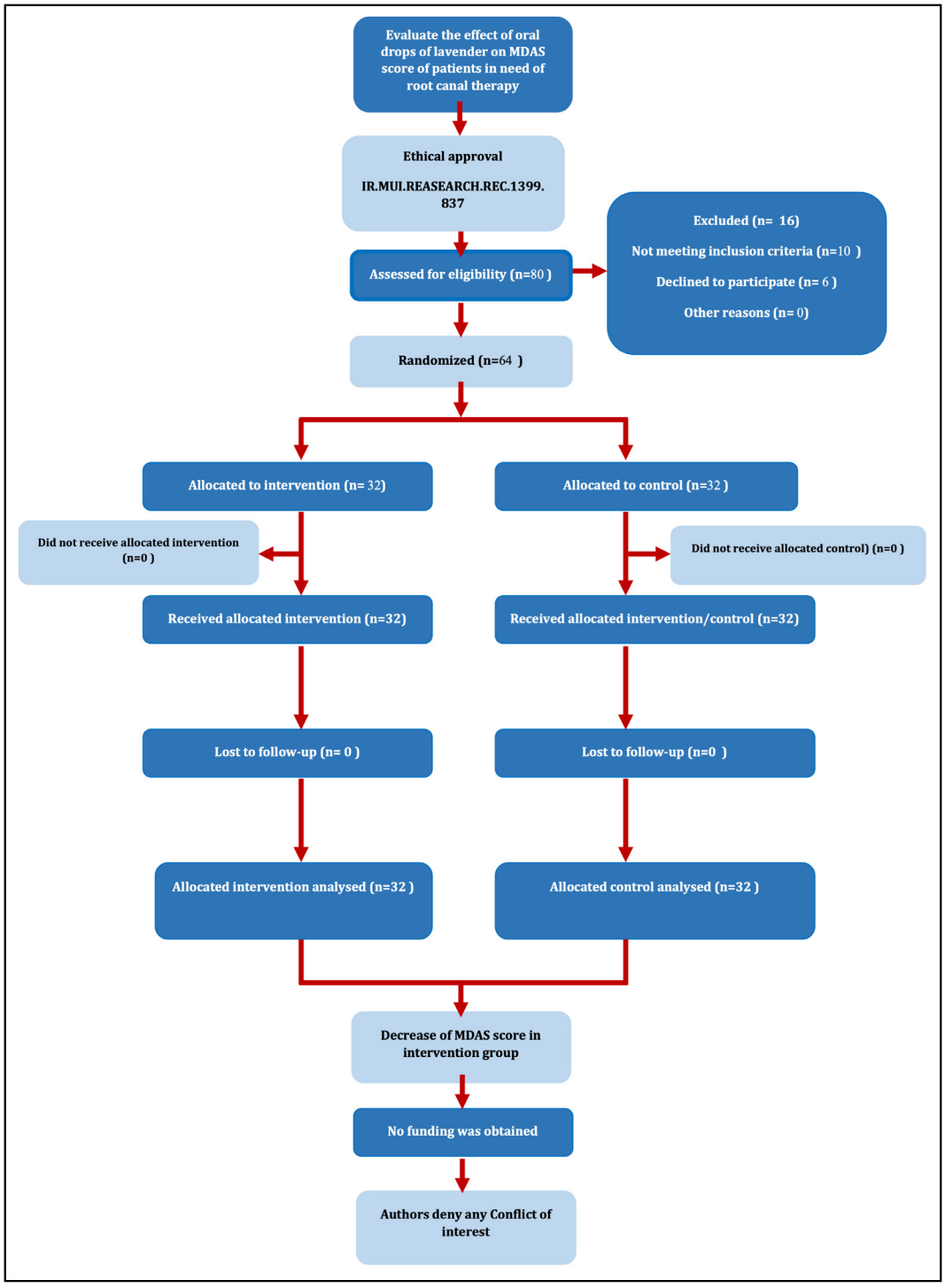

Figure 1. Patient flow diagram for the randomized controlled trial. This flowchart illustrates the study design, including patient enrollment, allocation, follow-up, and analysis. Of the 80 patients initially assessed for eligibility, 16 were excluded (10 did not meet inclusion criteria, and 6 declined participation). The remaining 64 patients were randomized into two groups: 32 in the intervention group and 32 in the control group. All patients in both groups received their respective treatments, with no loss to follow-up. Data analysis was conducted on all 64 participants

MDAS: Modified Dental Anxiety Scale

in the intervention group had a considerable decrease in their anxiety levels (Mean=8.75) compared to the patients in the control group (Mean=11.09 and p=0.001). There was a statistically significant (p=0.002) decrease in anxiety score of 2.34 points in the intervention group. Compared to a decrease of only 0.06 points in the control group. As Figure 2 illustrates, before the intervention, there was no significant difference between the two groups regarding anxiety score (intervention (11.09, SD=4.56) and control (11.16, SD=2.95)). While after the intervention, it was reduced significantly in the intervention group (8.75, SD=4.73) compared to the control group (11.09, SD=3.64). This difference persisted af-

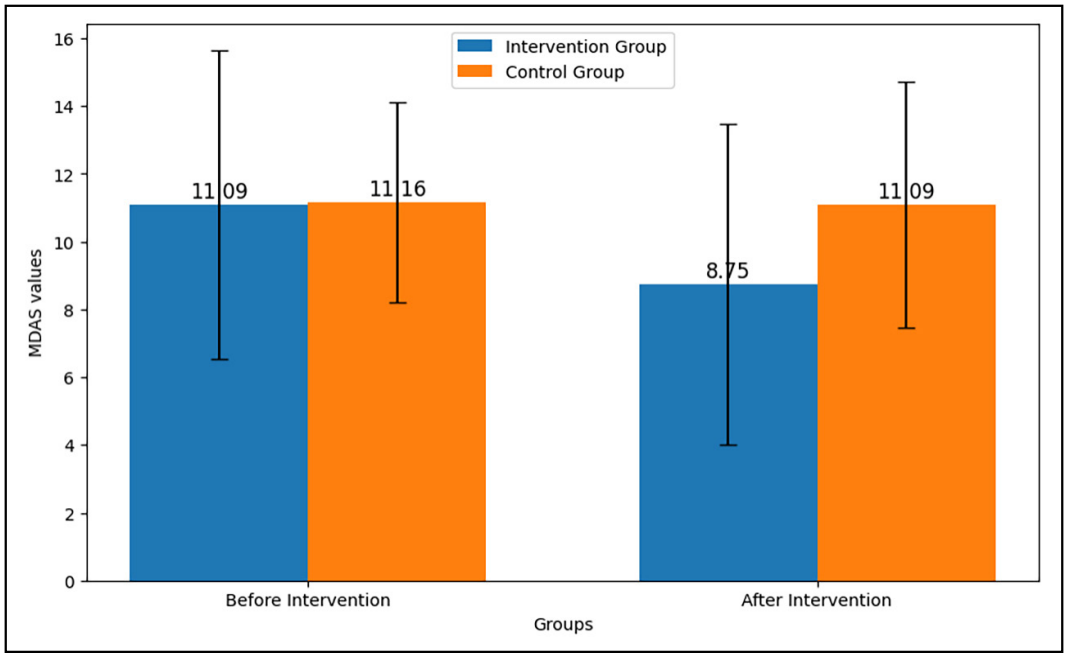

Figure 2. Mean and standard deviation of MDAS score before and after the intervention. The bar chart shows the mean MDAS (Modified Dental Anxiety Scale) scores for both the intervention and control groups before and after the intervention. Error bars represent the standard deviation. The intervention group exhibited a reduction in MDAS scores after the intervention, indicating its potential effectiveness, whereas the control group showed no significant change

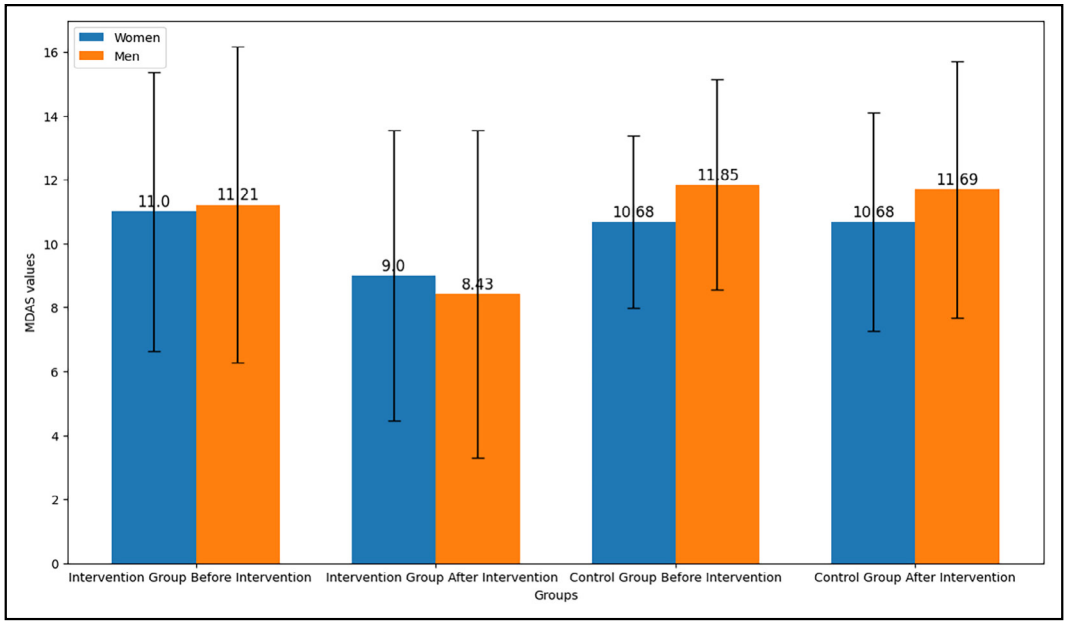

Figure 3. Mean and standard deviation of MDAS score before and after the intervention by sex groups. The bar chart displays the mean MDAS (Modified Dental Anxiety Scale) scores and standard deviations for women and men in both the intervention and control groups, before and after the intervention. The intervention group shows a significant reduction in anxiety scores after the intervention compared to the control group, for both sexes. Error bars represent the standard deviation of the scores. Statistical analysis confirms that the reduction in anxiety scores in the intervention group is significantly greater than in the control group ($p<0.05$)

ter grouping by age, sex, and weight. As Figure 3 illustrates, in both sex groups, the mean MDAS score after the intervention in the group receiving medicine is significantly lower than in the control group. In other words, the changes in the anxiety score in the control group were less than in the group receiving medicine ($p<0.05$).

Multiple regression analysis, which was conducted by considering post-intervention anxiety as a dependent variable and group variables of pre-intervention anxiety, age, gender, and weight as independent variables, showed a significant difference between the anxiety of the two groups after the intervention ($p=0.003$). However, the effects of gender ($p=0.562$),

weight (p=0.654), and age (p=0.215) were not significant. They proved that none affected how well oral drops of lavender extract worked. After taking lavender drops, patients reported no complications, and no adverse effects were seen or reported.

DISCUSSION

In this study, the anxiety level of patients requiring root canal therapy was measured before and after receiving oral drops of lavender extract. According to the findings of our study, patients who received oral drops of lavender following the intervention had considerably lower anxiety levels compared to those in the control group. Even when other factors, i.e., age, gender, and weight, were considered, this difference persisted. Thus, the null hypothesis, which stated that lavender oral drops have no significant effect on reducing dental anxiety, was rejected.

In this study, to standardize the groups, only the patients requiring root canal treatment of a vital tooth with irreversible pulpitis were included. The patients who had a history of taking any anti-anxiety drugs or benzodiazepines were not included in the study.

Lehrner et al. (21) investigated 200 patients needing dental procedures, such as dental hygiene, drilling, tooth pulling, and regular check-ups. They concluded that the aromas of lavender and orange considerably decreased patients' anxiety and elevated their mood compared to the control group. The findings of another study by Venkataramana et al. (22) on 100 patients attending dental clinics for the first time, the anxiety of those who got lavender aromatherapy was considerably reduced. Inhaling lavender perfume also dramatically decreased dental anxiety, according to a study by Zabirunnisa et al. (23) that involved 597 dental patients.

In a research study conducted by Seifi et al. (20), It was demonstrated that the anxiety of the group that inhaled the lavender essential oil was not substantially different from that of the control group in 60 patients who underwent coronary artery surgery. The difference between the present study's findings and Seifi's study could be due to the vital nature of coronary artery surgery. In addition, the concentration of the lavender extract and its administration may play a role in a study conducted by Rajai et al. (28) on 60 patients who were potential candidates for coronary artery surgery, and it was found that inhaling lavender extract essential oil dramatically decreased anxiety levels in the intervention group. The patients who inhaled lavender extract experienced considerably lower levels of anxiety than those in the control group in a study which was done by Mesri et al. (29) on 64 patients who were candidates for rhinoplasty surgery. Anxiety scores of the patients in the group that inhaled lavender extract were shown to be considerably lower than those in the control group in research conducted by Beyliklioğlu et al. (30) on 80 patients who were candidates for breast surgery. In a study conducted on 72 patients who were candidates for hemodialysis, Bagheri-Nesami et al. (31) found that administration of three drops of lavender essential oil, applied for 10 minutes every day for a month, significantly reduced depressive symptoms. However, this study found no difference in the patient's anxiety level. Apart from the time and administration method, it's possible that the difference in diseases of the patients studied by Bagheri-Nesami et al. (31) and the present study also contributed to the different outcomes. In contrast, Tayebi et al. (32) found that using three drops of lavender essential oil every day for three to four weeks reduced anxiety but did not affect the level of depression in 60 hemodialysis patients. The anxiety of patients in the lavender inhalation group decreased dramatically in research conducted by Fayazi et al. (33) on 72 patients who were candidates for surgery. The results of this study are consistent with our results and demonstrate a considerable decrease in anxiety following lavender administration. Research conducted in 2020 on 60 senior patients revealed that lavender tea can help older adults feel less stressed and anxious (34).

Although the conditions of the patients evaluated were not the same as those in the current study, it was discovered in most of them that lavender provides anti-anxiety properties. The present study's results show that short-term administration of lavender extract before a procedure considerably lowers patients' anxiety. Due to the study's time limitations, it was difficult to follow up with the patients over the long term. Patients declining to participate in the survey was another limitation of the study. Therefore, a larger sample size should be initially chosen. More studies are required to compare the various ways lavender extract can be administered to achieve the optimum results for reducing tension and anxiety in patients at dentistry clinics.

CONCLUSION

This study showed that taking lavender oral drops helps patients who need endodontic treatment feel less anxious. Thus, using this oral drop before endodontic treatment can be advised for anxious patients. In general, it can be claimed that the type of illness experienced by study participants, the length of time each session's lavender extraction is consumed, the quantity and length of the intervention, as well as the patient's age and gender, are among the possible causes of differences in the results of studies that are inconsistent with the present study.

Disclosures

Ethics Committee Approval: The study was approved by the Isfahan University of Medical Sciences and Health Services Research Ethics Committee (no: IR.MUI.RESEARCH.REC.1399.837, date: 17/03/2021).

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REFERENCES

1. Di Nasso L, Nizzardo A, Pace R, Pierleoni F, Pagavino G, Giuliani V. Influences of 432 Hz music on the perception of anxiety during endodontic treatment: a randomized controlled clinical trial. J Endod 2016; 42(9):1338–43. [CrossRef]
2. Saatchi M, Abtahi M, Mohammadi G, Mirdamadi M, Binandeh ES. The prevalence of dental anxiety and fear in patients referred to Isfahan Dental School, Iran. Dent Res J 2015; 12(3):248–53.
3. Hmud R, Walsh LJ. Dental anxiety: causes, complications and management approaches. J Minim Interv Dent 2009; 2(1):67–78.
4. Peretz B, Moshonov J. Dental anxiety among patients undergoing endodontic treatment. J Endod 1998; 24(6):435–7. [CrossRef]
5. Van Wijk AJ, Hoogstraten J. Anxiety and pain during dental injections. J Dent 2009; 37(9):700–4. [CrossRef]
6. Kasper S, Anghelescu I, Dienel A. Efficacy of orally administered Silexan in patients with anxiety-related restlessness and disturbed sleep-a randomized, placebo-controlled trial. Eur Neuropsychopharmacol 2015; 25(11):1960–7. [CrossRef]
7. Perlis RH, Fava M, Trivedi MH, Alpert J, Luther JF, Wisniewski SR, et al. Irritability is associated with anxiety and greater severity, but not bipolar spectrum features, in major depressive disorder. Acta Psychiatr Scand 2009; 119(4):282–9. [CrossRef]
8. Sari NPWP, Manungkalit M. The best predictor of anxiety, stress, and depression among institutionalized elderly. Int J Public Health Sci 2019; 8(4):419–26. [CrossRef]
9. Åstrøm AN, Skaret E, Haugejorden O. Dental anxiety and dental attendance among 25-year-olds in Norway: time trends from 1997 to 2007. BMC Oral Health 2011; 11:1–7. [CrossRef]
10. Kaptan RF, Haznedaroglu F, Basturk FB, Kayahan MB. Treatment approaches and antibiotic use for emergency dental treatment in Turkey. Ther Clin Risk Manag 2013;9:443–9. [CrossRef]
11. Lee M, Winkler J, Hartwell G, Stewart J, Caine R. Current trends in endodontic practice: emergency treatments and technological armamentarium. J Endod 2009; 35(1):35–9. [CrossRef]
12. Sarris J, Panossian A, Schweitzer I, Stough C, Scholey A. Herbal medicine for depression, anxiety and insomnia: a review of psychopharmacology and clinical evidence. Eur Neuropsychopharmacol 2011; 21(12):841–60. [CrossRef]
13. Ghassemi Dehkordi N, Sajjadi S, Ghannadi A, Amanzadeh Y, Azadbakht M, Asghari G. Iranian herbal pharmacopoeia (IHP). Hakim Res J 2003; 6(3):63–9.
14. Gilani AH. Trends in ethnopharmacology. J Ethnopharmacol 2005; 100(1-2):43–9. [CrossRef]
15. Jianu C, Pop G, Gruia AT, Horhat FG. Chemical composition and antimicrobial activity of essential oils of lavender (Lavandula angustifolia) and lavender (Lavandula x intermedia) grown in Western Romania. Int J Agric Biol 2013; 15(4):772–6.
16. Quintans-Júnior LJ, Barreto RS, Menezes PP, Almeida JR, Viana AFS, Oliveira RC, et al. β-Cyclodextrin-complexed (−)-linalool produces antinociceptive effect superior to that of (−)-linalool in experimental pain protocols. Biol Chem Pharm Bull 2013; 113(3):167–72. [CrossRef]
17. Kim S, Kim HJ, Yeo JS, Hong SJ, Lee JM, Jeon Y. The effect of lavender oil on stress, bispectral index values, and needle insertion pain in volunteers. J Altern Complement Med 2011; 17(9):823–6. [CrossRef]
18. Franco L, Blanck TJ, Dugan K, Kline R, Shanmugam G, Galotti A, et al. Both lavender fleur oil and unscented oil aromatherapy reduce preoperative anxiety in breast surgery patients: a randomized trial. J Clin Anesth 2016; 33:243–9. [CrossRef]
19. Kritsidima M, Newton T, Asimakopoulou K. The effects of lavender scent on dental patient anxiety levels: a cluster randomized-controlled trial. Community Dent Oral Epidemiol 2010; 38(1):83–7. [CrossRef]
20. Seifi Z, Beikmoradi A, Oshvandi K, Poorolajal J, Araghchian M, Safiaryan R. The effect of lavender essential oil on anxiety level in patients undergoing coronary artery bypass graft surgery: a double-blinded randomized clinical trial. Iran J Nurs Midwifery Res 2014; 19(6):574–80.
21. Lehrner J, Marwinski G, Lehr S, Johren P, Deecke L. Ambient odors of orange and lavender reduce anxiety and improve mood in a dental office. Physiol Behav 2005; 86(1-2):92–5. [CrossRef]
22. Venkataramana M, Pratap K, Padma M, Kalyan S, Reddy AA, Sandhya P. Effect of aromatherapy on dental patient anxiety: a randomized controlled trial. J Indian Assoc Public Health Dent 2016; 14(2):131–4. [CrossRef]
23. Zabirunnisa M, Gadagi JS, Gadde P, Myla N, Koneru J, Thatimatla C. Dental patient anxiety: possible deal with: lavender: fragrance. J Res Pharm Pract 2014; 3(3):100–3. [CrossRef]
24. Altman DG, Bland JM. How to randomise. BMJ 1999; 319(7211):703–4. [CrossRef]
25. Humphris G, Freeman R, Campbell J, Tuutti H, D'Souza V. Further evidence for the reliability and validity of the Modified Dental Anxiety Scale. Int Dent J 2000; 50(6):367–70. [CrossRef]
26. EMA. Community herbal monograph on Lavandula angustifolia Miller, aetheroleum. Available at: https://e-lactancia.org/media/papers/LavandaOil-DM-EMA2010.pdf. Accessed Feb 7, 2025.
27. Zhong B. How to calculate sample size in randomized controlled trial? J Thorac Dis 2009; 1(1):51–4.
28. Rajai N, Sajadi SA, Teymouri F, Zareiyan A, Siavoshi S, Malmir M. The effect of aromatherapy with lavender essential oil on anxiety and stress in patients undergoing coronary artery bypass graft surgery. Jundishapur J Chronic Dis Care 2016;5(4):e34035. [CrossRef]
29. Mesri M, Hosseini SM, Heydarifar R, Mirizadeh M, Forozanmeher M. Effect of lavender aromatherapy on anxiety and hemodynamic changes: a randomized clinical trial. Qom Univ Med Sci J 2017; 10(12):69–76.
30. Beyliklioğlu A, Arslan S. Effect of lavender oil on the anxiety of patients before breast surgery. J Perianesth Nurs 2019; 34(3):587–93. [CrossRef]
31. Bagheri-Nesami M, Shorofi SA, Nikkhah A, Espahbodi F. The effects of lavender essential oil aromatherapy on anxiety and depression in haemodialysis patients. J Biol Regul Homeost Agents 2017; 3(1):8–13. [CrossRef]
32. Tayebi A, Kasra Dehkordi A, Ebadi A, Sahraei H, Einollahi B. The effect of aromatherapy with lavender essential oil on depression, anxiety and stress in hemodialysis patients: a clinical trial. Evid Based Complement Alternat Med 2015; 5(2):65–74.
33. Fayazi S, Babashahi M, Rezaei M. The effect of inhalation aromatherapy on anxiety level of the patients in preoperative period. Iran J Nurs Midwifery Res 2011; 16(4):278.
34. Bazrafshan MR, Jokar M, Shokrpour N, Delam H. The effect of lavender herbal tea on the anxiety and depression of the elderly: a randomized clinical trial. J Complement Med Res 2020; 50:102393. [CrossRef]