

Effect of aromatherapy on dental patient anxiety: A cross-sectional study

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Abstract

Background: The pure essence of the aromatic essential oils provides both psychological and physiological beneficial effects. These oils are known for their unwinding, carminative, and sedative effects. Hence, an endeavor was made to investigate the olfactory impacts of these oils on the state of mind, physiology, and behavior during dental treatment.

Methods: In this cross-sectional study, the patients were divided into two groups (study and control group). Both the groups comprising patients of various ages. A total of 45 patients were assessed. In the study group, the aromatic odor of lavender essential oil was maintained with the help of scented perfumes and candles in the waiting area, and in the control group, normal candles were used as the armamentarium for aromatherapy. A questionnaire comprising demographic information and the Modified Dental Anxiety Scale was given to patients in the waiting room, and data regarding anxiety levels were recorded.

Observations and Results: Various observations were made based on the recordings made by the patients in both the groups, and it was found that the anxiety levels in patients in the study group reduced slightly with aromatherapy as compared to those in the control group.

Conclusion: Inhalation aromatherapy had positive effects on reducing anxiety in patients before the treatments. Hence, this should be recommended as a new and alternative way to reduce anxiety in patients before treatment. This will thus improve the behavior and approach of the patients to the treatment.

Keywords: Anxiety, aroma, aromatherapy, dental fear, dentistry, lavender oil

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INTRODUCTION

Many individuals hesitate to visit dental clinics and thus end up avoiding dental clinic visits. This hesitation is due to anxiety in association with stomatology. Anxiety can thus lead to several oral as well as general health issues.^[1]

It even results in the failure of the dental practitioner to provide successful and proficient dental service. Studies have demonstrated that a large number of patients suffer from anxiety. Anxiety is a state of uneasiness and apprehension, as about future uncertainties.^[2] The symptoms of anxiety are (1) Nervousness, restlessness,

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or being tense, (2) Feelings of peril or frenzy, (3) Rapid heart rate, (4) Rapid breathing or hyperventilation, (5) Increased or heavy perspiration, (6) Trembling or muscle twitching, (7) Weakness and lethargy, (8) Difficulty focusing, and (9) Gastrointestinal problems.^[3] There are various factors that can affect anxiety such as pain, bleeding, injections, smell of medicines, and past dental experience.

There are various pharmacological treatment options, but they all have side effects and drawbacks.

A new and alternative way to reduce anxiety levels in dental clinics is the use of aromatherapy.^[4] Aromatherapy uses plant materials and aromatic plant oils, including essential oils and other aroma compounds for improving psychological or physical well-being.

It can be offered as a complementary therapy.^[5]

Aromatherapy is being used currently to (1) relieve symptoms of a cold or flu, (2) nausea, (3) pain and body aches, (4) muscular aches, (5) headaches, (6) circulatory problems, (7) menstrual problems, (8) menopausal problems, (9) alopecia, (10) some types of psoriasis, and (11) digestive problems.^[6]

These oils are known for their unwinding, carminative, and sedative effects.^[7]

Subsequently, an endeavor was made to analyze the olfactory effects of these oils on mood, physiology, and behavior.^[8] Pulse being a direct measure of anxiety, pulse rate was used for the evaluation of anxiety of the patients who were exposed to the aromatic oils compared to patients who were not exposed to it, and the analysis was done.^[9] Therefore this study was done to evaluate the efficacy of aromatherapy in reduction of dental anxiety to eliminate the use of pharmacotherapy in reduction of dental anxiety.

METHODOLOGY

This comparative interventional cross-sectional study was carried out between June 2017 and June 2018. It was conducted on patients visiting three dental clinics for their treatment procedures.

Inclusion criteria

Forty-five adult patients were randomly included. They were further divided according to their age- >20 years, 20–35 years, 35–50 years, 50–65 years, and 65–80 years.

Exclusion criteria

1. Pediatric patients

2. Patients who are mentally or physically challenged, pregnant patients, patients having systemic diseases, and those taking anxiolytics or antidepressants
3. Patients unwilling to fill the questionnaire or any half-filled questionnaires

The patients were selected as per the lottery method (random allocation) to include in both the groups

Study group-scented candles were placed and scented perfume was sprayed in the waiting room.

Control group-normal candles (without fragrance) were placed.

Patients were blinded regarding the aromatic oils being sprayed during the study and were not informed that it is part of the study. Patient's consent was taken about a study being conducted. Anxiety of the patients was assessed through two variables:

1. A questionnaire comprising demographic information and a Modified Dental Anxiety Scale (MDAS) was given to patients in the waiting room, and data regarding anxiety levels were recorded
2. Pulse rate of the patient which was recorded thrice by the dentist:
 1. Before the dental treatment (in the waiting room)
 2. During the treatment
 3. After the treatment.

MDAS:^[10] In 1995, Corah's Dental Anxiety Scale was modified by Humphris *et al.*

Each item was scored as follows:

- Not anxious: 1
- Slightly anxious: 2
- Fairly anxious: 3
- Very anxious: 4
- Extremely anxious: 5.

Total score is a sum of all five items, range 5–25.

Less than 8 – no anxiety.

The cutoff is 19 or above which indicates a highly dentally anxious patient, possibly dentally phobic.

In this study, various demographic questions and questions from the MDAS were given to the patients which was then analyzed according to the criteria given above.

Each option had been given scores, and the sum was then

calculated to indicate if the patient was anxious according to the criteria given.

Along with the anxiety scale, their heart rate was assessed by measuring their pulse. The pulse rate of the patient was measured thrice.

- Before the dental treatment (in the waiting room)
- During the treatment
- After the treatment.

In the study group, the ambient odor of Lavender essential oil was maintained with the help of scented candles and perfumes in the reception area, and in the control group, normal candles were used as means of aromatherapy.

Patients were blinded regarding the aromatic oils being sprayed during the study and were not informed that it is part of the study.

All the findings were tabulated, analyzed, and the conclusion was thus drawn.

OBSERVATIONS AND RESULTS

Anxiety among the patients was measured as follows:

Both the groups were divided into five groups. [Figure 1] The mean age was 34.88 in the study group and 31.95 in the control group [Figure 2]. Anxiety was measured and it was found that maximum patients were anxious in various grades [Figures 3 and 4].

Both the groups were also asked about the type of dental treatment they were undertaking, it was found that maximum were for checkup [Figures 5 and 6].

The mean pulse rate was measured before and after aroma therapy and it was found that before aromatherapy, the mean pulse rate of cases was 79.6 and the mean pulse rate of the controls was 79.9. This difference is 0.35 with a standard error of 2.4; this difference is not statistically significant ($P > 0.05$).

After aromatherapy, the mean pulse rate of cases was 73.6 and the mean pulse rate of the controls was 79.6. This difference is 6.0 with a standard error of 2.4; this difference is statistically significant ($P < 0.05$) [Figure 7 and Table 1].

Subjective feedback after aromatherapy was also recorded and it was found that

patients in the study group have shown decrease in anxiety levels. Patients whose pulse was recorded showed

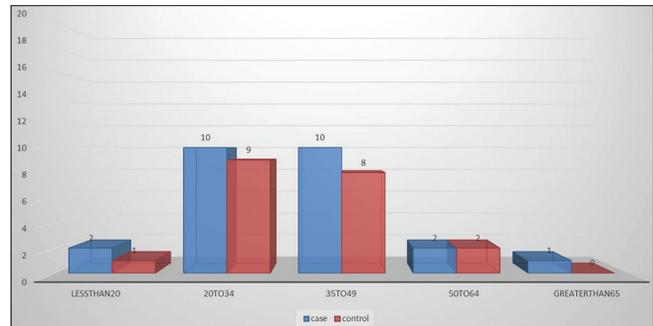


Figure 1: Age-wise frequency distribution of cases and control

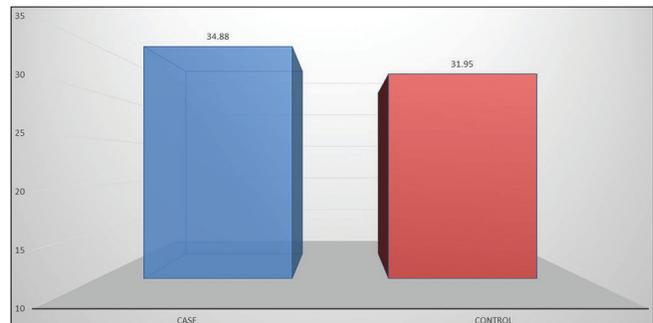


Figure 2: Age-wise mean distribution of cases and control

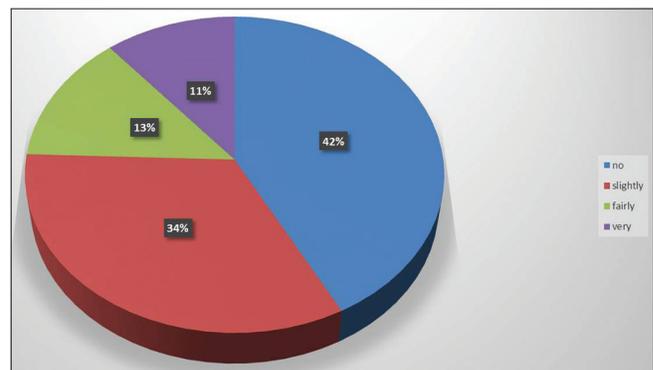


Figure 3: Anxiety levels in the total study group

a slight decrease in their pulse during and after their treatment [Figure 8].

Inhalation aromatherapy had positive effects on reducing anxiety in patients before their treatments.^[1] Hence, this should be recommended as a new and alternative way to reduce anxiety in patients before treatment. This will thus improve the behavior and approach of the patients to the treatment. Thus, even though it will increase the cost of the practitioner slightly, it should be incorporated in day-to-day dental practice to effectively treat the patient in a calm and comfortable manner.^[4]

DISCUSSION

The use of essential oils for remedial therapy, spiritual, hygienic, and conventional purposes has been used since

Table 1: Mean pulse rate

	Mean pulse rate of cases	SD of cases	Mean pulse rate of control	SD of control	P	Mean difference
Before aroma therapy	79.6	8.411	79.95	7.924	0.88	0.35
After aroma therapy	73.6	8.309	79.65	8.119	0.01	6.0

SD: Standard deviation

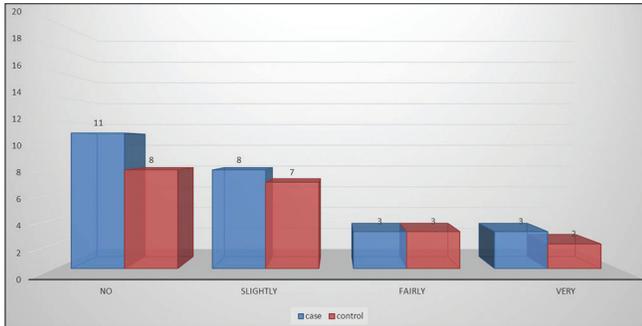


Figure 4: Anxiety wise distribution

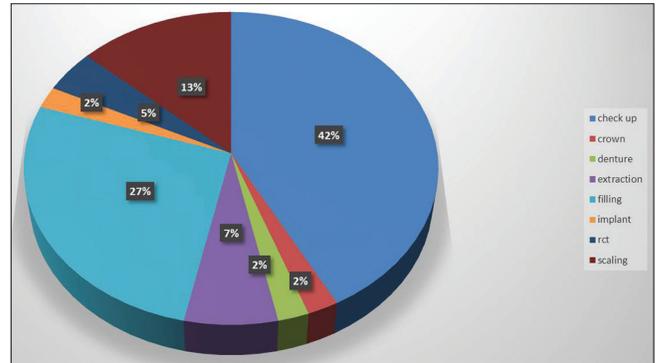


Figure 5: Procedure type in the total study group

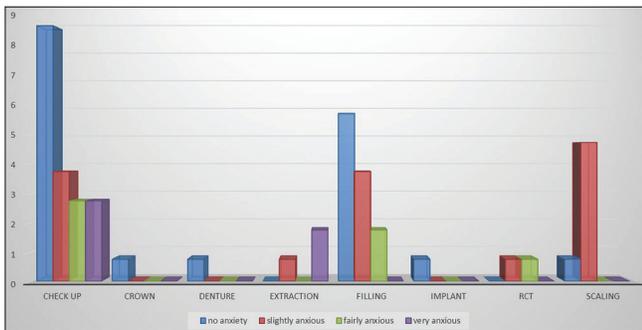


Figure 6: Anxiety wise distribution of procedure

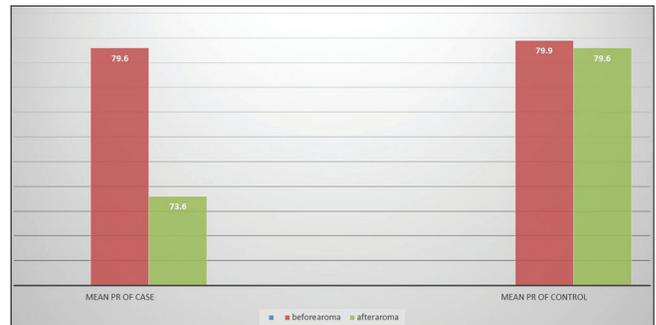


Figure 7: Pulse rate wise distribution

days of yore by the ancient civilizations of Chinese, Indian, Egyptian, Greek, and Roman population who utilized them in beautifying agents, perfumes, and drugs.^[1] In recent years, there has been an increased inclination toward the use of essential oils.^[12] These are auxiliary metabolites produced by various medicinal plants that possess antibacterial, antifungal, and antioxidant functions.^[13,14]

Various studies have been done to demonstrate the therapeutic functions of the various essential oils. Dental fear or odontophobia is an overwhelming and irrational reaction to threatening stimuli which could lead to hypertension, terror, and a feeling of uneasiness in dental situations.^[3] Both dental anxiety and fear result in physical, cognitive, emotional, and behavioral changes in an individual. This is a frequently encountered problem in dental offices. Anxiety is linked closely to painful stimulus and increased pain perception, and thus these patients experience more pain that lasts longer; they also exaggerate their memory of pain. Treating such anxious patients could be stressful for the dentist due to reduced cooperation, demanding more treatment time and resources, which

eventually results in an unpleasant experience for both the patient and the dentist.^[2]

Introducing pleasant ambient odors to the dental environment can also help to reduce anxiety by masking the smell of eugenol and other dental materials. These aromatic oils have potential anxiolytic effects of the odors themselves.^[15] Smell can trigger an array of emotions, this can condition a patient negatively toward dental treatment.^[16] Aromatherapy is an alternative treatment approach, wherein essential oils of aromatic plants are used to produce positive physiological or psychological effects through the sense of smell.^[17] Inhalation of pleasant scents such as essential oils improves mood as well as has a beneficial anxiolytic effect.^[18] Studies have shown it to be more efficient in managing moderate rather than severe anxiety.^[19] In healthy individuals, inhalation of lavender has been shown to significantly reduce the levels of salivary cortisol, salivary chromogranin, and serum cortisol.^[20] It has shown an increase in blood flow and decrease in galvanic skin conductance and systolic blood pressure.^[21]

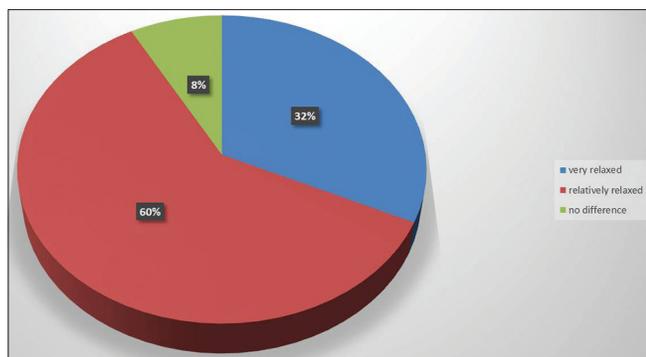


Figure 8: Subjective feedback after aromatherapy

Two basic mechanisms are offered to explain the effects. One is the influence of aroma on the brain (limbic system) through the olfactory system.^[22,23] The other is the direct pharmacological effect of the essential oils.^[9] Anxiety is mainly created in one's mind. These aromatic oils distract an individual from pondering about their fears.^[24] The measures for anxiety used on adult patients were done using a questionnaire which had questions from the Modified Dental Anxiety Scale and pulse rate to evaluate anxiety level which has not been used so far as per extensive literature search, which makes our study unique. The sample size of the study includes patients of various age groups. The sample size includes both males and females ranging from various age groups, thus, not limiting our study. Some of the patients were unable to perceive the questionnaire, so the questions were explained to them before they filled it on their own.

When the patients were asked for a feedback, the majority of the patients said that they enjoyed the concept of aromatic oils and would like to persist with it in the following dental visits. No reduction in pain was noticed. However, patient's distraction from pain was evident. Aromatherapy seems to be a psychological way to calm oneself down, and the patients showed an overwhelming response toward this therapy being practiced in dentistry. Most of the patients seemed relaxed during the treatment. The majority of the feedback from the patients toward this therapy was "good" or "very good." Hence a positive response was received toward it.

A study done previously using orange essential oil on patients 6–9 years of age at Dr. D. Y. Patil Dental College showed a similar result, pulse, systolic, and diastolic blood pressure were measured in the study and control patients did not shown statistically significant changes- $P < 0.001$ in both control and study groups.^[9] In another study conducted in Telangana, the study and control patients were divided according to their ages and sex, the statistics

showed a considerable decrease in both the study and control groups for all ages and sex, $P = 0.0020$ -study group and control group - 0.1449.^[2] In another study conducted on nurses in Korea: one hundred and twenty nurses were allocated to one of three groups, aroma gargling ($N = 40$), saline gargling ($N = 40$), or no treatment ($N = 40$). The aromatic gargle solution was blended by a certified aromatherapist and researcher. Peppermint (*Mentha piperita*), lemon (*Citrus limon*), tea tree (*Melaleuca alternifolia*), and ylang-ylang (*Cananga odorata*) were mixed in 1:1:2:1 ratios. The perceived stress in the aroma gargling group was significantly lowered compared with the control group and saline group at 10 min ($P < 0.001$) and 30 min ($P < 0.001$). Xerostomia in the aroma group decreased significantly compared with the saline solution and control groups after the treatment ($P < 0.001$). Aroma gargling reduced objective halitosis ($P < 0.001$ after 10 min; $P < 0.001$ after 30 min). Salivary pH in the aroma group significantly increased compared with the control and saline groups ($P < 0.001$ after 10 min; $P < 0.001$ after 30 min).^[25] The limitations of our study are that it should be conducted on a larger sample size, increasing the options of parameters of factors affecting dental anxiety in the questionnaire.

CONCLUSION

Aromatherapy is an effective alternative therapy that can be practiced in dentistry for anxious patients as it reduces anxiety while having no effect on pain. It is a nonpharmacological method contributing to the traditional clinical procedures. Dental visit can be made attractive by incorporating aromatherapy during treatments with no significant financial input. This will help treat the patients more efficiently in a calm and comfortable manner.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- 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;3:100-3.
- 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;14:131-4.
- Appukuttan DP. Strategies to manage patients with dental anxiety and dental phobia: Literature review. Clin Cosmet Investig Dent 2016;8:35-50.
- Hainsworth JM, Moss H, Fairbrother KJ. Relaxation and complementary therapies: An alternative approach to managing dental anxiety in clinical practice. Dent Update 2005;32:90-2, 94-6.

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5. Lee YL, Wu Y, Tsang HW, Leung AY, Cheung WM. A systematic review on the anxiolytic effects of aromatherapy in people with anxiety symptoms. *J Altern Complement Med* 2011;17:101-8.
6. Lakhan SE, Sheaffer H, Tepper D. The effectiveness of aromatherapy in reducing pain: A systematic review and meta-analysis. *Pain Res Treat* 2016;2016:8158693.
7. Buchbauer G, Jirovetz L, Jäger W, Dietrich H, Plank C, Karamat E. Aromatherapy: Evidence for the sedative effect of the essential oil of lavender after inhalation. *Z Naturforsch* 1991;46c: 1067-72.
8. Ludvigson HW, Rottman TR. Effects of ambient odors of lavender and cloves on cognition, memory, affect and mood. *Chem Senses* 1989;14:525-36.
9. Soni S, Bhatia R, Oberoi J. Evaluation of the efficacy of aromatherapy on anxiety level among pediatric patients in a dental setting: A randomized control trial. *Int J Oral Care Res* 2018;6:44-9.
10. Humphris GM, Morrison T, Lindsay SJ. The modified dental anxiety scale: Validation and United Kingdom norms. *Community Dent Health* 1995;12:143-50.
11. Stabholz A, Peretz B. Dental anxiety among patients prior to different dental treatments. *Int Dent J* 1999;49:90-4.
12. Vagish Kumar LS. Applications of aromatherapy in managing dental anxiety. *J Res Educ Indian Med* 2018;24:17-21.
13. Dagli N, Dagli R. Possible use of essential oils in dentistry. *J Int Oral Health* 2014;6:i-ii.
14. Nam SH, Choi MS, Choi YS. Antimicrobial effect of aroma essential oils on the oral cavity for the prevention and treatment of inflammatory diseases. *Biomed Res* 2018;29:3850-2.
15. Jimson S, Malathi L, Devi G. N, Sankari S. L. Aromatherapy In Dentistry – A Review. *Biomed Pharmacol J* 2016;9(2).
16. Oosterink FM, de Jongh A, Aartman IH. What are people afraid of during dental treatment? Anxiety-provoking capacity of 67 stimuli characteristic of the dental setting. *Eur J Oral Sci* 2008;116:44-51.
17. Loggia ML, Schweinhardt P, Villemure C, Bushnell MC. Effects of psychological state on pain perception in the dental environment. *J Can Dent Assoc* 2008;74:651-6.
18. Perry R, Terry R, Watson LK, Ernst E. Is lavender an anxiolytic drug? A systematic review of randomised clinical trials. *Phytomedicine* 2012;19:825-35.
19. Bradley BF, Brown SL, Chu S, Lea RW. Effects of orally administered lavender essential oil on responses to anxiety-provoking film clips. *Hum Psychopharmacol* 2009;24:319-30.
20. Jafarzadeh M, Arman S, Pour FF. Effect of aromatherapy with orange essential oil on salivary cortisol and pulse rate in children during dental treatment: A randomized controlled clinical trial. *Adv Biomed Res* 2013;2:10.
21. Hongratanaworakit T. Physiological effects in aromatherapy Songklanakarin. *J Sci Technol* 2004;26: 117-25.
22. Butje A, Repede E, Shattell M. Healing scents: An overview of clinical aromatherapy for emotional distress. *Journal of Psychosocial Nursing and Mental Health Services* 2008;46:46-52.
23. Aggleton JP, Mishkin M. The amygdala: Sensory gateway to the emotions. *Emotion* 1986;3:281-99.
24. Lehrner J, Marwinski G, Lehr S, Jöhren P, Deecke L. Ambient odors of orange and lavender reduce anxiety and improve mood in a dental office. *Physiol Behav* 2005;86:92-5.
25. Seo E-Y, Song J-A, Hur M-H, Lee M-k, Lee MS. Effects of aroma mouthwash on stress level, xerostomia, and halitosis in healthy nurses: A non-randomized controlled clinical trial. *European Journal of Integrative Medicine* 2017;10:82-9.