

Anxiolytic Effects of Pleasant Ambient Fragrances on Patients undergoing Simple Extraction: A Randomized Controlled Trial

Abstract:

Objective: To evaluate the effect of aromatherapy against dental anxiety among patients undergoing simple extractions.

Methodology: The present study was a Randomized Controlled Trial of concurrent parallel design with three (03) arms. A total of 90 subjects with age range of 15-45 years requiring simple extractions were included in the study. Participants were randomized into three groups: lavender oil group, rose oil group, and placebo (water) group. Participants' heart rate (HR) and blood pressure (BP) were measured using pulse oximeter and digital sphygmomanometer respectively. A questionnaire comprising Modified Dental Anxiety Scale (MDAS) was administered to the patients to measure their anxiety levels subjectively. All the data were recorded at before local anaesthesia (LA) administration, after LA administration (after 10 minutes) and post extraction stages. Data were analysed using SPSS version 16 (IBM corp, Armonk, NY). Inferential statistics was done using non parametric tests.

Results: Intragroup comparison showed statistically significant reduction in mean anxiety score in all the three groups from pre LA administration to post extraction except for pre LA administration to post LA administration stage in Rose oil group. Intergroup comparison of MDAS scores showed statistically significant differences in post LA administration and post extraction stages. Post extraction anxiety was found to be least in Lavender oil group and maximum in the placebo group.

Conclusion: Both Lavender oil and Rose oil group were found to be effective against dental anxiety among dentally phobic patients but comparatively Lavender oil group showed better results than Rose oil group and placebo group.

Key-words: Dental anxiety, Aromatherapy, Lavender oil, Rose oil, Modified Dental Anxiety Scale.

Introduction:

Anxiety can be described as a sensation marked by sensations of unease, anxious thoughts, and physiological changes such as elevated blood pressure (BP), escalated heart rate (HR), shortness of breath, queasiness, and perspiration.[1] Dental anxiety refers to feelings of unease linked to routine dental procedures, the expectation of treatment, apprehension about the unfamiliar, fear of discomfort, or concerns about interactions with dental staff within the dental clinic.[2] It signifies a state of worry that something distressing is about to occur in connection with dental procedures.[3] Triggers such as procedures like tooth drilling or injections can trigger dental anxiety among individuals.[4] This issue is commonly encountered in dental practices. The presence of dental anxiety has various consequences for both patients and dental practitioners. It can create challenges for practitioners as it

leads to decreased cooperation, necessitating more time and resources for treatment, or potentially causing appointment delays or cancellations. From the patient's perspective, those with dental anxiety often anticipate negative outcomes during dental procedures, tend to overestimate the level of pain

¹TANEJA PRATIBHA, ²MAHAPATRA SOUMYA,
³NAGPAL RUCHI, ⁴MARYA CHARU MOHAN,
⁵KATARIA SAKSHI

¹Sudha Rustagi College of Dental Sciences and Research, Faridabad, Haryana
Clinical Dental Practitioner, Jagannath Dental & Medical Care, Bargarh, Odisha

Address for Correspondence: Dr. Ruchi Nagpal
Sudha Rustagi College of Dental Sciences and Research,
Faridabad, Haryana, India
Email : drruchinagpal1975@gmail.com

Received : 30 Oct., 2024, **Published :** 30 Sept., 2025

Access this article online	
Website: www.ujds.in	Quick Response Code 
DOI: https://doi.org/10.21276/ujds.2025.v11.i3.2	

How to cite this article: Taneja, P., Mahapatra, S., Mohan Marya, C., Nagpal, R., & Kataria, S. (2025). Anxiolytic Effects of Pleasant Ambient Fragrances on Patients undergoing Simple Extraction: A Randomized Controlled Trial. UNIVERSITY JOURNAL OF DENTAL SCIENCES, 11(3).

they'll experience, express lower satisfaction, exhibit reluctance toward future treatments, and display reduced compliance.[5]

Underestimating the significance of dental anxiety is unwise. Dental anxiety is linked to reduced frequency of regular dental appointments, resulting in compromised oral health characterized by increased instances of missing teeth, decayed teeth, and poor periodontal condition. Affected individuals tend to seek dental care only during acute emergencies, leading to complex and distressing treatments that further worsen and reinforce their fear, ultimately causing them to avoid dental care in the future. This creates a cycle of escalating dental anxiety if these patients are not effectively addressed.[5]

Effective management of dental anxiety can be achieved through psychotherapeutic approaches, pharmacological interventions, non-pharmacological techniques, or a combination of these methods. Psychotherapeutic interventions can be behaviorally or cognitively focused, while pharmacological interventions involve conscious sedation or general anesthesia.[6] The pharmacological approach to managing anxiety carries risks, necessitates extra equipment, isn't suitable for patients with medication allergies, and presents numerous side effects. This has prompted a search for an alternative approach focusing on Complementary and Alternative Medicine (CAM).⁶ Medical practitioners from various parts of the world have increasingly incorporated complementary and alternative medicine into their daily practices. CAMs have gained popularity as effective non-pharmacological strategies for anxiety treatment. Notably, aromatherapy stands out as one of the most widely utilized forms of complementary and alternative medicine.[7]

Aroma therapy involves utilizing essential oils from aromatic plants to produce positive physiological or pharmacological effects through inhalation, resulting in anxiolytic effects and mood improvement.⁵ Research indicates its greater effectiveness in managing moderate anxiety as opposed to severe cases. Lavender, belonging to the Labiatae family, is particularly recognized for its anxiety-reducing and relaxing scent. The plant's active ingredients, linalool (a sedative that affects gamma-aminobutyric acid receptors in the central nervous system) and linalylacetate (a calming agent), contribute to these effects. Studies involving healthy individuals have demonstrated that inhaling lavender and rose oil significantly reduces levels of salivary cortisol, salivary chromogranin, and serum cortisol, while increasing blood flow and decreasing galvanic skin conductance and systolic

blood pressure.[8]¹ The current study aimed to evaluate the effect of aroma therapy against dental anxiety among patients undergoing simple extractions.

Methodology:

This study has been registered under Clinical Trial Registry of India (CTRI/2020/12/029929, <http://ctri.nic.in/Clinicaltrials/rmaindet.php?trialid=49961&EncHid=22479.76565&modid=1&compid=19>). Ethical clearance was sought from the Institutional Ethical Committee. This trial was conducted and documented in accordance with the Declaration of Helsinki and CONSORT guidelines. All the study subjects aged between 15-45 years were selected from the OPD of one of the educational Institute of NCR. Recruitment flow diagram of the participants is given in Figure1. Sample size was calculated through G-power software (inc.3.1). Since the study involves three groups (lavender oil, rose oil, and placebo), an ANOVA-based approach was used. A minimum sample size of 90 was found to be sufficient for $\alpha=0.05$, power of 95%, 0.35 as effect size as assessed from similar study.

Inclusion and Exclusion criteria:

Subjects with good general health and requiring simple extractions were included in the study. Participants with any breathing disorder, who are allergic to ingredients of aroma therapy, with an impaired sense of smell or with any history of hypertension and tachycardia were not included in the study.

Randomization, allocation concealment and Blinding:

After obtaining the written consent, the participants were randomly assigned to one of the three groups i.e. lavender oil, rose oil and placebo group using computerized randomization. All the study participants were asked to pick a slip containing a number from 1-90. Before starting the recruitment of participants, 90 completely opaque and securely sealed envelopes containing either of three interventions were randomly numbered from 1-90. As participants were recruited, they were assigned to respective intervention according to what was mentioned in the envelope. It was a triple blinded study, subjects, outcome assessors and data analyst were kept blinded to the group allocation.

Procedure:

After intervention allocation, the participants were made to wait in waiting area for 10 minutes. The fragrances were diffused in the irrespective operator's room through a room diffuser for 10-15 minutes. Lavender essential oil and rose oil were

diluted to 1% concentration. Operatory was chosen from the separate department to mask for all external factors like noise, patient familiarity with the clinic, or stress-inducing experiences which could have affected the results. The same diffuser was used in all the groups for the purpose of standardization. However oil was replaced by water in Placebo group. Subjective and objective assessments by recording Modified Dental Anxiety Scale (MDAS), Heart Rate and Blood Pressure recorded at three phases of treatment i.e. before local anaesthesia administration (pre-LA), after 10 minutes of LA Administration (post-LA) and post extraction. Pre LA measurements were taken in waiting area but post LA measurements were recorded in the operatory. A semi-structured questionnaire comprising demographic data and a Modified Dental Anxiety Scale

(MDAS) having five items was given to the patient to assess anxiety levels [9]. Participants' heart rate and blood pressure, being reliable and objective indicators of anxiety, were measured using Pulse oximeter (Dr Trust, USA) and digital Sphygmomanometer (Dr Trust, USA) respectively. Readings were then transferred to Excel sheet for the maintenance of records. The scores from MDAS were recorded on a Likert scale ranging from 1 to 5. Total score was calculated as a sum of all five items, range 5 to 25. Cut-off was set at 19 or above which indicated highly dental anxious patient, possibly dental phobic.⁹ As it was a single event treatment procedure, there were no dropouts and none of the participants reported any operative complications.

Statistical analysis:

The data was entered in to Microsoft Excel and was analysed using Statistical Package for Social Sciences version 21 (SPSS, IBM, inc, Virginia, US) for relevant statistical comparisons. All the responses of questionnaire and HR and BP recorded at pre LA administration, post LA administration and post extraction were summarized as mean.

Shapiro Wilk test was used to check which all variables were following normal distribution. Data was not normally distributed therefore, inferential statistics were performed using the nonparametric test. Intergroup comparison was done using Kruskal-Wallis test followed by Mann-Whitney U test for pairwise posthoc comparison and intra group comparison was done using Wilcoxon rank-sum test. Statistical significance was set at $p < 0.05$.

Results:

A total of 90 study participants i.e. 30 in each group viz. lavender oil, rose oil and placebo (water) group were

recruited. Study population were found to be homogenous in relation to age and gender distribution i.e. mean age and gender wise distribution showed no statistically significant difference.

Intragroup comparison using showed statistically significant decrease in mean anxiety scores from pre LA administration to post LA administration, and then further from post LA administration to post extraction, for lavender group. For rose oil group significant decrease in the mean anxiety score was observed from post LA to post extraction as well from pre LA to Post extraction. For Placebo group mean MDAS score significantly increased from pre LA administration to post LA administration but from post LA administration to post extraction and from pre LA administration to post extraction, a significant reduction in mean MDAS was seen. Intergroup comparison of MDAS scores after LA administration and extraction stages showed significant differences among three study groups ($p < 0.0001$). Mean anxiety levels after LA administration among lavender and rose oil group, was found to be significantly lower than that among placebo group (Table 1).

When comparing mean HR among study groups, statistically significant increase was seen in mean HR from pre LA administration to post LA administration stage for all the three groups. But significant reduction in mean HR was seen from post LA administration to post extraction and from pre LA administration to post extraction stage in all the groups. Intergroup comparison of Heart Rate (HR) at post LA administration did not reveal any significant difference among the three study groups. But, at post extraction stage, the mean HR among lavender group was significantly lower than that as compared to placebo group and rose oil group (Table 2). Thus, in other words, lavender oil aromatherapy was found to be more effective in lowering the elevated HR during tooth extraction.

On Intragroup comparison of systolic BP showed that it increased from pre LA to post LA among all the study groups, but this difference was statistically significant among placebo group only. Among all the groups, systolic BP further decreased significantly ($p < 0.05$) from post LA to post extraction. Overall also, the mean systolic BP decreased from pre LA to post extraction among all the study groups, but this reduction was significant for rose oil group and placebo group. While this difference in systolic BP among lavender oil group failed to reach the level of statistical significance. Intergroup comparison of Systolic blood pressure showed no statistically significant difference among three study groups at all the stages, i.e., pre LA, post LA and post extraction (Table 3).

While comparing among the study groups, diastolic BP among lavender group showed a significant reduction in it from pre LA to post LA, and then further from post LA to post extraction. In rose oil group, intragroup comparison of diastolic BP revealed no change from pre LA to post LA, but then, it decreased significantly from post LA to post extraction. Intragroup comparison of diastolic BP among placebo group showed that at first, it increased significantly from pre LA to post LA, and then it decreased significantly from post LA to post extraction. Overall change in diastolic BP from pre LA to post extraction was a statistically significant reduction. Intergroup comparison of diastolic BP showed that at pre LA stage and post LA stage, there were no difference among study groups. But after extraction completion, the mean diastolic BP among lavender group was significantly lower than that among placebo group, which was further significantly lower than that among rose oil group. Thus, it was concluded that the lavender oil aromatherapy was the most effective in lowering the diastolic BP after the procedure (Table 4).

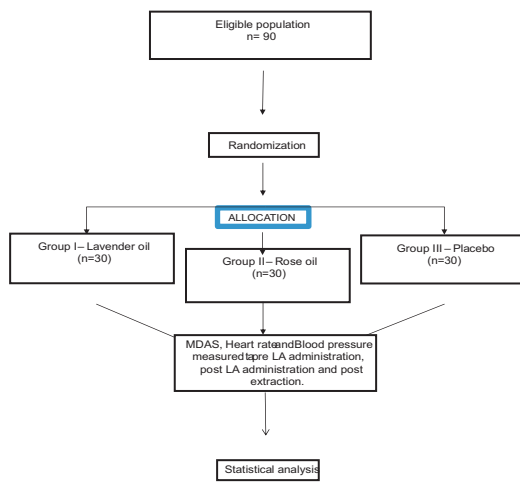


Figure 1: Recruitment flow chart

Table 1: Intergroup and intragroup comparison of mean MDAS scores among study population

Groups	Mean difference from			Mean difference from		
	Pre LA	Post LA	Post extraction	Pre LA- Post LA	Post LA- Post extraction	Pre LA- Post extraction
Lavender Oil Group	Mean	13.56	10.90	7.43	2.66*	6.13*
	SD	1.9	4.13	1.67		
Rose Oil Group	Mean	13.6	13.30	8.80	0.36	4.50*
	SD	2.53	3.76	1.86		4.86*
Placebo Group	Mean	13.46	14.86	10.40	1.40*	3.06*
	SD	1.67	1.69	2.04		
P ^a value	0.319	<0.0001*	<0.0001*			
Post Hoc P ^b	-	3>1,2	3>2>1			

^a Kruskal-Wallis test, ^b Mann-Whitney U test, * statistically significant difference

significant difference, Wilcoxon-rank-sum test, Level of statistical significance ≤ 0.05

Table 2: Intergroup and Intragroup comparison of mean HR scores among study population

Groups	Mean difference from			Mean difference from		
	Pre LA	Post LA	Post Extraction	Pre LA- Post LA	Post LA- Post extraction	Pre LA- Post extraction
Lavender Oil Group	Mean	80.03	83.80	75.47	3.76*	8.33*
	SD	5.505	8.899	4.462		4.56*
Rose Oil Group	Mean	80.70	84.00	79.27	3.30*	4.73*
	SD	8.044	9.731	6.690		1.43*
Placebo Group	Mean	82.17	85.93	80.33	3.96*	5.75*
	SD	7.424	9.350	5.108		1.83*
P Value	0.151	0.513	0.002*			
Post Hoc			2,3>1			

^a Kruskal-Wallis test, ^b Mann-Whitney U test, *- statistically significant difference, Wilcoxon-rank sum test, Level of statistical significance ≤ 0.05

Table 3: Inter and Intragroup group comparison of mean Systolic BP among study population

Groups	Mean difference from			Mean difference from		
	Pre LA	Post LA	Post Extraction	Pre LA- Post LA	Post LA- Post extraction	Pre LA- Post extraction
Lavender Oil Group	Mean	132.93	136.47	129.40	3.53	7.06*
	Std. Deviation	14.297	23.092	19.76		3.53
Rose Oil Group	Mean	139.03	141.67	135.10	2.63	6.56*
	Std. Deviation	13.325	14.235	12.08		3.93*
Placebo Group	Mean	134.23	140.13	129.77	5.90*	10.36*
	Std. Deviation	11.764	11.863	10.47		4.46*
P Value	0.532	0.803	0.107			

^a Kruskal-Wallis test, ^b Mann-Whitney U test, *- statistically significant difference, Wilcoxon-rank sum test, Level of statistical significance ≤ 0.05

Table 4: Intergroup and Intragroup comparison of mean Diastolic BP among study population

Groups					Mean difference from		
		Pre LA	Post LA	Post Extraction	Pre LA-Post LA	Post LA-Post Extraction	Pre LA-Post extraction
Lavender Oil Group	Mean	86.80	79.70	75.80	7.10*	3.90*	11.00*
	SD	5.744	11.161	8.164			
Rose Oil Group	Mean	87.77	87.80	84.33	0.03	3.46*	3.43*
	SD	6.106	10.210	8.535			
Placebo Group	Mean	83.83	86.40	81.63	2.56*	4.76*	2.20*
	SD	6.874	7.920	5.974			
P Value		0.094	0.223	0.001*			
Post Hoc				2>3>1			

^a Kruskal-Wallis test, ^b Mann-Whitney U test, *- statistically significant difference, Wilcoxon-rank sum test

Level of statistical significance ≤ 0.05

Discussion:

Dental anxiety refers to the patient's reaction towards associated stress related to dental treatment. Despite the advancements in the modern dentistry, prevalence of dental anxiety seems to be high. A study by Tellez [10] stated that nearly half (49.2%) of the subjects who sought regular or emergency dental care grieved from moderate to high level of anxiety. This high prevalence of dental anxiety could be attributed to the past traumatic dental experiences of the patient or from the negligence practised by the Indian population until a need for invasive dental treatment arises. High anxiety levels may also affect the bond between patients and dentists which could lead to misdiagnosis also. Therefore there is a need to control in operator anxiety among dentally phobic patients by non-invasive means. Essential oils, because of its anxiolytic actions have been used as an alternative medicine to control the dental anxiety since Egyptian times. Hence, the present study was initiated.

Lavender oil (*Lavandula angustifolia*) and Rose oil (*Rosa rubiginosa*) exert their effects after synapses by modulating the activity of cyclic adenosine monophosphate. Decreased activity of cyclic adenosine monophosphate is linked to sedation. These aromatic oils stimulate the olfactory system and alleviate symptoms associated with anxiety. Inhalation of aromatic essential oils triggers the olfactory nerves, transmitting signals to the brain to activate the central nervous system. Lavender oil and rose oil also target the gamma-aminobutyric acid receptors in the brain, which can induce the

anxiolytic (anxiety-reducing) effect.[11] Hence, these essential oils were selected as the agents of interest in this present study.

Dental anxiety in the present study was assessed through MDAS. None of the study participant was highly anxious though mild anxiety pre and post LA administration was present among all study participants. Also, Dental anxiety was found to be more among placebo group as compared to the participants which were exposed to lavender or rose oil aromatherapy. After LA administration and post extraction stages, dental anxiety substantially decreased in lavender and rose oil groups whereas in placebo group the anxiety increased from pre LA to post LA administration period. The discrepancies between heart rate and blood pressure could be because HR is more directly influenced by the autonomic nervous system's response to acute stress or anxiety, making it a more immediate and sensitive indicator of changes in anxiety levels.

SBP, on the other hand, is influenced by multiple factors, including peripheral vascular resistance, cardiac output, and baseline cardiovascular health, which may not respond as rapidly to anxiety or aromatherapy interventions. A prospective study by Muzarelli et al[12] showed significant effect of essential oils on dental anxiety and fear levels. Paula et al[13] in their research to determine whether essential oils used in aromatherapy may be used to minimize anxiety and stress levels found significant differences in stress and anxiety level before and after aromatherapy. Barati et al.[14] in their study of how aromatherapy affect anxiety among patients found out decreased level of dental anxiety among patients given inhalation of rose water.

Akbay Oba et al[15] similarly reported findings in their study where lavender oil effectively decreased dental anxiety. Our study's outcomes align with the research conducted by Burnett et al.[16, in which rosemary and lavender oils were administered to healthy college students during tasks that induced anxiety. The study by Zabirunnisa[17] also demonstrated a noteworthy decrease in anxiety scores within the lavender group compared to the control group. Another investigation by Itai et al.[18] highlighted significant reductions in anxiety and depression scores through the use of Hiba oil, while lavender oil exhibited a substantial reduction in anxiety scores as well.

No noteworthy differences were noted in heart rate (HR) prior to the administration of local anesthesia (LA) and after LA administration among the three groups under study. However, following the tooth extraction procedure, the Rose oil group

displayed significantly higher post-extraction HR in comparison to the Lavender group. HR experienced a significant decrease from before LA administration to after LA administration, as well as from after LA administration to post-extraction, across all three groups. In contrast to the findings of this study, a study by Premkumar et al.[19] observed no substantial distinctions in mean HR among the lavender, rose oil, and placebo groups following therapy. Systolic blood pressure (BP) did not exhibit notable differences among the three groups before and after LA administration, nor post-extraction. Similar outcomes were reported by Premkumar et al. [19] in their study where they assessed the impact of aromatherapy on dental anxiety among orthodontic patients.

In terms of diastolic BP, the lavender group displayed significantly lower levels compared to the rose and placebo groups. Across all three groups, there was a significant decrease in diastolic BP from before LA administration to post-extraction, as well as from before LA administration to after extraction. Similar to the findings of Premkumar et al. [19], the present study also observed significantly lower diastolic BP in the lavender group compared to the rose oil group after completing aromatherapy. The inclusion of measurements taken before, during, and after the extraction procedure, without any dropouts, adds strength to the present study's results.

No research comes without limitation. One of the major limitation of the study was that the participants were selected from a single institution in the NCR (National Capital Region), potentially limiting the generalizability of the findings to other populations. Also, the study did not assess the role of cultural or socio-economic factors that could influence anxiety and the effects of aromatherapy. Therefore, studies with larger sample size and longer duration adjusting for these confounders should be carried out to increase the generalizability of the study.

Conclusion:

With in the limitations of the study it can be concluded that aromatherapy using lavender and rose oil were effective and safe non-pharmacological treatment modality against dental anxiety while treating the patients. Thus can be used as an adjunctive aid to prevent or minimize emotional disturbances.

References

1. American Psychiatric Association A. Diagnostic and statistical manual of mental disorders. *Washington, DC: American Psychiatric Association*; 1980.
2. Roy J, Dempster LJ. Dental anxiety associated with orthodontic care: Prevalence and contributing factors. In *Seminars in Orthodontics* 2018;24(2):233-241.
3. Klingberg G, Broberg AG. Dental fear/anxiety and dental behaviour management problems in children and adolescents: a review of prevalence and concomitant psychological factors. *Int J P aediatric dentistry* 2007;17(6):391-406.
4. 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.
5. Appukkuttan DP. Strategies to manage patients with dental anxiety and dental phobia: literature review. *Clinical, cosmetic and investigational dentistry* 2016;8:35.
6. Coulthard P: Conscious sedation guidance. *Evid Based Dent* 2006, 7:90-1.
7. Nardarajah D, Dhanraj M, Jain AR. Effects of lavender aromatherapy on anxiety levels of patients undergoing mandibular third molar extraction. *Drug Intervention Today* 2018;18(30):18-30.
8. Venkataramana M, Pratap KV, 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.
9. Humphris GM, Freeman R, Campbell J, Tuutti H, D'souza V. Further evidence for the reliability and validity of the Modified Dental Anxiety Scale. *IDJ* 2000;50(6):367-70.
10. Tellez M, Kinner DG, Heimberg RG, Lim S, Ismail AI. Prevalence and correlates of dental anxiety in patients seeking dental care. *Community Dent Oral Epidemiol* 2015;43(2):135-42.
11. López V, Nielsen B, Solas M, Ramírez MJ, Jäger AK. Exploring Pharmacological Mechanisms of Lavender (*Lavandula angustifolia*) Essential Oil on Central Nervous System Targets. *Front Pharmacol* 2017;8:280.
12. Muzzarelli L, Force M, Sebold M. Aromatherapy and reducing preprocedural anxiety: A controlled prospective study. *Gastroenterol Nurs* 2006;29:466-71.
13. Dias P, Pedro LG, Pereira OR, Sousa MJ. Aromatherapy in the control of stress and anxiety. *Alternative and Integrative Medicine* 2017;6:1-5.
14. Barati F, Nasiri A, Akbari N, Sharifzadeh G. The Effect of Aromatherapy on Anxiety in Patients. *Nephro-urology Monthly* 2016;8(5):e38347.
15. Akbay Oba A, Dülgergil ÇT, Şaroğlu Sönmez I: Prevalence of dental anxiety in 7 to 11-year old children and its relationship to dental caries. *Med Princ Pract* 2009; 18:453-7.

16. Burnett KM, Solterbeck LA, Strapp CM. Scent and mood state following an anxiety-provoking task. *Psychol Rep* 2004;95(2):707-22.
17. Zahirunnisa 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.
18. Itai T, Amayasu H, Kuribayashi M, et al.: Psychological effects of aromatherapy on chronic hemodialysis patients. *Psychiatry Clin Neurosci* 2000, 54:393-7.
19. Premkumar KS, Syed Aafaque J, Sumalatha S, Narendran N. Effect of aromatherapy on dental anxiety among orthodontic patients: A randomized controlled trial. *Cureus* 2019;11(8):e5306.