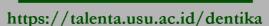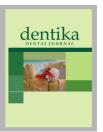# The Effect of Cananga (*Cananga odorata*) Aromatherapy on Anxiety Level of Patients Before Tooth Extraction in RSGM-P USU

(Pengaruh Aromaterapi Kenanga (*Cananga odorata*) Terhadap Tingkat Kecemasan Pasien Sebelum Pencabutan Gigi Posterior di RSGM USU)

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Abstract

Tooth extraction is a form of treatment in dentistry. Tooth extraction has the potential to cause excessive anxiety in patients because patients tend to think about things that will or can happen during the procedure. The purpose of this study was to determine the effect of Cananga aromatherapy (Cananga odorata) on the anxiety level of patients at RSGM USU. This research method is a quasi-experimental study using a re-experimental design non-randomized pretest and posttest control group design. The sample was divided into 2 groups, namely the treatment group and the control group. Each group consists of 16 people who will extract the posterior teeth of the upper and/or lower jaw. The treatment group was given a Cananga aromatherapy nasal inhaler and the control group was given an empty nasal inhaler without Cananga aromatherapy. Blood pressure and pulse measurements were taken twice. The first measurement after the patient was given informed consent and the MDAS questionnaire (Modified Dental Anxiety Scale) and the second measurement after inhaling the Cananga aromatherapy nasal inhaler and empty nasal inhaler without Cananga aromatherapy within 10 cm from the nasal cavity for 5 minutes. The results of this study were analyzed using the Wilcoxon and Mann-Whitney tests. In the treatment group, there was a significant decrease in blood pressure and pulse compared to the control group with a value of p = 0.000 <0.005. This study concludes that Cananga aromatherapy is effective in reducing the anxiety level of patients before tooth extraction in RSGM USU.

Keywords: tooth extraction, aromatherapy, cananga essential oil, dental anxiety scale, blood pressure

Abstrak

Pencabutan gigi merupakan salah satu tindakan perawatan dalam bidang kedokteran gigi. Tindakan pencabutan gigi berpotensi menimbulkan kecemasan berlebih pada pasien karena pasien cenderung memikirkan hal-hal yang akan atau dapat terjadi selama prosedur berlangsung. Tujuan dari penelitian ini adalah mengetahui pengaruh pemberian aromaterapi kenanga (*Cananga odorata*) terhadap tingkat kecemasan pasien di RSGM USU. Metode penelitian ini adalah penelitian eksperimental quasi dengan menggunakan rancangan eksperimental ulang *non-randomized pretest and posttest control group design*. Sampel dibagi menjadi 2 kelompok, yaitu kelompok perlakuan dan kelompok kontrol. Setiap kelompok terdiri dari 16 orang yang akan melakukan ekstraksi gigi posterior rahang atas dan atau rahang bawah. Pada kelompok perlakuan diberikan *nasal inhaler* aromaterapi kenanga dan kelompok kontrol diberikan *nasal inhaler* kosong tanpa aromaterapi kenanga. Pengukuran tekanan darah dan denyut nadi dilakukan dua kali. Pengukuran pertama setelah pasien diberikan *informed consent* dan kuisioner MDAS (*Modified Dental Anxiety Scale*) dan pengukuran kedua setelah menghirup *nasal inhaler* aromaterapi kenanga dan *nasal inhaler* kosong tanpa aromaterapi kenanga dalam jarak 10 cm dari rongga hidung selama 5 menit. Hasil penelitian ini dianalisi menggunakan uji *Wilcoxon* dan *Mann-Whitney*. Pada kelompok perlakuan terjadi penurunan tekanan darah dan denyut nadi yang bermakna dibandingkan kelompok kontrol dengan nilai p = 0,000<0,005. Kesimpulan penelitian ini adalah aromaterapi kenanga efektif menurunkan tingkat kecemasan pasien sebelum pencabutan gigi di RSGM USU.

Kata kunci: pencabutan gigi, aromaterapi, minyak esensial kenanga, scala kecemasan dental, tekanan darah

INTRODUCTION

Tooth extraction is a minor surgical procedure that involves the hard and soft tissues of the oral cavity.[1] The main reasons for tooth extraction are caries, periodontal disease, orthodontic treatment, trauma, and prosthetic procedures. Tooth extraction is the last option when the patient's teeth have been damaged and cannot be treated anymore.[2] Research conducted by Fithri et al. In 2014 found that the most commonly extracted teeth were posterior teeth with the order of mandibular first molars, mandibular third molars, maxillary first molars, mandibular second molars, maxillary first premolar, maxillary second premolar, mandibular first premolar, second premolar. Mandible, maxillary second molar, maxillary third molar.[3]

Based on research conducted by Wardle, shows that the act of extracting teeth is the first trigger of a person's anxiety. Tooth extraction has the potential to cause excessive anxiety in patients because patients tend to think about things that will or can happen during the tooth extraction procedure. Patients who are about to undergo tooth extraction tend to experience an increase in blood pressure and pulse due to the anxiety that occurs.[3] Anxiety that arises during a tooth extraction procedure can interfere with the smooth running of the procedure and prolong the duration of the tooth extraction procedure.[4,5]

Several previous studies have shown that inhalation therapy using natural ingredients with aromatic potency, better known as aromatherapy, can help reduce a person's anxiety level.[6] Aromatherapy is known to have therapeutic potential in overcoming anxiety, one of which is Cananga aromatherapy because it has the highest effect of reducing anxiety levels.[7] The benefits of Cananga aromatherapy (Cananga odorata) come from the chemical compounds contained therein. Linalool is the main active ingredient that has anti-anxiety and relaxing effects. In addition, the effect of eugenol, which is only present in Cananga aromatherapy, has a better effect on lowering blood pressure due to the relaxing effect it receives through the limbic system, where the effect of aroma affects these systems via the olfactory pathway.[8,9]

MATERIALS AND METHODS

This research is a quasi-experimental study using a non-randomized pretest-posttest control group design. Sampling was done by using non-probability sampling with purposive sampling technique. The sample was divided into 2 sample groups, each group consisting of 16 patients who will perform maxillary and/or mandibular posterior tooth extraction at RSGM USU. Health Research Ethical Committee of the Medical faculty Universitas Sumatera Utara approved this study (No. 251/DATE/KEPK/FKUSU -RSUP HAM/2020)

The sample of this research is those that meet the inclusion criteria and are not included in the exclusion criteria. The inclusion criteria in this study were patients who had maxillary and/or mandibular posterior tooth extraction, cooperative patients, patients aged 21-45 years, patients who did not have systemic disease, patients who had a Modified Dental Anxiety Scale (MDAS) between low levels (5-11) to moderate levels (12-18), the patient does not take sedatives, the patient does not have respiratory problems or disorders, the patient is without smell disorders, the patient does not consume caffeinated food or drinks before coming to the clinic. The exclusion criteria included patients who had met the inclusion criteria but did not follow the provisions of the Cananga aromatherapy inhalation technique according to the study procedure.

The treatment group was given a nasal inhaler that had been dripped with Canangabaromatherapy and the control group was given an empty nasal inhaler without Cananga aromatherapy. Making Cananga aromatherapy is by pouring 1 ml of Cananga aromatherapy into the nasal inhaler.[10] Then wait for 5 minutes for each group. Blood pressure and pulse measurements were taken twice. The first measurement of blood pressure and pulse after the patient was given informed consent and the Modified Dental Anxiety Scale (MDAS) questionnaire and the second measurement was 5 minutes after giving Cananga aromatherapy and empty nasal inhalers without Cananga aromatherapy. Data processing was performed by computer analysis using the Wilcoxon and Mann-Whitney tests.

RESULTS

Distribution of patient frequency based on age, MDAS score, and tooth type. Based on Table 1, it can be seen that the highest age group is 21-25 years old as many as 25 people (78.1%), followed by the 41-45 years age group with 4 people (12.5%), 31-35 years old group. as many as 2 people (12.5%), and then in the 26-30 years age group as many as 1 person (3.1%).

Based on Table 2, it can be seen that the highest gender was 18 women (56.25%) than men (44.75%). Based on Table 3, it can be seen that the highest MDAS score is mild MDAS score of 18 people (56.25%) then the moderate MDAS score is 14

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people (43.75%). Based on Table 4, it can be seen that the highest type of tooth was mandibular first molars of 14 people (43.8%), followed by 8 maxillary molars (25%), mandibular second molars of 5 people (15.6%), and 1 maxillary premolar as many as 3 people (9.4%). Blood pressure and pulse rate of research subjects before and after giving Cananga aromatherapy can be seen in Table 5.

Based on Tables 5 and 6, the treatment group for systolic blood pressure, diastolic blood pressure, and pulse has a value of $p < 0.05$, which means that there is a significant difference in blood pressure and pulse before and after treatment. Based on Tables 7 and 8, the control group for systolic blood pressure, diastolic blood pressure, and pulse has a value of $p < 0.05$, which means that there is a significant difference in blood pressure and pulse before and after treatment. After obtaining the difference in blood pressure and pulse rate of research subjects before and after treatment, the data normality test was carried out. Then to compare the treatment and control groups, the Mann-Whitney test was performed.

Based on Tables 9, 10, and 11, it can be seen that the P-value is the difference between blood pressure and pulse of the treatment group and the control group is <0.001. This means that there is a significant difference in decreasing blood pressure and pulse rate in the treatment group and the control group.

DISCUSSION

Based on the results of a study conducted on 32 patients with posterior tooth extraction at RSGM USU, there were differences in blood pressure and pulse rate between patients who were given a Cananga aromatherapy nasal inhaler and one who was given an empty nasal inhaler without a Cananga aromatherapy. The test results analyzed using the Wilcoxon and Mann-Whitney tests showed that Cananga aromatherapy was effective in reducing anxiety levels as assessed by decreasing blood pressure and pulse before tooth extraction.

The effect of Cananga aromatherapy on decreasing blood pressure and pulse rate can be seen from the results of measurements in the treatment group which showed a significant change in the mean systolic blood pressure from 119.06 mmHg to 110.62 mmHg and the mean diastolic blood pressure from 78.12 mmHg to 69.06 mmHg. The average pulse rate also decreased from 81.68 to 74.56. In the control group, the mean systolic blood pressure increased significantly from 111.25 mmHg to 116.25 mmHg, the mean diastolic blood pressure from 72.50 mmHg to 80.62 mmHg, and the mean pulse rate from 77.87 to 80.62. This increase in systolic, diastolic, and pulse blood pressure can occur due to the anxiety experienced before tooth extraction.

This is in accordance with research conducted by Swayoga AAM in 2019 which consisted of 90 research subjects which were divided into 2 groups, namely the treatment group and the control group. The results showed a significant decrease in blood pressure and pulse rate in the treatment group where systolic blood pressure had a mean reduction of 3.6 mmHg, diastolic blood pressure of 2.6 mmHg, and pulse rate of 5.4 x / minute. In the control group, there was a significant increase in blood pressure and pulse rate where systolic blood pressure had an average increase of 3.3 mmHg, diastolic blood pressure of 1 mmHg, and a pulse rate of 2.4 x / minute. Shaleha, Hendra, Parjo in 2016 also showed that Ylang aromatherapy significantly reduced systolic and diastolic blood pressure with a P-value <0.05. Linalool and eugenol can lower blood pressure and pulse by inhibiting the production of Adreno Corticotropic Hormone (ACTH) which is a hormone that causes anxiety in individuals.[11]

The anxiety felt by the patient is related to the treatment, tooth extraction to be performed, or the equipment used for the treatment. The room and clinic atmosphere can also affect patient anxiety. Another factor that can increase the anxiety of patients in the control group is the absence of previous tooth extraction experiences.[13]

Based on age, the age distribution of respondents who experienced the most anxiety was in the 21-25 years age group. The results of this study are in line with research conducted by Fazriah et al in 2019 regarding differences in anxiety based on gender in the act of filling teeth which states that the highest anxiety is in the 18-25 years age group. this occurs because anxiety disorders are more easily experienced by someone younger than older people. Young people are more prone to anxiety because of their immature mental and mental readiness and inexperience.[14]

Meanwhile, based on gender, the dental anxiety level was higher in female respondents than male respondents. This is in accordance with research conducted by Yildirim et al in Diyarbakir, Turkey which states that dental anxiety is significantly higher in female than male, this is because women have more sensitive emotions which will affect their feelings of anxiety.[14]

Anxiety will respond with several changes in the body, especially in vital signs. Changes can include an increase in blood pressure, pulse, and respiration.

Anxiety will stimulate a hormonal response from the hypothalamus which will release CRF (Corticotropin Hormone). These hormones will stimulate adrenal cortex to release cortisol into the blood circulation. Increased levels of cortisol in the blood will increase plasma renin, angiotensin II and an increase in the sensitivity of blood vessels to catecholamines, increasing blood pressure.[12,13]

The adrenal glands secrete catecholamines and autonomic nerves are stimulated when a person experiences anxiety. This is evidenced by the finding of increased catecholamines in plasma in hypertensive patients. It is strengthened when the sympathetic nervous system stimulates the blood vessels in response to emotional excitement and anxiety, the adrenal glands are also stimulated and secrete epinephrine, resulting in vasoconstriction of blood vessels. Activation of the sympathetic nerves results in an active adrenal medulla and releases epinephrine and norepinephrine into the blood. Epinephrine and norepinephrine play a role in increasing blood pressure and heart rate. Research by Iksan et al in 2012 explained that someone who experiences anxiety causes faster blood pumping to the heart so that the heart works faster and results in an increase in blood pressure.[15,16,17]

Aromatherapy is a therapeutic action using essential oils or essential oils that are useful for improving a person's physical and psychological state to be better. The benefits of aromatherapy are that it can foster a feeling of calm or relaxation in body, mind, and spirit (soothing the physical, mental, and spiritual), can create a peaceful atmosphere, and can keep feelings of anxiety. Aromatherapy, which is performed using inhalation techniques using essential oils or essential oils, is known to have the potential to increase awareness and reduce anxiety. This is because the aromatic molecules contained in essential oils or essential oils have the potential to inhibit the secretion of Adreno Corticotriphic Hormone (ACTH) which is a hormone that causes anxiety in individuals. Sixteen several previous studies have shown that inhalation therapy uses natural ingredients with aromatic potential or better known as aromatherapy, can reduce a person's anxiety level. Inhalation therapy is known to have a strong effect on the sensory organs because the sense of smell in humans has a sharper and more sensitive level of sensitivity. The acuity of the sense of smell can be up to 10,000 times stronger than the sense of taste.[6]

Linalool is the main active ingredient that has anti-anxiety and relaxing effects. Linalool has been known to provide a relaxing effect on the body so that giving Cananga aromatherapy can lower blood pressure and pulse. In addition, the effect of eugenol which is only found in Cananga aromatherapy provides a better effect on lowering blood pressure due to the relaxing effect it receives through the limbic system, where the aroma effect of Cananga essential oil content affects these systems through the olfactory pathway.[8,9]

In conclusion, from the results of the research and data analysis above, it can be concluded that Cananga aromatherapy is effective in reducing anxiety levels seen from the difference in blood pressure and pulse rate between patients who were given Cananga essential oil aromatherapy and patients who were not given Cananga essential oil aromatherapy before the posterior tooth extraction was carried out at RSGM USU.

TABLES

Table 1. Distribution of subjects by age

Age	N	%
21-25	25	78.1
26-30	1	3.1
31-35	2	6.3
41-45	4	12.5
Total	32	100

Table 2. Distribution of research subjects based on gender

Gender	N	%
Male	14	43.75
Female	18	56.25
Total	32	100

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Table 3. Distribution of subjects based on MDAS (Modified Dental Anxiety Scale) scores.

MDAS	N	%
Mild	18	56.25
Moderate	14	43.75
Total	32	100

Table 4. Distribution of subjects based on tooth type.

Tooth Type	N	%
Mandibular 1st Molar	14	43.8
Maxilla 1st Molar	8	25
Mandibular 2nd Molar	5	15.6
Maxilla 1st Premolar	3	9.4
Maxilla 2nd Premolar	2	6.3
Total	32	100

Table 5. Mean blood pressure before and after in the treatment group

Blood Pressure	N	Mean±SD (mmHg)	P-*Value*
Pressure systolic pretest	16	119.06±6.88	
Pressure systolic posttest	16	110.62±7.50	$P = 0.000 < 0.05$
Pressure diastolic pretest	16	78.12±4.03	
Pressure diastolic posttest	16	69.06±2.71	$P = 0.000 < 0.05$

Table 6. Mean pulse rate before and after in the treatment group.

Pulse Rate	N	Mean±SD	P-*Value*
Pulse rate pretest	16	81.68±8.77	
Pulse rate posttest	16	74.56±8.54	$P = 0.000 < 0.05$

Table 7. Mean blood pressure before and after in the control group

Blood Pressure	N	Mean±SD (mmHg)	P-*Value*
Pressure systolic pretest	16	111.25±7.18	
Pressure systolic posttest	16	116.25±5.32	P = 0.000 < 0.05
Pressure diastolic pretest	16	72.50±4.47	
Pressure diastolic posttest	16	80.62±6.55	P = 0.000 < 0.05

Table 8. Mean pulse rate before and after in the control group

Pulse Rates	N	Mean±SD	P-*Value*
Pulse rate pretest	16	77.87±7.08	
Pulse rate posttest	16	80.62±6.55	P = 0.000 < 0.05

Table 9. The difference in systolic blood pressure in the treatment and control groups

Difference Systolic Blood Pressure		P-*Value*
Treatment Group	Control Group	
-8.67	4.69	P = 0.000 < 0.05

Table 10. The difference in diastolic blood pressure values in the treatment and control groups

Difference Diastolic Blood Pressure		P-*Value*
Treatment Group	Control Group	
-9.00	8.13	P = 0.000 < 0.05

Table 11. The difference in pulse rates in the treatment and control groups

Difference Pulse Rates		P-*Value*
Treatment Group	Control Group	
-7.07	2.75	P = 0.000 < 0.05

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