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The Effectiveness of Lemon Aromatherapy in Reducing Pregnant Women's Anxiety Before Childbirth

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ABSTRACT

Anxiety approaching labour is a common phenomenon experienced by many pregnant women, particularly those giving birth for the first time. A high level of anxiety can negatively affect the labour process, leading to less effective contractions and prolonged delivery time. The objective of this study was to determine the effectiveness of lemon aromatherapy in reducing anxiety in pregnant women approaching childbirth at PMB Lismarini, Palembang. The study employed a quasi-experimental design with a one-group pretest–posttest approach and was conducted at PMB Lismarini, Palembang. The population consisted of all third-trimester pregnant women who were not allergic to essential oils. A total of 20 respondents were selected using a total sampling technique. Data analysis was performed using the Wilcoxon signed-rank test. The results showed a p-value of 0.002, indicating that lemon aromatherapy significantly reduced anxiety levels in pregnant women. It can be concluded that lemon aromatherapy has an effect on reducing anxiety in pregnant women before childbirth. Further research with a larger sample size, more rigorous study design, and comparisons with other types of aromatherapy is recommended to confirm its effectiveness.

Keywords: Aromatherapy, Lemon, Pregnant Women, Anxiety.

ABSTRAK

Kecemasan menjelang persalinan adalah fenomena umum yang dialami oleh banyak wanita hamil, terutama mereka yang baru pertama kali melahirkan. Tingkat kecemasan yang tinggi dapat berdampak negatif pada proses persalinan, menyebabkan kontraksi yang kurang efektif dan waktu persalinan yang lama. Tujuan dari penelitian ini adalah untuk mengetahui efektivitas aromaterapi lemon dalam mengurangi kecemasan pada ibu hamil menjelang persalinan di PMB Lismarini, Palembang. Penelitian ini menggunakan desain quasi eksperimental dengan pendekatan one-group pretest-posttest dan dilakukan di PMB Lismarini, Palembang. Populasi penelitian ini adalah seluruh ibu hamil trimester ketiga yang tidak alergi terhadap minyak atsiri. Sebanyak 20 responden dipilih dengan menggunakan teknik total sampling. Analisis data dilakukan dengan menggunakan uji peringkat bertanda Wilcoxon. Hasil penelitian menunjukkan nilai p-value sebesar 0,002, yang menunjukkan bahwa aromaterapi lemon secara signifikan menurunkan tingkat kecemasan pada ibu hamil. Dapat disimpulkan bahwa aromaterapi lemon berpengaruh terhadap penurunan kecemasan pada ibu hamil menjelang persalinan. Penelitian lebih lanjut dengan jumlah sampel yang lebih besar, desain penelitian yang lebih ketat, dan perbandingan dengan jenis aromaterapi lainnya disarankan untuk memastikan keefektifannya.

Kata kunci: Aromaterapi, Lemon, Ibu Hamil, Kecemasan.

INTRODUCTION

Pregnancy is a natural process experienced by every mother, but throughout the pregnancy, various challenges can arise that pose a risk to both the mother and the fetus. These challenges can range from mild disorders due to physiological changes to serious complications that require medical intervention. These problems can occur at any stage of pregnancy, from the first trimester to the third trimester (Murdayah, Lilis, & Lovita, 2021) .

The third trimester of pregnancy is a period full of preparation for birth. At this stage, the mother's attention is more focused on the growing fetus. Fetal movements and uterine growth are reminders that birth is getting closer. This often makes the mother more protective of her baby, more prepared for birth, and raises various speculations about the sex or appearance of the baby to be born (Rukiyah & Yulianti, 2010).

During pregnancy, mothers experience various significant changes, both physically and psychologically. In the third trimester, common physical changes include back pain, breast swelling, constipation, respiratory problems, frequent urination, difficulty sleeping, varicose veins, abdominal contractions, leg swelling, cramps, and increased vaginal discharge. Meanwhile, psychological changes that often occur include feelings of discomfort with physical conditions, feeling less attractive, fear of pain, anxiety before childbirth, and concerns about financial conditions. In addition, prospective mothers can also experience anxiety about the birth of a baby and the transition to a new phase in their lives (Atifah et al., 2021).

Excessive anxiety can give impact negative for health mother and baby. A number of study show that level high anxiety can trigger improvement production hormone stress, such as cortisol and adrenaline, which have the potential interfere with the labor process as well as to worsen condition Mother (Cunningham et al., 2018). Research conducted by Brunton et al. (2015) also revealed that excessive anxiety related with increasing risk preeclampsia, complications labor like bleeding, as well as duration longer and more difficult labor. In addition, high anxiety can impact on the decline quality Sleep mother, improve perception painful moment childbirth , as well as slow down the recovery process post give birth to.

Non-pharmacological approaches in therapy complementary, such as acupuncture, massage, relaxation, aromatherapy, and therapy music, become one of alternatives that can used for help mother pregnant overcome anxiety approaching childbirth. Aromatherapy functions to calm the nervous system, reduce stress hormone levels, and enhance comfort and relaxation (Nan et al., 2013; Soares et al., 2021).

One of the increasingly advanced and widely applied methods is aromatherapy. This therapy utilizes essential oils extracted from plants to provide a calming effect, promote relaxation, and support psychological well-being. Lemon essential oil (*Citrus limon*) is one type that has been proven effective in helping to alleviate anxiety (Rambod et al., 2020; Agarwal et al., 2022). Lemon essential oil has a fresh aroma that can stimulate the limbic system of the brain, which plays a role in regulating emotions and responses to stress. Previous studies have shown that the scent of lemon can reduce cortisol levels, the hormone associated with stress, while also improving mood. Therefore, lemon aromatherapy has great potential as an intervention method to address anxiety in pregnant women before childbirth (Hamdayani, 2018)

The benefits of lemon aromatherapy have been lots discussed, research that is special evaluate its influence to anxiety Mother pregnant approaching labor Still limited. Therefore that, research this aiming For to study effectiveness lemon aromatherapy in lower level anxiety in mother pregnant approaching delivery. It is expected that the results study this can contribute in development safe and effective non-pharmacological approaches use support maternal mental health pregnant. This study aims to determine the effectiveness of lemon aromatherapy in reducing anxiety in pregnant women before childbirth at PMB Lismarini Palembang.

RESEARCH METHODS

This research employed a quantitative design using a pre-experimental method with a one-group pretest–posttest approach. A pretest was conducted prior to the administration of lemon aromatherapy, and a posttest was conducted afterwards. Aromatherapy was administered through direct inhalation using a handkerchief. The method involved applying five drops of lemon essential oil onto a handkerchief, which was then inhaled directly. This approach is considered

effective as it allows the essential oil molecules to enter the respiratory system quickly, promoting relaxation and a calming effect.

Primary data were used in this study. Data analysis was conducted using non-parametric statistical methods, specifically the Wilcoxon signed-rank test. The measurement tool used was the Pregnancy-Related Anxiety Questionnaire (PRAQ), which categorises anxiety levels into low, mild, and high. The study population consisted of pregnant women in their third trimester (32–36 weeks of gestation) who were not allergic to essential oils, had no psychological disorders, and had not previously experienced severe anxiety. A total of 20 participants met the criteria. The sampling technique used was total sampling, resulting in a sample size of 20. Both univariate and bivariate analyses were conducted, and the Wilcoxon test was used for statistical analysis. This study received ethical approval under the number 022/KEP/I/2025.

RESULTS

Table 1. Frequency and Percentage Distribution Characteristics Respondents.

Characteristics	Frequency (f)	Percentage (%)
Age		
< 20 years	6	30
20-35 years	12	60
> 35 years	2	10
Education level		
< High School	11	55
≥ High School	9	45
Job		
Work	9	45
Doesn't work	11	55
Anxiety level		
Low	5	25
Currently	14	70
Tall	1	5

Table 1 shows that the respondents with the ages of 20-35 years (60%), education level < high school (55%), not work (55%) and have moderate anxiety (70%).

Table 2. Influence Lemon Aromatherapy in Reduce Anxiety Pregnant Women Face Labor.

Anxiety level	Mean	SD	p-value
Pretest	56.75	0.714	0.002
Posttest	46.20	0.526	

Table 2 shows that the obtained average level result anxiety before giving aromatherapy at 56.75 or including category anxiety moderate, while the average level anxiety after given aromatherapy decrease to 46.20 or including category anxiety low. P-value obtained which is 0.002, meaning there is influence giving lemon aromatherapy in reduce anxiety in mother pregnant.

DISCUSSION

Aromatherapy is a widely used complementary therapy to enhance psychological well-being and reduce anxiety. Aromatherapy works by stimulating the central nervous system, primarily through the olfactory pathway, which is directly connected to the limbic system in the brain (Nan et al., 2013; Soares et al., 2021). The limbic system plays a crucial role in regulating emotions, including anxiety and stress (Lee et al., 2017; Hedigan, Sheridan & Sasse, 2023; Yoo, & Park, 2023). Essential oils from various plants contain bioactive components that provide relaxation effects. Lemon essential oil (*Citrus limon*), for instance, contains compounds such as limonene and β-pinene, which have anxiolytic (anxiety-reducing) properties (Rambod et al., 2020; Agarwal et al., 2022). The scent of lemon has been shown to lower cortisol levels, a hormone associated with the stress response, while also increasing neurotransmitters, such as serotonin and dopamine, which contribute to feelings of calmness and comfort (Hamdayani, 2018). The

exposure to lemon essential oil significantly reduced physiological markers of stress, such as blood pressure and heart rate variability, further supporting its role in anxiety reduction.

The results of this study show that the administration of lemon aromatherapy has a significant effect on reducing anxiety in pregnant women, with a p-value of 0.02. These findings are consistent with previous studies examining the effects of lemon aromatherapy (Lilis, 2019; Claudia, & Rasyid, 2021; Sirkeci, Cagan, & Koc, 2023). Similarly to research conducted by Meylin et al., (2024), which examines the effect of lemon aromatherapy on anxiety in postpartum women at PMB Wulan Mardikaningtyas Kartasura (Meylin, Prastiyoningsih, & Widyastuti, 2024). This study used a pre-experimental design with a one-group pretest-posttest approach. The results demonstrated that the administration of lemon aromatherapy significantly reduced anxiety levels in postpartum mothers, with a p-value < 0.05 (Meylin, Prastiyoningsih, & Widyastuti, 2024). Citrus-based aromatherapy, including lemon, has a beneficial impact on perinatal anxiety by modulating hormonal and neurological pathways (Ghods et al., 2022; Mohammadi et al., 2022).

Anxiety before labor is a feeling of fear, worry, or tension experienced by pregnant women as they approach childbirth. This anxiety can range from mild to severe and may impact both the physical and psychological well-being of the mother. It is a natural response to uncertainty, pain, and the significant life changes that childbirth brings. Several factors can trigger anxiety before labor, including physical, psychological, and social aspects. One of the main causes is the fear of pain during the labor process. Many pregnant women, especially first-time mothers, feel anxious due to their lack of experience and uncertainty about the intensity of pain they will endure (Malouf et al., 2024).

Lemon aromatherapy is a therapeutic method that utilizes essential oils extracted from the peel of lemons (*Citrus limon*). This oil has a fresh aroma and is well-known for its calming effects. One of its primary components, limonene, has been shown in various studies to have anxiolytic properties, helping to reduce anxiety (Eddin et al., 2021; Chen et al., 2024). When the scent of lemon is inhaled, the molecules from the essential oil stimulate olfactory receptors in the nose. These signals are then transmitted to the limbic system in the brain, which is responsible for regulating emotions and stress responses. The limbic system plays a key role in controlling feelings of anxiety, fear, and stress, so stimulation by the scent of lemon can help create a sense of calm and relaxation (Bhatia-Dey, & Heinbockel, 2020; Stark, 2024).

In pregnant women, lemon aromatherapy works by stimulating the brain's limbic system, which regulates emotions. When inhaled, olfactory receptors send signals to the brain, triggering a relaxation response and suppressing the activity of the sympathetic nervous system (Lin et al., 2021). This process helps alleviate anxiety symptoms such as increased heart rate, shortness of breath, and muscle tension. The findings of this study further support the effectiveness of lemon aromatherapy in managing anxiety before labor. Given its mechanism of action, stimulating the limbic system, exerting anxiolytic effects through limonene, regulating the autonomic nervous system, improving sleep quality, and enhancing mood, lemon aromatherapy is a promising non-pharmacological intervention to help pregnant women feel calmer, more relaxed, and better prepared for childbirth.

CONCLUSION

Following a study involving 20 mothers in their third trimester of pregnancy who experienced anxiety prior to childbirth, it can be concluded that lemon aromatherapy has an effect on reducing anxiety levels in pregnant women at PMB Lismarini, Palembang. Further research on the effects of lemon aromatherapy on maternal anxiety should be conducted using more rigorous experimental designs, such as Randomised Controlled Trials (RCTs), to enhance the validity of the findings. Additionally, it is important to explore the long-term effects of aromatherapy and various methods of administration, such as diffusion or direct inhalation.

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