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THE EFFECT OF COMBINATION RELAX TECHNIQUE AND BASIL AROMATHERAPHY FOR HANDLING ON ANXIETY, DYSMENORRHEA PAIN AND MENSTRUAL PATTERNS IN ADOLESCENT

Pengaruh Pemberian Kombinasi Teknik Relax dan Aromaterapi Daun Kemangi untuk Penanganan Kecemasan, Nyeri Dismenore dan Pola Menstruasi Pada Remaja

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ABSTRAK

Di usia remaja kecemasan memengaruhi beberapa sistem reproduksi seperti terjadinya disminorea dan mengganggu pola menstruasi. Teknik Relax merupakan terapi alternative berisi self-talk dan deep breathing exercise yang akan dikombinasikan dengan pemberian aromaterapi daun kemangi. Kandungan minyak atsiri dipercaya mampu menjadi perantara antidepresan. Penelitian ini bertujuan untuk mengetahui pengaruh pemberian terapi Relax yang dikombinasikan dengan aromaterapi daun kemangi. Penelitian ini menggunakan jenis penelitian true eksperimen dengan pre and post two groups design. Responden merupakan remaja putri berusia 15-19 tahun dengan jumlah 64, dibagi menjadi 3 kelompok perlakuan dan 1 kelompok kontrol. Analisis hasil penelitian menggunakan uji Wilcoxon, Kruskal Wallis dan Man-Whitney. Hasil analisis pemberian Teknik Relax didapatkan kecemasan (p=0.005), dysmenorrhea (p=0.038), pola menstruasi (p=0.001) yang berarti terdapat pengaruh pemberian Teknik Relax untuk menurunkan kecemasan, dysmenorrhea dan pola menstruasi. Hasil analisis kombinasi Teknik Relax dan aromaterapi daun kemangi didapatkan kecemasan (p=0.001), dysmenorrhea (p=0.000) berarti terdapat pengaruh terapi kombinasi terhadap kecemasan dan nyeri dysmenorrhea sedangkan untuk pola menstruasi (p=0.194) tidak ada pengaruh pemberian terapi kombinasi terhadap pola menstruasi. Sehingga disimpulkan bahwa teknik Relax yang dikombinasikan dengan aromaterapi kemangi efektif mengatasi kecemasan dan nyeri disminorea tetapi tidak efektif pada pola menstruasi. Hasil uji Mann-Whitney menunjukkan tidak ada perbedaan signifikan antara kedua terapi dalam mengurangi kecemasan (p=0,539) dan dismenore (p=0,527), yang menunjukkan efektivitas yang sebanding. Namun terdapat perbedaan signifikan untuk pola menstruasi (p=0,003) pada terapi Relax. Dapat disimpulkan kedua terapi berpengaruh terhadap kecemasan dan dysmenorrhea tetapi hanya terapi Relax yang berpengaruh pada pola menstruasi.

***Kata kunci**: aromaterapi daun kemangi, dismenore, kecemasan, pola menstruasi, remaja, terapi relax*

ABSTRACT

Anxiety in adolescents affects several reproductive systems, such as causing dysmenorrhea and disrupting menstrual patterns. The Relax Technique, as used here, involves self-talk therapy and deep breathing exercises. When combined with basil aromatherapy, this technique includes inhaling basil essential oil, which is believed to have antidepressant properties. This study aims to determine the effect of the relax technique with and without basil aromatherapy. A true experimental research design was

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used, consisting of a pre- and post-two-group setup. Respondents included 64 female adolescents aged 15–18 years, divided into three treatment groups and one control group. Analysis was conducted using the Wilcoxon, Kruskal-Wallis, and Mann-Whitney tests. Results showed that providing the Relax Technique alone affected anxiety (p = 0.005), dysmenorrhea (p = 0.038), and menstrual patterns (p = 0.001), indicating an effect on reducing anxiety and dysmenorrhea and improving menstrual patterns. The combination of the Relax Technique and basil aromatherapy showed effects on anxiety (p = 0.001) and dysmenorrhea (p = 0.000), meaning it reduced anxiety and dysmenorrhea pain; there was no effect on menstrual patterns (p = 0.194). Therefore, the combined technique is effective for anxiety and dysmenorrhea, but not for menstrual patterns. The Mann-Whitney test showed no significant difference between the two therapies in reducing anxiety (p = 0.539) and dysmenorrhea (p = 0.527), indicating comparable effectiveness. However, there was a significant difference in menstrual patterns (p = 0.003) with the Relax Technique. In conclusion, both therapies affect anxiety and dysmenorrhea, but the Relax Technique affects menstrual patterns.

Keywords: Adolescents, Anxiety, Basil Leaf Aromatherapy, Dysmenorrhea, Menstrual Patterns, Relax Therapy

INTRODUCTION

Adolescence is a transition period from childhood to adulthood, during which physical and psychological changes occur, Adolescents are the age group most susceptible to stress and anxiety [1][2]. Anxiety is another common concern among adolescents, often influencing their menstrual cycle. World Health Organization (WHO) data indicated that anxiety disorders surged in 2021, with cases rising from 53.2 million to 76.2 million, predominantly affecting women (51.8 million cases) compared to men (24.4 million cases). Anxiety levels were found to be highest among individuals aged 20-24 years, with an additional 1,331 cases per 100,000 population [3][4]. National statistics also highlighted a concerning trend: in 2020, 58% of Indonesians reported experiencing anxiety disorders, with adolescent cases reaching 47.7% in 2021. A 2023 survey by the National Adolescent Mental Health Survey (I-NAMHS) found that 15.5 million Indonesian adolescents suffered from mental health conditions, including anxiety disorders. In East Java alone, the prevalence of anxiety reached 7.5% [5].

A preliminary survey at Amanah Husada Health Vocational School, Batu City, showed that nearly 80% of students experienced anxiety disorders, with female students being more affected (56%). Persistent anxiety in adolescents can lead to decreased immunity, digestive and respiratory disorders, central nervous system disturbances, and reduced academic performance [6]. The brain's susceptibility to anxiety during this period is linked to the asynchronous development of brain functional systems related to anxiety [7]. Specific stressors that occur during puberty such as menstrual symptoms, menstrual deficits, and difficulty with activities are associated with depression and anxiety [8].

Dysmenorrhea is a common gynecological obstacle felt by women of all ages, including teenagers. It is estimated that women in the United States lose 1.7 million working days each month due to the impact of dysmenorrhea [9]. WHO in 2020 found that 1,769,425 of women in the world experienced severe dysmenorrhea [10] based on World Health Ogranization report in Cristiana, *et al* (2023) prevalence of dysmenorrhea in Indonesia was 107,673 people (64.25%), consisting of 59,671 people (54.89%) experiencing primary dysmenorrhea and 9,496 people (9.36%) experiencing secondary dysmenorrhea [11]. Based on Survei Survey Kesehatan Reproduksi Remaja (SKRR) East Java Province in Cristiana, *et al* (2023) 4,653 adolescents with experienced dysmenorrhea, primary dysmenorrhea was 4,297 (90.25%) and the others experienced secondary dysmenorrhea as many as 365 people (9.75%) [11]. In a preliminary study conducted, it was found that 53 students (46%) experienced dysmenorrhea every month

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during their menstrual cycle. Adolescent girls who experience dysmenorrhea while studying and experience anxiety can interfere with learning activities, reduce their ability to concentrate on learning, and even have difficulty concentrating so that the material being studied or learned is not well received [12] [13]. Menstrual irregularities, often associated with anxiety, affect a significant portion of the global population. Approximately 50% of menstruating individuals experience [10] irregular cycles [14]. According to the 2018 Basic Health Research Data, 11.7% of Indonesian adolescents reported irregular menstruation, with urban centers recording a higher prevalence (14.9%) [15]. In East Java, 13.3% of women experienced menstrual disturbance [16]. In a preliminary survey study, 50 students (44%) experienced irregular menstruation.

Some therapies for reducing anxiety include relaxation techniques. Relaxation is a technique that helps someone return self-control, focus, and attention so that the person can provide an appropriate response when they are in a situation that is considered threatening [17]. Self-talk can be performed silently or audibly, reinforcing positive affirmations that can influence mental well-being [18]. Deep breathing involves slow, deliberate inhalation and exhalation that stimulate pulmonary stretch receptors, activate the parasympathetic nervous system, and suppress sympathetic activity. Relaxation therapy combines this technique with self-talk and other psychological strategies to reduce anxiety.

This multi-faceted approach is widely utilized in managing psychological distress and enhancing emotional stability [19]. Among botanical remedies, basil (Ocimum basilicum L.) is widely recognized for its broad therapeutic properties. Beyond its culinary use, basil functions as an anti-inflammatory, analgesic, antimicrobial, antifungal, and diuretic agent. Rich in beta-carotene and magnesium, it also supports cardiovascular health. Basil contains diverse bioactive compounds such as flavonoids, saponins, tannins, and essential oils. Its essential oil, the primary active component, exhibits notable anxiolytic effects. Aromatherapy with basil essential oil has been shown to reduce anxiety and fear, providing natural stress relief[20],[21]. The aim of this study was to determine the effectiveness of the combination of “Relax” Therapy and the administration of basil leaf essential oil aromatherapy on anxiety, dysmenorrhea and menstrual patterns in adolescents.

METHODS

Type of research was experimental, using the Quasy Experiment approach aimed at determining the symptoms or effects that arise due to certain treatments and all variables cannot be controlled by the researcher [22]. This study employed a pre–post two-group design using primary data collected through questionnaires administered before and after intervention. Validated and reliable global-standard instruments were applied: the Hamilton Anxiety Rating Scale (HARS), developed by Max Hamilton (1956), to assess anxiety, and the Numeric Rating Scale (NRS), ranging from 0–10, to measure dysmenorrhea pain levels [23].

Relax (Relaxation of Anxiety) is a non-pharmacological therapy combining deep breathing and self-talk. In this study, it was combined with basil (Ocimum basilicum L.) essential oil aromatherapy prepared at the Atsiri Institute of Brawijaya University Malang and phytochemically tested at the Materia Medica Unit, Batu City. Therapy was delivered using 4–5 drops of basil oil diluted in 200 cc of water with a humidifier. The study, conducted from August–September 2024 at Amanah Husada Health Vocational School, Batu City, lasted 40 days. A pre-test was carried out to select respondents using inclusion and exclusion criteria. From a population of 237 female students, 64 adolescents (15–19 years) were recruited via simple random sampling with the Federer formula. Inclusion criteria were willingness to participate, anxiety, dysmenorrhea, or irregular cycles without antidepressant use; exclusion criteria included male students or refusal to participate. To reduce bias, respondents were divided into four groups:

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negative control (R1), positive control (R2), Relax therapy (R3), and Relax + basil aromatherapy (R4). No dropouts occurred. Respondents were divided into 4 groups consisting of,

a. The negative control group (C-) are adolescents without anxiety complaints, normal menstrual patterns, and do not experience dysmenorrhea. (R1)
b. The positive control group (C+) are adolescents with anxiety complaints, abnormal menstrual patterns, and experience dysmenorrhea without being given any treatment (R2)
c. The Treatment Group 1 (T1) are adolescents with anxiety complaints, abnormal menstrual patterns, and experience dysmenorrhea with the provision of "Relax" therapy treatment (R3)
d. The Treatment Group 2 (T2) are adolescents with anxiety complaints, abnormal menstrual patterns, and experience dysmenorrhea with the treatment of "Relax" therapy in combination with Ocimum Basilium Aromatherapy. L. or basil (R4)

The independent variables were Relax therapy and its combination with basil leaf aromatherapy, while the dependent variables were anxiety, dysmenorrhea, and menstrual patterns. Data were analyzed using the Wilcoxon test to compare pre- and post-intervention results, the Kruskal–Wallis test to examine differences across respondents, and the Mann–Whitney test to compare groups, with significance set at $p < 0.05$. Ethical considerations included potential side effects, confidentiality, and informed consent involving parental approval. Ethical clearance was granted by the Ethics Commission of Brawijaya University (No. 327/EC/KEPK/09/2024).

Figure 1. Basil Leaf Distillation Process

Before the intervention was carried out, the researcher conducted a pre-test simultaneously on all respondents on August 12, 2024, then an intervention was carried out on each treatment group, which will be detailed in the table below:

Tabel 1. Table of Intervention Implementation for Treatment Group 1 (P1)

Intervention Date	Intervensi	Intervention Group	Explanation
22 Augst – 29 Augst 2024 23 Augst – 30 Augst 2024 24 Augst – 31 Augst 2024 25 Augst – 1 Sept 2024 26 Augst– 2 Sept 2024 27 Augst – 3 Sept 2024 28 Augst – 4 Sept 2024 29 Augst – 5 Sept 2024 30 Augst – 6 Sept 2024 31 August – 7 Sept 2024 1 Sept – 8 Sept 2024 2 Sept – 9 Sept 2024 3 Sept – 10 Sept 2024 4 Sept – 11 Sept 2024 5 Sept – 12 Sept 2024 6 Sept – 13 Sept 2024	Relax Theraphy	R3	Relax therapy was given for 7 days to each respondent with a frequency of 1 time per day for 10 minutes.

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Tabel 2. Table of Intervention Implementation for Treatment Group 2 (P2)

Intervention Date	Intervensi	Intervention Group	Explanation
7 Sept – 14 Sept 2024 8 Sept – 15 Sept 2024 9 Sept – 16 Sept 2024 10 Sept – 17 Sept 2024 11 Sept – 18 Sept 2024 12 Sept – 19 Sept 2024 13 Sept – 20 Sept 2024 14 Sept – 21 Sept 2024 15 Sept – 22 Sept 2024 16 Sept – 23 Sept 2024 17 Sept – 24 Sept 2024 18 Sept – 25 Sept 2024 19 Sept – 26 Sept 202 20 Sept – 27 Sept 2024 21 Sept – 28 Sept 2024 22 Sept – 29 Sept 2024	"Relax" therapy combination with Ocimum Basilium Aromatherapy. L. or basil	R4	Relaxation therapy and basil leaf aromatherapy were given for 7 days to each respondent with a frequency of 1 time per day for 10 minutes.

RESULT

The respondents were determined based on inclusion and exclusion criteria. The characteristics of the respondents are shown in Table 1.

Table 3. The Characteristics of respondents

Characteristics	Category	n	%
Age	11-14 year old	2	3.1
	15-17 year old	61	95.5
	18-21 year old	1	1.6
Age of Menarche	9-11 year old	14	21.9
	12-14 year old	50	78.1

Based on Table 3, most respondents were adolescents aged 15–17 years (61; 95.5%), categorized as middle adolescents, with menarche predominantly at 12–14 years (60; 78.1%). Notably, 14 respondents (21.9%) experienced menarche earlier than the normal age. Table 4 shows that before “Relax” therapy, anxiety levels were largely moderate (43.8%) and severe (37.5%), with 18.8% mild, and none at no anxiety or extremely severe levels. After therapy, the distribution shifted significantly, with most respondents (68.8%) in the mild category, 18.8% moderate, and only 12.5% severe. These findings indicate that “Relax” therapy effectively reduced anxiety levels in adolescent girls.

Table 4. Frequency Distribution of Relaxation Techniques of Anxiety

Variables	Scale					
Anxiety	No anxiety	Mild	Moderate	Severe	Extremely Severe	Total
Pre-test	0 (0.0%)	3 (18.8%)	7 (43,8%)	6 (37.5%)	0 (0.0%)	16 (100%)
Post-test	0 (0.0%)	11 (68.8%)	3 (18.8%)	2 (12.5%)	0 (0.0%)	16 (100%)

Table 5 shows the frequency distribution of “Relax” therapy for Dysmenorrhea, before the intervention most respondents experienced severe pain (68.8%) and the rest moderate pain (31.3%). After the intervention, severe pain decreased to 18.8%, moderate pain increased to 62.5%, and mild pain appeared in 18.8%, indicating a reduction in pain levels. There was a decrease in the level of dysmenorrhea pain after “Relax” therapy was given.

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Table 5. Frequency Distribution of Relaxation Techniques for Dysmenorrhea Pain

	Pain Level				
Dysmenorrhea	No Pain	Mild	Moderate	Severe	Total
Pre-test	0 (0.0%)	0 (0.0%)	5 (31.3%)	11 (68.8%)	16 (100%)
Post-test	0 (0.0%)	3 (18.8%)	10 (62.5%)	3 (18.8%)	16 (100%)

Table 6 shows the frequency distribution of "Relax" therapy for menstrual patterns. Before the intervention, most respondents had menstrual patterns >35 days (68.8%), and the rest <24 days (31.3%). After the intervention, menstrual patterns >35 days decreased to 18.8%, <24 days increased to 62.5%, and 24-35 days occurred in 18.8%. This indicates a change in menstrual patterns. There was a difference in changes in menstrual patterns before and after the intervention.

Table 6. Frequency Distribution of Relax Techniques on Menstrual Patterns

Menstrual Pattern	Duration			
	24-35 days	< 24 days	>35 days	Total
Pre-test	0 (0.0%)	5 (31.3%)	11 (68.8%)	16 (100%)
Post-test	3 (18.8%)	10 (62.5%)	3 (18.8%)	16 (100%)

Table 7. Frequency Distribution of the Combination of Relaxation Techniques and Basil Aromatherapy on Anxiety

Variables	Scale					(n)
Anxiety	No worry	Mild	Moderate	Severe	Extremely severe	
Pre-test	0 (0.0%)	2 (12.5%)	3 (18.8%)	5 (31.3%)	6 (37.5%)	16 (100%)
Post-test	0 (0.0%)	9 (56.3%)	5 (31.3%)	2 (12.5%)	0 (0.0%)	16 (100%)

Table 7 shows that before the combination of relaxation therapy and basil aromatherapy, anxiety levels were distributed as extremely severe (37.5%), severe (31.3%), moderate (18.8%), and mild (12.5%). After treatment, extremely severe anxiety disappeared (0%), severe decreased to 12.5%, while moderate and mild increased to 31.3% and 56.3%, respectively, indicating a notable reduction in anxiety. Table 8 shows that before treatment, dysmenorrhea was mostly severe (87.5%) and moderate (12.5%). After therapy, severe cases dropped to 12.5%, with increases in moderate (62.5%), mild (18.8%), and none (6.3%). These results demonstrate a clear improvement in both anxiety and dysmenorrhea following the intervention.

Table 8. Frequency Distribution of the Combination of Relaxation Techniques and Basil Aromatherapy for Dysmenorrhea

	Pain Level				Total
Dysmenorrhea	None	Mild	Moderate	Severe	
Pre-test	0 (0.0%)	0 (0.0%)	2 (12.5%)	14 (87.5%)	16 (100%)
Post-test	1 (6.3%)	3 (18.8%)	10 (62.5%)	2 (12.5%)	16 (100%)

Table 9. Frequency Distribution of the Combination of Relaxation Techniques and Basil Aromatherapy on Menstrual Patterns

Menstrual Pattern	Duration			Total
	24-35 days	< 24 days	>35 days	
Pre-test	6 (37.5%)	7 (43.8%)	3 (18.8%)	16 (100%)
Post-test	9 (56.3%)	5 (31.3%)	2 (12.5%)	16 (100%)

Table 9 shows the frequency distribution of the combination of relaxation therapy and basil aromatherapy for menstrual pattern. Before treatment, the levels were >35 days (18.8%), <24 days (43.8%), and 24-35 days (37.5%). After treatment, there was a

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decrease in >35 days (12.5%), < 24 (31.3%), and increase in 24-35 days (56.3%). There was a difference in menstrual pattern before and after the intervention.

Table 10. Effectiveness Analysis of Relaxation Therapy and Basil Aromatherapy Combination on Three Research Variables

Outcome	Relax Therapy (*p*)**	Relax + Basil Aromatherapy (*p*)**	Between-Group Difference (*p*)*	Significant
Anxiety	0.001	0.001	0.539	Both effective; no difference
Dysmenorrhea	0.038	0.000	0.527	Both effective; no difference
Menstrual Pattern	0.005	0.194	0.003	Only Relax Therapy effective

Note: Significance threshold set at p < 0.05, * Mann–Whitney test, ** Wilcoxon test

Table 10 shows that both Relaxation Therapy and its combination with Basil Aromatherapy significantly reduced anxiety and dysmenorrhea ($p < 0.05$). However, for menstrual patterns, only Relaxation Therapy proved effective ($p = 0.005$), while the combination showed no significant effect ($p = 0.194$). The Mann–Whitney test confirmed no significant difference between the two therapies in reducing anxiety ($p = 0.539$) and dysmenorrhea ($p = 0.527$), but Relaxation Therapy had a significantly greater impact on improving menstrual patterns ($p = 0.003$).

DISCUSSION

The Effectiveness of Relax Technique on Anxiety

Based on the analysis, the Relax technique was found to reduce anxiety in adolescent girls. This study is the first to combine self-talk and deep breathing, techniques commonly applied in anxiety therapy. Self-talk, or positive self-dialogue, helps manage thoughts, fears, and anxiety during stressful situations, making it an effective method for self-regulation and strengthening resilience.[24]. With self-talk, someone can learn to overcome frightening and stressful situations by applying positive self-talk [25]. Deep breathing better known as deep breathing techniques is effective in reducing anxiety in adolescent girls. Deep breathing can reduce hyperventilation in patients with asthma and excessive anxiety. Regulating breathing patterns can impact the brain's functioning by altering the signals between the body and the brain. Individuals with anxiety often experience hyperventilation; therefore, applying deep breathing techniques can help reduce CO^2 levels and increase O^2 levels, ensuring adequate oxygen delivery to all body tissues [26]. It can be concluded that the Relax Technique can reduce anxiety levels in adolescents.

The Effectiveness of Relax Technique on Menstrual Patterns

Data analysis indicates that the Relax technique positively influences menstrual patterns in adolescents. Menstrual cycles are calculated from the first day of menstruation, with the average cycle lasting 28 days. However, research shows variations in healthy women, where the follicular phase can vary by up to 12 days, while the luteal phase remains relatively constant at 14 days[27]. The correlation between the provision of the Relax technique and the menstrual pattern is a series of characteristics of anxiety disorders in adolescents, namely adolescents who experience anxiety tend to contribute to the severity of their menstrual pattern symptoms. This occurs during the final luteal phase of their menstrual cycle when estrogen and progesterone levels are low [28]. Several studies have stated that women who experience problems with quite high anxiety are more susceptible to disorders in their menstrual cycle or the emergence of dysmenorrhea [29]. Research conducted in India found that 50% of women experience menstrual disorders such as irregular cycles due to anxiety and stress due to emotional and mood changes stated that someone with anxiety experiences hypersensitivity to high

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levels of carbon dioxide in the body [30]. By inhaling carbon dioxide, the body will experience subjective dyspnea. By providing deep breathing therapy, anxiety can be reduced, correlate with the regularity of the menstrual cycle [27][29]. It can be concluded that the Relax Technique can repair menstrual patterns in adolescents.

The Effectiveness of Relax Technique on Dysmenorrhea

Dysmenorrhea is characterized by irregular uterine contractions and lower abdominal pain due to excessive prostaglandin release, often accompanied by headaches, agitation, fainting, and nausea. Symptoms usually begin before menstruation and intensify as it starts. Women with higher stress and anxiety levels have a 54% greater risk of dysmenorrhea. Anxiety disrupts the neuroendocrine system through CRH and cortisol regulation, causing hormonal imbalances that affect FSH and LH secretion. This disturbance interferes with follicular development, increases prostaglandin synthesis (PGE2 and PGF2), and enhances their binding to myometrial receptors, leading to stronger uterine contractions and vascular tension[31]. Engaging in deep breathing exercises can alleviate pain through the reticular activating system, which modulates pain perception by inhibiting excessive sensory stimuli. Additionally, deep breathing techniques enhance parasympathetic nervous system activity [32]. Heart rate when someone does breathing techniques, due to an increase in parasympathetic activity [33]. It can be concluded that the application of the Relax Technique can reduce pain due to dysmenorrhea in adolescents.

The effectiveness of the Relax technique and Ocimum Basilium L. Oil on Anxiety

The findings of this study highlight the effectiveness of the Relaxation technique combination with Ocimum Basilicum (OB) aromatherapy in alleviating anxiety among adolescents. OB essential oil comprises various volatile secondary metabolites with low boiling points, which are stored in specialized extracellular plant tissues and readily vaporize upon exposure to air [34]. Essential oils are used for inhalation and as identifiers of human mental health status [35]. The inhalation of OB essential oil was able to reduce anxiety levels in rat research [36]. As well as the antidepressant and antisiolytic content in basil reduces the level of depression by upregulating GFAP and Ki67 gene expression and downregulating caspase [37]. Several human studies using Electroencephalography (EEG) have examined mental function and health, including olfactory responses to basil aromatherapy. Findings showed a decrease in gamma waves and an increase in beta waves after inhalation. Notably, beta wave activity significantly increased in the left frontal and right parietal regions, as well as in Brodmann's area 38, as measured by sLORETA[38]. Basil leaf decoction to women with dysmenorrhoea proved effective in reducing the severity of dysmenorrhea pain with a significance level of 0.01 [39]. This study is the first to combine the Relax Technique with basil aromatherapy, demonstrating effectiveness in lowering anxiety levels among adolescents.

The Effectiveness of the Relax Technique and Ocimum Basilium L. Oil on Menstrual Patterns

Mann–Whitney Test results showed that combining the Relax Technique with Ocimum basilicum aromatherapy did not significantly affect adolescent menstrual patterns ($p > 0.05$). Research on this combined therapy in adolescents is still limited, although previous studies reported that Ocimum basilicum capsules were effective in reducing premenopausal symptoms in women. The phytoesterogenic content in Ocimum basilicum is believed to reduce menopausal symptoms Meanwhile, from [40] research involving 248 premenopausal women was then examined for symptoms of depressive disorders and hormones within 2 menstrual cycles. No relationship was found between hormonal disorders due to depression and hormonal changes in the menstrual cycle [40]. Menstrual cycle disorders are quite diverse, while the most common type is hypermenorrhoea, namely menstrual disorders with a menstrual duration of more than 7

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days or longer cycle length [41]. It can be concluded that administering a combination of the two therapies has not been proven to be effective in the menstrual cycle of adolescents. So, further research is still needed with a longer duration and to test the reaction of basil essential oil content to adolescent menstrual hormones.

The Effectiveness of the Relax Technique and Ocimum Basilium L. Oil Dysmenorrhoea in adolescents

Based on the research results, it was found that the Relax technique and Ocimum Basilicum aromatherapy were effective in reducing dysmenorrhoea pain in adolescent girls. Ocimum Basilium contains pharmacological activity, namely apart from treating anxiety, it is also used as a medicine for flu, fever, migraines, diabetes, and pain/cramps during menstruation [42],[43] Phytochemical tests show that Ocimum basilicum (basil) contains flavonoids, polyphenols, and eugenol, which act as natural analgesics. Basil aromatherapy promotes endorphin release, lowers stress hormones, and enhances serotonin secretion, activating the parasympathetic system to relieve dysmenorrhea pain. Its mechanism involves the hippocampal olfactory pathway, stimulating neuroenergetics, enhancing GABA activity, and regulating acetylcholine release, thereby reducing pain perception[44]. The olfactory receptors are triggered by the inhalation of essential oils which will send signals to the brain and induce memory, thought, and emotional structures. So it has an impact on the release of internal chemicals, namely endorphins and enkephalins which play a role in inhibiting pain and anxiety [45]. So, if these two interventions are combined, the results are proven to be effective in reducing dysmenorrhoea pain in adolescent girls.

The strength of this study lies in introducing RELAX, a novel method combining self-talk and deep breathing, with the innovative use of basil leaf aromatherapy. These non-pharmacological therapies were effective in reducing anxiety and addressing adolescent reproductive problems. Limitations included insufficient time to fully assess menstrual patterns and the lengthy basil oil distillation process. The findings highlight the potential of relaxation therapy combined with basil aromatherapy as a non-pharmacological intervention for adolescent anxiety, with possible applications for intrapartum and preoperative patients. Given the limited medical use of basil leaves and the absence of basil-based aromatherapy products on the market, this study provides a foundation for developing new therapeutic products for anxiety and reproductive health.

CONCLUSION

Relax therapy effectively reduces anxiety, dysmenorrhea pain, and improves menstrual patterns in adolescents, while its combination with basil leaf aromatherapy reduces anxiety and dysmenorrhea but has no effect on menstrual patterns. These findings can be applied in healthcare services, such as managing anxiety in patients with anxiety disorders, pre- and post-operative conditions, or maternal care during childbirth and invasive procedures. In education, Relax therapy may also serve as a supportive intervention in school counseling to help adolescent girls manage anxiety and reduce dysmenorrhea pain.

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