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Effectiveness of Autogenic Relaxation Therapy for Managing Mood Swings in Adolescent Girls with Premenstrual Syndrome

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ABSTRACT

Premenstrual Syndrome (PMS) is associated with mood instability in adolescents, affecting emotional well-being and daily functioning. Non-pharmacological interventions, such as autogenic relaxation, may help manage these fluctuations. This study examined the effect of autogenic relaxation therapy on mood changes in 88 female adolescents at SMP Negeri 1 Pare, Kediri Regency, using a one-group pretest–posttest pre-experimental design. Mood was assessed with the Four Dimensions Mood Scale (FDMS) and analyzed using the Wilcoxon Signed-Rank test. Before the intervention, most participants (61.4%) reported negative mood. After autogenic relaxation, the majority (52.3%) shifted to the positive mood category, with statistically significant improvement ($p < 0.001$). These results suggest that autogenic relaxation promotes emotional regulation through focused attention and controlled breathing, supporting a physiological relaxation response. Autogenic relaxation appears to be a simple, accessible, and cost-effective method for managing PMS-related mood disturbances in adolescents. However, the absence of a control group and limited demographic scope warrant caution. Future studies with controlled designs and diverse populations are recommended.

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Introduction

Premenstrual Syndrome (PMS) is a physiological condition experienced by most women of reproductive age, characterized by a range of physical, emotional, and behavioral symptoms occurring one to two weeks before menstruation. Among adolescents, mood swings are particularly disruptive, affecting social, academic, and psychological functioning. In Indonesia, the prevalence of PMS is reported to range from 70% to 90%, with emotional symptoms such as irritability, anxiety, and fatigue being the most commonly reported manifestations. These symptoms are primarily associated with hormonal fluctuations, particularly increased estrogen and progesterone, as well as reduced serotonin levels, a neurotransmitter regulating mood. Declines in serotonin may lead to heightened emotional sensitivity, irritability, anxiety, and frustration [1].

While mood changes during the premenstrual phase are considered physiological, they may become pathological if severe, prolonged, and disruptive to daily functioning. Such changes can impair social interactions, academic performance, and family relationships, and in severe cases, may be associated with self-harm or suicidal ideation. Persistent and uncontrolled mood swings also increase the risk of developing depression in the absence of effective coping mechanisms [2].

Epidemiological data indicate that approximately 40% of women aged 14–50 years experience PMS, with 2–12% reporting severe symptoms. According to the World Health Organization, around 65.7% of adolescent girls experience PMS, including mood fluctuations. In Indonesia, the incidence remains high, affecting 70–90% of women of reproductive age. Symptoms generally occur 7–14 days before menstruation and resolve with the onset of bleeding. If left untreated, mood swings may progress to more serious psychological conditions, highlighting the need for interventions that are both clinically effective and culturally appropriate for adolescents [3].

Several non-pharmacological approaches have been recommended to alleviate PMS-related mood disturbances, including regular physical activity, time management, balanced nutrition, adequate sleep, and relaxation techniques [4]. Among these, autogenic relaxation represents a promising strategy. This technique, based on autosuggestion, promotes deep relaxation through the use of mental imagery and body awareness, enabling individuals to regulate physiological functions such as respiration, blood pressure, heart rate, and body temperature. Previous studies have demonstrated its effectiveness in reducing physiological tension and enhancing emotional stability, although its application in adolescents with PMS, particularly within the Indonesian context, remains limited [5].

Recent literature supports the biological underpinnings of PMS-related mood disturbances but leaves important gaps. For instance, Fitri et al. (2023) highlight the role of

estrogen and progesterone in serotonin modulation, but their work is largely descriptive and does not address psychosocial moderators of mood fluctuations [5]. Cunha-Bang and Knudsen (2021) emphasize the serotonergic basis of impulsivity and aggression but focus on general affective dysregulation rather than hormonally-driven emotional changes [6]. Similarly, López-Echeverri et al. (2023) examine genetic determinants of serotonin transport and depression but overlook cyclical manifestations in adolescent females [7]. Collectively, these studies establish a biological framework for PMS-related mood disturbances but underscore the absence of research on adolescence-specific, non-pharmacological interventions.

Accordingly, this study aims to evaluate the effectiveness of autogenic relaxation in reducing mood swings among adolescent girls at SMP Negeri 1 Pare, Kediri Regency (a public junior high school in Indonesia). The selection of this population is justified for several reasons. First, adolescence is a critical developmental stage marked by rapid biological, psychological, and social changes, making individuals more vulnerable to emotional instability during the premenstrual phase. Second, the onset of menarche typically occurs between the ages of 11 and 15, placing junior high school students at heightened risk for PMS-related symptoms. Third, adolescents often lack adequate coping strategies or access to effective mental health resources, which increases the likelihood of PMS symptoms disrupting academic performance, peer relationships, and overall well-being. Finally, schools represent an accessible and structured setting for implementing non-pharmacological interventions, allowing for sustainable and cost-effective strategies to promote adolescent reproductive and mental health.

In addition, the study site in Kediri, Indonesia, provides an important context for examining PMS-related interventions. Indonesia reports one of the highest prevalence rates of PMS globally, ranging from 70% to 90% among women of reproductive age, with emotional symptoms such as mood swings being particularly common. Within Kediri Regency, as in many semi-urban areas of Indonesia, adolescent girls often face limited access to reproductive health education and psychological support services. Cultural attitudes may also discourage open discussion of menstruation and emotional distress, increasing the risk of unmet health needs. Conducting the study in this setting not only addresses a population with high prevalence and limited intervention options, but also provides evidence relevant for the development of culturally sensitive, school-based mental health strategies that could be applied more broadly in Indonesia and similar low- and middle-income countries.

Material and Methods

This study employed a pre-experimental design using a one-group pretest–posttest approach. The study population consisted of 146 female students in grade 7 at SMP Negeri 1 Pare, Kediri Regency. A total of 88 participants who had experienced menarche were recruited through purposive sampling.

The independent variable was the administration of autogenic relaxation, and the dependent variable was mood change, measured using the validated Four Dimension Mood Scale (FDMS) questionnaire. Normality of the data was assessed with the Shapiro–Wilk test, which indicated a non-normal distribution ($p < 0.05$). Therefore, differences between pretest and posttest scores were analyzed using the Wilcoxon signed-rank test. To strengthen interpretation, the effect size (r) was calculated using the formula $r = Z / \sqrt{N}$, and the 95% confidence interval for the median difference was reported. Boxplot analysis and the interquartile range (IQR) method were applied to identify outliers; no data points were excluded, as all values fell within acceptable behavioral parameters.

All statistical tests were two-tailed, with a significance threshold of $p < 0.001$. Results were interpreted not only in terms of statistical significance but also with consideration of their practical relevance.

This study received ethical approval from the Ethics Committee of the STIKES Karya Husada Kediri Research and Community Service Institute (Approval No. 121/EC/LPPM/STIKES/KH/V/2024).

The main limitations of this design concern internal validity, particularly the influence of natural mood fluctuations, placebo effects, and regression to the mean. However, the chosen design was pragmatic, reflecting resource constraints and the contextual realities of school-based implementation. To minimize potential temporal bias, validated instruments were employed and measurement schedules were aligned with participants' menstrual cycles.

Results and Discussion

A. Respondent Characteristics

Table 1 presents the demographic and menstrual characteristics of participants. The majority of respondents were 13 years old (54.5%), while the remainder were 12 years old (45.5%). This distribution reflects the early adolescent stage, a period marked by physical maturation, psychosocial transitions, and heightened vulnerability to emotional disturbances. The predominance of 13-year-olds suggests that most participants had

passed the initial years of puberty and were already adapting to the hormonal fluctuations associated with menstruation.

Table 1. Respondent characteristics based on age, age at menarche, menstrual cycle, duration of menstruation, PMS time, current condition, activities often done at home, current diet program, and place of residence.

Characteristics	Total	Percentage (%)
Age		
11 years	0	0
12 years	40	45.5
13 years	48	54.5
Age at menarche		
9–10 years	44	50.0
11–12 years	36	40.9
13–14 years	8	9.1
Menstrual cycle each month		
Routine	80	90.9
Rarely	8	9.1
Duration of menstruation		
< 1 week	24	27.3
1 week	30	34.1
> 1 week	34	38.6
PMS time		
1–3 days from the first day of menstruation	40	45.5
> 3 days from the first day of menstruation	48	54.5
Activities often done at home		
Indoors	48	54.5
Outdoors	40	45.5
Currently undergoing a diet program		
Yes	6	6.8
No	82	93.2

Most respondents experienced menarche between the ages of 9–10 years (50.0%), followed by 11–12 years (40.9%), with only a small proportion at 13–14 years (9.1%). Early menarche is associated with increased risk of PMS, as premature exposure to cyclical hormonal changes can trigger greater dysregulation of neurotransmitters such as serotonin and GABA. This aligns with Rui et al. (2024), who emphasized that early menarche is linked to higher incidence of PMS-related mood disturbances due to hormonal imbalance and reduced cognitive readiness for coping [8].

Regarding menstrual cycle regularity, nearly all participants (90.9%) reported routine cycles, which may explain the predictability of PMS symptoms in this group. Menstrual

duration varied, with 38.6% reporting more than one week, 34.1% exactly one week, and 27.3% less than one week. Extended menstruation has been correlated with more severe PMS manifestations, including mood instability, due to prolonged exposure to fluctuating estrogen and progesterone levels.

PMS timing also showed variation, with 54.5% of respondents reporting symptoms beginning more than three days before menstruation. This is consistent with prior studies showing that PMS often appears in the late luteal phase and persists until menstruation begins. From a behavioral standpoint, over half of participants (54.5%) engaged primarily in indoor activities, which may limit sunlight exposure and subsequently reduce serotonin production. Low serotonin levels have been implicated in mood disorders and PMS symptoms [6, 7, 8]. Finally, dietary patterns revealed that 93.2% were not following a formal diet program, suggesting unrestricted eating behaviors. Frequent consumption of high-sugar, high-caffeine, and processed foods has been linked to worsening PMS symptoms [9].

B. Mood Changes Before Autogenic Relaxation

Table 2 illustrates baseline mood states prior to the intervention. A combined 81.9% of participants were categorized as experiencing negative (61.4%) or very negative moods (20.5%). Only 18.2% reported a neutral state, while none reported positive moods. This distribution highlights the substantial burden of mood disturbances among adolescents with PMS, corroborating reports from WHO that nearly two-thirds of adolescents globally experience premenstrual emotional symptoms. The dominance of negative affect in this group underscores the urgency of implementing effective interventions.

Table 2. Frequency distribution of mood categories before autogenic relaxation among female adolescents at SMP Negeri 1 Pare (N = 88).

Mood Category	n	Percentage (%)
Very negative mood (Angry, hopeless)	18	20.5
Negative mood (Sad, anxious, irritable)	54	61.4
Neutral mood (Neutral, indifferent)	16	18.2
Positive mood (Happy, content, calm)	0	0
Very positive mood (Euphoria, elated, ecstatic)	0	0
Total	**88**	**100.0**

C. Mood Changes After Autogenic Relaxation

Table 3 demonstrates substantial shifts in mood following the intervention. More than half of participants (52.3%) reported positive moods, while 40.9% reported very positive moods. Only 6.8% remained neutral, and none reported negative or very negative moods. These results confirm the effectiveness of autogenic relaxation in improving emotional

states. The transition of more than 90% of participants from negative to positive affect represents a meaningful clinical and psychosocial outcome, demonstrating the practical utility of relaxation techniques in adolescent health promotion.

Table 3. Mood distribution after autogenic relaxation among female adolescents at SMP Negeri 1 Pare (N = 88).

Mood Category	n	Percentage (%)
Very negative mood (Angry, hopeless)	0	0.0
Negative mood (Sad, anxious, irritable)	0	0.8
Neutral mood (Neutral, indifferent)	6	6.8
Positive mood (Happy, content, calm)	46	52.3
Very positive mood (Euphoria, elated, ecstatic)	36	40.9
Total	**88**	**100.0**

D. Analysis of Mood Changes Before and After Autogenic Relaxation

Table 4 compares mood distributions before and after autogenic relaxation. The Wilcoxon signed-rank test revealed a statistically significant difference ($p < 0.001$), with a moderate-to-large effect size ($r = 0.53$). The magnitude of this effect suggests not only statistical reliability but also practical relevance for real-world application. Importantly, no participants remained in negative mood states post-intervention, underscoring the robustness of autogenic relaxation in alleviating PMS-related mood disturbances.

Table 4. Comparison of mood distribution before and after autogenic relaxation among female adolescents at SMP Negeri 1 Pare (N = 88).

Mood Category	Before n(%)	After n(%)
Very negative mood	18 (20.5%)	0 (0.0%)
Negative mood	54 (61.4%}	0 (0.0%)
Neutral mood	16 (18.2%)	6 (6.8%)
Positive mood	0 (0.0%)	46 (52.3%)
Very positive mood	0 (0.0%)	36 (40.9%)
Total	**88 (100.0%)**	**88 (100.0%)**
Wilcoxon test (α = 0.05)	**p < 0.001, r = 0.53**	

More than half of the respondents (54.5%) were 13 years old. At this age, adolescent girls are likely to have passed the peak of pubertal onset, which generally begins around 11 years of age. Pubertal development is characterized not only by rapid physical growth but also by significant emotional and social changes. Parents and teachers may observe physical indicators such as increased height and weight, breast development, and the appearance of fine hair in the axillary and pubic regions, alongside the onset of menarche. Equally important, however, are the psychological challenges at this stage, including heightened emotional sensitivity, identity-seeking behaviors, and ambivalence in social interactions. Many adolescents report conflicting needs: a desire for peer affiliation while simultaneously

seeking solitude, feelings of self-consciousness regarding bodily changes, and uncertainty in navigating friendships. Such factors collectively contribute to mood fluctuations and heightened vulnerability to PMS during this developmental stage [10].

The findings also revealed that half of the respondents experiencing mood swings had menarche at 9–10 years of age, placing them in the category of early menarche. This result is consistent with Rui et al. (2024), who observed that earlier menarche is associated with a greater risk of PMS symptoms [8]. Early menarche is problematic because it coincides with limited cognitive and emotional preparedness to understand or manage menstruation. Physiologically, early menarche reflects earlier activation of the hypothalamic–pituitary–gonadal axis, which increases estrogen and progesterone secretion at a younger age. Fluctuations in these hormones influence neurotransmitter systems such as serotonin, gamma-aminobutyric acid (GABA), and beta-endorphins, all of which play a central role in mood regulation. During the luteal phase, reductions in serotonin and GABA have been associated with irritability, anxiety, and negative affect, thereby predisposing girls with early menarche to stronger PMS-related mood swings [11]. Moreover, some studies suggest early menarche may also correlate with diminished cognitive control, further amplifying emotional vulnerability during adolescence [8, 10, 11].

Lifestyle and environmental factors also emerged as relevant in this study. More than half of the respondents (54.5%) who reported mood swings during PMS reported engaging primarily in indoor activities. This finding supports Akun and Erbil (2024), who demonstrated that reduced exposure to sunlight may decrease serotonin synthesis in the brain, contributing to lower mood and affective instability [1]. Sunlight is also integral to circadian rhythm regulation, and disruptions in circadian alignment can exacerbate menstrual irregularities and intensify PMS symptoms. In addition, low serotonin availability may alter estrogen and progesterone feedback mechanisms, increasing susceptibility to physical symptoms such as bloating and breast tenderness, further compounding mood difficulties.

Dietary factors also played a noteworthy role. The majority of respondents (93.2%) reported not being on a diet program, which suggests relative freedom in choosing food and beverages. However, frequent consumption of foods and drinks such as chocolate, tea, coffee, and soft drinks is known to worsen PMS symptoms [12]. High sugar and caffeine intake, in particular, contribute to dysregulated blood glucose levels and overstimulation of the central nervous system, both of which can exacerbate irritability and anxiety [13]. Moreover, excessive intake of processed foods and soft drinks, which are often high in salt and additives, may intensify fluid retention and discomfort during PMS, thereby indirectly affecting mood states.

Crucially, this study demonstrated significant improvements in mood following autogenic relaxation, with 93.2% of participants shifting to either the positive or neutral category. These results are consistent with prior research supporting nonpharmacological approaches to PMS management [14, 15]. For instance, Lestari (2023) showed that Spiritual Emotional Freedom Technique (SEFT) therapy (i.e., another mind-body intervention) improved emotional regulation in women with cyclical mood disturbances [15]. While SEFT emphasizes both cognitive and somatic strategies, our findings highlight the efficacy of autogenic relaxation as a focused breathing and somatic-awareness technique that facilitates top-down regulation of mood via prefrontal cortical pathways. This aligns with cognitive-behavioral theories of affect regulation, which suggest that self-guided techniques can disrupt maladaptive emotional cycles. From a neurobiological perspective, autogenic relaxation likely attenuates hypothalamic–pituitary–adrenal (HPA) axis hyperactivity, thereby reducing stress-related hormones such as corticotropin-releasing factor (CRF) and adrenocorticotropic hormone (ACTH), both implicated in mood instability [15 16].

By integrating psychological and physiological frameworks, the present findings provide further evidence that autogenic relaxation offers a safe, accessible, and effective intervention for managing PMS-related mood disturbances. Importantly, this study extends existing literature by situating these findings in an underrepresented population (i.e., Indonesian adolescent girls) where cultural barriers to discussing menstruation and mental health may otherwise restrict access to effective support strategies [14, 15].

The contribution of this study can be summarized in three key dimensions. First, scientifically, it broadens global understanding of autogenic relaxation therapy by providing empirical data from a Southeast Asian adolescent population that is rarely represented in the literature. Second, practically, it demonstrates the feasibility of a school-based, low-cost, and easily implemented intervention that does not require specialist training, making it especially valuable in low-resource contexts. Third, methodologically, it highlights the importance of cultural adaptation and local validation of psychological assessment tools, underscoring that interventions and instruments should be responsive to the sociocultural realities of the populations in which they are applied. Collectively, these contributions support the integration of autogenic relaxation into adolescent health promotion initiatives, particularly in school and community settings where preventive mental health strategies are increasingly prioritized.

Conclusion

Prior to the intervention, the majority of respondents (61.4%) were categorized as experiencing negative mood states. Following the administration of autogenic relaxation, more than half (52.3%) shifted to the positive mood category. Statistical analysis confirmed a significant effect of autogenic relaxation on mood improvement among female adolescents experiencing premenstrual syndrome at SMP Negeri 1 Pare, Kediri Regency.

These findings reinforce the role of non-pharmacological psychological interventions as adaptive, cost-effective, and easily implemented strategies within educational settings in Indonesia. From a practical perspective, autogenic relaxation could be integrated into school Guidance and Counseling programs as a simple tool for students to regulate emotions and manage stress independently. At the policy level, the results support the inclusion of school-based psychosocial interventions in broader adolescent mental health strategies, particularly in regions with limited access to clinical or pharmacological services.

From a scientific standpoint, this study contributes to the growing body of evidence on culturally adapted, school-based psychological therapies in Southeast Asia. Nevertheless, future research is needed to strengthen generalizability through longitudinal designs, larger and more diverse populations, and cross-cultural validation studies. Moreover, combining autogenic relaxation with other evidence-based approaches, such as mindfulness training or cognitive-behavioral strategies, may enhance its therapeutic potential and provide a more comprehensive framework for adolescent mental health promotion.

Study Limitations and Recommendations for Future Work

This study has several limitations that should be considered when interpreting the findings. The pre-experimental one-group pretest–posttest design limits the ability to establish causal relationships, as natural mood fluctuations, placebo effects, or regression to the mean may have influenced the observed outcomes. In addition, the reliance on self-reported measures of mood introduces the potential for response bias or social desirability effects. The sample was drawn from a single school in Kediri Regency, which limits the generalizability of the results to broader adolescent populations with different cultural, socioeconomic, or geographic characteristics. Finally, the short-term nature of the intervention prevents assessment of the long-term sustainability of mood improvements.

Future research should consider adopting randomized controlled trial designs with control groups to strengthen causal inferences and expand the study to include larger and more diverse adolescent populations to enhance external validity. Incorporating objective physiological measures, such as cortisol levels or heart rate variability, alongside self-reported

mood assessments would provide a more comprehensive understanding of intervention effects. Evaluating the long-term efficacy of autogenic relaxation through follow-up assessments and exploring its integration with other evidence-based interventions, such as mindfulness or cognitive-behavioral strategies, may reveal additive benefits for emotional regulation. Additionally, qualitative studies examining adolescents' subjective experiences with autogenic relaxation could inform culturally sensitive adaptations and practical implementation strategies in school settings.

Conflict of Interest

We declare that we do not have any conflict of interest.

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