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The Effect of Deep Breathing Techniques on Reducing Menstrual Related Stress Among Students of SMPN 2 Rambutan, Banyuasin Regency

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Abstract: *Stress among early adolescent girls in junior high school is an increasing health concern due to academic demands, social pressure, digital exposure, and menstrual related discomforts. Complementary interventions such as deep-breathing techniques offer a simple method that can be implemented in school settings to rapidly reduce stress. This study aimed to examine the effect of deep-breathing techniques on menstrual related stress among ninth-grade female students at SMPN 2 Rambutan, Banyuasin Regency. A pre-experimental one-group pretest–posttest design was used. The sample consisted of 60 students selected from the ninth-grade population. Stress levels were measured using the Perceived Stress Scale (PSS-10) focusing on stress during menstruation before and after a single deep-breathing session. Data were analyzed using the Wilcoxon test. The results showed a significant reduction in stress scores after the intervention ($p < 0.001$). The proportion of students in the high-stress category decreased from 20% to 6.7%, while those in the low-stress category increased from 10% to 30%. The mean stress score decreased from 21.35 ± 4.82 to 15.42 ± 4.11. This study concludes that deep-breathing techniques are effective in reducing menstrual-related stress in female students within a single session and can be recommended as a complementary strategy that is easy to implement in schools for adolescent menstrual stress management.*

Keywords: *Adolescent Girls, Deep breathing, Junior high school students, Menstrual Related Stress, Stress management.*

1. BACKGROUND

Adolescent mental health has increasingly gained attention due to the rising academic, social, and digital pressures experienced by students at the junior high school level. Changes during puberty, complex school demands, and exposure to social media can create psychological burdens that affect students' learning abilities and emotional well-being (Addini, 2022). This condition is evident in various regions, including public schools such as SMPN 2 Rambutan in Banyuasin Regency, where students face substantial academic demands and social adaptation challenges.

The Indonesian National Adolescent Mental Health Survey (I-NAMHS) reported that approximately 34.9% of Indonesian adolescents experience mental health problems, and 1 in 20 adolescents meets the diagnostic criteria for a mental disorder. These data illustrate the high psychological burden on Indonesian adolescents in general, including junior high school students who are in an emotionally transitional period and highly vulnerable to stress (Kurniawan et al., 2022). The 2018 Basic Health Research (Riskesdas) also noted an increase in emotional disorders among Indonesian adolescents based on indicators of emotional mental

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disorders, highlighting the need for simple psychological interventions that can be easily implemented in schools (Ministry of Health of the Republic of Indonesia, 2018).

Stress among junior high school students can be caused by various factors such as high academic demands, competition for grades, numerous school assignments, parental pressure, peer conflicts, lack of sleep, and the influence of social media that triggers social comparison. During and after the pandemic, stress factors increased due to shifts in learning methods, loss of social interaction, and reduced emotional adaptability among some students. Studies in various Indonesian schools show that academic and social factors are the dominant contributors to stress among adolescents, making schools a strategic setting for implementing stress-management interventions (Addini, 2022).

Additionally, for adolescent girls, stress levels may fluctuate during menstruation due to hormonal changes, menstrual pain, and physical discomfort. This menstrual-related stress can further impact emotional regulation, concentration, and overall well-being, making female students particularly vulnerable during their menstrual cycles (Nurhayati, 2020; Pratiwi et al., 2020).

To manage stress in adolescents, various methods can be applied, including school counseling, mental health education, meditation, music therapy, and physical relaxation techniques. One simple, low-cost intervention that can be conducted in a classroom setting is deep breathing exercises. This technique works by stimulating the parasympathetic nervous system, thereby reducing heart rate, lowering physiological tension, and creating a sense of calm in a short amount of time. This approach is recommended by mental health practitioners as an effective method for reducing acute stress responses in adolescents (Nestor, 2020).

International research indicates that slow or diaphragmatic breathing effectively reduces anxiety and stress among students. A pilot study involving high school students demonstrated that a slow-breathing curriculum significantly reduced stress symptoms and improved emotional regulation after participating in short video-based sessions (Bentley et al., 2022). In addition, research conducted in Indonesia found that spiritual deep breathing effectively reduced stress levels in adolescents, with significant results even after a single brief intervention session (Junaidi et al., 2023). This evidence shows that breathing-based interventions have strong potential for implementation in Indonesian schools, including at the junior high school level.

However, most previous studies were conducted on senior high school students, university students, or involved multiple intervention sessions over several weeks. There is still limited research evaluating the effectiveness of a one-day deep breathing intervention specifically for

menstrual-related stress in junior high school students, particularly in regions such as South Sumatra, including Banyuasin Regency. In fact, a short, effective intervention is urgently needed by schools to reduce stress before examinations, during intensive academic periods, or when students experience sudden psychological pressure. Therefore, research is needed to examine the extent to which deep breathing techniques can reduce stress levels related to menstruation among students at SMPN 2 Rambutan in a short time, so that it may serve as a practical intervention that can be applied by teachers and school health personnel (Bentley et al., 2022).

2. THEORETICAL STUDY

Stress Management in Adolescents with Menstrual-Related Stress

During adolescence, hormonal changes during menstruation can trigger increased emotional sensitivity, anxiety, and stress. Symptoms such as dysmenorrhea, fatigue, mood changes, and physical discomfort often worsen stress levels, making stress-management strategies essential in the context of adolescent reproductive health.

Stress management for adolescents can be implemented through psychological approaches, counseling, health education, and relaxation techniques. One of the simplest, most affordable, and safest methods to apply in schools is deep breathing. This technique works by activating the parasympathetic nervous system, lowering heart rate, and reducing stress hormones such as cortisol (Harvard Health Publishing, 2021). Because it is easy to perform and requires no equipment, deep breathing is highly suitable for reducing menstrual-related stress among adolescent girls.

Deep Breathing as a Relaxation Intervention for Menstrual-Related Stress

Deep breathing is a diaphragmatic breathing technique proven to improve body oxygenation, reduce the activation of the sympathetic “fight or flight” response, and produce a rapid relaxation effect. Ma et al. (2017) reported that 5–10 minutes of deep-breathing practice can significantly reduce stress and improve mood among school-aged adolescents. Chen et al. (2020) also confirmed that this technique decreases heart rate, anxiety, and muscular tension in a short time.

In the context of menstruation, deep breathing helps reduce muscle tension in the abdomen and back, enhances relaxation, and decreases stress intensity caused by menstrual discomfort. Because it is simple, non-invasive, and can be done anytime, this technique is highly appropriate for implementation among junior high school female students.

Related Studies in the Indonesian School Context

Several studies in Indonesia have demonstrated the effectiveness of deep breathing in reducing stress and anxiety among students and adolescents. Dewi and Lestari (2020) reported that a 10-minute deep-breathing intervention significantly reduced academic stress among junior high school students. Similarly, Pratama (2022) found that this technique increases calmness and concentration in secondary school students.

These findings indicate that deep breathing is a relevant, easy-to-implement, and non-pharmacological intervention suitable for school settings. In the context of this research, deep breathing has the potential to effectively reduce menstrual-related stress among students of SMPN 2 Rambutan, Banyuasin Regency.

3. RESEARCH METHODS

This study employed a quasi-experimental pre–post single-group design to evaluate the effect of deep breathing techniques on students menstrual-related stress levels. The study population consisted of all 9th-grade female students at SMPN 2 Rambutan, totaling 180 students. From this population, 60 students were selected using simple random sampling. Random selection was conducted by numbering the class attendance list and using a random number generator to obtain 60 unique participants. Inclusion criteria were 9th-grade students who were present on the day of data collection and provided parental consent and student assent; exclusion criteria included students with uncontrolled respiratory problems or medical conditions that contraindicate breathing exercises.

Stress levels were measured using the Indonesian version of the Perceived Stress Scale (PSS-10), a valid and reliable instrument administered as both pre-test and post-test. The intervention involved a 15-minute guided deep breathing session (diaphragmatic pattern: inhale for 4 seconds, hold for 2 seconds, exhale for 6–8 seconds), conducted in the classroom immediately after the pre-test. The deep breathing session was specifically performed during or shortly before the students' menstrual period to capture stress experienced in relation to menstrual symptoms. Following a short break, students completed the post-test PSS-10. All data collection and intervention procedures were completed within a single day. Data were analyzed using the Wilcoxon test. This statistical test was selected because menstrual-related stress scores measured using PSS-10 are ordinal and the pre–post design involved paired, non-normally distributed data.

Ethical considerations included obtaining written parental consent and student assent, maintaining data confidentiality through anonymized IDs, ensuring the right to withdraw at any time, and providing referral options for students showing high stress levels or unexpected reactions. Additional ethical attention was given to menstrual privacy, ensuring that discussions about menstrual-related stress were conducted sensitively and without requiring students to disclose personal menstrual details publicly.

A limitation of this method is the absence of a control group, which restricts the ability to fully isolate intervention effects, and the measurement captures only short-term (immediate) outcomes, because menstrual-related stress fluctuates across the menstrual cycle, the timing of data collection may influence stress levels, potentially affecting the consistency of the results.

4. RESULTS AND DISCUSSION

Table 1. Distribution of Stress Categories Before and After Deep Breathing Intervention (n = 60).

Stress Category (PSS-10)	Pre-test	Post-test
Low	6 (10%)	18 (30%)
Moderate	42 (70%)	38 (63.3%)
High	12 (20%)	4 (6.7%)

The distribution shows a notable improvement in stress levels, with the proportion of students in the high-stress category decreasing from 20% to 6.7%, while those in the low-stress category increased from 10% to 30%.

Table 2. Differences in Stress Scores Before and After Deep Breathing Intervention (n = 60).

Variable	Mean ± SD	Min–Max	p-value	Effect Size
Pre-test Stress (PSS-10)	21.35 ± 4.82	12–31		
Post-test Stress (PSS-10)	15.42 ± 4.11	7–25	< 0.001	0.85 (large)

There was a statistically significant reduction in stress scores after the intervention ($p < 0.001$), with a large effect size (0.85), indicating that deep breathing had a strong immediate impact on lowering stress.

The findings of this study indicate a significant decrease in students perceived stress levels after the deep-breathing intervention. This is reflected in the shift of stress categories: the proportion of students with high stress dropped from 20% to 6.7%, while those with low stress increased from 10% to 30%, because the sample consisted of female students experiencing menstrual-related stress, this improvement suggests that deep breathing may effectively reduce

stress associated with menstrual discomfort, hormonal fluctuations, and emotional changes during the menstrual cycle These immediate effects align with evidence showing that short sessions of controlled breathing can rapidly reduce symptoms of stress and anxiety in adolescents and young adults (Ma et al., 2017) and improve emotional regulation in school-based settings (Bentley et al., 2022).

Physiologically, the reduction in stress can be explained by the activation of the parasympathetic nervous system, particularly through increased vagal tone. Slow diaphragmatic breathing prolongs exhalation, stimulates vagus-nerve activity, reduces heart rate, enhances heart-rate variability, and suppresses sympathetic arousal responsible for "fight-or-flight" responses (Gerritsen & Band, 2018). Harvard Health also emphasizes that deep, slow breathing lowers cortisol levels and promotes relaxation by directly influencing brain–body stress circuits (Harvard Health Publishing, 2019). In relation to menstruation, reduced sympathetic activation may lessen physical symptoms such as abdominal tension, cramps, fatigue, and irritability, contributing to lower menstrual-related stress.

From a psychological perspective, breathing exercises help reduce stress through attentional redirection, emotional regulation, and increased perceived control. Focusing on the breath reduces intrusive thoughts related to academic pressure, while the sense of mastery over physiological reactions strengthens coping ability. During menstruation, this psychological regulation is particularly relevant because emotional fluctuations and mood instability are common, and deep breathing offers a non-pharmacological method to stabilize emotional responses. Experimental studies also show that slow breathing improves attention and decreases negative affect, which corresponds with the decline in students' stress scores in this study (Ma et al., 2017).

This study's findings are further supported by research conducted in schools. A feasibility study implementing slow-breathing routines among high-school students reported decreased stress and improved emotional balance after short in-class sessions, suggesting applicability within time-limited school schedules (Bentley et al., 2022). **In** Indonesian adolescent populations, simple breathing-based practices have also been shown to reduce stress in a single session, indicating cultural and contextual suitability for menstrual-related stress reduction (Junaidi et al., 2023).

Meta-analytical evidence also supports the effectiveness of breathwork in improving mental-health outcomes. A recent meta-analysis concluded that breathing-based interventions significantly reduce stress and anxiety across diverse populations, though the authors noted heterogeneity in techniques and study quality (Fincham et al., 2023). Therefore, while the

results of the current study are consistent with the broader evidence base, future research should apply more rigorous designs, such as randomized controlled trials to verify long-term and comparative effectiveness. Further studies should also examine the sustained effects of breathing techniques across different phases of the menstrual cycle to better understand their role in managing cyclical stress variations.

The marked reduction in high-stress students in this study demonstrates that deep breathing is a practical and low-cost technique suitable for school environments. Its advantages include simplicity, no equipment requirements, and feasibility for rapid deployment before examinations or stressful learning sessions. Research on school implementation suggests that 3–5-minute breathing routines can be integrated into daily classroom transitions to maintain long-term benefits (Bentley et al., 2022). In menstrual contexts, deep breathing may be incorporated during school hours to help alleviate discomfort or emotional tension experienced during menstruation.

However, several limitations must be acknowledged. The absence of a control group limits the ability to isolate the true intervention effect from expectancy or time effects. The use of self-report measures such as the PSS-10 may also be influenced by social desirability biases. Additionally, the immediate pre–post measurement does not capture the durability of effects across hours or days. Previous reviews warn that long-term effectiveness requires repeated practice and standardized breathing protocols (Fincham et al., 2023). The timing of data collection relative to different menstrual phases may also influence stress levels, which could introduce variability in the findings. Further studies should incorporate physiological markers such as HRV or cortisol to strengthen the mechanistic understanding.

Overall, the study supports the use of deep-breathing exercises as a rapid and effective complementary technique to reduce stress among junior-high students. Specifically, this study highlights the potential of deep breathing as a simple intervention to reduce menstrual-related stress, offering a practical strategy for improving the well-being of adolescent girls in school settings.

5. CONCLUSION

This study demonstrates that a single-session deep-breathing intervention effectively reduces menstrual-related stress levels among ninth-grade students at SMPN 2 Rambutan. The proportion of students experiencing high stress decreased substantially, while those with low stress increased after the intervention. The findings support existing evidence that diaphragmatic breathing activates the parasympathetic nervous system, enhances emotional

regulation, and rapidly decreases physiological arousal associated with stress. In the context of menstruation, the physiological calming effect of deep breathing may help reduce tension, discomfort, mood fluctuations, and heightened emotional sensitivity commonly experienced during the menstrual cycle. Given its simplicity, low cost, and immediate impact, deep-breathing exercises can serve as a practical complementary strategy for stress management menstrual related stress in school settings. Future research should incorporate control groups, physiological indicators, and long-term follow-up to strengthen the evidence base for routine implementation in educational environments, including evaluation across different phases of the menstrual cycle.

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