

The effect of progressive muscle relaxation, thought-stopping therapy, and acupressure on adolescent mental health

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ABSTRACT

Background: Adolescence is a critical developmental period marked by biological, psychological, and social changes that increase susceptibility to mental health problems. Although various psychological interventions have been developed, practical, non-pharmacological, and school-based complementary approaches remain limited.

Objectives: This study aimed to examine the effect of a combination of Progressive Muscle Relaxation (PMR), Thought Stopping Therapy (TST), and acupressure on improving adolescents' mental health.

Methods: A pre-experimental study with a one-group pre-test and post-test design was conducted among tenth-grade students at a senior high school in Denpasar, Bali, Indonesia. From a population of 401 students, 34 respondents were selected using purposive sampling. Mental health status was assessed using the Strengths and Difficulties Questionnaire (SDQ). The intervention consisted of four sessions, each including 15 minutes of PMR, 15 minutes of TST, and acupressure stimulation at ST36 (Zusanli), CV17 (Shanzhong), and HT7 (Shenmen). At each acupoint, stimulation was performed by applying moderate pressure accompanied by circular rotational movements, with 30 repetitions of pressure and rotation at each point. Data were analyzed using the Wilcoxon Signed-Rank Test with a significance level of $p < 0.05$.

Results: The mean SDQ score decreased from 16.97 ($SD=1.114$) before the intervention to 14.09 ($SD=0.933$) after the intervention, representing a mean reduction of 2.61 points. Statistical analysis demonstrated a significant improvement in adolescents' mental health following the intervention ($p=0.001$). Participants also showed a transition from the borderline category to the normal category based on SDQ classification.

Conclusions: The combination of PMR, TST, and acupressure effectively improves adolescents' mental health through complementary physiological, cognitive, and somatic mechanisms. This integrated intervention represents a feasible, low-cost, and school-based complementary strategy that can support adolescent mental health promotion and prevention programs.

KEYWORD: *acupressure; adolescent ; mental health ; progressive muscle relaxation; thought-stopping therapy*

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INTRODUCTION

Adolescence is a critical phase in a person's life marked by significant biological, psychological, and social changes. According to Santrock's theory, adolescents often go through a phase of identity exploration, which makes them vulnerable to stress and emotional pressure. Adolescents tend to face various challenges, including academic pressure, interpersonal conflicts, and the influence of social media, all of which can affect their mental health (1).

Adolescent mental health is a significant global concern. The WHO reports that approximately 50% of mental disorders first emerge by age 14 or younger, yet they often go undetected or untreated; of the 450 million people worldwide with mental disorders, approximately 154 million suffer from depression (2). The prevalence of depressive symptoms among adolescents shows an alarming trend, including an increase in suicidal ideation from 5.4% to 8.5% (3). The Indonesian Health Survey and Profile reports a national prevalence of depression of 1.4%, rising to approximately 2% among those aged 15–24, with a higher proportion among females. As many as 61% of adolescents have had suicidal

thoughts, particularly junior high and high school students. Among adolescents with depression, only 10.4% receive treatment. Another study showed that 37.3% of 1,873 adolescents experienced depression, and 26.7% of 5,664 adolescents aged 10–17 years experienced mental health problems, with 5.3% suffering from depression, predominantly among females. These findings underscore the importance of early detection and intervention (2,4,5,6,7).

At the regional level, the Indonesian Health Survey reports that the aggregate prevalence of depression in Bali Province is 0.2% (2). However, this low aggregate prevalence does not align with the significant long-term consequences that result. The low rate of seeking treatment among patients with depression contributes to the high suicide rate in Bali. The National Crime Information Center recorded 135 suicide cases in Bali in 2023, 140 in 2024, and Bali ranked first in Indonesia for suicide rates (3.07%) (8,7). This situation serves as an early warning of serious mental health issues, including among adolescents. The Bali Provincial Basic Health Research Report indicates that adolescents aged 15 and older experience depression and emotional mental disorders at a rate of 5 per thousand residents. Adolescents still in

school constitute a significant proportion of mental health issues, at 7.58%, with 5.21% of these cases occurring in the city of Denpasar (9). Research findings indicate that out of 265 adolescents, 46.8% experienced emotional mental disorders, 74% experienced mild stress, and 4.9% exhibited psychotic symptoms (10).

Preliminary study results indicate that 100 adolescents in Denpasar have been identified as having mental health issues, 25 of whom are located in North Denpasar, specifically within the service area of Community Health Center III under the North Denpasar Subdistrict Health Office. Of these 25, 7 are students at a school in the city of Denpasar that falls under the jurisdiction of Community Health Center III under the North Denpasar Subdistrict Health Office. There was a previous incident where a student jumped from the second floor of a building, indicating a case in the severe category. To date, the interventions provided have been limited to psychoeducation, and no interventions have been implemented to address mental health. One of the government's efforts to improve public health is through the implementation of the Free Health Checkup (CKG) program, which includes physical and mental health screenings. For adolescents, mental health screening is conducted using the Strengths and Difficulties Questionnaire (SDQ), the Patient Health Questionnaire (PHQ), and the WHO-5 Well-Being Index (WHO-5). Adolescents

identified as being at risk of or showing signs of mental health disorders are then referred to community health centers (puskesmas) for services and follow-up care based on their level of need. However, the implementation of this program still has limitations because screening is conducted only once a year. This situation prevents the continuous early detection of changes in adolescents' mental health, creating the potential for delays in identifying new cases and providing timely interventions (11).

If left untreated, the mental health issues experienced by adolescents can lead to further psychological problems, such as feelings of despair and even suicide (12). This statement is supported by a study indicating that the suicide rate among adolescents is 6.5 per 100,000 (13). Progressive Muscle Relaxation and thought stopping therapy are recognized as effective approaches for managing mental health disorders. Progressive muscle relaxation works by reducing muscle tension and increasing psychological calm (14), while Thought Stopping Therapy helps individuals control negative thoughts that often cause anxiety (15).

Acupressure, a traditional method involving the stimulation of energy points on the body, is also a relevant intervention for improving mental well-being, as it can significantly reduce symptoms of depression and anxiety (16). In the local context, the introduction of this technique can provide a more natural and affordable

approach to addressing mental health issues, particularly in the city of Denpasar, which has access to traditional health resources. The combination of Progressive Muscle Relaxation, Thought Stopping Therapy, and acupressure offers a holistic approach that focuses not only on physical but also psychological aspects. This approach is highly relevant in Denpasar, Bali, given the need for mental health interventions that align with local culture. By integrating modern and traditional methods, this intervention is expected to serve as an effective solution for improving adolescent mental health (14,15,16).

Although previous studies have demonstrated that Progressive Muscle Relaxation, Thought Stopping Therapy, and acupressure are individually effective in reducing anxiety, stress, and depressive symptoms among adolescents and other populations, evidence regarding their combined application remains limited. Most existing studies have evaluated these interventions separately, primarily focusing on single psychological outcomes or clinical populations rather than overall adolescent mental health in school settings. Furthermore, few studies have investigated complementary interventions that simultaneously target physiological relaxation, cognitive restructuring, and somatic stimulation within a single integrated program. Evidence from Indonesia, particularly in Bali, is also

scarce, despite the increasing burden of adolescent mental health problems and the need for culturally acceptable, low-cost, and school-based interventions. Therefore, it remains unclear whether integrating Progressive Muscle Relaxation, Thought Stopping Therapy, and acupressure produces a synergistic effect in improving adolescents' mental health. Addressing this gap, the present study evaluates the effectiveness of this combined complementary intervention among senior high school students in Denpasar, Bali.

This study aims to evaluate the effects of a combination of Progressive Muscle Relaxation, thought stopping therapy, and acupressure on adolescents' mental health. The results of this study are expected to make a meaningful contribution to the development of sustainable, evidence-based community service strategies. Based on the results of a previous study conducted at a high school in Denpasar involving 201 respondents, there were 5 adolescents (2.5%) with abnormal mental health, 24 (11.9%) with borderline mental health, and 172 (85.6%) with normal mental health. These data indicate that there are adolescents experiencing mental health issues who require further intervention (17). Based on these findings, it is necessary to conduct a study on the effects of Progressive Muscle Relaxation, thought stopping therapy, and acupressure on adolescent mental health.

MATERIALS AND METHODS

This study employed a pre-experimental design with a one-group pre-test and post-test design. The study population consisted of all 10th-grade students at a high school in Denpasar, totaling 401 students. The study sample comprised adolescents experiencing mental health issues, selected using purposive sampling.

The sample size was calculated based on the minimum required sample size, with an additional 10% to account for dropouts, resulting in a total sample of 34 respondents. The research instrument used was the Strengths and Difficulties Questionnaire (SDQ), a standardized assessment tool recommended by the Ministry of Health of the Republic of Indonesia for evaluating adolescents' mental health. Sampling in this study used purposive sampling, which involves selecting participants based on specific criteria established in accordance with the study's objectives.

The sampling process began with a mental health screening using the Strengths and Difficulties Questionnaire (SDQ) for all adolescents aged 15–18 who met the inclusion criteria. The screening results were then categorized according to the SDQ interpretation guidelines into normal, borderline, and abnormal categories. Adolescents who scored in the borderline and abnormal categories were selected as

potential study participants because they met the characteristics required for this study. The selection process was conducted in stages until the sample size meeting the criteria reached 34 respondents. Thus, the study sample consisted of adolescents aged 15–18 years who had SDQ screening results in the borderline or abnormal categories, met all inclusion criteria, and were willing to participate in the study. The intervention was carried out over four therapy sessions spanning two weeks (14).

The research procedure began with a pre-test using the SDQ questionnaire, followed by the intervention consisting of 15 minutes of progressive muscle relaxation, 15 minutes of thought-stopping therapy, and acupressure on the meridian points ST36, CV17, and H7 using a technique of 30 presses and 30 rotations with the fingers. After the entire intervention series was administered, a post-test was conducted again using the SDQ questionnaire. Data analysis was performed using the Wilcoxon Signed-Rank Test to determine differences in mental health scores before and after the intervention. This study received ethical approval from the STIKES Wira Medika Bali Health Research Ethics Committee under number 442/E1.STIKESWIK/EC/III/2025, dated March 21, 2025.

RESULTS AND DISCUSSION

The distribution of the research data by gender is presented in **Table 1**.

Table 1. Gender distribution

Variable	Count (f)	Percentage (%)
Gender		
Male	19	55.9
Female	15	44.1
total	34	100

Table 1 shows that the majority of respondents were male, totaling 19 people (55.9%), while female respondents numbered 15 (44.1%). These results indicate that the composition of respondents by gender is relatively balanced, although the number of male respondents is slightly higher than that of female respondents. This distribution suggests that this study involved both gender groups, allowing the research findings to represent the mental health status of adolescents in both groups.

Adolescence is a transitional period marked by various biological, psychological, and social changes that affect mental health. According to Santrock, adolescents are in the stage of identity formation (identity versus role confusion), making them more vulnerable to psychological stress resulting from academic demands, peer relationships, hormonal changes, and the influence of their social environment. Both male and female adolescents can experience this vulnerability, although the manifestations of mental health disorders often differ between the two groups (18).

Various previous studies have shown that adolescent girls tend to have a higher prevalence of internalizing disorders, such as anxiety, depression, and emotional

stress. These conditions are influenced by hormonal changes, more sensitive emotional regulation, and greater social pressure. In contrast, adolescent boys more frequently exhibit externalizing disorders, such as aggressive behavior, impulsivity, or behavioral problems; consequently, mental health issues in boys are often under-identified because they do not always manifest as emotional complaints. Therefore, although there are differences in psychological characteristics based on gender, both genders face an equal risk of experiencing mental health problems (19)(20).

The results of this study show a relatively balanced distribution of respondents, thereby providing an opportunity to assess the effectiveness of the intervention across both gender groups. The researchers argue that the predominance of male respondents—which differed from female respondents by only about 11.8%—did not have a significant impact on the interpretation of the study's results. This is because both groups remain adequately represented, and the mechanism of action of the intervention does not depend on gender but rather focuses on regulating physiological,

psychological, and cognitive responses to stress. Therefore, the combination of Progressive Muscle Relaxation, Thought Stopping Therapy, and acupressure is expected to offer potential benefits for both male and female adolescents. Nevertheless, future research is recommended to include a larger sample size with gender-specific analyses to determine whether there are differences in the intervention's effectiveness between the two groups. Based on age characteristics, all respondents in this study were between the ages of 15 and 18, and thus exhibited relatively homogeneous developmental characteristics. Age homogenization was performed to minimize the influence of differences in developmental stages on the study results. According to Santrock, adolescents at this age are in the phase of self-identity exploration, characterized by rapid cognitive, emotional, and social

development, making them more vulnerable to psychological stress and mental health issues due to the various developmental demands they face (18).

After describing the respondents' characteristics, the next stage of the analysis focused on testing the effectiveness of the intervention on adolescents' mental health. The analysis was conducted by comparing mental health scores before (pre-test) and after (post-test) the administration of a combination of Progressive Muscle Relaxation (PMR), Thought Stopping Therapy (TST), and acupressure to 34 respondents. Comparisons of mean values and standard deviations were used to describe changes in mental health status, while statistical tests were performed to determine whether the observed changes were statistically significant. The results of this analysis are presented in **Table 2**.

Table 2. Research analysis results

Mental Health Variable	n	Pre-test		Post-test		p-value
		Mean	SD	Mean	SD	
Adolescent Mental Health	34	16.97	1.114	14.09	0.933	0.001

Table 2 shows that there was a decrease in the average mental health score of 2.61. When categorized, this indicates that participants were in the borderline category before the intervention and improved to the normal category after the intervention. The results of the analysis yielded a p-value of 0.001, indicating that the administration of progressive muscle

relaxation, thought-stopping therapy, and acupressure has an effect on adolescents' mental health.

Research findings indicate that a combination of PMR, thought stopping, and acupressure significantly reduced adolescents' mental health problem scores following the intervention. Evidence from the literature suggests that Progressive

Muscle Relaxation consistently reduces anxiety levels and improves sleep quality and emotional well-being in adolescents and young adults. A recent experimental study reported that PMR can significantly reduce symptoms of anxiety and emotional distress compared to a control group that did not receive a similar intervention; PMR is also more effective when combined with other therapies than when used alone; PMR can reduce tension and promote physical relaxation (21,22,23,12).

Thought-Stopping Therapy, as a cognitive technique, is an important component of strategies for managing negative thoughts. Recent research examining cognitive interventions in adolescent populations indicates that techniques focusing on the recognition and reduction of negative automatic thoughts (such as thought stopping) can reduce general anxiety levels. This literature confirms that interventions targeting maladaptive thought patterns are associated with improved mental functioning in the context of psychological stress (24,25,26).

Acupressure, as an intervention based on the stimulation of specific pressure points, has been reported to provide a relaxing effect and reduce stress symptoms. A combination intervention consisting of progressive muscle relaxation, thought-stopping therapy, and acupressure on the ST36, CV17, and HT7 points—using a pressing and rotating technique repeated

30 times at each point—is a complementary approach with the potential to improve adolescents' mental health. The combination of these three interventions works through complementary mechanisms: reducing physiological tension, helping to control recurring negative thoughts, and balancing the body's neurophysiological responses through acupressure point stimulation. This multimodal approach targets not only physical aspects but also psychological and emotional aspects, thereby potentially providing more comprehensive benefits in supporting adolescents' mental health compared to the use of a single type of intervention. These research results align with previous studies stating that stimulation of acupuncture points, such as Shenmen (HT7), plays a role in emotional regulation through nervous system modulation and the reduction of stress responses. Additionally, stimulation of the ST36 point is also known to contribute to an improvement in holistic physical and psychological balance. Thus, a combination of relaxation therapy and meridian-based acupressure can be considered an effective complementary approach to improving adolescent mental health. Furthermore, acupressure has also been reported to have the potential to alleviate anxiety disorders, as evidenced by a reduction in the biomarker High Mobility Group Box 1 (HMGB1), and to be effective in reducing symptoms of depression and anxiety (27,28,29,16,30).

Although no specific studies have yet been found that combine PMR, thought stopping, and acupressure to address mental health issues, researchers believe that combining PMR, thought stopping, and acupressure is an effective approach to addressing mental health issues, as mental health issues can affect physical health; thus, this intervention not only addresses mental health issues but also indirectly improves physical health at the same time. The literature indicates that multimodal interventions often demonstrate stronger effects than a single technique alone. This is because a multimodal approach targets various aspects of the stress response including physiological (muscles), cognitive (thoughts), and somatic (pressure points) thereby increasing the likelihood of faster and more stable psychological adaptation. This is supported by research showing that combining mindfulness therapy with acupressure can reduce psychological distress in gastritis patients and is more effective in improving health (31,32). The combination of CBT with acupressure demonstrates improvements and additional benefits compared to receiving CBT alone (33).

The results of this study further strengthen the evidence that a combination of nonpharmacological interventions provides greater benefits than a single intervention in improving mental health. A multimodal approach allows the various aspects that play a role in mental health

namely, physiological, psychological, cognitive, and behavioral aspects to be addressed simultaneously, resulting in more comprehensive benefits. Various previous studies support this approach. Nasution et al., reported that a combination of prenatal yoga and acupressure was more effective in promoting relaxation and regulating physiological responses than standard care. Septiansyah et al., also found that cognitive-based strategies, physical activity, psychoeducation, and behavioral interventions were able to improve individuals' ability to manage stress and enhance psychological functioning.

Among adolescents, Deviantony et al., demonstrated that spiritual breathing techniques can reduce psychological distress, while Pratiwi et al, reported that education based on electronic modules can enhance self-efficacy as a protective factor for mental health. Another study by Wulandari et al. also showed that relaxation exercise education is effective in reducing anxiety, while Ashar et al., found that endorphin massage can reduce anxiety in third-trimester pregnant women. Furthermore, a systematic literature review by Putri et al., showed that psychological interventions and complementary therapies, such as progressive muscle relaxation and acupressure, are effective in reducing depression and anxiety. Overall, these various findings indicate that mental health issues can be addressed more effectively through structured and comprehensive

interventions. Complementary therapies serve as adjunctive treatments that complement conventional medical therapy by enhancing an individual's ability to manage physiological and psychological responses, thereby supporting a more comprehensive improvement in mental health. This reinforces the rationale for using a combination of progressive muscle relaxation, thought-stopping therapy, and acupressure in this study as an approach that works synergistically to improve adolescents' mental health (34,35,36,37,38,39,40).

CONCLUSION AND RECOMMENDATION

This study shows that a combination of Progressive Muscle Relaxation, Thought Stopping Therapy, and acupressure has a significant effect on improving adolescents' mental health. This combined approach is effective because it works simultaneously on physiological aspects through muscle relaxation, cognitive aspects through the control of negative thoughts, and somatic aspects through the stimulation of meridian points. Thus, this intervention can serve as an applicable, affordable, and relevant complementary therapy alternative to be implemented in efforts to improve adolescents' mental health, particularly in school settings.

A combination of Progressive Muscle Relaxation (PMR), Thought Stopping Therapy, and acupressure is recommended as a mental health promotion program in

schools through school health units (UKS) and community health centers (Puskesmas). This intervention can be implemented on a regular basis with adolescents.

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