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Effectiveness of Mindfulness Training on Sleep Problems and Depression in Adolescents

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A B S T R A C T

Objective: The present study aimed to determine the effectiveness of mindfulness-based intervention on sleep problems and depression in adolescents.

Methods and Materials: This research was a quasi-experimental study with a pre-test and post-test design, along with a control group. The statistical population included all high school students with sleep problems in the city of Azarshahr during the 2023-2024 academic year. A sample of 30 individuals was selected using the Depression Anxiety Stress Scales (DASS) by Lovibond and Lovibond (1995) and the Insomnia Severity Index (ISI) by Morin (1993) through purposive sampling methods. They were randomly assigned to experimental and control groups. Data analysis was conducted using covariance analysis in SPSS version 25.

Results: Data analysis revealed that the mindfulness-based intervention resulted in a significant difference between the groups in terms of depression (0.71) and insomnia problems (0.55) ($p < .05$).

Conclusion: According to the findings, it can be suggested that mindfulness-based intervention reduces depression and sleep problems.

Keywords: *Mindfulness, Sleep Problems, Depression, Adolescents.*

1. Introduction

Adolescence is a period of growth that marks the transition from childhood to adolescence, with its onset and completion varying across cultures. This stage is also referred to as the transitional period (Colizzi et al., 2020). During adolescence, the presence of behavioral and emotional disorders is a critical issue as it can pave the way for psychological disorders and problems in adulthood.

Additionally, considering the sensitivity of adolescence as a starting point for some disorders or the development of health-related behaviors and diseases, the formation of a health pattern and a healthy lifestyle in adolescents is of significant importance (Romero et al., 2014). One of these disorders includes anxiety and sleep problems. Anxiety is considered abnormal when it hinders an individual's ability to adapt to situations (Garoff et al., 2012; Khayyer & Ostovar, 2007).

Anxiety disorder is characterized by a specific and persistent fear of being embarrassed or negatively evaluated in social situations or while performing activities in the presence of others (Cao et al., 2020; Ghorbani et al., 2012; Huang & Zhao, 2020). Consequently, these situations are avoided due to the intense anxiety they provoke (Nasirzadeh et al., 2020; Stanton et al., 2020; Tezvaran et al., 2012). Anxiety, depending on the range of situations a person fears and avoids, is diagnosed as either generalized or specific social anxiety. For instance, a person who is anxious about writing in front of others but not about other social situations would be diagnosed with specific anxiety. The generalized type, which has an early onset age, is more comorbid with other disorders such as depression and substance abuse, has more negative impacts on social and occupational activities (Vafaii et al., 2012; Wang et al., 2020), and if untreated, can lead to prolonged periods of disability, causing significant personal and social functional impairments (Roaei et al., 2011; Roy et al., 2020).

Sleep is one of the physiological needs of humans, and when this need is unmet, individuals may experience various physical and psychological disorders (Roy et al., 2020; Yang et al., 2020). Poor sleep quality can result from daily fatigue, reduced energy, and insomnia, is associated with sleep disorders, and negatively impacts individuals' quality of life (Paulson et al., 2006; Yang et al., 2020; Zawadzki et al., 2013). One of the issues frequently discussed regarding sleep is the disorders that occur during it. Psychologists have always sought to discover the causes, nature, and treatment of these disorders and have designed various methods to overcome them. These disorders, besides disrupting normal sleep, lead to significant consequences in occupational, social, and family functioning. Approximately 20% of the population faces sleep problems. Those who work late into the night or work night shifts, as well as those who suffer from anxiety, restlessness, depression, schizophrenia, and substance abuse, are more likely to grapple with these disorders (Stanton et al., 2020; Xiao et al., 2020). Insomnia is one of the most common sleep disorders and perhaps the most prevalent complaint after pain. The Diagnostic and Statistical Manual of Mental Disorders estimates the prevalence to be between 4% and 12%. Among younger individuals, the prevalence is 8% to 9%, and in older adults, it is 25% to 35%. In an epidemiological study, the prevalence was estimated at 13.5%. The prevalence is higher among women, older adults, the less educated, and those with lower social conditions (Mohamadi et al., 2015).

The present study aimed to investigate the effectiveness of mindfulness-based training on sleep problems to test the hypothesis that mindfulness-based training impacts sleep problems.

2. Methods and Materials

2.1. Study Design and Participants

The research method was quasi-experimental, utilizing a pre-test and post-test design with a control group. The statistical population comprised high school students in Azarshahr during the 2023-2024 academic year who were suffering from sleep problems. The sampling method was purposive non-random sampling, selecting students with sleep problems. The Sleep Problems Questionnaire was distributed among 100 students, and 30 who scored the highest on sleep problems were selected as the sample. Given the intervention nature of the study, a minimum sample size of 15 per group was considered (Khodayari-Fard et al., 2002). Thus, 30 adolescents with sleep problems at Shahed High School were randomly assigned to intervention and control groups (random assignment based on group matching methods using initial data). The mindfulness training group counseling program consisted of eight weekly 90-minute sessions post-pre-test for the intervention group. The control group received no intervention.

Inclusion criteria included an interest in participating in the study, meeting DSM-5 criteria for sleep problems diagnosed by a clinical psychologist, being aged 15-18 years, scoring above the third quartile on the Sleep Problems Questionnaire, not receiving any prior medication, psychological treatment, or counseling before the study, absence of other psychological disorders, and obtaining written consent from participants and their parents. Exclusion criteria included missing more than two intervention sessions.

Upon initiating the study and participant recruitment, initial interviews, evaluations, and screenings were conducted. After identifying the group members, the first session explained the process, including goals, timeline,

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implementation, benefits of participating in therapy sessions, and the exit procedure if desired. The Sleep Problems Questionnaire was distributed, and instructions on responding were provided. Finally, participants were randomly assigned to experimental and control groups, and the session start dates were set. The experimental group underwent eight 90-minute sessions of mindfulness training, while the control group remained on the waiting list. One week after the intervention, both groups completed the mentioned questionnaires. For ethical considerations, a consent form explaining the study's purpose was prepared. Participants read the consent form and agreed to participate in the study. The research consent form is provided in the appendix. Participants were assured of the confidentiality of their responses and results. Some participants requested the interpretation of their questionnaire results, which was provided in simple language.

2.2. Measures

2.2.1. Emotional Problems

The Depression Anxiety Stress Scales (DASS) by Lovibond and Lovibond (1995) was used to measure stress, anxiety, and depression. The DASS-21 includes 21 questions divided into three subscales, each containing seven questions. Each question is scored from 0 (does not apply to me at all) to 3 (applies to me very much). As DASS-21 is a shortened form of the original 42-item scale, the final score for each subscale is doubled. Lovibond and Lovibond (1995) reported the reliability of DASS-21 as 0.77 (Nakhaei Moghadam et al., 2024).

2.2.2. Insomnia Severity

Designed by Morin (1993), the ISI is a brief self-report instrument that measures the patient's perception of their insomnia. It includes seven items assessing difficulty in falling asleep, sleep maintenance (both nocturnal awakenings and early morning awakenings), satisfaction with current sleep patterns, interference with daily functioning, noticeable impairment due to the sleep problem, and degree of distress or concern caused by the sleep problem. Participants rate their perception of the ISI items on a 5-point scale (0 = not at all; 4 = very much), with total scores ranging from 0 to 28. Higher scores indicate greater perceived insomnia. Each ISI item reflects DSM-IV criteria for insomnia. Scoring guidelines are: 0-7 = no clinically significant insomnia, 8-14 = subthreshold insomnia, 15-21 = moderate clinical insomnia, 22-28 = severe clinical insomnia. Bastien et al. (2001) evaluated the psychometric properties of ISI in two samples of patients with insomnia, reporting an internal consistency of 0.74 and item-total correlations ranging from 0.36 to 0.67. Correlations between individual ISI items and sleep diary variables were 0.38 for sleep onset latency, 0.35 for wake after sleep onset, and 0.35 for early morning awakening, while the overall ISI score correlation with sleep efficiency was -0.19. Bastien et al. (2001) reported an internal consistency reliability of 0.74 and a concurrent validity with sleep diary entries of 0.65. In a study by Dastani et al. (2011), the internal consistency of the ISI was reported as 0.72 through Cronbach's alpha. Khajeh Mehrizi and Sadegh Niat (2013, as cited by Pashang et al., 2013) reported a Cronbach's alpha of 0.76 for the translated version of the ISI, with item-total correlations ranging from 0.42 to 0.60 (Safikhani, 2022).

2.3. Intervention

2.3.1. Mindfulness

The stress reduction program based on mindfulness interventions created by Kabat-Zinn (1990) includes eight 120-minute sessions (Mousavi et al., 2019; Segal et al., 2018; Teasdale, 2004).

Session One

The first session aimed to introduce the participants, build group cohesion, and explain the training objectives. Initially, a pre-test was administered. Participants were asked to answer questions about why they were there and how anxiety had impacted their lives. Their concerns and questions about mindfulness were addressed. An explanation of the basics of mindfulness and its benefits in medical and psychological contexts was provided. Participants were encouraged to commit to consistent and timely attendance, completing assignments and exercises, refraining from interrupting others, maintaining confidentiality, and not focusing excessively on immediate results to avoid constant self-judgment. The session concluded with a 15-minute breathing exercise where participants sat straight, closed their eyes, and followed the group leader’s guidance in a body scan, focusing their attention on their bodily sensations and breathing. The homework assignment was to practice this 15-minute breathing exercise daily.

Session Two

In the second session, participants shared their experiences with the 15-minute breathing exercise. A

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summary of the previous session and feedback were discussed. Participants were introduced to the raisin exercise, where they examined a raisin as if seeing it for the first time, describing its color, shape, and texture, then slowly chewing and savoring it, paying attention to the sensations and saliva mixing with the raisin. They were also guided through a full-body scan to facilitate non-judgmental awareness. The raisin exercise illustrated how mindfulness could alter the nature of experiences that typically occur automatically. Participants reported that mindful eating felt significantly different from their usual eating habits. Homework was to mindfully eat one meal during the week.

Session Three

This session incorporated slow and mindful yoga movements to promote physical relaxation and body awareness. Participants were encouraged to stay within their physical limits and avoid competing with others, emphasizing the idea that physical limitations can change over time. They were asked to view the exercises not as athletic activities but as mindfulness practices. After feedback on the yoga practice, a non-judgment exercise was conducted in pairs, where one participant shared an unpleasant experience, and the other listened without judgment or emotional reactions. Homework included daily yoga practice and recording unpleasant experiences.

Session Four

The session began with seated meditation focusing on bodily sensations, viewing them as just sensations without interpretation. Participants then practiced mindful walking, deliberately focusing on bodily sensations while walking, such as the movement of the legs, weight shifts, and balance. They were encouraged to gently redirect their attention to the sensations of walking if their minds wandered. Mindful walking aimed to cultivate continuous body-mind awareness. Psychological and physiological stress responses were explained. Homework included body scans, yoga, seated meditation, and mindful walking.

Session Five

This session reviewed the previous one and discussed the impact of the training halfway through the program. Participants shared their experiences with unpleasant events and their effects on bodily sensations, emotions, and thoughts. Seated meditation was extended to include discussions on thoughts and feelings that arose during the practice, emphasizing mindfulness in responding to daily stress. The session included a 40-minute yoga meditation, followed by individual feedback on the exercise's impact.

Session Six

Participants discussed their homework experiences and the exercises' effects on their current functioning. A 40-minute meditation focused on mindful awareness of the environment was conducted, starting with abdominal breathing and expanding awareness to the whole body. Participants were guided to notice and gently address areas of pain. They then listened to surrounding sounds, noting their occurrence and disappearance without seeking them out. Attention was directed to incoming thoughts and emotions, observing them without attachment. Homework included alternating yoga, body scans, and seated meditation, with mindfulness applied to daily activities.

Session Seven

A half-day retreat lasting three hours involved silence and continuous meditation and body scan practices. Participants were instructed not to speak or make eye contact, focusing on being present and accepting whatever arose during the day. The aim was to enhance awareness of both pleasant and unpleasant experiences without judgment. At the end of the retreat, participants shared their mixed emotions and experiences in a group discussion.

Session Eight

The final session began with a review of previous homework and continued with a body scan exercise. The discussion centered on participants' experiences throughout the sessions. They provided feedback on the mindfulness practices and their effects on their lives. The session concluded with a final discussion on the results and benefits of mindfulness, wrapping up the training program.

2.4. Data analysis

The variance and mean of the data were calculated using these indices, and the demographic information of the sample was categorized using descriptive statistics and displayed on charts. In this study, covariance analysis was used to test the hypotheses and confirm or refute them.

3. Findings and Results

Based on the results, the experimental group consisted of 54% males and 46% females, while the control group comprised 60% males and 40% females.

Table 1

Descriptive Statistics of Scores in Pre-Test and Post-Test Stages for Both Groups

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Variables	Groups	Mean	Standard Deviation
Depression	Pre-Test Control	23.6000	4.45293
	Pre-Test Experimental	24.8000	3.34237
	Post-Test Experimental	13.2667	2.60403
	Post-Test Control	25.7333	2.12020
Sleep Problems	Pre-Test Control	25.4000	3.22490
	Pre-Test Experimental	22.2667	4.57426
	Post-Test Experimental	13.3333	3.01583
	Post-Test Control	27.6667	7.75211

As seen in Table 1, the mean scores for sleep problems and depression in the control and experimental groups have significantly changed, indicating the effectiveness of mindfulness training on sleep problems and depression in adolescents. To examine the assumption of homogeneity of regression slopes, a multivariate analysis of covariance (MANCOVA) was performed to assess the interaction between the covariate and the independent variable, the results of which are presented in Table 2. The interaction between the independent variable and the covariate was not significant ($F = 85.771$, $p \leq .05$). Therefore, it can be concluded that the assumption of homogeneity of regression slopes is met. Additionally, the assumption of homogeneity of variances was also met ($F = 1.874$, $p \geq .05$). At the given error level of 0.05, this is not significant, meaning the observed covariance matrices between different groups are equal.

Table 2

Results of Multivariate Tests

Effect	Value	F	df	Error df	Sig.	Partial Eta Squared
Time * Group	Pillai's Trace	.909	8.121	9.000	168.000	.000
	Wilks' Lambda	.160	16.389	9.000	131.572	.000
	Hotelling's Trace	4.798	28.080	9.000	158.000	.000
	Roy's Largest Root	4.706	87.846c	3.000	56.000	.000

Table 2 shows the results of four multivariate tests. Given that the significance level of the test is less than 0.05, it is significant ($p \leq .05$). This means that, based on this test, the differences between the pre-test and post-test are significant. This result indicates significant differences in outcomes between the groups over time.

Table 3

Results of Covariance Analysis for Comparing Mean Post-Test Scores

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Model	Sleep Problems	1781.133	3	593.711	23.627	.000	.559
	Depression	1507.783b	3	502.594	47.553	.000	.718
Group	Sleep Problems	1781.133	3	593.711	23.627	.000	.559
	Depression	1507.783	3	502.594	47.553	.000	.718
Error	Sleep Problems	1407.200	56	25.129			
	Depression	591.867	56	10.569			

As shown in Table 3, the impact of pre-test scores on post-test scores is significant ($F = 85.771$, $p \leq .05$). It can be said that the correlation between the covariate and the independent variable is maintained. This means that after removing the effect of the pre-test, there is a significant difference between the mean post-test scores of the two groups. This implies that mindfulness training impacts sleep problems and depression in adolescents.

4. Discussion and Conclusion

The present study aimed to determine the effectiveness of mindfulness-based intervention on sleep problems and depression in adolescents. The results showed that mindfulness training impacts adolescents' emotional problems. These findings align with prior studies (Ahmadi & Valizadeh, 2021; Babakhanlou, 2023; Black et al., 2014;

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Burns et al., 2022; Campbell et al., 2016; Carlson, 2004; Davoudi et al., 2020; Faghfouriazar, 2023; Flugel Colle et al., 2010; Frank et al., 2015; Gibson Watt et al., 2023; Kashmari et al., 2024; Li et al., 2021; Rahmani et al., 2024; Rash et al., 2019; Sessanna et al., 2021; Tripathi, 2018; Weis et al., 2021; Zamani et al., 2021). The emergence of various changes is one of the emotional features of adolescents, and adapting to change, even positive change, is considered difficult during adolescence. Some adolescents easily accept these changes, making their parents' work easier. Adolescents who are slow to accept change experience more emotional turmoil and create more problems for their parents. Emotional and behavioral disorders, also known as Emotional Disturbance IDEA, often affect children and adolescents, causing mood disruptions that hinder their ability to maintain social and peer relationships (Davoudi et al., 2020).

Adolescence is a stressful period characterized by "storm and stress," with emotional fluctuations and turmoil. Emotional and affective issues have been a significant topic in adolescent psychology, discussed and examined from the past to the present. Emotional problems in children and adolescents manifest as anxiety disorders, bipolar disorder, behavioral issues, eating disorders, obsessions, and distress. Children with emotional disorders struggle to process and manage their feelings (Kashmari et al., 2024; Rahmani et al., 2024). Stress is a dynamic and exciting state where an individual faces an unusual opportunity, constraint, or demand, showing emotional, physical, and cognitive reactions (Kashmari et al., 2024). Stress is the individual's response to an external event perceived as beyond their control capacity. Anxiety refers to a state where an individual is excessively worried about the occurrence of something terrible in the future, feeling tense and distressed. Depression is characterized by depressed mood, decreased interest or pleasure, weight loss or changes in appetite, insomnia, psychomotor agitation or retardation, fatigue or loss of energy, feelings of worthlessness or guilt, difficulty concentrating or indecisiveness, and suicidal thoughts (Babakhanlou, 2023).

Emotional problems are internalized and considered internal reactions. Behavioral disorders and antisocial behaviors represent externalizing problems, while behaviors such as depression, suicide, eating disorders, and substance use reflect internalizing problems, especially if adolescents use substances to escape or avoid unpleasant situations. Psychological pressure at school, work environments, and peer relationships can cause adolescents significant turmoil. Some individual characteristics of adolescents also contribute to or exacerbate stress. Mindfulness is a technique that combines meditation and specific mental orientations towards an experience, encouraging non-judgmental awareness of the present moment or minimizing the engagement of thoughts and feelings (Davoudi et al., 2020). Individuals with anxiety can significantly reduce stress, anxiety, and depression symptoms after practicing mindfulness techniques. Depressed individuals who have practiced mindfulness for a month report reduced depression symptoms and other benefits in this area.

Based on Kabat-Zinn's mindfulness-based stress reduction (MBSR) model and incorporating cognitive therapy principles, mindfulness-based cognitive therapy (MBCT) was developed to replace negative emotions with positive ones. MBCT combines mindfulness meditation training with cognitive therapy interventions. During mindfulness exercises, self-regulation abilities are trained through practices focusing on internal attention, such as awareness of breathing, or external objects, like sounds, with an emphasis on present-moment experiences (Burns et al., 2022). With a non-judgmental view of thoughts, feelings, and behaviors during mindfulness practices, attention can be immediately shifted from irrelevant worrisome thoughts to present-moment experiences. Poor emotional awareness can leave individuals without information on what feelings they are experiencing and how best to alleviate them during distress (Weis et al., 2021). Additionally, these individuals may lack the interest and capacity to understand how their actions may cause others to suffer, thus refraining from aggression. People with poor empathy cannot consider another's perspective and imagine that others did not intend to harm, humiliate, or abandon them, nor can they worry about the suffering they inflict through antisocial actions (Safikhani, 2022; Segal et al., 2018). Therefore, mindfulness training increases a sense of connection and empathy towards others, improving emotional regulation problems in students with conduct disorders.

The results also showed that mindfulness training impacts adolescents' sleep problems. These findings align with prior findings (Black et al., 2014; Campbell et al., 2016; Carlson, 2004; Davoudi et al., 2020; Faghfouriazar, 2023; Flugel Colle et al., 2010; Frank et al., 2015; Gibson Watt et al., 2023; Kashmari et al., 2024; Li et al., 2021; Rahmani et al., 2024; Rash et al., 2019; Zamani et al., 2021). This suggests that mindfulness training affects adolescents' sleep problems. Sleep is a fundamental human need, with approximately one-third of our lives spent sleeping. This

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time should not be considered a waste because sleep reduces stress, anxiety, and nervous tension, helping individuals regain energy for concentration, adaptation, and enjoying daily activities. Sleep aids mental and physiological rejuvenation, necessary for accepting new roles and responsibilities (Zamani et al., 2021). A good night's sleep significantly impacts productivity and success. Combs and Krippner believe adults spend about one-third and infants two-thirds of their lives asleep, considering sleep one of the most fundamental needs. The complex and mysterious world of sleep primarily involves research identifying brain parts and their connections to sleep, understanding sleep sequences, the cause of dreams, and the consequences of sleep deprivation. Different theoretical approaches to sleep do not always align, leading to varied explanations. Sleep is an integral part of human life, with sleep disorders being common and directly and indirectly affecting other life aspects. Diagnosing sleep disorders is crucial and requires appropriate tools (Flugel Colle et al., 2010; Rash et al., 2019; Sessanna et al., 2021; Zamani et al., 2021).

Insomnia, sleep apnea, Ekbom's syndrome, hypersomnia, narcolepsy, nightmares, panic disorders in sleep, sleepwalking, and sleep talking are among these disorders. Sleep is essential for mental and physical benefits, including memory enhancement, stress reduction, increased concentration, and weight stability. Some people fall asleep as soon as their heads hit the pillow, while others take hours or wake up several times at night. Inadequate or poor-quality sleep can have irreversible consequences on the body (Campbell et al., 2016). Adequate and quality sleep plays a crucial role in a person's rehabilitation and focus. Sleep and wakefulness function involve the entire brain, not just specific parts. In today's competitive and stressful society, sleep deprivation and disorders have become social issues, reducing physical and mental health. Therefore, appropriate treatment is vital. Over time, various pharmacological treatments and drug groups have been used to treat insomnia, including benzodiazepine receptor agonists, melatonin receptor agonists, antidepressants, atypical antipsychotics, and first-generation benzodiazepine receptor antagonists. Despite their widespread use, careful monitoring for potential side effects, abuse, and tolerance development is necessary. Behavioral and psychotherapy should also be considered as complementary methods (Rash et al., 2019).

Sleep problems cause adolescents to stay awake at night, affecting various functions. For example, sleep-deprived individuals perform poorly in school or cannot engage in sports activities. Moodiness, depression, emotional problems, etc., can all result from irregular and insufficient sleep. Many cases of dangerous accidents involving adolescents are linked to insomnia. Adolescents should ideally sleep 8-10 hours daily, going to bed by 10 PM to wake up at 6 AM for school. However, many adolescents struggle to fall asleep early. An unsuitable sleep environment can also affect regular sleep patterns, with rooms being too warm, cold, bright, or noisy disrupting sleep. Stress or anxiety, whether related to school, emotional issues, or family conflicts, also impact sleep. Mental health issues such as depression and post-traumatic stress disorder cause sleep disturbances. Some medications negatively affect sleep, while poor dietary habits contribute to sleep problems (Zamani et al., 2021).

Mindfulness increases awareness and focuses on breathing and sensing each body part in alignment, achieved through meditation. By being present and focusing on the moment, separating the mind from past and future, and quieting mental chatter, mindfulness can be attained quickly, eventually leading to a powerful and aware mind through practice. Mindfulness based on stress reduction (MBSR) has been shown to reduce sleep disorders and improve sleep quality. Limitations of this study include the difficulty of implementing some mindfulness-based intervention techniques with adolescents and the lack of a follow-up phase to assess the continuity of intervention effects. Future research should include long-term follow-up periods to examine the enduring therapeutic effects of mindfulness-based interventions (Black et al., 2014; Campbell et al., 2016). Considering the impact of mindfulness on sleep problems, it is recommended as an effective approach to improving emotional regulation processes. Positive and negative emotions within the family should be assessed, and positive thinking should be reinforced. Adolescents' emotions and behaviors, such as severe pessimism, worthlessness, hopelessness, low self-esteem, self-blame, and restlessness, should be addressed logically. Emotional problems should be analyzed interactively within the family. When all attention is on the adolescent, and parents withdraw or consider their role neutral, no significant improvement typically occurs. Meditation and mindfulness have been studied extensively in clinical trials by psychologists. Based on these studies, meditation effectively controls pressure, anxiety, pain, depression, and insomnia (Weis et al., 2021).

Mindfulness is a method that fosters awareness and concentration on breathing and the sensations of individual body parts in alignment, achieved through meditation. By

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being present in the moment and focusing on the present, while quieting mental chatter about the past and future, mindfulness can be quickly achieved and gradually leads to a more powerful and aware mind through practice. Mindfulness based on stress reduction (MBSR) has been shown to reduce sleep disorders and improve sleep quality.

5. Limitations & Suggestions

Limitations of this study include the difficulty of implementing some mindfulness-based intervention techniques with adolescents due to the challenge of establishing a connection with them. Another limitation was the absence of a follow-up phase to assess the continuity of the therapeutic effects of the mindfulness-based intervention. Future research should include long-term follow-up periods to evaluate the lasting therapeutic effects of mindfulness-based interventions.

Considering the impact of mindfulness on sleep problems, it is recommended that mindfulness interventions be used as an effective approach to improving emotional regulation processes. Positive and negative emotions within the family should be evaluated, and positive thinking should be reinforced. Adolescents' emotions and behaviors, such as severe pessimism, worthlessness, hopelessness, low self-esteem, self-blame, and restlessness, should be logically addressed. Emotional problems should be analyzed interactively within the family context. When all focus is on the adolescent, and parents withdraw or consider their role neutral, significant improvement is unlikely to occur. Meditation and mindfulness have been extensively studied in clinical trials by psychologists. Based on these studies, meditation can effectively control stress, anxiety, pain, depression, and insomnia.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed in this article.

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