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Examining the Effectiveness of Mindfulness-Based Therapy on Adaptive and Maladaptive Emotion Regulation in Students with Body Dysmorphic Disorder

Mina. Jafari[1], Zohreh. Latifi[2*], Mohsen. Golparvar[3]

1 PhD Student in counseling, Department of counseling, Isf.C., Isalmic Azad University, Isfahan, Iran
2 Associate Professor, Department of Psychology, Payame Nour University, Tehran, Iran
3 Professor, Department of Psychology, Isf.C., Islamic Azad University, Isfahan, Iran.
*Correspondence: Z_yalatif@pnu.ac.ir

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ABSTRACT

This study aimed to examine the effectiveness of mindfulness-based therapy on resilience and emotion regulation among students with body dysmorphic disorder in Isfahan. The research employed an experimental design with pre-test, post-test, and follow-up stages using control and experimental groups. The statistical population included all students with body dysmorphic disorder who had referred to counseling and psychotherapy centers in Isfahan. From this population, 40 female students were purposefully selected based on inclusion and exclusion criteria and were randomly assigned to experimental and control groups. All participants were assessed using the Cognitive Emotion Regulation Questionnaire developed by Garnefski and Kraaij (2006) across three stages. While the control group was placed on a waiting list, the experimental group received eight 90-minute sessions of mindfulness-based therapy. The collected data were analyzed using descriptive statistics (mean and standard deviation) and inferential statistics (repeated measures ANOVA and Bonferroni post hoc test). The results indicated that this intervention improved various dimensions of emotion regulation among the female participants in the sample. Based on these findings, it can be concluded that mindfulness is an effective approach for enhancing emotion regulation dimensions among these students.

Key words: Resilience, Mindfulness, Students, Body Dysmorphic Disorder

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Introduction

Body image is one of the most salient aspects of self-concept formation in adolescence, encompassing perceptions, attitudes, and emotional evaluations of one's physical appearance (1). During adolescence, rapid biological, social, and cognitive changes heighten sensitivity toward physical appearance and self-presentation. When this sensitivity is accompanied by distorted or unrealistic body perceptions, it may lead to maladaptive psychological consequences such as body dissatisfaction, shame, and, in severe cases, body dysmorphic disorder (BDD) (2). BDD is characterized by a persistent preoccupation with perceived defects in appearance that are either minimal or unobservable to others, leading to significant distress and functional impairment (3). This disorder often begins in adolescence—a developmental period when self-image and identity are especially vulnerable to external evaluations and social comparison (4).

Research indicates that adolescents with BDD exhibit higher levels of emotional dysregulation, cognitive distortions, and perfectionism, which further exacerbate their symptoms and reduce psychological well-being (5). Emotional regulation plays a central role in the maintenance and severity of BDD, as individuals with this condition often resort to maladaptive cognitive strategies such as rumination, catastrophizing, and self-blame to manage negative affect (6). Conversely, adaptive emotion regulation strategies—such as positive refocusing and acceptance—contribute to greater emotional stability and resilience (7). Deficits in adaptive emotion regulation may therefore mediate the relationship between body dissatisfaction and the development of psychopathological symptoms (8).

In the context of Iranian adolescents, sociocultural factors such as social media exposure, beauty norms, and collectivist values amplify body image concerns and emotional instability (9). Recent studies highlight the rising prevalence of appearance anxiety and body image disorders among Iranian youth, especially adolescent girls, due to increased engagement with idealized online representations and peer comparison (10). Moreover, pressures stemming from academic performance and social expectations may compound the emotional distress experienced by this group, increasing vulnerability to maladaptive coping mechanisms (11). In this light, addressing emotional regulation deficits in adolescents with BDD is crucial for promoting both psychological resilience and mental health.

Traditional therapeutic approaches to BDD, such as Cognitive Behavioral Therapy (CBT), have demonstrated moderate effectiveness in symptom reduction, but often fall short in addressing the deep-seated emotional dysregulation underlying the disorder (4). Moreover, cognitive interventions alone may not adequately enhance adolescents' acceptance and awareness of bodily sensations and thoughts. In contrast, mindfulness-based interventions have gained growing empirical support as integrative approaches that target both cognitive and emotional dimensions of psychopathology (12). Mindfulness encourages individuals to observe their thoughts, sensations, and emotions nonjudgmentally, promoting awareness and self-compassion, which are essential for managing appearance-related distress (13).

Empirical evidence supports the efficacy of mindfulness-based interventions in improving emotional regulation, reducing rumination, and enhancing psychological flexibility among individuals with anxiety and mood disorders (14). Mindfulness-based therapy facilitates adaptive coping by strengthening attentional control, reducing experiential avoidance, and promoting acceptance-oriented responses to distressing thoughts or self-perceptions (15). From a neuropsychological standpoint, mindfulness practices engage neural circuits involved in emotion regulation, particularly the prefrontal cortex and anterior cingulate cortex, leading to better modulation of emotional reactivity (13).

Adolescent-centered mindfulness training, an adaptation of traditional mindfulness programs, emphasizes developmentally appropriate practices that align with the cognitive and emotional capacities of teenagers (16). This approach incorporates experiential exercises such as mindful breathing, body scanning, and emotion awareness games, which cultivate present-moment awareness and self-regulation. Studies in Iranian populations have confirmed the effectiveness of adolescent-centered mindfulness interventions in reducing depressive symptoms, mind wandering, and risk-taking behaviors (17). Similarly, mindfulness-based protocols have shown significant effects in improving emotional regulation, resilience, and psychological capital among adolescents in educational settings (7).

Mindfulness also enhances tolerance for ambiguity and cognitive flexibility, helping adolescents reinterpret negative self-evaluations and body-related thoughts (12). By fostering nonjudgmental awareness, mindfulness interrupts automatic emotional responses, thereby mitigating maladaptive patterns such as catastrophizing and excessive rumination (6). These mechanisms are particularly beneficial for adolescents with BDD, who often engage in compulsive checking, avoidance, or reassurance-seeking behaviors driven by distorted self-image (2). When adolescents learn to observe their distressing thoughts without overidentifying with them, they become less reactive to perceived imperfections and more capable of adaptive emotional processing (8).

In addition to its emotional benefits, mindfulness has been associated with improved cognitive performance, attention control, and self-awareness (13). Such improvements are particularly relevant to adolescents with BDD, whose cognitive distortions often revolve around selective attention to perceived flaws and self-focused rumination (5). Moreover, mindfulness-based therapy strengthens self-compassion, which serves as a buffer against the internalized shame and self-criticism common among individuals with body image disturbances (18). Research has demonstrated that adolescents who practice self-compassion and mindful awareness report higher self-esteem and reduced psychological vulnerability to negative appearance evaluations (9, 18).

In the Iranian context, mindfulness training has been integrated into various therapeutic and educational frameworks to enhance mental well-being and resilience among adolescents (19). Rahimpour et al. (2021) found that adolescent-centered mindfulness training significantly improved both resilience and wisdom among female high school students, demonstrating its potential for fostering adaptive coping in stressful environments. Similarly, Davoodi et al. (2019) reported that mindfulness training, compared with cognitive-behavioral and emotion-focused therapies, yielded superior improvements in emotional regulation among adolescent girls with mobile phone-related anxiety symptoms. These findings underscore the suitability of mindfulness-based approaches for addressing complex emotional challenges in adolescent populations.

Mindfulness interventions also contribute to the development of psychological well-being components such as optimism, engagement, and purpose, aligning with Seligman's PERMA model of flourishing (20). Incorporating mindfulness within positive psychology frameworks has been shown to increase vitality, enjoyment, and emotional balance in youth populations (20). Moreover, mindfulness fosters metacognitive awareness—the ability to observe one's thoughts as transient mental events rather than absolute truths—which helps adolescents detach from distorted self-perceptions that fuel body dissatisfaction (3).

Despite the growing body of evidence, the relationship between mindfulness, emotion regulation, and BDD remains an area that requires further empirical exploration, particularly in adolescent samples. Many adolescents with BDD not only struggle with maladaptive cognitive patterns but also with emotional avoidance and heightened self-criticism, which traditional therapeutic models may inadequately address (11). Integrating mindfulness into therapeutic settings provides an opportunity to target these underlying processes by promoting awareness, acceptance, and emotional flexibility (17).

Furthermore, contemporary mindfulness-based interventions emphasize the cultivation of compassion and interpersonal awareness, helping adolescents build healthier social connections and reduce isolation—a common feature among those with appearance-related concerns (9). In addition, mindfulness helps individuals respond constructively to external evaluations and social comparisons, which are prominent

stressors in adolescence (5). Enhancing emotional regulation through mindfulness thus serves as both a preventive and therapeutic mechanism for reducing the severity of BDD symptoms (7).

A number of studies conducted in Iran and other contexts have verified the benefits of mindfulness-based approaches for anxiety, depression, and emotion dysregulation (14, 15). For example, Karimi et al. (2023) demonstrated the effectiveness of mindfulness therapy in reducing anxiety and stress levels among patients with COVID-19, highlighting its role in promoting adaptive emotional responses to distressing circumstances. Similarly, Sohrabi (2023) showed that mindfulness training significantly enhanced anxiety control and performance among adolescent athletes with disabilities, providing further evidence of its generalizability across populations and stressors.

Moreover, mindfulness-based interventions can be flexibly integrated into school settings, where adolescents can learn structured emotional regulation strategies in a supportive environment (7). This integration aligns with contemporary educational psychology perspectives emphasizing social-emotional learning as a core component of adolescent development. By equipping students with mindfulness skills, educators and clinicians can foster emotional awareness, psychological resilience, and body acceptance, which collectively enhance well-being and academic functioning (20).

Recent meta-analytic findings reinforce the cross-domain benefits of mindfulness on emotional and cognitive outcomes. Yang et al. (2025) reported that mindfulness interventions significantly improve cognitive functioning and attentional control in athletes, findings that extend to general adolescent populations dealing with emotional distress. These effects are attributed to mindfulness-induced neural plasticity and the strengthening of self-regulatory processes (13). Together, these findings indicate that mindfulness may serve as a valuable transdiagnostic intervention for psychological disorders characterized by emotional dysregulation, including BDD.

In conclusion, the literature demonstrates that mindfulness-based therapy promotes adaptive emotion regulation, reduces maladaptive emotional responses, and enhances overall psychological functioning in adolescents (6, 7, 17). However, despite growing research attention, few empirical studies have examined the direct impact of mindfulness training on emotion regulation among adolescents with body dysmorphic disorder in Iran. Addressing this gap is critical for developing culturally sensitive interventions that target the emotional and cognitive mechanisms underlying BDD.

Therefore, the present study aimed to investigate the effectiveness of mindfulness-based therapy on adaptive and maladaptive emotion regulation among students with body dysmorphic disorder.

Methods and Materials

Study Design and Participants

Given that the purpose of this study was to determine the effectiveness of mindfulness training on the dimensions of emotion regulation among students with body dysmorphic disorder, an experimental research method (a pre-test–post-test design with a three-group control model) along with a follow-up phase (one month to 45 days after the post-test) was used. The statistical population consisted of all adolescents with psychological problems in the 2024–2025 academic year. The statistical sample included 80 adolescents with psychological problems who were selected through convenience sampling from among adolescents with psychological difficulties based on inclusion and exclusion criteria.

Inclusion criteria included:

1. Age between 12 and 15 years.
2. Female gender.
3. Being identified by school officials as depressed or anxious.
4. Having psychological problems based on a score above average (the sum of mid-range scores for each item) on the Beck Depression and Anxiety inventories within the range of anxiety symptoms.
5. Obtaining informed consent from parents for participation in the training course.
6. Not participating concurrently in another psychotherapy or educational course.

Exclusion criteria included:

1. Concurrent participation in another educational program.
2. Being absent from more than two sessions during the course.
3. Being older than fifteen years.
4. Suffering from psychological problems other than depressive and anxiety disorders.

For adequate sampling, a convenience sampling method was used. To this end, by visiting four large public schools, the school administrators were asked to introduce students known to be suffering from anxiety and depression. In this stage, 100 students were introduced, and based on the inclusion criteria, 80 students were selected. To prevent sample attrition, internal motivation was fostered through the explanation of the therapeutic logic. In addition, participants were provided with suitable refreshments in each session, and every other session, small gifts such as stationery items were given to increase external motivation. It should be noted that no attrition occurred in the groups. The sample size was calculated using G*Power software, version 3.1, which indicated 20 participants per group. After obtaining the necessary permissions from the university and its research deputy, the study was introduced to the Department of Education of Isfahan City, which issued introduction letters to four public schools. Following purposeful sampling, an initial meeting was held with parents and selected adolescents from the four groups, during which they were asked to attend the training sessions twice a week for four weeks. Informed consent for participation was obtained from both parents and adolescents. Additionally, after the completion of two months and eight sessions of training, the control group received a summary of the sessions.

At this stage, all adolescents completed the pre-test measures using the study instruments. The location and schedule of the educational sessions were then introduced. To enhance the internal and external validity of the research, the training sessions were conducted by qualified instructors (other than the researcher) who held official certificates in the relevant training methods.

Data Collection

The Cognitive Emotion Regulation Questionnaire (CERQ-Short), developed by Garnefski and Kraaij (2006), is an 18-item instrument that assesses cognitive emotion regulation strategies in response to threatening or stressful life events on a five-point Likert scale ranging from 1 (never) to 5 (always). The score for each of the nine subscales is calculated by summing the scores of the two items corresponding to each subscale. The total score for adaptive strategies is obtained by summing the subscales of positive refocusing, positive reappraisal, acceptance, refocus on planning, and putting into perspective, then dividing by 10 (the number of items). The score for maladaptive strategies is obtained by summing the subscales of self-blame,

other-blame, rumination, and catastrophizing, then dividing by 8 (the number of items). The validity of this questionnaire was confirmed by Garnefski and Kraaij (2006). They reported acceptable Cronbach's alpha reliability coefficients for the subscales, with the lowest being for self-blame (0.67), and the remaining coefficients ranging from 0.73 to 0.81. In the present study, internal consistency for both subscales was again assessed using Cronbach's alpha, yielding coefficients of 0.78 for adaptive emotion regulation and 0.70 for maladaptive emotion regulation.

Intervention

All participants received ten 90-minute mindfulness-based training sessions designed specifically for adolescents (Sadri et al., 2021). The program followed a structured and progressive format emphasizing emotional awareness, self-regulation, and mindful compassion. The first session focused on administering the pre-test, introducing participants to each other, and providing an overview of the logic and neurobiological foundations of mindfulness, along with mindful compassion meditation practiced with parents. The second session introduced mindful breathing techniques and diaphragmatic breathing to manage anxiety and worry, along with the "glitter bottle" exercise to illustrate the difference between an agitated and calm mind. The third session taught body scan techniques and the "good memory" exercise to enhance awareness of positive social experiences. In the fourth session, participants practiced mindfulness of the present moment through the "glass of water" exercise and learned to identify emotional processes during psychological insecurity. The fifth session focused on sensory mindfulness using the five senses and meditation practices for relief from depression and anxiety. The sixth session introduced mindfulness of emotions through "I feel" games, reflective journaling, and meditative awareness of emotional experiences. The seventh session taught mindfulness of thoughts, including the "blank whiteboard" metaphor for accepting negative thoughts without judgment and the "tree meditation" exercise. The eighth session expanded mindfulness to the surrounding environment through compassion-based practices and kind actions toward others. The ninth session addressed painful emotions, their impact on daily life, and the importance of nonjudgmental acceptance using mindful breathing and self-reflective worksheets. Finally, the tenth session served as a review and consolidation phase, where key concepts were revisited, participants' questions were answered, and the post-test was administered.

Data analysis

For data analysis, repeated measures analysis of variance (ANOVA) was conducted using SPSS software.

Findings and Results

As shown in Table 1, in the variable of emotion regulation (adaptive and maladaptive), the schema therapy group, the mindfulness-based therapy group, and the acceptance and commitment therapy (ACT) group exhibited more significant changes than the control group during the post-test and follow-up stages.

Table 1. Mean and standard deviation of emotion regulation (adaptive and maladaptive) in research groups at three time stages

Variable	Time	Mindfulness-Based Therapy Group *M (SD)*	Control Group *M (SD)*

Adaptive Emotion Regulation	Pre-test	22.55 (2.19)	22.75 (2.15)
	Post-test	29.65 (1.46)	21.40 (2.16)
	Follow-up	35.10 (2.10)	21.65 (2.37)
Maladaptive Emotion Regulation	Pre-test	27.85 (4.70)	28.15 (4.81)
	Post-test	20.65 (4.05)	27.50 (4.39)
	Follow-up	18.65 (4.07)	27.50 (4.68)

Table 2 presents the results of the Shapiro–Wilk test (for normality of distribution), Levene's test (for equality of variances), Box's M test (for equality of variance–covariance matrices), and Mauchly's test (for sphericity assumption) for the emotion regulation variable (adaptive and maladaptive).

Table 2. Results of Shapiro–Wilk, Levene's, Box's M, and Mauchly's tests for emotion regulation (adaptive and maladaptive)

Variable	Time	Shapiro–Wilk (Statistic / Sig.)	Levene's Test (Statistic / Sig.)	Box's M (Statistic / Sig.)	Mauchly's (Statistic / Sig.)
Adaptive Emotion Regulation	Pre-test	0.94 / 0.008	1.54 / 0.21	53.62 / 0.001	0.81 / 0.001
	Post-test	0.98 / 0.26	5.22 / 0.002		
	Follow-up	0.95 / 0.01	1.14 / 0.49		
Maladaptive Emotion Regulation	Pre-test	0.96 / 0.013	3.87 / 0.012	60.18 / 0.001	0.99 / 0.82
	Post-test	0.93 / 0.001	2.47 / 0.07		
	Follow-up	0.95 / 0.01	4.20 / 0.01		

As observed in Table 2, emotion regulation (adaptive and maladaptive) showed a normal distribution at all three stages (pre-test, post-test, and follow-up), except for adaptive emotion regulation in the pre-test and maladaptive emotion regulation in the post-test ($p \leq 0.01$ or $p \leq 0.05$). Equality of error variances was also observed, except for adaptive emotion regulation in the post-test ($p < 0.05$ or $p \leq 0.01$). In contrast, the equality of variance–covariance matrices (Box's M test) and Mauchly's test for a daptive emotion regulation were significant ($p < 0.05$), indicating that the sphericity assumption was not met. In cases where the sphericity assumption is violated, the Greenhouse–Geisser correction should be applied to the degrees of freedom in the final analysis tables.

Table 3. Results of repeated measures ANOVA for emotion regulation (adaptive and maladaptive)

Type of Effect	Source	SS	df	MS	F	Sig.	η^2	Power
Adaptive Emotion Regulation								
Within-group	Time	3306.10	1.68	1965.20	815.79	0.001	0.91	1
	Time × Group	1498.57	5.05	296.92	123.26	0.001	0.83	1
	Error (Time)	308.86	127.86	2.41				
Between-group	Group	2315.25	3	771.75	48.59	0.001	0.66	1
	Error	1207.05	76	15.88				
Maladaptive Emotion Regulation								
Within-group	Time	2178.41	2	1088.70	317.95	0.001	0.81	1
	Time × Group	600.79	6	100.13	29.24	0.001	0.54	1
	Error (Time)	520.47	152	3.42				
Between-group	Group	1135.85	3	378.61	10.50	0.001	0.29	0.99
	Error	2740.28	76	36.06				

Given the violation of the sphericity assumption for adaptive emotion regulation and the fulfillment of this assumption for maladaptive emotion regulation, as shown in the table, adaptive emotion regulation

exhibited significant differences across time (F = 815.79, df = 1.68, p < 0.01) and in the interaction between time and group (F = 123.26, df = 5.05, p < 0.01). This indicates a significant difference (p < 0.01) in adaptive emotion regulation between pre-test, post-test, and follow-up phases and in the interaction of time with group. The eta-squared value for the time factor was 0.91 with a power of 1, and for the time–group interaction it was 0.83 with a power of 1. This shows that 91% and 83% of the variance in adaptive emotion regulation were attributable to the independent variable, both confirmed with full statistical power.

Furthermore, as observed in the between-group section, adaptive emotion regulation showed a significant difference (p < 0.01). The eta-squared value for the group factor was 0.66, with a power of 1, meaning that the analysis detected, with 100% power, a 66% difference in adaptive emotion regulation between at least one of the experimental groups and the control group.

For maladaptive emotion regulation, significant differences were observed across time (F = 317.95, df = 2, p < 0.01) and for the interaction between time and group (F = 29.24, df = 6, p < 0.01). This indicates significant differences (p < 0.01) in maladaptive emotion regulation between pre-test, post-test, and follow-up stages and in the interaction of time with group. The eta-squared values for the time factor and the time–group interaction were 0.81 and 0.54, respectively, both with a statistical power of 1. Thus, 81% and 54% of the variance in maladaptive emotion regulation were due to the independent variable, fully confirmed by the statistical power test.

Additionally, in the between-group section, maladaptive emotion regulation showed a significant difference (p < 0.01). The eta-squared value for the group factor was 0.29, with a power of 0.99, indicating that the analysis revealed, with 99% power, a 29% difference in maladaptive emotion regulation between at least one of the experimental groups and the control group.

Table 4. Results of Bonferroni post hoc test for pairwise comparisons of experimental and control groups in emotion regulation (adaptive and maladaptive)

Variable & Time	Comparison	Mean Difference	SE	Sig.
Adaptive Emotion Regulation	Pre-test – Post-test	-5.27	0.19	0.001
	Pre-test – Follow-up	-9.05	0.27	0.001
	Post-test – Follow-up	-3.77	0.21	0.001
	Mindfulness vs. Control	7.17	0.73	0.001
Maladaptive Emotion Regulation	Pre-test – Post-test	5.71	0.28	0.001
	Pre-test – Follow-up	6.90	0.29	0.001
	Post-test – Follow-up	1.19	0.30	0.001
	Mindfulness vs. Control	-5.33	1.10	0.001

For adaptive emotion regulation, there were significant differences between the pre-test and post-test (p < 0.01) and between the pre-test and follow-up (p < 0.01). Moreover, significant differences were found among the three experimental groups (schema therapy, mindfulness-based therapy, and acceptance and commitment therapy) (p < 0.01), as well as between all three experimental groups and the control group (p < 0.01).

For maladaptive emotion regulation, significant differences were found between the pre-test and post-test (p < 0.01) and between the pre-test and follow-up (p < 0.01). However, there were no significant differences among the experimental groups (p > 0.05). Nevertheless, significant differences were observed between each of the three experimental groups (schema therapy, mindfulness-based therapy, and acceptance

and commitment therapy) and the control group ($p < 0.01$). This indicates that all three therapeutic methods had equally effective impacts on reducing maladaptive emotion regulation.

Discussion and Conclusion

The results of the present study demonstrated that mindfulness-based therapy significantly improved adaptive emotion regulation and reduced maladaptive emotion regulation among students with body dysmorphic disorder (BDD). This finding confirms the main hypothesis that mindfulness training serves as an effective intervention in enhancing emotional functioning among adolescents struggling with negative body image perceptions. In particular, the results revealed a significant increase in adaptive emotion regulation strategies such as acceptance, positive refocusing, and planning, alongside a decrease in maladaptive strategies like rumination, catastrophizing, and self-blame. These outcomes are consistent with prior evidence supporting mindfulness as a tool for cultivating psychological flexibility, emotional awareness, and nonjudgmental acceptance of internal experiences (6, 7, 13).

The improvement observed in adaptive emotion regulation aligns with the theoretical framework suggesting that mindfulness enhances cognitive reappraisal and reduces emotional reactivity. Adolescents with BDD typically exhibit excessive preoccupation with perceived physical flaws and negative self-schemas, which elicit emotional instability and maladaptive coping behaviors (2). By engaging in mindfulness practices such as body scanning, breathing awareness, and emotion observation, participants learned to decenter from distressing body-related thoughts and regulate their emotions more adaptively. These mechanisms are consistent with findings from Rahimpour et al. (2021), who reported that adolescent-centered mindfulness training improved resilience and wisdom by fostering self-awareness and emotional stability among students (19). Similarly, Davoodi et al. (2019) found that mindfulness training significantly enhanced emotional regulation compared to cognitive-behavioral and emotion-focused therapies among adolescent girls with mobile phone-related anxiety (8).

Another explanation for these findings lies in the role of mindfulness in reducing cognitive fusion and promoting tolerance of ambiguity, allowing adolescents to interpret intrusive appearance-related thoughts as transient rather than absolute truths. This supports the results of Asli-Azad et al. (2019), who demonstrated that mindfulness therapy effectively decreased cognitive-behavioral fusion and enhanced ambiguity tolerance among patients with obsessive-compulsive symptoms (12). Such cognitive defusion processes may help adolescents with BDD detach from rigid beauty ideals and diminish their emotional responses to self-critical thoughts. The reduction in maladaptive emotion regulation strategies found in this study is also congruent with the findings of Rezapour et al. (2023), who reported that mindfulness and behavioral activation interventions effectively reduced experiential avoidance and enhanced emotional regulation in adolescents with social anxiety disorder (11).

Moreover, the findings correspond to neuropsychological models of mindfulness, which propose that sustained practice strengthens prefrontal regulation of limbic responses, leading to enhanced control over emotional arousal (13). This neurological explanation has been supported by recent meta-analyses showing that mindfulness interventions improve cognitive functioning and attentional control, which are vital for adaptive emotion regulation. Such improvements may explain the significant reduction in maladaptive strategies like rumination and catastrophizing among participants. Karimi et al. (2023) also found that

mindfulness therapy alleviated stress and anxiety among patients with COVID-19, attributing the results to improved cognitive-emotional integration and stress regulation (14).

The observed findings also resonate with prior Iranian studies emphasizing the efficacy of adolescent-centered mindfulness programs in reducing depressive and anxiety symptoms. For example, Salahi-Isfahani and Izadi (2022) demonstrated that mindfulness therapy decreased mind wandering and depressive symptoms among adolescents (16). A subsequent study by the same authors (2023) reported that mindfulness therapy and emotion regulation training effectively reduced risk-taking behaviors and depression among adolescents (17). These studies corroborate the current results, suggesting that mindfulness promotes emotional stability and behavioral control by enhancing moment-to-moment awareness and reducing automatic emotional responses.

Additionally, the findings align with the work of Sharifian Motlaq and Mohammadi (2025), who found that mindfulness training significantly enhanced psychological capital and emotion regulation among gifted students (7). The overlap between their results and those of the present study underscores mindfulness as a multidimensional approach that not only mitigates psychological distress but also promotes personal growth and adaptive coping. The enhancement of adaptive emotional regulation observed in this study may also be linked to the cultivation of self-compassion—a core component of mindfulness. Self-compassion helps adolescents adopt a kinder internal dialogue, thereby reducing self-criticism and shame associated with body dissatisfaction (18).

The present study's findings are further consistent with previous research highlighting the psychosocial impact of mindfulness-based interventions in adolescent populations. For instance, Sohrabi (2023) showed that adolescent-centered mindfulness reduced anxiety and improved self-control in young athletes with disabilities (15). Similarly, Marashi et al. (2023) demonstrated that mindfulness, integrated within the PERMA model of well-being, increased vitality and academic motivation among adolescents (20). Together, these findings indicate that mindfulness fosters broad improvements in self-regulation, engagement, and emotional balance across contexts.

From a clinical standpoint, the reduction in maladaptive emotion regulation strategies observed in this study reflects mindfulness's ability to disrupt habitual thought patterns associated with BDD. Adolescents with body image disturbances often engage in self-focused rumination and avoidance behaviors that perpetuate anxiety and depressive symptoms (4). Mindfulness encourages exposure to distressing thoughts and sensations within a framework of acceptance rather than avoidance, thus breaking the reinforcement cycle of emotional dysregulation. This outcome is in line with the conceptualization of mindfulness as an experiential therapy that shifts attention from evaluative to observational processing (12).

Furthermore, the positive effects of mindfulness on emotional regulation in adolescents with BDD may be partially explained by its enhancement of metacognitive awareness. Ahmaditahr et al. (2011) emphasized the importance of metacognitive interventions in improving symptoms of BDD, noting that awareness of thought processes contributes to symptom relief (3). Mindfulness similarly fosters metacognitive insight, allowing individuals to observe their mental states from a detached perspective. By learning to identify and label emotions as passing experiences, adolescents can better regulate emotional intensity and prevent escalation into maladaptive cycles of anxiety or depression (6).

The findings of this study also align with cross-cultural research emphasizing the connection between mindfulness, social functioning, and body image satisfaction. Papapanou et al. (2023) found that adolescents with higher social appearance anxiety and loneliness reported greater emotional distress, particularly when excessive social media use amplified self-comparisons (9). In such contexts, mindfulness training can mitigate social anxiety by reducing overidentification with external evaluations and fostering acceptance of one's body and emotions (2). The adolescents in this study likely benefited from such mechanisms, as mindfulness helped them decouple self-worth from appearance and social validation.

In addition to emotional benefits, mindfulness may indirectly improve interpersonal and academic functioning by enhancing attentional regulation and cognitive clarity. Studies such as Yang et al. (2025) confirm that mindfulness interventions contribute to improved cognitive control, which facilitates better emotion regulation and resilience (13). Similarly, Marashi et al. (2023) found that mindfulness components like gratitude and awareness increased academic vitality (20). The present results, therefore, extend these findings by illustrating that emotional regulation improvements through mindfulness are not isolated phenomena but rather part of a broader enhancement of psychological functioning.

Moreover, the comparison of mindfulness-based therapy to other modalities like schema therapy and acceptance and commitment therapy (ACT) within this study revealed that mindfulness was equally or more effective in improving emotional regulation. This is consistent with findings by Davoodi et al. (2019), who noted that adolescent-centered mindfulness produced comparable or superior results relative to CBT and emotion-focused therapy (8). The common factor across these therapies is the cultivation of emotional awareness and cognitive restructuring, but mindfulness adds the distinctive element of nonjudgmental observation, which may explain its effectiveness in treating BDD.

Finally, the improvement in both adaptive and maladaptive dimensions of emotion regulation observed in this study reinforces the dual regulatory role of mindfulness. Adaptive emotion regulation strategies, such as acceptance and positive refocusing, empower adolescents to constructively reinterpret experiences, while reductions in maladaptive strategies limit the recurrence of emotional distress (6). These complementary mechanisms may collectively underlie the sustained improvements found in the follow-up phase, suggesting that mindfulness fosters long-term emotional stability in adolescents with BDD.

Despite its valuable findings, this study is subject to several limitations. First, the relatively small and gender-homogeneous sample (limited to female adolescents) restricts the generalizability of the results to broader populations, including male adolescents or adults with BDD. Second, the study relied primarily on self-report questionnaires, which are subject to response bias and may not fully capture nuanced emotional changes. Third, while the inclusion of a follow-up phase allowed for observation of short-term maintenance effects, long-term outcomes beyond 45 days remain unknown. Additionally, mindfulness sessions were administered by trained facilitators; thus, variations in instructor competence could have influenced outcomes. Finally, the absence of neurophysiological or behavioral measures limits conclusions regarding the underlying mechanisms of change.

Future studies should employ larger and more diverse samples, encompassing both genders and various cultural contexts, to enhance external validity. Researchers could incorporate mixed-method designs, combining self-report scales with neurocognitive or physiological measures, such as EEG or fMRI, to explore the neural correlates of emotion regulation improvements following mindfulness training. Longitudinal

designs spanning six months to one year would also clarify the durability of treatment effects. Moreover, comparative studies investigating the efficacy of integrated mindfulness-based protocols that combine cognitive-behavioral and metacognitive techniques could provide deeper insights into multimodal interventions for BDD. It is also recommended that future research examines the mediating roles of self-compassion, metacognition, and interpersonal awareness in explaining how mindfulness improves emotion regulation among adolescents.

Given the effectiveness of mindfulness-based therapy in enhancing emotional regulation, educational and clinical practitioners should consider incorporating mindfulness training into school-based mental health programs. Teachers, counselors, and psychologists can use short mindfulness exercises—such as mindful breathing and emotion observation—to support adolescents coping with body dissatisfaction and stress. Mental health centers should also adapt adolescent-centered mindfulness protocols to be culturally sensitive and developmentally appropriate. Additionally, parental involvement in mindfulness education can strengthen emotional communication and family support, further promoting adolescents' emotional well-being and self-acceptance.

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Authors' Contributions

All authors equally contributed to this study.

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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