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Comparison of Mentalization-Based Therapy and Attachment-Based Therapy on Sleep Quality in Individuals with Borderline Personality Disorder

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A B S T R A C T

This study aimed to compare the effectiveness of mentalization-based therapy and attachment-based therapy on improving sleep quality in individuals diagnosed with borderline personality disorder. This research employed a quasi-experimental design with two experimental groups and one control group, conducted across pretest, posttest, and two-month follow-up stages. The statistical population consisted of individuals aged 18–35 with a clinical diagnosis of borderline personality disorder who had been referred to psychological centers in Mashhad in 2024. Using purposive sampling, 45 eligible participants were selected and randomly assigned to three groups: Mentalization-Based Therapy (n = 15), Attachment-Based Therapy (n = 15), and Control (n = 15). The Borderline Personality Disorder Scale (BSL-23) and the Pittsburgh Sleep Quality Index (PSQI) were used for assessment. Interventions were implemented over weekly sessions based on established therapeutic protocols. Data analysis was conducted using mixed-design ANOVA with adherence to statistical assumptions. Mauchly's test confirmed the assumption of sphericity for sleep-related variables. Multivariate ANOVA results indicated significant differences among groups across assessment stages for sleep problems (Wilks' Lambda = 0.176, F = 95.657, p < .001). Within-subjects tests showed a significant main effect of time (F = 185.253, p < .001), demonstrating meaningful changes in sleep problems across measurement stages. A significant interaction between time and group (F = 36.012, p < .001) revealed that improvement trajectories differed between groups. Bonferroni post-hoc comparisons showed significant reductions in sleep problems from pretest to posttest and follow-up (p < .001), with stability of outcomes over time. Between-group comparisons indicated that both mentalization-based and attachment-based therapies were significantly more effective than the control condition, while the two interventions did not differ significantly from each other.

Keywords: *Borderline Personality Disorder; Mentalization-Based Therapy; Attachment-Based Therapy; Sleep Quality.*

1. Introduction

Borderline personality disorder (BPD) is a severe personality pathology characterized by pervasive instability in affect regulation, self-image, interpersonal relationships, and impulse control, and it is associated with marked functional impairment and elevated risk of self-harm and suicide (Livesley & Larstone, 2018). Contemporary clinical and empirical work has emphasized that individuals with BPD often describe their diagnosis as both stigmatizing and insufficiently responsive to their lived experience of chronic relational insecurity, emotional pain, and identity disturbance (Tedesco et al., 2024). Recent research has also highlighted the heterogeneity of BPD presentations, including antagonistic narcissistic traits in some subgroups of women with BPD and their association with greater interpersonal dysfunction (Wülfing et al., 2025). Developmental studies further suggest that borderline personality features in youth are linked with lower self-efficacy, poorer school adjustment, and vulnerability that can be buffered by adequate social support (Yu et al., 2025). Taken together, these findings underscore BPD as a complex, multidimensional disorder that emerges at the intersection of temperament, attachment history, social context, and neurocognitive vulnerability (Livesley & Larstone, 2018).

Attachment theory provides one of the most influential frameworks for understanding the developmental roots of BPD. Bowlby conceptualized attachment as a biologically based behavioral system that organizes proximity seeking to caregivers in the service of safety and emotion regulation (Bowlby, 1969). Subsequent work on the adult attachment system has clarified how early internal working models of self and others shape emotion regulation, threat appraisal, and interpersonal expectations across the lifespan (Mikulincer & Shaver, 2003). Clinical theorists have argued that chronic exposure to inconsistent, frightening, or rejecting caregiving may foster disorganized attachment patterns, unstable self-experience, and a heightened sensitivity to abandonment that are central to BPD (Brisch, 2002). Empirical evidence suggests that attachment insecurity—especially fear of rejection and difficulties trusting others—is closely linked to addiction tendencies and maladaptive coping among vulnerable populations (Haji Hosseini & Hashemi, 2017). Meta-analytic work further indicates that there are no robust gender differences in attachment across the lifespan, underscoring that attachment-related risk processes are broadly relevant to both men and women (Bakermans-Kranenburg & van Ijzendoorn, 2009).

Within this attachment-based perspective, BPD is increasingly conceptualized as a disorder of social cognition and "mentalization"—the capacity to understand one's own and others' behaviors in terms of underlying mental states such as thoughts, emotions, desires, and intentions (Bateman & Fonagy, 2016). Neuro-social-cognitive models describe BPD as involving deficits not only in basic theory of mind but also in meta-social-cognitive processes, including hypermentalizing and unstable interpretations of others' intentions (Bora, 2021). These mentalization difficulties are reflected in elevated levels of borderline symptoms as measured by brief instruments such as the Borderline Symptom List (BSL-23), for which psychometric work has led to proposals for clinically meaningful severity classifications (Kleindienst et al., 2020). Cross-cultural validation studies on short BPD symptom measures, including French versions of the BSL-23, indicate good reliability and construct validity and support their use in both clinical and research settings (Nicastro et al., 2016). In this conceptual frame, impaired mentalization, insecure attachment, and heightened emotional vulnerability are viewed as mutually reinforcing processes that sustain the characteristic instability of BPD (Livesley & Larstone, 2018).

Sleep disturbance is another central but relatively under-addressed feature of BPD. From a psychoneuroimmunology perspective, insufficient or poor-quality sleep exerts wide-ranging effects on immune functioning, emotional reactivity, and stress responsivity, with downstream consequences for mental and physical health (Irwin, 2015). Public health statements from major professional bodies emphasize that both sleep duration and sleep quality are tightly intertwined with lifestyle behaviors and cardiometabolic outcomes, highlighting sleep as a key modifiable health behavior (St-Onge et al., 2016). Experimental and observational data further show that regular physical exercise can meaningfully improve subjective sleep quality and reduce insomnia complaints, reinforcing the idea that sleep can be targeted through behavioral interventions (Banno et al., 2018). At a more fine-grained level, topographical analyses of sleep homeostasis have documented individual patterns in the dynamics of slow-wave activity, suggesting that vulnerability to sleep disruption may vary across persons (Rusterholz & Achermann, 2011).

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In people with BPD, sleep problems often involve difficulties initiating and maintaining sleep, nightmares, circadian irregularities, and subjective non-restorative sleep, which in turn exacerbate affective instability and impulsivity (Jenkins et al., 2022). Objective and subjective assessments of sleep in young people with borderline features confirm elevated sleep fragmentation and poorer perceived sleep, supporting the notion that sleep disturbance is not merely a secondary complaint but a core feature of the disorder (Jenkins et al., 2022). Poor sleep may also interact with interpersonal stress and identity disturbance, contributing to a vicious cycle in which sleep loss amplifies emotional dysregulation, self-harm urges, and interpersonal conflict. Yet, despite the centrality of sleep disturbance in BPD and its strong links with health outcomes, there is still limited evidence regarding psychotherapeutic approaches that directly or indirectly improve sleep quality in this population (Irwin, 2015; St-Onge et al., 2016).

Mentalization-based treatment (MBT) is one of the leading evidence-based therapies for BPD and was originally developed to specifically address mentalization deficits in the context of attachment insecurity (Bateman & Fonagy, 2010). MBT conceptualizes BPD as emerging from failures of mentalization under conditions of attachment-related stress, leading to misinterpretation of others' intentions, affective storms, and maladaptive behaviors such as self-harm or substance misuse (Bateman & Fonagy, 2016). Clinical manuals describe MBT as a structured, manualized approach that combines individual and group sessions, focuses on here-and-now interpersonal processes, and works to restore a curious, reflective stance in patients when strong emotions threaten to collapse mentalization (Bateman & Fonagy, 2016). Observational and randomized controlled studies in adults with BPD have demonstrated that MBT can reduce self-harm, suicidality, and general symptom severity, and improve interpersonal functioning (Oliveira et al., 2017).

The evidence base for MBT has expanded to adolescents, where group-based MBT programs have been shown to reduce borderline symptomatology and improve functioning in youth with emerging BPD traits (Beck et al., 2020). Follow-up data from randomized controlled trials suggest that these gains can be sustained over periods of 3 to 12 months, supporting the durability of MBT effects in young populations (Jørgensen et al., 2021). Systematic reviews and meta-analyses further conclude that MBT is efficacious for reducing self-harm behavior, particularly among adolescents and young adults with BPD or related symptom profiles (Hajek Gross et al., 2024). Comparative reviews indicate that MBT and dialectical behavior therapy (DBT) both demonstrate robust effects for reducing self-harm and BPD symptoms, but they differ in their theoretical emphases and mechanisms of change, with MBT focusing more explicitly on social cognition and attachment processes (Johnstone et al., 2022). Recent trials have also begun to examine the impact of treatment format and dosage, comparing short-term versus long-term MBT (Juul et al., 2023) and day hospital versus intensive outpatient MBT, with some evidence that clinical severity moderates treatment response (Smits et al., 2024).

In the Iranian context, several studies have provided preliminary support for MBT in reducing core BPD symptoms and improving psychological resources. Research with adults diagnosed with BPD has shown that MBT can enhance ego strength and adaptive defense mechanisms, suggesting changes at the level of personality organization (Eini & Narimani, 2019). Comparative trials indicate that MBT and cognitive-analytic therapy may both improve object relations, but MBT's focus on mental state understanding may be uniquely suited to addressing interpersonal instability in BPD (Eini et al., 2018). Other work suggests that MBT can reduce borderline symptoms and depression in women with BPD, pointing to its utility in routine clinical settings (Haji Mohammadi et al., 2021). Studies comparing MBT with other third-wave or integrative interventions, such as self-compassion training, have also reported benefits for cognitive flexibility and marital functioning, underscoring the broader relational impact of improved mentalization (Ashrafi et al., 2022; Shabani, 2024). At the symptom level, MBT has been shown to be at least as effective as dialectical behavior therapy in ameliorating BPD symptoms in some Iranian samples (Ghadernejad et al., 2022).

Parallel to the development of MBT, a growing body of research has evaluated attachment-based therapeutic approaches. These interventions explicitly target maladaptive attachment patterns, emotion regulation difficulties, and relational schemas rooted in early caregiver experiences (Brisch, 2002). Attachment-based family and couple models conceptualize emotional and behavioral problems as emerging within attachment relationships and seek to reorganize these patterns through corrective emotional experiences and improved communication (Van Vlierberghe et al., 2023). Attachment-based family therapy in middle childhood, for example, highlights how strengthening parental responsiveness and secure-base

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provision can reduce children's psychological symptoms and improve developmental trajectories (Van Vlierberghe et al., 2023). In adult and clinical samples, attachment-based therapies have been applied to conditions ranging from depressive and anxiety disorders to chronic illness and substance-related problems (Collado-Navarro et al., 2021; Mikulincer & Shaver, 2003).

Evidence indicates that attachment-focused interventions can reduce depressive, anxious, and adjustment symptoms in routine mental health settings, particularly when combined with mindfulness or compassion components (Collado-Navarro et al., 2021). Attachment-based compassion therapy has been shown to increase self-compassion and move individuals toward more secure attachment patterns, suggesting that shifts in internal working models may be attainable through structured group programs (Navarro-Gil et al., 2020). In Iranian studies, attachment-based interventions have improved mother–child relationship quality and health indicators among mothers of chronically ill children (Dehghani Arani & Basharat, 2014), reduced depressive symptoms in girls with attachment problems (Jahangir et al., 2011), and aided emotional regulation and physical health outcomes, such as body mass index and food craving, among obese adolescent girls (Dehrooyeh et al., 2020). Attachment-based couple therapy has also been effective in reducing anxiety sensitivity and enhancing emotion regulation in women experiencing marital conflict (Khosravi et al., 2022).

For medically ill populations, attachment-based therapy has shown promise for improving adherence and emotional functioning, as demonstrated in patients with chronic ulcers where such interventions improved attachment style, reduced emotional regulation difficulties, and increased treatment adherence (Kiavandloo et al., 2023). In the domain of addiction, attachment-based approaches have been compared with motivational therapies, with findings suggesting that attachment-focused work may be particularly useful for reducing relapse, craving, and sustaining abstinence in patients whose substance use is intertwined with borderline personality features and attachment disturbances (Tahmasbian et al., 2022). Collectively, this literature supports attachment-based therapy as a flexible, relationally focused approach that can address both intrapersonal and interpersonal dimensions of psychopathology, including those salient in BPD (Haji Hosseini & Hashemi, 2017; Mikulincer & Shaver, 2003).

Despite the strong theoretical rationale linking attachment, mentalization, and sleep regulation, empirical work directly comparing MBT and attachment-based therapy on sleep-related outcomes in BPD remains scarce. Conceptually, improvements in mentalization could help individuals reinterpret interpersonal stressors, reduce hyperarousal, and mitigate night-time rumination, thereby promoting more regular and restorative sleep (Bateman & Fonagy, 2016; Bora, 2021). Similarly, attachment-based interventions that foster a sense of safety, secure-base support, and co-regulation may reduce nocturnal anxiety and physiologic hypervigilance, thereby improving the continuity and perceived quality of sleep (Brisch, 2002; Collado-Navarro et al., 2021). However, existing MBT and attachment-based trials have rarely included sleep quality as a primary outcome, and it is not yet clear whether mentalization-focused or attachment-focused mechanisms provide equal or differential benefits for sleep in patients with BPD (Beck et al., 2020; Ghadernejad et al., 2022; Navarro-Gil et al., 2020). Given that sleep is a critical determinant of emotional stability, health, and daily functioning, this represents a significant gap in the current evidence base (Irwin, 2015; St-Onge et al., 2016).

Moreover, as clinical practice increasingly seeks to tailor interventions based on patient characteristics and mechanisms of change, understanding how MBT and attachment-based therapies compare in terms of improving sleep quality could inform more nuanced treatment planning (Johnstone et al., 2022; Juul et al., 2023; Smits et al., 2024). Clarifying whether these two theoretically related but distinct approaches achieve similar or different impacts on sleep could also shed light on whether enhancing mentalization, modifying attachment representations, or their combination is most critical for alleviating insomnia and sleep-related complaints in BPD. Such knowledge would be especially valuable in contexts where resources are limited and clinicians must prioritize interventions with the most comprehensive functional benefits (Ashrafi et al., 2022; Eini & Narimani, 2019; Haji Mohammadi et al., 2021).

In light of the substantial burden of sleep disturbance in borderline personality disorder, the central role of attachment and mentalization processes in its etiology and maintenance, and the growing yet incomplete evidence base for mentalization-based and attachment-based treatments, the present study aimed to compare the effectiveness of mentalization-based therapy and attachment-based therapy on improving sleep quality in individuals with borderline personality disorder.

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2. Methods and Materials

2.1. Study Design and Participants

This study employed a quasi-experimental design with pretest–posttest and follow-up measurements for two experimental groups and one control group. The statistical population consisted of all individuals diagnosed with Borderline Personality Disorder who referred to psychological centers in Mashhad in 2024. To determine the sample size, various criteria exist; in experimental research, a sample of 15 participants per group is considered sufficient (Dalavar, 2017). Accordingly, 15 participants were allocated to each group. From the mentioned population, individuals with Borderline Personality Disorder—identified through clinical interviewing and relevant questionnaires and who met the inclusion criteria—were recruited. A total of 45 individuals were selected through purposive sampling and randomly assigned to three groups: Experimental Group 1 (Mentalization-Based Therapy; n = 15), Experimental Group 2 (Attachment-Based Therapy; n = 15), and the Control Group (n = 15).

Inclusion criteria consisted of having a clinical diagnosis of Borderline Personality Disorder (established through interview and questionnaires), being between 18 and 35 years old, having at least a high school diploma (for reading and writing ability), absence of chronic physical illness, consistent attendance at therapeutic sessions, and not using medication. Exclusion criteria included missing more than two therapy sessions, unwillingness to continue participation, and receiving psychological treatments within the previous year.

To observe ethical considerations, prior to the study, the research objectives were clearly explained and informed consent was obtained from all participants. During the implementation of the study, the researcher aimed to establish effective communication with the participants and provide support to reduce potential concerns (e.g., anxiety caused by answering questionnaires, lowered self-esteem or self-confidence, or participants' worry about the impact of results on their future). Confidentiality and anonymity of participant information were strictly maintained by the researcher.

Before administering the independent variables (Mentalization-Based Therapy for Experimental Group 1 and Attachment-Based Therapy for Experimental Group 2), all three groups completed the pretest. After the intervention was applied to Groups 1 and 2, all groups completed the posttest again. The intervention sessions were conducted once per week and lasted approximately three months. Subsequently, data collection was carried out using the questionnaires, and the posttest results were analyzed. In addition, a two-month follow-up was conducted to assess the stability of therapeutic effects.

2.2. Measures

Borderline Personality Disorder Scale: This instrument is a 23-item self-report scale that represents a shortened version of the original 90-item Borderline Personality Disorder Symptom Scale. It was developed by Bohus, Limberger, Frank, Chapman, Köhler, and Stiglitz (2007). The scale effectively distinguishes individuals with Borderline Personality Disorder from those with other psychiatric conditions and is sensitive to changes during treatment. The short version assesses emotions and experiences during the past week, using a scale ranging from 0 = not at all to 4 = very strongly. Some items reflect diagnostic criteria, such as emotional instability ("My mood shifts quickly with anxiety, anger, or depression"), recurrent suicidal behaviors ("I do not believe I deserve to live"; "The idea of dying is appealing to me"; "I think about harming myself"), self-punishment, and transient dissociative symptoms ("I feel very distant from myself"). Other items are based on empirical findings related to self-criticism, self-esteem difficulties, emotional vulnerability, shame, disgust, loneliness, and helplessness ("Criticism has a destructive effect on me"; "I do not trust others"; "I feel vulnerable"). Since this instrument is not a diagnostic tool, it does not have a cutoff score. Cronbach's alpha for the short version has been reported between .94 and .97, indicating strong reliability (Nicastro et al., 2016). In the present study, Cronbach's alpha reliability coefficient was .76.

Pittsburgh Sleep Quality Index (PSQI): One of the best instruments designed to assess sleep quality is the Pittsburgh Sleep Quality Index (PSQI). This questionnaire was developed in 1989 by Dr. Buysse and colleagues at the Pittsburgh Psychiatric Institute. The questionnaire originally contains nine items; however, because item 5 consists of ten sub-items, the total number of items is 19. Responses are scored on a 4-point Likert scale ranging from 0 to 3. The PSQI assesses the patient's perceptions of sleep quality during the past four weeks. It provides seven component scores: (1) subjective sleep quality, (2) sleep latency, (3) sleep duration, (4) habitual sleep efficiency, (5) sleep disturbances, (6) use of sleep medication, and (7) daytime dysfunction, as well as a global score. Each component is

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scored from 0 to 3, where 0, 1, 2, and 3 reflect no difficulty, mild difficulty, moderate difficulty, and severe difficulty, respectively. A global score above 5 indicates poor sleep quality (Buysse et al., 1989). The developers reported content validity of .80 and Cronbach's alpha reliability of .83. In the present study, Cronbach's alpha for this scale was .82.

2.3. Interventions

The attachment-based intervention consisted of ten weekly sessions, each lasting two hours, following the therapeutic principles outlined by Brisch (2002) and adapted protocols used in prior Iranian studies. Session 1 introduced the concept of attachment, types of attachment problems, behavioral symptoms associated with insecure attachment, and the links between attachment patterns and mental health. Session 2 focused on explaining the logic and goals of treatment, clarifying psychological and physiological needs, teaching the "availability technique," and practicing scenario-building to model appropriate responses to attachment needs. Session 3 introduced verbal communication skills, storytelling as an intervention tool, and scenario-building exercises addressing question–answer exchanges, role clarification within the family, and techniques to enhance self-worth and self-esteem. Session 4 emphasized the importance of behavioral consistency for restoring trust, teaching the "contact technique" (especially eye contact), and practicing authentic expressions of affection through mental imagery and role play. Session 5 targeted the facilitation of peer relationships, encouraging social engagement, supporting active participation in group tasks, and practicing scenarios related to companionship, humor, and positive social interaction. Session 6 focused on collaborative behavior through scenario-based exercises illustrating cooperative interactions between caregivers and the individual, promoting positive engagement while avoiding coercion. Session 7 addressed unresolved behavioral issues, teaching strategies for creating a joyful and stimulating environment to reduce depressive tendencies, and reinforcing verbal encouragement while discouraging social withdrawal. Session 8 introduced family-based stress-management techniques aimed at reducing anxiety, teaching reassurance methods to enhance perceived parental support, and practicing scenarios that increase enjoyable activities. Session 9 taught the "observer parent" technique for addressing oppositional behaviors, along with differential reinforcement strategies to strengthen positive behaviors. Session 10 reviewed potential obstacles in applying therapeutic techniques, emphasized the importance of continued practice to consolidate trust and attachment repair, evaluated progress toward initial treatment goals, and concluded with overall integration of therapeutic gains.

The mentalization-based treatment (MBT) program, based on the structured approach of Bateman and Fonagy (2016), consisted of eight 90-minute sessions tailored for individuals with borderline personality features. Session 1 reviewed the structure, goals, and rules of the intervention while introducing the principles and benefits of mentalization, indicators of weak versus strong mentalizing, common difficulties in interpreting one's own and others' mental states, problems in emotion regulation, impulsivity, and interpersonal sensitivity; misunderstandings were clarified by the group leader, and homework was assigned. Session 2 revisited the previous discussion and homework, addressing how to deal with emotions, interpret internal emotional cues, recognize emotional expressions in others, utilize interpersonal co-regulation, and manage dysregulated emotions, along with training in relaxation techniques. Session 3 reviewed prior content and introduced the specific aims of MBT, providing structured training and group practice in mentalizing skills, reinforced by homework tasks. Session 4 again reviewed and built upon prior work, highlighting the role of interpersonal connection and group participation while offering psychoeducation about depression and borderline personality disorder. Session 5 focused on participants' selected concerns, encouraging open discussion, validating experiences, and clarifying misunderstandings through therapist guidance. Session 6 involved deeper exploration of interpersonal and emotional difficulties, using emotional identification and emotional-focus strategies to work through group-presented challenges. Session 7 taught advanced mentalization skills to foster epistemic trust and enhance understanding of relational signals, including attention to markers of transference and interpersonal dynamics. Session 8 prepared participants for termination of therapy, focusing on feelings related to ending treatment, discussing the meaning of therapeutic loss, reviewing skills learned, and helping participants consolidate mentalizing capacities for use beyond the treatment context.

2.4. Data analysis

Data were analyzed using mixed analysis of variance (mixed ANOVA) with adherence to statistical assumptions, performed in SPSS software.

3. Findings and Results

The descriptive findings of this study, including statistical indices such as mean and standard deviation for the sleep quality variable in the experimental and control groups across the pretest, posttest, and follow-up stages, are presented in Table 1.

Table 1

Descriptive Indices of Sleep Quality in the Experimental and Control Groups

Group	Variable	Category	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Follow-up Mean	Follow-up SD
Sleep Quality	Sleep Quality	Experimental 1	11.900	0.430	7.133	0.388	7.000	0.447
		Experimental 2	11.066	0.713	8.666	0.860	8.466	0.866
		Control	12.266	0.383	11.933	0.266	11.533	0.400

Based on the results of Table 1, the descriptive mean indices for the pretest, posttest, and follow-up stages in Experimental Groups 1 and 2 and the Control Group for sleep quality were 11.900, 11.066, and 12.266; and 7.133, 8.666, and 11.933; and 7.000, 8.466, and 11.533, respectively.

To compare the effectiveness of Mentalization-Based Therapy and Attachment-Based Therapy in improving sleep quality in individuals with Borderline Personality Disorder, participants' scores in the pretest, posttest, and follow-up stages were statistically analyzed, and the results are presented in the following tables. Mixed ANOVA was used to examine this variable. Table 2 reports the results of Mauchly's test of sphericity to determine assumptions for applying mixed ANOVA. Table 3 presents the results of multivariate ANOVA for evaluating sleep quality.

Table 2

Results of Mauchly's Test of Sphericity for Multivariate ANOVA Assumptions

Within-Subjects Effect	Mauchly's W	df	Sig.
Time – Sleep Problems	0.907	2	0.135

The results of Table 2 indicate that Mauchly's test for the variable of cognitive sleep problems is not significant, demonstrating that the statistical assumption of sphericity is met.

Table 3

Results of Multivariate ANOVA Tests for Comparing Sleep Problems Based on Group

Source of Variance	Test Name	Value	df Hypothesis	df Error	Eta	F	Sig.
Sleep Problems	Pillai's Trace	0.824	2	41	0.824	95.657	0.001
	Wilks' Lambda	0.176	2	41	0.824	95.657	0.001
	Hotelling's Trace	4.666	2	41	0.824	95.657	0.001
	Roy's Largest Root	4.666	2	41	0.824	95.657	0.001

Table 5 shows the results of Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root for comparing sleep problems across groups. The results indicate that the groups differ significantly in sleep problems; that is, at least one of the three assessment stages (pretest, posttest, and follow-up) shows a difference among Experimental Groups 1 and 2 and the Control Group. It should be noted that significance in multivariate ANOVA does not specify which stages differ.

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Table 4

Results of Within-Subjects Effects Tests for Experimental and Control Groups

Component	Test	Sum of Squares	df	Mean Square	F	Sig.
Sleep Problems	Time	170.844	1	170.844	185.253	0.001
	Time × Group	66.422	2	33.211	36.012	0.001

Table 4 shows that the effect of time is significant (P < 0.001). This indicates that changes over time had a significant effect on sleep problems, meaning that sleep problems varied across the measurement stages. The significant interaction effect (Time × Group) (P < 0.001) indicates that changes in sleep problems over time differed among the groups. In other words, the effect of time on sleep problems varied across groups, and this difference was significant. The experimental groups, due to receiving Mentalization-Based Therapy and Attachment-Based Therapy, experienced fewer sleep problems, and this effect persisted over time.

Table 5

Results of Bonferroni Post Hoc Test for Comparing Pretest, Posttest, and Follow-Up

Dependent Variable	Group Stage Comparison	Mean Difference	Standard Error	Sig.
Sleep Problems	Pretest – Posttest	2.511	0.212	0.001
	Pretest – Follow-up	2.756	0.202	0.001
	Posttest – Pretest	-2.511	0.212	0.001
	Posttest – Follow-up	0.244	0.162	0.418
	Follow-up – Pretest	-2.756	0.202	0.001
	Follow-up – Posttest	-0.244	0.162	0.418

The results of Table 5 indicated that posttest sleep problem scores significantly decreased compared to pretest scores, indicating intervention effectiveness. Additionally, posttest and follow-up scores showed no significant difference, indicating that intervention effects remained stable.

Table 6

Results of Bonferroni Post Hoc Test for Comparing Experimental and Control Groups

Variable	Group Comparison	Mean Difference	Standard Error	Sig.	Lower Bound	Upper Bound
Sleep Quality	Exp. 1 – Exp. 2	-0.711	0.757	1.000	-2.599	1.176
	Exp. 1 – Control	-3.222	0.757	0.001	-5.110	-1.335
	Exp. 2 – Control	-2.511	0.757	0.006	-4.399	-0.624

The results of Table 6 show that there was no significant difference between Experimental Group 1 and Experimental Group 2 (P > 0.01), indicating that both interventions were equally effective. Sleep problem scores in Experimental Group 1 and the Control Group differed significantly (P < 0.01), indicating that Mentalization-Based Therapy was effective in reducing sleep problems. Sleep problems also differed significantly between Experimental Group 2 and the Control Group (P < 0.01), demonstrating the effectiveness of Attachment-Based Therapy.

4. Discussion

The present study investigated and compared the effectiveness of mentalization-based therapy and attachment-based therapy on improving sleep quality among individuals with borderline personality disorder (BPD). The results demonstrated that both therapeutic approaches led to significant improvements in sleep quality from pretest to posttest, and these gains were maintained at follow-up. Importantly, no significant difference emerged between the two experimental groups, indicating that mentalization-based therapy and attachment-based therapy were equally effective in enhancing sleep quality. These findings contribute to the growing body of research emphasizing the relevance of relational, cognitive–affective, and attachment-related mechanisms in the psychopathology and treatment of BPD.

The observed improvements in sleep quality align with existing evidence suggesting that psychological interventions that reduce hyperarousal, emotional dysregulation, and interpersonal distress can positively influence sleep architecture. Individuals with BPD commonly experience fragmented sleep, prolonged sleep latency, nightmares, and subjective non-restorative sleep, reflecting underlying affective instability and heightened physiological arousal (Jenkins et al., 2022). The present findings, showing marked reductions in sleep difficulties following both interventions, reinforce the conceptualization that sleep disturbance is closely tied to affective and cognitive processes central to BPD (Irwin, 2015). Moreover, evidence from public health and psychophysiological research suggests that sleep quality is modifiable and responsive to behavioral and psychological interventions targeting stress, regulation, and daily functioning (St-Onge et al., 2016). Thus, the current study's results further validate the importance of addressing sleep within psychotherapeutic frameworks for BPD.

Mentalization-based therapy demonstrated a significant positive effect on sleep quality, consistent with its established role in improving affect regulation, reducing interpersonal crises, and mitigating self-harm behaviors in individuals with BPD (Bateman & Fonagy, 2010, 2016). By enhancing individuals' ability to interpret internal and external mental states more accurately, MBT reduces cognitive distortions, catastrophizing, and hypermentalization—all of which are implicated in nocturnal rumination and pre-sleep arousal. Findings from prior clinical trials indicate that MBT produces durable reductions in emotional instability and maladaptive relational patterns (Beck et al., 2020; Jørgensen et al., 2021), changes that likely contribute to more stable and restorative sleep. Additional evidence indicates that MBT reduces self-harm and improves multiple domains of functioning, including cognitive flexibility and interpersonal sensitivity (Ashrafi et al., 2022; Haji Mohammadi et al., 2021), which may indirectly alleviate sleep problems by decreasing psychological distress.

Meta-analytic work further supports the notion that MBT enhances social-cognitive processes, which are often impaired in individuals with BPD (Bora, 2021). Increased mentalization capacities may translate into improved emotion regulation, reduced intensity of interpersonal conflicts, and better modulation of stress—factors consistently linked with sleep quality in both clinical and general populations (Irwin, 2015). Research comparing short-term and long-term MBT suggests that improvements in emotional and cognitive functioning often emerge early in treatment and continue to consolidate over time (Juul et al., 2023). Likewise, comparisons of intensive outpatient MBT and day-hospital MBT show that treatment responsiveness may vary depending on clinical severity, although mentalization gains are evident across treatment modalities (Smits et al., 2024). This body of evidence aligns with the present study's finding that MBT meaningfully improves sleep quality and that such improvement persists into follow-up.

Attachment-based therapy was also effective in improving sleep quality, consistent with research highlighting the centrality of attachment processes in shaping emotion regulation, stress responses, and interpersonal functioning (Mikulincer & Shaver, 2003). Sleep is highly sensitive to feelings of safety, attachment security, and co-regulation capacities; thus, interventions that strengthen internal working models of self and others may help reduce hypervigilance and nighttime anxiety—common features in individuals with BPD (Bowlby, 1969). Attachment-based interventions, as demonstrated in empirical work, enhance secure attachment representations, reduce distress symptoms, and foster emotional stability, all of which contribute to healthier sleep patterns (Collado-Navarro et al., 2021). The effectiveness of attachment-based therapy in this study reflects findings from trials involving diverse clinical groups, where this approach reduced depressive symptoms, anxiety, and maladaptive coping strategies (Jahangir et al., 2011; Khosravi et al., 2022).

Attachment-based models emphasize the reorganization of internal relational schemas and the creation of corrective emotional experiences within the therapeutic dyad. Such processes can lower baseline arousal and reduce fear of abandonment—core features of BPD that contribute to nighttime rumination and sleep disturbances (Brisch, 2002). Moreover, attachment-based compassion therapies have been shown to increase self-compassion and decrease self-criticism (Navarro-Gil et al., 2020), psychological shifts that may directly mitigate the intrusive thoughts and emotional dysregulation that impair sleep. Evidence from Iranian studies also supports the efficacy of attachment-based approaches for improving emotional regulation, treatment adherence, and health-related outcomes (Dehghani Arani & Basharat, 2014; Kiavandloo et al., 2023). Likewise, research on patients with substance use disorders and comorbid BPD traits suggests that attachment-based therapy effectively

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reduces relapse and craving (Tahmasbian et al., 2022), further supporting the approach's broad therapeutic impact.

The finding that both therapies exerted similar levels of effectiveness highlights theoretical overlaps between mentalization and attachment constructs. Mentalization theory itself is deeply rooted in attachment research, proposing that early attachment relationships shape the capacity for reflective functioning and interpersonal understanding (Bateman & Fonagy, 2016). The convergence in treatment outcomes suggests that improving reflective capacities and enhancing attachment security may influence shared mechanisms tied to emotion regulation, interpersonal functioning, and stress reduction, which collectively contribute to better sleep quality. Studies comparing MBT and dialectical behavior therapy have similarly noted overlapping therapeutic benefits despite theoretical differences (Ghadernejad et al., 2022; Johnstone et al., 2022). Given that both treatments target relational processes and emotional instability—central features linked with impaired sleep—the findings are unsurprising and consistent with broader literature.

The stability of treatment effects at follow-up further aligns with research supporting the durability of improvements following MBT and attachment-based interventions. Sustained reductions in psychological distress and relational instability may protect individuals with BPD from the re-emergence of sleep disturbances, especially as sleep quality tends to fluctuate in response to emotional upheavals and interpersonal stress. Studies on sleep homeostasis indicate that individuals with chronic emotional dysregulation are particularly vulnerable to disruptions in sleep continuity (Rusterholz & Achermann, 2011). Thus, therapeutic approaches that stabilize emotional and relational functioning may have downstream effects on the biological processes underlying restorative sleep.

5. Conclusion

This study also provides preliminary evidence for the importance of integrating sleep-related outcomes into BPD treatment research. Although sleep is not traditionally conceptualized as a core treatment target in psychotherapies for personality disorders, accumulating evidence suggests that sleep quality is intertwined with symptom severity, self-harm risk, emotion dysregulation, and overall functioning (Irwin, 2015; Jenkins et al., 2022). Addressing sleep symptoms may therefore enhance the broader therapeutic gains of BPD interventions and improve quality of life.

Several important limitations should be acknowledged. First, the sample size, while aligned with experimental research standards, was relatively small, limiting the generalizability of findings to broader clinical populations. Second, the reliance on self-report sleep quality measures may not capture objective sleep disturbances; incorporating polysomnography or actigraphy in future work would provide a more comprehensive assessment. Third, the study design did not include an active comparison intervention such as dialectical behavior therapy, which limits the ability to contextualize the observed effects relative to other leading BPD treatments. Fourth, although follow-up measurements demonstrated the stability of treatment gains, the follow-up period was relatively brief; longer-term studies are needed to evaluate the persistence of improvements. Finally, cultural and contextual factors specific to the study population may influence treatment response, limiting the degree to which these findings can be generalized across diverse cultural settings.

Future studies should incorporate larger and more diverse samples to enhance generalizability and examine potential moderators such as attachment style, trauma history, and symptom severity. Research should also employ multi-method assessments of sleep—including objective physiological measures—in addition to subjective reports. Comparative effectiveness studies evaluating MBT and attachment-based therapy against other empirically supported treatments for BPD, such as DBT or schema therapy, would provide a deeper understanding of differential treatment mechanisms. Longitudinal research extending beyond short-term follow-up is needed to examine the durability of sleep improvements and the extent to which changes in sleep mediate broader therapeutic outcomes. Finally, future studies may explore whether integrating targeted sleep interventions (e.g., CBT-I) with relational therapies enhances treatment responsiveness in individuals with BPD.

Clinicians working with individuals with BPD should consider assessing sleep problems as part of routine diagnostic and treatment planning procedures. Both mentalization-based and attachment-based therapeutic frameworks appear beneficial for improving sleep, suggesting that relational and reflective processes are important mechanisms of change. Practitioners may enhance treatment outcomes by integrating psychoeducation about sleep hygiene and stress regulation into therapy. Additionally, attention to attachment dynamics and mentalization capacities may help patients build the

emotional stability necessary for consistent and restorative sleep.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. The study protocol was reviewed and approved under the ethics code IR.IAU.TNB.REC.1404.407. Informed consent was obtained from all participants after explaining the aims, procedures, potential risks, and benefits of the research, and confidentiality and anonymity of the data were fully ensured.

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