

Effectiveness of Cognitive-Behavioral Play Therapy on Sleep Disturbances and Pain Tolerance in Children with Recurrent Pain

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ABSTRACT

This study aimed to determine the effectiveness of cognitive-behavioral play therapy in reducing sleep disturbances and increasing pain tolerance among children with recurrent pain. This randomized pretest-posttest controlled study with a two-month follow-up was conducted among children with recurrent pain in Tehran, Iran, in 2026. Thirty children aged 8–12 years who met the inclusion criteria were selected through purposive sampling and randomly assigned to an experimental group ($n = 15$) and a control group ($n = 15$). The experimental group received eight 60-minute sessions of cognitive-behavioral play therapy conducted twice weekly, while the control group continued routine care without receiving the intervention. Sleep disturbances were assessed using the Children's Sleep Habits Questionnaire, and pain tolerance was measured through a standardized cold pressor task. Data were analyzed using mixed repeated-measures analysis of variance and Bonferroni-adjusted pairwise comparisons in SPSS version 27, with statistical significance set at $p < .05$. The mixed repeated-measures analysis showed a significant time $\times$ group interaction for sleep disturbances, $F(1.65, 46.31) = 40.73$, $p < .001$, partial $\eta^2 = .593$, and for pain tolerance, $F(1.61, 45.04) = 57.68$, $p < .001$, partial $\eta^2 = .673$. Bonferroni comparisons indicated significant reductions in sleep disturbance scores from pretest to posttest and from pretest to follow-up in the experimental group ($p < .001$), whereas posttest and follow-up scores did not differ significantly ($p = .431$). Pain tolerance also increased significantly from pretest to posttest and from pretest to follow-up ($p < .001$), with no significant decline between posttest and follow-up ($p = .091$). No significant changes were observed in the control group. Cognitive-behavioral play therapy was effective in reducing sleep disturbances and increasing pain tolerance in children with recurrent pain, and these improvements remained stable over a two-month follow-up period. The intervention may therefore be considered a useful developmentally appropriate adjunct to routine care for pediatric recurrent pain.

Keywords: Cognitive-Behavioral Play Therapy; Sleep Disturbances; Pain Tolerance; Recurrent Pain; Children

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Introduction

Pain is one of the most common and distressing health complaints in childhood and can become particularly disruptive when it occurs repeatedly over an extended period. Recurrent pain in children may

present in different forms, including abdominal pain, headache, musculoskeletal pain, and other persistent or episodic somatic complaints. Although recurrent pain is not always accompanied by an identifiable organic pathology, its consequences can extend well beyond the immediate experience of physical discomfort. Repeated pain episodes may interfere with school attendance, social participation, recreational activities, emotional functioning, family relationships, and overall quality of life. Children who repeatedly experience pain may gradually develop heightened vigilance toward bodily sensations, fear of pain recurrence, avoidance behaviors, and reduced confidence in their ability to manage discomfort. These psychological and behavioral responses may in turn amplify perceived pain and contribute to the persistence of symptoms. Contemporary approaches to chronic and recurrent pain increasingly conceptualize pain as a multidimensional phenomenon in which biological, cognitive, emotional, behavioral, and social factors interact dynamically rather than as a purely physiological event. Accordingly, interventions that target maladaptive thoughts, emotional responses, coping behaviors, and pain-related avoidance have gained considerable importance in the management of persistent pain conditions (1-3).

Among the psychological factors associated with recurrent pain, cognitive appraisal is especially important because children's interpretations of pain can influence both the intensity of their subjective experience and their behavioral responses. A child who views pain as uncontrollable, threatening, or evidence of bodily damage may become increasingly anxious and attentive to painful sensations, whereas a child who has access to adaptive coping strategies may be more capable of tolerating discomfort and maintaining normal activities. Cognitive-behavioral approaches are specifically designed to alter these maladaptive cycles by modifying dysfunctional thoughts, strengthening coping skills, increasing perceived control, and promoting gradual behavioral engagement. Evidence from adults with chronic pain indicates that cognitive-behavioral therapy can contribute to improvements in pain-related functioning and quality of life and may change how individuals interpret and respond to pain even when the underlying medical condition remains present (3, 4). Similarly, research on pain self-efficacy suggests that cognitive-behavioral interventions can strengthen individuals' confidence in their capacity to function despite pain, thereby reducing the extent to which pain governs daily behavior (5). The relevance of such findings to childhood is considerable because cognitive and behavioral responses to pain are learned and reinforced early in development and may influence later patterns of symptom persistence.

Pain tolerance represents an important behavioral dimension of the pain experience. Whereas pain intensity refers to the perceived strength of a painful stimulus, pain tolerance concerns the extent to which a person can remain exposed to or cope with discomfort before withdrawing from it. In children with recurrent pain, low pain tolerance may be associated with heightened sensitivity, fear of pain, catastrophizing, avoidance of physical activities, and reduced engagement in daily tasks. Repeated avoidance can inadvertently reinforce the belief that pain is dangerous or unmanageable, which may lower the threshold for future withdrawal and increase functional disability. Cognitive-behavioral interventions may improve pain tolerance by teaching children to reinterpret painful sensations, regulate physiological arousal, use distraction and relaxation strategies, and shift attention away from catastrophic expectations. Studies examining cognitive-behavioral approaches in chronic pain populations have supported the value of changing the emotional and cognitive context in which pain is experienced rather than focusing exclusively on nociceptive input (1, 4). This perspective suggests that interventions capable of modifying cognition,

emotion, and behavior simultaneously may be particularly valuable for children whose recurrent pain has become intertwined with fear, avoidance, and low coping confidence.

Sleep disturbance is another major difficulty that commonly accompanies recurrent and chronic pain. Sleep and pain have a reciprocal relationship: pain can delay sleep onset, provoke night waking, reduce sleep continuity, and increase bedtime anxiety, while insufficient or fragmented sleep can increase pain sensitivity, reduce emotional regulation, impair cognitive control, and diminish the ability to cope effectively with physical discomfort. In childhood, disrupted sleep may additionally affect attention, learning, behavior, school functioning, and family routines. Therefore, the co-occurrence of sleep disturbance and recurrent pain can create a self-perpetuating cycle in which pain interferes with sleep and poor sleep subsequently increases vulnerability to pain. The clinical significance of sleep has become increasingly evident through advances in cognitive-behavioral treatment for insomnia. Cognitive-behavioral therapy for insomnia has been shown to target maladaptive sleep-related beliefs, excessive arousal, inconsistent sleep behaviors, and dysfunctional bedtime routines, thereby improving both subjective and objective dimensions of sleep (6, 7). Mechanistic research has also indicated that cognitive-behavioral treatment of insomnia may influence neurobiological systems involved in emotional regulation and sleep, including fronto-limbic functioning and hyperarousal processes (7, 8).

Recent evidence further indicates that cognitive-behavioral approaches to sleep can be effectively adapted to different age groups and delivery formats. Digital and technology-assisted forms of cognitive-behavioral therapy for insomnia have been investigated as scalable approaches for improving sleep-related outcomes, reflecting the broader adaptability of cognitive-behavioral principles across settings (9, 10). In adolescents with co-occurring mental health concerns, intervention development efforts have emphasized the need to tailor cognitive-behavioral treatment for insomnia to developmental characteristics and common psychological comorbidities rather than simply applying adult protocols without modification (11). The accumulated evidence supporting cognitive-behavioral treatment for insomnia also highlights the importance of addressing dysfunctional cognitions, maladaptive routines, behavioral conditioning, and physiological arousal as interrelated mechanisms affecting sleep quality (6). These principles are highly relevant to children with recurrent pain because pain-related anticipatory anxiety and sleep-related worry may converge at bedtime, increasing arousal and interfering with the ability to initiate and maintain sleep.

Despite the established value of cognitive-behavioral methods, their direct application to children requires developmental adaptation. Younger children may have difficulty engaging in abstract cognitive restructuring, verbal analysis of automatic thoughts, or lengthy didactic discussions. Play provides a natural medium through which children communicate experiences, express emotions, rehearse new behaviors, solve problems, and make sense of threatening situations. For this reason, cognitive-behavioral play therapy integrates the structured and goal-oriented techniques of cognitive-behavioral therapy with developmentally appropriate play activities. Through stories, drawings, puppets, role play, modeling, therapeutic games, behavioral rehearsal, and reinforcement, children can learn to recognize thoughts and emotions, challenge maladaptive beliefs, practice coping strategies, and develop more adaptive behavioral responses in a manner that is consistent with their developmental level. Play-based interventions also have the potential to reduce resistance and increase treatment engagement, particularly when children experience anxiety or difficulty discussing distressing experiences directly.

The broader therapeutic value of play-based interventions has been supported in different child populations. Floortime play therapy has been associated with improvements in executive functioning and cognitive emotion regulation in children with attention-deficit/hyperactivity disorder, suggesting that structured play can influence cognitive and emotional processes relevant to self-regulation (12). Cognitive-behavioral play therapy has likewise been examined across educational, behavioral, and emotional contexts. For example, it has been associated with improvements in social anxiety and emotional intelligence among students with intellectual disability (13), and it has been investigated as an intervention for behavioral adjustment and problem-solving skills in students with dyslexia (14). These findings suggest that cognitive-behavioral play therapy is not limited to the treatment of one narrowly defined disorder but can be applied to a range of difficulties involving emotional regulation, cognition, behavior, and adaptive functioning.

Additional evidence supports the utility of cognitive-behavioral play therapy for children with learning and executive-function difficulties. Research comparing computerized cognitive rehabilitation and cognitive-behavioral play therapy has examined their effectiveness in improving executive functions among students with dyslexia, highlighting the relevance of play-based cognitive-behavioral methods to cognitive control and self-regulation (15). Similarly, comparisons of cognitive-behavioral play therapy and cognitive rehabilitation have explored their effects on academic achievement among students with dyslexia, further demonstrating that cognitive-behavioral play therapy may influence functional outcomes that extend beyond emotional symptoms alone (16). These studies are particularly relevant to recurrent pain because successful adaptation to pain requires executive processes such as attentional control, flexible thinking, inhibition of catastrophic responses, and the ability to implement coping strategies in emotionally demanding situations.

Research in other child populations further indicates that cognitive-behavioral play therapy can influence anxiety, behavioral problems, and adaptive psychological resources. Cognitive-behavioral group play therapy has demonstrated effectiveness for anxiety-based school refusal and behavioral problems in elementary school boys, indicating that play-based cognitive-behavioral techniques may reduce avoidance and improve adaptive participation in stressful contexts (17). Cognitive-behavioral play therapy has also been compared with mindfulness interventions in relation to psychological capital among adolescent girls, emphasizing its potential effects on positive psychological functioning and coping resources (18). In aggressive elementary school students, comparisons between cognitive-behavioral play therapy and Gestalt play therapy have examined outcomes such as impulsivity, vandalistic behavior, and cognitive flexibility, providing further support for the capacity of structured play interventions to modify maladaptive behavioral and cognitive patterns (19). Collectively, these findings indicate that cognitive-behavioral play therapy can be used to address psychological mechanisms that are also relevant to recurrent pain, including avoidance, impulsive responses to distress, inflexible thinking, emotional dysregulation, and low coping capacity.

The emotional and behavioral benefits of child-focused cognitive-behavioral interventions also appear across clinical anxiety contexts. Cognitive-behavioral therapy has been compared with attachment-based play therapy in children with separation anxiety disorder, with attention to outcomes such as emotional regulation and quality of life (20). These outcomes are directly relevant to pediatric pain because children who experience repeated physical discomfort may become emotionally reactive, dependent on reassurance, fearful of being separated from caregivers during periods of pain, or less confident in independently managing distress. An intervention that improves emotional regulation may consequently influence both

sleep and pain tolerance. Cognitive-behavioral play therapy provides opportunities to rehearse coping with discomfort in a safe context, reinforce mastery experiences, and reduce maladaptive emotional responses through repeated practice.

The applicability of cognitive-behavioral play therapy to pain-related and medical situations is further illustrated by research conducted in pediatric healthcare settings. In a randomized controlled trial involving uncooperative children undergoing restorative dental procedures, cognitive-behavioral play therapy was compared with the tell-show-do technique as a strategy for behavior modification (21). Such findings are relevant because medical and dental procedures frequently involve anticipatory fear, pain expectations, physiological arousal, and behavioral avoidance. The use of cognitive-behavioral play therapy in this context underscores its potential to help children reinterpret threatening situations and develop more adaptive responses to anticipated discomfort. Although procedural pain differs from recurrent pain, both involve cognitive appraisal, fear, behavioral coping, and tolerance of unpleasant bodily sensations. Thus, strategies effective in preparing children to cope with medical discomfort may also have utility in recurrent pain conditions.

From a cognitive-behavioral perspective, recurrent pain may be maintained partly through reciprocal interactions between negative expectations, hypervigilance to physical sensations, physiological arousal, avoidance, and reinforcement from the surrounding environment. A child who expects pain to be intolerable may attend more closely to bodily sensations, experience greater anxiety when discomfort begins, disengage rapidly from activities, and receive increased reassurance or relief from responsibilities. These consequences may unintentionally reinforce avoidance and strengthen pain-related beliefs. Cognitive-behavioral play therapy can intervene at several points in this cycle. Therapeutic games and stories can help children identify catastrophic thoughts; role-playing can support cognitive restructuring and alternative responses; relaxation and imagery can reduce physiological arousal; and graded behavioral activities can provide corrective experiences of coping successfully with discomfort. Repeated mastery through play may also increase perceived self-efficacy and willingness to remain engaged in activities despite pain.

The same intervention mechanisms may be relevant to sleep difficulties. Children with recurrent pain may approach bedtime with expectations that pain will prevent sleep, remain excessively attentive to bodily sensations in bed, seek repeated reassurance from caregivers, resist bedtime, or develop irregular sleep routines. Cognitive-behavioral play therapy can translate sleep-related cognitive and behavioral strategies into forms that are accessible to children. Through bedtime stories, visual routines, relaxation games, imagery, behavioral reinforcement, and role play, children may learn to reduce presleep arousal and develop more adaptive sleep-related expectations. The established effectiveness of cognitive-behavioral approaches for insomnia provides a strong theoretical rationale for incorporating these principles into child-focused play interventions (10, 11). Furthermore, evidence that cognitive-behavioral therapy for insomnia can alter cognitive, emotional, and physiological mechanisms associated with disturbed sleep reinforces the possibility that developmentally adapted cognitive-behavioral interventions may produce benefits even when sleep problems occur alongside another clinical condition (8, 9).

An additional consideration is that sleep disturbance and pain tolerance may not be independent treatment outcomes. Insufficient sleep can weaken executive control and emotion regulation, increase irritability, heighten physiological reactivity, and amplify the perceived unpleasantness of pain. Conversely,

improved sleep may enhance children's capacity to use cognitive and behavioral coping strategies when pain occurs. Thus, an intervention that improves sleep could indirectly facilitate greater pain tolerance, while reductions in pain-related anxiety and arousal could improve sleep. This reciprocal model supports the simultaneous examination of sleep disturbances and pain tolerance rather than treating them as unrelated problems. The cognitive-behavioral framework is particularly suited to such an approach because it emphasizes transdiagnostic mechanisms such as maladaptive cognition, avoidance, arousal, self-efficacy, behavioral conditioning, and coping.

Recent pain-related research also suggests that cognitive-behavioral interventions should be evaluated in terms of functioning and coping rather than symptom elimination alone. Systematic work comparing cognitive-behavioral treatment with more conservative pain-management approaches has emphasized occupational and functional outcomes in chronic pain populations (2). Similarly, cognitive-behavioral treatment has been associated with changes in pain perception and emotional processing in rheumatoid arthritis (4), while web-based cognitive-behavioral treatment has been used to strengthen pain self-efficacy (5). These lines of evidence support the notion that successful treatment may involve changing an individual's relationship with pain and improving the ability to function despite discomfort. For children, increasing pain tolerance may therefore represent a meaningful behavioral indicator of improved coping rather than simply a laboratory measure.

Nevertheless, despite growing evidence supporting both cognitive-behavioral interventions and play-based treatments, there remains a need for research specifically examining cognitive-behavioral play therapy in children with recurrent pain. Much of the existing literature on cognitive-behavioral therapy for pain has focused on adults with chronic musculoskeletal or rheumatological conditions, while research on cognitive-behavioral play therapy has predominantly examined emotional disorders, behavioral problems, learning disabilities, or adjustment outcomes. Likewise, much of the contemporary evidence regarding cognitive-behavioral interventions for sleep has focused on adolescents, adults, or older adults rather than younger children experiencing recurrent pain (6, 9). This leaves an important empirical gap concerning whether a developmentally tailored cognitive-behavioral play intervention can simultaneously reduce sleep disturbances and enhance pain tolerance in pediatric recurrent pain.

Addressing this gap is particularly important because interventions for children should be both evidence-based and developmentally acceptable. A treatment may be theoretically effective but have limited practical value if children cannot understand, tolerate, or engage with its procedures. Cognitive-behavioral play therapy offers a potentially useful bridge between structured psychological treatment and children's natural modes of learning and expression. Its applicability across emotional, behavioral, cognitive, educational, and healthcare contexts suggests that it may be sufficiently flexible to address the complex interaction of pain, sleep, emotion, and coping that characterizes recurrent pain in childhood (13, 14, 21). At the same time, the emerging literature on cognitive-behavioral approaches to insomnia and pain provides a strong theoretical basis for expecting improvements in both sleep-related functioning and tolerance of discomfort.

Therefore, the aim of the present study was to determine the effectiveness of cognitive-behavioral play therapy in reducing sleep disturbances and increasing pain tolerance among children with recurrent pain.

Methods and Materials

Study Design and Participants

This study employed a randomized pretest–posttest controlled design with a follow-up assessment to investigate the effectiveness of cognitive-behavioral play therapy on sleep disturbances and pain tolerance among children with recurrent pain. The statistical population consisted of children with recurrent pain who attended pediatric medical and psychological clinics in Tehran, Iran, during 2026. Following preliminary screening and assessment of the eligibility criteria, 30 children aged 8–12 years who experienced recurrent pain were selected through purposive sampling and randomly assigned to either the experimental group ($n = 15$) or the control group ($n = 15$). Recurrent pain was defined as pain occurring repeatedly or continuously over a period of at least three months and sufficiently frequent or severe to interfere with the child's everyday functioning. The inclusion criteria were being between 8 and 12 years of age, experiencing recurrent pain for at least three months as confirmed through clinical evaluation and parental report, obtaining a score indicative of sleep problems during the initial screening, having sufficient cognitive and verbal abilities to participate in play-therapy sessions, having no severe physical condition that would preclude participation in the intervention, and obtaining written informed consent from a parent or legal guardian as well as the child's assent. The exclusion criteria included diagnosis of a severe neurological or psychiatric disorder requiring intensive treatment, use of medications or participation in another psychological intervention that could substantially influence pain or sleep during the study period, absence from more than two intervention sessions, development of an acute medical condition during the study, and unwillingness of either the child or the parents to continue participation. After baseline assessment, eligible participants were assigned to the experimental and control groups using a simple random allocation procedure. The experimental group received cognitive-behavioral play therapy in addition to routine care, whereas the control group received routine care without the psychological intervention during the study period. Both groups completed the outcome assessments at pretest and posttest, and a follow-up assessment was conducted two months after completion of the intervention to examine the stability of treatment effects. Participation was voluntary, confidentiality of personal information was maintained throughout the study, and participants were informed that they could withdraw from the research at any stage without any consequences for their routine medical care.

Data Collection Tools

Children's Sleep Habits Questionnaire (CSHQ). Sleep disturbances were assessed using the Children's Sleep Habits Questionnaire developed by Owens, Spirito, and McGuinn in 2000. The CSHQ is a parent-report instrument designed to assess common behavioral and clinical sleep problems in school-aged children. The original questionnaire contains 45 items, of which 33 items are included in the calculation of the total sleep disturbance score. The instrument evaluates several major dimensions of children's sleep, including bedtime resistance, sleep-onset delay, sleep duration, sleep anxiety, night waking, parasomnias, sleep-disordered breathing, and daytime sleepiness. Parents rate the frequency of each sleep-related behavior during a typical recent week using a three-point response scale, with responses generally scored as 1 for rarely, 2 for sometimes, and 3 for usually; relevant items are reverse-scored according to the

questionnaire scoring instructions. Scores on the 33 scored items are summed to provide a total sleep disturbance score, with higher scores indicating greater sleep-related difficulties and more problematic sleep patterns. A total score above the commonly used clinical cutoff of 41 is considered indicative of clinically meaningful sleep difficulties. The CSHQ has been extensively used in pediatric populations and has demonstrated acceptable internal consistency, test–retest reliability, discriminant validity, and construct validity in previous studies. Evidence from translated versions of the questionnaire has also supported its suitability for the assessment of sleep-related problems among children across different cultural settings.

Cold Pressor Task. Pain tolerance was assessed using a standardized cold pressor task, a behavioral procedure widely used in pediatric and experimental pain research to evaluate responses to experimentally induced pain. In this procedure, the child was seated comfortably and received standardized instructions before testing. The nondominant hand was first maintained at a neutral temperature when necessary to minimize differences in baseline hand temperature and was then immersed up to the wrist in circulating cold water maintained at approximately 10°C. The child was instructed to keep the hand in the water for as long as tolerable but was explicitly informed that the hand could be withdrawn at any time. Pain tolerance was operationalized as the elapsed time, measured in seconds using a stopwatch, between immersion of the hand and voluntary withdrawal because of discomfort or pain. For safety and procedural standardization, a maximum immersion time of 120 seconds was established, after which the researcher terminated the task even if the child had not voluntarily withdrawn the hand. Longer immersion duration represented greater pain tolerance. The same water temperature, immersion depth, instructions, environmental conditions, and maximum exposure period were maintained across pretest, posttest, and follow-up assessments. The cold pressor procedure has been widely employed as a standardized experimental measure of pain tolerance in children and adults, and previous research has demonstrated its acceptable test–retest reliability and sensitivity to individual differences and psychological interventions affecting pain perception and coping. Children were monitored continuously during administration, and testing was discontinued immediately at the child’s request or in the presence of unusual distress.

Intervention

The cognitive-behavioral play therapy intervention was administered to participants in the experimental group in eight sessions conducted twice weekly, with each session lasting approximately 60 minutes. The intervention integrated developmentally appropriate play techniques with core cognitive-behavioral principles and was adapted to address maladaptive cognitive, emotional, behavioral, and physiological responses associated with recurrent pain and sleep difficulties. The initial session focused on establishing a therapeutic relationship through structured games, familiarizing children with the treatment setting, identifying recurrent pain experiences and their consequences, and providing age-appropriate psychoeducation about the relationship among thoughts, emotions, bodily sensations, behavior, pain, and sleep. The second session emphasized emotional recognition and expression using emotion cards, drawing, puppets, and storytelling, enabling children to identify emotions associated with pain episodes and bedtime difficulties. The third session introduced the identification of negative automatic thoughts related to pain, such as catastrophizing, fear of worsening symptoms, helplessness, and anticipatory anxiety, through therapeutic stories and role-playing activities. During the fourth session, cognitive restructuring techniques

were taught through games that encouraged children to distinguish helpful from unhelpful thoughts and to replace exaggerated or threatening interpretations of pain with more adaptive coping statements. The fifth session concentrated on behavioral coping with pain and included distraction games, guided imagery, diaphragmatic breathing, progressive muscle relaxation, and playful rehearsal of relaxation skills that could be applied during painful episodes. The sixth session focused on sleep-related behavioral skills, including establishing regular bedtime and waking schedules, reducing stimulating activities before bedtime, developing calming bedtime routines, managing bedtime resistance, and practicing relaxation strategies before sleep. The seventh session involved graded exposure to situations or activities that children had begun to avoid because of anticipated pain, using modeling, role play, behavioral rehearsal, reinforcement, and problem-solving games to increase perceived control and adaptive functioning. The final session reviewed skills learned during the intervention, integrated cognitive and behavioral coping strategies into individualized pain-management plans, practiced responses to possible future pain episodes and sleep difficulties, and focused on relapse prevention and maintenance of therapeutic gains. Parents received brief guidance concerning reinforcement of adaptive coping behaviors, establishment of consistent sleep routines, and avoidance of excessive attention to pain behaviors. Sessions were conducted by a trained therapist familiar with cognitive-behavioral interventions and therapeutic work with children. Participants in the control group did not receive cognitive-behavioral play therapy during the intervention period and continued to receive their usual medical care.

Data Analysis

Data were analyzed using IBM SPSS Statistics, version 27. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize demographic characteristics and the distributions of sleep disturbance and pain tolerance scores at the pretest, posttest, and follow-up assessments. Before conducting inferential analyses, the assumptions required for parametric testing were evaluated. Normality of the dependent variables was examined using the Shapiro–Wilk test and inspection of distributional indices, homogeneity of variances was assessed using Levene’s test, and homogeneity of covariance matrices was evaluated where appropriate. Because sleep disturbances and pain tolerance were measured repeatedly across three assessment occasions in two independent groups, a mixed repeated-measures analysis of variance was used to evaluate the effects of time, group, and the time $\times$ group interaction. Mauchly’s test was used to assess the assumption of sphericity, and when this assumption was violated, the Greenhouse–Geisser correction was applied. Significant interaction effects were followed by pairwise comparisons with Bonferroni adjustment to determine changes between pretest, posttest, and follow-up assessments and to evaluate the maintenance of intervention effects. Effect sizes were reported using partial eta squared to indicate the magnitude of observed effects. All statistical tests were two-tailed, and the level of statistical significance was set at $p < .05$.

Findings and Results

The final sample consisted of 30 children with recurrent pain who completed the study and all three assessment stages, including pretest, posttest, and two-month follow-up. Fifteen participants were assigned to the cognitive-behavioral play therapy group and 15 to the control group. The mean age of participants in

the experimental group was 10.13 years ($SD = 1.25$), compared with 10.07 years ($SD = 1.28$) in the control group. In the experimental group, 8 participants (53.3%) were girls and 7 (46.7%) were boys, while the control group consisted of 7 girls (46.7%) and 8 boys (53.3%). Regarding age distribution, 6 children (20.0%) were 8–9 years old, 16 children (53.3%) were 10–11 years old, and 8 children (26.7%) were 12 years old. The most frequently reported recurrent pain complaints were recurrent abdominal pain, headache, and musculoskeletal pain. There were no statistically significant differences between the experimental and control groups in age or gender distribution at baseline ($p > .05$), indicating that the two groups were demographically comparable prior to implementation of the intervention. No participant withdrew after random allocation, and therefore the analyses were conducted on data from all 30 children.

Table 1. Descriptive Statistics for Sleep Disturbances and Pain Tolerance in the Experimental and Control Groups at Pretest, Posttest, and Follow-Up

Variable	Group	Pretest Mean $\pm$ SD	Posttest Mean $\pm$ SD	Follow-Up Mean $\pm$ SD
Sleep disturbances	Experimental	55.47 $\pm$ 5.68	42.20 $\pm$ 4.89	43.07 $\pm$ 4.96
Sleep disturbances	Control	54.93 $\pm$ 5.41	53.67 $\pm$ 5.52	53.27 $\pm$ 5.61
Pain tolerance (seconds)	Experimental	38.60 $\pm$ 8.74	67.87 $\pm$ 10.21	64.73 $\pm$ 9.86
Pain tolerance (seconds)	Control	39.47 $\pm$ 8.31	41.20 $\pm$ 8.79	41.73 $\pm$ 8.63

As presented in Table 1, the two groups demonstrated highly similar mean scores for both dependent variables at the pretest stage. The mean sleep disturbance score at baseline was 55.47 ($SD = 5.68$) in the experimental group and 54.93 ($SD = 5.41$) in the control group, indicating substantial sleep-related difficulties in both groups before the intervention. Following cognitive-behavioral play therapy, however, the mean sleep disturbance score in the experimental group decreased markedly to 42.20 ($SD = 4.89$), representing an improvement of more than 13 points relative to the pretest score. At the two-month follow-up, the experimental group obtained a mean score of 43.07 ($SD = 4.96$), demonstrating that the improvement was largely maintained after termination of the intervention. In contrast, the control group showed only a small descriptive change in sleep disturbance scores, with the mean declining from 54.93 ($SD = 5.41$) at pretest to 53.67 ($SD = 5.52$) at posttest and 53.27 ($SD = 5.61$) at follow-up. A similar pattern in the opposite direction was observed for pain tolerance. The experimental group had a baseline mean pain tolerance of 38.60 seconds ($SD = 8.74$), which increased substantially to 67.87 seconds ($SD = 10.21$) following the intervention and remained relatively high at the follow-up assessment, with a mean of 64.73 seconds ($SD = 9.86$). By comparison, pain tolerance in the control group changed only slightly from 39.47 seconds ($SD = 8.31$) at pretest to 41.20 seconds ($SD = 8.79$) at posttest and 41.73 seconds ($SD = 8.63$) at follow-up. Thus, the descriptive findings suggested that cognitive-behavioral play therapy was associated with a pronounced reduction in sleep disturbances and a substantial increase in pain tolerance, whereas no comparable pattern of improvement was evident in the control group.

Prior to conducting the main inferential analyses, the statistical assumptions underlying mixed repeated-measures analysis of variance were examined. The Shapiro–Wilk test was nonsignificant for sleep disturbance and pain tolerance scores across the experimental and control groups at all three assessment occasions ($p > .05$), supporting the assumption of approximate normality. Levene’s tests for equality of error variances were also nonsignificant at pretest, posttest, and follow-up for both dependent variables ($p > .05$), indicating that the homogeneity of variance assumption was satisfied. Mauchly’s test of sphericity was significant for sleep disturbances, $W = .79$, $\chi^2(2) = 6.54$, $p = .038$, and for pain tolerance, $W = .76$, $\chi^2(2) =$

7.58, $p = .023$. Therefore, the Greenhouse–Geisser correction was applied to the within-subject effects for both variables. Examination of extreme standardized values and distributions did not indicate influential outliers that would substantially affect the analysis. Collectively, these diagnostic findings supported the use of mixed repeated-measures analysis of variance for evaluating changes across time and differences between groups.

Table 2. Mixed Repeated-Measures Analysis of Variance for Sleep Disturbances and Pain Tolerance

Variable	Effect	df	F	p	Partial η^2
Sleep disturbances	Time	1.65, 46.31	59.42	< .001	.679
Sleep disturbances	Group	1, 28	20.84	< .001	.427
Sleep disturbances	Time $\times$ Group	1.65, 46.31	40.73	< .001	.593
Pain tolerance	Time	1.61, 45.04	71.36	< .001	.718
Pain tolerance	Group	1, 28	27.19	< .001	.493
Pain tolerance	Time $\times$ Group	1.61, 45.04	57.68	< .001	.673

The results of the mixed repeated-measures analysis of variance are presented in Table 2. For sleep disturbances, the main effect of time was statistically significant, $F(1.65, 46.31) = 59.42$, $p < .001$, partial $\eta^2 = .679$, demonstrating that sleep disturbance scores changed significantly across the three assessment occasions when both groups were considered together. The main effect of group was also significant, $F(1, 28) = 20.84$, $p < .001$, partial $\eta^2 = .427$, showing an overall difference between the experimental and control groups across measurement occasions. More importantly, the time $\times$ group interaction was statistically significant, $F(1.65, 46.31) = 40.73$, $p < .001$, partial $\eta^2 = .593$. This interaction indicates that the pattern of change in sleep disturbances over time differed significantly between the two groups. The large partial eta squared associated with the interaction suggests that approximately 59.3% of the explainable variance in changes in sleep disturbance scores was associated with differential temporal change between the intervention and control conditions. The descriptive results indicate that this interaction was attributable primarily to the substantial reduction in sleep disturbances observed in the experimental group following cognitive-behavioral play therapy, whereas the control group remained comparatively stable.

For pain tolerance, the main effect of time was likewise significant, $F(1.61, 45.04) = 71.36$, $p < .001$, partial $\eta^2 = .718$, demonstrating a significant change in pain tolerance scores across assessment occasions. A statistically significant main effect of group was also observed, $F(1, 28) = 27.19$, $p < .001$, partial $\eta^2 = .493$. Most importantly for evaluating the effectiveness of the intervention, the interaction between time and group was statistically significant, $F(1.61, 45.04) = 57.68$, $p < .001$, partial $\eta^2 = .673$. The magnitude of this effect was large, indicating that approximately 67.3% of the relevant variance in the temporal pattern of pain tolerance scores was associated with differences between the experimental and control groups. Inspection of the group means showed that children who participated in cognitive-behavioral play therapy demonstrated a pronounced increase in the length of time for which experimentally induced pain could be tolerated from pretest to posttest, whereas only negligible changes occurred in the control group. The preservation of relatively high pain tolerance scores at the follow-up assessment further suggested that the therapeutic gains were not restricted to the immediate post-intervention period.

Because statistically significant time $\times$ group interaction effects were obtained for both dependent variables, Bonferroni-adjusted pairwise comparisons were conducted separately to identify the specific

assessment occasions between which statistically significant changes occurred. The results of these comparisons are reported in Table 3.

Table 3. Bonferroni-Adjusted Pairwise Comparisons of Pretest, Posttest, and Follow-Up Scores in the Experimental and Control Groups

Variable	Group	Comparison	Mean Difference	SE	p
Sleep disturbances	Experimental	Pretest – Posttest	13.27	1.20	< .001
Sleep disturbances	Experimental	Pretest – Follow-up	12.40	1.28	< .001
Sleep disturbances	Experimental	Posttest – Follow-up	-0.87	0.58	.431
Sleep disturbances	Control	Pretest – Posttest	1.27	0.76	.324
Sleep disturbances	Control	Pretest – Follow-up	1.67	0.83	.168
Sleep disturbances	Control	Posttest – Follow-up	0.40	0.51	1.000
Pain tolerance	Experimental	Pretest – Posttest	-29.27	2.54	< .001
Pain tolerance	Experimental	Pretest – Follow-up	-26.13	2.46	< .001
Pain tolerance	Experimental	Posttest – Follow-up	3.13	1.38	.091
Pain tolerance	Control	Pretest – Posttest	-1.73	1.31	.594
Pain tolerance	Control	Pretest – Follow-up	-2.27	1.43	.359
Pain tolerance	Control	Posttest – Follow-up	-0.53	0.92	1.000

As shown in Table 3, the Bonferroni-adjusted pairwise comparisons provided further evidence regarding the pattern and persistence of change in the experimental group. For sleep disturbances, the experimental group demonstrated a statistically significant reduction from pretest to posttest, with a mean difference of 13.27 points ($SE = 1.20$, $p < .001$). The comparison between pretest and follow-up was also significant, with sleep disturbance scores at follow-up remaining 12.40 points lower than baseline levels ($SE = 1.28$, $p < .001$). In contrast, the difference between posttest and follow-up was not statistically significant (mean difference = -0.87, $SE = 0.58$, $p = .431$). This absence of a significant deterioration between the immediate and follow-up assessments indicates that the reduction in sleep disturbances achieved through cognitive-behavioral play therapy was largely maintained during the two-month period following the intervention. In the control group, none of the pairwise comparisons for sleep disturbances reached statistical significance. Specifically, the difference between pretest and posttest was 1.27 points ($p = .324$), the difference between pretest and follow-up was 1.67 points ($p = .168$), and the difference between posttest and follow-up was 0.40 points ($p = 1.000$). These findings indicate that the minor descriptive reductions observed in the control group were not sufficiently large to represent statistically meaningful changes.

The pattern of pairwise comparisons for pain tolerance was similarly consistent with the effectiveness of the intervention. In the experimental group, pain tolerance increased significantly from pretest to posttest, as reflected by a mean difference of -29.27 seconds when pretest scores were subtracted from posttest scores ($SE = 2.54$, $p < .001$). Pain tolerance at the follow-up assessment also remained significantly higher than at pretest, with a mean difference of -26.13 seconds ($SE = 2.46$, $p < .001$). Although the experimental group showed a small decrease in pain tolerance from posttest to follow-up, corresponding to a mean difference of 3.13 seconds, this change did not reach statistical significance after Bonferroni adjustment ($SE = 1.38$, $p = .091$). Therefore, the increased pain tolerance observed immediately after cognitive-behavioral play therapy was substantially preserved over the two-month follow-up period. By comparison, none of the changes in pain tolerance in the control group were statistically significant. The difference between pretest and posttest was -1.73 seconds ($p = .594$), the difference between pretest and follow-up was -2.27 seconds ($p = .359$), and the difference between posttest and follow-up was -0.53 seconds ($p = 1.000$). Taken together, the pairwise

comparisons demonstrate that statistically significant improvements occurred exclusively in the experimental group and were maintained at follow-up.

Overall, the findings demonstrated a consistent pattern across descriptive and inferential analyses. At baseline, the experimental and control groups had comparable levels of sleep disturbances and pain tolerance. Following the eight-session cognitive-behavioral play therapy intervention, children in the experimental group exhibited a substantial decrease in sleep disturbance scores and a pronounced increase in behavioral pain tolerance, whereas participants in the control group showed no statistically significant changes in either outcome. The significant time $\times$ group interactions for both sleep disturbances and pain tolerance indicate that these changes cannot be attributed merely to the passage of time or repeated measurement, but instead reflect different trajectories in the two study groups. Furthermore, the nonsignificant differences between posttest and follow-up scores within the experimental group, combined with the significant differences between pretest and follow-up scores, demonstrate that the effects of the intervention remained relatively stable for at least two months after completion of treatment. Accordingly, the findings support the effectiveness and short-term durability of cognitive-behavioral play therapy in reducing sleep disturbances and increasing pain tolerance among children with recurrent pain.

Discussion and Conclusion

The present study examined the effectiveness of cognitive-behavioral play therapy on sleep disturbances and pain tolerance among children with recurrent pain. The findings showed that children who participated in the cognitive-behavioral play therapy intervention experienced a substantial reduction in sleep disturbance scores and a marked increase in pain tolerance from pretest to posttest, while no statistically significant changes were observed in the control group. Furthermore, the significant time $\times$ group interaction effects for both outcomes indicated that the pattern of change across the three measurement occasions differed meaningfully between the intervention and control groups. The maintenance of improvements at the two-month follow-up, together with the nonsignificant differences between posttest and follow-up scores, suggested that the therapeutic effects were not merely immediate or transient but remained relatively stable after completion of the intervention. These results support the effectiveness of cognitive-behavioral play therapy as a developmentally appropriate psychological intervention for children experiencing recurrent pain, particularly when pain-related difficulties are accompanied by disturbed sleep and reduced tolerance of discomfort.

The first major finding was that cognitive-behavioral play therapy significantly reduced sleep disturbances in children with recurrent pain. This result is consistent with the broader literature demonstrating that cognitive-behavioral approaches can improve sleep-related functioning by modifying maladaptive beliefs, reducing physiological and cognitive arousal, restructuring bedtime habits, and promoting more adaptive sleep-related behaviors. Evidence from cognitive-behavioral therapy for insomnia indicates that interventions targeting dysfunctional sleep cognitions and behaviors can produce significant improvements in sleep quality and reduce persistent insomnia symptoms (6, 7). Similarly, findings from interventions delivered through digital platforms indicate that cognitive-behavioral principles remain effective when adapted to different formats and age groups, supporting the generalizability of these mechanisms beyond conventional face-to-face therapy (9, 10). The current findings therefore extend

previous evidence by suggesting that cognitive-behavioral techniques, when integrated into a play-based format suitable for children, may also improve sleep in pediatric populations experiencing recurrent pain.

This finding may be explained by the fact that children with recurrent pain often enter bedtime with heightened vigilance toward bodily sensations, anticipatory anxiety about pain, and worries about whether they will be able to fall asleep or remain asleep. These processes can increase physiological arousal and create maladaptive associations between bedtime, pain, and distress. Cognitive-behavioral play therapy may interrupt this cycle by helping children identify and modify threatening thoughts, practice relaxation and imagery, learn predictable bedtime routines, and develop a greater sense of control over their physical and emotional responses. The use of play may make these strategies more understandable and acceptable to children than conventional verbal cognitive therapy. Research on adolescent insomnia interventions similarly emphasizes the importance of adapting cognitive-behavioral techniques to developmental needs, particularly when sleep difficulties occur alongside emotional or psychological problems (11). The present findings are therefore compatible with the view that developmentally tailored cognitive-behavioral interventions may reduce sleep disturbance by influencing cognitive, emotional, and behavioral mechanisms simultaneously.

The reduction in sleep disturbances may also be interpreted through mechanisms involving decreased hyperarousal and improved emotional regulation. Contemporary research on cognitive-behavioral therapy for insomnia has shown that treatment effects may involve alterations in neurobiological and psychophysiological processes associated with sleep and emotional processing. In particular, cognitive-behavioral treatment has been linked to changes in fronto-limbic mechanisms and reductions in sleep-related hyperarousal (7, 8). Although the present study did not measure neurobiological variables, the observed reduction in sleep disturbance is theoretically consistent with a decrease in cognitive and physiological arousal. Through relaxation games, guided imagery, behavioral rehearsal, emotion labeling, and cognitive restructuring, children may have acquired strategies that reduced tension before sleep and weakened the association between pain and bedtime distress. In this way, the intervention may have facilitated both emotional calming and more adaptive sleep behavior.

The second major finding was that cognitive-behavioral play therapy significantly increased pain tolerance among children with recurrent pain. This result is consistent with studies showing that cognitive-behavioral interventions can modify pain perception, pain coping, self-efficacy, and functional responses to discomfort. Research among patients with chronic pain has demonstrated that cognitive-behavioral therapy can improve pain-related outcomes and quality of life by targeting maladaptive cognitions and promoting more effective coping strategies (3). Similarly, cognitive-behavioral interventions have been associated with improvements in pain perception and emotional processing in patients with rheumatoid arthritis (4). Web-based cognitive-behavioral interventions have also been shown to improve pain self-efficacy, suggesting that cognitive-behavioral treatment can strengthen confidence in the ability to manage pain and continue functioning despite physical discomfort (5). The present findings are therefore aligned with previous evidence indicating that cognitive-behavioral approaches can alter the way individuals interpret, tolerate, and respond to pain.

From a psychological perspective, the increase in pain tolerance may be explained by changes in catastrophic thinking, attentional focus, fear of pain, and perceived control. Children who repeatedly

experience pain may come to interpret painful sensations as highly threatening and uncontrollable. Such interpretations can intensify attention to bodily sensations and increase emotional reactivity, leading to faster withdrawal from discomfort. Cognitive-behavioral play therapy may weaken this process by helping children reinterpret pain-related thoughts, practice alternative coping statements, use distraction, and regulate emotional arousal. Repeated successful experiences during therapeutic games may also strengthen the child's sense of mastery. As perceived control increases, the child may become less likely to respond to pain with immediate avoidance or distress. This interpretation is consistent with broader cognitive-behavioral models of chronic pain, which emphasize that treatment outcomes are influenced not only by nociceptive intensity but also by cognitive appraisal, emotional response, behavioral avoidance, and self-efficacy (1, 2).

The findings are also compatible with studies examining cognitive-behavioral play therapy in children with emotional, behavioral, and cognitive difficulties. Cognitive-behavioral group play therapy has been shown to reduce anxiety-based school refusal and behavioral problems, suggesting that play-based cognitive-behavioral interventions can reduce avoidance and increase adaptive engagement in stressful situations (17). Similarly, cognitive-behavioral play therapy has been associated with improvements in behavioral adjustment and problem-solving abilities among students with dyslexia (14). Improvements in executive functioning have also been investigated in children receiving cognitive-behavioral play therapy, indicating that the intervention may influence attention, inhibition, planning, and cognitive flexibility (15). These abilities may be directly relevant to pain tolerance because enduring discomfort requires attentional control, flexible interpretation of bodily sensations, and the inhibition of immediate avoidance responses.

The current results are further supported by studies showing that cognitive-behavioral play therapy can influence emotional regulation and broader psychological functioning. Research on children with intellectual disability has reported improvements in social anxiety and emotional intelligence following cognitive-behavioral play therapy (13), while comparisons of cognitive-behavioral and other play-based approaches have shown benefits for emotional regulation and quality of life in children with separation anxiety (20). These findings suggest that cognitive-behavioral play therapy can improve the child's ability to identify, regulate, and respond to distressing emotions. In the context of recurrent pain, improved emotion regulation may reduce the amplification of pain through anxiety and distress and may allow the child to tolerate uncomfortable sensations for a longer period. Because emotional and pain-processing systems are closely interconnected, reductions in fear and emotional reactivity may contribute directly to improved pain tolerance.

The play-based format itself may have been an important factor in the effectiveness of the intervention. Children often communicate and learn more naturally through play than through abstract verbal discussion. By embedding cognitive and behavioral techniques within role play, storytelling, drawing, puppetry, and therapeutic games, the intervention likely increased engagement and made coping strategies more concrete. Evidence from play therapy research indicates that structured play can support cognitive and emotional development and improve self-regulatory processes. For example, Floortime play therapy has been associated with improvements in executive functioning and cognitive emotion regulation in children with attention-deficit/hyperactivity disorder (12). Likewise, cognitive-behavioral play therapy has been compared favorably with other interventions in relation to academic achievement, executive functions, psychological

capital, cognitive flexibility, and behavioral outcomes (16, 18, 19). These findings support the proposition that play provides an effective developmental medium through which cognitive-behavioral skills can be learned and practiced.

The effectiveness of cognitive-behavioral play therapy in increasing pain tolerance may also be understood in light of research conducted in pediatric medical settings. Cognitive-behavioral play therapy has been shown to facilitate more adaptive behavior among uncooperative children undergoing restorative dental procedures, a context in which pain anticipation, fear, and avoidance are highly salient (21). Although dental procedural pain differs from recurrent pain, both situations require children to cope with anticipated discomfort, regulate anxiety, and remain engaged despite unpleasant sensations. The improvement in pain tolerance observed in the present study therefore appears consistent with the idea that cognitive-behavioral play techniques can alter how children respond to threatening or painful experiences.

Another important finding was the maintenance of therapeutic effects at follow-up. The experimental group retained significantly lower sleep disturbance scores and higher pain tolerance compared with baseline, while posttest and follow-up differences were not statistically significant. This pattern suggests that children were able to continue using the skills acquired during treatment after formal sessions ended. Skills such as relaxation, cognitive reframing, distraction, emotion regulation, problem solving, and adaptive bedtime routines may have become integrated into daily coping. This interpretation is compatible with the cognitive-behavioral emphasis on skills acquisition and self-management rather than therapist-dependent symptom control. It is also consistent with studies indicating that cognitive-behavioral interventions can produce sustained changes in pain coping and sleep-related functioning by modifying the mechanisms that maintain symptoms (3, 6).

The simultaneous improvement in sleep disturbances and pain tolerance also deserves attention. These two outcomes may be linked through reciprocal mechanisms. Poor sleep can increase pain sensitivity, reduce emotional control, impair attentional regulation, and lower coping capacity, while recurrent pain can increase bedtime anxiety and fragment sleep. Therefore, reducing sleep disturbances may indirectly increase tolerance of pain, and improving pain coping may in turn promote more restful sleep. The intervention used in the present study addressed both cognitive and behavioral mechanisms that could influence this reciprocal cycle. By reducing fear, catastrophizing, and physiological arousal while increasing coping skills and perceived control, cognitive-behavioral play therapy may have simultaneously improved the child's capacity to sleep and to tolerate discomfort. This interpretation is consistent with evidence emphasizing the central role of cognition, arousal, and self-regulation in both insomnia and chronic pain (1, 8).

Overall, the present findings add to a growing body of evidence supporting cognitive-behavioral interventions for pediatric and pain-related problems. Previous studies have demonstrated the applicability of cognitive-behavioral play therapy to behavioral, emotional, academic, and self-regulation outcomes in children (13-15), while research on cognitive-behavioral approaches to pain and insomnia has shown meaningful effects on pain coping, sleep quality, self-efficacy, and daily functioning (5, 9, 10). The present study extends these lines of research by demonstrating that a developmentally adapted cognitive-behavioral play intervention may simultaneously reduce sleep disturbances and increase pain tolerance in children with recurrent pain. The large interaction effects observed for both outcomes further suggest that the changes were clinically meaningful rather than merely statistically detectable. Accordingly, cognitive-behavioral play

therapy may be considered a promising adjunctive psychological intervention for recurrent pain in childhood, particularly when pain is accompanied by impaired sleep and maladaptive responses to discomfort.

A number of limitations should be considered when interpreting these findings. First, the sample consisted of only 30 children from clinics in Tehran, which limits the generalizability of the results to children from other geographical, cultural, socioeconomic, or clinical settings. Second, the study included children with different forms of recurrent pain rather than focusing on a single diagnostic category, and differences in pain etiology may have influenced treatment responsiveness. Third, sleep disturbances were measured primarily through parent-reported questionnaire data, which may be influenced by parental perception and reporting bias. Fourth, pain tolerance was assessed using an experimental cold pressor task, which provides a standardized behavioral measure but does not fully represent the complexity of naturally occurring recurrent pain. Fifth, the follow-up period was limited to two months, and therefore the long-term stability of treatment effects remains uncertain. Finally, although the control group received routine care, the study did not include an active psychological comparison condition, making it difficult to determine which specific components of cognitive-behavioral play therapy were responsible for the observed changes.

Future studies should replicate these findings using larger and more diverse samples and should consider stratifying participants according to the type, duration, and severity of recurrent pain. Longer follow-up periods of six months or one year would provide stronger evidence regarding the durability of treatment effects. Future research could also incorporate objective sleep measures such as actigraphy or polysomnography alongside parent- and child-report instruments and could assess additional pain-related variables such as pain catastrophizing, pain-related fear, self-efficacy, functional disability, and school attendance. Comparative studies examining cognitive-behavioral play therapy against other active treatments, including mindfulness-based interventions, relaxation training, family interventions, or standard cognitive-behavioral therapy, would help clarify its specific therapeutic advantages. It would also be useful to examine mediating mechanisms to determine whether improvements in sleep, emotional regulation, pain-related cognitions, or self-efficacy explain changes in pain tolerance. Future studies could additionally investigate the role of parental involvement and family responses to pain in strengthening or maintaining treatment outcomes.

In practice, cognitive-behavioral play therapy can be considered as a developmentally appropriate adjunct to routine medical management for children with recurrent pain, particularly when they also experience sleep difficulties, anxiety about pain, or low tolerance of discomfort. Pediatric psychologists, counselors, rehabilitation professionals, and other clinicians working with children can integrate play-based cognitive restructuring, relaxation, guided imagery, emotion regulation, problem-solving, and graded coping exercises into individualized treatment programs. Brief parental guidance should also be incorporated so that adaptive coping and consistent sleep routines are reinforced at home while excessive attention to pain behaviors is minimized. Schools and pediatric clinics may benefit from coordinated approaches that support children in maintaining normal academic, social, and physical activities despite recurrent pain. Because the intervention is structured yet adaptable, it may be integrated into outpatient psychological services, pediatric pain programs, rehabilitation settings, and school-based mental health services with appropriate training and supervision.

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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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