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The Effectiveness of Metacognitive Training on Distress Tolerance and Cognitive Dysregulation in Mothers of Children with Intellectual Disabilities

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A B S T R A C T

Objective: The present study aimed to investigate the effectiveness of metacognitive training on distress tolerance and cognitive dysregulation in mothers of children with intellectual disabilities.

Methods and Materials: This study was an applied quasi-experimental research with a pretest–posttest design and a two-month follow-up including a control group. The statistical population consisted of all mothers of children with intellectual disabilities in Tabriz in 2025, from whom 30 participants were selected using purposive and convenience sampling methods. After meeting the inclusion criteria and providing informed consent, participants were randomly assigned to an experimental group (n = 15) and a control group (n = 15). The experimental group received 12 weekly sessions of metacognitive training based on Wells' protocol (2017), each lasting 60 minutes, while the control group received no intervention. Data were collected using the Distress Tolerance Questionnaire (Simons & Gaher, 2005) and the Cognitive Dysregulation Questionnaire (Mason et al., 1995), administered at pretest, posttest, and follow-up stages. Data were analyzed using repeated measures analysis of variance (ANOVA) in SPSS version 27.

Findings: The results of repeated measures ANOVA indicated significant effects of time, group, and time × group interaction on distress tolerance ($F = 195.32$, $p < .001$, $\eta^2 = 0.875$; $F = 45.94$, $p < .001$, $\eta^2 = 0.621$; $F = 71.43$, $p < .001$, $\eta^2 = 0.718$) and cognitive dysregulation ($F = 280.98$, $p < .001$, $\eta^2 = 0.909$; $F = 30.82$, $p < .001$, $\eta^2 = 0.524$; $F = 98.78$, $p < .001$, $\eta^2 = 0.779$). Multivariate analysis of variance also confirmed a significant main effect of time ($F = 31.86$, $p < .001$, $\eta^2 = 0.485$) and a significant time × group interaction ($F = 44.92$, $p < .001$, $\eta^2 = 0.581$). Bonferroni post hoc tests showed significant differences between pretest and posttest and between pretest and follow-up ($p < .001$), while no significant differences were observed between posttest and follow-up ($p = 1.00$), indicating stability of effects.

Conclusion: Metacognitive training is an effective and stable intervention for increasing distress tolerance and reducing cognitive dysregulation in mothers of children with intellectual disabilities, and its effects remain sustained over time.

Keywords: *metacognitive therapy, cognitive dysregulation, distress tolerance, mothers of children with intellectual disabilities*

1. Introduction

The presence of a child with intellectual disability constitutes a significant and enduring psychological challenge for family systems, particularly for mothers who often assume the primary caregiving role. The caregiving demands associated with intellectual disability extend beyond routine parental responsibilities and frequently involve continuous supervision, specialized educational and rehabilitation needs, and long-term uncertainty regarding the child's developmental trajectory. These stressors place mothers at heightened risk for a range of psychological difficulties, including elevated stress, anxiety, depressive symptoms, and impaired emotional functioning. Empirical evidence suggests that mothers of children with intellectual and developmental disabilities experience significantly higher levels of psychological distress compared to mothers of typically developing children, largely due to the chronic and multifaceted nature of caregiving burdens (Dukmak et al., 2023; Zeng et al., 2025). Moreover, caregiving-related stress has been linked to adverse mental health outcomes not only for mothers but also for children, as parental psychological functioning plays a critical role in shaping children's emotional and behavioral adjustment (Piro-Gambetti et al., 2023).

One of the central constructs implicated in the psychological adaptation of mothers facing such stressors is distress tolerance, defined as the perceived or actual capacity to withstand negative emotional states. Distress tolerance has been identified as a key resilience factor that influences individuals' responses to stress, their emotional regulation strategies, and their overall psychological well-being. Lower levels of distress tolerance have been associated with maladaptive coping behaviors, increased vulnerability to anxiety and depression, and difficulties in managing daily stressors (Azizi et al., 2010; Yao et al., 2026). In the context of parenting a child with intellectual disability, distress tolerance becomes particularly salient, as mothers are frequently exposed to persistent stressors that require sustained emotional regulation. Research indicates that higher distress tolerance is associated with better psychological adjustment and lower perceived stress among mothers of children with disabilities, highlighting its importance as a protective factor (Hosseini et al., 2024; Nouri Ghaleh Alikhani et al., 2025).

In parallel with distress tolerance, cognitive dysregulation represents another critical psychological construct that has received increasing attention in recent years. Cognitive dysregulation refers to maladaptive patterns of thinking, including excessive worry, rumination, attentional biases toward threat, and difficulties in controlling intrusive thoughts. These cognitive processes are central to the development and maintenance of emotional disorders and are closely linked to emotional dysregulation. Studies have demonstrated that cognitive and emotional dysregulation play a mediating role in the relationship between stressors and psychological outcomes, suggesting that individuals who struggle to regulate their cognitive processes are more likely to experience heightened distress and psychopathology (Chan et al., 2026; Namjoo Abosaeidi et al., 2021). Among mothers of children with intellectual disabilities, persistent worry about the child's future, self-blame, and negative beliefs about caregiving may contribute to elevated levels of cognitive dysregulation, thereby exacerbating emotional distress and reducing overall well-being (Hosseini & Ashouri, 2024).

Given the central role of distress tolerance and cognitive dysregulation in psychological functioning, interventions that target these constructs are of considerable importance. In recent years, a variety of psychological interventions have been developed to enhance emotional and cognitive regulation in caregivers of children with disabilities. For example, acceptance and commitment therapy (ACT) has been shown to improve distress tolerance and time perspective in mothers of children with intellectual disabilities (Asgari et al., 2021), while mindfulness-based and compassion-focused interventions have demonstrated effectiveness in reducing worry and increasing tolerance of distress (Homayounfar et al., 2022). Similarly, spiritually oriented group interventions and forgiveness-based therapies have been found to reduce psychological distress and improve emotional functioning in this population (Hosseini et al., 2024; Mazrouei et al., 2024). Although these approaches have yielded promising results, they primarily focus on modifying emotional experiences or promoting acceptance, and may not directly address the underlying metacognitive processes that govern individuals' relationships with their thoughts.

Metacognitive therapy (MCT), developed by Wells (2017), offers a distinct and theoretically grounded approach that targets dysfunctional metacognitive beliefs and processes. According to the metacognitive model, psychological distress is maintained not by the content of thoughts per se, but by maladaptive patterns of thinking collectively referred to as the Cognitive Attentional Syndrome (CAS), which includes worry, rumination, threat

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monitoring, and ineffective coping strategies. MCT aims to modify individuals' beliefs about thinking—such as beliefs regarding the uncontrollability and danger of thoughts—and to promote adaptive cognitive control strategies, including detached mindfulness and flexible attention allocation (Wells, 2017). Evidence from clinical and non-clinical populations has demonstrated the effectiveness of metacognitive interventions in reducing symptoms of anxiety, depression, and other forms of psychological distress (Meinhart et al., 2025). Additionally, metacognitive-based emotion regulation training has been shown to produce significant improvements in both cognitive and emotional functioning, further supporting the utility of this approach (Cesur, 2026).

Despite the growing body of evidence supporting metacognitive interventions, relatively few studies have examined their application among mothers of children with intellectual disabilities. Existing research suggests that interventions targeting higher-order cognitive processes may be particularly beneficial for this population, given the pervasive role of maladaptive thinking patterns in maintaining caregiving-related stress. For instance, metacognitive therapy has been found to be more effective than mindfulness-based cognitive therapy in improving psychological well-being and resilience in mothers of children with cerebral palsy (Khorrami et al., 2020). Moreover, qualitative research highlights the importance of cognitive and motivational factors in shaping caregiving experiences, indicating that mothers' beliefs about their thoughts and abilities play a crucial role in their psychological adjustment (Hosseini & Ashouri, 2024). These findings underscore the potential value of metacognitive training as a targeted intervention for improving both distress tolerance and cognitive regulation in this population.

Furthermore, cultural and contextual factors may influence the effectiveness of psychological interventions, particularly in societies where caregiving roles are strongly gendered and social support systems may be limited. In such contexts, mothers often experience additional pressures related to societal expectations, stigma, and limited access to resources, which can exacerbate psychological distress (Mohebbi Nobandegani et al., 2010). Therefore, developing and evaluating interventions that are both theoretically sound and contextually appropriate is essential for addressing the mental health needs of mothers of children with intellectual disabilities. Metacognitive training, with its focus on universal cognitive processes, may offer a flexible and adaptable framework that can be effectively implemented across diverse cultural settings.

In summary, the existing literature highlights the critical roles of distress tolerance and cognitive dysregulation in the psychological functioning of mothers of children with intellectual disabilities and underscores the need for effective interventions that address these constructs. While previous studies have demonstrated the efficacy of various therapeutic approaches, there remains a gap in the application of metacognitive training in this population. Given the theoretical and empirical support for metacognitive therapy and its focus on modifying maladaptive thinking processes, it is plausible that such an intervention could lead to meaningful improvements in distress tolerance and reductions in cognitive dysregulation among mothers facing the challenges of caregiving. Therefore, the present study aims to investigate the effectiveness of metacognitive training on distress tolerance and cognitive dysregulation in mothers of children with intellectual disabilities.

2. Methods and Materials

2.1. Study Design and Participants

The present study is classified as an applied study in terms of its objective and was conducted using a quasi-experimental design with a pretest, posttest, and two-month follow-up, including a control group. The statistical population consisted of all mothers of children with intellectual disabilities residing in the city of Tabriz in 2025 who had referred to counseling centers, rehabilitation clinics, welfare centers, psychological service centers, and associations supporting families of children with special needs. A purposive and convenience sampling method was employed to select the sample. For this purpose, initial coordination was established with the aforementioned centers, and the necessary information regarding the implementation of the study and participation criteria was disseminated. Subsequently, mothers who expressed willingness to participate and met the preliminary inclusion criteria were subjected to an initial assessment. Inclusion criteria included having a child diagnosed with an intellectual disability by a specialist, at least six months having passed since the initiation of the child's rehabilitation services, being within the age range of 25 to 50 years, absence of severe psychiatric disorders such as psychosis, no use of psychiatric medications with fluctuating dosages, and the ability and willingness to participate regularly in the

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training sessions. Mothers who missed more than two sessions or withdrew their willingness to continue participation were excluded from the study. Ultimately, 30 eligible mothers were enrolled in the study, and after obtaining informed consent, they were randomly assigned through simple randomization into an experimental group (n = 15) and a control group (n = 15). The experimental group participated in 12 weekly sessions of 60 minutes each, receiving metacognitive training, whereas the control group did not receive any intervention during this period. Data collection instruments included the Distress Tolerance Questionnaire and the Cognitive Dysregulation Questionnaire, which were administered to both groups at the pretest, posttest, and follow-up stages.

2.2. Measures

Distress Tolerance Questionnaire: The Distress Tolerance Questionnaire is a self-report measure of emotional distress tolerance developed by Simons and Gaher (2005). This scale consists of 15 items and four subscales: tolerance of emotional distress, absorption by negative emotions, subjective appraisal of distress, and regulation of efforts to alleviate distress. Scoring is based on a Likert scale ranging from 1 to 5 (from strongly agree, scored as 1, to strongly disagree, scored as 5). Higher scores indicate greater distress tolerance. Item 6 of this scale is reverse-scored, and each subscale score is obtained by calculating the mean of its respective items. The scale yields a total score, which is calculated as the sum of the four subscale scores. In a study, Cronbach's alpha coefficients for the dimensions of tolerance of emotional distress, absorption by negative emotions, subjective appraisal of distress, and regulation of efforts to alleviate distress were reported as 0.72, 0.82, 0.78, and 0.70, respectively, and 0.82 for the total scale. The intraclass correlation coefficient after six months was reported as 0.61. Additionally, the scale demonstrated good criterion validity and initial convergent validity (Simons & Gaher, 2005). Azizi (2010) also reported a Cronbach's alpha of 0.67 and a reliability coefficient of 0.79 for this questionnaire. In the present study, Cronbach's alpha was calculated as 0.76.

Cognitive Dysregulation Questionnaire: This questionnaire was developed by Mason et al. (1995) and consists of 14 dichotomous (yes/no) items. For scoring purposes, each "yes" response is assigned 1 point and each "no" response is assigned 0 points. The total score is obtained by summing the scores of all items, resulting in a range from 0 to 14. Higher scores indicate greater levels of cognitive dysregulation, and vice versa. In the study by Mason et al. (1995), internal consistency of the questionnaire, assessed using Cronbach's alpha, was reported as 0.77. In the study by Namjoo Abusaeidi et al. (2021), test–retest reliability was evaluated using a sample of 53 participants selected through voluntary sampling, who were reassessed after a five-week interval. The reliability coefficient for cognitive dysregulation was reported as 0.57. Additionally, internal consistency assessed via Cronbach's alpha was found to be 0.71. In the present study, Cronbach's alpha coefficient was calculated as 0.69.

2.3. Intervention

The metacognitive training protocol implemented in this study consisted of 12 structured sessions derived from the metacognitive therapy framework developed by Wells (2017), delivered in a group format over 12 consecutive weeks, with each session lasting approximately 60 minutes. The intervention began with psychoeducation about the nature of thoughts, metacognitive beliefs, and the Cognitive Attentional Syndrome (CAS), emphasizing the role of maladaptive thinking patterns such as worry, rumination, threat monitoring, and dysfunctional coping strategies in maintaining emotional distress. Subsequent sessions focused on increasing participants' awareness of their metacognitive processes and distinguishing between thoughts and beliefs about thinking. Techniques such as detached mindfulness were introduced to help participants observe their thoughts without engaging with them or attempting to control them. Attention training techniques (ATT) were employed to enhance flexible control over attentional processes and reduce self-focused attention. The protocol also targeted both positive and negative metacognitive beliefs, including beliefs about the uncontrollability and danger of thoughts, through verbal reattribution, behavioral experiments, and Socratic dialogue. Participants were guided to challenge beliefs that worrying is necessary or beneficial, as well as beliefs that thoughts are uncontrollable or harmful. Additional components included modifying maladaptive coping strategies, reducing avoidance behaviors, and promoting adaptive responses to internal experiences. Homework assignments were provided in each session to facilitate skill generalization and consolidation outside the therapeutic setting. The final sessions focused on relapse prevention, reinforcing learned strategies, and developing individualized plans for maintaining gains over time. The

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content and sequencing of sessions were aligned with the standardized guidelines outlined by Wells (2009), ensuring fidelity to the metacognitive therapy model throughout the intervention.

2.4. Data Analysis

After completion of the three assessment phases, the collected data were analyzed using repeated measures analysis of variance with SPSS version 27 to examine the effects of the intervention and the stability of its outcomes over time.

3. Findings and Results

In examining the demographic characteristics of the research sample, the mean age of the mothers was 37.8 years, with an age range of 27 to 50 years. Regarding educational level, 26.7% held a high school diploma, 40% had an associate or bachelor's degree, and 33.3% had a master's degree or higher. Additionally, 86.7% of the mothers were married, while 13.3% were heads of household or divorced. Examination of employment status indicated that 63.3% were homemakers, 23.3% were employed in the private sector, and 13.4% were employed in the public sector. The mean duration since the diagnosis of the child's intellectual disability was 4.6 years, with a minimum of one year and a maximum of ten years. Table 1 presents the descriptive indices of the study variables.

Table 1

Descriptive indices of the study variables

Dependent Variable	Group	Pretest Mean	SD	Skewness	Kurtosis	Posttest Mean	SD	Skewness	Kurtosis	Follow-up Mean	SD	Skewness	Kurtosis
Distress Tolerance	Experimental	41.20	4.49	-0.646	0.493	57.26	3.86	-0.074	0.310	56.66	2.84	-0.790	-0.169
	Control	40.73	4.27	1.33	0.639	39.66	4.85	0.238	0.867	40.66	3.84	0.870	-0.159
Cognitive Dysregulation	Experimental	8.46	1.87	0.948	-1.03	4.13	1.66	-1.11	0.018	4.60	1.84	-0.248	0.842
	Control	7.46	1.77	-1.34	-0.071	7.33	3.65	-1.34	0.086	6.60	1.91	-0.248	0.842

Examination of descriptive indices indicated that the mean scores of distress tolerance in the experimental group increased markedly from the pretest to the posttest stage, rising from 41.20 to 57.26, and this improvement remained relatively stable at the follow-up stage (56.66). The values of skewness and kurtosis at all three stages were within acceptable ranges, indicating normal distribution of the data. In contrast, the control group did not experience significant changes in distress tolerance, and the mean scores remained relatively stable. Regarding cognitive dysregulation, the experimental group showed a substantial decrease in scores following the intervention, such that the mean decreased from 8.46 at pretest to 4.13 at posttest, and this reduction was maintained at follow-up (4.60). In the control group, the pattern of changes was minimal and non-significant, with mean scores remaining close to baseline values across all three stages. Overall, the pattern of mean changes in the two primary variables indicates that the intervention led to increased distress tolerance and reduced cognitive dysregulation in the experimental group, while no such changes were observed in the control group.

Prior to conducting repeated measures analysis of variance to examine changes in distress tolerance and cognitive dysregulation across the three stages (pretest, posttest, and follow-up), all statistical assumptions of the test were evaluated. To assess normality of data distribution, the Shapiro–Wilk test was conducted separately for each variable at all three time points. The results were non-significant in all cases ($p > .05$), indicating normal distribution of scores for both variables. To examine linearity of relationships among the three measurements for each variable, scatterplots were used, which demonstrated a linear and systematic distribution pattern; thus, the assumption of linearity was confirmed. The results of Levene's test for homogeneity of error variances across the three time points were also non-significant for both variables ($p > .05$), indicating that the assumption of homogeneity of variances was met and justifying the use of parametric methods. Furthermore, Box's M test was conducted to evaluate homogeneity of variance–covariance matrices, and in both variables the significance level exceeded 0.05, confirming this assumption. The interaction test of "group ×

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pretest" was also performed to examine the assumption of homogeneity of regression slopes, and non-significant results ($p > .05$) indicated that this assumption was satisfied. Finally, the results of Mauchly's test of sphericity for both distress tolerance and cognitive dysregulation showed significance levels greater than 0.05; therefore, the sphericity assumption was met and no corrections such as Greenhouse–Geisser or Huynh–Feldt were required. Based on these results, all assumptions necessary for conducting repeated measures ANOVA were satisfied, allowing for valid analysis of changes in distress tolerance and cognitive dysregulation across the three time points.

Table 2

Multivariate analysis of variance (MANOVA) results for dependent variables across groups and time

Effect	Test	Value	F	Hypothesis df	Error df	Sig	Effect Size
Time	Pillai's Trace	0.485	31.86	5	24	.001	0.485
	Wilks' Lambda	0.015	31.86	5	24	.001	0.485
	Hotelling's Trace	5.805	31.86	5	24	.001	0.485
	Roy's Largest Root	5.805	31.86	5	24	.001	0.485
Time × Group	Pillai's Trace	0.581	44.92	5	24	.001	0.581
	Wilks' Lambda	0.019	44.92	5	24	.001	0.581
	Hotelling's Trace	5.61	44.92	5	24	.001	0.581
	Roy's Largest Root	5.61	44.92	5	24	.001	0.581

The results of multivariate analysis of variance (MANOVA) indicated that the main effect of time on the set of dependent variables, namely distress tolerance and cognitive dysregulation, was significant, as all multivariate indices—including Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root—yielded an F value of 31.86 with a significance level of less than .001, and an effect size of 0.485, indicating a strong magnitude of change in both variables across the three time points. This finding suggests that participants' scores changed significantly over time. In addition, the interaction effect of time × group was highly significant across all multivariate indices ($F = 44.92$, $p < .001$), with an effect size of 0.581, indicating a substantial difference in the pattern of changes between the experimental and control groups. This result demonstrates that the trajectory of changes in distress tolerance and cognitive dysregulation in the experimental group was significantly different and more pronounced than in the control group, such that the intervention produced marked and sustained changes in the experimental group, whereas the control group did not exhibit such changes. Overall, the MANOVA findings confirm the overall effectiveness of the intervention in improving the two primary study variables.

Table 3

Repeated measures ANOVA results for distress tolerance and cognitive dysregulation

Variable	Source	SS	df	MS	F	Sig	Effect Size	Power
Distress Tolerance	Within-group (Time)	4185.800	2	2092.900	195.32	.001	0.875	1.00
	Between-group	1109.511	1	1109.511	45.94	.001	0.621	1.00
	Time × Group	1530.822	2	765.411	71.43	.001	0.718	1.00
Cognitive Dysregulation	Within-group (Time)	2680.067	2	1340.033	280.98	.001	0.909	1.00
	Between-group	577.600	1	577.600	30.82	.001	0.524	1.00
	Time × Group	942.200	2	471.100	98.78	.001	0.779	1.00

The results of repeated measures ANOVA indicated that for the variable of distress tolerance, the within-group effect of time was significant ($F = 195.32$, $p < .001$, $\eta^2 = 0.875$), reflecting substantial changes in scores across the three stages of pretest, posttest, and follow-up. The between-group effect was also significant ($F = 45.94$, $p < .001$, $\eta^2 = 0.621$), indicating an overall difference between the experimental and control groups. Furthermore, the interaction effect of time × group was significant ($F = 71.43$, $p < .001$, $\eta^2 = 0.718$), suggesting that the pattern of changes in distress tolerance over time differed between the two groups and that the intervention played a significant role in improving this variable in the experimental group. For cognitive dysregulation, the effects of time ($F = 280.98$, $p < .001$, $\eta^2 = 0.909$), group ($F = 30.82$, $p < .001$, $\eta^2 = 0.524$), and time × group interaction ($F = 98.78$, $p < .001$, $\eta^2 = 0.779$)

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were all significant. The large effect sizes for both variables indicate the strong impact of the intervention. Additionally, statistical power was equal to 1.00 in all cases, indicating sufficient sample size and high sensitivity of the test in detecting true effects. Overall, these findings demonstrate the significant and sustained effectiveness of the intervention in increasing distress tolerance and reducing cognitive dysregulation in the experimental group compared to the control group.

Table 4

Bonferroni post hoc test results for mean differences from pretest to follow-up in distress tolerance and cognitive dysregulation

Variable	Comparison Groups	Mean Difference	Standard Error	Sig
Distress Tolerance	Pretest – Posttest	-8.00	0.749	.001
	Pretest – Follow-up	-16.70	1.20	.001
	Posttest – Follow-up	0.70	0.027	1.00
Cognitive Dysregulation	Pretest – Posttest	6.73	0.370	.001
	Pretest – Follow-up	13.36	0.705	.001
	Posttest – Follow-up	0.633	0.066	1.00

The findings of the Bonferroni post hoc test indicate that for the variable of distress tolerance, there was a significant difference between the pretest and posttest stages ($\Delta M = -8.00$, $p = .001$), indicating that distress tolerance increased significantly following the intervention. The comparison between pretest and follow-up also showed a highly significant difference ($\Delta M = -16.70$, $p = .001$), reflecting the stability of the intervention effects over time. In contrast, the difference between posttest and follow-up was not significant ($p = 1.00$), suggesting that the increase in distress tolerance remained stable during the follow-up period. Regarding cognitive dysregulation, Bonferroni comparisons indicated significant differences between pretest and posttest ($\Delta M = 6.73$, $p = .001$) and between pretest and follow-up ($\Delta M = 13.36$, $p = .001$), demonstrating that the intervention led to a substantial reduction in cognitive dysregulation at both post-intervention and follow-up stages. Similar to distress tolerance, the difference between posttest and follow-up for this variable was not significant ($p = 1.00$), indicating the persistence of reduced cognitive dysregulation over time. Overall, the Bonferroni test results confirm the effectiveness of the intervention in producing sustained improvements in distress tolerance and sustained reductions in cognitive dysregulation.

4. Discussion

The present study aimed to examine the effectiveness of metacognitive training on distress tolerance and cognitive dysregulation in mothers of children with intellectual disabilities. The findings showed that metacognitive training produced a significant and stable increase in distress tolerance and a significant and stable decrease in cognitive dysregulation in the experimental group compared with the control group. The descriptive findings indicated that distress tolerance in the experimental group increased from pretest to posttest and remained almost stable at the two-month follow-up, whereas the control group showed no meaningful change. Similarly, cognitive dysregulation decreased substantially in the experimental group after the intervention and this reduction was maintained at follow-up, while the control group remained close to its baseline level. The repeated-measures ANOVA results confirmed significant effects of time, group, and time × group interaction for both dependent variables, showing that the observed improvements were not merely due to the passage of time but were attributable to the metacognitive intervention. The Bonferroni post hoc results further showed significant differences between pretest and posttest and between pretest and follow-up, while the difference between posttest and follow-up was non-significant, indicating the durability of the intervention effects.

The finding that metacognitive training increased distress tolerance is theoretically consistent with the metacognitive model, according to which emotional suffering is maintained by maladaptive responses to internal experiences, especially worry, rumination, threat monitoring, and rigid attentional engagement with negative thoughts (Wells, 2017). Mothers of children with intellectual disabilities are repeatedly exposed to chronic caregiving stressors, uncertainty about the child's future, social judgment, financial and rehabilitation demands, and continuous emotional pressure. Such conditions may reduce perceived capacity to tolerate distress and may lead mothers to interpret negative emotional arousal as unbearable or uncontrollable. By helping participants identify the difference between

thoughts, emotions, and metacognitive beliefs about those experiences, metacognitive training likely reduced the perceived threat value of distress and increased participants' ability to remain psychologically present in difficult situations without immediately engaging in avoidance, suppression, or worry-based coping. This interpretation is supported by previous evidence showing that distress tolerance is a key mechanism in emotional adjustment and that lower distress tolerance is associated with maladaptive coping, emotional vulnerability, and psychological symptoms (Azizi et al., 2010; Yao et al., 2026).

The improvement in distress tolerance is also aligned with studies conducted among mothers of children with disabilities. Asgari et al. showed that acceptance and commitment therapy improved distress tolerance in mothers of children with intellectual disability, suggesting that interventions which change the individual's relationship with distressing internal experiences can improve emotional endurance in this population (Asgari et al., 2021). Homayounfar et al. similarly reported that compassion-based mindfulness training reduced worry and improved distress tolerance among mothers of children with intellectual disability, indicating that strengthening nonreactive awareness and reducing self-critical engagement with distress can enhance adaptive functioning (Homayounfar et al., 2022). The present study extends these findings by showing that a metacognitive approach, rather than directly focusing on acceptance or compassion, can also improve distress tolerance by modifying the cognitive-attentional mechanisms that intensify distress. This finding is also compatible with research showing that distress tolerance in mothers of children with physical-motor disabilities can be predicted by guilt, self-compassion, and mindfulness, because these constructs are closely related to how individuals appraise and respond to internal distress (Nouri Ghaleh Alikhani et al., 2025).

The significant reduction in cognitive dysregulation following metacognitive training is another important finding of the present study. Cognitive dysregulation includes patterns such as repetitive negative thinking, difficulty disengaging from intrusive thoughts, maladaptive self-focused attention, and impaired control over cognitive responses. The intervention directly targeted these processes through techniques such as detached mindfulness, attention training, modification of positive and negative metacognitive beliefs, and reduction of maladaptive coping strategies. From the perspective of Wells' metacognitive theory, the content of negative thoughts is less important than the manner in which individuals relate to and regulate those thoughts; therefore, when mothers learned to observe thoughts without prolonged engagement and to disengage from worry and rumination, their cognitive dysregulation decreased (Wells, 2017). This explanation is consistent with research indicating that cognitive and emotional dysregulation are important pathways through which stress contributes to psychological symptoms (Chan et al., 2026). It is also consistent with findings showing that interventions targeting cognitive distress can reduce anxiety-related and relapse-related concerns in clinical populations (Namjoo Abosaeidi et al., 2021).

The reduction in cognitive dysregulation can also be understood in relation to the specific caregiving context of mothers of children with intellectual disabilities. Previous studies have shown that parents of children with developmental and intellectual disabilities experience high levels of stress, and that child behavior problems can predict parental stress (Dukmak et al., 2023). In such circumstances, mothers may become trapped in repetitive patterns of worry about caregiving competence, the child's future independence, social stigma, educational outcomes, and family functioning. These forms of repetitive negative thinking can intensify distress and weaken emotional regulation. By reducing the dominance of worry and rumination, metacognitive training may interrupt the cycle through which caregiving stress becomes cognitive overload. This interpretation is supported by evidence that maternal stress in families affected by intellectual disability can follow chronic and longitudinal trajectories, making intervention on regulatory mechanisms especially important (Zeng et al., 2025). Moreover, qualitative evidence from Iranian mothers of children with intellectual and developmental disabilities has emphasized the central role of caregiving motivation, emotional burden, and cognitive appraisal in maternal adaptation, suggesting that interventions that reshape mothers' cognitive relationship with caregiving stress may be particularly useful (Hosseini & Ashouri, 2024).

The present findings are also consistent with studies demonstrating the effectiveness of metacognitive and related cognitive-regulatory interventions in different clinical and caregiving populations. Khorrami et al. found that metacognitive therapy improved mental vitality, psychological well-being, and resilience in mothers of children with cerebral palsy, indicating that metacognitive intervention can enhance adaptive psychological resources in mothers facing chronic caregiving demands (Khorrami et

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al., 2020). Meinhart et al., in a systematic meta-review of metacognitive training for psychosis, showed that metacognitive training has broad effectiveness in modifying maladaptive metacognitive processes and reducing psychological difficulties, which supports the theoretical robustness of this intervention across populations (Meinhart et al., 2025). Furthermore, Cesur showed that emotion regulation training for children with specific learning disorders produced metacognitive and emotional effects, suggesting that interventions focused on higher-order cognitive awareness and regulation can produce meaningful psychological changes beyond symptom reduction (Cesur, 2026). Although these studies differ from the present research in population and outcome variables, they collectively support the assumption that metacognitive mechanisms are modifiable and clinically relevant.

The stability of the effects at the two-month follow-up is particularly noteworthy. The non-significant differences between posttest and follow-up in both distress tolerance and cognitive dysregulation suggest that participants maintained the skills acquired during the intervention. This durability may be due to the practical and transferable nature of metacognitive techniques. Skills such as detached mindfulness, postponement of worry, attentional flexibility, and recognition of metacognitive beliefs can be applied repeatedly in daily caregiving situations. Mothers of children with intellectual disabilities encounter recurrent stressors; therefore, an intervention that teaches generalizable cognitive regulation strategies may remain useful beyond the formal sessions. This finding is consistent with the broader evidence that structured psychological interventions can produce sustained benefits in caregivers when they target persistent mechanisms rather than temporary emotional relief (Hosseini et al., 2024; Mazrouei et al., 2024). It also aligns with findings that parental psychological symptoms are linked to child mental health outcomes, suggesting that sustained improvements in mothers' regulation may have broader family-level implications (Piro-Gambetti et al., 2023).

The results of this study also contribute to the literature on psychological support for families of children with intellectual disabilities in Iran. Earlier research has shown that parents' attitudes toward intellectual disability and the psychosocial meanings attached to disability can shape family functioning and adaptation (Mohebbi Nobandegani et al., 2010). In sociocultural contexts where mothers may carry a disproportionate caregiving burden, emotional distress can be intensified by stigma, guilt, and social expectations. In this regard, the present intervention may be useful because it does not require the elimination of external stressors; rather, it helps mothers change their responses to internal cognitive-emotional events. This makes metacognitive training a potentially feasible and culturally adaptable intervention for mothers who continue to face unavoidable caregiving challenges. In line with previous evidence on forgiveness therapy, spiritual-religious group training, mindfulness-based approaches, and acceptance-based interventions, the present study confirms that structured psychological training can improve maternal adjustment in disability-related caregiving contexts (Asgari et al., 2021; Homayounfar et al., 2022; Hosseini et al., 2024; Mazrouei et al., 2024).

5. Conclusion

Overall, the findings indicate that metacognitive training is an effective intervention for increasing distress tolerance and reducing cognitive dysregulation in mothers of children with intellectual disabilities. The effectiveness of the intervention can be explained by its direct impact on maladaptive metacognitive beliefs, repetitive negative thinking, attentional rigidity, and threat monitoring. By weakening these processes, mothers may become better able to tolerate emotional distress, disengage from unproductive worry, and respond more flexibly to caregiving challenges. The large effect sizes observed in the statistical analyses suggest that the intervention had substantial clinical and practical significance. Therefore, metacognitive training may be considered a valuable addition to psychosocial support programs for mothers of children with intellectual disabilities, particularly when the aim is to improve emotional endurance and cognitive regulation rather than merely reduce situational stress.

6. Limitations & Suggestions

The present study had several limitations that should be considered when interpreting the findings. First, the sample size was relatively small and included only 30 mothers from Tabriz, which limits the generalizability of the findings to broader populations of mothers of children with intellectual disabilities. Second, the study relied on self-report questionnaires, and participants' responses may have been influenced by social desirability, response bias, or temporary emotional states. Third, although a two-month follow-up was included, this period was not sufficient to determine the long-term durability of intervention effects over six months

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or one year. Fourth, the study included only mothers and did not examine fathers or other family caregivers, although caregiving is a family-system experience. Fifth, variables such as severity of the child's disability, comorbid behavioral problems, family income, perceived social support, and marital quality were not controlled in depth, despite their potential influence on maternal distress tolerance and cognitive dysregulation.

Future studies are recommended to replicate this research with larger and more diverse samples across different cities and clinical settings to increase external validity. It is also suggested that future research compare metacognitive training with other evidence-based interventions such as acceptance and commitment therapy, mindfulness-based cognitive therapy, compassion-focused therapy, and cognitive-behavioral therapy in randomized controlled trials. Longer follow-up periods should be used to evaluate whether the effects of metacognitive training remain stable over six months or one year. Future studies may also examine mediating mechanisms such as reduction in rumination, change in metacognitive beliefs, attentional flexibility, self-compassion, perceived stress, and parenting self-efficacy. In addition, including fathers, couples, and other caregivers would provide a more comprehensive understanding of how metacognitive training affects family-level adaptation.

In practical terms, the findings suggest that metacognitive training can be integrated into counseling centers, rehabilitation clinics, welfare centers, and psychological service programs for families of children with intellectual disabilities. Practitioners working with these mothers should pay specific attention to repetitive worry, rumination, threat monitoring, and beliefs about the uncontrollability of thoughts, rather than focusing only on the external burden of caregiving. Group-based metacognitive training may be particularly useful because it is time-efficient, cost-effective, and provides opportunities for normalization of shared experiences among mothers. Training psychologists, counselors, and rehabilitation specialists in metacognitive techniques can help improve the quality of support services offered to families. It is also recommended that psychoeducational packages be developed for mothers to practice detached mindfulness, attention training, and worry postponement in daily caregiving situations.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

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

Transparency of Data

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

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Authors' Contributions

All authors have equally contributed to the research process and the development of the manuscript.

Declaration

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