Comparison of the Effectiveness of the Integrative Cognitive–Emotional Couple Reconstruction Package for Infertile Women and Unified Transdiagnostic Couple Therapy on Marital Intimacy and Empathy

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A r t i c l e   I n f o

A B S T R A C T

Objective: The purpose of the present study was to compare the effectiveness of an integrative cognitive–emotional couple reconstruction intervention for infertile women with unified transdiagnostic couple therapy on marital intimacy and empathy.

Methods and Materials: This study was conducted using a quasi-experimental design with pretest–posttest and a two-month follow-up, including a control group. The statistical population consisted of infertile women referred to infertility treatment centers in the city of Isfahan during the winter of 2025. A total of 60 participants were selected through purposive sampling and randomly assigned to three groups of 20 participants each (cognitive–emotional reconstruction, unified transdiagnostic couple therapy, and control). The first experimental group received 10 sessions of 60-minute cognitive–emotional couple reconstruction intervention, and the second experimental group received 10 sessions of 60-minute unified transdiagnostic couple therapy. The research instruments included the Marital Intimacy Questionnaire (Walker & Thompson, 1983) and the Empathy Scale (Mehrabian & Epstein, 1972). Data were analyzed using repeated measures analysis of variance and Bonferroni post hoc test in SPSS version 26.

Findings: The results indicated that both therapeutic approaches, compared with the control group, led to significant increases in marital intimacy and empathy (p < .01). However, the magnitude of improvement in both variables was higher in the cognitive–emotional reconstruction group, although the difference between the two treatments was not statistically significant.

Conclusion: Overall, the findings suggest that couple-based interventions grounded in cognitive reconstruction and emotion regulation can be effective in improving emotional interactions, strengthening empathy, and enhancing marital intimacy among infertile women. Accordingly, the application of these two approaches in counseling and infertility treatment centers—particularly for promoting emotional health and quality of life among couples—is recommended.

Keywords: *Cognitive–emotional couple reconstruction; unified transdiagnostic couple therapy; marital intimacy and empathy; infertility.*

1.   Introduction

Infertility is widely recognized as a major reproductive health challenge with substantial psychological and interpersonal consequences. Beyond its biomedical definition, infertility often functions as a chronic, uncontrollable stressor characterized by uncertainty, repeated treatment cycles, and fluctuating hope and disappointment. A large-scale systematic review and meta-analysis covering global evidence from 1990 to 2021 indicates that infertility remains prevalent and that estimation approaches vary across contexts, reinforcing the need to consider infertility as both a public health and psychosocial issue (Cox et al., 2022). For many women, infertility is not only a medical condition but also a profound personal and relational crisis that can destabilize emotional functioning, threaten identity and perceived life trajectory, and disrupt intimate bonds. Conceptual and empirical work underscores the complexity of the infertility–distress association, emphasizing bidirectional pathways in which distress may both result from and contribute to infertility-related experiences and treatment burdens (Simionescu et al., 2021).

Evidence increasingly indicates that women undergoing infertility evaluation and treatment are at heightened risk for clinically meaningful emotional symptoms, including anxiety, depressive symptoms, and broad psychological distress. Research focusing on women undergoing in vitro fertilization highlights that infertility-related experiences can intensify mental health vulnerabilities, particularly in contexts where treatment demands and social pressures co-occur (Moutzouroulia et al., 2025). In parallel, qualitative and mixed evidence syntheses show that infertility-related stigma can be deeply embodied and relationally enacted, with women reporting experiences of shame, silence, and social withdrawal that constrain help-seeking and amplify emotional burden (Lee et al., 2025). These stigma-related processes can erode open emotional communication within the couple, reduce perceived support, and foster patterns of emotional suppression, thereby undermining the relational context that would otherwise buffer distress.

Within couple relationships, two constructs appear particularly central to adjustment during infertility: marital intimacy and empathy. Marital intimacy is commonly conceptualized as the quality of emotional closeness, mutual disclosure, affection, trust, and psychological accessibility between partners. Empathy is a complementary relational capacity, typically referring to the ability to perceive,

understand, and respond to a partner's emotional experience in an attuned and supportive manner. When infertility becomes a prolonged stressor, couples may experience relational strain through shifts in sexual functioning, communication patterns, problem-solving, and mutual responsiveness. In infertile couples undergoing assisted reproduction, infertility-related stress has been shown to correlate with reduced marital intimacy, suggesting that stress reactions directly shape relational closeness and emotional availability (Abdoli et al., 2025). In the same vein, family-level outcomes such as stability and relational continuity are linked to emotion regulation capacities and intimacy processes; notably, emotion regulation and sexual self-efficacy have been modeled as predictors of family stability through the mediating role of marital intimacy, indicating that intimacy is not merely an outcome but also a mechanism connecting intrapersonal regulation to family functioning (Baqri et al., 2024).

A relational lens also highlights the protective value of collaborative coping and dyadic processes. Among couples undergoing assisted reproductive treatment, higher levels of couple collaboration and relational resources are associated with improved well-being and psychological health, implying that relational functioning may moderate the psychological impact of infertility and treatment demands (Reisi et al., 2024). Yet, infertility can challenge precisely these protective dynamics by fostering mutual misunderstandings, mismatched coping styles, and cycles of emotional withdrawal. Importantly, early psychological evaluation of couples with unexplained infertility has drawn attention to gender-linked patterns in psychological responses, emphasizing that treatment planning should consider differentiated emotional experiences and relational roles within couples, rather than treating distress as uniform (Ciacchini et al., 2025). Such findings are consistent with the view that infertility is a "couple stressor" that is nevertheless experienced through gendered meanings and sociocultural expectations, which in turn shape intimacy, empathy, and support exchanges.

Given these impacts, psychological interventions have been increasingly integrated into infertility care. Recent evidence syntheses suggest that psychological interventions can yield meaningful improvements in mental health and relational functioning for infertile women. A systematic review and meta-analysis focusing on infertile women found overall beneficial effects of psychological interventions, supporting the clinical relevance of counseling and psychotherapy as adjuncts to medical treatment (Jackson et

al., 2025). Specifically focusing on intimacy outcomes, a systematic review of counseling approaches reported that several intervention modalities demonstrate positive associations with marital intimacy among women and couples experiencing infertility, while also noting variability in methods and the need for more comparative trials to identify optimal approaches for relational outcomes (Salarfard et al., 2025). Collectively, this evidence base positions marital intimacy as a key clinical target in infertility-related psychosocial care, particularly because intimacy can function both as an outcome of intervention and as a resilience factor against ongoing stress.

Among established couple-based approaches, cognitive-behavioral couple therapy and emotion-focused couple therapy represent influential models for addressing relational distress, each with distinct mechanisms of change. Comparative evidence indicates that both cognitive-behavioral and emotion-focused couple interventions can reduce maladaptive relational patterns (including covert aggression) and improve couple functioning in conflict-affected couples, suggesting that both cognitive restructuring/skills training and emotional processing/attachment-focused work can improve relational outcomes (Bashiri et al., 2024). Moreover, in populations with infertility, emotion-focused therapy has been shown to enhance adaptability and marital intimacy, indicating that focusing on emotional experience and relational bonding may be particularly salient in contexts where loss, uncertainty, and threat to identity are prominent (Habibollahi Najafabadi & Zarei Niestanak, 2023). Process research in emotion-focused therapy also emphasizes that therapeutic alliance and depth of emotional experiencing are important predictors of outcome, highlighting the clinical significance of emotionally engaged work and relational safety in therapy (Harrington et al., 2021).

At the same time, there is growing interest in integrative or hybrid models that address both cognitive and emotional determinants of couple functioning. Empirical developments in couple therapy have increasingly emphasized the cognitive–affective nature of empathy and intimacy, proposing that effective change may require simultaneous modification of maladaptive appraisals, emotion regulation patterns, and interpersonal responsiveness. A recent study developing and validating micro-focused couple therapy—and comparing it with emotion-focused couple therapy—reported improvements in cognitive-affective empathy among couples with marital conflicts, reinforcing the premise that empathy is a modifiable, mechanism-relevant

target in couple interventions (Khushbakht et al., 2024). Related evidence in clinical health contexts supports the importance of empathy and perceived marital quality for women's quality of life, indicating that empathy operates as a salient relational resource across stress-laden life circumstances (KavehFarsani & Worthington Jr, 2024). These converging findings motivate the design and evaluation of interventions that directly enhance empathic capacities and intimacy, particularly under conditions of chronic stress such as infertility.

Alongside disorder-specific and modality-specific couple therapies, transdiagnostic frameworks have emerged as prominent approaches for addressing emotional dysfunction across heterogeneous symptom presentations. The Unified Protocol and related unified approaches emphasize shared mechanisms—such as heightened negative affect, aversive reactivity to emotions, emotional avoidance, maladaptive cognitive appraisals, and limited emotion regulation repertoires—suggesting that targeting these mechanisms can yield broad improvements across emotional disorders and contexts (Barlow et al., 2020). Contemporary "state of the science" reviews indicate that the Unified Protocol has accrued a substantial evidence base, with ongoing refinements in conceptualization, mechanism testing, and applied implementation across settings (Farchione et al., 2024). Evidence comparing the Unified Protocol with single-disorder treatments supports its efficacy for comorbid psychopathology accompanying emotional disorders, indicating that unified, mechanism-focused intervention can perform competitively against more narrowly targeted protocols (Steele et al., 2018). Moreover, adaptation to telehealth delivery has been documented, demonstrating feasibility and clinical utility of transdiagnostic approaches under service constraints and broadening the potential reach of such interventions (Cassiello-Robbins et al., 2021).

In the context of infertility, transdiagnostic and integrated therapies have attracted attention because infertility-related distress often comprises mixed emotional symptoms (e.g., anxiety, depressive affect, somatic tension), cognitive fusion, experiential avoidance, and interpersonal disruptions that are not neatly captured by single diagnostic categories. In Iranian samples, integrated transdiagnostic therapy has been associated with improvements in cognitive emotion regulation strategies and social adaptability among infertile women, implying that a unified, mechanism-oriented approach can strengthen regulatory capacities relevant to coping with infertility stressors (Talebi et al., 2017). More recently, integrated transdiagnostic therapy has been

reported to reduce infertility stress and cognitive fusion in infertile women, strengthening the empirical rationale for transdiagnostic couple-oriented applications in infertility care (Karegar et al., 2023). Additionally, evidence from related relational distress contexts suggests that transdiagnostic therapy can improve marital intimacy, mental vitality, and emotional expression, reinforcing its potential relevance for intimacy-related outcomes when emotional processes are central to dysfunction (Zangeneh et al., 2023).

Despite these advances, two substantive gaps remain salient. First, while multiple interventions demonstrate promise for improving relational outcomes in infertility, there remains limited head-to-head evidence comparing integrative cognitive–emotional couple-based interventions with unified transdiagnostic approaches on core relational outcomes such as marital intimacy and empathy. Second, the expanding literature on digital and remote relationship interventions suggests broader feasibility and dissemination potential for couple-focused programs, yet effectiveness varies by modality and target constructs; systematic evidence indicates that digital interventions can improve relationship satisfaction, but outcomes depend on intervention design, engagement, and contextual fit (Kernová et al., 2025). These trends underscore the importance of designing and evaluating interventions that are both mechanism-driven and context-sensitive— especially for infertility, where stigma, treatment fatigue, and emotional volatility may affect engagement and relational processes. In parallel, the broader psychotherapy process literature highlights that relational mechanisms (e.g., alliance quality, emotional engagement) can shape outcomes, suggesting that interventions targeting empathy and intimacy should be attentive to both content and process-level change (Harrington et al., 2021).

Accordingly, a compelling clinical and research direction is to evaluate couple-oriented interventions that explicitly integrate cognitive reconstruction and emotional reconstruction, and to compare them with transdiagnostic unified protocols that target core emotional mechanisms. The integrative approach is conceptually aligned with evidence linking emotion regulation to marital intimacy and broader family functioning (Baqri et al., 2024) and with applied couple therapy findings indicating benefits of both cognitive-behavioral and emotion-focused methods for relational problems (Bashiri et al., 2024). The unified transdiagnostic approach is supported by a robust, expanding evidence base emphasizing mechanism-level

change in emotional disorders (Barlow et al., 2020; Farchione et al., 2024), including documented efficacy and adaptability across contexts (Cassiello-Robbins et al., 2021; Steele et al., 2018). Importantly, empirical work in infertility populations already supports the relevance of transdiagnostic methods for infertility stress and related cognitive-emotional vulnerabilities (Karegar et al., 2023; Talebi et al., 2017). At the same time, evidence emphasizing gendered experiences and stigma suggests that interventions must be responsive to women's specific relational and emotional contexts to effectively restore intimacy and empathic connection (Ciacchini et al., 2025; Lee et al., 2025).

The present study is situated within this integrative and comparative framework and focuses on two outcomes of high clinical relevance in infertility: marital intimacy and empathy. These constructs are not only markers of relationship quality but also plausible mechanisms through which women and couples maintain resilience under chronic reproductive stress (Reisi et al., 2024). Strengthening empathy may enhance emotional attunement and supportive responsiveness, while enhancing intimacy may restore the relational bond necessary for adaptive coping during infertility treatment trajectories (Abdoli et al., 2025; Salarfard et al., 2025). By directly comparing an integrative cognitive–emotional couple reconstruction intervention with unified transdiagnostic couple therapy, the study contributes to the evidence base on mechanism-relevant couple interventions and offers practical implications for infertility counseling and psychosocial services.

The present study aimed to compare the effectiveness of an integrative cognitive–emotional couple reconstruction intervention and unified transdiagnostic couple therapy on marital intimacy and empathy in infertile women.

2. Methods and Materials

2.1. Study Design and Participants

The present study was a three-group quasi-experimental design consisting of one cognitive–emotional couple reconstruction treatment group, one unified transdiagnostic couple therapy group, and one control group, conducted across three stages: pretest, posttest, and a two-month follow-up. The statistical population included infertile women referred to infertility treatment centers in the city of Isfahan during the winter of 2025. Sixty infertile women from the aforementioned population were selected through purposive sampling based on the inclusion criteria and were

then randomly assigned via simple randomization (lottery method) into three groups of 20 participants each (cognitive–emotional reconstruction therapy, unified transdiagnostic couple therapy, and control). The allocation of 20 participants per group was determined in accordance with the recommendation of a minimum of 15 participants per group for experimental studies.

The inclusion criteria were: failure to achieve pregnancy after 12 months of regular sexual intercourse without the use of contraceptive methods; provision of written informed consent by infertile couples; willingness to participate in the study; acceptance of and commitment to the principles and rules of the treatment protocols; absence of concurrent psychological or psychiatric treatments; and no history of chronic psychological disorders such as bipolar disorder, schizophrenia, and similar conditions. The exclusion criteria included: use of contraceptive methods during the study; lack of cooperation or unwillingness to continue participation in the training sessions; failure to complete assigned tasks; and absence from two or more therapeutic sessions. Ethical principles, including confidentiality, use of data solely for research purposes, participants' complete freedom to withdraw from the study at any stage, and provision of accurate feedback upon request along with training for the control group after completion of the experimental interventions, were strictly observed throughout the study.

Data collection was conducted as follows: after random assignment of participants to the three groups—two experimental groups (cognitive–emotional couple reconstruction for infertile women and unified transdiagnostic couple therapy) and one control group—all infertile women completed the Marital Intimacy Scale and the Empathy Scale at the pretest stage. Subsequently, each of the two experimental groups participated in their respective group-based therapeutic sessions at a psychology clinic. After completion of the treatment period, all three groups again completed the Marital Intimacy and Empathy questionnaires at the posttest stage and once more two months later at the follow-up stage.

The "cognitive–emotional couple reconstruction intervention for infertile women" was delivered in 10 sessions of 60 minutes each, once per week over 10 consecutive weeks. Within this program, approximately 300 minutes were devoted to training in each of the dimensions of cognitive reconstruction and emotional reconstruction. The "unified transdiagnostic couple therapy" intervention likewise consisted of 10 sessions of 60 minutes each,

conducted once per week over 10 consecutive weeks. Both interventions were implemented by a therapist with extensive experience in psychotherapy and specialized psychological training. The control group did not receive any intervention or training during the period in which the experimental groups were undergoing treatment.

2.2. Measures

Marital Intimacy Scale (MIS). This questionnaire was developed by Thompson and Walker (1983) to assess marital intimacy and consists of 17 items. The items are scored on a 7-point Likert scale ranging from 1 (never) to 7 (always). In the study by Thompson and Walker (1983), the overall reliability coefficient of the scale, calculated using Cronbach's alpha, was reported as .85, indicating satisfactory reliability. Furthermore, in the study conducted by Bagheri et al. (2024), Cronbach's alpha for this instrument was also reported as .85, confirming its reliability and validity within the Iranian population (Bagheri et al., 2024).

Empathy Scale. This instrument was developed by Mehrabian and Epstein (1972) to assess the ability to perceive and respond to the feelings and thoughts of others. The scale contains 33 items and includes the following components: reactive empathy, expressive empathy, participatory empathy, emotional susceptibility, emotional stability, empathy toward others, and control. The items are rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Items 3, 4, 6, 11, 12, 13, 20, 21, 23, 24, 26, 28, 30, 32, and 33 are reverse-scored. The reliability coefficient reported by Mehrabian and Epstein (1972) was .84. Additionally, Zarsheghaei et al. (2010) reported a Cronbach's alpha coefficient of .56 for this scale.

2.3. Interventions

The Cognitive–Emotional Couple Reconstruction intervention for infertile women was developed for the first time in the present study and implemented following preliminary validation. The development process involved a deductive, theory-driven thematic network analysis of the literature based on the framework of Attride-Stirling (2001), through which basic, organizing, and global themes related to cognitive therapy, emotion-focused therapy, and infertility—particularly for women—were systematically extracted. After delineating the conceptual scope of each global theme for cognitive and emotional reconstruction in women experiencing infertility, an expert-focused validation

was conducted by five independent reviewers holding doctoral degrees in psychology and more than 15 years of teaching and clinical experience. The theoretical coherence and logical consistency between global, organizing, and basic themes were examined, and only components achieving inter-rater agreement of .91 or higher were retained, while those with lower agreement were revised based on expert feedback. The finalized intervention was delivered in ten weekly 60-minute group sessions and progressed through structured therapeutic phases: (1) orientation, establishment of therapeutic alliance, clarification of goals, introduction to cognitive–emotional reconstruction, group discussion of emotional needs, and training in distress emotion regulation with homework; (2) training in identification, control, and management of ambiguous emotional states with practice assignments; (3) training in modifying maladaptive emotional coping responses with corresponding homework; (4) instruction in managing and restructuring negative core beliefs with in-session exercises; (5) training in recognizing and correcting cognitive distortions with guided practice; (6) identification and regulation of dysfunctional automatic thoughts with home exercises; (7) restructuring maladaptive cognitive and behavioral coping strategies and replacing them with adaptive alternatives; (8) management of cognitive and emotional distress; (9) enhancement of self-compassion and forgiveness toward self and others through experiential exercises; and (10) repair and strengthening of impaired emotional relationships, integration of all therapeutic skills, assignment of relational repair homework, and coordination for the two-month follow-up phase. The intervention explicitly targeted the reciprocal interaction of cognition and emotion in infertility-related distress, promoting emotional regulation, cognitive flexibility, relational healing, empathy enhancement, and marital intimacy.

Unified Transdiagnostic Couple Therapy was implemented based on the model developed by Barlow et al. (2011) and previously validated in Iran for effectiveness in reducing infertility stress and cognitive fusion among infertile women (Kargar et al., 2023). The intervention consisted of ten weekly 60-minute group sessions following a structured transdiagnostic framework that targets shared emotional mechanisms across psychological difficulties. Session one focused on enhancing motivation for treatment by helping participants evaluate the advantages and disadvantages of change versus maintaining previous patterns; session two provided psychoeducation on the nature of emotions, core components of emotional experience, and learned emotional responses; session three developed mindful emotional awareness by training participants in nonjudgmental, present-focused observation of emotional experiences; session four addressed cognitive appraisal by teaching identification and modification of maladaptive thinking patterns and strengthening cognitive flexibility; session five focused on recognizing emotional avoidance patterns and maladaptive emotion-driven behaviors and replacing them with adaptive response strategies; session six examined emotion-driven behaviors, their effects on emotional experiences, and the development of alternative action tendencies through behavioral exposure; session seven cultivated awareness of bodily sensations and tolerance of physical emotional responses while exploring reciprocal interactions between physiological sensations, cognition, and behavior; sessions eight and nine implemented systematic exposure to internal and external emotional triggers, increasing emotional tolerance, facilitating new contextual learning, and constructing personalized hierarchies of emotional avoidance; and session ten emphasized relapse prevention by consolidating therapeutic gains, anticipating potential challenges, and administering post-treatment assessments. This protocol aimed to enhance emotional regulation, reduce experiential avoidance, promote adaptive coping, and improve relational functioning by targeting transdiagnostic emotional processes underlying distress in infertile women and their marital relationships.

2.4. Data Analysis

In the statistical analysis of the data, in addition to preliminary assumption testing—including the normality assumption assessed via the Shapiro–Wilk test, the homogeneity of error variances evaluated using Levene's test, the equality of variance–covariance matrices examined with Box's M test, and the sphericity assumption assessed using Mauchly's test—descriptive statistics (mean and standard deviation) were calculated. Subsequently, repeated measures analysis of variance and the Bonferroni post hoc test were applied. Data were analyzed using SPSS version 26. The acceptable significance level in the present study was set between .05 (minimum) and .001 (maximum).

3. Findings and Results

The three study groups were compared in terms of age, educational level, years since marriage, and years involved

with infertility using the chi-square test. The results of the analysis of demographic variables are presented in Table 1.

Table 1

Comparison of the Frequency Distributions of the Research Groups on Demographic Variables

Variable & Levels	Cognitive–Emotional Reconstruction Therapy n (%)	Transdiagnostic Integrative Couple Therapy n (%)	Control n (%)	Chi-square test (significance)
Education				$\chi^2 = 2.34$, $p > .05$
High school diploma or lower	7 (35)	4 (20)	4 (25)	
Associate & bachelor's	10 (50)	11 (55)	13 (70)	
Master's & doctoral	3 (15)	5 (25)	3 (5)	
Age				$\chi^2 = 1.81$, $p > .05$
≤ 30 years	10 (50)	8 (40)	8 (40)	
31–35 years	8 (40)	11 (55)	9 (45)	
≥ 36 years	2 (10)	1 (5)	3 (15)	
Years since marriage				$\chi^2 = 0.14$, $p > .05$
≤ 5 years	12 (60)	11 (55)	11 (55)	
≥ 6 years	8 (40)	9 (45)	9 (45)	
Years involved with infertility				$\chi^2 = 0.80$, $p > .05$
≤ 3 years	9 (45)	10 (50)	11 (55)	
4–5 years	6 (30)	5 (25)	4 (20)	
≥ 6 years	5 (25)	5 (25)	5 (25)	

As shown in Table 1, there were no statistically significant differences among the three research groups on the demographic variables.

Table 2

Means and Standard Deviations of Marital Intimacy and Empathy across Three Time Points

Variable	Time	Cognitive–Emotional Reconstruction Group		Unified Transdiagnostic Therapy Group		Control Group	
		M	SD	M	SD	M	SD
Marital Intimacy	Pretest	37.15	7.58	38.20	8.29	38.40	9.60
	Posttest	83.85	8.62	72.60	8.36	40.75	9.86
	Follow-up	85.00	8.79	72.85	7.69	40.85	8.87
Empathy	Pretest	61.05	12.87	60.15	10.65	67.95	12.50
	Posttest	107.50	15.42	89.10	8.20	69.85	11.80
	Follow-up	116.30	25.31	90.70	8.47	71.85	12.68

As presented in Table 2, the mean scores of marital intimacy and empathy in both treatment groups (cognitive–emotional reconstruction and unified transdiagnostic couple therapy) increased substantially at the posttest and follow-up stages compared with the control group. These changes indicate that the implementation of both therapeutic approaches resulted in significant improvements in marital intimacy and empathy among infertile women relative to the control group. Prior to conducting the repeated measures analysis of variance, the results of the Shapiro–Wilk test confirmed the normality of the data distribution for marital intimacy and empathy (p > .05). In addition, Levene's test demonstrated the homogeneity of variances across the study groups (p > .05). The results of Box's M test also supported the equality of variance–covariance matrices (p > .05). Examination of the sphericity assumption using Mauchly's test yielded significant results for both variables, indicating a violation of this assumption; therefore, the degrees of freedom for the time factor and the group × time interaction were adjusted using the Greenhouse–Geisser correction. The results of the repeated measures analysis of variance for marital intimacy and empathy are reported in the following table.

Table 3

Results of Repeated Measures Analysis of Variance for Empathy and Marital Intimacy

Source of Effect	Sum of Squares	df	Mean Square	F	p	Partial Eta Squared	Power
Empathy							
Within-Subjects							
Time	31,500.31	1.57	20,023.78	164.24	< .001	.74	1.00
Time × Group	15,728.96	3.15	4,999.21	41.01	< .001	.59	1.00
Error (Time)	10,932.07	89.67	121.91	—	—	—	—
Between-Subjects							
Group	19,086.98	2	9,543.49	24.32	< .001	.46	1.00
Error	22,368.68	57	392.43	—	—	—	—
Marital Intimacy							
Within-Subjects							
Time	31,517.01	1.19	26,445.23	549.17	< .001	.91	1.00
Time × Group	14,265.76	2.38	5,985.04	124.29	< .001	.81	1.00
Error (Time)	3,271.23	67.93	48.15	—	—	—	—
Between-Subjects							
Group	26,548.54	2	13,274.27	79.22	< .001	.73	1.00
Error	9,551.52	57	167.57	—	—	—	—

Based on the results presented in Table 3, for the variable of empathy, the repeated measures analysis of variance indicated that both the main effect of time (F = 164.24, p < .001) and the interaction effect of time × group (F = 41.01, p < .001) were statistically significant. The partial eta squared for the time factor was .74, and for the time × group interaction was .59, reflecting a strong impact of the interventions on improving empathy over time. Furthermore, the between-groups effect was also significant (p < .001), with a partial eta squared of .68, indicating that approximately 68% of the variance in empathy scores between groups was attributable to the type of therapeutic intervention.

For the variable of marital intimacy, the repeated measures analysis of variance similarly demonstrated significant effects for time (F = 549.17, p < .001) and for the time × group interaction (F = 124.29, p < .001). The partial eta squared values were .91 for the time effect and .81 for the interaction, indicating very strong intervention effects on marital intimacy across time. The between-groups effect was also significant (p < .001), with a partial eta squared of .73, showing that approximately 73% of the variance in marital intimacy scores between groups was due to the type of treatment. Overall, these findings indicate that both therapeutic approaches — cognitive–emotional reconstruction and unified transdiagnostic couple therapy — produced significant improvements in marital intimacy and empathy among infertile women, and that these effects were sustained over time and in interaction with treatment type.

Table 4

Results of Bonferroni Post Hoc Tests for Empathy and Marital Intimacy

Variable	Comparison	Reference Group	Comparison Group	Mean Difference	SE	p
Empathy						
Time	1	Pretest	Posttest	−25.77	1.53	< .001
	2		Follow-up	−29.90	2.20	< .001
	3	Posttest	Follow-up	−4.13	1.54	.03
Group	4	Cognitive–Emotional Reconstruction	Unified Transdiagnostic	14.97	3.62	< .001
	5		Control	25.07	3.62	< .001
	6	Unified Transdiagnostic	Control	10.10	3.62	.02
Marital Intimacy						
Time	1	Pretest	Posttest	−27.82	1.14	< .001
	2		Follow-up	−28.32	1.18	< .001
	3	Posttest	Follow-up	−0.50	0.41	< .001
Group	4	Cognitive–Emotional Reconstruction	Unified Transdiagnostic	7.45	2.36	.008
	5		Control	28.67	2.36	< .001
	6	Unified Transdiagnostic	Control	21.22	2.36	< .001

According to the results shown in Table 4, for the variable of empathy, Bonferroni post hoc comparisons indicated significant differences between the pretest and posttest, and between the pretest and follow-up (p < .01), whereas the difference between the posttest and follow-up was not statistically significant (p > .05). These findings demonstrate that participants' empathy increased from pretest to posttest and follow-up, and that this improvement remained stable at the follow-up stage. Intergroup comparisons further revealed that both treatment groups—cognitive–emotional reconstruction and unified transdiagnostic couple therapy—differed significantly from the control group (p < .01), while no significant difference was observed between the two treatment groups (p > .05). This pattern indicates that both interventions were effective in enhancing empathy among infertile women and that their effects were maintained over time.

For marital intimacy, the Bonferroni test results likewise showed significant differences between pretest and posttest and between pretest and follow-up (p < .01), whereas no significant difference emerged between posttest and follow-up (p > .05). This finding suggests that marital intimacy increased significantly as a result of the therapeutic interventions and that this increase was sustained during the follow-up period. Intergroup comparisons indicated significant differences between each of the treatment groups and the control group (p < .01), but no significant difference between the cognitive–emotional reconstruction group and the unified transdiagnostic couple therapy group (p > .05). Therefore, the overall results indicate that both interventions were effective in enhancing marital intimacy among infertile women, and that their positive effects were preserved at follow-up.

4.   Discussion

The present study compared the effectiveness of an integrative cognitive–emotional couple reconstruction intervention and unified transdiagnostic couple therapy in improving marital intimacy and empathy among infertile women. The findings indicated that both interventions produced statistically significant improvements in marital intimacy and empathy from pretest to posttest, and that these gains were maintained at the two-month follow-up. In practical terms, these results suggest that both approaches can modify core relational and socioemotional processes that are commonly disrupted by infertility-related stress. This overall pattern is consistent with evidence showing that

infertility is not only a biomedical condition but also a persistent psychosocial stressor with meaningful consequences for emotional adjustment and intimate relationships (Cox et al., 2022; Simionescu et al., 2021). It also aligns with broader syntheses indicating that psychological interventions for infertile women yield measurable benefits across emotional and relational domains, particularly when interventions explicitly target coping, emotional processing, and relationship functioning (Jackson et al., 2025; Salarfard et al., 2025). Accordingly, the current findings reinforce the argument that psychosocial care should be considered a core component of infertility services rather than an optional add-on, particularly when the clinical goal extends beyond symptom reduction to restoring relational connection and emotional responsiveness.

The improvement in marital intimacy observed in both treatment groups is theoretically coherent given prior evidence linking infertility-related distress to intimacy impairment. Infertility-related stress often erodes emotional closeness through elevated negative affect, uncertainty, recurring disappointment, and threat-related cognitions, which can push couples toward emotional withdrawal or conflict escalation. Empirical work has documented an inverse association between infertility-related stress and marital intimacy in couples undergoing assisted reproductive treatment, indicating that higher stress is accompanied by lower intimacy and diminished relational satisfaction (Abdoli et al., 2025). Similarly, dyadic and relational resources such as couple collaboration, mutual engagement, and supportive interaction patterns are associated with better psychological health and well-being among infertile couples, suggesting that intimacy-related processes can operate as resilience factors within treatment trajectories (Reisi et al., 2024). By demonstrating that structured interventions can significantly increase marital intimacy relative to a control condition, the present study extends this evidence from correlational associations to an applied, change-oriented context, implying that intimacy is a modifiable outcome responsive to mechanism-focused couple interventions. In addition, the maintenance of improvements at follow-up suggests that participants were able to consolidate new relational patterns and carry them into daily life beyond the immediate therapeutic setting, which is particularly important given the chronic and recurrent nature of infertility-related stressors.

A parallel pattern of improvement was observed for empathy, a relational capacity central to emotional

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attunement, supportive responding, and conflict de-escalation. The enhancement of empathy in the two intervention groups is clinically meaningful because empathic responsiveness can protect relationships under conditions of prolonged strain by strengthening perceived understanding and reducing misattunement. Evidence from other health-related contexts suggests that marital empathy is strongly tied to perceived marital quality and, through this pathway, to women's quality of life, underscoring empathy as a consequential relational resource rather than a peripheral interpersonal skill (KavehFarsani & Worthington Jr, 2024). In infertility contexts, empathic functioning may be compromised by stigma, shame, and avoidant coping, which inhibit emotional disclosure and reduce opportunities for mutual understanding. Indeed, qualitative meta-synthesis of women's lived experiences of infertility-related stigma emphasizes recurring patterns of silence, shame, and social withdrawal that can constrain emotional expression within the couple and heighten relational distance (Lee et al., 2025). The present results suggest that interventions targeting emotional processes and cognitive appraisals within a couple-based framework can strengthen empathic capacities and foster more emotionally responsive interactions, thereby countering the isolating relational dynamics linked to infertility stigma.

Although both interventions were effective, the cognitive–emotional reconstruction intervention produced numerically larger gains in both marital intimacy and empathy (while the between-treatment difference did not reach statistical significance). This pattern is plausibly attributable to the intervention's direct focus on infertility-salient cognitive and emotional mechanisms that manifest within the couple relationship. Couple therapy research suggests that both cognitively oriented and emotion-focused approaches can yield meaningful relational improvements, but the strongest effects may occur when interventions address cognition and emotion in a coordinated manner and link intrapersonal change to interpersonal enactment. Comparative work has shown that both cognitive-behavioral couple therapy and emotion-focused couple therapy can reduce maladaptive relational patterns and improve couple functioning in distressed couples, indicating that both cognitive restructuring/skills-based pathways and emotional processing/attachment-based pathways can be effective (Bashiri et al., 2024). Moreover, in infertile women specifically, emotion-focused therapy has been associated with improvements in adaptability, marital intimacy, and sexual performance, implying that emotional processing and

relational bonding are particularly relevant in infertility-related distress (Habibollahi Najafabadi & Zarei Niestanak, 2023). The cognitive–emotional reconstruction protocol evaluated in the present study integrated these elements by targeting maladaptive appraisals (e.g., negative beliefs and cognitive distortions), emotion regulation deficits, and relational repair processes—an integration that is consistent with the notion that marital intimacy is shaped by both emotional regulation and cognitive interpretations of relational events. Supporting this logic, evidence indicates that emotion regulation and related personal resources can influence broader family functioning via marital intimacy, highlighting intimacy as a mechanism through which regulation-related capacities translate into relational stability (Baqri et al., 2024). Accordingly, the relatively stronger numerical gains in the cognitive–emotional reconstruction group may reflect the benefits of a more tailored, infertility-relevant integration of cognitive and affective mechanisms within couple functioning.

At the same time, the unified transdiagnostic couple therapy produced robust improvements, which aligns with the theoretical strengths and empirical support of transdiagnostic models. Unified and transdiagnostic approaches conceptualize emotional distress as driven by shared mechanisms across symptom presentations, such as heightened negative affect, maladaptive emotion-driven behaviors, avoidance of internal experiences, and rigid cognitive appraisals. A foundational rationale for the unified approach emphasizes the "neurotic paradox" and the role of avoidance and short-term relief behaviors that maintain distress over time (Barlow et al., 2020). Contemporary state-of-the-science reviews indicate that the Unified Protocol has developed into a mature evidence-based framework supported by accumulating outcome research and mechanism-focused refinement (Farchione et al., 2024). Its efficacy has been documented for comorbid emotional problems relative to single-disorder protocols, supporting the claim that targeting common processes can yield broad benefits (Steele et al., 2018). Importantly, the applicability of unified approaches has extended to telehealth delivery, indicating flexibility and feasibility even under service constraints (Cassiello-Robbins et al., 2021). Within infertility-focused research, integrated transdiagnostic therapy has been associated with improvements in cognitive emotion regulation and social adaptability, suggesting that transdiagnostic mechanisms are clinically relevant for infertile women's adjustment (Talebi et al., 2017). In addition, evidence from Iranian samples indicates that

integrated transdiagnostic therapy reduces infertility stress and cognitive fusion among infertile women, providing a direct precedent for the usefulness of this approach in infertility-related distress profiles (Karegar et al., 2023). The present study extends this body of evidence by demonstrating that a unified transdiagnostic approach can also enhance relational outcomes—marital intimacy and empathy—suggesting that improvements in emotion regulation and reduced avoidance may generalize to couple functioning by enabling more adaptive emotional expression, greater tolerance of relational stressors, and increased responsiveness to partners.

The stability of improvements at follow-up across both interventions further suggests that the changes were not merely immediate post-treatment fluctuations but reflected more consolidated shifts in emotional and interpersonal processes. This finding is compatible with evidence emphasizing the role of emotionally engaged therapeutic work and process-level factors such as the therapeutic alliance in supporting meaningful and lasting change. Research in emotion-focused therapy indicates that depth of experiencing and alliance quality can predict differential outcomes, highlighting that enduring improvements often emerge when clients engage emotionally while experiencing relational safety in the therapeutic context (Harrington et al., 2021). Similarly, research on transdiagnostic therapy in relationally strained populations has found improvements in marital intimacy and emotional expression, supporting the notion that changes in emotion regulation and avoidance can influence relational connection over time (Zangeneh et al., 2023). Taken together, the present findings suggest that both interventions likely operated through strengthening emotional processing and regulation, reducing maladaptive cognitive appraisals, and enhancing relational skills that support empathic and intimate exchanges, thereby producing improvements that persist beyond the treatment window.

5. Conclusion

Finally, the findings should be interpreted in light of evidence that infertility experiences are shaped by gendered psychological dynamics and sociocultural contexts. Initial psychological evaluation work in couples with unexplained infertility has emphasized gender differences in psychological presentation and adjustment, suggesting that intervention planning should remain sensitive to women's specific emotional burdens and relational positions within infertility treatment processes (Ciacchini et al., 2025).

Additionally, counseling research indicates that psychosocial approaches can improve marital intimacy among infertility-affected couples, while also calling for stronger comparative trials and clearer specification of active ingredients (Salarfard et al., 2025). By directly comparing an integrative cognitive–emotional intervention and a unified transdiagnostic approach, the present study addresses this gap and provides applied evidence that both models are capable of improving core relational outcomes among infertile women. Moreover, the presence of improvement in both empathy and marital intimacy indicates that infertility-related relational impairment is responsive to targeted intervention, supporting a clinical stance that relational repair and emotional attunement should be prioritized in infertility counseling and psychotherapy services (Abdoli et al., 2025; Jackson et al., 2025).

6. Suggestions and Limitations

Several limitations should be considered when interpreting these findings. First, the sample was limited to infertile women from a single geographic region, which may restrict generalizability to other cultural or clinical contexts. Second, reliance on self-report measures introduces potential response bias. Third, although follow-up results indicate stability of change, longer follow-up intervals would provide a more comprehensive understanding of the durability of treatment effects. Fourth, the absence of male partner participation limits conclusions about dyadic processes within the couple.

Future studies should replicate this design across diverse cultural and clinical populations and incorporate multi-informant and observational measures of relational functioning. Investigations comparing in-person and digital delivery of these interventions would also be valuable. Additionally, research examining underlying mechanisms—such as changes in cognitive appraisals, emotional regulation, and attachment security—would clarify how these interventions exert their effects. Including male partners in future trials would enable a more complete understanding of dyadic change processes.

Clinicians working with infertile women should integrate structured psychological interventions into infertility treatment programs. Training counselors in both cognitive–emotional reconstruction techniques and transdiagnostic emotional regulation strategies may enhance clinical flexibility. Mental health services in fertility clinics should prioritize relational assessment and intervention, focusing on

empathy development, emotional communication, and intimacy restoration to support both psychological well-being and relationship stability.

Authors' Contributions

S.A. conceptualized the study, designed the intervention protocols, and supervised the research implementation. M.G. developed the methodological framework, oversaw the experimental design and statistical strategy, and contributed substantially to the interpretation of findings. Z.Y. coordinated participant recruitment, conducted the intervention sessions, managed data collection, and prepared the initial draft of the manuscript. All authors participated in revising the manuscript, approved the final version for publication, and accept full responsibility for the accuracy and integrity of the work.

Declaration

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

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants (Ethics Code: IR.IAU.KHUISF.REC.1404.329).

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