

Comparison of the Effectiveness of Cognitive–Behavioral Therapy and Short-Term Solution-Focused Therapy on Intolerance of Uncertainty in Pregnant Women

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ABSTRACT

Objective: The purpose of the present study was to compare the effectiveness of cognitive–behavioral therapy (CBT) and short-term solution-focused therapy (SFBT) on intolerance of uncertainty among pregnant women in 2024.

Methods and Materials: This study was applied in purpose and employed an experimental design with a pretest–posttest–follow-up structure and a control group. The statistical population consisted of all pregnant women who visited comprehensive health service centers and obstetric specialists in Semnan City and had become pregnant naturally or through assisted reproductive techniques in 2021 and 2022. A total of 66 pregnant women were selected through convenience sampling. Data were collected using standardized questionnaires and analyzed using SPSS software, version 27. To measure intolerance of uncertainty, the Freeston Intolerance of Uncertainty Scale was employed.

Findings: The results indicated that both cognitive–behavioral therapy and short-term solution-focused therapy significantly reduced intolerance of uncertainty among pregnant women, demonstrating the effectiveness of both approaches. Statistically, the mean score of the short-term solution-focused group was lower than that of the cognitive–behavioral group, indicating a greater impact of this therapeutic method on intolerance of uncertainty.

Conclusion: Based on the findings, it can be concluded that both therapeutic approaches were effective in reducing intolerance of uncertainty and maintained stable effectiveness over time. Therefore, it is recommended that behavioral therapy specialists incorporate the findings of this study into their treatment programs.

Keywords: *Intolerance of uncertainty; Cognitive–behavioral therapy; Short-term solution-focused therapy; Pregnant women*

1. Introduction

Pregnancy is a profound biopsychosocial transition during which normative hormonal changes, role shifts, and uncertainties about maternal–fetal health can heighten vulnerability to psychological distress. Intolerance of uncertainty (IU)—the dispositional tendency to find uncertain situations stressful and unacceptable—has emerged as a central cognitive risk factor for perinatal anxiety, fear of childbirth, and stress-related sequelae that can affect both mother and infant. Contemporary work connects IU to fear of childbirth and shows that the IU model maps well onto pregnancy-specific concerns, such as unpredictability of labor, neonatal outcomes, and trajectories of maternal role functioning (Flink et al., 2023). Epidemiological and cohort findings further indicate that perinatal distress is not merely transient: when nested in socioeconomic disadvantage, it is associated with adverse obstetric and neonatal outcomes, underscoring the importance of accessible, mechanism-focused interventions (Daalderop et al., 2023). Within this risk landscape, early-life stress and epigenetic mechanisms are increasingly invoked to explain why some women exhibit heightened stress responsivity in pregnancy, suggesting that targeting modifiable cognitive–behavioral processes like IU may help buffer biologically embedded vulnerabilities (Ochi & Dwivedi, 2023).

The COVID-19 era sharpened awareness of IU's clinical salience in pregnant populations. Large-scale and clinical studies document high rates of fear of childbirth during the pandemic, with IU and coping styles predicting symptom severity among pregnant women (Han et al., 2022). Randomized trials and mechanistic studies converge on cognitive–behavioral therapy (CBT) as an evidence-based option to reduce perinatal stress, depression, and anxiety, often via shifts in maladaptive cognitions and behavioral patterns that maintain uncertainty-driven arousal (Donegan et al., 2022; Li et al., 2022). In parallel, digital and internet-delivered CBT demonstrated feasibility and benefits for pandemic-related distress, increasing the reach of structured interventions and suggesting that core CBT processes retain potency across delivery formats (Aminoff et al., 2021; Cheng et al., 2021). Taken together, these findings motivate comparative effectiveness research on brief, structured therapies that can be implemented in routine prenatal care to ameliorate IU.

Beyond symptom reduction, perinatal mental health increasingly emphasizes resilience—the capacity to adapt to

stress while maintaining or quickly recovering psychological functioning. Evidence links resilience to lower depressive symptoms in young adults with trauma histories, positioning resilience both as an outcome and a mediator through which interventions confer durable benefits (Chang et al., 2021). CBT's structured skill-building in cognitive reappraisal, exposure, and behavioral activation plausibly enhances resilience by reducing experiential avoidance and improving problem-focused coping (Dobson & Dozois, 2021). Concurrently, solution-focused brief therapy (SFBT) is designed to cultivate strengths, exceptions, and goal-directed change using collaborative, future-oriented dialogue and scaling questions, processes that map closely onto resilience-building pathways and resource activation. In nursing students, solution-oriented thinking correlates positively with resilience, a pattern echoed in SFBT group formats that improve burnout and resilience among working women (Avci & Ataç-Öksüz, 2023; Poorgholamy et al., 2023). These converging strands suggest that both CBT and SFBT may alleviate perinatal IU, albeit via partially distinct mechanisms—CBT by restructuring threat appraisals under uncertainty and SFBT by amplifying agency, strengths, and perceived solvability.

Pregnancy-specific evidence strengthens this rationale. Randomized and controlled studies show that CBT reduces perinatal stress and anxiety and can be adapted to online formats; notably, among pregnant women during the pandemic, online CBT functioned as a “psychological vaccine” against stress, consistent with a preventative model that directly targets cognitive vulnerability under uncertainty (Li et al., 2022; Puertas-Gonzalez et al., 2022). Resilience appears to moderate gains from cognitive–behavioral stress management in pregnancy, indicating that individual differences in adaptive capacity interact with CBT processes to shape outcomes (Puertas-Gonzalez et al., 2023). In Iranian contexts, comparative trials in nulliparous pregnant women further support the utility of CBT relative to other third-wave approaches for mood and stress outcomes, highlighting potential cultural and health-system relevance (Hosseinian et al., 2022). Beyond obstetrics, CBT reliably improves distress tolerance and emotion regulation across diverse clinical groups—including cardiac patients, women facing complicated life stressors, and individuals with hoarding disorder—demonstrating generalizable effects on transdiagnostic mechanisms tied to uncertainty and avoidance (Aliyari Khanshan Vatan et al., 2022; Bakhtiari & Pouredel, 2024; Grisham et al., 2022).

SFBT, for its part, has accumulated supportive evidence in populations where brevity and acceptability are paramount. Trials and quasi-experimental studies report SFBT-related improvements in vitality and resilience in students with physical disabilities, enhanced emotional expression and reduced distress in adolescents within family-based empowerment frameworks, and clinically meaningful benefits in oncology settings among adolescents and young adults (Okhovat et al., 2021; Rahbari Ghazani et al., 2022; Zhang et al., 2022). In Iranian clinical samples, SFBT reduced pain perception and improved distress tolerance in women with multiple sclerosis, and showed advantages on perturbation tolerance relative to schema therapy in women with mental disorders—findings that align with SFBT's focus on exception-finding and resource amplification for coping with unpredictable symptoms (Hashemi Saraj et al., 2022; Naderipour et al., 2023). Among female adolescents with academic failure, SFBT reduced depression and IU, directly connecting the model to the target mechanism of the present study (Erfanifar et al., 2024). Collectively, these data justify a head-to-head comparison between SFBT and CBT for perinatal IU, with attention to differential mechanisms and scalability.

The mechanistic case for targeting IU in pregnancy is also supported by basic and translational research. IU heightens threat expectancy, worry, and safety-seeking behaviors that inadvertently sustain anxiety; CBT disrupts these cycles by cognitive restructuring and graded behavioral experiments that update uncertainty beliefs (Dobson & Dozois, 2021; Donegan et al., 2022). Emotion-regulation-enhanced CBT variants further improve outcomes in conditions characterized by difficulty tolerating ambiguity, underscoring the value of explicitly training adaptive regulation when uncertainty is prominent (Grisham et al., 2022). In parallel, SFBT engages motivational and self-efficacy pathways by directing attention to prior successes, exceptions, and near-term, attainable goals—mechanisms consistent with theory and empirical associations between solution orientation and resilience (Avci & Ataç-Öksüz, 2023). These complementary routes may both converge on reduced IU in pregnancy, albeit through different proximal changes: cognitive reappraisal and exposure-based learning in CBT, and strengthened agency, hope, and future orientation in SFBT (Dobson & Dozois, 2021; Zhang et al., 2022).

In the Iranian perinatal context, additional psychosocial complexities accentuate the value of brief, structured interventions. Studies document elevated psychological

distress among pregnant women exposed to domestic violence and identify IU and psychological cohesion as predictors of mental fatigue in pregnant women with cardiac histories, suggesting that uncertainty-laden stressors intersect with health vulnerabilities (Cheraghi et al., 2022; Dastyar & Askarpour, 2023). Work on pregnancy anxiety indicates that resilience and couple intimacy relate to quality of life, potentially mediating how expectant mothers adapt to uncertainty about pregnancy and parenting (Nejadhoseinian et al., 2024). At the same time, meta-analytic and comparative evidence from Iranian and international samples shows CBT's efficacy in reducing perinatal mood and stress, while mindfulness-based cognitive therapy and emotion-focused approaches produce benefits on adjacent targets such as IU and distress tolerance, underscoring the broader effectiveness of structured, mechanism-focused psychotherapies in women's health (Elahi et al., 2023; Jahangirrad et al., 2022; Li et al., 2022; Nasiri et al., 2022).

Distress tolerance and ambiguity tolerance—the capacity to remain engaged and goal-directed in the presence of emotional discomfort and uncertain cues—are proximal outcomes through which both CBT and SFBT may influence perinatal well-being. Evidence from bulimia nervosa, irritable bowel syndrome, and substance-related contexts shows that structured psychotherapies can improve distress tolerance, suggesting transferability to perinatal IU where ambiguity is pervasive (Elahi et al., 2023; Jahangirrad et al., 2022; Zarabi et al., 2021). Likewise, CBT's benefits for resilience and emotion regulation have been demonstrated in cancer survivors and women facing chronic stressors, while SFBT-based group counseling has improved resilience and reduced burnout in employed women—outcomes that are theoretically congruent with navigating uncertainty in pregnancy (Poorgholamy et al., 2023; Taghizadeh, 2023). Notably, comparative and component-focused studies indicate that interventions enhancing cognitive flexibility and values-consistent action can raise distress tolerance in youth with obsessive-compulsive symptoms, hinting that—across developmental stages—structured, skills-based therapies can target intolerance-driven avoidance (Baniasadi et al., 2025).

Broader public health lessons from Internet-delivered CBT during COVID-19 also bear on scalability. Pilot and controlled trials found iCBT feasible and effective for generalized pandemic distress, and digital CBT for insomnia improved downstream health resilience, implying that short, protocolized interventions can enhance adaptive capacity

under prolonged uncertainty (Aminoff et al., 2021; Cheng et al., 2021). For pregnant women, online CBT reduced stress during pandemic conditions, aligning with stepped-care models in obstetrics and opening pathways for hybrid delivery that conserve resources while preserving fidelity (Puertas-Gonzalez et al., 2022). These delivery considerations are essential in health systems where time, personnel, and specialty mental health access are constrained. The present study builds directly on this literature by comparing CBT and SFBT for reducing IU in pregnant women,

2. Methods and Materials

2.1. Study design and Participant

The present study was applied in purpose and employed an experimental design with a pretest–posttest–follow-up structure and a control group. The statistical population included all pregnant women who visited the Comprehensive Health Service Center and obstetric specialists in Semnan City and became pregnant during 2023 and 2024. The minimum sample size, according to Cohen's (1988) criteria, with an effect size of 0.42, a statistical power of 0.90, and a confidence level of 95%, was estimated at 64 participants. Therefore, 66 pregnant women were selected using convenience sampling and randomly assigned into three groups, each consisting of 22 participants: a cognitive–behavioral therapy (CBT) group, a short-term solution-focused therapy (SFBT) group, and a control group (which received no intervention). Random assignment was performed using a block randomization method. It should be noted that the intervention groups were divided into two parallel subgroups of 11 participants each to facilitate group sessions. Accordingly, 22 participants in the CBT group (two parallel subgroups of 11 participants each) attended intervention sessions simultaneously, and 22 participants in the SFBT group (two parallel subgroups of 11 participants each) attended equivalent parallel intervention sessions.

The inclusion criteria for participation in this study were: willingness to participate in the research and not participating in another study concurrently, absence of any severe medical condition, no substance addiction, and absence of severe personality disorders. The exclusion criteria included absence from more than two intervention sessions and withdrawal of consent to continue participation.

To conduct the study, after obtaining the necessary authorization, a complete explanation of the research objectives and procedures was provided to the statistical

sample. Then, after obtaining informed consent from the participants, they were given the questionnaires to complete. To ensure research ethics, personal information questions were avoided, and participants were assured that their data would remain confidential and would be used solely for research purposes. Participants were also informed that they could access the study results upon request.

At the beginning of the study, participants' demographic information—including age, level of education, number of children, and gestational age—was recorded in a demographic questionnaire. After completing the therapy sessions, intolerance of uncertainty was measured using the Intolerance of Uncertainty Scale (IUS). The questionnaire completion process was explained to participants, and they were instructed to answer the questions attentively and accurately. Each questionnaire was scored on a Likert scale, and total scores for each variable were computed. Subsequently, the mean scores for each group were calculated.

The two intervention groups received cognitive–behavioral therapy (CBT) in 8 weekly sessions and short-term solution-focused therapy (SFBT) in 6 weekly sessions. Participants in the control group were placed on a waiting list. Data from all three groups were collected at three time points: pretest, posttest, and follow-up (after 8 weeks).

2.2. Measures

Freeston Intolerance of Uncertainty Scale (IUS): This scale was developed by Buhr and colleagues in 2002 to assess individuals' intolerance toward uncertain and ambiguous situations. It consists of 27 items rated on a 5-point Likert scale. Buhr and Dugas reported a Cronbach's alpha coefficient of 0.94 and a five-week test–retest reliability coefficient of 0.74. In a study by Akbari et al., Cronbach's alpha was 0.88, and the three-week test–retest reliability was 0.76. Predictive validity of the scale was determined through its correlations with the Penn State Worry Questionnaire (PSWQ) and the Cognitive Avoidance Questionnaire (CAQ).

2.3. Interventions

The cognitive–behavioral therapy (CBT) intervention was implemented based on the structured training package developed by Espri (2009), whose content validity was confirmed by Hossinian (2022). The CBT program was conducted in eight weekly sessions. In the first session, participants were introduced to the purpose and structure of

group therapy, group norms, the importance of attendance, and the basic principles of CBT, emphasizing shared problems and collective learning. The second session focused on identifying types of thinking patterns—constructive versus destructive, essential versus nonessential, positive versus negative—and their effects on mood and interpersonal relationships, followed by daily mood and thought monitoring homework. The third session introduced cognitive distortions such as filtering, mind-reading, fortune-telling, overgeneralization, labeling, “should” statements, and all-or-nothing thinking, along with the ABCD model to challenge irrational thoughts. The fourth session examined the role of daily activities and behavioral activation in improving mood, asking participants to identify their regular activities. The fifth session centered on enriching daily pleasurable activities as sources of reinforcement and emotional regulation, using a checklist of 95 pleasant activities. The sixth session addressed goal setting, time management, and planning for the future, differentiating between clear and vague goals and introducing Maslow’s hierarchy of needs. The seventh session targeted interpersonal skills and assertiveness training, emphasizing effective communication, expressing emotions, and managing sensitivity to rejection or criticism. Finally, the eighth session reviewed and consolidated therapeutic progress, reinforced adaptive cognitive and behavioral changes, and focused on transferring these skills to daily life.

The short-term solution-focused therapy (SFBT) followed the “Diamond Model” approach developed by Connie and Froerer (2023). The intervention consisted of six structured sessions emphasizing solution construction, strengths, and goal orientation. In the first session, participants engaged in an icebreaker exercise inspired by Iranian culture and learned the conceptual foundations of self-efficacy, emotional regulation, and dyadic adjustment,

setting personal goals for participation. The second session involved envisioning a preferred future using a 0–10 scaling technique, identifying previous successful actions, and engaging in group empathy and feedback. The third session focused on recognizing recent positive changes in emotion management or relationships, analyzing the participant’s role in these changes, and exploring their positive personal traits. The fourth session encouraged recalling and analyzing two or three past successful experiences in communication or emotion regulation to identify effective internal and external resources. The fifth session centered on recognizing personal and social resources that enhance self-efficacy and emotional regulation, such as supportive individuals and coping skills for overcoming common barriers. Finally, the sixth session reviewed participants’ progress using scaling, developed a plan for maintaining motivation and continuing improvements, defined strategies for celebrating progress, and stabilized long-term therapeutic goals.

2.4. Data Analysis

For data analysis, in addition to descriptive statistics (mean and standard deviation), inferential statistical analyses, including repeated-measures analysis of variance (ANOVA), were performed using SPSS software.

3. Findings and Results

The minimum age of participants was 23 years, and the maximum was 46 years. The mean \pm standard deviation of participants’ age was 33.92 ± 6.045 . Regarding educational level, the lowest frequency was observed among participants with a master’s degree or higher (6.06%), while the highest frequency belonged to those with a bachelor’s degree (45.45%). Table 3 presents the descriptive findings of intolerance of uncertainty across the research groups.

Table 1

Between-Group Comparison of Respondents in the Pretest Phase

Variable	Study Group	Pretest Mean	SD	Posttest Mean	SD	Follow-up Mean	SD
Intolerance of Uncertainty	Control	73.23	7.34	73.64	9.02	73.50	8.22
	Cognitive–Behavioral Group	73.32	10.03	55.00	7.52	55.36	7.58
	Solution-Focused Short-Term Group	73.18	7.02	47.59	4.74	47.91	5.04

To perform repeated-measures ANOVA, the assumptions related to the data were examined to ensure the validity and accuracy of the results. Before conducting the main analyses,

assumptions of normality, homogeneity of variances, and sphericity of the covariance matrix were assessed.

Outliers were examined using box plots, which revealed no outliers among the collected data; all variable values were

within the standard range. The results of the Kolmogorov–Smirnov and Shapiro–Wilk tests ($p > .05$), along with acceptable skewness and kurtosis coefficients (within -2 to $+2$), confirmed that the distribution of intolerance of uncertainty scores in the pretest phase was normal.

Levene’s test was conducted to check the homogeneity of variances, and the results indicated that error variances at the three time points were equal, showing no significant difference ($p > .05$). Moreover, the robust test of equality of means showed a nonsignificant result ($p = .99$), confirming

group equivalence and the suitability of using repeated-measures ANOVA.

Next, Mauchly’s test of sphericity indicated a violation of the sphericity assumption ($p < .05$). Therefore, the Greenhouse–Geisser correction was applied in the repeated-measures ANOVA to adjust for this violation.

For comparing the mean scores of the two experimental groups and the control group across time points, repeated-measures ANOVA was conducted as follows.

Table 2

Results of Repeated-Measures ANOVA for Main and Interaction Effects of Intolerance of Uncertainty

Source of Variation	MS	F	df	p	Effect Size	Power
Group Effect	5184.136	31.784	2	< .001	.502	1.000
Time Effect	5008.292	1091.837	1.824	< .001	.945	1.000
Time \times Group Interaction	1294.591	309.416	3.649	< .001	.908	1.000

The results of the repeated-measures ANOVA revealed that the main effect of group was significant ($p < .001$), the main effect of time was significant ($p < .001$), and the interaction effect of time and group was also significant ($p < .001$). In other words, significant differences were observed between pretest, posttest, and follow-up measurements.

Based on the effect size values, 52% of the variance in intolerance of uncertainty was attributable to group

membership, 94.5% to changes over time, and 90.8% to the time–group interaction, indicating that changes in at least one group level contributed significantly to the variance in intolerance of uncertainty. Bonferroni post hoc tests were then conducted to examine pairwise mean differences across the three evaluation stages.

Table 3

Bonferroni Test Results for the Emotional Distress Intolerance Variable

Reference Stage (Mean)	Comparison Stage (Mean)	Mean Difference	SE	p
Pretest	Posttest	14.500	0.354	< .001
Pretest	Follow-up	14.318	0.402	< .001
Posttest	Follow-up	−0.182	0.306	1.000

As shown in Table 3, the mean differences between pretest and posttest (reflecting the immediate intervention effect) and between pretest and follow-up (reflecting the persistence of the effect over time) were greater and statistically more significant than the mean differences between posttest and follow-up (indicating the stability of the intervention’s impact). These findings suggest that Cognitive-Behavioral Therapy produced significant improvements in both sleep quality and pain perception at

posttest, and these therapeutic benefits remained stable and durable during the follow-up period.

As shown in Table 3, the difference between pretest and posttest scores was significant ($p < .05$), indicating a reduction in intolerance of uncertainty at posttest. However, no significant difference was found between posttest and follow-up scores ($p > .05$).

To further examine differences among the three groups, pairwise comparisons of mean scores across time stages were performed using the Bonferroni post hoc test.

Table 4

Differences in Mean Scores of Intolerance of Uncertainty Across Groups in Three Evaluation Stages

Group	I (Time)	J (Time)	Mean Difference (I-J)	SE	p
Control	Pretest	Posttest	-0.409	0.613	1.000
	Pretest	Follow-up	-0.273	0.696	1.000
	Posttest	Follow-up	0.136	0.529	1.000
Cognitive-Behavioral	Pretest	Posttest	18.318	0.613	< .001
	Pretest	Follow-up	17.955	0.696	< .001
	Posttest	Follow-up	-0.364	0.529	1.000
Solution-Focused Short-Term	Pretest	Posttest	25.591	0.613	< .001
	Pretest	Follow-up	25.273	0.696	< .001
	Posttest	Follow-up	-0.318	0.529	1.000

As shown in Table 4, the Bonferroni post hoc comparisons revealed no significant differences among the mean scores of the control group across the three time periods ($p > .05$). However, significant mean differences were found in the CBT and SFBT groups between pretest–

posttest and pretest–follow-up ($p < .05$), indicating significant intervention effects in these groups. Additionally, no significant difference was observed between posttest and follow-up scores ($p > .05$), suggesting the persistence of treatment effects over time.

Table 5

Bonferroni Post Hoc Test Comparing Research Groups on Total Intolerance of Uncertainty Scores

Dependent Variable	Group (I)	Group (J)	Mean Difference (I-J)	Standard Error	p-value	95% Confidence Interval
Intolerance of Uncertainty	Control	Cognitive-Behavioral	12.23	2.223	< .001	6.89 – 17.56
	Control	Solution-Focused Short-Term	17.23	2.223	< .001	11.89 – 22.56
	Cognitive-Behavioral	Solution-Focused Short-Term	5.00	2.223	.071	-0.34 – 10.34

The results indicated a significant difference between the two intervention groups and the control group ($p < .05$). Furthermore, the short-term solution-focused therapy demonstrated a greater reduction in intolerance of uncertainty compared to cognitive-behavioral therapy, although this difference was not statistically significant ($p > .05$).

Therefore, it can be concluded that there was no significant difference between the effectiveness of cognitive-behavioral therapy and short-term solution-focused therapy in reducing intolerance of uncertainty. In general, both therapeutic approaches were effective and demonstrated stable efficacy over time.

4. Discussion and Conclusion

The present study aimed to compare the effectiveness of cognitive-behavioral therapy (CBT) and short-term solution-focused therapy (SFBT) on intolerance of uncertainty (IU) in pregnant women. The findings revealed that both interventions significantly reduced IU compared to

the control group, with improvements maintained at the eight-week follow-up. Although the mean post-intervention scores indicated a slightly greater reduction in IU for the SFBT group, the difference between the two active treatments was not statistically significant. This outcome demonstrates that both approaches, while theoretically distinct, effectively improve adaptive cognitive and emotional processing among pregnant women faced with uncertainty. The enduring impact observed in follow-up evaluations highlights that structured psychotherapeutic programs targeting cognitive, behavioral, and solution-oriented mechanisms can foster sustained tolerance of ambiguity during pregnancy—a period inherently marked by unpredictability and heightened anxiety (Flink et al., 2023; Han et al., 2022; Li et al., 2022).

The efficacy of CBT in the current study aligns with a substantial body of evidence emphasizing its role in modifying maladaptive cognitive schemas that perpetuate distress under uncertain conditions. CBT enhances tolerance for uncertainty by restructuring catastrophic interpretations, reducing safety-seeking behaviors, and promoting problem-

focused coping (Dobson & Dozois, 2021; Donegan et al., 2022). In the perinatal context, these mechanisms are particularly relevant: fear of childbirth, intrusive worry about fetal health, and anticipatory anxiety regarding delivery are often maintained by distorted beliefs about uncontrollability and danger (Flink et al., 2023). The results of this study corroborate those of Li et al. (2022), who found that CBT effectively reduced perinatal anxiety and stress through improved cognitive appraisal and behavioral activation. Similarly, studies among nulliparous Iranian women reported significant declines in depression, anxiety, and stress following CBT-based interventions (Hosseinian et al., 2022). These converging findings underscore CBT's transdiagnostic utility across both clinical and nonclinical maternal populations. Moreover, the sustained reduction of IU over time is consistent with prior meta-analytic results indicating that cognitive restructuring and graded exposure yield enduring improvements in uncertainty tolerance (Li et al., 2022; Torshizi et al., 2023).

The improvement observed in the SFBT group reflects the capacity of solution-oriented approaches to facilitate cognitive flexibility and positive coping by highlighting strengths and exceptions rather than deficits. SFBT promotes the reorganization of meaning and attention away from uncontrollable aspects of uncertainty toward achievable, goal-directed action (Avci & Ataç-Öksüz, 2023; Zhang et al., 2022). The current findings are congruent with research demonstrating SFBT's effectiveness in enhancing resilience, vitality, and emotional regulation among women and students in stressful contexts (Okhovat et al., 2021; Poorgholamy et al., 2023). In Iranian samples, SFBT has been shown to decrease distress tolerance difficulties and pain perception in individuals with chronic conditions (Naderipour et al., 2023), and to reduce perturbation intolerance in women with mental disorders (Hashemi Saraj et al., 2022). These results suggest that the approach's brevity and emphasis on agency make it particularly well-suited for pregnant women, who may face logistical barriers to lengthy therapies. Moreover, Erfanifar et al. (2024) demonstrated that SFBT effectively lowered both depression and IU among adolescent females, which parallels the present finding that this method can directly address intolerance-related cognitive patterns.

The lack of a significant difference between CBT and SFBT in overall outcomes implies that both therapies may operate through partially overlapping mechanisms that ultimately converge on emotional stabilization and uncertainty tolerance. CBT focuses on restructuring

maladaptive cognitions through guided discovery and behavioral experiments, whereas SFBT fosters adaptive emotional engagement by emphasizing perceived self-efficacy and goal-oriented thinking. These processes may converge in their capacity to reduce avoidance and enhance problem-solving, key pathways in adapting to uncertainty (Avci & Ataç-Öksüz, 2023; Dobson & Dozois, 2021). Comparable equivalence between cognitive and brief solution-focused methods has been observed in trials examining distress tolerance, suggesting that therapeutic common factors such as alliance, goal clarity, and positive expectancy play central roles (Baniasadi et al., 2025; Jahangirrad et al., 2022). Furthermore, both methods build resilience—the ability to recover from stress and maintain functioning amid adversity—which mediates reductions in psychological distress (Chang et al., 2021; Puertas-Gonzalez et al., 2023). The comparable maintenance of benefits at follow-up supports the notion that once these self-regulatory skills are acquired, their effects are self-sustaining.

From a mechanistic standpoint, the current findings affirm that IU can be successfully modified through interventions targeting either cognitive restructuring or solution generation. As theorized, IU reflects both a cognitive bias toward perceiving uncertainty as threatening and an affective intolerance for ambiguity. CBT reduces this bias by re-evaluating threat expectancies and facilitating exposure to uncertainty cues, while SFBT shifts attention toward control and mastery, thereby indirectly decreasing perceived threat intensity (Donegan et al., 2022; Zhang et al., 2022). The similar magnitudes of change observed in this study may reflect the shared activation of top-down regulatory networks responsible for appraisal reformation and affect modulation. Prior neurocognitive evidence in perinatal samples supports this view: interventions enhancing cognitive control and emotional regulation predict better adaptation to unpredictable pregnancy-related stressors (Ochi & Dwivedi, 2023; Puertas-Gonzalez et al., 2022). Thus, both approaches, despite different theoretical orientations, appear to target the same underlying neurobehavioral processes that enable tolerance of uncertainty.

Another critical interpretation concerns the broader psychosocial implications of reducing IU during pregnancy. Research links heightened IU with fear of childbirth, increased physiological arousal, and poor obstetric outcomes (Daalderop et al., 2023; Han et al., 2022). In this sense, improving IU may indirectly foster more adaptive prenatal health behaviors, better pain management during labor, and

enhanced mother–infant bonding postpartum. This aligns with findings that interventions addressing psychological resilience can buffer adverse perinatal outcomes associated with socioeconomic stressors (Daalderop et al., 2023; Nejadhoseinian et al., 2024). The current study therefore reinforces the conceptualization of IU as both a cognitive target and a clinical risk factor warranting early psychological attention within prenatal care frameworks.

Cross-study comparisons reveal that CBT's effects on IU and distress tolerance are not limited to the perinatal population. For example, in patients with coronary heart disease, CBT enhanced distress tolerance and reduced anxiety by restructuring maladaptive worry patterns (Aliyari Khanshan Vatan et al., 2022). Similarly, Bakhtiari (2024) found that CBT increased resilience and emotional regulation in women exposed to spousal substance abuse, confirming the generalizability of CBT's benefits for individuals facing chronic uncertainty and stress. Parallel improvements in distress tolerance have been documented in patients with irritable bowel syndrome and bulimia nervosa following structured CBT (Jahangirrad et al., 2022; Zarabi et al., 2021). The present findings extend this transdiagnostic profile to pregnant women, demonstrating that the cognitive and behavioral principles underpinning CBT are equally effective in addressing uncertainty-driven anxiety within physiological transitions like pregnancy.

In terms of the SFBT findings, the present results also resonate with international research emphasizing the therapy's capacity to mobilize self-efficacy and solution-oriented thinking as protective factors against distress. Studies among individuals coping with chronic illness and occupational stress indicate that SFBT's focus on identifying resources and scaling progress contributes to sustained well-being (Avci & Ataç-Öksüz, 2023; Poorgholamy et al., 2023). In adolescent and oncology samples, brief SFBT interventions yielded notable gains in resilience and reduced emotional distress (Zhang et al., 2022). The same therapeutic principles—future orientation, exception finding, and goal visualization—likely enhanced the pregnant participants' sense of control over unpredictable circumstances, explaining the robust post-intervention reductions in IU. Furthermore, evidence from solution-oriented group programs in Iranian contexts supports SFBT's adaptability to cultural expectations of collectivism and relational dialogue (Rahbari Ghazani et al., 2022). Collectively, these data illustrate that SFBT's brevity and empowerment orientation make it an accessible, low-burden alternative to CBT in maternity care settings.

The maintenance of therapeutic gains at follow-up is particularly noteworthy, suggesting that both interventions produced stable cognitive and emotional restructuring. This stability may result from the integration of newly acquired coping strategies into daily functioning, promoting a self-reinforcing cycle of adaptive appraisal and behavior. The results echo those of Puertas-Gonzalez et al. (2023), who found that cognitive-behavioral stress management during pregnancy yielded durable benefits moderated by resilience. Similarly, mindfulness-based and emotion-focused therapies have demonstrated long-term improvements in IU and distress tolerance, reflecting the persistence of skills-based changes (Jahangirrad et al., 2022; Nasiri et al., 2022). Thus, the follow-up data strengthen the argument that targeted psychological interventions can induce enduring transformations in uncertainty processing across varying therapeutic models.

An additional explanatory factor for the lack of significant difference between the two active treatments may be the presence of shared therapeutic factors such as alliance, expectancy, and structured engagement. Both CBT and SFBT rely on active client participation, goal formulation, and experiential learning. Prior research indicates that these nonspecific factors account for substantial portions of variance in psychotherapy outcomes (Dobson & Dozois, 2021; Grisham et al., 2022). Furthermore, the group format used in the present study likely amplified cohesion, normalization, and vicarious learning—mechanisms well-documented to enhance treatment adherence and sustain change in perinatal populations (Puertas-Gonzalez et al., 2023; Taghizadeh, 2023). Consequently, it is plausible that both the specific and common factors interacted synergistically, producing equivalent overall improvements.

From a cultural and contextual perspective, these findings contribute to expanding evidence on the adaptability of both CBT and SFBT for Iranian pregnant women. The replication of cognitive and solution-focused benefits within this sample aligns with other Iranian trials demonstrating similar efficacy in addressing psychological distress and intolerance in medical and nonclinical populations (Bakhtiari & Pourdel, 2024; Hashemi Saraj et al., 2022; Naderipour et al., 2023). Furthermore, the present data complement findings showing that family-based, empowerment-oriented programs grounded in solution-focused principles can mitigate emotional suppression and stress among adolescents, suggesting that these approaches harmonize with local therapeutic and cultural values (Rahbari Ghazani et al., 2022). By reinforcing both international and domestic

evidence, the current results underscore that culturally attuned psychotherapies grounded in cognitive or resource-based frameworks can yield meaningful improvements in tolerance of uncertainty among women navigating pregnancy.

5. Limitations and Suggestions

Despite its contributions, the present study has several limitations. First, the sample was relatively small and drawn through convenience sampling, which may limit the generalizability of findings beyond similar clinical and cultural contexts. Second, self-report questionnaires were the primary data collection tools, which may be susceptible to social desirability bias, particularly in pregnant women concerned with perceived maternal expectations. Third, the study's follow-up period was restricted to eight weeks, making it difficult to infer the long-term stability of treatment effects across the postpartum transition. Additionally, no physiological or observational indices of stress were included to triangulate self-reported IU. Finally, the study did not assess potential mediators, such as resilience, emotional regulation, or perceived self-efficacy, which could clarify the mechanisms underlying observed improvements.

Future investigations should employ larger, randomized, and multicenter designs to enhance statistical power and external validity. It would also be valuable to include longitudinal follow-up assessments extending into the postpartum period to evaluate the persistence of benefits on maternal adjustment and infant outcomes. Researchers should consider integrating mixed-methods designs combining quantitative measures with qualitative interviews to capture participants' lived experiences of uncertainty and therapeutic change. Comparative analyses involving third-wave approaches such as acceptance and commitment therapy or mindfulness-based interventions could further delineate which therapeutic ingredients most effectively modulate IU. Finally, neurocognitive and psychophysiological measures—such as stress biomarkers or attentional bias indices—could elucidate the biological correlates of therapeutic change in pregnant women.

Clinicians working with pregnant women should integrate structured, evidence-based psychological interventions into prenatal care programs to address IU and related distress. Both CBT and SFBT protocols can be adapted for short-term group formats compatible with obstetric schedules. Psychoeducational workshops

emphasizing uncertainty normalization, cognitive restructuring, and solution-focused goal setting may improve emotional resilience and maternal well-being. Healthcare providers should be trained to identify high-IU patients early and provide timely referrals to psychotherapy. Incorporating brief CBT or SFBT sessions within community health centers could enhance accessibility, promote preventative mental health, and contribute to healthier pregnancies and postpartum outcomes.

Authors' Contributions

Authors contributed equally to this article.

Declaration

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

Transparency Statement

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

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

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