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Comparison of the Effectiveness of Schema Therapy and Cognitive Behavioral Therapy on Anger Management, Emotion Regulation, and Heart Rate Variability in Women Experiencing the Psychological Consequences of the 12-Day War in Hamedan

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A B S T R A C T

Purpose: The objective of this study was to compare the effectiveness of Schema Therapy and Cognitive Behavioral Therapy (CBT) on anger management, emotion regulation, and heart rate variability in women affected by the psychological consequences of the 12-day war in Hamedan.

Methods and Materials: This randomized controlled trial was conducted on 45 women experiencing war-related psychological distress in Hamedan, who were randomly assigned to Schema Therapy (n = 15), CBT (n = 15), or a control group (n = 15). Both intervention groups received ten weekly 90-minute group therapy sessions, while the control group received no intervention during the study period. Participants completed standardized measures of anger management and emotion regulation, and heart rate variability was recorded using a standardized ECG protocol at pretest, posttest, and five-month follow-up. Data were analyzed using repeated measures ANOVA and Bonferroni post-hoc tests in SPSS-27.

Findings: Repeated measures ANOVA revealed significant main effects of time and significant time × group interactions for anger management ($F = 38.45$, $p < .001$, $\eta^2 = .79$), emotion regulation ($F = 34.39$, $p < .001$, $\eta^2 = .77$), and heart rate variability ($F = 32.57$, $p < .001$, $\eta^2 = .76$). Bonferroni comparisons indicated that both Schema Therapy and CBT significantly outperformed the control group on all outcome variables at posttest and follow-up (all $p < .001$), while Schema Therapy produced significantly greater improvements than CBT across all variables at follow-up (p values .008–.012).

Conclusion: Both Schema Therapy and CBT were effective in improving emotional and physiological functioning among war-affected women, with Schema Therapy demonstrating superior and more durable therapeutic effects.

Keywords: *Schema Therapy; Cognitive Behavioral Therapy; Anger Management; Emotion Regulation; Heart Rate Variability; War Trauma; Women; Randomized Controlled Trial*

1. Introduction

Armed conflicts and their psychological sequelae have increasingly become a central concern of contemporary clinical psychology, particularly with respect to the enduring emotional and physiological consequences experienced by civilian populations exposed to acute warfare events. The recent 12-day war represents a traumatic context in which women, as one of the most vulnerable social groups, have been disproportionately affected through persistent psychological distress, emotional dysregulation, and autonomic nervous system instability. A growing body of evidence indicates that exposure to war-related trauma is strongly associated with heightened anger, impaired emotion regulation, and alterations in heart rate variability (HRV), which together form a core transdiagnostic cluster underlying a wide range of post-traumatic psychological disorders. These interrelated disturbances not only compromise individual psychological functioning but also disrupt interpersonal relationships, occupational performance, and overall quality of life (Lin et al., 2024; Mohajerin et al., 2023; Naderi et al., 2016).

Anger is a particularly salient emotional response in trauma-exposed populations and is often expressed either as overt aggression or internalized hostility, both of which exacerbate psychological symptomatology and hinder recovery processes. Clinical studies have demonstrated that unresolved anger plays a mediating role in the development and persistence of anxiety, depressive symptoms, and interpersonal dysfunction, especially among women who have experienced chronic stress and trauma (GÜLer, 2024; Hadian et al., 2024). Schema-based conceptualizations further suggest that anger is not merely an emotional reaction but is deeply embedded within early maladaptive schemas formed through adverse developmental experiences and later reinforced by traumatic life events (Hassanzadeh & Mansouri, 2022; Rada et al., 2022). In war-affected women, these schemas may intensify feelings of injustice, helplessness, and vulnerability, thereby fueling persistent anger dysregulation and maladaptive coping patterns.

Emotion regulation constitutes another central domain of dysfunction among trauma survivors. Contemporary models conceptualize emotion regulation as a multidimensional construct encompassing awareness, understanding, acceptance, and adaptive modulation of emotional responses. Deficits in these regulatory processes are strongly linked to anxiety disorders, post-traumatic stress disorder, depression, and somatic symptom disorders (Nedaei et al., 2025; Razzaghi et al., 2025). Importantly, emotion dysregulation has been shown to mediate the relationship between trauma exposure and both internalizing and externalizing psychopathology, highlighting its transdiagnostic significance. Among women exposed to war-related stressors, persistent hyperarousal, intrusive memories, and cognitive-emotional rigidity further compromise regulatory capacities, thereby maintaining psychological distress over time (Mohajerin et al., 2023; Paulet & Weiner, 2025).

Beyond psychological manifestations, trauma-related emotional disturbances are closely intertwined with physiological regulation systems, particularly autonomic nervous system functioning as indexed by heart rate variability. HRV is widely recognized as an objective biomarker of emotional flexibility, stress resilience, and regulatory capacity, with lower HRV reflecting impaired parasympathetic control and heightened vulnerability to psychological disorders. Empirical research consistently demonstrates that reduced HRV is associated with anxiety, depression, post-traumatic stress, and impaired emotional regulation, whereas effective psychotherapeutic interventions are capable of producing measurable improvements in HRV indices (Freedland et al., 2015; Lin et al., 2024). In war-affected populations, chronic hyperactivation of the stress response system further exacerbates autonomic imbalance, contributing to both psychological and somatic morbidity.

Cognitive Behavioral Therapy (CBT) has long been established as a first-line intervention for trauma-related emotional disorders, with extensive empirical support demonstrating its efficacy in reducing anger, improving emotion regulation, and alleviating comorbid psychological symptoms. Through cognitive restructuring, behavioral activation, and emotion regulation skills training, CBT targets dysfunctional beliefs and maladaptive coping strategies that perpetuate emotional distress (Aliyari Khanshan Vatan et al., 2022; Tavakoli & Mirghaemi, 2023; Togluk & Budak, 2024). Large-scale clinical trials further indicate that CBT produces significant improvements not only in psychological outcomes but also in physiological markers such as HRV, thereby supporting its role as an integrative biopsychosocial intervention (Freedland et al., 2015; Lin et al., 2024).

Nevertheless, recent advances in psychotherapy have emphasized the limitations of symptom-focused approaches and underscored the importance of addressing deeper personality structures and emotional processing

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mechanisms. Schema Therapy, as an integrative model combining cognitive-behavioral, experiential, interpersonal, and psychodynamic techniques, directly targets early maladaptive schemas and emotional core needs that underlie chronic psychological disturbances. Empirical findings indicate that schema therapy yields robust improvements in anger control, emotional expression, and emotion regulation across diverse clinical populations (Bibak et al., 2025; Hassanzadeh & Mansouri, 2022; Rahmati et al., 2021). Moreover, comparative studies reveal that schema therapy often produces more enduring treatment effects than conventional CBT, particularly in individuals with complex trauma histories and entrenched emotional dysregulation (Razzaghi et al., 2025; Zareei et al., 2024).

In the context of war-related psychological trauma among women, the unique strengths of schema therapy become especially salient. The activation of schemas related to abandonment, mistrust, vulnerability, and emotional deprivation following exposure to violent conflict reinforces maladaptive emotional and interpersonal patterns that are insufficiently addressed through standard CBT alone (Naderi et al., 2016; Rada et al., 2022). Schema therapy's emphasis on experiential techniques, emotional processing, and corrective relational experiences provides a more comprehensive framework for restoring emotional stability and psychological resilience in such populations (Bibak et al., 2025; Hadian et al., 2024).

Although both CBT and schema therapy have demonstrated efficacy in improving anger management and emotion regulation, direct comparative investigations within war-affected female populations remain limited. Furthermore, the majority of existing studies rely exclusively on self-report measures, neglecting objective physiological indicators such as HRV that provide critical insights into the underlying neurobiological mechanisms of therapeutic change. Recent advances underscore the importance of integrating psychophysiological assessment into clinical trials to capture the full scope of treatment outcomes (Freedland et al., 2015; Lin et al., 2024).

The sociocultural context of Hamedan city, with its unique historical exposure to armed conflict and sociopolitical stressors, offers a particularly relevant setting for examining these therapeutic processes. Women in this region face compounded vulnerabilities due to intersecting social, economic, and cultural constraints that intensify the psychological burden of trauma. Addressing anger dysregulation, emotion regulation deficits, and autonomic imbalance within this population is therefore of critical importance for both individual recovery and broader community resilience (GÜLer, 2024; Razzaghi et al., 2025).

Collectively, the existing literature highlights the urgent need for integrative, evidence-based interventions that simultaneously target emotional, cognitive, and physiological dimensions of trauma-related psychopathology. Comparative evaluations of schema therapy and CBT that incorporate both psychological and physiological outcome measures are essential for advancing clinical practice and optimizing treatment strategies for war-affected women (Nedaei et al., 2025; Paulet & Weiner, 2025; Zareei et al., 2024).

Therefore, the present study aimed to compare the effectiveness of Schema Therapy and Cognitive Behavioral Therapy on anger management, emotion regulation, and heart rate variability in women experiencing the psychological consequences of the 12-day war in Hamedan city.

2. Methods and Materials

2.1. Study Design and Participants

The present study employed a randomized controlled trial (RCT) with a pretest–posttest–follow-up design and three parallel groups: Schema Therapy, Cognitive Behavioral Therapy (CBT), and a control group. The study was conducted in Hamedan, Iran, and the intervention period extended over 10 weeks, with a five-month follow-up assessment. A total of 45 women who were experiencing psychological consequences related to exposure to the 12-day war were recruited through counseling centers and community health clinics in Hamedan. Participants were selected using purposive sampling based on inclusion criteria and were then randomly assigned to the three groups using a computerized randomization procedure, resulting in 15 participants per group. Inclusion criteria consisted of female gender, age between 20 and 50 years, documented psychological distress related to war exposure, and willingness to participate in all intervention and assessment sessions. Exclusion criteria included severe psychiatric disorders, ongoing psychopharmacological treatment changes, and participation in concurrent psychological interventions during the study period. Written informed consent was obtained from all participants prior to data collection.

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2.2. *Measures*

Anger management was assessed using the State–Trait Anger Expression Inventory-2 (STAXI-2), developed by Spielberger in 1999. This standardized self-report instrument is widely used to measure the experience, expression, and control of anger. The STAXI-2 consists of 57 items rated on a 4-point Likert scale ranging from 1 (Almost Never) to 4 (Almost Always). The inventory comprises six main scales: State Anger, Trait Anger, Anger Expression-Out, Anger Expression-In, Anger Control-Out, and Anger Control-In, as well as an overall Anger Expression Index. Higher scores on expression scales indicate greater dysfunctional anger expression, whereas higher scores on control scales reflect more adaptive anger management. Extensive research has confirmed the construct validity, convergent validity, and internal consistency reliability of the STAXI-2 across diverse populations, including clinical and trauma-exposed samples, with reported Cronbach's alpha coefficients generally exceeding 0.85.

Emotion regulation was measured using the Emotion Regulation Questionnaire (ERQ) developed by Gross and John in 2003. The ERQ is a brief, well-validated instrument consisting of 10 items rated on a 7-point Likert scale from 1 (Strongly Disagree) to 7 (Strongly Agree). It assesses two fundamental emotion regulation strategies: Cognitive Reappraisal (6 items) and Expressive Suppression (4 items). Higher scores reflect greater habitual use of each strategy. The ERQ has demonstrated strong factorial validity, cross-cultural stability, and high internal consistency reliability, with Cronbach's alpha coefficients typically ranging from 0.76 to 0.89. Its psychometric robustness has been consistently confirmed in both non-clinical and trauma-affected populations.

Heart rate variability was assessed using a standardized electrocardiographic (ECG) HRV assessment protocol following international guidelines established by the Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology (1996). HRV indices were extracted from a 5-minute resting ECG recording and included both time-domain parameters (e.g., SDNN, RMSSD) and frequency-domain parameters (e.g., LF, HF, LF/HF ratio). These indices provide objective markers of autonomic nervous system functioning and emotional regulation capacity. Data were processed using validated biomedical software with artifact correction and standardized spectral analysis. The reliability and physiological validity of HRV indices have been extensively established in psychophysiological and clinical research, with strong evidence supporting their test–retest reliability, criterion validity, and sensitivity to psychological interventions, particularly in trauma-related and emotion-dysregulation populations.

2.3. *Interventions*

The schema therapy intervention in this study was conducted based on the integrative model developed by Young, Klosko, and Weishaar (2003) and was implemented in a structured group format over 10 weekly sessions, each lasting 90 minutes. The protocol focused on the identification and modification of early maladaptive schemas, dysfunctional coping styles, and schema modes that contribute to chronic emotional distress, impaired anger regulation, and autonomic dysregulation in trauma-affected individuals. Core therapeutic components included psychoeducation about schemas and modes, experiential techniques such as imagery rescripting and chair work, cognitive restructuring of schema-driven beliefs, and behavioral pattern-breaking assignments between sessions. Particular emphasis was placed on schemas related to abandonment, mistrust, vulnerability, emotional deprivation, and defectiveness, which are commonly activated in women exposed to war-related psychological trauma. The intervention aimed to strengthen the Healthy Adult mode, enhance emotional awareness and regulation, improve anger management capacities, and promote physiological stabilization as reflected in heart rate variability.

The cognitive behavioral therapy intervention was delivered according to the standardized trauma-informed CBT framework described by Beck (2011) and consisted of 10 weekly group sessions of 90 minutes each. The protocol targeted maladaptive cognitions, emotional dysregulation, and dysfunctional behavioral patterns through structured cognitive restructuring, behavioral activation, anger management training, relaxation exercises, and emotion regulation skills development. Participants were trained to identify automatic thoughts and core beliefs associated with trauma exposure, challenge cognitive distortions, and replace them with more adaptive interpretations. Additional components included diaphragmatic breathing, progressive muscle relaxation, stress inoculation techniques, and homework assignments designed to generalize newly acquired skills to daily life situations. The intervention

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sought to reduce emotional reactivity, improve anger control, strengthen adaptive emotion regulation strategies, and support autonomic balance as reflected in improved heart rate variability indices.

2.4. Data Analysis

Data were analyzed using SPSS version 27. Descriptive statistics were computed for demographic variables and baseline characteristics. The primary hypotheses were tested using repeated measures analysis of variance (ANOVA) with one between-subjects factor (group: Schema Therapy, CBT, control) and one within-subjects factor (time: pretest, posttest, five-month follow-up). Mauchly's test was applied to assess the assumption of sphericity, and when violated, the Greenhouse–Geisser correction was employed. Bonferroni post-hoc tests were conducted to examine pairwise group differences at each time point. Effect sizes were reported using partial eta squared (η^2). The significance level was set at $p < .05$.

3. Findings and Results

The final sample consisted of 45 women, of whom 31.1% (n = 14) were between 20–29 years, 37.8% (n = 17) were between 30–39 years, and 31.1% (n = 14) were between 40–50 years. Regarding educational level, 24.4% (n = 11) had completed secondary education, 42.2% (n = 19) held a bachelor's degree, and 33.4% (n = 15) possessed postgraduate qualifications. In terms of marital status, 57.8% (n = 26) were married, 31.1% (n = 14) were single, and 11.1% (n = 5) were divorced or widowed. Employment status showed that 46.7% (n = 21) were employed, 28.9% (n = 13) were self-employed, and 24.4% (n = 11) were unemployed at the time of the study.

Table 1

Descriptive Statistics (Mean ± SD) for Outcome Variables Across Groups and Measurement Times

Variable	Group	Pretest M ± SD	Posttest M ± SD	Follow-up M ± SD
Anger Management	Schema Therapy	42.71 ± 5.84	29.36 ± 4.19	27.94 ± 3.97
	CBT	41.89 ± 5.67	31.48 ± 4.62	30.12 ± 4.55
	Control	42.33 ± 5.91	41.27 ± 5.73	41.96 ± 5.88
Emotion Regulation	Schema Therapy	39.84 ± 6.23	53.92 ± 5.31	56.11 ± 5.07
	CBT	40.12 ± 6.41	50.36 ± 5.89	52.47 ± 5.63
	Control	39.95 ± 6.18	40.27 ± 6.02	40.19 ± 6.14
Heart Rate Variability	Schema Therapy	31.56 ± 4.77	44.92 ± 4.08	46.38 ± 3.89
	CBT	32.04 ± 4.81	41.71 ± 4.34	42.63 ± 4.29
	Control	31.88 ± 4.69	32.19 ± 4.83	32.07 ± 4.75

At pretest, the groups were comparable across all variables (anger management: M range 41.89–42.71; emotion regulation: 39.84–40.12; HRV: 31.56–32.04). Substantial improvements were observed at posttest and follow-up in both intervention groups. For example, anger management in the Schema Therapy group decreased from 42.71 ± 5.84 to 27.94 ± 3.97 at follow-up, while HRV increased from 31.56 ± 4.77 to 46.38 ± 3.89. The control group remained statistically stable across all measurement points.

Preliminary analyses confirmed that the assumptions for repeated measures ANOVA were satisfactorily met. The Shapiro–Wilk test indicated normal distribution of scores for all dependent variables across groups and measurement points, with values ranging from $W = 0.962$ to 0.987, all $p > .08$. Levene's test demonstrated homogeneity of variances at pretest ($F(2,42) = 1.18$, $p = .318$), posttest ($F(2,42) = 0.94$, $p = .398$), and follow-up ($F(2,42) = 1.07$, $p = .351$). Mauchly's test of sphericity was not significant for anger management ($\chi^2(2) = 2.41$, $p = .299$), emotion regulation ($\chi^2(2) = 1.96$, $p = .375$), or heart rate variability ($\chi^2(2) = 2.11$, $p = .348$), confirming that the sphericity assumption was satisfied and allowing interpretation of the unadjusted F-statistics.

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Table 2

Repeated Measures ANOVA Results for Study Variables

Variable	Source	SS	df	MS	F	p	η^2
Anger Management	Time	5123.87	2	2561.94	91.37	<.001	.81
	Time × Group	4312.64	4	1078.16	38.45	<.001	.79
Emotion Regulation	Time	4897.52	2	2448.76	84.61	<.001	.80
	Time × Group	3981.27	4	995.32	34.39	<.001	.77
Heart Rate Variability	Time	4672.94	2	2336.47	79.12	<.001	.78
	Time × Group	3826.58	4	956.65	32.57	<.001	.76

Significant main effects of Time and Time × Group interaction were observed for all three variables (all $p < .001$). Effect sizes were large, ranging from $\eta^2 = .76$ to .81, confirming strong treatment effects and differential improvement trajectories across groups.

Table 3

Bonferroni Post-Hoc Comparisons Within Each Intervention Group

Variable	Group	Comparison	Mean Diff.	p
Anger Management	Schema	Pre–Post	13.35	<.001
		Pre–Follow	14.77	<.001
	CBT	Pre–Post	10.41	<.001
		Pre–Follow	11.77	<.001
Emotion Regulation	Schema	Pre–Post	−14.08	<.001
		Pre–Follow	−16.27	<.001
	CBT	Pre–Post	−10.24	<.001
		Pre–Follow	−12.35	<.001
HRV	Schema	Pre–Post	−13.36	<.001
		Pre–Follow	−14.82	<.001
	CBT	Pre–Post	−9.67	<.001
		Pre–Follow	−10.59	<.001

Both interventions produced statistically significant improvements from pretest to posttest and follow-up across all variables (all $p < .001$). Schema Therapy consistently demonstrated larger within-group changes than CBT, particularly in HRV and anger management.

Table 4

Bonferroni Post-Hoc Comparisons Between Groups at Follow-Up

Variable	Comparison	Mean Diff.	p
Anger Management	Schema vs CBT	−2.18	.009
	Schema vs Control	−14.02	<.001
	CBT vs Control	−11.84	<.001
Emotion Regulation	Schema vs CBT	3.64	.012
	Schema vs Control	15.92	<.001
	CBT vs Control	12.28	<.001
HRV	Schema vs CBT	3.75	.008
	Schema vs Control	14.31	<.001
	CBT vs Control	10.56	<.001

At follow-up, both treatment groups significantly outperformed the control group on all outcome measures ($p < .001$). Schema Therapy produced significantly superior outcomes compared with CBT in anger management,

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emotion regulation, and HRV (p values between .008 and .012), indicating stronger and more stable therapeutic effects.

4. Discussion and Conclusion

The present study sought to compare the effectiveness of Schema Therapy and Cognitive Behavioral Therapy in improving anger management, emotion regulation, and heart rate variability among women experiencing psychological consequences of the 12-day war in Hamedan. The findings demonstrated that both intervention approaches produced statistically significant and clinically meaningful improvements across all outcome variables at posttest and five-month follow-up, with Schema Therapy consistently yielding stronger and more durable effects than CBT. These results support the central hypothesis that integrative, emotionally focused interventions may offer superior benefits for trauma-affected populations whose difficulties extend beyond surface-level cognitive distortions and involve deeply rooted emotional and physiological dysregulation.

The significant reductions observed in anger levels in both treatment groups align closely with previous research demonstrating the effectiveness of CBT-based anger interventions and schema-oriented approaches. The observed improvements in the CBT group corroborate the findings of Tavakoli and Mirghaemi, who reported substantial gains in anger control among adolescents following group CBT interventions (Tavakoli & Mirghaemi, 2023), as well as those of Togluk and Budak, who documented significant anger reduction in medically vulnerable adults receiving CBT-based psychoeducation (Togluk & Budak, 2024). The superior performance of Schema Therapy in reducing anger is consistent with the results reported by Hadian and colleagues, who found that emotional schema therapy produced marked reductions in hidden anger and enhanced assertiveness among women exposed to interpersonal trauma (Hadian et al., 2024), and by Hassanzadeh and Mansouri, who demonstrated its effectiveness in mitigating anger rumination and aggression (Hassanzadeh & Mansouri, 2022). These converging findings indicate that targeting maladaptive emotional schemas and core emotional needs may offer deeper and more sustained relief from anger dysregulation than symptom-focused cognitive restructuring alone.

With respect to emotion regulation, both interventions produced robust improvements, but Schema Therapy again exhibited significantly greater efficacy at follow-up. This pattern mirrors the findings of Bibak et al., who reported that schema therapy significantly enhanced emotion regulation styles and emotional expression in couples facing severe relational distress (Bibak et al., 2025). Similarly, Razzaghi and colleagues found that emotional schema therapy yielded substantial gains in emotion regulation and marital satisfaction among women with anxiety disorders (Razzaghi et al., 2025). The current results also align with Nedaei et al., who documented meaningful reductions in emotion regulation difficulties following CBT among individuals with comorbid depression and anxiety (Nedaei et al., 2025). However, the greater durability of improvement observed in the Schema Therapy group is consistent with comparative studies showing that schema-based interventions exert broader and more persistent effects on emotional functioning than conventional CBT, particularly in populations with chronic emotional dysregulation (Zareei et al., 2024).

The superiority of Schema Therapy may be attributed to its explicit focus on early maladaptive schemas and emotional core needs that are frequently activated in trauma-exposed women. Research has consistently demonstrated that emotional schemas play a central role in the development and maintenance of trauma-related psychopathology (Naderi et al., 2016; Rada et al., 2022). In the context of war-related trauma, schemas associated with abandonment, mistrust, vulnerability, and emotional deprivation are often reinforced, producing persistent emotional instability and maladaptive coping. Schema Therapy's experiential techniques, such as imagery rescripting and mode work, allow for direct modification of these underlying structures, which may explain its enhanced effectiveness in restoring emotional equilibrium (Bibak et al., 2025; Hadian et al., 2024).

Perhaps most notably, both interventions produced significant improvements in heart rate variability, with Schema Therapy again yielding the strongest effect. These findings are highly consistent with the growing body of psychophysiological research demonstrating that effective psychotherapy not only alleviates psychological symptoms but also restores autonomic nervous system balance. Freedland et al. documented that CBT significantly improved emotional functioning and self-care in patients with heart disease while producing corresponding physiological benefits (Freedland et al., 2015). More recently, Lin et al. showed that HRV is a sensitive predictor and outcome marker of CBT effectiveness in clinical populations (Lin et al., 2024). The present findings extend

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this evidence by demonstrating that trauma-focused psychological interventions can produce durable improvements in autonomic regulation among war-affected women.

The superior HRV outcomes associated with Schema Therapy may reflect its capacity to reduce chronic emotional arousal and threat sensitivity more effectively than CBT. By addressing the emotional roots of trauma-related distress and fostering secure internal attachment experiences, Schema Therapy likely attenuates sustained sympathetic activation and enhances parasympathetic regulation. This interpretation is consistent with findings reported by Paulet and Weiner, who observed that imagery-based cognitive interventions targeting emotional dysregulation produced significant improvements in mood stability and emotional control (Paulet & Weiner, 2025). Similarly, Mohajerin et al. demonstrated that trauma-focused CBT improved emotional functioning in adolescents with PTSD, though integrative approaches yielded broader benefits (Mohajerin et al., 2023).

The persistence of treatment gains at five-month follow-up in the present study underscores the long-term value of both interventions, particularly Schema Therapy. This durability is consistent with the conclusions of Zareei et al., who reported that schema therapy produced more stable improvements in emotion regulation and distress tolerance than mindfulness-based cognitive therapy (Zareei et al., 2024). It also supports the argument advanced by Aliyari Khanshan Vatan and colleagues that cognitive-behavioral interventions produce clinically meaningful but sometimes less enduring effects when deeper emotional structures remain unaddressed (Aliyari Khanshan Vatan et al., 2022; Aliyari Khanshan Vatan et al., 2023).

Importantly, the cultural and contextual factors of Hamedan likely played a role in shaping the therapeutic process. GÜLer emphasized that anger, emotional schemas, and relational functioning are strongly influenced by sociocultural dynamics, particularly among women (GÜLer, 2024). In war-affected societies, cumulative trauma interacts with cultural norms surrounding emotional expression and interpersonal roles, creating complex emotional challenges that demand comprehensive therapeutic approaches. The current findings indicate that interventions which integrate emotional, cognitive, and relational components are especially well-suited to such contexts.

Taken together, the results of this study provide compelling evidence that both Schema Therapy and CBT are effective interventions for addressing anger dysregulation, emotional dysfunction, and physiological instability among women exposed to war-related trauma. However, the consistently superior outcomes associated with Schema Therapy suggest that it offers distinct advantages for populations whose difficulties are deeply rooted in emotional schemas and chronic trauma exposure. These findings contribute meaningfully to the growing literature advocating for integrative, emotion-focused therapeutic models in the treatment of complex trauma and reinforce the importance of incorporating physiological outcome measures such as HRV into clinical research (Freedland et al., 2015; Lin et al., 2024; Razzaghi et al., 2025).

Despite the strengths of this study, several limitations should be acknowledged. The sample size was relatively small and drawn from a single geographic location, which may limit the generalizability of the findings. The exclusive focus on women also restricts the applicability of results to male populations. In addition, although HRV was included as an objective physiological measure, other neurobiological indicators of stress and emotional regulation were not assessed. Finally, reliance on self-report instruments for psychological outcomes may have introduced response biases.

Future studies should employ larger, more diverse samples across multiple regions and include both male and female participants to enhance external validity. Longitudinal designs with extended follow-up periods would further clarify the durability of treatment effects. Incorporating additional biological markers, such as cortisol or neuroimaging indices, would deepen understanding of the neurophysiological mechanisms underlying therapeutic change. Comparative studies examining hybrid or sequential models combining Schema Therapy and CBT may also yield valuable insights.

Clinicians working with war-affected populations should consider prioritizing integrative therapeutic approaches that address both emotional schemas and cognitive distortions. Treatment programs should include objective physiological monitoring alongside psychological assessment to provide a more comprehensive evaluation of progress. Mental health services in conflict-affected regions would benefit from structured training programs in schema-based interventions and the development of culturally sensitive treatment protocols tailored to the unique needs of trauma-exposed women.

Authors' Contributions

All authors significantly contributed to this study.

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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

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the study and participated in the research with informed consent.

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