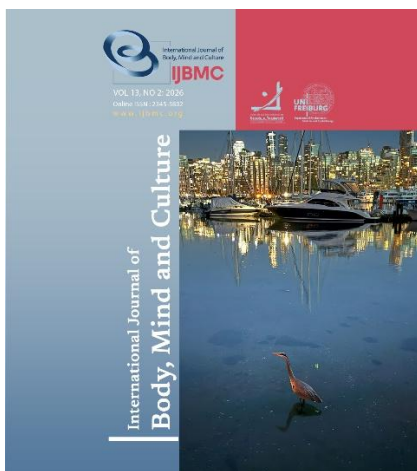


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# Prediction of Somatic Symptom Severity from Post-Traumatic Stress Symptom Severity, Difficulties in Emotion Regulation, Alexithymia, and Sleep Quality in War-Affected Adolescents

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## ABSTRACT

**Objective:** This study aimed to examine the predictive contribution of post-traumatic stress symptom severity, difficulties in emotion regulation, alexithymia, and sleep quality to somatic symptom severity in war-affected adolescents aged 13–18.

**Methods and Materials:** A cross-sectional predictive design was employed. Sixty adolescents exposed to the recent Iran–Israel conflict were recruited through purposive sampling in Tehran. Participants completed the Somatic Symptom Scale-8 (SSS-8), Child Post-Traumatic Stress Reaction Index (CPTSD-RI), Difficulties in Emotion Regulation Scale (DERS), Toronto Alexithymia Scale (TAS-20), and Pittsburgh Sleep Quality Index (PSQI). Data were analyzed using Pearson correlation coefficients and hierarchical multiple regression. Significance was set at  $p < .05$ .

**Findings:** Somatic symptom severity was positively correlated with post-traumatic stress symptom severity ( $r = .61, p < .001$ ), difficulties in emotion regulation ( $r = .58, p < .001$ ), alexithymia ( $r = .49, p < .001$ ), and poor sleep quality ( $r = .46, p < .001$ ). Hierarchical regression analysis revealed that post-traumatic stress symptoms significantly predicted somatic symptoms ( $\beta = .61, t = 7.02, p < .001$ ), followed by difficulties in emotion regulation ( $\beta = .34, t = 3.60, p = .001$ ), alexithymia ( $\beta = .27, t = 2.80, p = .007$ ), and sleep quality ( $\beta = .25, t = 2.95, p = .005$ ). The overall model explained 58% of the variance in somatic symptom severity (Adjusted  $R^2 = .56, F(4, 55) = 18.45, p < .001$ ).

**Conclusion:** Post-traumatic stress symptoms, emotional regulation difficulties, alexithymia, and poor sleep quality are significant predictors of somatic symptom severity in adolescents affected by war.

**Keywords:** somatic symptom, post-traumatic stress, emotion regulation, alexithymia, sleep quality, war-affected adolescents.

## Introduction

War and armed conflict represent some of the most potent sources of human stress, particularly for adolescents whose psychological and neurobiological systems are still developing. The recent escalation of hostilities following the attack on Tehran on February 28, 2026, as part of the Iran–Israel and US conflict, has brought unprecedented disruption to civilian life, leading to widespread exposure to threat, displacement, and loss (Organization, 2025). Although the medical and infrastructural impacts of this conflict are readily visible, the psychological sequelae among adolescents remain an urgent concern. Adolescents exposed to war-related trauma exhibit elevated rates of post-traumatic stress symptoms, emotional dysregulation, somatic complaints, and disrupted sleep, all of which can undermine physical and mental health (Pineros-Ortiz et al., 2021; Sharma et al., 2017).

Post-traumatic stress in youth is characterized not only by intrusive memories and hyperarousal but also by pervasive alterations in cognition and mood (American Psychiatric Association, 2013). In conflict zones, these symptoms can be compounded by ongoing threat, shattered routines, and loss of safety, leading to chronic physiological stress responses that amplify the perception of bodily symptoms. Studies of war-exposed adolescents in diverse contexts have shown that higher post-traumatic stress symptom severity predicts increased somatic complaints such as headaches, gastrointestinal distress, fatigue, and generalized pain (Morina et al., 2018; Sharma et al., 2017; Thabet & Ghannam, 2014). The biological embedding of trauma—through mechanisms such as hypothalamic–pituitary–adrenal (HPA) axis dysregulation and autonomic nervous system sensitization—may heighten somatic symptom reporting independently of any identifiable medical cause (Burchell et al., 2023).

Emotion regulation emerges as a central mechanism linking trauma exposure to somatic symptoms. Adolescents who struggle to identify, tolerate, and modulate negative emotions are more likely to experience prolonged physiological arousal and maladaptive coping, such as avoidance or suppression, which itself may manifest as somatic distress (Gross & Thompson, 2007). This is especially important in war-affected contexts, where emotional upheaval is

constant and social support may be limited. Difficulties in emotion regulation have been shown to mediate the effects of trauma on both psychopathology and physical complaints, suggesting that regulation deficits can transform psychological distress into somatic expression (Weissman et al., 2019).

Another construct implicated in trauma responses is alexithymia, a personality trait characterized by difficulty identifying and describing feelings and an externally oriented thinking style (Bagby et al., 1994). Alexithymia may increase vulnerability to somatic symptom severity because individuals with limited emotional awareness may be less able to recognize psychological distress and more likely to somatize emotional pain. Research in trauma and health psychology indicates that alexithymic tendencies are associated with greater reporting of bodily symptoms across clinical and nonclinical samples, particularly in populations facing chronic stressors (Taylor & Bagby, 2021). In war-affected adolescents, alexithymia may be both a consequence of emotional overwhelm and a factor that amplifies somatic distress by constraining adaptive emotional processing.

Sleep quality is equally critical for mental and somatic health. War-related disruptions—such as nighttime attacks, displacement, noise, and fear—can fragment sleep patterns and reduce restorative sleep. Poor sleep quality has been linked not only to increased emotional reactivity and cognitive difficulties but also to heightened perception of physical symptoms, immune dysregulation, and fatigue (Kobayashi et al., 2023; Lewis et al., 2020). In adolescent populations, sleep disturbances can have particularly pervasive effects, given the importance of sleep for emotional memory consolidation, stress recovery, and physiological homeostasis.

Although many studies have investigated the psychological impact of trauma in isolation, fewer investigations have simultaneously examined the interrelated roles of post-traumatic stress symptoms, difficulties in emotion regulation, alexithymia, and sleep quality in predicting the severity of somatic symptoms among conflict-exposed adolescents. Understanding these factors as a network of predictors is crucial, especially in the context of ongoing conflict, such as the recent Iran–Israel and US hostilities, where adolescents may experience chronic rather than acute stress.

Identifying which psychological processes most strongly contribute to somatic distress can inform targeted screening, prevention, and intervention strategies that bridge mental and physical health domains.

Accordingly, the present study aims to examine the predictive contribution of post-traumatic stress symptom severity, difficulties in emotion regulation, alexithymia, and sleep quality to the severity of somatic symptoms in adolescents aged 13–18 who have been exposed to war-related trauma. By clarifying these associations, the study seeks to support early identification of high-risk youth and to inform holistic approaches to health that integrate psychological and somatic care in post-conflict settings.

## Methods and Materials

### Study Design

The present study employed a cross-sectional predictive design to examine the extent to which post-traumatic stress symptom severity, difficulties in emotion regulation, alexithymia, and sleep quality predict somatic symptom severity in adolescents exposed to war. A cross-sectional design allows simultaneous assessment of multiple psychological constructs and their associations, enabling identification of key predictors of somatic symptoms (Creswell & Creswell, 2017). This approach is particularly appropriate in post-conflict contexts where longitudinal tracking may be logistically difficult.

### Participants and Setting

The study population consisted of adolescents aged 13–18 years who were residing in Tehran and surrounding areas following the recent Iran–Israel and US conflict that began on February 28, 2026. Participants were recruited from schools, community centers, and clinics providing psychosocial support for war-affected youth. A total of 60 adolescents were selected through purposive sampling based on exposure to war-related trauma, as reported by caregivers and school authorities. The inclusion criteria were: (1) age 13–18, (2) exposure to war-related stressors during or after the attack on Tehran, (3) ability to complete self-report questionnaires, and (4) parental consent for participation. Exclusion criteria included: (1) diagnosed severe psychiatric disorder (e.g., psychosis, severe depression with suicidal risk), (2) neurological or

chronic medical condition that could independently produce somatic symptoms, and (3) refusal to provide consent.

### Instruments

#### *Somatic Symptom Severity*

Somatic symptoms were assessed using the Somatic Symptom Scale–8 (SSS-8), Gierk et al. (2014), a widely used self-report questionnaire assessing common physical complaints, including headaches, fatigue, gastrointestinal issues, and pain. Each item is rated on a 5-point Likert scale from 0 (not at all) to 4 (very much), with higher total scores indicating greater symptom severity. The Persian version has demonstrated satisfactory internal consistency among Iranian adolescents (Cronbach's  $\alpha = .83$ ).

#### *Post-Traumatic Stress Symptoms*

The Child Post-Traumatic Stress Reaction Index (CPTSD-RI), Pynoos et al. (1996), was used to assess post-traumatic stress symptom severity. This scale includes items evaluating re-experiencing, avoidance, and hyperarousal. Items are scored on a 5-point Likert scale, with higher scores reflecting more severe post-traumatic stress symptoms. Reliability studies in Iranian adolescent populations have shown Cronbach's alpha coefficients ranging from .87 to .91.

#### *Difficulties in Emotion Regulation*

Emotion regulation difficulties were measured using the Difficulties in Emotion Regulation Scale (DERS), Gratz & Roemer (2004), which evaluates six domains: nonacceptance of emotional responses, difficulties engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. Items are rated on a 5-point Likert scale, with higher scores indicating greater difficulties. Persian adaptation has demonstrated acceptable psychometric properties (Cronbach's  $\alpha = .89$ ).

#### *Alexithymia*

Alexithymia was measured using the Toronto Alexithymia Scale (TAS-20), Bagby et al. (1994), a 20-item self-report questionnaire assessing difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking. Responses are scored on a 5-point Likert scale. The Persian version has shown good internal consistency (Cronbach's  $\alpha = .82-.85$ ) in adolescent samples.

### Sleep Quality

Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), Buysse et al. (1989), which measures subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Higher scores indicate poorer sleep quality. The Persian version has demonstrated high reliability and validity in adolescents (Cronbach's  $\alpha = .79$ ).

### Procedure

Data collection occurred over 4 weeks in Tehran and nearby districts affected by the conflict. Trained research assistants visited schools and community centers, explained the study objectives, and administered questionnaires in a quiet room. Participants completed the measures individually under supervision to ensure comprehension. For younger adolescents (13–14 years), items were read aloud if necessary. Average completion time was approximately 45–60 minutes.

### Ethical Considerations

Written informed consent was obtained from both adolescents and their legal guardians. Participation was voluntary, and confidentiality of responses was assured. Participants were informed that they could withdraw at any point without consequences. Appropriate psychological support was available for participants reporting high levels of distress during the study.

### Data Analysis

Data were analyzed using SPSS 28 and AMOS 26 for structural modeling. Preliminary analyses included descriptive statistics, assessment of missing data, and evaluation of assumptions for multiple regression, including linearity, multicollinearity (Variance Inflation Factor  $< 2.5$ ), and normality. Pearson correlations were calculated to examine bivariate associations between somatic symptom severity and the predictor variables. A hierarchical multiple regression analysis was then conducted to determine the predictive contribution of post-traumatic stress symptom severity, emotion regulation difficulties, alexithymia, and sleep quality to somatic symptoms. Post hoc checks included Durbin-Watson statistics for the independence of residuals and examination of standardized residuals for outliers. Significance was set at  $p < .05$ .

### Findings and Results

The study included 60 adolescents (30 males, 30 females) aged 13–18 years ( $M = 15.6$ ,  $SD = 1.7$ ). Most participants were in middle to high school grades. Average exposure duration to war-related stress since the attack on Tehran (9 Esfand 1404) was approximately 3 months ( $SD = 0.4$ ). No significant demographic differences were observed between age groups or sexes regarding key psychological variables ( $p > .05$ ), indicating sample homogeneity.

**Table 1**

*Descriptive statistics for study variables*

Variable	Mean	SD	Minimum	Maximum
Somatic Symptom Severity (SSS-8)	16.42	5.87	3	30
Post-Traumatic Stress Symptoms (CPTSD-RI)	38.76	11.25	12	65
Difficulties in Emotion Regulation (DERS)	94.21	17.63	60	132
Alexithymia (TAS-20)	55.34	8.94	36	73
Sleep Quality (PSQI)	8.27	3.56	3	16

As shown in Table 1, adolescents reported moderate to high levels of somatic symptoms, post-traumatic stress, and emotion regulation difficulties. Sleep quality

scores indicated a trend toward poor sleep, consistent with prior findings in conflict-exposed youth (Kobayashi et al., 2023; Lewis et al., 2020).

**Table 2**

*Pearson correlations among study variables*

Variable	1	2	3	4	5
1. Somatic Symptoms	1				
2. PTSD Symptoms	.61**	1			

3. Emotion Regulation	.58**	.72**	1		
4. Alexithymia	.49**	.56**	.44**	1	
5. Sleep Quality	.46**	.51**	.43**	.40**	1

Note:  $p < .01$ .

Table 2 indicates significant positive correlations between somatic symptoms and all predictors. The strongest association was observed between somatic symptoms and post-traumatic stress symptoms ( $r = .61$ ,  $p < .01$ ), followed by difficulties in emotion regulation ( $r = .58$ ,  $p < .01$ ). Alexithymia and sleep quality also demonstrated moderate positive correlations with somatic symptom severity. A hierarchical regression was

conducted to examine whether post-traumatic stress symptoms, difficulties in emotion regulation, alexithymia, and sleep quality predict somatic symptom severity. Predictor variables were entered in three steps: Step 1: Post-traumatic stress symptoms; Step 2: Difficulties in emotion regulation and alexithymia; Step 3: Sleep quality.

**Table 3**

*Hierarchical regression predicting somatic symptom severity*

Step	Predictor	B	SE B	$\beta$	t	p
1	PTSD Symptoms	0.32	0.06	.61	7.02	<.001
2	Emotion Regulation	0.18	0.05	.34	3.60	.001
2	Alexithymia	0.14	0.05	.27	2.80	.007
3	Sleep Quality	0.21	0.07	.25	2.95	.005

*Model Summary:*

Step 1:  $R^2 = .37$ ,  $F(1,58) = 49.28$ ,  $p < .001$

Step 2:  $\Delta R^2 = .16$ ,  $F \text{ change}(2,56) = 9.85$ ,  $p < .001$

Step 3:  $\Delta R^2 = .05$ ,  $F \text{ change}(1,55) = 8.70$ ,  $p = .005$

Total  $R^2 = .58$ , Adjusted  $R^2 = .56$

As shown in Table 3, post-traumatic stress symptoms accounted for 37% of the variance in somatic symptom severity. Adding difficulties in emotion regulation and alexithymia in Step 2 significantly improved the model, explaining an additional 16% of variance. The inclusion of sleep quality in Step 3 accounted for an additional 5% of the variance. All predictors were statistically significant in the final model, with PTSD symptoms ( $\beta = .61$ ), emotion regulation difficulties ( $\beta = .34$ ), alexithymia ( $\beta = .27$ ), and poor sleep quality ( $\beta = .25$ ) uniquely contributing to higher somatic symptom severity.

Post-traumatic stress symptoms were the strongest predictor of somatic symptom severity among war-exposed adolescents. Difficulties in emotion regulation and alexithymia were significant contributors, indicating that impaired emotional processing mediates somatic distress. Poor sleep quality added incremental predictive value, highlighting its role in exacerbating physical complaints. The final model explained 58% of the variance in somatic symptom severity, suggesting a

robust combined effect of trauma-related psychological factors. These findings suggest that interventions targeting PTSD symptoms, emotional awareness and regulation, and sleep improvement may be effective in reducing somatic complaints in adolescents affected by war. The interrelated effects of psychological trauma, alexithymia, emotional dysregulation, and sleep disruption provide a comprehensive framework for understanding somatic symptom expression in this population.

### Discussion and Conclusion

The present study investigated the predictive contributions of post-traumatic stress symptom severity, difficulties in emotion regulation, alexithymia, and sleep quality to somatic symptom severity in adolescents aged 13–18 who were exposed to the recent Iran–Israel and US conflict beginning on February 28, 2026. The findings showed that all four variables

significantly predicted somatic symptom severity, with post-traumatic stress symptoms exhibiting the strongest effect, followed by emotion regulation difficulties, alexithymia, and poor sleep quality. Collectively, these predictors explained 58% of the variance in somatic symptoms, highlighting the substantial role of psychological and behavioral factors in somatic distress among war-affected adolescents.

The strong association between post-traumatic stress symptoms and somatic complaints aligns with prior research showing that trauma exposure and hyperarousal can amplify bodily symptom perception through heightened interoceptive sensitivity and prolonged activation of the hypothalamic–pituitary–adrenal axis (Burchell et al., 2023; Thabet & Ghannam, 2014). Adolescents exposed to ongoing conflict may experience chronic stress, which exacerbates both psychological and physical symptomatology (Pineros-Ortiz et al., 2021; Sharma et al., 2017). This suggests that post-traumatic stress is a central driver of somatic complaints and underscores the need for interventions targeting trauma-related symptoms.

Difficulties in emotion regulation were also significant predictors, consistent with evidence that impaired regulation prolongs physiological arousal and increases somatic symptom perception (Gross & Thompson, 2007; Weissman et al., 2019). Adolescents who struggle to identify, tolerate, and modulate negative affect may somaticize distress rather than process it adaptively, intensifying headaches, fatigue, and gastrointestinal complaints. Interventions that enhance emotional awareness and regulation may therefore directly reduce somatic burden.

Alexithymia significantly contributed to somatic symptom severity, supporting theoretical models in which limited emotional awareness leads to somatization (Bagby et al., 1994; Taylor & Bagby, 2021). Adolescents with high alexithymia may misinterpret emotional arousal as bodily discomfort, and conflict-related trauma may exacerbate these tendencies. These findings suggest that assessment of alexithymia is important in post-conflict adolescent populations, and that therapeutic approaches incorporating emotion identification skills could reduce somatic complaints.

Sleep quality emerged as a modest but significant predictor of somatic symptoms. Poor sleep has been associated with greater emotional reactivity, impaired

cognitive control, and heightened perception of bodily symptoms (Kobayashi et al., 2023; Lewis et al., 2020). Adolescents exposed to war may experience disrupted sleep due to ongoing stress, fear, and environmental instability, which may exacerbate physical symptoms. Addressing sleep disturbances in conjunction with psychological interventions may therefore be essential for holistic recovery.

Overall, these findings highlight the interrelated nature of trauma, emotional processing, and somatic expression. Interventions targeting PTSD symptoms, emotion regulation skills, alexithymia, and sleep may have synergistic effects in reducing somatic symptom severity. Clinicians and policymakers working with war-affected adolescents should consider integrated approaches that address both psychological and somatic domains to optimize health outcomes. Several limitations should be noted. First, the cross-sectional design precludes causal inference, and longitudinal research is needed to confirm temporal relationships. Second, reliance on self-report instruments may introduce response bias. Third, the study was conducted in Tehran and surrounding areas; findings may not generalize to adolescents in other regions or to those with different levels of trauma exposure. Finally, although the sample size was sufficient for regression analysis, larger studies are recommended to increase statistical power and generalizability.

### Conclusion

This study demonstrated that post-traumatic stress symptoms, difficulties in emotion regulation, alexithymia, and poor sleep quality significantly predict somatic symptom severity in adolescents exposed to the recent Iran–Israel and US conflict. Among these, post-traumatic stress symptoms were the strongest predictor, highlighting the central role of trauma in somatic distress. Emotional dysregulation and alexithymia further contribute to somatization, while poor sleep amplifies physical complaints. The findings underscore the importance of integrated interventions that simultaneously target trauma, emotional regulation, and sleep to reduce somatic symptom severity in war-affected adolescents. Early identification of adolescents at risk for severe somatic symptoms can inform psychosocial support programs, school-based interventions, and clinical services, ultimately improving

both psychological and physical health outcomes in this vulnerable population.

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### Declaration of Interest

The authors of this article declared no conflict of interest.

### Ethical Considerations

The study protocol adhered to the principles outlined in the Declaration of Helsinki, which provides guidelines for ethical research involving human participants. Ethical considerations in this study were that participation was entirely optional.

### Transparency of Data

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

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### Authors' Contributions

All authors equally contribute to this study.

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