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RESEARCH ARTICLE

Psychometric Properties of the Turkish Version of the Impact of Event Scale – 6

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ABSTRACT

Background: Natural disasters, such as the earthquake that occurred in Turkey on February 6, 2023, can lead to significant psychological distress, including post-traumatic stress disorder (PTSD). The Impact of Event Scale – 6 (IES-6), a short version of the revised Impact of Event Scale (IES-R), is a tool that has been validated in various populations for assessing PTSD symptoms following traumatic events. This study aims to evaluate the psychometric properties of the Turkish version of the IES-6 following the Kahramanmaraş earthquake.

Methods: A cross-sectional study was conducted with 220 earthquake survivors and 220 controls. Data were collected using a sociodemographic questionnaire and the IES-6 scale. Reliability was assessed using Cronbach's alpha coefficient, while validity was evaluated through exploratory and confirmatory factor analyses. Participants' responses were analyzed to assess the scale's internal consistency and factor structure.

Results: Exploratory factor analysis revealed that the Turkish IES-6 exhibited a unidimensional structure in both groups. Confirmatory factor analysis, after adjusting for error covariances, confirmed that the one-factor model had acceptable fit indices. The obtained Cronbach's alpha value indicated strong internal consistency. The total scores of the scale showed a high correlation between the groups ($r = 0.90$, $p < 0.001$).

Conclusion: The Turkish version of the IES-6 demonstrates strong psychometric properties, including valid factor structure and high reliability, making it an effective tool for assessing PTSD symptoms in populations affected by natural disasters. Future longitudinal studies examining the long-term psychological effects of trauma could contribute to a better understanding of trauma's impacts.

Keywords: Earthquakes, Impact of Event Scale, Psychometrics, Post-traumatic stress disorder

Introduction

Natural disasters are a significant global issue that affects millions of people each year, causing humanitarian, material, economic, or environmental losses, often occurring within a short or prolonged period.[1] Goldman and Galea (2014) note that between 13% and 19% of the adult population experiences some form of disaster during their lifetime.[2] On February 6, 2023, a powerful earthquake with a magnitude of 7.8 occurred in southeastern Turkey. Estimates suggest that the earthquakes have led to over 50,000 deaths, and tens of thousands of injuries, and displaced more than 216,000 individuals within the affected

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regions.[3] Following unpredictable events such as earthquakes, individuals may experience psychiatric symptoms that typically resolve spontaneously; however, these symptoms have the potential to persist, influenced by various individual factors.[4] It is also known that traumatic events can lead to the development of psychiatric disorders, including post-traumatic stress disorder (PTSD), depression, anxiety, and substance abuse.[5]

Assessing the risk of developing PTSD, one of the most common disorders following traumatic events such as natural disasters is crucial for predicting potential adverse health outcomes. In the literature, various assessment tools such as Post-traumatic Diagnostic Scale-5 (PDS-5), The Posttraumatic Stress Disorder Checklist-5 (PCL-5), The Clinician-Administered PTSD Scale for the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (CAPS-5), The International Trauma Questionnaire (ITQ), and Posttraumatic Stress Syndrome 10-Questions Inventory (PTSS-10) are available to screen for symptoms that may arise following trauma.[6–9] One such tool, the Impact of Event Scale (IES-R), provides significant value in evaluating stress resulting from various traumatic experiences across different populations and offers reliable assessments for both clinical research and intervention purposes.[10–13] However, the number of items on the scale may pose a limitation in assessing the level of post-traumatic symptoms in populations affected by large-scale traumatic events, such as natural disasters, as it could also create challenges in application, particularly in terms of time constraints and participant engagement. In this context, the IES-6, a six-item short form of the IES-R developed by Thoresen and colleagues[14], is valid and reliable in assessing PTSD symptoms in Norwegian and Welsh populations with experiences of trauma, natural disasters, and personal violence. Similarly, in a study by Jeong et al.[15] assessing the traumatic effects of the COVID-19 pandemic, the IES-6 was found to be valid in a population of adults in the United States. The IES-6 scale is not only distinguished by its brevity when compared with other scales found in the extant literature, but also its self-report nature renders it particularly well-suited for clinical and research applications.

The current study aims to assess the level of traumatic stress in individuals affected by the February 6th Kahramanmaraş earthquake and to examine the psychometric properties of the Turkish version of the Impact of Events Scale – 6 (IES-6).

Method

Participants: The study, designed as a cross-sectional investigation, involved a sample of 220 individuals who had experienced the February 6th Kahramanmaraş earthquake and 220 healthy volunteers, reached through social media and interpersonal messaging applications. It was assumed that the participants consented to the study by selecting the 'I agree' option, thereby acknowledging and accepting the informed consent form.

The present study consisted of two samples; *Sample 1* consisted of Turkish adult victims of the earthquake that occurred on 6 February 2023 in Kahramanmaraş (N = 220). Inclusion criteria for participation in the study were having experienced the earthquake of February 6 in one of the 11 provinces severely affected by the disaster and consenting to the informed consent form. Exclusion criteria included the presence of cognitive impairments that would prevent participation in the study and not being in the cities affected by the disaster during the event. The mean age of the participants was 34.9 years (SD = 10.86), with 36.8% of the participants being male (N = 81)

and 63.2% female (*N* = 139). 40.5% of the participants were single, whereas 54.5% were married, and 5% were specified as other. About the educational status of the participants, 23.2% have obtained a high school diploma, 57.3% hold a bachelor's degree, and 19.5% have completed a graduate program. The economic status of the participants was as follows: 19.5% reported an income that was less than their expenditure, 55.5% reported an income that was equal to their expenditure, and 25% reported an income that was greater than their expenditure. A total of 34.5% of the participants are currently unemployed, while 65.5% are employed.

Sample 2 consisted of a randomly selected cohort of Turkish adults (*N* = 220), to act as a control group for Sample 1. The mean age was 33.73 years (*SD* = 8.5), with 48.2% of the participants being male (*N* = 106) and 51.8% female (*N* = 114). *Sample 2* consisted of 41.8% single participants, 56.8% married participants, and 1.4% were specified as other participants. With regard to the educational status of the participants, 4.5% have obtained a high school diploma, 50.5% hold a bachelor's degree, and 45% have completed a graduate program. The economic status of the participants was as follows: 9.5% reported an income that was less than their expenditure, 40.9% reported an income that was equal to their expenditure, and 49.5% reported an income that was greater than their expenditure. A total of 34.5% of the participants are currently unemployed, while 65.0% are employed and .5% are specified as other participants.

Procedure: Ethical approval for the study was granted by the Toros University Scientific Research and Publication Ethics Committee under decision number 186, dated 21.11.2024. All procedures adhered to the principles of the Helsinki Declaration and ethical standards.

Participants initially completed a sociodemographic data form, which was developed by the researchers in accordance with the objectives of the study and relevant literature. The form included questions regarding participants' age, gender, educational level, marital status, economic status, and employment status. Following this, participants were asked to complete the IES-R to assess the severity of their reactions to stress-inducing life events. After the statistical analyses were conducted on the obtained data, appropriate reporting was carried out.

Measures

Impact of Events Scale – 6 (IES – 6): The original form of IES[16] and the revised version [17] (IES-R) was developed to assess traumatic stress symptoms. The revised form of the scale consists of 22 items designed to measure the principal components of posttraumatic stress disorder. The items are rated on a 5-point Likert scale ranging from 0 to 4, evaluating the severity of symptoms over the past 7 days. The Cronbach's alpha coefficient for internal consistency of the scale ranges from .90 to .92[17]. The IES-6 is a shortened version of the IES-R scale, consisting of 6 items. This version is particularly useful as an initial step for further assessment of PTSD diagnosis in individuals exhibiting significant traumatic stress symptoms. Similar to the IES-R, it uses a 5-point Likert scale, with the total possible score ranging from 0 to 24.[14]

Data Analysis

In the analysis, categorical variables were presented as frequencies and percentages, whereas continuous variables were expressed as the mean ± standard deviation. The validity and reliability of the brief measure of posttraumatic stress reactions (IES-6), a short form of the IES-R scale, were examined. To evaluate reliability, the internal consistency

coefficient and item-total correlations were calculated using SPSS version 28. Validity was assessed through exploratory and confirmatory factor analyses conducted with SPSS AMOS version 22.

Results

Findings of Exploratory Factor Analysis: Kaiser-Meyer-Olkin (KMO) test and a Barlett sphericity test were conducted to ascertain the suitability of the sample size for factor analysis for both samples. KMO sampling suitability coefficient was calculated as .81 in Sample 1 and .85 in Sample 2. Barlett's Test of Sphericity was significant for Sample 1 (χ^2 (15) = 471.760, p < .001) and Sample 2 (χ^2 (15) = 588.695, p < .001). The KMO value exceeding the minimum limit of .60[18] and Bartlett's Test of Sphericity $\chi 2$ value being significant demonstrates that the collected data are appropriate for factor analysis. The eigenvalues of ≥ 1 were previously employed for the interpretation of the number of factors within the data set. It was subsequently determined that the scale was in fact 1 factor with all loadings in both samples (Table 1.).

Table 1. Factor Loadings for Exploratory Factor Analysis of IES-6

Item No.	Items	Sample 1	Sample 2
		Factor 1	Factor 1
1	I thought about it when I didn't mean to	.83	.82
2	I felt watchful or on-guard	.73	.75
3	Other things kept making me think about it	.76	.83
4	I was aware that I still had a lot of feelings about it, but I didn't deal with them	.64	.76
5	I tried not to think about it	.72	.68
6	I had trouble concentrating	.74	.80

Findings of Confirmatory Factor Analysis: At this stage, the 6-item unidimensional model that constituted the theoretical basis of the original scale was taken as a reference and its factor properties were re-tested.

Sample 1

As a result of the CFA, the chi-square test of the model fit was (χ^2= 51.379, p <.001, RMSEA = .15, NFI = .89, GFI = .93, AGFI = .84, CFI = .91, TLI = .85) for Sample 1. The normed chi-square ($\chi 2$/df ratio) was 5.71. Since this value was considerably higher than the recommended value of 5[19], error covariance relationships were included in the items suggested by the Amos 22 program on theoretical grounds. Although the IES-6 scale was found to be one factored, the long form of the scale had 3 subscales and the IES-6 scale included 2 items from every subscale: intrusion (Items 1 and 3), avoidance (Items 4 and 5) and hyperarousal (Items 2 and 6). Error covariances were added between 2 items from each subscale and, the chi-square test of the model fit was (χ^2= 14.120, p <.001, RMSEA = .08, NFI = .97, GFI = .98, AGFI = .92, CFI = .98, TLI = .96) for Sample 1. The normed chi-square (χ^2/df ratio) was 2.35. The model can be found in Figure 1.

Sample 2

As a result of the CFA, the chi-square test of the model fit was (χ^2= 49.055, p <.001, RMSEA = .14, NFI = .92, GFI = .93, AGFI = .84, CFI = .93, TLI = .89). The normed chi-square ($\chi 2$/df ratio) was 5.45. Since this value was considerably higher than the recommended value of 5[19], error covariance relationships were included in the items suggested by the Amos 22 program on theoretical grounds. Although the IES-6 scale was found to be one factored, the long form of the scale had 3 subscales and the IES-6 scale included 2 items from every subscale: intrusion (Items 1 and 3), avoidance (Items 4 and 5) and hyperarousal (Items 2 and 6).

Table 2. Model Fit Indices for Confirmatory Factor Analysis of IES-6

Fit Indices	Sample 1	Sample 2
χ^2/df ratio	2.35	3.57
RMSEA	.08	.11
NFI	.97	.96
GFI	.98	.97
AGFI	.92	.89
CFI	.98	.97
TLI	.96	.93

Error covariances were added between 2 items from each subscale and, the chi-square test of the model fit was (χ^2= 21.441, p <.001, RMSEA = .11, NFI = .96, GFI = .97, AGFI = .89, CFI = .97, TLI = .93) for Sample 2. The normed chi-square (χ^2/df ratio) was 3.57. The model can be found in Figure 2. The comparison of the models can be found in Table 3.

Findings of Reliability Analysis

The Cronbach alpha score was found to be .83 for the IES-6 scale in Sample 1, and .87 for the IES-6 scale in Sample 2. In the item-total correlation, values of .30 and above are indicative of an accurate understanding of the items.[20] Upon examination of Table 2, it can be stated that the values exceed the .30 threshold, indicating that the items in the scale are effective and sufficient. The IES-6 sum scores for Sample 1 and Sample 2 were examined with a correlation analysis with Fisher's z scores confidence interval estimation r = 0.90, 95% CI [0.87, 0.92], p = .001.

Table 3. Corrected Item-Total Correlations of IES-6

Item No.	Items	Sample 1		Sample 2	
		Corrected Item-Total Correlations	Cronbach's Alpha if Item Deleted*	Corrected Item-Total Correlations	Cronbach's Alpha if Item Deleted*
1	I thought about it when I didn't mean to	.72	.78	.71	.83
2	I felt watchful or on-guard	.59	.81	.63	.85
3	Other things kept making me think about it	.62	.80	.72	.83
4	I was aware that I still had a lot of feelings about it, but I didn't deal with them	.51	.82	.66	.84
5	I tried not to think about it	.59	.81	.57	.86
6	I had trouble concentrating	.60	.81	.69	.84

*Cronbach's alpha for Sample 1 = .83, Cronbach's alpha for Sample 2 = .87.

Discussion

This study aims to assess the Turkish adaptation of the IES-6, a tool designed to evaluate the psychological impact of traumatic events. The IES-6 measures the effect of such events on individuals, serving both as a diagnostic aid and as a valuable instrument in research. Our findings indicate that the Turkish version of the scale demonstrates strong validity and reliability.

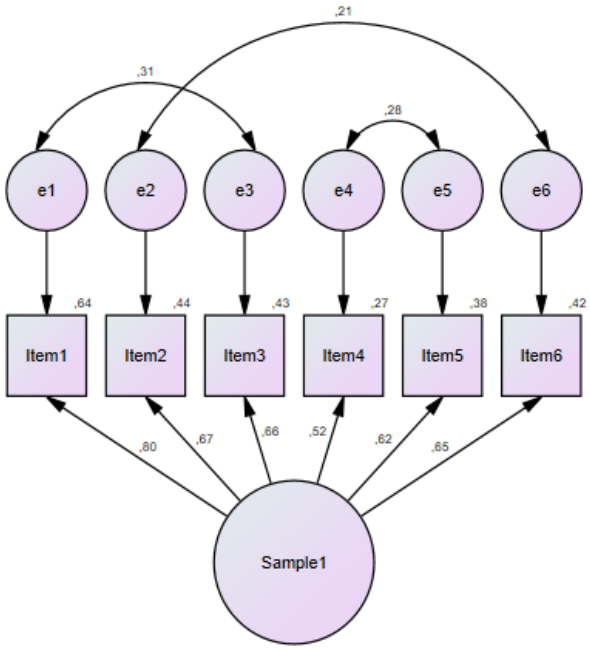

Figure 1. Confirmatory Factor Analysis for Sample 1

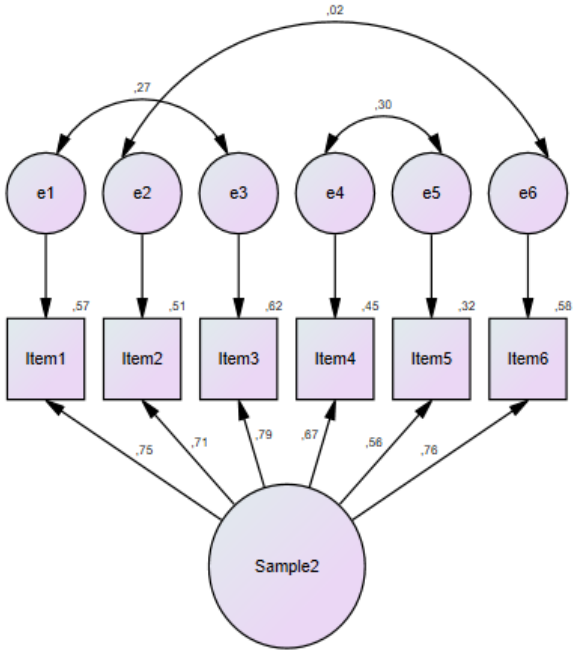

Figure 2. Confirmatory Factor Analysis for Sample 2

Consistent with prior research on the IES-6 [14–15], our exploratory factor analysis indicated a one-factor solution across both samples. Furthermore, confirmatory factor analysis (CFA) results corroborated these findings, as the one-factor model demonstrated satisfactory fit indices. However, incorporating error covariances among items within the same subscales of the IES-R significantly improved model fit, underscoring the relevance of the three-factor structure of the original scale. Additionally, the Turkish version of the IES-6 exhibited high Cronbach's alpha values, comparable to those reported for the U.S. and Italian versions of the scale[14,21], reflecting a strong level of internal consistency. Finally, unlike previous validity studies of the IES-6, which primarily focused on samples such as individuals affected by the COVID-19 pandemic or acute respiratory distress syndrome (ARDS) [15,22], the Turkish version of the IES-6 was validated using samples comprising both earthquake victims and non-victims. The results demonstrated that the scale is equally valid for assessing traumatic stress across these distinct groups.

There is a notable gap in brief measurement tools specifically designed to assess the psychological impact of traumatic events, particularly in societies where the prevalence of trauma-related stress is high. It is anticipated that this gap can be addressed by a Turkish version of the IES-6, a well-established scale with a solid theoretical foundation, demonstrating adequate internal consistency, factor structure, and content validity. The Turkish adaptation of the IES-6, with its optimal number of items, is expected to serve

as an effective instrument for both clinical assessments and research, providing reliable and valid measurements of the impact of traumatic events.

The findings of this study should be interpreted considering several limitations. Firstly, the sample size was relatively small, which may limit the generalizability of the results. Additionally, the cross-sectional nature of the study restricts our ability to infer causality or examine the long-term effects of trauma. Another limitation is the lack of information regarding the participants' prior traumatic experiences, which could have influenced their responses and the study's outcomes. Furthermore, the measurement tool employed in this study predominantly focused on symptoms of post-traumatic stress disorder (PTSD), whereas trauma may give rise to a broader spectrum of psychiatric symptoms, many of which were not captured by the scale. It should also be noted that the assessment was conducted approximately two years after the traumatic event, rather than immediately following the event, which may have impacted participants' recall of their experiences and emotional responses. Timing of the assessment also limited the possibility of testing predictive validity and test-retest reliability of the scale. Future research with larger sample sizes, longitudinal designs, and more comprehensive assessments of traumatic histories would be valuable in addressing these limitations and advancing our understanding of the long-term effects of trauma.

In conclusion, the findings indicate that the Turkish version of the IES-6 scale is a reliable and valid instrument for identifying clinically significant symptoms of PTSD within the Turkish population. This brief measure holds significant potential as a valuable tool for PTSD screening in both clinical settings and research follow-up assessments.

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