Araştırma / *Original article*

How does impact of objective and subjective disaster exposure relate to the three clusters of posttraumatic stress symptoms?*

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ABSTRACT

Objective: *Around the globe, millions of people are exposed to disasters annually. Disasters may result in a wide range of psychological consequences in adult populations, including posttraumatic stress symptoms (PTS). However, little is known about the effects of the impacts of type of disaster exposure on the symptoms of PTS. This study aimed to understand the effects of objective and subjective impact severity of disaster exposure on symptoms of PTS in the aftermath of two earthquakes which struck Van, Turkey in 2011.* ***Methods:*** *Three hundred and sixty earthquake survivors from districts with different levels of earthquake exposure participated in the study. Consistent with the aims of the study, the participants responded to the Impact of Event Scale-Revised and a measure of earthquake exposure severity. The relationship between symptom clusters and impact of disaster exposure was examined through a multivariate analysis of variance.* ***Results:*** *The findings demonstrated differential effects of type of disaster exposure severity on the symptom clusters of PTS, showing that the two core clusters, re-experiencing and avoidance, differentially related to levels of subjective and objective impact of disaster exposure while symptoms of hyperarousal were commonly reported in survivors who experienced high levels of impact irrespective of the type of exposure.* ***Discussion:*** *This study provided empirical evidence for an important distinction regarding impact of exposure between symptom clusters of PTSD. The findings may guide the development or planning of psychoeducation-based interventions with differential focus on posttraumatic stress symptoms for survivors having different levels of objective and/or subjective impact of exposure.* ***(Anatolian Journal of Psychiatry 2016; 17(3):209-213)***

Keywords: *earthquake, trauma, posttraumatic stress disorder*

Afete uğramanın öznel ve nesnel etkisi travma sonrası stresin üç belirti kümesi ile nasıl ilişkilidir?

ÖZ

Amaç: *Dünyada milyonlarca insan her yıl afetlerin etkilerine maruz kalmaktadır. Afetlerin yetişkinlerde travma sonrası stres (TSS) belirtileri de dahil olmak üzere çeşitli ruhsal sonuçları olmaktadır. Buna karşılık, afete uğrama biçiminin TSS belirti üzerindeki etkileri hakkında az şey bilinmektedir. Bu çalışma 2011 yılında Van, Türkiye'de yaşanan iki depremin sonrasında afete uğramanın öznel ve nesnel etki şiddetinin TSS belirtileri üzerindeki etkilerini anlamayı amaçlamıştır.* ***Yöntem:*** *Çalışmaya depreme farklı düzeylerde maruz kalmış bölgelerden deprem yaşamış 360 birey katılmıştır. Çalışmanın amaçları ile tutarlı olarak, katılımcılar Olayın Etkisi Ölçeği-Gözden Geçirilmiş Formuna ve deprem yaşama şiddetini incelemek üzere oluşturulmuş bir ölçeğe yanıt vermişlerdir. Belirti kümeleri ve afete uğramanın etkisi arasındaki ilişki çoklu varyans analizi yoluyla incelenmiştir.* ***Sonuçlar:*** *Bulgular afete*

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uğrama şiddetinin türünün TSS'nin belirti kümeleri üzerinde farklı etkilerinin olduğunu; iki belirti kümesi olarak yeniden yaşamanın ve kaçınmanın, afete uğramanın nesnel ve öznel etkilerinin düzeyleri ile farklı şekilde ilişkili olduğunu, buna karşın aşırı uyarılmışlık belirtilerinin maruz kalmanın türünden bağımsız olarak yüksek düzeyde etkilenen deprem yaşamış bireylerde yaygın olarak bildirildiğini göstermiştir. ***Tartışma:*** *Bu çalışma TSSB'nin belirti kümeleri arasında maruz kalmanın etkisi açısından önemli bir farklılık olduğuna yönelik kanıt sunmaktadır. Bulguların afete uğrayanlarda farklı düzeylerde görülen nesnel ve/veya öznel etki bildiren deprem yaşamış bireyler için travma sonrası stres belirtilerine ayrımlı olarak odaklanan ruhsal eğitim temelli girişimlerin geliştirilmesi veya planlanması için yol gösterebileceği düşünülmektedir.* ***(Anadolu Psikiyatri Derg 2016; 17(3):209-213)***

Anahtar sözcükler: *Deprem, travma, travma sonrası stres bozukluğu*

INTRODUCTION

Exposure to disasters is common, with millions of people affected annually. Disasters may result in a wide range of psychological consequences in adult populations, including posttraumatic stress (PTS) reactions. These include anxiety, flashbacks about the event, unwanted intrusive thoughts, avoidance of reminders, fear, anger, sadness, and problems of memory, concentration, sleep, and appetite.[1] In addition, posttraumatic stress disorder (PTSD) has shown to be quite common following potentially traumatic events, especially disasters. The prevalence of the disorder among individuals directly exposed to disasters was estimated to be around 40%, showing a significant increment over the rates in the general population (5-10%).[2-4]

Severity of disaster exposure is an important variable for understanding trauma-related psychological outcomes following disasters as epidemiological studies of PTSD have shown that disaster severity and level of exposure to disaster-related stressors such as injury or loss, rather than the type of disaster, were associated with PTSD.[5] Previous research on the severity of traumatic exposure focused on a combination of objective exposure variables such as proximity to the epicenter, specific aspects such as injury to self and close ones, loss of resources, exposure to victims, and subjective impact variables such as feelings of horror and helplessness; and experiences of exposed individuals and the degree of exposure and consequences were all shown to be associated with psychological outcomes of disasters.[6] Overall, studies investigating the relationship between exposure to disasters and psychological adjustment have reported a dose-response effect, whereby greater exposure was associated with higher levels of symptomatology.[2,6,7] So far, however, majority of those studies focusing on impact and severity of traumatic exposure seemed to solely investigate the relation of exposure to combined clusters of PTS; therefore, there has been little discussion about the effects of severity of objective and subjective indices of disaster exposure on specific PTS reactions.

This study aimed to understand the effects of objective and subjective impact of disaster exposure on the three clusters of posttraumatic stress reactions, namely hyperarousal, avoidance, and re-experiencing, in the aftermath of the two destructive earthquakes which struck Van, Turkey, in 2011, causing more than 600 casualties and around 2000 injured and ranking 5th worldwide among the top ten natural disasters by number of deaths.[8]

METHODS

Participants and procedure

The study involved data from 360 participants (50% women/men; mean age 33.94±12.70), recruited from pre-set districts with different levels of earthquake damage using quota sampling techniques.[9] Table 1 presents sociodemographic characteristics of the participants. Majority of the participants were born and lived most of their lives in Van (75%), married (63.3%), high school graduates (30.6%), unemployed (59.7%), and reported having medium level of income (53.9%).

Households in districts having different levels of earthquake damage were selected accidentally based on the availability of household members and volunteering for participation. Only one member in each household was set to be eligible to participate in the study. Upon contacting member(s) in a household, the interviewers introduced themselves and informed the potential participants about the scope and the purposes of the study.

This study was approved by the Applied Ethics Research Center of Middle East Technical University for research with human participants and the Governorate of Van prior to data collection.

Table 1. Sociodemographic characteristics of the participants

Variable	n	%
Marital status		
Single	125	34.7
Married	228	63.3
Divorced/Widow	7	1.9
Education level		
Illiterate	43	11.9
Literate	10	2.8
Primary school	89	24.7
Secondary school	35	9.7
High school	110	30.6
Vocational school	12	3.3
University	57	15.8
Graduate school	4	1.1
Employment status		
Employed	125	34.7
Unemployed	215	59.7
Retired	20	5.6
Income level		
Very low	27	7.5
Low	116	32.2
Medium	194	53.9
High	18	5.0
Very high	5	1.4

Materials

The participants responded to the Impact of Event Scale-Revised (IES-R)[10] in addition to a demographic information form and a measure of earthquake exposure severity. The IES-R assesses the impact of stressors on three major symptom dimensions, avoidance, re-experiencing, and hyperarousal. The IES-R was translated and adapted into Turkish by Corapcioglu and colleagues.[11] In the current study, Cronbach's alpha coefficients were 0.90 for the total scale, 0.87 for the hyperarousal subscale, 0.87 for the re-experiencing subscale, and 0.65 for the avoidance subscale.

Measure of earthquake exposure severity consisted of eleven 'yes/no' questions addressing the subjective and objective severity of earthquake impact from the earthquakes in Van, Turkey. These questions were formed on the basis of criterion A indicated for the diagnostic criteria for PTSD in DSM-IV-TR[12] for detailing what constitutes a traumatic event. The first part including four questions asked whether the participant thought her/his or a close one's life was threatened, felt helpless or experienced an intense fear or horror during the earthquake. The items corresponded to criterion A2 and labeled as 'subjective impact of exposure'. The second part included seven questions targeted at assessing objective impact severity. The questions asked the participant whether s/he experienced, witnessed, or was confronted with actual or threatened death or serious injury, or a threat to the physical integrity of self or others during the earthquake. The items corresponded to criterion A1 and labeled as 'objective impact of exposure'. Lower scores indicated lower subjective and objective severity of earthquake exposure. It was found that both scales for the assessment of subjective and objective impact severity had acceptable level of reliability, as shown by Cronbach's alpha coefficients of 0.64 and 0.61 respectively.

Data analysis

Prior to the main analyses, all data was checked for accuracy of data entry, missing values, existing outliers, and fit between the distributions of values and assumptions of analysis, namely normality, homogeneity of variances and covariances, and lack of collinearity. Examination of missing values revealed no missing values in the data; participants fully completed all of the measures. Data were then analyzed for univariate and multivariate outliers. No cases were found to be univariate outliers having extremely high z scores on measures in the study; however four cases were identified as multivariate outliers investigating Mahalanobis distance with $p<0.001$. Data from these four participants were excluded from the data set, leaving 356 participants to be included in further analyses.

Study variables were tested for normality through investigation of values of skewness and kurtosis and histograms. The impact of departure from zero kurtosis and skewness is known to diminish in cases where the sample size is large (>200);[13] therefore, high skewness and kurtosis values obtained for subjective disaster impact severity were ignored. Finally, variables were evaluated for multicollinearity and singularity, and none of the study variables were found to be highly correlated with each other, with r over 0.90.

In the study, analysis was performed using the IBM SPSS v20.0 Computer Software. After the inspection of the data and relevant data cleaning procedures, descriptive analyses were conducted to examine the characteristics of the participants and also descriptive information for study variables. Main analyses included multivariate analysis of variance (MANOVA) to examine the relationship between symptom clusters

and impact of disaster exposure.

RESULTS

A 2x2 between-subjects MANOVA was performed on three dependent variables: symptoms of re-experiencing, avoidance, hyperarousal. High and low levels on independent variables, namely objective and subjective impact of exposure, were computed using each scale's absolute midpoint. With the use of the Wilks' criterion, the combined DVs were significantly related to objective exposure, $F_{(3,350)}=3.76$, $p=0.011$, $\eta_p^2=0.031$, to subjective exposure, $F_{(3,350)}=6.19$, $p<0.001$, $\eta_p^2=0.05$, and to their interaction, $F_{(3,350)}=3.09$, $p=0.027$, $\eta_p^2=0.026$. Results of the multivariate test of significance are presented in Table 2.

Table 2. Multivariate tests of significance

Variables	Wilks' lambda	Symptoms of posttraumatic stress F	df	p	partial η2
Objective impact of exposure	0.97	3.76	3,350	0.011	0.031
Subjective impact of exposure	0.95	6.19	3,350	0.001	0.050
Objective*subjective impact of exposure	0.97	3.09	3,350	0.027	0.026

Since individual DVs were moderately correlated with each other, a Roy-Bargmann stepdown analysis was performed to investigate each main effect on the individual DVs. A unique contribution to predicting differences between survivors reporting high or low objective impact of exposure was made by avoidance, stepdown $F_{(1,352)}=6.80$, $p=0.009$, $\eta_p^2=0.019$, and hyperarousal, stepdown $F_{(1,352)}=5.42$, $p=0.021$, $\eta_p^2=0.015$. Post-hoc analysis using a Bonferroni type adjustment revealed that survivors reporting higher objective impact of exposure exhibited higher levels of hyperarousal (M=12.54, 95% CI [9.20, 15.87]) and avoidance (M=15.27, 95% CI [12.45, 18.09]) symptoms, but not re-experiencing, compared to survivors reporting lower levels of severity (M=8.39, 95% CI [7.31, 9.46] for hyperarousal; M=11.35, 95% CI [10.44, 12.25] for avoidance).

Re-experiencing and hyperarousal symptoms following the disaster varied significantly with the reported level of subjective impact of disaster exposure, with stepdown $F_{(1,352)}=16.41$, $p<0.001$, $\eta_p^2=0.045$, and stepdown $F_{(1,352)}=7.92$, $p=0.005$, $\eta_p^2=0.022$, respectively. Univariate comparison revealed that higher levels of subjective impact of disaster exposure were associated with more re-experiencing (M=18.47, 95% CI [16.49, 20.44]) and hyperarousal (M=12.97, 95% CI [11.33, 14.61]) symptoms than low levels of subjective impact (M=9.75, 95% CI [6.01, 13.49] for re-experiencing; M=7.95, 95% CI [4.85, 11.05] for hyperarousal). None of the symptom clusters varied significantly with the interaction term in univariate analyses.

DISCUSSION

The results showed that the two core symptom clusters of PTS, namely re-experiencing and avoidance, differentially related to levels of subjecttive and objective impact of disaster exposure. The survivors who experienced an actual threat to self or others predominantly reported avoidance symptoms, while survivors who report subjective fear, helplessness, etc. experienced symptoms of re-experiencing. On the other hand, hyperarousal symptoms were commonly reported in survivors who experienced high levels of impact irrespective of the type of exposure. This provides evidence for the suggested prominent role of hyperarousal in the course of PTSD[14] and also reflects the utility of examining symptom clusters of PTS, particularly in disaster contexts. Consistently, evolving conceptualizations of PTSD posit that it may be comprised of distinct symptom representations that are dependent on the individual and the trauma experience.[15]

Many studies provides empirical and theoretical support for the APA's elimination of the A2 stressor criterion of PTSD from DSM-5[16] and recommend the use of the subjective emotional response as an early predictor or screen for PTSD.[17,18] The current study provides evidence for the relative importance of subjective response to trauma, including emotions of fear, horror, and helplessness, especially for the re-experiencing symptom cluster of PTSD compared to the other clusters.

The findings of the current study may inform the

the development or planning of psychoeducation-based interventions for traumatized populations with differential focus on PTS symptoms for survivors having different levels of objective and/or subjective exposure, as the findings point out the unique role of subjective trauma perceptions for re-experiencing and the possible role of avoidance for psychological adjustment in the face of serious objective impacts. Following disasters, it is important to identify survivor groups requiring different kinds of psychosocial support and this requires a program for proper needs assessment in which individuals with psychosocial difficulties are assessed formally for their needs before any psychosocial intervention.[19] Furthermore, it is acknowledged that a multi-layered support system which responds to different needs of different groups should be developed to organize mental health and psychosocial support to traumatized populations.[20]

This study provides empirical evidence for an important distinction regarding impact of exposure between symptom clusters of PTSD. Nevertheless, further examination of potential factors mediating or moderating the relationship between exposure levels and PTS symptoms is warranted. Furthermore, the results may be specific to earthquakes thus a replication with other types of disasters is needed. Future studies need to focus on interactions between levels of exposure and other individual or disaster-related factors and their effects on post-disaster symptomatology to better understand the nature of the effects observed in this study.

Authors' contributions: *All authors contributed to the design of the study and the development of methodology. G.I. and C.D. collected the data. G.I. performed the statistical analysis and wrote the manuscript. All authors read and confirmed the final version of manuscript before submission.*

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