

The Effect of Traumatic Loss on Posttraumatic Growth Among 2011 Van Earthquake Survivors: The Mediating Role of Posttraumatic Stress

ABSTRACT

Objective: Posttraumatic growth (PTG), defined as a positive change after a traumatic event, has become the subject of various studies, and its relationship with posttraumatic stress symptoms (PTSS) has been extensively investigated. However, studies have indicated differences in the relationship between PTG and PTSS. Therefore, this study aimed to investigate the mediating role of PTSS in the relationship between the number of traumatic losses and PTG among the 2011 Van earthquake survivors.

Methods: The sample of this study consisted of 917 participants who experienced the 2011 Van earthquake. A personal information form, impact of event scale-revised (IES-R), and posttraumatic growth inventory (PTGI) were used as data collection tools.

Results: Survivors with traumatic loss were found to have higher PTSS and PTG than survivors without traumatic loss. The mean scores of the PTGI subscales were higher among survivors with traumatic loss except for changes in self-perception. A positive correlation was found between IES-R and PTGI total scores. In the regression analysis, it was found that PTSS played a mediating role in the relationship between the number of traumatic losses and PTG.

Conclusion: This study revealed that PTG is possible with the presence of PTSS. Mental health professionals assisting survivors with traumatic loss should take the enhancement of PTG into consideration in addition to their efforts to reduce PTSS.

Keywords: Posttraumatic growth, posttraumatic stress disorder, earthquakes

Introduction

Earthquakes are serious traumatic events characterized by unpredictability and destructiveness and cause a severe psychological¹ and physical² impact on survivors. Like other serious traumatic life events,³⁻⁵ the most common mental health consequence of earthquakes is the posttraumatic stress disorder (PTSD).^{6,7} Higher exposure to specific events associated with earthquakes, such as being trapped under rubble, physical injury, loss of a significant other, and witnessing the death of others, are associated with an increase in PTSD symptomology.⁸

Exposure to a natural disaster in combination with the loss of a significant other was found to be associated with an increase in PTSD symptomology.⁹ The loss of a significant other during an earthquake can be defined as a traumatic loss, which includes specific elements such as (1) suddenness and unpredictability; (2) violence, mutilation, and destruction; (3) preventability and/or randomness; and (4) multiple deaths in addition to the mourner's personal encounter with death, where there is either a significant threat to personal survival or a massive and/or shocking confrontation with death and mutilation of others.¹⁰ Survivors of a traumatic event who experience a traumatic loss are expected to suffer more chronic PTSD,¹¹ because they have to cope with both simultaneously. Kristensen et al¹² found that the prevalence of PTSD was higher among bereaved survivors six years



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Received: September 16, 2020
Accepted: November 2, 2020
Published Online: March 18, 2021

Cite this article as: Şenyüz S, Ergün D, Çakıcı E. The effect of traumatic loss on posttraumatic growth among 2011 Van earthquake survivors: the mediating role of posttraumatic stress. *Alpha Psychiatry*. 2021;22(2):79-84.



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after the 2004 Tsunami. The results of a follow-up study showed that loss of a significant other was a continuum risk factor for PTSD, six months, two years, and three years after the earthquake among survivors.¹³

Despite the negative impact of traumatic events on mental health, positive adaptation¹⁴ and growth were also identified among survivors after various types of traumatic events.¹⁵⁻¹⁸ In the past decade, there has been an increase in the number of studies that emphasize positive growth after a traumatic event.¹⁹ PTG is defined as “the experience of positive change that occurs as a result of the struggle with highly challenging life crises.”²⁰ It has been found that individuals exposed to trauma experience more positive change than those who do not.²⁰ Essentially, the presence of trauma does not lead to growth, because survivors suffer in their lives in the aftermath of trauma.²¹ Dekel et al²² found that survivors with PTSD had higher PTG over time than those without PTSD, and PTG was facilitated and maintained by PTSD.

Previous studies have revealed an inconsistent relationship between PTSD and PTG. Among earthquake survivors, a positive correlation,¹⁶ negative correlation,²³ and curvilinear relationship have all been found between PTSD symptom severity and PTG.²⁴ Moreover, Michélsen et al.¹⁷ found that those experiencing a threat to life and bereavement had higher PTG scores and PTSS was 1 of the mediating factors for PTG among survivors of the 2004 tsunami.

In Turkey, studies on earthquake survivors focus on the negative consequences, PTSD in particular.^{25,26} There are limited studies that have investigated positive outcomes, particularly posttraumatic growth among earthquake survivors in Turkey. Karanci and Acartürk²⁷ found that survivors of area severely damaged by the Marmara earthquake reported higher growth. Resilience score was positively correlated with PTSS among survivors of the 2011 Van earthquake and authors mentioned that resilience may have similar characteristics to PTG.²⁸ This study aims to investigate the mediating role of PTSS in the relationship between the number of traumatic losses and PTG among survivors of the 2011 Van earthquake.

Methods

Sample

This study is a household study and a cross-sectional design was used. The universe of the study consisted of survivors who experienced the 2011 Van earthquake. The earthquakes in Van-Erciş and Van-Edremit in 2011 caused 644 deaths, and 1974 people were se-

riously injured or became physically ill.²⁹ The inclusion criteria of the current study were experience of the 2011 Van earthquake and being aged 18 years or older. Random sampling was used, which enabled a total of 1080 participants to be reached, of whom 113 (10.9%) were not included in the analysis, because they did not meet the criteria or their questionnaires were incomplete. Hence, the final sample of this study included 917 survivors.

Instruments

Personal Information Form: The personal information form is divided into two parts. The first section of this form includes questions to determine the sociodemographic characteristics of the participants, such as sex, age, education level, marital status, and monthly income. The second part consists of five questions requiring a yes/no response. Traumatic loss was assessed by asking whether or not the participant lost a significant other because of the 2011 Van earthquake. The degree of closeness with the lost person was determined by questions such as, “Did you lose a close family member? Like a child, spouse,” “Did you lose a family member? Like a mother, father, sibling,” “Did you lose any relatives? Like uncle, aunt,” “Did you lose your friends, neighbors?”

Impact of Event Scale-Revised (IES-R): This scale was developed to measure the stress level of individuals when confronted by traumatic events.²⁷ The 5-point Likert-type scale includes 22 questions, 3 subscales (re-experience, avoidance, and hyperarousal) and the Cronbach’s alpha value is .93.³⁰ High scores on the scale indicate high traumatic stress. The Turkish validity and reliability study of the scale was conducted by Çorapçioğlu et al³¹ and the Cronbach’s alpha value of the total score of the scale was found to be .93. In this study, the Turkish form was used, and the Cronbach’s alpha value was found to be .90.

Posttraumatic Growth Inventory (PTGI): PTGI was developed to measure positive changes in the individual after traumatic experiences.²¹ In this study, the Turkish adaptation version was used.³² There are 21 questions in the inventory that are scored between 0-5. High scores indicate high growth after the traumatic event. In the Turkish validity and reliability study, there are three subscales (self-perception, life philosophy, and relationship with others) and the Cronbach’s alpha value for the whole scale was found to be .92.³² The Cronbach’s alpha value in this study was .88.

Procedure

Ethical approval for this study was obtained from the Social Sciences Ethics Committee of Near East University on April 17, 2019 (Approval number: 2019/415). The purpose of the study was explained to the participants and informed consent was obtained. Participants were reached in their homes and only one participant was recruited from each household between May and July 2019. The questionnaires were distributed in the center of the city of Van and its district Erciş, which was the epicenter of the earthquake.

Statistical Analysis

Data were analyzed by using SPSS version 21 (IBM Corp.; Armonk, NY, USA). The characteristics of the participants were shown by using descriptive statistics. Independent samples *t* test was used for comparing the IES-R and PTG scores between survivors with loss and those without loss. The correlation analysis between scales was performed

MAIN POINTS

- *PTSS plays a mediating role in the relationship between the number of traumatic losses and PTG among survivors of the Van earthquake.*
- *PTSS and PTG were found higher among survivors with traumatic loss than survivors without traumatic loss.*
- *Changes in the philosophy of life and changes in the relationship subscales of PTGI were found higher among survivors with traumatic loss.*
- *It was suggested that mental health professionals assisting survivors with traumatic loss should focus on enhancing PTG.*

Table 1. Sociodemographic Characteristics of Sample

		N (%)
Age, mean (SD), range		35.5 (12.91), (18-69)
Gender	Female	506 (55.2)
	Male	411 (44.8)
Educational level	Illiterate	43 (4.7)
	Primary	77 (8.4)
	Middle	94 (10.3)
	High	434 (47.3)
	University and over	269 (29.3)
Marital status	Married	406 (44.3)
	Single	425 (46.3)
	Divorced	31 (3.4)
	Spouse deceased	55 (6.0)
Monthly income	2020 TL-below	255 (27.8)
	2500-3500 TL	225 (24.6)
	3501-4500 TL	170 (18.6)
	4501-5000 TL	120 (13.1)
	5001 and over TL	146 (15.9)

with Pearson correlation analysis. Linear regression analysis was used to examine the mediating role of PTSS in the relationship between the number of traumatic losses and PTG.

Results

The mean age of the sample was 35.5 (SD = 12.91) years (range: 18-69), 55.2% were women, and most of the participants (76.6%) had graduated from high school or above, 67.9% lived in a nuclear family, and 52.4% reported having a monthly income of 3500 TL and below (Table 1).

A total of 496 (54.1%) reported experiencing traumatic loss during the 2011 Van earthquake, of whom, 101 (11%) lost a very close family member, 145 (15.8%) lost a family member, 203 (22.1%) lost their relative, and 204 (22.2%) lost a friend or neighbor.

The survivors with traumatic loss and those without traumatic loss differed in terms of the total mean score of IES-R in addition to the re-experience subscale, avoidance subscale, and hyperarousal subscale of IES-R. There were significant differences between survivors

Table 2. Comparison of the Total Mean Score of IES-R and Subscales and PTGI and Subscales Between Survivors with Traumatic Loss and Those Without

	Survivors with traumatic loss, mean (SD)	Survivors without traumatic loss, mean (SD)	t	P ^a
IES-R	41.58 (17.17)	31.58 (16.45)	-8.01	< .001
Reexperience	15.61 (7.24)	11.77 (6.94)	-8.12	< .001
Avoidance	14.99 (6.59)	12.80 (6.41)	-5.06	< .001
Hyperarousal	10.99 (5.65)	8.06 (5.38)	-7.98	< .001
PTG	59.64 (17.17)	55.03 (19.80)	-3.76	< .001
Changes in self-perception	29.94 (8.96)	29.01 (10.29)	-1.46	.144
Changes in philosophy of life	16.40 (6.32)	14.84 (6.73)	-3.61	< .001
Changes in relationship	13.30 (5.37)	11.19 (5.95)	-5.61	< .001

Abbreviations: IES-R, Impact of Event Scale-Revised; PTGI, Posttraumatic Growth Inventory.

^aIndependent samples t-test.

Table 3. Correlation Between the Number of Traumatic Losses, the IES-R Total and Subscale Scores, and the PTGI Total Scores and Subscale Scores

	1	2	3	4	5	6	7	8	9
1. The number of traumatic losses	1	0.33 ^a	0.32 ^a	0.24 ^a	0.33 ^a	0.15 ^a	0.057	0.16 ^a	0.19
2. IES-R		1	0.90 ^a	0.85 ^a	0.90 ^a	0.38 ^a	0.29 ^a	0.33 ^a	0.36
3. Reexperience			1	0.61 ^a	0.77 ^a	0.35 ^a	0.28 ^a	0.30 ^a	0.33 ^a
4. Avoidance				1	0.66 ^a	0.33 ^a	0.26 ^a	0.29 ^a	0.31 ^a
5. Hyperarousal					1	0.32 ^a	0.24 ^a	0.29 ^a	0.31 ^a
6. PTGI						1	0.90 ^a	0.83 ^a	0.79 ^a
7. Changes in self-perception							1	0.59 ^a	0.55 ^a
8. Changes in philosophy of life								1	0.54 ^a
9. Changes in relationship									1

Abbreviations: IES-R, Impact of Event Scale-Revised; PTGI, posttraumatic growth inventory.

^aP < .001.

Table 4. Mediating Role of PTSS in the Relationship Between the Number of Traumatic Losses and PTG

	B	SE	β	t	P	AdjR ²	F	P
1. The number of traumatic losses → PTSS	7.298	0.69	0.331	10.61	< .001	0.11	112.64	< .001
2. The number of traumatic losses → PTGI	3.436	0.76	0.147	4.48	< .001	0.02	20.04	< .001
3. The number of traumatic losses, PTSS, PTGI						0.14	74.65	< .001
The number of traumatic losses → PTGI	0.592	0.76	0.025	0.78	.437			
PTSS → PTGI	0.390	0.03	0.367	11.25	< .001			

Abbreviations: PTSS, Posttraumatic Stress Symptoms; PTG, Posttraumatic Growth Inventory.

with traumatic loss and those without traumatic loss in terms of PTGI total mean score, changes in the philosophy of life, and changes in the relationship subscale of PTGI except for changes in self-perception. The survivors with traumatic loss had higher PTSS and PTG scores (Table 2).

A positive moderate correlation was found between the number of traumatic losses and the score of IES-R and its subscales. PTGI and its changes in the philosophy of life and changes in the relationship had a positive low correlation with the number of traumatic losses, but there was no correlation with changes in self-perception (Table 3).

To examine the mediating role of PTSS on the relation between traumatic loss and PTG, a regression analysis was performed. In the first step, the direct effect of the number of traumatic losses on PTSS was analyzed. It was found that the number of traumatic losses predicted PTSS significantly and positively. The second step examined the direct effect of the number of traumatic losses on PTG, and it was found to predict it in a significant and positive way. In the final step, the effect of both the number of traumatic losses and PTSS on PTG was examined. It was found that the effect of PTSS was statistically significant, whereas the effect of the number of traumatic losses was not significant. Therefore, PTSS was a mediator on the effect of the number of traumatic losses on PTG (Table 4).

Discussion

This study aims to investigate the mediating role of PTSS in the relationship between the number of traumatic losses and PTG among survivors of the 2011 Van earthquake. Survivors with traumatic loss were found to have higher PTS symptoms than those without traumatic loss in the current study. Higher levels of earthquake-specific events have been associated with higher PTSS and loss of a significant other was one of the traumatic events that had a higher negative impact on mental health.³³ Kvestad et al³⁴ found that bereaved mothers had a higher level of PTSS than nonbereaved mothers in Nepal.

Survivors with traumatic loss were found to have higher PTG than those without loss in this study. Previous studies also indicated that exposure to more earthquake-specific events, including the loss of a significant other, were also associated with greater PTG.^{16,35} Considering the subscales of PTG, survivors with traumatic loss had higher growth in terms of relationships with others and life philosophy in this study. Loss may increase the importance of people in a bereaved survivor's life or they may feel close to others who experience a similar traumatic event and the experience of loss may lead to the understanding of themselves as a mortal human being.³⁶ In contrast, the PTG subscale of changes in self-perception did not differ between survivors with traumatic loss and those without loss in this study. This finding can be interpreted independently from the loss experience, as both groups surviving after being exposed to the destructive nature of the earthquake might have enabled individuals to perceive themselves as a survivor, which led to increased personal strength among both groups.

In this study, it was found that an increase in the struggle with the traumatic loss by re-experience, avoidance, and hyperarousal leads

to an increase in PTG. This finding is in line with previous studies.^{16,37-39} However, Meng et al²³ found that PTSD and PTG were negatively correlated, whereas resilience was positively correlated with PTG. Moreover, the results of a meta-analytic study indicated that the direction and strength of the correlation between PTG and PTSD depend on the nature of the traumatic event.²⁴

The main finding of this study showed that PTSS plays a mediating role in the relationship between the number of traumatic losses and PTG. This finding is corroborated by similar studies.^{17,40}

Seo and Lee⁴⁰ found a fully mediating role of PTSD in the relationship between the level of exposure to earthquake-specific events and PTG among earthquake survivors without loss. Tedeschi and Colhoun²⁰ determined that growth is not only a direct result of a traumatic event but survivors also need to struggle with the new reality after a traumatic event. PTSS, as a consequence of traumatic loss, may play a role in struggling. This struggling process will provide cognitive reconstruction, which enables survivors to adapt to new conditions and develop a structure that increases their resilience for future events.

This study has some limitations. The sample included survivors from the center of Van and Erciş province and, therefore, does not represent all survivors of the 2011 Van earthquake. A self-report questionnaire was administered; hence, participants may have responded in a socially acceptable way. Data were collected in the daytime and this may have caused overrepresentation of some groups like housewives or retirees. The study was conducted 8 years after the Van earthquake, therefore the results of this study cannot be representative of the earlier period after the earthquake. Owing to the cross-sectional design of the study, a cause and effect relationship cannot be established between traumatic loss, PTSS, and PTG. Further investigations may use a longitudinal study design to understand the impact of PTSS on the relationship between traumatic events and PGD over time. In addition, studies might consider previous life events, particularly losses and mental health conditions of survivors before the earthquake.

Despite these limitations, the findings of this study contribute to the literature as only a limited number of studies have investigated the mediating role of PTSS on the development of PTG among earthquake survivors. These findings are also thought to be beneficial for psychological interventions and the recovery process after disaster-related traumatic events. The results of the study suggest that mental health professionals assisting survivors with traumatic loss should focus on enhancing PTG besides focusing on reducing PTSS.

Ethics Committee Approval: Ethics committee approval was received for this study from the Social Sciences Ethics Committee of Near East University (Approval Date: April 17, 2019; Approval Number: 2019/415).

Informed Consent: Informed consent was obtained from the individuals who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - S.Ş., D.E.; Design - S.Ş., D.E., E.Ç.; Supervision - S.Ş., D.E., E.Ç.; Resource - S.Ş., D.E., E.Ç.; Materials - S.Ş., D.E.; Data

collection and/or Processing - S.Ş.; Analysis and/or interpretation - S.Ş., D.E., E.Ç.; Literature review - S.Ş., D.E., E.Ç.; Writing - S.Ş., D.E., E.Ç.; Critical review - D.E., E.Ç.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

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