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Effectiveness of Religiously Adapted Brief Cognitive-Behavioral Therapy in Reducing Post-Traumatic Stress Disorder Symptoms After an Earthquake: A Quasi-Experimental Study*

Taha Burak Toprak[1,3] · **Hanne Nur Özçelik**[1,2,3] · **Hatice Rumeysa Işık**[2,3]

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Abstract

Earthquakes are considered one of the most life-threatening natural disasters. They can lead to a wide range of psychological distress and psychopathology across society; thus, individuals exposed to such disasters are at risk of acute stress disorder and post-traumatic stress disorder (PTSD). In recent years, numerous studies have examined the positive contributions of religion-integrated treatments to the recovery process. Based on this premise, the present study investigated whether the Religiously Adapted Brief Cognitive-Behavioral Therapy program is effective in reducing post-traumatic stress symptoms in individuals affected by earthquakes. In this quasi-experimental study, 24 individuals with post-traumatic stress symptoms were divided into two non-randomized groups: an experimental group and a control group. A 2.5-week marathon intervention program consisting of five sessions was administered to the participants, which was developed in consultation with clergy and trauma specialists. The results showed a statistically significant decrease in PTSD levels in the experimental group compared to the control group at post-test measurement. Both groups exhibited a significant reduction in trauma-related cognitions. These findings provided evidence that the religion-integrated brief intervention program significantly alters PTSD symptoms and maladaptive cognitions. The results further suggested that developing brief, time- and resource-efficient treatments may be a worthwhile endeavor and that religiously sensitive interventions could serve as an alternative early intervention to alleviate and prevent the development of PTSD symptoms.

Keywords Post-traumatic stress symptoms · Earthquake · Religious-adapted cognitive behavioral therapy · Brief intervention

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Extended author information available on the last page of the article

Introduction

On February 06, 2023, two earthquakes of Mw 7.7 and Mw 7.6 magnitude occurred at 4.17 and 13.24 Turkish time with epicenters in Pazarcık (Kahramanmaraş) and Elbistan (Kahramanmaraş), respectively. The earthquake affected an area of 108,812 km^2, covering 11 provinces in the Eastern and Southeastern Anatolia Region. Both earthquakes were felt very strongly in Kahramanmaraş, Hatay, Adıyaman, Gaziantep, Malatya, Kilis, Diyarbakır, Adana, Osmaniye, Şanlıurfa, and Elazığ, causing heavy damage and loss of life. Following the earthquakes, 11,020 aftershocks occurred, and 45,089 people died (Disaster and Emergency Management Presidency (AFAD), 2023).

Earthquakes were recognized as one of the most life-threatening, destructive, and uncontrollable of the many types of natural disasters (Farooqui et al., 2017; Gautschi et al., 2008) and can be a harbinger of community-wide psychological distress, psychopathology, and traumatic grief (Shultz et al., 2011). Moreover, disaster survivors are at risk for acute stress disorder, depression, and PTSD (Fullerton et al., 2004). The first reaction during traumatic events is acute stress disorder (Benight & Harper, 2002). According to DSM-5, acute stress disorder (ASD) is a condition that may occur immediately after exposure to a traumatic stressor and affect functionality. It is similar to PTSD and is characterized by symptoms such as intrusive thoughts, hyperarousal, and avoidance of situations that remind one of the traumatic event. However, it does not last longer than 4 weeks. It may also include dissociation components such as depersonalization and derealization. If these symptoms last longer than 4 weeks, it is called post-traumatic stress disorder (American Psychiatric Association, 2013). ASD appears to be the first trauma reaction that predicts post-traumatic stress disorder, and this suggests that people with ASD are at risk for developing PTSD (Bryant & Harvey, 2002; Bryant et al., 2000). Studies generally report a prevalence of PTSD ranging from 5 to 60% in the first 1–2 years after a disaster (Galea et al., 2005). PTSD is associated with severe dysfunction and significant economic and social difficulties (Brady et al., 2000; Kessler et al., 2005). Therefore, various treatments have been developed to alleviate the psychological burden associated with PTSD (Walser & Westrup, 2007).

Studies have shown that the most effective methods in the treatment of PTSD are eye movement desensitization and reprocessing (EMDR) and trauma-focused cognitive behavioral therapy (TF-CBT) (Lewis et al., 2020; Mavranezouli et al., 2020). However, the American Psychological Association (APA) provided a conditional recommendation for Eye Movement Desensitization and Reprocessing (EMDR), citing the insufficient strength of evidence supporting its effectiveness. In contrast, cognitive behavioral therapy (CBT) received a firm and primary recommendation from the APA (American Psychological Association, 2023, July 24). Cognitive behavioral therapy has also been effective (Qureshi et al., 2021) and long-lasting (Weber et al., 2021). In a study aiming to determine for whom CBT is effective with machine learning, OCD and PTSD were concluded to be the disorders for which CBT is the most effective method (Vieira et al., 2022).

An increasing number of trauma-specific culturally sensitive CBT interventions have also been shown to be effective, and it has been discussed how post-traumatic cultural group-specific assessment, psychoeducation, normalization, restructuring of catastrophizing interpretations, attention control, and exposure can be adapted to the culture in these interventions (Acarturk et al., 2019; Jalal et al., 2017, 2018). In addition to adapting interventions, therapists are encouraged to approach clients with cultural humility (Fisher-Borne et al., 2015; Garcia et al., 2023). Religion, which is considered a form of culture encompassing a range of beliefs, practices, values, moral codes, symbols, and artifacts (Cohen, 2009), is closely related to mental health. Evidence for the effectiveness of religiously integrated psychotherapies for religious patients is growing rapidly (Bentley et al., 2021; Levin & Chatters, 1998; Zoellner et al., 2018).

Religious interventions in psychotherapy can be effective by teaching spiritual concepts, encouraging reflection concerning sacred texts, emphasizing forgiveness, and incorporating religious community resources into the process (Martinez et al., 2007). Religion-adapted interventions are particularly beneficial because they are compatible with clients' cultural and religious values, increasing their engagement and acceptance of therapy (de Abreu Costa & Moreira-Almeida, 2021; Zoellner et al., 2018).

Integrating religious examples, such as the lives of the prophets, allows cognitive restructuring of trauma through a familiar and meaningful framework. For example, narratives about the resilience of the prophets Job and Joseph help individuals reframe their traumatic experiences as part of a divine test, which promotes post-traumatic growth and reduces feelings of helplessness (Bentley et al., 2021). In addition to cognitive restructuring, religiously adapted interventions incorporate spiritual practices such as prayer as a form of emotional processing. In the Islamic Trauma Recovery program, participants turn to Allah for their trauma by making "Dua" (supplication), which serves as a form of imaginal exposure. This practice helps individuals feel spiritually supported while confronting painful memories. This promotes emotional regulation and reduces avoidance behaviors often seen in PTSD (Zoellner et al., 2018). Furthermore, conducting interventions in mosques increases social support, reduces isolation, and helps normalize trauma-related responses that are often stigmatized in religious communities (Bentley et al., 2021). Research also highlights the importance of addressing spiritual distress, such as abandonment by God or moral injury, which can exacerbate PTSD symptoms. Spiritually focused interventions help individuals resolve these internal conflicts by providing a religious framework that facilitates forgiveness, meaning-making, and emotional healing (Harris et al., 2021). This suggests that spiritual practices act as a protective buffer, enabling individuals to cope with trauma more effectively and supporting long-term psychological healing (Bowland et al., 2012; Oman & Bormann, 2015). Religiously and spiritually integrated interventions can also alleviate distress associated with psychological confusion or guilt by helping individuals explore existential questions in line with their beliefs (Işık & Toprak, 2024; Smothers & Koenig, 2018).

Although existing treatment methods are effective in alleviating PTSD symptoms, difficulties in accessing treatment or a slow flow of treatment services (Kazlauskas et al., 2016) and dropouts due to prolonged treatment durations (Imel et al., 2013)

may lead to fewer people benefiting from therapy. For this reason, it is suggested that developing brief, time- and resource-efficient treatments is a crucial endeavor (Stavland et al., 2021). Consistent with this, there are many studies in the literature suggesting that brief treatments of 3–6 sessions can prevent post-traumatic stress symptoms due to various factors (Cordova et al., 2003; Hickling et al., 2005; Kangas et al., 2014; Messman-Moore & Resick, 2002; Steenkamp et al., 2011; Thompson-Hollands et al., 2021; Zoellner et al., 2022).

In this context, our study was critical because it included CBT, the most effective treatment; it can be applied quickly and appropriately regarding cultural-religious sensitivity.

Accordingly, this study aimed to test the effectiveness of A Brief Intervention of Religious-Adapted Cognitive Behavioral Therapy on Muslim clients who directly experience post-traumatic stress symptoms after the earthquake.

Method

Participants

The sample of the study consisted of volunteers who have directly experienced and been affected by the earthquake disaster that occurred on February 6, 2023, and affected 11 provinces and 1 district of our country (Adana, Adıyaman, Diyarbakır, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye, Şanlıurfa, Elâzığ, and Gürün district of Sivas). The participants were willing to benefit from psychological support services and accepted to participate in the research and religious intervention.

Initially, a total of 31 individuals applied to participate in the study. These applicants were contacted individually by phone by a psychologist who did not serve as a therapist in the study. As a result of these consultations, one person decided to withdraw from receiving support, one declined to participate due to school and exam obligations, one indicated that they no longer needed support, and one could not be reached. Consequently, 26 participants were included in the study. Participants were non-randomly assigned to experimental and control groups based on their preference to start treatment during Ramadan, a sacred month for Muslims during which they fasted and devoted more time to religious practices. Those who preferred to begin treatment after Ramadan were assigned to the control (waiting) group, while those who opted to start during Ramadan were assigned to the experimental group. Following this, participants were provided with detailed information about the study process. During these consultations, it was discovered that one participant had been diagnosed with bipolar disorder, another was receiving therapy elsewhere, one was under the age of 18, and one could not be reached. As a result, four participants were excluded from the study. At this stage, there were 11 participants (10 female, 1 male) in the experimental group and 11 participants (all female) in the control group, totaling 22 participants.

One participant withdrew after the first session, stating that they no longer needed the intervention, another did not begin the program due to returning to the

earthquake-affected region and prioritizing other needs; and a third participant did not attend the final session and could not be reached. Additionally, five participants had missing follow-up data during the 1-year follow-up after the completed intervention program. Therefore, two participants (approximately 9%) discontinued treatment during the active intervention phase, and five participants, while completing the intervention, were excluded due to missing follow-up data. As a result of these factors, 14 participants completed the study, with 7 in the experimental group and 7 in the control group.

Inclusion/Exclusion Criteria

On February 21, 2023, a form was shared via a social media announcement for individuals who had directly experienced the earthquake and were struggling psychologically. Participants were identified through this survey form, which included an Informed Consent Form, Sociodemographic Information Form, and the DSM-5 Acute Stress Disorder Symptom Severity Scale. Additional criteria for inclusion in the study were having directly experienced the earthquake, being between the ages of 18 and 65, not having a diagnosis of any psychiatric disorder other than post-traumatic stress symptoms or disorder and not currently undergoing psychotherapy. Participants were contacted by phone and invited to join the study. After providing information about the study's purpose, procedures, and confidentiality policies, informed consent was obtained from those who agreed to participate. Before the initial assessment, all participants underwent a screening interview, and those deemed eligible were included in the study. Accordingly, one individual under the age of 18, one individual with a diagnosis of bipolar disorder, and three individuals currently receiving psychotherapy were excluded from the study.

Research Design

The research had a 2 (group: experimental, control) × 3 (time: pre-test, post-test, follow-up) quasi-experimental design. Participants were assigned to the experimental and control groups non-randomly. The evaluation was carried out with self-report scales. The follow-up test of the experimental group was taken 1 week, 1 month, and 1 year after the post-test.

Procedure

An application was made to Ibn Haldun University Social and Human Sciences Scientific Research and Publication Ethics Committee, and ethics committee approval was received with the decision dated June 13, 2023, and numbered E- 71395021–100-26–970. Before the research, a questionnaire form including an Informed Voluntary Consent Form, Sociodemographic Information Form, and DSM-5 Acute Stress Symptom Severity Scale was prepared via Google Forms for the participants to read and approve. This form was shared via social media to reach the participants. Afterward, a questionnaire containing the specified measurement

tools was prepared on Google Forms and administered to the participants before the intervention. These measurement tools also constituted the pre-test and post-test data of the study. After these measurements, the participants started a 5-session, 2.5-week brief intervention program process, which was developed in consultation with religious authorities and trauma experts. At the same time, the therapist-client matching before the intervention was done by a third person who was not involved in the study to minimize bias. There was no specific practice location for participation in the study. The intervention sessions were also conducted online. At the end of the two-and-a-half-week intervention program, the scales specified as post-tests were given to the participants again after the last session. In addition, all scales were also used in 1-week, 1-month, and 1-year follow-up measurements.

Data Collection Tools

The DSM-5 Acute Stress Symptom Severity Scale (NSESSS) was used to determine the severity of acute stress symptoms. The Post-Traumatic Stress Disorder Checklist for DSM-5 (PCL-5) was used to measure the severity of post-traumatic stress disorder symptoms, The Post-Traumatic Cognitions Scale (PTCI) was used to assess trauma-related cognitions, the Post-Traumatic Growth Inventory (PTGI) was used to measure perceived psychological growth after the traumatic experience, and the Religious Coping Scale for Muslims (MRC) was used to assess religious coping strategies. Participants were also given a sociodemographic information form prepared by the researchers.

Sociodemographic Information Form

The form provided to the participants was designed to collect sociodemographic information and assess acute stress symptom severity. This form included fields for the participant's name, email address, telephone number, the telephone number of a relative, age, gender, education level, occupation, marital status, city of residence before and after the earthquake, date of departure from the earthquake zone, reason for seeking psychological support, degree of impact by the earthquake, current psychological support and psychiatric diagnosis, treatment status, and preference for inclusion of religious/spiritual elements in the psychological support process.

DSM-5 Acute Stress Symptom Severity Scale (NSESSS)

The reliability and validity study of the Turkish form of the Acute Stress Symptom Severity Scale developed to measure the severity of acute stress disorder according to DSM-5 criteria was conducted by Aşçıbaşı et al. (2017). The scale evaluates the severity of acute stress symptoms after a highly stressful event or experience and consists of seven items. It is a self-report scale applied to individuals aged 18 and over. Scoring is done between 0 and 4 for each item, and the total score varies between 0 and 28. A higher score on the scale indicates more severe acute stress disorder symptoms. Cronbach's alpha internal consistency coefficient was 0.95 for

the whole group. Item-total correlation values ranged between 0.76 and 0.88. The findings of the study indicate that the Acute Stress Symptom Severity Scale Turkish form is reliable and valid (Aşçıbaşı et al., 2017).

Post-Traumatic Stress Disorder Checklist for DSM-5 (PCL-5)

Weathers et al. (2013) made the most recent adaptation of the PCL-5, which is widely used to measure PTSD symptoms, according to DSM-5. The Turkish adaptation was organized by Boysan et al., (2017). The scale, which consists of 20 items based on self-assessment, measures the symptoms compatible with PCL-5 in the last month. The scale is a five-point Likert-type scale with responses ranging from 0 (not present) to 4 (extremely present). In the adaptation study of the scale in Turkey, four subscales were obtained, and the mean scale scores differed significantly between the control, depression, and PTSD groups in the ANOVAs conducted to assess concurrent validity. Reliability coefficients were 0.79–0.92 for the re-experiencing subscale, 0.73–0.91 for the avoidance subscale, 0.85–0.90 for negative changes in affect and cognitions, and 0.81–0.88 for hyperarousal in the control and clinical groups, respectively. Test–retest reliability coefficients were 0.70, 0.64, 0.78, and 0.76, respectively. The scale consists of a range of 0–80 points. When evaluating the scale, the scores on all items can be summed up and evaluated over the total score. In this method, the cut-off score is recommended to be 33, although it varies according to the intended use (Weathers et al., 2013). For the Turkish adaptation, the authors suggested a cut-off score of 47. At scores of 47 and above, individuals are more likely to meet the diagnostic criteria for PTSD (Boysan et al., 2017). In addition, questions answered as two or above can be used when calculating the diagnostic criteria. In order to meet item B of DSM-5, a value of 2 or more should be obtained from at least one of the items between 1 and 5; for item C, a score of 2 or more should be obtained from at least 1 of the questions 6–7. For item D, at least 2 of the items between 8 and 14, and for item E, at least 2 of the questions between 15 and 20 must have a score of 2 or above. If all these conditions are met, it can be said to meet the diagnostic criteria for PTSD.

Post-Traumatic Growth Inventory (PTGI)

Initially developed by Tedeschi and Calhoun in 1996, the Post-Traumatic Growth Inventory (PTGI) was designed to identify positive changes that individuals may experience after traumatic events. One of the Turkish adaptation studies of the scale was conducted by Kağan et al. (2012). The Turkish version of the scale consists of three sub-dimensions: change in self-perception, change in the philosophy of life, and change in relationships with others. There are 21 items to be scored on a 6-point Likert scale with values ranging from 0 to 5. A high score on the scale indicates a high rate of post-traumatic growth. The validity analyses showed that the scale exhibited a three-factor structure different from the original scale, and it was concluded that the three-factor structure was valid for the Turkish form of the TSBI with the structural equation model. The scale's total reliability coefficient (Cronbach's alpha) was 0.92, and the test–retest internal correlation coefficient was 0.83.

Post-Traumatic Cognitions Inventory (PTCI)

Developed in 1999 by Foa and colleagues, the Post-Traumatic Cognitions Scale (PTCI) was prepared to assess negative thoughts that may arise after trauma (Foa et al., 1999). The adaptation study of the scale was conducted by Yağcı-Yetkiner (2010). The scale, which initially consisted of a total of 36 scale items, has three sub-dimensions: "Negative cognitions about oneself (2, 3, 4, 5, 6, 9, 12, 14, 16, 17, 20, 21, 24, 25, 26, 28, 29, 30, 33, 35, 36)," "Negative cognitions about the world (7, 8, 10, 11, 18, 23, 27, 36)," and "Self-blame (1, 15, 19, 22, 31)." In the adaptation study of PTCI, a self-evaluation scale, 3 items were removed from the form due to factor analysis, and the scale was reduced to 33 items. The answers are organized from 1 to 7 in the seven-point Likert-type scale. High scores on the scale indicate an abundance of erroneous cognitions related to the traumatic event. Independent groups *t*-test was used to test the discriminant validity of the scale, and it was found that the scale could distinguish between groups with and without PTSD ($t = -8.107$, SD = 444, $p < 0.01$). The Cronbach's alpha internal consistency coefficient $\alpha = 0.95$, test–retest reliability coefficient 0.76, and split-half reliability 0.87 were found for the whole scale.

Religious Coping Scale for Muslims (MRC)

The original scale was developed by Adam and Ward (2016) to examine the relationship between the psychological well-being levels of Muslim immigrants living in New Zealand and their ability to use religious coping strategies with acculturation stress. The adaptation study of the scale to Turkey was conducted by Künroğlu & Sevi Tok, (2020). The scale, consisting of a total of 19 items, is divided into three subscales: behavioral (7 items), cognitive (8 items), and social (4 items) coping strategies. The cognitive subscale reflects how participants interpret God's role in their stressful situations (e.g., viewing their situation as God's will); the behavioral subscale assesses the use of religious rituals as a means of coping with stress (e.g., reading the Quran); and the social subscale captures how participants seek help, advice, and comfort from the Muslim community (e.g., expecting love and care from mosque members). Higher scores on the five-point Likert scale indicate more significant use of the corresponding religious coping strategy. The total scale score is calculated by summing the scores from each subscale, while the total score for each subscale is determined by adding the scores of the items within that subscale. Confirmatory factor analysis showed that the three-factor structure of the MRC was supported and had acceptable fit indices ranging from 0.56 to 0.84. In order to test the external criterion validity of the scale, the relationship between the total score of the MRC and the total scores of the positive and negative religious coping subscales of the Religious Coping Styles Scale was examined, and a positive and robust relationship was found between the MRC score and the positive religious coping score ($r = 0.89$, $p < 0.001$). On the other hand, the negative religious coping score had a weak inverse association with the MRC score ($r = -0.15$, $p < 0.05$). In the internal consistency analysis, the Cronbach's alpha coefficient of the whole scale was found to be 0.96. The internal consistency coefficients (Cronbach's alpha) of

the sub-dimensions were 0.96 for cognitive religious coping 0.94 for behavioral religious coping and 0.89 for social religious coping. In the split-half reliability, the correlation coefficient between the total scores of the two forms was found to be 0.93.

Intervention

A Brief Religious Integrated CBT Intervention Program developed by Taha Burak Toprak was a rapid and early intervention method designed explicitly for ASD to alleviate post-earthquake trauma symptoms and prevent post-traumatic stress disorder (PTSD). In this study, the program was revised for individuals who may be diagnosed with PTSD and to reduce post-traumatic stress symptoms. The version designed for ASD focused on the patient's symptoms and did not provide any information other than psychoeducation on these symptoms. However, in the revised version of PTSD, clear psychoeducation on PTSD was provided. In order to finalize the study, the opinions of religious authorities and experts working on trauma were taken. As a result of the evaluations, the program was finalized. The program aimed to develop culturally sensitive, religiously-adapted, quickly applicable early and brief intervention methods to reduce trauma symptoms and prevent PTSD. The two-and-a-half-week brief intervention program consists of five sessions, two sessions per week, each lasting an average of 50 min online. Before the implementation, therapists were trained on the model and supervised by the model developer. The session framework of the intervention program was shown in Table 1. The religious component of the intervention is detailed in the section below.

Religious Intervention Section

By this stage, participants had received psycho-education about their situation and had gained an understanding of what maladaptive cognition is and how to identify and restructure it. They also became aware of the critical role of values-based behavior in recovery, which we confirmed through feedback. We then informed the participants that one of the critical aspects of cognitive structure for people of faith was thoughts about oneself, God, God's will, and fate. Moreover, we conveyed: "One of these areas, a very critical one, is our relationship with the Creator, our ideas about Him, and our beliefs about His relationship to all that is going on. This is what we want to address today. First of all, I would ask you, have you noticed any change in your thoughts about God, about destiny, after this incident? Or, after this incident, did you realize that you already had thoughts about fate, about God, which did not lead you to a solution, did not help you make sense of things, and made you feel bad, hopeless, and helpless? Let us talk a little bit about these." Thus, we tried to identify maladaptive religious cognitions, which we reconstructed according to the religious references in the file of responses on religiously distorted cognitions frequently encountered after the earthquake, which we had prepared in consultation with religious authorities.

These chapters focused on issues such as "How disaster should be understood as a test." We used Qur'anic verses and hadiths such as "And certainly We will test you

Table 1 Intervention session content

Session 1: Assessment Interview
• Case anamnesis is taken with a focus on earthquake-related difficulties, and therapy goals are set • At the end of the first session, brief psycho-education is provided on post-traumatic symptoms, avoiding unmentioned symptoms to prevent the negative effects of debriefing • Emphasis is placed on addressing the complaints expressed by the patient
Session 2: Psychoeducation
• Psychoeducation is focused on trauma-related symptoms, addressing only those discussed in the first session • Cognitive distortions and avoidances caused by trauma are identified, and intervention-targeted cognitions are explained • Patients are guided to reflect on value-oriented behaviors, with homework assigned to align their behaviors with their values
Session 3: Cognitive Restructuring and Values
• Intervention on trauma-related cognitive distortions identified in the previous session, followed by the introduction of alternative thoughts • Metaphors are used to enhance understanding. Behavioral assignments for avoidance are set, while remaining flexible due to the acute stress period. After setting behavioral goals, potential obstacles are discussed with solutions offered • Encouraging value-oriented behaviors helps reduce post-traumatic stress symptoms and improve quality of life
Session 4: Religious Intervention
• After revisiting cognitive change, the session explores how patients' views on fate, God, and spirituality may have shifted due to the event • Dysfunctional religious cognitions are clarified and restructured using religious references from a file prepared with input from Islamic scholars • The session also links value-oriented behaviors with religious values, reinforcing both aspects
Session 5: General Recovery
• A brief review of progress so far, focusing on internal and external obstacles and coping strategies • Emphasis on how to manage recurring post-traumatic symptoms, including applying learned strategies and consulting a specialist if needed • The session concludes by reinforcing the importance of new interpretations and value-oriented behaviors, encouraging continued practice

with fear and hunger, and with loss of property, lives and crops. Give good news to those who are patient" (2:155). Additionally, the question "Why does the Creator allow loss?" was addressed in the light of relevant religious texts, such as "Whoever Allah wills to give good, He tests him with calamities" (Bukhari-Merda, 1) and "No fatigue, nor disease, nor sorrow, nor sadness, nor hurt, nor distress befalls a Muslim, even if it were the prick he receives from a thorn, but that Allah expiates some of his sins for that" (Sahih al-Bukhari).

Throughout these processes, the verses, hadiths, and sayings used were presented to the patients for them to discuss together, and the alternative thoughts generated from these references were determined in a Socratic way as much as possible.

Data Analysis

The data obtained from the experimental and control groups were analyzed with the "SPSS for Windows 22.0" program. Due to the study's small sample size, the survey data were analyzed using nonparametric statistical analyses. Therefore, the Mann–Whitney *U* test, a nonparametric test, was used to analyze whether there was a significant difference between the experimental group (independent variable) receiving the intervention program and the control group not. The Friedman Test examined whether the within-group differences between the pre-test, post-test, and follow-up tests were significant in the experimental group's PCL-5, PTCI, PTGI, and MRC measurements.

Results

Sociodemographic Findings

The sociodemographic information of the participants is presented in Table 2. Thirteen participants were female (92.9%), and one was male (7.1%). The age range was 18–56 years, with a mean age of 29. In addition, 42.9% ($n=6$) of the participants were married, and 57.1% were single ($n=8$). Of the participants, 78.6% ($n=11$) had not experienced anything other than a tremor but had witnessed much destruction and tremors around them, 7.1% ($n=1$) had experienced a building collapse but had not been buried under the cave-in, and 14.3% ($n=2$) had lost second-degree relatives. In addition, no individuals in the experimental and control groups did not request religious intervention.

Table 2 Sociodemographic characteristics of the participants

		Experiment ($N=7$)		Control (Waiting) ($N=7$)	
		N	%	*N*	%
Gender	Female	6	85.7	7	100
	Male	1	14.3	-	-
Age	18–24	4	57.2	3	42.9
	25–56	3	42.9	4	57.2
Education	Pre-license	3	42.9	2	28.6
	Undergraduate and later	4	57.2	5	71.4
Marital status	Married	3	42.9	3	42.9
	Single	4	57.1	4	57.1
Level of earthquake impact	Just a tremor	4	57.1	7	100
	Building collapsed	1	14.3	-	-
	Second-degree bereavement	2	28.6	-	-

Comparison of Groups at Different Measurement Times

When the results of the Mann–Whitney *U* test analysis conducted to examine the effect of the group at different measurement times were analyzed, it was observed that there was a main effect of time for PCL-5 post-test ($U = 7.50$, $z = -2.17$, $p < 0.05$, $r = -0.58$) and 1-year follow-up test ($U = 1.50$, $z = -2.94$, $p < 0.05$, $r = -0.79$) and PTCI post-test ($U = 8.00$, $z = -2.11$, $p < 0.05$, $r = -0.56$) and 1-year follow-up ($U = 1.00$, $z = -3.00$, $p < 0.05$, $r = -0.80$). The effect size of these differences indicates a large effect. When the groups were compared according to time for PTGI and MRC, the pre-test, post-test, and 1-year follow-up values did not differ between the groups. The time-dependent change in the measurement scores of the experimental and control groups is presented in Table 3.

Comparison of the Pretest, Post-Test, and Follow-Up Results of the Experimental Groups

Friedman test was conducted to determine whether there was a significant difference between the PCL-5 and MRC pre-test, post-test, and follow-up test scores

Table 3 Comparison of pre-test, post-test, and follow-up measurements of the groups

	Experiment $N=7$	Control (waiting) $N=7$			
Variable	Mean rank	Mean rank	*U*	z	*p*
PCL-5					
Pre-test	7.07	7.93	21.50	−0.385	0.700
Post-test	5.07	9.93	7.50	−2.175	0.030**
Follow-up	4.21	10.79	1.50	−2.942	0.003**
PTGI					
Pre-test	7.93	7.07	21.50	−0.384	0.701
Post-test	7.93	7.07	21.50	−0.386	0.700
Follow-up	8.93	6.07	14.50	−1.282	0.200
PTCI					
Pre-test	6.57	8.43	18.00	−0.831	0.406
Post-test	5.14	9.86	8.00	−2.111	0.035**
Follow-up	4.14	10.86	1.00	−3.006	0.003**
MRC					
Pre-test	7.71	7.29	23.00	−0.192	0.848
Post-test	9.50	5.50	10.50	−1.791	0.073
Follow-up	8.29	6.71	19.00	−0.704	0.481

PCL-5, Post-Traumatic Stress Disorder Checklist for DSM-5; *PTGI*, Post-Traumatic Growth Inventory; *PTCI*, Post-Traumatic Cognitions Inventory; *MRC*, Religious Coping Scale for Muslims

N, number of observations; *Mean rank*, mean rank; *U*, Mann–Whitney *U*; *p*, significance; *z*, the magnitude and significance of the difference between the samples

** $p < .005$

of the experimental group. Significant differences were observed for PCL-5 ($x^2(4) = 22.28$; $p < 0.001$), PTCI ($x^2(4) = 17.37$, $p = 0.002$) and MRC ($x^2(4) = 9.53$; $p = 0.049$) pre-test, post-test, and follow-up test scores. Friedman's test findings revealed that the main effect of time was very large for the PCL-5 and PTCI tests in the experimental group ($\eta^2 = 1.00$ for both), suggesting that the changes in these tests were quite marked and significant. For the MRC test, the effect size was moderate ($\eta^2 = 0.68$), implying that differences in this variable over time were more modest but still significant.

There was no statistically significant difference between PTGI pre-test, post-test, and follow-up test scores ($p > 0.05$). The measurement values of the experimental group obtained at three different times are presented in Table 4.

Wilcoxon signed-rank test was performed to determine which pairs of measurements showed significant differences. The results showed significant differences in favor of follow-up measurements between pre-test–1-week follow-up ($p = 0.041$), pre-test–1-month follow-up ($p < 0.001$), and pre-test–1-year follow-up ($p = 0.004$) for PCL-5. For PTCI, significant differences were found between pre-test–1-month follow-up ($p = 0.013$) and pre-test–1-year follow-up ($p = 0.001$) in favor of follow-up measurements. No significant difference was detected in pairwise comparisons for MRC.

Discussion

The primary purpose of the current study was to test the effectiveness of a Brief Religious-Adapted Cognitive Behavioral Therapy Intervention Program to reduce post-traumatic stress symptoms in people with post-traumatic stress symptoms after the earthquake.

To the best of our knowledge, this is the first study developed for the earthquake in Turkey that can be implemented in a short period, the outcomes of which can be observed and which is suitable for religious integration.

The literature has substantiated that the impacts of brief (Cordova et al., 2003; Hickling et al., 2005; Kangas et al., 2014; Messman-Moore & Resick, 2002; Steenkamp et al., 2011; Thompson-Hollands et al., 2021; Zoellner et al., 2022), religious (Bentley et al., 2021; Işık & Toprak, 2024; Zoellner et al., 2018), culturally (Acarturk et al., 2019; Jalal et al., 2017, 2018), and spiritually sensitive (Oman & Bormann, 2015; Smothers & Koenig, 2018) trauma interventions effectively mitigate trauma symptoms and enhance mental health outcomes. Similarly, according to the results of the study, the post-traumatic stress symptom level of the group to which the Brief Religious-Adapted Cognitive Behavioral Therapy Intervention program was applied showed a statistically significant reduction in the post-test measurement compared to the control group (Fig. 1).

Our study contributes to the expanding body of research demonstrating the effectiveness of integrating religious elements into treatment. This investigation utilized religiously adapted interventions specifically designed to meet the needs of a Muslim population. The primary aim, however, is to demonstrate the potential for increasing clinical benefits of integrating religion into trauma care.

Table 4 Comparison of within-group scale scores of the experimental group

	Experimental group											
	Pre-test		Post-test		1 week follow-up test		1 month follow-up test		1 year follow-up test			
	N = 7 Mean (SD)	Mean rank	*N* = 7 Mean (SD)	Mean rank	*N* = 7 Mean (SD)	Mean rank	*N* = 7 Mean (SD)	Mean rank	*N* = 7 Mean (SD)	Mean rank	x^2	*p*
PCL-5	56.36 (9.63)	5.00	51.79 (17.94)	3.86	30.00 (6.97)	2.57	19.86 (5.58)	1.57	32.36 (18.65)	2.00	22.286	0.000*
PTGI	50.07 (16.20)	2.93	54.07 (11.64)	3.43	54.71 (14.22)	2.43	56.57 (15.79)	2.79	54.93 (13.94)	3.43	2.101	0.717
PTCI	149.86 (31.38)	5.00	132.43 (33.22)	3.14	110.43 (22.24)	2.86	101.14 (17.19)	2.29	113.50 (35.10)	1.71	17.371	0.002**
MRC	74.86 (10.92)	2.00	78.00 (8.94)	4.36	79.29 (10.81)	3.43	76.71 (12.98)	2.71	71.64 (13.88)	2.50	9.536	0.049**

PCL-5, Post-Traumatic Stress Disorder Checklist for DSM-5; *PTCI*, Post-Traumatic Cognitions Inventory; *PTGI*, Post-Traumatic Growth Inventory; *MRC*, Religious Coping Scale for Muslims

*$p < .001$, **$p < .005$

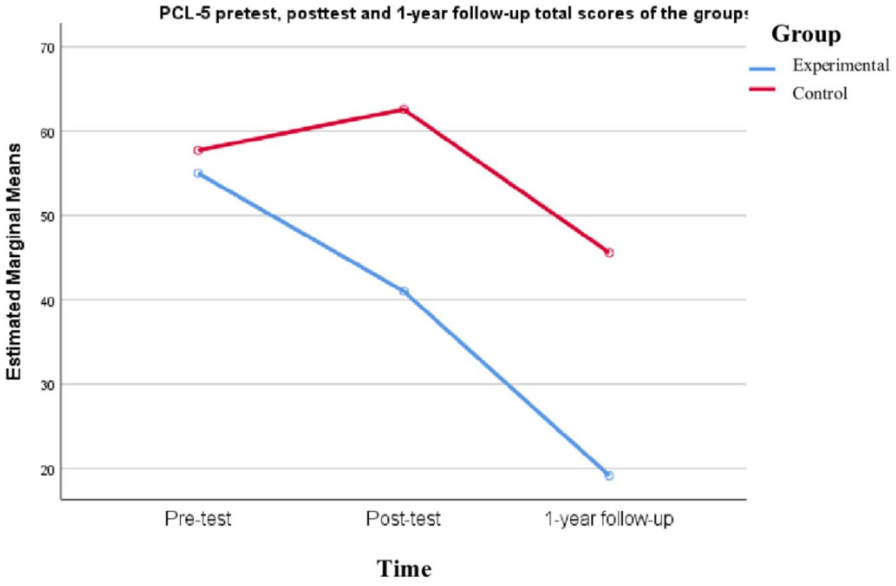

Fig. 1 Comparison of groups at different measurement times for PCL-5

CBT-based trauma treatment models primarily focus on the cognitive structures underlying symptoms, aiming to facilitate recovery through cognitive restructuring (Kleim et al., 2013; Mueser et al., 2015). Ehlers & Clark, (2000) contend that cognitive restructuring is essential for patients to reinterpret the emotions and behaviors experienced during traumatic events. Given that a significant proportion (69.95%) of the individuals in the region are religious (Nişancı, 2023) and that approximately 97% of therapy participants expressed a preference for religious intervention, it is evident that core motivations in their cognitive frameworks regarding self, life, and others are shaped by the prevailing religious context. In this model, therefore, cognitive restructuring not only addresses maladaptive cognitions but also integrates religious cognitions concerning God, fate, and divine will.

In this approach, individuals' uncertainty-related thoughts—such as "An earthquake could happen at any moment, and I may lose someone," "Nothing will be the same as before," "I will not be able to cope with these losses," and "I will never return to a normal life"—were reconstructed using religious knowledge. Additionally, dysfunctional cognitions concerning theological issues, such as "Why did God allow this to happen?", "If God loved and protected me, He wouldn't allow these things to happen," and "Are all these events a punishment from God for all of us?", were addressed and restructured through relevant religious teachings.

As a result, the experimental group exhibited a statistically significant reduction in post-traumatic dysfunctional cognition levels compared to the control group (see Fig. 2).

These findings are further corroborated by participants' written feedback on aspects they found beneficial in therapy. Responses included reflections such as "There are no guarantees in life, and whatever is destined to happen will inevitably

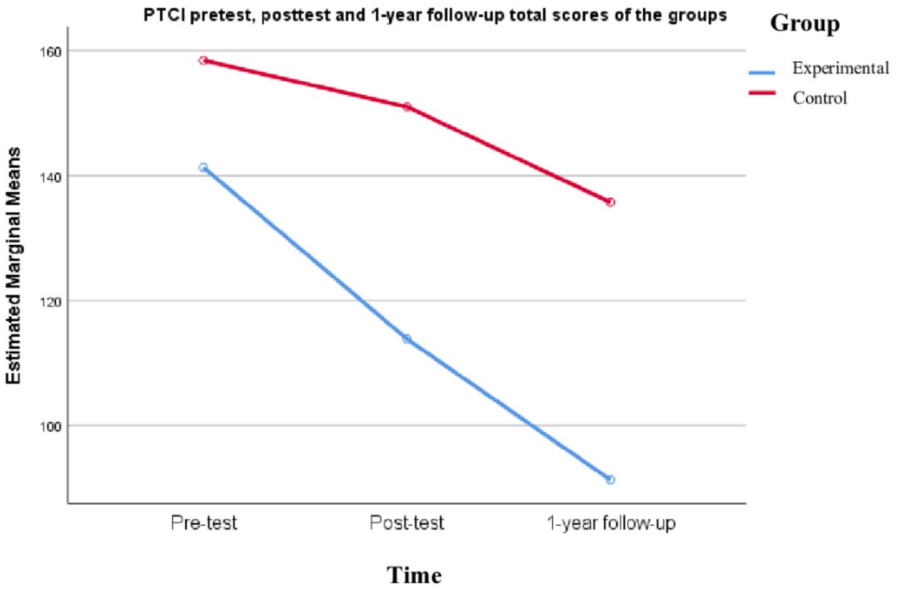

Fig. 2 Comparison of groups at different measurement times for PTCI

occur; we cannot prevent it. However, taking precautions and placing trust in coping with potential life events can ease the process." Additionally, some participants attributed their progress to the religious approach of their psychologist: "I attribute it to the religious approach of my psychologist." Other responses emphasized the benefits of positive thinking, encouragement, and learning how to manage distressing thoughts: "It was useful for me to focus on thinking positively, to be encouraged, and to understand how I should respond to bothersome thoughts" and "It was useful for me to adopt a healthier way of thinking." These reflections underscore the value of religious and cognitive approaches in enhancing coping mechanisms.

When the therapist feedback was examined, therapists stated that participating in an intervention process that is compatible with their religious values increased their professional satisfaction, that they felt whole during the therapy, and that they were more motivated because they saw that the interventions increased the patients' treatment motivation.

Overall, it was observed that, through verses, patients were more readily able to accept their losses in all aspects of life. Additionally, they demonstrated greater acceptance of the fact that the distressing symptoms associated with their problems would not resolve immediately.

Considering all these findings collectively, it appears that aligning religious interventions with the religious structures shaping patients' cognitive frameworks in therapy facilitates the identification and restructuring of dysfunctional cognitions. This adaptation provides a notable advantage in addressing these cognitions during the therapeutic process. A therapeutic environment that encourages open discussion of issues from a religious perspective enabled patients—predominantly religious

individuals from the region—to more readily recognize and express the religious cognitions that form the basis of their views on themselves, life, and others. Additionally, providing appropriate cognitive references by therapists, who were prepared in this regard, likely contributed to greater acceptance and cognitive change.

An intervention compatible with such values is thought to contribute to the deepening and maintenance of recovery at 1-year follow-up, suggesting that the intervention's new alternative compatible cognitions and coping strategies are strongly internalized by patients.

The literature suggests that recovery tends to be more enduring when individuals' religious or spiritual beliefs and value systems are integrated into therapy (Captari et al., 2018).

Research has shown that although traumatic experiences often lead to severe psychological stress, they can also lead to positive psychological changes as trauma survivors cope with the trauma (Linley et al., 2008; Ogińska-Bulik et al., 2023). This is called post-traumatic growth. In post-traumatic growth, disappointment is transformed into appreciation and gratitude, unpredictability into preparedness, fragility, or vulnerability into personal courage and strength (Janoff-Bulman, 2004). Research shows positive religious coping predicts post-traumatic growth (Abu-Raiya & Sulleiman, 2021; Zeligman et al., 2020).

In this context, our study incorporated religious coping interventions such as 'worship and prayer', 'reading the Quran' and 'helping others' which reflect behavioral manifestations of religious values. Post-traumatic growth (PTG) and religious coping scores increased significantly in the experimental group, likely due to the integration of these tailored religious elements. However, similar increases were also observed in the control group, with no statistically significant difference noted between the groups in PTGI and MRC measurements. This finding may suggest that natural coping mechanisms and community support prevalent in the region contributed to the control group's improvement. Further research is needed to disentangle the unique effects of religiously integrated interventions versus natural coping responses.

Although both religious coping and post-traumatic growth naturally increased in the control group, a reduction in post-traumatic stress symptoms was expected. However, the findings indicated that post-traumatic stress symptoms and dysfunctional cognitions were higher in the control group.

From this perspective, it may be concluded that religious coping strategies alone may not suffice to alleviate symptoms. However, these strategies may contribute to symptom reduction when integrated into cognitive restructuring through psychoeducation.

Based on this finding, intervening by making existing religious coping resources a part of cognitive restructuring while working with religious clients may help these individuals both to produce effective solutions to their psychological difficulties and to make religious values, which are actually a powerful resource for them, a part of the solution more effectively.

Limitations

In the study, priority was given to meeting the needs of the disaster survivor group rather than the requirements of a randomized controlled experimental design. Consequently, the groups were not randomized, and the sample size and distribution were not at the recommended level. Additionally, the control group did not receive a cognitive-behavioral therapy protocol without religious intervention to test construct validity. This makes it difficult to generalize and attribute between-group differences to the intervention. Despite these limitations, the study highlights the potential value of a brief, religiously sensitive intervention that is accessible online. In a context described as the "disaster of the century," where individuals face significant deprivation and hardship, such an approach may offer a practical means to reduce post-traumatic stress symptoms and enhance coping skills in future disaster situations.

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Data Availability The data supporting the findings of this study are available upon request from the corresponding author due to ethical and confidentiality considerations.

Declarations

Ethics Approval The study was approved by the Ibn Haldun University Social and Human Sciences Scientific Research and Publication Ethics Committee (date and number of approval: 13.06.2023 / E-71395021–100-26–970).

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest The authors declare no competing interests.

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Authors and Affiliations

Taha Burak Toprak[1,3] · Hanne Nur Özçelik[1,2,3] · Hatice Rumeysa Işık[2,3]

✉ Taha Burak Toprak
tahaburaktoprak@gmail.com

[1] Department of Psychology, Ibn Haldun University, Istanbul, Turkey

[2] Department of Psychology, Istanbul Sabahattin Zaim University, Istanbul, Turkey

[3] Association for Psychology and Psychotherapy Research, Istanbul, Turkey