

Original Article

Effectiveness of Narrative Exposure Therapy on the Severity of Posttraumatic Stress and the Co-Morbid Symptoms of Iranian Survivors of Mina Disaster

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Abstract

Background: Mass gathering has not received much attention of researches as one of the potentially traumatic events in the field of psychological studies. Mina (Mecca, Saudi Arabia) disaster during 2015 hajj occurred in this context. Individuals may be at risk for posttraumatic stress disorder (PTSD), depression and somatic symptoms following traumatic events. Narrative exposure therapy (NET) has been known as a therapeutic protocol for PTSD and trauma-related disorders. The present study was carried out aimed to investigate the effectiveness of narrative exposure therapy on the severity of posttraumatic stress symptoms and the co-morbid symptoms of Iranian survivors of Mina disaster.

Materials and Methods: The present study is based on single-case experimental design (SCED) with baseline. Eight Survivors of Mina disaster who met the criteria for posttraumatic stress disorder and completed inclusion criteria were randomly divided into two groups NET and control. The experimental group participant received twelve NET sessions individually. Data collection tool included PTSD Checklist for DSM-5 (PCL-5) and Beck depression inventory-II (BDI-II), patient health questionnaire 15 (PHQ-15). Data was analyzed using the cut-off point, percentage improvement index, RCI and the Hedges' g effect size.

Results: Total percentage improvement of participant receiving NET for PTSD, was 68.25%, depression 63.25%, and somatic symptoms was 53.75%. All changes in the participant receiving NET were clinically significant in severity of PTSD, depression and somatic symptoms ($RCI \geq 1.96$).

Conclusion: According to the results of this study, NET has a significant effect on the reduction of PTSD symptoms and its co-morbid symptoms.

Keywords: Narrative exposure therapy, Posttraumatic stress disorder, Depression symptom, Somatic symptom, Mass gathering, Mina disaster

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Introduction

Mass gatherings (MGs) are prone to significant human disasters. Therefore, participants in MGs may be exposed to experiencing actual death or death threats and serious injuries, MGs can be considered a psychological potentially traumatic experience. Mina disaster in 2015 occurred in a mass gathering context in which more than 4,000 people, including 464 Iranians, were killed in this event and large number of people were also injured⁽¹⁾. Persons who are exposed to potentially traumatic events are vulnerable to posttraumatic stress disorder (PTSD)⁽²⁾. The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), in addition to exposure traumatic event directly, has witnessed its occurrence for another, Learning that a relative or close friend was exposed to a trauma or exposure to a trauma by part of the work, the four main symptoms avoiding its external and internal clues, cites negative and eventual mood changes following the event experience (NACM) and changes in arousal and reactivity as PTSD diagnostic criteria. This symptoms should last for at least a month, cause significant clinical discomfort or disorder in the performance of the social, occupational, or other important field of activity, and in addition, it should be not due to physiological effects of the substance (such as medicine, alcohol) or other physical illness⁽³⁾.

Patients with PTSD likely 80% more than other patients to have symptoms that met diagnostic criteria for at least one other psychological disorder. More than 30-50% of them suffer from significant depression^(4,5). In addition, Most survivors of traumatic events express different physical complaints⁽⁶⁾. However, more than 70% of people who have experienced psychological trauma report multiple somatic symptoms⁽⁷⁾. There is a significant relationship between PTSD, general health, and the number of medical visits and days of absenteeism. So that general health decrease and the number of medical visits and days of absenteeism increase by increasing PTSD.⁽⁸⁾ These factors are associated with major disruptions in individual and social performance⁽⁹⁾.

There are various psychotherapy protocols for treatment of PTSD. Cognitive therapy (CT), prolonged exposure therapy (PET), cognitive processing therapy (CPT), and eye movement desensitization and reprocessing (EMDR)

are some of the most important ones^(10, 11). Exposure therapies are known as the first line treatment for PTSD^(10, 12). In this treatment, after a traumatic event is identified, it has tried to encounter an individual with PTSD in a safe environment with relevant thoughts, images, objects, situations, and activities. Imaginal and *in vivo* exposure techniques are used for achieving this purpose^(13, 14).

Applying exposure therapies is associated with various limitations including; failure to complete the therapeutic course^(10, 15, 16), access restriction^(6, 10), remaining some symptoms after the end of therapeutic course⁽¹⁷⁾, appropriateness of these treatments with western cultures or specific populations, such as military or raped ones⁽¹⁸⁾ and the lack of proper acceptance of their use by trained professionals⁽¹⁹⁻²¹⁾.

According to Cukor et al.^(6, 22), PTSD is still considered as a difficult disorder in terms of treatment due to many constraints that they are facing, although there are many evidence on the effectiveness of exposure therapy. Therefore, it is necessary and inevitable to identify new therapeutic options.

Narrative exposure therapy (NET) is considered as a new model for PTSD therapy based on new findings of cognitive neuroscience. NET can be affected by Conway's views on autobiographical memory and the framework provided by his theory to understand how the intrusion symptoms are formed in PTSD. NET pays attention to fear/trauma networks and their activation in the brain⁽²³⁾. In addition, one of the most important advantages of NET is along with the elements of exposure models and considers the components of the testimony therapy⁽²³⁾. In testimony therapy, people with PTSD are asked to tell their story of their lives, including their traumatic experiences⁽²⁴⁾. The purpose of NET is to follow the lifeline from birth to present time, focusing on the details of the traumatic experiences and developing a coherent narrative of the whole process⁽²⁵⁾. In addition, NET also considers pleasant memories for traumatic memories life.

In different cultures, NET has high applicability^(26,27). However, many studies have been carried out aimed to examine the effectiveness of NET in different countries and populations, such as immigrants⁽²⁸⁾, political prisoners⁽²⁹⁾, survivors of tortur⁽³⁰⁾, earthquake survivors⁽³¹⁾ and children affected by the war⁽³²⁾. Several

studies have been carried out aimed to evaluate the effectiveness of NET. As far as we know, NET has not been used for treatment of MGs-related PTSD, as is true about Mina disaster. Although, it has not been conducted any study on the effectiveness in Iranian adult sample until now. The present study was carried out aimed to investigate the effectiveness of NET on the severity of posttraumatic stress symptoms and the co-morbid symptoms of Iranian survivors of Mina disaster.

Methods

The present study is based on single-case experimental design (SCED) with baseline, which was carried out two years after the Mina (Mecca, Saudi Arabia) disaster in annual Hajj (24 September 2015) on Iranian participant, Tehran during the period of September 2017 to May 2018. This study was registered with ethical code of IR.SBMU.MSP.REC.1395.316 at Shahid Beheshti University of Medical Sciences.

Participants: Eight patients who had the inclusion criteria were selected from 81 people who completed a diagnosis of PTSD following the disaster according to a screening study and were randomly divided into two groups of NET and control. Patients treated and followed by a clinical psychologist in Hajj and pilgrimage medical center of the Iranian Red Crescent (IRC).

In this study, inclusion criteria included the desire to receive PTSD healthcare services and diagnosis according to the results of diagnostic interviews using structured clinical interview for DSM-5 (SCID-5). Exclusion criteria included another treatment for PTSD, substances abuse, and the diagnosis of schizophrenia-spectrum and other psychiatric disorders. Patients were matched based on two variables of gender and PTSD scores. Each group consisted of two male participants (N2, N4, W2, W4) and two female patients (N1, N3, W1, W3). The participant in experimental group received 12 NET sessions for 90 to 120 minutes individually. No session ended before experiencing emotional habituation. This is a basic rule in NET⁽²⁵⁾. The NET protocol was introduced by M Schauer et al. for the first time in 2005⁽³³⁾ and reviewed in 2011⁽²⁵⁾. Patients in control group received a psychological training session on common reactions after traumatic experiences, PTSD and its symptoms and future treatment options.

Measurements: Patients who receiving the NET were evaluated before treatment and in the second, fourth, sixth, eighth, tenth, and twelfth sessions, in three two-

week, one month and three month following steps. The control group was evaluated every two weeks. The following tools were used to evaluate the symptoms in the treatment process:

Structured clinical interview for DSM-5 (SCID-5): SCID-5 is very suitable for research fields⁽³⁴⁾. Intensity scales of SCID-5 indicate a high internal consistency and the Cronbach's alpha coefficient is greater than 0.80 for all of them. The test-retest reliability, structural and predictive validity of SCID-5 is acceptable⁽³⁵⁾. The Persian version of this tool is available⁽³⁶⁾.

PTSD checklist for DSM-5 (PCL-5): The PCL-5 has 20 items and each item is scored from 0 to 4 on a Likert scale. Its scores vary 0 to 80⁽³⁷⁾. In 2013, this scale was reviewed by Weathers based on DSM-5 criteria⁽³⁷⁾. Sadeghi et al.⁽³⁸⁾ reported Cronbach's alpha coefficients high than 0.70 for the PCL-5 Persian version and its subscales. The test-retest co-efficient for the total scale was 0.77, for the subscale of intrusion symptoms was 0.80, for the Avoidance subscale was 0.78, for the subscales of NACN and the changes in arousal and reactivity as equal to 0.77. Cut off point was set on 33 to detect probable PTSD and for achieving clinical purposes⁽³⁹⁾.

Beck depression inventory-II: This is widely one used for measuring depression symptoms and 21 main symptoms of depression. According to Qasemzadeh et al,⁽⁴⁰⁾ total reliability of the questionnaire was 0.87 and the reliability of the test-retest was 0.74.

Patient health questionnaire 15 (PHQ-15): The questionnaire has 15 items that are scored on a Likert scale between 0-2. Its changes vary between 0 and 30^(41, 42). Its reliability is 0.80 and its internal consistency is estimated between 0.20 and 0.29⁽⁴¹⁾. Abasi et al,⁽⁴³⁾ reported that the internal consistency of the questionnaire in terms of the Cronbach's alpha coefficient is equal to 0.81.

Statistical analysis: In the present study, data was analyzed using cut-off point, percentage improvement index, Reliable change index (RCI) and Hedges' g' effect size. The percentage improvement was calculated using formula 1. When the result is higher than 50%, changes are significant clinically⁽⁴⁴⁾. In this formula, the average of changes in the follow-up steps was used. In the present study, two types of percentages improvement were calculated, including: a percentage improvement for each participant on a scale and the other one to determine the overall improvement for each of the NET and control groups.

$$\Delta A\% = (A0 - A1) / A0$$

Formula 1: The percentage improvement

RCI was calculated using formula 2. If $RCI \geq 1.96$, it can be concluded that the observed changes can be due to the effectiveness of the treatment and not due to the measurement error^(45, 46). This index was calculated for all scales and for each of the participant using the RCI Calculator software⁽⁴⁷⁾.

$$RCI = \frac{x_2 - x_1}{\sqrt{2(s_1\sqrt{1 - r_{xx}})^2}}$$

Formula 2: Reliable change index (RCI)

The Hedges' g' effect size was calculated using formula 3^(48, 49) and Effect Size calculator⁽⁵⁰⁾. This effect size was used for comparing the participants' changes in two groups.

$$g = \frac{M1 - M2}{SD^*_{pooled}} \times \left(\frac{N - 3}{N - 2.25} \right) \times \sqrt{\frac{N - 2}{N}}$$

Formula 3: Effect size

Results

The improvement process of PTSD, depression and somatic symptoms according to patients is shown in the table 1. The mean, standard deviation and the effect size of Hedges' g for each group before and after treatment, follow up and also the difference between the two groups according to the measurement tool, were listed in the table 2.

The results related to the effectiveness of NET on reducing PTSD symptom: All patients had a PTSD score higher than the 33 cut-off point in the PCL-5 at the baseline step. At the end of the treatment, the scores of the participants in the NET group were decreased below this cut-off point (Figure 1). The NET group showed an acceptable overall improvement 68.25%. The percentage overall improvement for the intrusive symptoms 70.25%, in avoidance symptom was 62.5%, in the NACM symptom was equal to 71.25% and in the changes in arousal and reactivity symptom was 65%. Total percentage improvement of PTSD in the control group was 12%.

Table 1: Percentage improvement index and RCI.

| | NET | | | | Waiting List (Control) | | | |
|---|--------|--------|-------|--------|------------------------|-------|-------|-------|
| | N1 | N2 | N3 | N4 | W1 | W2 | W3 | W4 |
| severityPTSD | 78% | 86% | 38% | 72% | 7% | 13% | 18% | 10% |
| <i>RCI</i> | 9.59 | -12.09 | -5.09 | -11.42 | -0.77 | -1.54 | -2.88 | -1.34 |
| Intrusive symptoms | 72% | 92% | 41% | 76% | 15% | 17% | 5% | 19% |
| <i>RCI</i> | -14.28 | -19.76 | -9.34 | -17.57 | -3.29 | -3.29 | -1.10 | -4.40 |
| Avoidant symptoms | 58% | 80% | 53% | 67% | 6% | 11% | 19% | -6% |
| <i>RCI</i> | -4.28 | -7.35 | -4.91 | -7.35 | -0.61 | -1.23 | -2.45 | 0.61 |
| NACM symptoms | 87% | 92% | 31% | 75% | -6% | 0% | 13% | 19% |
| <i>RCI</i> | -19.97 | -24.07 | -7.68 | -19.46 | 1.03 | 0 | -4.10 | -4.61 |
| changes in arousal and reactivity symptoms | 78% | 74% | 39% | 69% | 9% | 22% | 31% | -6% |
| <i>RCI</i> | -4.44 | -4.92 | -2.06 | -5.87 | -0.48 | -1.27 | -2.54 | 0.32 |
| DEPRESSION SYMPTOMS | 69% | 82% | 51% | 51% | 14% | 6% | 13% | 10% |
| <i>RCI</i> | -8.03 | -12.04 | -6.39 | -6.10 | -1.48 | -0.89 | -2.08 | -1.34 |
| SOMATIC SYMPTOMS | 29% | 93% | 36% | 57% | 29% | 4% | 25% | 10% |
| <i>RCI</i> | -2.15 | -3.58 | -2.15 | -4.16 | -1.72 | -0.29 | -2.01 | -0.72 |

Table 2: The mean, standard deviation, and the effect size of Hedges' g for each group.

| Measurement tools | Therapeutic groups | Pre- | | Post- | | Follow-up | | Hedges' g | Hedges' g |
|---|--------------------|-----------|----------|-----------|----------|-----------|----------|-----------------------|------------------|
| | | Treatment | | Treatment | | | | Between | Between |
| | | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | <i>M</i> | groups post-treatment | groups Follow-up |
| PCL-5 | NET | 6.12 | 48.25 | 9.26 | 16.50 | 9.49 | 15.08 | -2.91 | -2.90 |
| | Control | 7.85 | 46.50 | 6.50 | 43.25 | 5.43 | 40.83 | | |
| Intrusive subscale | NET | 0.96 | 13.25 | 4.04 | 4.50 | 3.09 | 4 | -2.37 | -2.73 |
| | Control | 0.82 | 13 | 2.06 | 13.25 | 0.96 | 11.17 | | |
| Avoidant Subscale | NET | 0.82 | 5 | 1 | 1.50 | 0.57 | 1.75 | -4.12 | -6.95 |
| | Control | 0.5 | 6.25 | 0.5 | 5.25 | 0.42 | 5.75 | | |
| NACM Subscale | NET | 0.96 | 16.25 | 2.45 | 5 | 4.41 | 4.67 | -2.64 | -1.89 |
| | Control | 4.65 | 14.25 | 3.11 | 13.50 | 3.14 | 13 | | |
| changes in arousal and reactivity subscale | NET | 3.10 | 13.75 | 2.89 | 5.50 | 1.83 | 4.67 | -2.05 | -3.22 |
| | Control | 2.71 | 13 | 1.89 | 11.25 | 1.53 | 10.92 | | |
| BDI-II | NET | 3.11 | 28.50 | 5.68 | 11.75 | 3.84 | 10.25 | -2.38 | -3.53 |
| | Control | 4.55 | 30 | 6.02 | 27.75 | 4.28 | 26.75 | | |
| PHQ-15 | NET | 3.77 | 14.25 | 6.26 | 8 | 4.79 | 7.25 | -0.97 | -1.44 |
| | Control | 2.22 | 16.25 | 2.22 | 13.25 | 2.38 | 13.50 | | |

Results related to the effectiveness of NET on reducing co-morbid symptoms of depression and somatic symptoms: The trend of depression symptoms changes is shown in figure 2. The percentage improvement in this group varied from 51% to 82% ($RCI \geq 1.96$). The percentage of overall improvement for depression symptoms in participants treated with NET, 63.25% and participants in the control group was 10.75%. Somatic symptoms in the NET group was 53.75%, indicate that general improvement for all participants in this group is significant ($RCI \geq 1.96$). The overall improvement in these symptoms in the control group was 17%, which is significant only for the W3 participant. Figure 3 shows the evolution of the somatic

symptoms.

Discussion

The aim of this research was to investigate the effectiveness of narrative exposure therapy on severity of posttraumatic stress symptoms and co-morbid symptoms of Iranian survivors in Mina disaster. According to the results, NET has led to reduce the severity of PTSD, depression, and somatic symptoms significantly. NET had the greatest effect on the overall improvement in PTSD (Hedges' $g = -2.91$), which remained constant during the follow-up period (Hedges' $g = -2.90$). Among the four PTSD symptom, the highest improvement was observed in the avoidance symptoms (Hedges' $g = -4.12$),

and the lowest amount was related changes in arousal and reactivity (Hedges' $g = -2.05$). The improvement rate of these symptoms increased during the follow up step (Hedges' $g_{\text{Hyper arousal}} = -3.22$; Hedges' $g_{\text{Avoidance}} = -6.95$).

events simultaneously. Therefore, such narratives are not merely a neutral reproduction of what happened. However, they are more considered in the form of cognitive reconstruction that can be full of emotions and

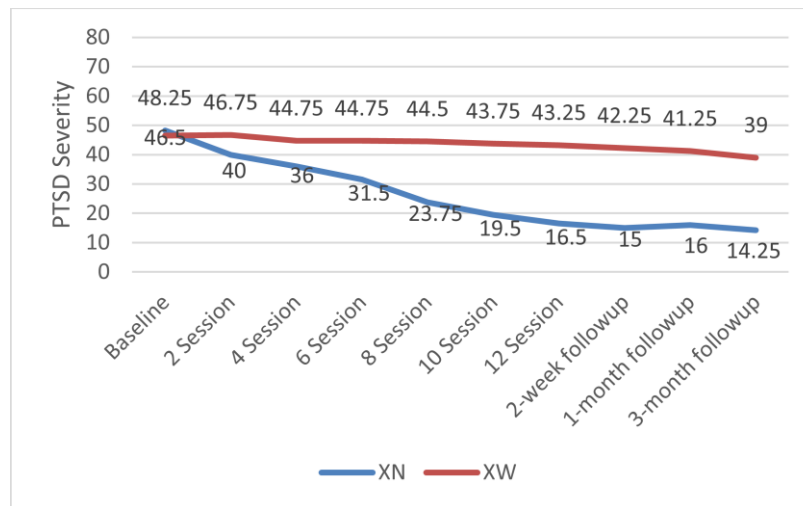


Figure 1. PTSD Severity During Narrative Exposure Therapy

Other studies, such as Alghamdi et al.⁽²⁸⁾, Bichescu and Neuner⁽²⁹⁾, Zang et al.⁽³¹⁾, and Hijazi et al.⁽⁵¹⁾, have confirmed that NET has a significant effect on the severity of PTSD. Therefore, the results of this study are consistent with previous studies results.

Rubin⁽⁵²⁾ emphasized to importance role of memory in the etiology of PTSD. Different types of autobiographical memory, general memory and episodic memory are affected in PTSD. During NET the patients with PTSD were asked to express traumatic memory in details and this time emphasizing spatial and temporal context of its occurrence, while experience all emotions, feelings and physical emotions and thoughts about traumatic memory⁽⁵³⁾. A patient with PTSD experiences gradually emotional habituation through considering memories of a traumatic event in a story which is experienced in the form of cool memories. In addition, by reviewing the lifeline, positive memories are also being reviewed for him/her and are considered as a rich source of life. Such processes lead to partial improvement of disorder⁽²⁵⁾.

Storytelling and narrative activity is considered as one of the natural human activities that make individuals enable to organize their life events in a coherent structure and thus they can get a sense of this way. In addition, processing and emotional regulation can benefit from this organization⁽⁵⁴⁾. Many of the positive and negative details of an event are again considered during narrative of life

emotions. When meaning and structure is given to an experience, its emotional effects can be managed in a better way⁽⁵⁵⁾. Pennebaker et al.⁽⁵⁴⁾ during a study concluded that the writing of traumatic events and extremely inconvenient experiences could play an important role in improvement of the mental and physical health of individuals. According to Pascuzzi and Smorti, there is no significant difference between writing and speaking⁽⁵⁵⁾.

A significant improvement was observed, 17% in the intensity of PTSD of one of the control participant (W3). This percentage improvement has been achieved during six months. In other studies, it has been reported that a significant improvement was observed among patients who were not under active treatment intervention⁽⁵¹⁾. Over 50% of patients with PTSD were improved during the first three months after the event⁽³⁾. In addition, according to the results of some studies, there is a significant relationship between social supports provided by the society with the accelerated improvement of PTSD⁽⁵⁶⁾. Therefore, the observed improvement in the control group may reflect the follow-up of their mental health status by a major organization in providing Hajj health care services, Hajj and pilgrimage medical center of the IRC.

On the other hand, according to the results of previous studies, people with lower levels of exposure experience

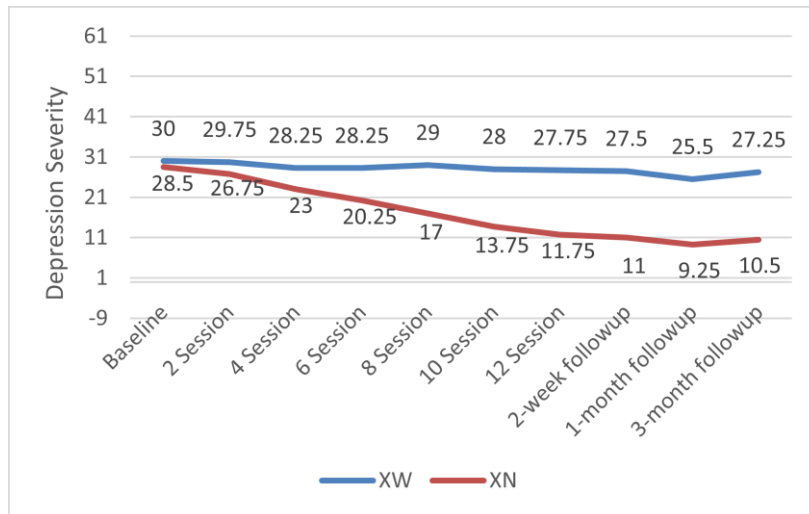


Figure 2. Depression Severity During Narrative Exposure Therapy

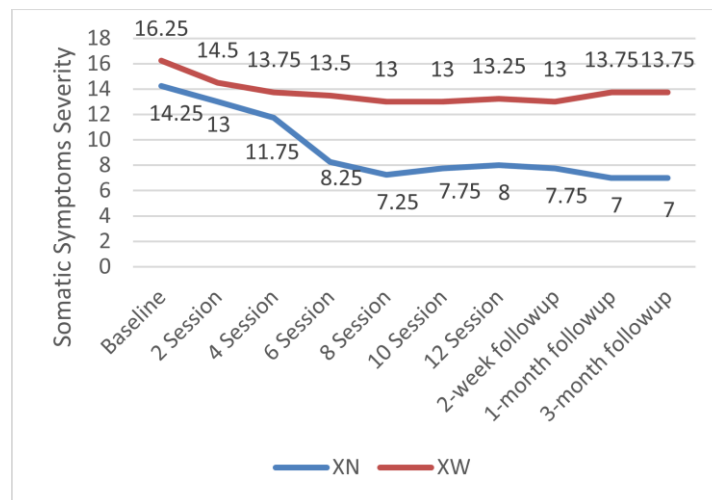


Figure 3. Somatic symptoms severity During Narrative Exposure Therapy

more improvement over the time⁽⁵⁷⁾. Hajj and pilgrimage organization of Iran asks women and children to take part in the 'stoning of Satan' ritual at night to protect them against the pressures of the population. Consequently, women have not faced high levels of Mina disaster (it was true about the participant W3). However, it should not neglect that the observed improvement in the control group may be due to psychoeducation or repeated measurements.

According to the results of this study, the participant receiving NET in addition to the overall severity of PTSD, showed a significant improvement in intrusive, avoidance and changes in arousal and reactivity symptoms. These results are consistent with the results of Zang et al.³⁰. However, Zang et al,³⁰ reported that highest

decrease in comparison with the control group, was observed in the subscales of changes in arousal and reactivity, and then the subscales of intrusive and avoidance symptoms. While in the present study, changes in arousal and reactivity symptom showed the least change compared to the control group (Hedges' $g = -2.05$). This difference can reflect the difference in measurement scales or sample under study. While in present study, PCL-5 was used for evaluation of the PTSD symptoms based on DSM-5 diagnostic criteria. Zang et al. used the impact of event scale-revised (IES-R) based on DSM-IV diagnostic criteria. In addition, this may be due to the presence of dissociative symptoms in some survivors of Mina disaster, especially those who had a longer exposure to the event and who were present

on the Mina disaster at the intersection of streets 204 (N2 and N4). Negative alterations in cognition and mood factor (NACM) in DSM-5 was added to the diagnostic criteria of this disorder. According to the results of this study, NET could reduce NACM symptoms (Hedges' $g=-2.64$). This subscale in the PCL-5 had seven items. One item (question 8) is related to having problems about remembering important parts of the traumatic experience. Narrative exposure therapy through frequent traumatic event narrative help the survivor's remember the most important details about the order of the occurrence of the events, the people involved in the event, the conversations between the survivors and others, their thoughts, many sensory and behavioral details. Two items were related to having strong negative beliefs about self, others and the world (question 9), and blaming self or others for traumatic experience (question 10). Narrative exposure therapy can have a significant effect on both the negative beliefs and the blatant thoughts of the survivors of Mina disaster in two ways. First, these beliefs can be considered as a part of the fear/trauma network that have been identified during narrative exposure and their importance has diminished following habituation experience or whether these beliefs and thoughts are considered as a part of the further evaluations of the pilgrims in the Mina disaster, performance and decision making by themselves or others that remembering more details or achieving new insights have adjusted those above items during the narrative of a traumatic event or after experiencing emotional habituation. Also, the four items of the NACM subscale are related to negative mood changes. These items include strong negative affect such as fear, panic, anger, feeling guilty or shame (question 11), loss of interest in the activities that were formerly enjoyable (question 12), getting away from people (question 13) and having a problem in experiencing positive emotions (question 14).

The above negative affects form the main emotional core of the fear/trauma network in people with PTSD. In addition, the physiological arousal potential caused by the activation of this network can be so much that a person avoids any form of emotional arousal, even his/him positive emotions^(53, 58). Thus, like other symptoms, narrative exposure and the possibility of experiencing emotional habituation, which is provided through NET, can lead to adjust the fear/trauma network and reduce the negative mood symptoms. In addition,

any decrease in symptoms with emotional components can be a reflection of the emotional regulation that is created following the narrative of life story and more coherence in autobiographical memory⁽⁵⁵⁾.

According to the results of this study, NET could reduce the depression symptoms of the survivors of Mina disaster (Hedges' $g=-2.38$). This symptom has improved significantly in the follow-up steps (Hedges' $g=-3.53$). This result is consistent with Schaal's findings and the results reported by Hizaji et al.⁽⁵¹⁾, Bichescu and Neuner⁽²⁹⁾ and Zang et al.⁽³¹⁾. However, in the study conducted by Hizaji, the difference between the two groups was significant only until the second month of treatment, and then no significant difference was observed between the two groups. In order to discuss about this difference, it should be noted that a significant difference was observed between the Hizaji study and the present study in two respects: first, the sample under study was influenced by special immigration conditions. While in this study, survivor's in another country (Saudi Arabia) faced with a traumatic event related to mass gathering (Mina disaster) and lived in their country during their treatment. In addition, Hizaji used NET with a low dose (three sessions), while in this study, 12-session NET was used.

Post et al.⁽⁵⁹⁾ believe that the high rate of co-occurring between PTSD and depression following a traumatic event is due to common factors between them such as dysphoria, rumination and negative affect. For example, dysphoria, which is considered as a major component of depression, in patients with PTSD is associated with a disability in remembrance of important traumatic events, lack of interest, limited affect, shortening the future; sleep problems, restlessness and focusing problems. In addition, rumination related to trauma in depression also is similar to intrusive symptoms in PTSD⁽⁵⁹⁾. It seems that NET by effecting these common symptoms leads to improve the depression.

The latest result of the present study is related to the effect of NET on reducing the somatic symptoms of the survivors of Mina disaster (Hedges' $g=-0.97$), which also increased during the follow up steps (Hedges' $g=-1.44$). This result is consistent with the results of Hijazi et al.⁽⁵¹⁾. However, this effect has not been lasting at the follow-up steps in their study. This explanation can reflect the features of the sample. Two participant from the NET group (N2 and N4) from the pilgrims were present on the 204 street, which was exposed to severe pressure for

several hours. From this perspective, the somatic symptoms reported by them could be part of a fear/traumatic network following Mina disaster that has lost its power during treatment and the links of this network as well as the emotional habituation. According to Pennebaker⁽⁵⁴⁾, psychotherapies can play an important role in improving the physical condition of PTSD patients through the narrative of stressful events⁽⁵⁴⁾. In addition, the dose of NET in the present study was greater than the study conducted by Hijazi et al⁽⁵¹⁾.

The results of this study showed that, NET could be used in the sample including Iranian adult with PTSD and it can be expected that this treatment will have a positive significant impact on reducing the overall severity of this disorder and its co-morbid disorders.

The study was associated with several limitations. First limitation was access to the sample, which had a significant effect on the identification of pilgrims and attracting their participation in the treatment process and second limitation is related to generalize the results due to cultural considerations.

It is suggested that, in future studies, other disorders that have relationship with Mina disaster as a major traumatic event, including prolong grief disorder, to be considered. In addition, it is suggested that similar studies to be carried out with respect to cultural considerations in other countries affected by Mina disaster.

Conclusion

According to the results of this study, NET has a significant effect on the reduction of PTSD symptoms and its co-morbid symptoms.

Acknowledgment

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