The Effects of a Short-term Cognitive Behavioral Group Intervention on Bam Earthquake Related PTSD Symptoms in Adolescents

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Objective: Post traumatic stress disorder (PTSD) may be the first reaction after disasters. Many studies have shown the efficacy of cognitive–behavioral therapy in treatment of post traumatic stress disorder. The main objective of this study is to evaluate the effect of group CBT in adolescent survivors of a large scale disaster (Bam earthquake).

Methods: In a controlled trial, we evaluated the efficacy of a short term method of group cognitive-behavioral therapy in adolescent survivors of Bam earthquake who had PTSD symptoms and compared it with a control group. The adolescents who had severe PTSD or other psychiatric disorders that needed pharmacological interventions were excluded. We evaluated PTSD symptoms using Post traumatic Stress Scale (PSS) pre and post intervention and compared them with a control group.

Results: 100 adolescents were included in the study and 15 were excluded during the intervention. The mean age of the participants was 14.6±2.1 years. The mean score of total PTSD symptoms and the symptoms of avoidance was reduced after interventions, and was statistically significant. The mean change of re-experience and hyper arousal symptoms of PTSD were not significant.

Conclusion: Psychological debriefing and group cognitive behavioral therapy may be effective in reducing some of the PTSD symptoms.

Keywords: Behavior therapy, Cognitive therapy, Group psychotherapy, Post traumatic stress disorder, Adolescents, Earthquakes

During past decades, psychological effects of earthquakes have been in the focus of attention. Studies that investigate the outcomes of natural events, demonstrate particular clinical responses after exposure to traumatic events in earthquake survivors such as loss of special persons, social construction and lack of social support (1).

Researches have shown that severe earthquakes lead to long time disabilities. In two separate studies done following 1999 Turkey earthquake with 430 and 586 subjects, close relationships were found between the severity of disabilities and mental disorders like PTSD with severity and the level of exposure to trauma (2, 3). In general, PTSD is the survivors' first response to the disaster which is an important anticipator for these patients' long term mental and physical health conditions (4). Based on some studies, 18.3% of people who were exposed to these kinds of traumas suffered from PTSD (5).

A research in Taiwan showed that 21.7% of 323 participants had PTSD syndrome features. However, in general, there are different reports for PTSD prevalence in earthquake survivors which varies from 2.5 to 33% in adults and 28 to 70% in children (6). Encountering level to a threat is a specific anticipator for disability. Additionally, types of coping strategies and defense mechanisms such as avoidance and demographic characteristics including female gender, low social class, younger or older age also have correlation with psychological distress (5). In another study, emotional problem backgrounds, use of neurotic responses and high level of dealing with life events have been related to disability length derived from PTSD after earthquakes (7). Moreover, loss of social and family support, like parents' death, has been related to PTSD syndromes severity (8). Concurrent incidence of other psychiatric disorders is another problem which leads to disability...
PTSD in children. In one study on 218 survivor pupils from Armenia earthquake, a relationship between PTSD symptoms severity and depression symptoms incidence was reported (9).

PTSD Children experience clinical pain affecting their educational performance and other functional areas (10). Therefore, therapeutic interventions and prevention are needed. Various treatments have been introduced to control PTSD symptoms such as pharmacotherapy treatments (11,12); non-pharmacological treatments such as individual and group supportive psychotherapy; and cognitive-behavior approaches including muscle relaxation, systematic desensitization and other psychotherapy treatments (13,14,15).

Group therapy and supportive groups are used to treat PTSD when there are so many individuals who are affected by PTSD (14). Yule et al. have proposed group techniques to confront PTSD symptoms; these techniques are based on cognitive-behavior approaches and are used to treat PTSD (16).

Psychological debriefing is another method which is used between 48 to 72 hours after the incident to prevent the disorder (17). Using techniques such as regulating emotions, normalization of responses and training for normal psychological reactions to events in a supportive group background are used in individual therapeutic sessions to prevent and decrease PTSD symptoms (18).

In a variety of studies, these interventions have been implemented to decrease PTSD symptoms which were derived from any kinds of traumas like road crashes between two groups. Case and control in total 106 participants which revealed that the case group had more performance drop. Regarding to more severity of trauma and more length of impatience in case group, it's possible to affect on the outcomes (19).

In another study, the effectiveness of these interventions on PTSD prevention in participants who were exposed to different traumas was investigated, in which there was no difference between case and control groups (20). These interventions have been implemented in the world when natural disasters such as earthquakes take place; however, some meta-analyses have shown different results (21, 22, 23). Nevertheless, when there are long periods between the implementation of this intervention method and the incidence time, this intervention would be used less than the others.

Doing other kinds of psychotherapy is another intervention which is used in this field. In one study on 64 survivor adolescents of Armenia earthquake, trauma & grief based brief psychotherapy reduced stress symptoms and although it did not reduce depression symptoms, it showed less intensification of depression symptoms in comparison with the control group (24). Nevertheless, this question still needs to be investigated that: "could psychological debriefing and cognitive-behavioral interventions be effective in reducing PTSD symptoms resulted from natural disasters with high level of trauma like BAM earthquake "?

Still it seems that the combination of these two methods can be more effective than using one of them (17). Considering the great number of traumatized children and adolescents in BAM earthquake, group interventions were necessary. Therefore, we implemented a combination of interventions like psychological debriefing and short-time behavior therapy according to Crisis Intervention Center Model in Norway (25) and Mental Health Office in Ministry Of health with focus on symptoms of disorder. Using PSS scale (26), we compared the effectiveness of these interventions with a control group.

Materials and Method

The current study has been performed as a field trial in two groups on male and female adolescents who had experienced BAM earthquake stress 6 and 8 months after the earthquake. Sampling method was simple improbability from resident adolescents by referring to their tents. Participants were allocated and distributed into case and control groups randomly.

Because parallel intervention was not possible to whole of the participants, control group was selected based on a waiting list. Therefore, in each month, some participants were given interventions and the others were assigned to be in a waiting list for next months.

In order to remove time effects, interventions were executed for case and control groups in two neighbor regions randomly and then, similarity of the characteristics for each group was compared.

Inclusion & Exclusion criteria

Those adolescents who had at least two PTSD symptoms after BAM earthquake based on psychiatric interview by a psychiatrist and were aged 11 to 18 were included in the study and psychotic and mood disorder patients and patients with sever physical disability or severe illness who needed medical interventions were excluded from study.

Data collection

Demographic information were recorded and assessed through a researcher-made questionnaire and symptoms assessment were executed by PSS scale which is implemented to quantify PTSD symptoms. This scale consists of a series of questions to evaluate the severity of reexperiencing, avoidance and hyper arousal. Screening and diagnosis of disorders were performed by a psychiatrist according to DSM-IV criteria. On the other hand, assessment and completion of questionnaires were carried out by a trained psychologist in collaboration with a resident of psychiatry.

The therapeutic method was explained to the participants and their parents after screening and identifying the samples. Then their consent was obtained, demographic information was recorded and PTSD symptoms were assessed. Then, group
intervention sessions were executed weekly by a trained psychiatrist; the first session was specified to psychological debriefing and to provide a supportive setting to express earthquake memories, responses, reactions and feelings about earthquake during confrontation and to share them with the group. Other sessions were assigned to psychotherapy regarding cognitive – behavioral approaches which were based on Crisis Intervention Center Model in Norway (25) and Mental Health Office in Ministry Of health using imagination and guided imagery methods.

**Therapeutic interventions**
Therapeutic sessions were as follows:
- **First session:** Psychological debriefing using normalization of responses, feelings interchange in the group and providing a supportive setting to express memories, responses, reactions and feelings during confrontation and to share them with group members.
- **Second session:** Techniques related to intrusive thoughts and events recalling, which consisted of imaginative techniques including screening techniques, hand and distance, framing and positive counter image.
- **Third session:** Using hyper arousal techniques like relaxation training, breathing control and guided imagery to visit a safe place.
- **Fourth session:** Event avoidance techniques consisting of grading traumatic reminders, imaginal and in vivo graded exposure.

**Participants**
Case and control groups are as follows:
- Group A: The group who just received therapeutic interventions.
- Group B: The group who received no therapeutic interventions (Control).

The research method and interventional methods were ethically approved by the Vice – chancellor for research in Tehran University of Medical Sciences. After providing interventions, symptoms were assessed again, and then the waiting list group received therapeutic interventions.

**Statistical analysis**
Mean scores for symptoms pre and post interventions in each group were compared using paired sample t-test. We calculated the difference of mean scores and compared them between groups using T-independent sample test and ANCOVA (considering age as covariate). Chi square analysis was used to compare nonparametric data, and descriptive statistical methods were used for demographic characteristics. SPSS-11.5 statistical software was used for data analysis.

**Results**
One hundred survivor adolescents of Bam earthquake were assessed in case and control groups on a clinical trial. Of them, 15 were excluded from the study because of migration, change of residence or lack of interest to continue with the study. Therefore, 85 persons aged (14.6±2.1), (25.9% boys and 74.1 girls) were compared. The mean age of the participants in case and control groups were 14±2.3 and 15.1±1.9 (p=0.024) respectively. Participants were single and had trauma experiences of the earthquake either as attendance, observer or hearer. The demographic information of the 2 groups was compared, showing that the two groups were similar in all the indicators except gender distribution. Table 1 demonstrates the demographic characteristics of the participants.

Comparison of dealing with the disaster and its consequences between the 2 groups showed that 97.2 percent of the case group and 95.9% of the control group had direct exposure to the event. 5.6% of the case group and 14.3% of the control had been buried under debris but no one in the case group was seriously hurt, whereas 12.2% of the control had serious injury and 2% had severe paralysis.

Based on the results, 30.6% of the case group and 16.3% of the control group had lost at least one of their immediate family members. Type of dealing with the disaster and its consequences were compared between the two groups using Chi square statistical model in which there was a significant difference between the two groups in physical hurt from the earthquake (p=0.03) ; differences were not significant in other indicators. Comparing the two groups for PTSD features using two independent T-tests showed significant differences just in mean avoidance features score; no significant differences were observed in others . Table 2 demonstrates the mean scores of indicators in the two groups.

After interventions, symptoms were assessed again and mean scores were compared pre and post intervention. Table 3 demonstrates mean scores changes in the two groups separately.

In case of comparison difference of pre and post test mean scores between the two groups for re – experiencing, avoidance and hyper arousal, there were significant differences on re – experiencing and avoidance (p=0.031 and p=0.006) respectively. No significant differences were observed for hyper arousal (p=0.317). In case of the total PTSD score, this difference was also significant between the two groups (p=0.005). Because of group differences in age level, we compared the mean differences using ANCOVA considering age as a covariate. According to these results, the mean differences of re-experience and hyper arousal were not statistically significant (p=0.068 and p=0.369 respectively) but the mean differences of avoidance and total PTSD symptoms were significant (p=0.024 and p=0.020 respectively).
**Table 1. Participants’ demographic characteristics**

<table>
<thead>
<tr>
<th>Demographic information</th>
<th>Statistical index</th>
<th>Case group</th>
<th>Control group</th>
<th>P value</th>
</tr>
</thead>
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<tr>
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<td></td>
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<tr>
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<td></td>
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<tr>
<td>Employment status</td>
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<tr>
<td></td>
<td>Unemployed</td>
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<td>6</td>
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<td></td>
<td>Student</td>
<td>31</td>
<td>31</td>
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</tr>
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**Table 2. Baseline PTSD means scores in case and control groups**

<table>
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<tr>
<th>Groups</th>
<th>Case Group</th>
<th>Control Group</th>
<th>P-Value</th>
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</thead>
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<tr>
<td></td>
<td>Re – experiencing</td>
<td>6.8±3.4</td>
<td>6.3±3.7</td>
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<td></td>
<td>Avoidance</td>
<td>7.7±4.8</td>
<td>7.1±4.3</td>
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<tr>
<td></td>
<td>Hyper arousal</td>
<td>8.2±3.4</td>
<td>8.7±3.4</td>
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<tr>
<td></td>
<td>Total Symptoms</td>
<td>22.9±9.7</td>
<td>26.47±8.3</td>
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**Table 3. Mean score changes in two groups separately**

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Case Group</th>
<th>Control Group</th>
<th>P Value</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Pre test</td>
<td>Post test</td>
<td></td>
</tr>
<tr>
<td>Re – experiencing</td>
<td>7.6±2.8</td>
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<td>0.025</td>
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<tr>
<td>Avoidance</td>
<td>10.1±4.9</td>
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<tr>
<td>Hyper arousal</td>
<td>8.7±2.9</td>
<td>7.4±3.3</td>
<td>0.099</td>
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<tr>
<td>Total Symptoms</td>
<td>20.7±9.8</td>
<td>22.0±19.7</td>
<td>0.002</td>
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</tbody>
</table>

**Discussion**

After Bam earthquake and based on the extent of PTSD prevalence, conducting this study was of importance. This was a unique study because it has been done on a large scale natural disaster for traumatized adolescents. In addition, this study has combined two separate interventional methods, debriefing and short term group CBT, that were investigated separately before; therefore, no similar study has been conducted on the subject to date. Based on the results of this study, supportive interventions consist of psychological debriefing (one session) and cognitive behavioral therapy (three sessions) which are effective on decreasing avoidance and total PTSD symptoms in comparison with the control group. However, they do not effect the re-experience and hyper arousal symptoms. Efficiency of psychological debriefing and CBT has been investigated in different studies with other methods and different instruments separately.

The outcomes of studies conducted on the effect of psychological debriefing have been different. The first aim of debriefing is to prevent PTSD incidence. Regarding the large range of objectives such as normalization of responses, verbalizing of event experiences, strengthening and expanding group supports, this method is not identified as a psychotherapy method, so there are many disagreements about this issue (27). Mc Farlen reported that although these interventions may have positive effect in short time, they are negative in longtime (27), whereas Jenkins and Shalev have reported positive effects for these interventions (27). In one research, the effect of group therapy using psychological debriefing was investigated in survivors of natural events after 6 months which showed and control groups symptoms decreasing in both cases (18). In another study, psychological debriefing in police and firemen personnel was used which caused a decrease of PTSD occurrence in the case group (28). In a Meta – analysis, the efficiency of these interventions in preventing chronic PTSD and other disorders related to trauma was investigated, and based on the results these methods have not decreased PTSD symptoms or other related disorders (21).

Those studies which have investigated the effectiveness of cognitive behavioral methods in children and adolescents mostly have had positive results (29, 30, and 31).

In one study in Turkey on 231 earthquake survivors who suffered from PTSD after the earthquake, short term behavioral treatments (3-4 sessions) during 13 months after the earthquake had reduced all features of the disorders (15).

In another study, the effectiveness of 4 – session cognitive – behavioral interventions following physical trauma was investigated that lead to introducing IES scale indicators (32). Effectiveness of these interventions was investigated in children too and 4 – session treatment lead to decrease of PTSD symptoms in children who had PTSD symptoms till 2 years after a natural disaster (33). In the Yule et al study on survivor girls from a sunken ship called Jupiter during 5 to 9 months, the efficiency of these interventions were
examined, and the results revealed that IES scale indicators had been reduced in the case group (9). Although the combination of these two interventions has reduced avoidance and total scores of symptoms, some limitations and confounding factors may affect these results.

Sampling method is one of these factors, which was executed because of existent limitations of disaster situation; and based on the reference, the order of treatment groups and randomized assignment of participants were not possible. However, case and control groups were randomly assigned.

Both the case and control groups were similar in all demographic characteristics and the kind of exposure to the event except age, gender distribution and physical injuries. Although we tried to control age effect using the ANCOVA statistical method, gender differences and physical injuries may have confounding effects on the results and classification as these factors may reduce the power of the study. Other limitation was the effect of group sessions independent of therapeutic interventions and it was better that the control group had talking group sessions without CBT contents to control this effect. Another limitation is that the participants and assessors were aware of interventions type and the study was not blind. Moreover, according to the results, the drop rate in case and control groups was 28% and 2% respectively; this important difference can affect the outcome of the analysis.

On the other hand, results show that although the interventions have caused to reduce re-experience and hyper arousal symptoms, in comparison with the control group, this effect is not significant. This could be affected by various factors like sample size. If sample size in both groups was larger, maybe this difference would have been statistically significant. There are other factors such as environmental stressors, next post earthquakes and few therapeutic sessions which may have effect on loss of decreasing in hyper arousal symptoms. Using PSS as the only evaluation instrument is another limitation of the study. Therefore, for future studies it is proposed to use blind researches, randomized sampling with a larger sample size, more than one instrument and more therapeutic sessions.

In conclusion, doing therapeutic interventions consisting of a psychological debriefing sessions and three groups cognitive – behavioral therapy sessions could decrease PTSD symptoms in general and avoidance symptoms in particular.

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References