

# Cognitive-behavioural Group Intervention for PTSD Symptoms in Children Following the Athens 1999 Earthquake: A Pilot Study

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## ABSTRACT

**This study examined the effects of a short-term group cognitive-behavioural intervention in children who were experiencing PTSD symptoms following the Athens 1999 earthquake. Twenty children, aged 8–12 years, referred for treatment to a local child mental health team were assigned, depending on timing of referral to two groups – Group 1 ( $N = 10$ ), which started treatment 2 months after the earthquake and Group 2 ( $N = 10$ ), which started treatment at 4 months postearthquake. A statistically significant reduction in overall PTSD (Posttraumatic Stress Disorder) symptoms across the three PTSD symptom clusters – intrusion, avoidance, and arousal – as well as in depressive symptoms was reported immediately after the intervention. The treatment also produced a statistically significant improvement in children’s psychosocial functioning. Further significant improvement was reported in children at an 18-month follow-up. Treatment gains were maintained at a 4-year follow-up. Despite several limitations to this study, short-term group CBT (cognitive-behavioural therapy) was found to be a useful treatment approach, which can be offered in clinical settings, particularly if resources are limited.**

## KEYWORDS

*CBT, disaster, earthquake, group treatment, PTSD*

ON 7 SEPTEMBER 1999, at 2:56 pm, an earthquake of magnitude 5.9 on the Richter scale hit Athens, causing extensive damage to residential and industrial buildings. More than 40 buildings collapsed, 143 deaths and 700 injuries were reported and 40,000 people became homeless. The heaviest damage occurred within a radius of 12 km from the

*Clinical Child Psychology and Psychiatry* Copyright © 2006 SAGE Publications (London, Thousand Oaks and New Delhi) Vol 11(4): 543–553. DOI: 10.1177/1359104506067876 www.sagepublications.com

epicenter (Mount Parnitha), an area inhabited by approximately 1 million people (Organization of Antiseismic Planning and Protection [OAPP], 2001). The main event was followed by significant aftershock activity that created fear among the population, and many people hesitated to sleep indoors even when their houses had suffered minimal or no damage.

Recent child-disaster studies suggest that children and adolescents may develop post-traumatic stress symptoms after exposure to an earthquake. The reported rates range from 21 to 70% (Goenjian et al., 1995; Hsu, Chong, Yang, & Yen, 2002). Follow-up studies have shown long-term persistence of PTSD symptoms (Goenjian et al., 1995, 2000) and that even moderate-intensity earthquakes can lead to long-standing problems in some survivors (Carr et al., 1997). Notwithstanding high prevalence rates and significant public health impact (Keane, 1996), the disaster-related PTSD literature contains surprisingly few published studies evaluating the efficacy of interventions for this disorder (National Institute for Clinical Excellence [NICE], 2005).

In adults, the evidence-based treatment of PTSD is robust for CBT (Foa & Rothbaum, 1998; NICE, 2005). In comparison to adult PTSD literature, relatively few PTSD treatment studies have been conducted with children and adolescents. However, the up-to-date evidence is also strongest for CBT delivered in either individual or group format (Cohen, Berliner, & March, 2000; Feen, Foa, Treadwell, & March, 2004). Recently a small number of studies examining the efficacy of group-delivered protocol-driven CBT interventions have been published (Chetomb, Nakashima, & Hamada, 2002; Goenjian et al., 1997; March, Amaya-Jackson, Murray, & Schulte, 1998; Stein et al., 2003). Only two studies targeted children with disaster-related PTSD.

In a nonrandomized study Goenjian et al. (1997) compared CBT to no treatment for children who suffered PTSD 18 months after having experienced the 1988 earthquake in Armenia. Children in two of four schools near the earthquake epicenter received a school-based intervention, comprising of four 30-minute group sessions and an average of two individual sessions. The intervention included reprocessing the trauma, modifying cognitive distortions, coping strategies, grief resolution, problem solving, aggression management, and relaxation. Children in the remaining two schools received no intervention. Treatment effects were assessed with self-report measures of PTSD and

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depression prior to treatment and 18 months later. Participants who received treatment, in contrast to controls who did not receive treatment, showed a significant reduction in PTSD symptoms. In terms of clinical significance, at follow-up, 28% of the children in the treatment group met criteria for PTSD according to the *Child Posttraumatic Stress Disorder Reaction Index* (CPTSD-RI) compared to 60% at pretreatment. The respective figures for the control group were 52 and 69%, indicating an increase in the PTSD rate among those who did not receive intervention. The results are quite impressive given the restricted number of short sessions but the conclusions are limited by methodological drawbacks of the study. The diagnostic status was not based on a psychiatric interview, the evaluators were not blind to study condition, the assignment of children to study condition was not randomized and assessment was not conducted immediately following the treatment.

Chetomb et al. (2002) conducted the first randomized control trial (individual versus group intervention) with children, 2 years after their exposure to a hurricane. The four-session treatment focused on encouraging children to review, in a structured way, their hurricane experiences using a combination of play, expressive art, and discussion. The treatment proved effective as indicated by a significant reduction in PTSD symptoms following both types of treatment and the gains were maintained at 1-year follow-up. An interesting finding reported in this study was that children were more likely to complete group treatment than individual treatment. Taken together, both studies described here indicate overall good support for the usefulness of group CBT in reducing disaster-related posttraumatic stress reactions in children who fall within the clinical range but nevertheless have not been referred for treatment. These studies, however, do not give us any information about whether the treatment had an effect on children's psychosocial functioning.

Ehnholt, Smith, and Yule (2005) report the use of a manualized intervention to deliver trauma-focused CBT to adolescent refugees and asylum seekers in London secondary schools. The group who received six weekly CBT sessions showed statistically significant but clinically modest reductions in distress immediately following the intervention. The improvements were seen not only in PTSD symptoms but in behavioural and emotional symptoms as well. However, the gains were not maintained in the few adolescents who participated in follow-up. It was concluded that while the CBT intervention has a role to play, other social interventions, particularly resolving the children's right to remain in their chosen host country, were more important.

The present study aimed to contribute to the existing knowledge in the field by conducting a clinic-based intervention study. The Community Mental Health Service (CMHS) of Peristeri, established in 1990 to serve the population living in the western sector of Athens (an area that was highly affected by the earthquake), which has had a child psychiatry service in operation since 1998, received many referrals of children and adolescents who developed postearthquake PTSD symptoms. In light of an already existing heavy clinical case load and limited resources, we were concerned that we would not be able to offer help to those traumatized children and their families within a reasonable time-frame. Given that groups have the potential to deliver treatment to a larger number of children in need and on the basis of evidence available at the time for effective psychosocial interventions for PTSD in children (March et al., 1998; Saigh, Yule, & Inamdar, 1996), we opted for a pilot clinic-based group CBT intervention. We hypothesized that PTSD and associated depressive symptoms would improve within the context of this type of treatment, as well as that children would find the group format acceptable. We report the results of this pilot trial of group CBT for children with earthquake-related PTSD.

## Method

### Subjects

The participants were 20 children, aged 8 to 12 years ( $M = 9.6$  years), consecutively referred to the local CMHS for assessment and treatment of PTSD symptoms, which had developed after their exposure to an earthquake and who met the study criteria and agreed to participate in group treatment. The inclusion criteria were: (1) Age, 8–12 years; (2) meeting the DSM-IV (American Psychiatric Association [APA], 1994) criteria for a diagnosis of PTSD causing mild to moderate dysfunction; (3) suitability for group treatment as judged by general cognitive abilities and absence of comorbid psychopathology (e.g., conduct disorder, ADHD). There were 11 girls and 9 boys. All children received comprehensive clinical assessment between 6 to 14 weeks following the earthquake, depending on time of referral to the clinic. This assessment comprised separate interviews with parents and children. The diagnosis was based upon the clinician's judgement based on clinical interviews, backed up by the child meeting the cut-off on the *Children's Revised Impact of Event Scale* (CRIES; Giannopoulou et al., 2006) as an alternative to structured diagnostic interview. Group 1 (immediate treatment group) comprised the first 10 children referred to the service that met the inclusion criteria for the study and waited less than 2 weeks prior to commencing treatment (2 months after the earthquake). Group 2 (delayed treatment group) comprised 10 children who had waited from 10 to 12 weeks prior to entering into treatment, which commenced 4 months following the event. Their symptoms and diagnoses were reconfirmed immediately prior to entering the group CBT treatment. Participants were asked to return for follow-up evaluation at 18 months after completing the treatment. A second follow-up wave took place between February and March 2004 (approximately 4 years after completing the treatment).

Seventeen children of the twenty (85%) completed the intervention. More specifically, three children in Group 2 dropped out during the course of the therapy and despite our efforts to contact them they did not return for follow-up evaluation. These three children were therefore not included in the analysis.

### Outcome measures

For the purpose of evaluating the intervention, the following instruments were administered before treatment (T1), immediately after completing the treatment (T2), at first follow-up (T3) and at the second follow-up (T4).

**Primary outcome measure: Children's Revised Impact of Event Scale (CRIES)** The CRIES (Dyregrov & Yule, 1995; see <http://www.childrenandwar.org>) is a newly developed 13-item scale adapted from the Impact of Event Scale (Horowitz, Wilner, & Alvarez, 1979). It is a self-report scale designed to measure PTSD symptoms of intrusion, avoidance and arousal. A score of 17 and above on the eight items relating to intrusion and avoidance has been found to be an efficient cut-off for discriminating cases of PTSD, misclassifying only 10% (Dyregrov & Yule, 1995). Each question is answered on a 4-point scale (not at all, rarely, sometimes, often), scored 0, 1, 3, 5 with no reversed items. The total score indicates severity and ranges from 0 to 65. The psychometric properties of the original and the revised scale have been described elsewhere (Dyregrov, Kuterovac, & Barath, 1996; Giannopoulou et al., 2006; Smith, Perrin, Dyregrov, & Yule, 2003; Yule, ten Bruggencate, & Joseph, 1994). This scale was used as the primary outcome measure of the treatment's effectiveness. In the present study, all children met the CRIES cut-off before entering group treatment.

*Secondary outcome measures*

- *Depression Self-Rating Scale* (DSRS; Birlleson, 1981): This widely used scale was developed as a clinical instrument to assess the extent of depressive feelings in children. It consists of 18 items, scored on a 3-point scale (most = 2, sometimes = 1, never = 0), with 8 items being scored in a reversed way. The scale has good internal consistency (Birlleson, 1981) and correlates highly with other measures of depression such as the *Children's Depression Inventory* (Kovacs, 1985). It has been found to discriminate clinically depressed from nondepressed children, using a cut-off score of between 13 (Asarnow & Carlson, 1985) and 15 (Birlleson, Hudson, Buchanan, & Wolff, 1987). In the present study 2 out of the 17 children met the DSRS cut-off before treatment.
- The *Impact Measure of the Strengths and Difficulties Questionnaire* (SDQ; Goodman, 1997) was administered before (T1) and after treatment (T2) to the parents. This includes a question about distress and social impairment in four domains: Home life, friendships, classroom learning, and leisure activities. Each of these items is rated on a 4-point scale (not at all, only a little, quite a lot, a great deal), scored 0, 1, 2, 3. The total score indicates the impact of child's difficulties on his/her everyday functioning and ranges from 0 to 15.

**Manual-based treatment protocol**

The treatment programme took place over 7 weeks, with the first introductory session being scheduled for parents only. The aims of this one-session meeting with parents were: To normalize their children's reactions after the earthquake; to improve the recovery environment of the child; to advise parents on self-help strategies; to explain the intervention; to give suggestions on how to help their children and what should be their involvement with children's homework.

Children participated in a 6-week group CBT based on the manual *Children and Disasters: Teaching Recovering Techniques* (Smith, Dyregov, & Yule, 1999), which we adapted to six weekly 2-hour sessions. Group leaders included a child and adolescent psychiatrist experienced in CBT and a clinical psychologist trained in treating PTSD. Each session included a statement of the goals, a review of the preceding week's homework, introduction to new information, psychoeducation and skills training, therapist-assisted practice and homework for the coming week.

We provided a separate waiting area with coffee-making facilities for those parents who wished to stay at the CMHS while their child participated in the group session. Although we were not able to monitor how they used their waiting time, based upon our discussions with them we formed the impression that this option gave them the opportunity to create a 'self-support' group. The parents were asked to attend the last 30 minutes of each session, during which time one of the therapists met with them to discuss the techniques children were taught in the group session as well as homework plans. Written information was also provided. This half-hour session provided an opportunity for parents to ask questions and discuss any issues related to progress in treatment.

Session 1 began by defining group rules of confidentiality, respecting others, listening to others, and attendance. PTSD was described as a normal reaction to an abnormal situation. We then described an example of a child's reactions to experience of the Athenian earthquake. Through discussing this hypothetical example children were made aware of the common early distressing reactions experienced by children exposed to an earthquake so that their own problems became definable and manageable. This was important in normalizing their reactions so that they did not feel 'alone and going crazy'.

It also helped them to begin to share their experiences of the earthquake so that they could come together as a group. Next, children were provided with an outline of the treatment protocol. Intrusive symptoms (i.e., thoughts and images) were addressed and children were taught about how traumatic reminders can upset them. Children practised creating an imaginary 'safe place'.

Session 2 was devoted to teaching children various imagery techniques. They practised these techniques to demonstrate to themselves that they could gain some control over the intrusive images that troubled them. They were introduced to distraction techniques, dual attention techniques (similar to some of the EMDR techniques) and how to manage frightening, repetitive dreams.

Session 3 concentrated on arousal symptoms. At first children were helped to identify their reactions and were then taught the skills that enabled them to relax at will. They were encouraged to make use of their own techniques to induce relaxation and where possible bolster these by breathing exercises and progressive muscle relaxation. They were also encouraged to develop and practise coping self-statements.

Session 4 dealt with avoidance behaviours. The children were introduced to the concept of graded hierarchy. They were helped to grade traumatic reminders, using the 'fear thermometer' to rate distress in response to traumatic reminders and learn self-rating of fear. They practised relaxation techniques.

Sessions 5 and 6 were devoted to exposure. Children were introduced to the concept of graded exposure, by practising imaginary exposure. They were helped to practise the use of imaginary techniques, constructive and positive self-statements emphasizing personal efficacy, predictability and controllability of the environment as well as realistic self-appraisal. Children were encouraged to draw, write and talk about their earthquake experience. Graded *in vivo* exposure was introduced as homework.

Session 7 concentrated on summarizing, reinforcing and promoting generalization of using anxiety-management techniques, and exposure, with the emphasis on relapse prevention. This session finished with a proactive section on planning for the future.

### **Statistical analysis**

Pre-treatment differences between the immediate and delayed treatment groups in mean outcome scores were measured using unpaired sample *t*-tests. Paired sample *t*-tests were used to examine change in outcome measures between the beginning and the end of the waiting period in the delayed treatment group.

The pretest, posttest and follow-up scores in groups were analysed with one factor (time) repeated-measures analysis of variance (ANOVA), using the Greenhouse–Geiser correction. Pairwise differences were measured using paired *t*-tests with a Bonferroni correction to control for Type I error. The adjusted alpha was  $\alpha = 0.05/4 = 0.013$ .

## **Results**

Pairwise comparisons for the delayed treatment group indicated no significant change in mean CRIES scores from the beginning to the end of the waiting period [ $t(1, 6) = -0.79, p = 0.46; M = 39.57, SD = 8.62$  and  $M = 4.47, SD = 4.47$ ].

The two treatment groups, that is, the immediate and the delayed treatment group, did not significantly differ in the primary outcome pre-treatment measure [ $t(2, 15) = -1.28, p = 0.22$ ; Group 1: CRIES  $M = 37.10, SD = 8.39$ ; Group 2 CRIES  $M = 41.57, SD = 4.47$ ]. Given that both groups of children had similar mean scores on the PTSD measure at pretreatment and all received the same CBT intervention for the purpose of analysis of data we combined both groups into one treatment group. Table 1 presents the combined

Table 1. Repeated-measures analysis of variance (N = 15)

Measure	T1		T2		T3		T4		Time (F)	p	$\eta^2$ effect size
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)			
CRIES-13 total	39.47 (7.32)	14.93 (5.27)	3.53 (1.60)	2.93 (1.67)	348.29	.001	0.97				
Intrusion	12.60 (3.22)	5.33 (2.32)	1.27 (0.96)	0.73 (0.70)	139.43	.001	0.91				
Avoidance	12.93 (3.65)	5.20 (2.88)	1.06 (0.80)	0.67 (0.82)	122.50	.001	0.90				
Arousal	13.93 (3.77)	4.20 (1.90)	1.33 (0.97)	0.86 (0.74)	143.76	.001	0.91				
DSRS	11.40 (3.52)	4.60 (2.29)	4.73 (1.71)	5.46 (2.20)	38.76	.001	0.73				
SDQ impact	5.60 (1.71)	1.90 (1.01)	N/A	N/A	t = 9.35	.001					

Note. N/A = not applicable.

groups mean pre (T1), post (T2), 18-month follow-up (T3) and 4-year follow-up (T4) raw scores for the primary and secondary outcome measures. One-factor repeated measures analysis of variance (ANOVA) showed significant overall time effect in all outcome measures after completion of treatment ( $p < .001$ ).

Pairwise comparisons indicated that the intervention produced a significant reduction in mean CRIES-total and DSRS scores after completion of the treatment and a further significant reduction at the 18-month follow-up but no further reduction at the 4-year follow-up. The same pattern of results was found for intrusion, avoidance and arousal symptoms across time (see Table 2).

Likewise, the treatment produced a significant improvement in children's psychosocial functioning immediately after completion of the treatment as indicated by significant reduction in their mean impact scores, according to parent ratings on the Impact Supplement of the SDQ. Figure 1 displays graphically the results across both treatment groups as well as the combined group.

In terms of clinical significance, at posttreatment, only 2 out of the 17 children scored above the PTSD cut-off measure and none of the children were in the clinical range in respect to the depression measure.

## Discussion

This study empirically supports the effectiveness of a short-term group CBT approach for treatment-seeking children with clinically significant postearthquake-related PTSD. The treatment produced a statistically significant reduction in overall PTSD symptoms, across the three PTSD symptom clusters (i.e., intrusion, avoidance, and arousal) as well as in depressive symptoms immediately after completion of the intervention. Mean scores of PTSD were further significantly reduced at an 18-month follow-up measurement and maintained at the 4-year follow-up. The further significant improvement seen in children at the first follow-up could suggest that either the passage of time diminished the symptoms or that children were helped through treatment to develop more effective ways of managing their distress. Without a no-treatment control group, it is not possible to be confident that the significant improvements seen in children in this study were in response to treatment rather than to natural recovery processes. However, the fact that there was no significant change in baseline measures between the beginning and the end of the waiting period for the delayed treatment group would support the view that the improvement was related to the intervention and not merely the passage of time. This

Table 2. Pairwise comparisons of outcome measures

Measure	Pretreatment–Posttreatment	Posttreatment–18-month follow-up	18-month–4 year follow up
	Mean Difference $\pm$ SE (N = 17)	Mean Difference $\pm$ SE (N = 17)	Mean Difference $\pm$ SE (N = 15)
CRIES-13 total	24.25 $\pm$ 0.97***	1.00 $\pm$ 1.10***	0.60 $\pm$ 0.35
Intrusion	7.41 $\pm$ 0.74***	3.65 $\pm$ 0.56***	0.53 $\pm$ 0.20
Avoidance	7.30 $\pm$ 0.72***	4.06 $\pm$ 0.63***	0.40 $\pm$ 0.13
Arousal	9.71 $\pm$ 0.80***	2.75 $\pm$ 0.46***	0.47 $\pm$ 0.20
DSRS	6.53 $\pm$ 0.73***	-0.29 $\pm$ 0.47	-0.73 $\pm$ 0.62
SDQ impact	3.76 $\pm$ 0.28***		

\*\*\*  $p < 0.001$ .

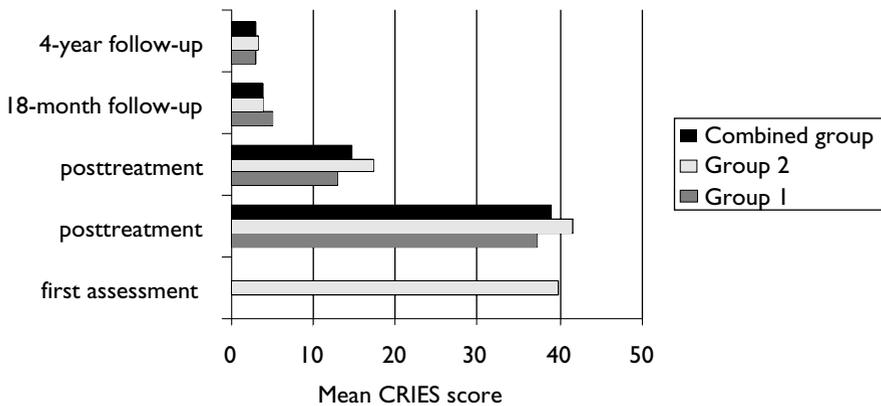


Figure 1. Mean PTSD outcome measure over time by groups.

is further supported by the significant improvement in children's psychosocial functioning as indicated by their parents' ratings immediately after the completion of the treatment irrespective of whether the children received treatment immediately or after delay of 10–12 weeks.

It is likely that several components of the manual-based treatment protocol contributed to the reduction in PTSD scores. The anxiety-management training, imaginal exposure, and tackling avoidance behaviours themselves are likely to have made significant contributions to decreasing the levels of distress. Unfortunately, we did not use any measures during the course of treatment to allow us to track the changes in symptoms as different treatment components were provided. Therefore we cannot draw any conclusions about the relative importance of those components contributing to the outcome. In addition, social support, the opportunity for self-expression and normalizing the children's stress reactions probably made major contributions. The group was popular with children who often told the investigators that the groups made them 'feel well' and 'not different from others'.

Despite these rather encouraging results, the study is not without its limitations. We selected for group CBT intervention only children who had PTSD causing mild to moderate dysfunction that was not complicated by increased levels of comorbidity. Therefore it may well be that for more severe cases of PTSD and those complicated by grief or comorbid psychopathology this intervention would not work as effectively. Another limitation is that we did not use a structured clinical interview for PTSD. The PTSD diagnosis was based on a comprehensive clinical interview backed up by the child meeting the cut off on the PTSD measure (CRIES). A major limitation of the present study is the absence of a no-treatment control or comparison treatment condition and the relatively small number of subjects in the treatment group. This undoubtedly limits our conclusions about the efficacy of the manual-based group CBT protocol used in the present study. However, the nature of the condition meant that it was not ethical to give no treatment to those who asked for help. On the other hand, individual as opposed to group CBT treatment could not be provided as a comparison treatment model due to limited resources in our clinic and given that this type of treatment was reserved for a number of cases that did not meet our inclusion criteria for group CBT. Further randomized treatment trials with larger samples will be needed to determine whether the treatment approach used in the present study is effective for children with disaster-related PTSD.

In conclusion, it is important to note that despite the pilot nature of this study and its methodological shortcomings our findings support the promise of this treatment approach and have important clinical implications. A group intervention appears to be beneficial for treatment-seeking children with clinically significant PTSD symptoms related to their experience of a moderate-intensity earthquake. Therefore, it is an appropriate intervention to offer in clinical settings, especially if there are limited resources. It is likely that this type of intervention may not be effective for some children. However, one function of the therapeutic group could be to identify those children who may need to continue with individual treatment. Given that social and family factors play an important role in the way the children manage their PTSD symptoms, we would have liked to be able (in terms of resources) to run a parallel group intervention with parents in order to achieve optimal treatment. It remains to be answered whether children's groups conducted in conjunction with parents' group intervention sessions would produce superior results in terms of immediate outcome of treatment as compared to children's group intervention with limited input for their parents or no input at all.

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