

# Cognitive Behavioral Therapy for Young People after L'Aquila Earthquake

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**Abstract:** *Objective:* Cognitive behavior therapy (CBT) emerges as the best validated therapeutic approach for children and adolescents who experienced trauma-related symptoms, particularly associated with anxiety or mood disorders. The aim of this study was to evaluate the CBT efficacy among young people exposed to L'Aquila earthquake, in 2009.

*Methods:* one year after the disaster, 39 young subjects as a case group (CBT treated) and 24 as a comparison group (no CBT treated) were evaluated with the Impact of Event Scale Revised (IES-R), the General Health Questionnaire-12 items (GHQ-12) and the Brief Cope. CBT was conducted in 12 sessions (once per week for 3 months). After CBT intervention, both groups were evaluated again with the same psychometric instruments.

*Results:* our results show a significantly decrease in post traumatic symptoms and psychological distress severity in CBT group. It was attributable to an improvement in each of three PTSD dimensions (intrusion, avoidance, and arousal) and in the total score of IES-R ( $p < 0.04$ ). Among CBT treated group, subjects that adopted “planning/problem solving” coping strategies ( $p < .02$ ) and “religiosity” ( $p < .045$ ) show higher improvement in psychological distress.

*Conclusions:* our findings show the efficacy of CBT and the influence of individual coping strategies in the improvement of posttraumatic stress symptoms and psychological distress among young people seeking help from an outpatients service for young people with psychiatric problems (the SMILE) after the catastrophic disaster in L'Aquila.

**Keywords:** Cognitive-Behavioural Therapy, Earthquake, SMILE, Natural Disaster, Anxiety, PTSD.

## INTRODUCTION

On April 6<sup>th</sup>, 2009, at 03:32 (local time) a major earthquake measuring 6.3 on the Richter scale struck L'Aquila, the capital city of Abruzzo, Italy, killing 309 residents, injuring over 2,500, leaving 28,000 homeless and 66,000 displaced, caused destruction or serious damage to between 3,000 and 11,000 buildings (the 65% of building and homes). The earthquake occurred early in the morning, when people was asleep. The earthquake caused not only damage to people's physical health, but also had tremendous effects to psychological health.

Serious and long-lasting psychiatric consequences can be found in general population following major stressor events [1].

Several studies have revealed that posttraumatic stress disorders, depressive disorders, anxiety disorders, and substance use disorders are among the major psychiatric

problems that occur after a disaster [2-7]. Of these problems, PTSD is seen as an early response among victims; it is also an important predictor of a poor outcome of their long-term mental and physical health [8-10].

PTSD symptomatology in children and adolescents closely resembles that of adults but childhood presentation might be influenced by age or developmental phases [11]. For example, in review of PTSD in children, Yule [12] stated that children and adolescents severely affected by a traumatic event mostly suffer repetitive and intrusive thoughts and flashbacks about the trauma, sleep disturbances, nightmares, anger, separation anxiety, memory and concentration problems, survivors guilt, changes in perception of the world as a “safe and predictable” place. Yule categorized these symptoms under three PTSD symptom clusters: (a) re-experiencing, (b) avoidance, and (c) physiological hyperarousal.

The importance of traumatic experiences during the periods of the adolescence was their impact on their future development, cognition and attention, social skills, personality, self-esteem and impulse control. Also an history of trauma in this period is a significant risk factor for the development of

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PTSD in adulthood following exposure to another life stressor [1, 13].

Recent studies have shown that increased risk for PTSD is associated with how young people experiences and interprets the event. This evidence explains the importance, therefore, of going to evaluate their young people coping strategies, their ability to adapt to different needs and cope with stress. The Coping has been seen as a stabilizing factor that can help individuals maintain psychosocial adaptation during stressful events [14]. There is general agreement that adolescents exhibiting avoidance coping strategies (such as behavioral efforts to avoid the stressful situation and efforts to avoid thinking about the problem by using fantasy or wishful thinking) are more likely to develop severe stress-related problems than adolescents with active coping strategies (like positive thinking and problem solving) [15, 16]. An adolescent's tendency to cope by avoidance rather than by problem solving is not only determined by the type of stressful event, but also by the perception of the availability of social networks [17].

Religiosity is a protective factor which has an impact on all of the three dimensions of health status, among others, it goes together with a longer lifetime, better indicators of health status indicators and quality of life, less anxiety, depression and suicide, more effective coping strategies. In relation to adolescent health, less investigation has been available thus far [18, 19].

Cognitive behavior therapy (CBT) emerges as the best validated therapeutic approach for children and adolescents who experienced trauma-related symptoms, particularly symptoms associated with anxiety or mood disorders [1]. Trauma-focused CBT interventions have been shown to be effective in PTSD [20, 21] and are currently recommended as first line treatments for this condition [22-24]. Yule et al. [12] showed the effects of a short-term CBT in young people with PTSD symptoms following the Athens 1999 earthquake: he found a reduction of PTSD and depressive symptoms after treatment and an improvement in psychosocial functioning, maintained at 4-year follow-up.

The aim of study was to evaluate the Cognitive Behavioral Therapy (CBT) efficacy among young people exposed to L'Aquila earthquake, by comparing posttraumatic stress symptoms and distress level, pre- and post intervention. Also, we investigated the role of coping strategies on individual trauma experience.

## MATERIALS AND METHODOLOGY

One year after the earthquake (between May and December 2010), three residents of psychiatry conducted clinical interviews and collected informations about earthquake experience from 163 young outpatients seeking help to the S.M.I.L.E. (Service for Monitoring and early Intervention against psychoLogical and mEntal suffering in young people) for an aspecific anxiety symptomatology (sleep disorder, headache, irritability, somatic disorders, etc.) and psychological distress perceived.

S.M.I.L.E. is a psychiatric service established in November 2005 under the auspices of the Department of Mental Health, University of L'Aquila, Italy. It is the mission of

service to reduce the burden of mental suffering among young people by means of an earlier recognition of signs and symptoms, systematic evaluation of psychological distress, and promotion of attitudes that encourage young people to seek care. The service closely links with primary care physicians and University Hospital psychiatrists, and all people aged 16-30 years who meet criteria for psychological, behavioural or psychiatric suffering are offered help by SMILE.

The study's inclusion criteria were: the presence at least one of symptoms of PTSD according to DSM-IV criteria (as assessed by the SCID module for PTSD) [25] and high level of psychological distress perceived (General Health Questionnaire-12 items total score >15); the direct exposure to L'Aquila earthquake with moderate damage property and not experiences of physical injury or grief; aged between 16-30 years; no pre-existing major psychiatric disorder or psychopharmacological/psychological treatment; no evidence of cognitive deficit.

Following ethics local committee approval, individuals who appeared to satisfy the study inclusion criteria were submit a description of the study; obtained consent, all eligible young subjects (163 subjects) completed study's assessment consist of:

**General Health Questionnaire-12 items (GHQ-12)** a 12 items scale used to assess psychological distress perceived: each item assessing the severity of a mental problem over the past few weeks using a 4-point scale (from 0 to 3). It can be used to identify a "probable clinical case" on the basis of cutoff scores and to determinate the severity of morbidity on the basis of the total scores. The sensitivity and specificity in the prediction of cases of psychiatric morbidity were 69,6 % and 94,8%, respectively, in a community study. The score was used to generate a total score ranging from 0 to 36: a score  $\leq 15$  indicate a normal stress level, a 15-20 score a moderate level of stress and a score  $\geq 20$  indicate a more intense *psychological distress* [26].

**Impact of Events Scale (IES-R)**, a self-report measure comprising 22 items and three subscales (intrusion, hyperarousal, avoidance). Respondents should rate each item on a scale from 0 (*not at all*) to 4 (*extremely*), according to their experience over the past 7 days. The results indicated that the IES's two-factor structure is stable over different types of events, that it can discriminate between stress reactions at different times after the event, and that it has convergent validity with observer-diagnosed post-traumatic stress disorder. The use of IES in many psychopharmacological trials and outcome studies is supportive of the measure's clinical relevance. The IES is a useful measure of stress reactions after a range of traumatic events, and it is valuable for detecting individuals who require treatment. The instruments were administered in groups by trained mental health professionals [27].

**Brief Coping** was used to evaluate coping strategies. This is a brief version of the COPE, consisting of 28 items divided into 14 subscales, each, 2 items. The items are rated on a 4-point scale from 1 (absolutely not normally do this) to 4 (usually I just like that). A total score is meaningless, while the score is calculated for the individual steps necessary to

**Table 1. Demographic, Baseline Characteristics and Score of first Assessment of Total Sample**

|                 | <b>Total Sample<br/>(N=163)</b> | <b>Group 1<br/>(N=89)</b> | <b>Group 2<br/>(N=74)</b> | <b>P* value</b> |
|-----------------|---------------------------------|---------------------------|---------------------------|-----------------|
| Gender          |                                 |                           |                           |                 |
| Women           | 66.7% (N=109)                   | 72% (N=64)                | 58.3% (N=43)              | 0.25            |
| Men             | 33.3% (N=54)                    | 28% (N=25)                | 41.7% (N=31)              |                 |
| Mean Age        | 27.4 ys<br>(SD ± 1.7)           | 26.9 ys<br>(SD ± 1.6)     | 27.5 ys<br>(SD ± 1.3)     | 0.9             |
| Education Level | 13.8 ys<br>(SD ± 3.7)           | 13.5 ys<br>(SD ± 3.8)     | 14.3 ys<br>(SD ± 3.5)     | 0.3             |
| Occupation      |                                 |                           |                           |                 |
| Employed        | 34.5%                           | 41.5%                     | 45.9%                     |                 |
| Unemployed      | 5.3%                            | 4.2%                      | 6.9%                      |                 |
| Student         | 60.2%                           | 54.3%                     | 43.1%                     |                 |

obtain a "profile" of the subject of coping. The Brief COPE can be used in three contexts: to explore the coping style of the subjects, namely the manner in which they generally tend to respond to stressful situations (version "dispositional") to evaluate how subjects responded to stress in a period of time in the past (version "situational-past") to assess response to a recent period, from one moment to date (version "situational-actual") [28].

After the assessment, the first 89 subjects (Group 1) of the list were selected for the intervention and received Cognitive Behavioural Therapy (CBT) treatment, while the remaining (74 subjects, Group 2) in a waiting list and in the future they will be placed in other treatment groups. Because of limitation in facilities and other equipments, all of the subjects could not be treated at once.

The extent of exposure was equivalent because all subjects had resident in L'Aquila at the moment of earthquake and thereafter. Cognitive Behavioural Therapy was conducted in 12 sessions (once per week for 3 months).

After a an education about earthquake experience nature of PTSD (re-experience, avoidance, hyperarousal) and panic disorder [29] we have explained to people some techniques for individual control of anxiety like breathing retraining and muscle relaxation training [30]. CBT is based on Ehlers and Clark's model of PTSD, structured in 3 main steps: modify of excessively negative appraisals of the trauma and its sequelae, reduce re-experiencing by elaboration of the trauma memories and discrimination of triggers and drop dysfunctional behaviours and cognitive strategies [31].

After Group 1 had undergone 14 sessions of CBT, we assessed all subjects again with the General Health Questionnaire-12 items and the Impact of Events Scale-Revised.

## STATISTICAL ANALYSIS

Statistical analysis was performed using SPSS (version 18.0). For all analyses, a P value less than 0.05 (2-tailed) was used for statistical significance. Demographic characteristics and IES-R, GHQ-12 and Brief Coping scores of the two

groups were compared by using an *independent t-test*. Effects of treatment on IES-R and GHQ-12 scores were assessed by using repeated-measures analysis of variance (ANOVA), with intervention as the between-group factor and IES-R and GHQ-12 score as a within-group factor. Differential effects of treatment on mean scores for the PTSD symptom categories were evaluated by using repeated-measures ANOVA, with intervention as a between-group factor and symptom category as a within-group factor.

## RESULTS

Of the 163 young survivors, 66.7% (N= 109) were women and the 33.3 % (N=54) men.

Mean age of sample was 27.4 years (SD ±1.7), in Group 1 (CBT treated, N=89) was 26.9 (SD ±1.6) and in Group 2 (no CBT treated, N=74) was 27.5 (SD ±1.3) without statistical differences (p<0.08). The most part of total sample were college students (60.2%, N=98).

Others demographic and baseline characteristics of total sample and of two groups are showed in Table 1.

The mean score of GHQ-12 was 19.5 (SD ±0.7) and IES-R score was 34.1 (SD ±0.3). There were no statistical differences in baseline score of IES-R, its subscales and GHQ-12 total score measured by multiple ANOVA between two groups. Also these results are showed in Table 1.

First, we compared the first and second assessment points by condition for CBT treated group. The interaction term for the following outcome measures was significant, demonstrating greater improvement from Assessment 1 to Assessment 2 for GHQ-12 total score (F=2,57; p < .01), IES-R total score (F= 3,1; p < .02) and among its dimension only in *Avoidance* dimension (p < .03).

The analysis of IES-R and GHQ-12 scores between the two assessments (Assessment 1 and 2) for not CBT treated subjects (Group 2) shows that the interaction term was not significant for any dimensions investigated.

The results are showed in Table 2.

**Table 2. Post Traumatic Symptomatology and Psychological Distress As a Function of Treatment**

|                          | First Assessment | Second Assessment                | P*   |
|--------------------------|------------------|----------------------------------|------|
| <b>IES-R Total Score</b> |                  |                                  |      |
| Group 1                  | 32.4 (SD ±0.3)   | 28.4 (SD ±0.6)                   | 0.02 |
| Group 2                  | 33.5 (SD ±0.3)   | 32.9 (SD ±0.7)                   | 0.06 |
| <b>Hyperarousal</b>      |                  |                                  |      |
| Group 1                  | 17 (SD ±0.8)     | 16.8 (SD ±1.2)                   | 0.08 |
| Group 2                  | 16 (SD ±1.8)     | 15.7 (SD ±0.9)                   | 0.07 |
| <b>Avoidance</b>         |                  |                                  |      |
| Group 1                  | 14 (SD ±0.9)     |                                  | 0.03 |
| Group 2                  | 15 (SD ±0.1)     | 11.6 (SD ±0.5)<br>14.7 (SD ±0.4) | 0.07 |
| <b>Reexperience</b>      |                  |                                  |      |
| Group 1                  | 12 (SD ±1.1)     | 11.2 (SD ±0.7)                   | 0.08 |
| Group 2                  | 13 (SD ±0.5)     | 12.8 (SD ±0.8)                   | 0.09 |
| <b>GHQ-12</b>            |                  |                                  |      |
| Group 1                  | 18.9 (SD ±1.7)   | 14.4 (SD ±1.2)                   | 0.01 |
| Group 2                  | 19.5 (SD ±0.7)   | 18.9 (SD ±1.9)                   | 0.06 |

\* P value less than 0.05 (2-tailed) was used for statistical significance.

#### Glossary

(PTSD), Post Traumatic Stress Disorder

(CBT), Cognitive behavior therapy

(IES-R), Impact of Event Scale Revised

(GHQ-12), General Health Questionnaire-12 items

(S.M.I.L.E.), Service for Monitoring and early Intervention against psychoLogical and mEntal suffering in young people

Among Group 1 (CBT treated), subjects that adopted planning/problem solving coping strategies ( $p < .02$ ) and religiosity ( $p < .045$ ) show higher improvement in perceived stress level between the two evaluations. Religiosity like coping strategies shows a significant statistical difference ( $p < .03$ ) between girls (score = 3,2;  $sd \pm 0.5$ ) and boys (2,1;  $sd \pm 0.4$ ).

## DISCUSSION

The present study compared post traumatic symptoms and psychological distress among L'Aquila earthquake young survivors, divided after the first psychometric assessment, in two groups: Group 1 treated by CBT intervention and Group 2 waiting for an intervention. We enrolled only people directly exposed to the disaster, without any pre-existing major psychiatric disorder and psychopharmacological/psychological treatment.

Our results are in line with the recent literature :Group 1 shows a significant reduction both in severity of post traumatic symptomatology total score evaluated by IES-R ( $p < .02$ ) and psychological distress by GHQ-12 ( $p < .01$ ). Overall PTSD dimensions have an improvement, but only *Avoidance* dimension shows significant differences pre and post intervention. The differential effect supporting may be explained, in part, by the emphasis on cognitive restructuring contained in the CBT intervention with also a specific section of treatment based on exposure to the traumatic event.

The CBT treatment focusing on PTSD and anxiety symptoms was well accepted and efficacious [24]: the goal of our study is the confirmation of this effect in a population of young people exposed to the same type of trauma and the possibility to improve the quality of life of young people through an intervention of proven effectiveness, and to reduce healthcare costs. In fact, PTSD, particularly among those who have experienced chronic traumatization like an entire population exposed to a natural disaster, is associated with complex outcomes like displacement, social networks disruption, emotional and clinical aftermaths and physical health difficulties [10].

Another important finding of our study is the important of religious coping strategy like a possible protective factor in people exposed to any kind of trauma: among our groups of study, individuals who showed in the second assessment an improvement of perceived distress level had adopted this personal strategies. Others studies in future must evaluated in a larger population of study this coping strategies like "post traumatic growth" factor.

In conclusion, the treatment of populations, such as those with chronic mental illness or other psychiatric disorder (anxiety, depression, sleep disorder, substance abuse), requires the recognition of the necessity of treatment in the context of a larger and emergency system of care.

Future research is also needed in the area of mechanisms of change in cognitive-behavioral psychotherapies for PTSD

and of the potential critical sessions could lead to more effective evidence-based therapies for PTSD. It seems important to identify what specifically occurs in treatment among clinical and not clinical population exposed to a collective trauma. Advances in treatment require the development of integrated and well related systems of care and study designs that assess the mental health benefits of such service systems and their individual components.

## LIMITATIONS

One of the most important limitations of this study was the lack of randomization or any other systematic comparable methods. Other traumatic experiences in the subject's life were not asked; it might confound the results, because it is possible that some of the PTSD symptoms may be attributable to other traumatic experiences, before or after the earthquake. Finally, a further limitation of this study is the lack of a follow-up to ensure the long-term effectiveness of CBT intervention and their quality of life.

## CONFLICT OF INTEREST

The authors confirm that this article content has no conflicts of interest.

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