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Post Traumatic Stress Psychopathology 8 years after a flooding in Italy

Психопатология Посттравматического Стрессового Расстройства спустя 8 лет после наводнения в Италии

Abstract. Objective: Post Traumatic Stress Psychopathology (PTSP) was assessed among village's inhabitants 8 years after the 1996 Versilia flooding in Italy. **Methods:** The sample was formed by 61 subjects. The Davidson Trauma Scale (DTS) was used to evaluate PTSP. Gender and two class of age (young and old subjects) were considered as demographic characteristics. **Results:** No significant differences resulted on DTS total and factor scores between female and male subjects. On the contrary, significant differences emerged on Hyperarousal Total and Hyperarousal Frequency between young and old subjects. People considered having enough symptoms for full Post Traumatic Stress Disorder (PTSD) were 45,9% (N=28), while 35,8% (N=20) had subthreshold PTSD, and 21,3% (N=13) had no PTSD. In the full PTSD subgroup old subject had a mean Hyperarousal Frequency significantly higher than young subjects, while in the subthreshold PTSD subgroup old subjects have a mean score on Intrusion Frequency, Intrusion Severity, Total Intrusion, Total Frequency and Total score significantly higher than young subjects. **Conclusion:** This study confirms that the traumatic impact of a flooding on a population hit some years before is not time-limited, showing the persistence of a high level of PTSP 8 years later. Old subjects showed on Hyperarousal Total and Hyperarousal Frequency within the whole sample, on Hyperarousal Frequency within the full PTSD subgroup, and on all Intrusion clusters, Total Frequency and Total score in the subthreshold PTSD subgroup, significantly higher scores than young subjects. Further specific research is needed in the elderly, in order to facilitate a better understanding of PTSP that is present in this unique population.

Реферат. Цель: Психопатология Посттравматического Стрессового Расстройства (ПТСР) была оценена среди жителей деревни спустя 8 лет после наводнения 1996 года в Версили, Италия. Методы: Выборка состояла из 61 человека. Шкала Травмы Дэвидсона (ШТД) использовалась, чтобы оценить ПТСР. Учитывались пол и две возрастные категории (молодые и пожилые участники). Результаты: Результаты ШТД не различались между женщинами и мужчинами. Существенные различия выявились по подшкалам Общего Гипервозбуждения и Частоты Гипервозбуждения между молодыми и пожилыми участниками. Полный ПТСР был диагностирован у 45,9% участников (N=28), подпороговый ПТСР имелся у 35,8% (N=20), и 21,3% (N=13) не имели ПТСР. В подгруппе с полным ПТСР пожилые участники имели уровень Частоты Гипервозбуждения значительно выше, чем молодые. При подпорогом ПТСР уровень по подшкалам Частоты Интрузии, Тяжести Интрузии, Общей Интрузии и по общему показателю тяжести и частоты пожилые участники имели значительно более высокий уровень ПТСР, чем молодые. Выводы: Необходимы дальнейшие исследования ПТСР среди пожилых.

Introduction

Disasters are traumatic events that affect whole communities of individuals and cause widespread destruction and distress, unlike traumatic events that are understood to happen at the level of the individual (American Heritage Dictionary, 1982). They are distinguished by their magnitude and seeming capacity to traumatize a great many individuals at once, and, by definition, they overwhelm the social and political fabric of communities, a disruption that can be expected to significantly exacerbate and color individuals' suffering in response to the trauma. Moreover, they are unique among the traumas in their very public nature, and offer unique opportunities to study human response to tragedy on any level, making them perhaps uncommonly accessible for the sake of treating and studying traumas (Katz et al., 2002).

A considerable number of psychiatric surveys have been conducted subsequent to earthquakes, hurricanes, volcanoes and various, man-made disasters and document a range of psychiatric symptoms and disorders associated with these events (Katz et al., 2002; Maj et al., 1989; Freddy et al., 1992; Lima et al., 1993; Goenjian et al., 1994; Bland et al., 1996; Sharan et al., 1996; Bland et al., 1997; Carr et al., 1997; McFarlan et al., 1997; Armenian et al., 2000). Rubonis and Bickman (1991) conducted a statistical review of studies that quantified psychopathology in the aftermath of disasters dating back to 1966 and, on the basis of this analysis, estimated that disasters are associated with a 17% increase in the best mean estimate prevalence of psychopathology in comparison to pre-disaster or control group rates.

Studies using standardized diagnostic criteria have reported a prevalence rate of Post-Traumatic Stress Disorder (PTSD) of 10-30% in population exposed to a natural disaster (Armenian et al., 2000; Madakasira & O'Brien, 1987; Steinglass & Gerrity, 1990; Lima et al., 1991; Green et al., 1992; Garrison et al., 1995; Wang et al., 2000), substantially higher than that observed in the general population (1-8%) (Davidson et al., 1991; Resnick et al., 1993; Kessler et al., 1995; Solomon & Davidson, 1997; Perkonigg et al., 2000).

Several reports of the psychiatric consequences of these kinds of events suggest that early detection and treatment may prevent long-term disability from PTSD or chronic anxiety and depression (Dew MA, 1987; North CS, 2001; North CS, 1999; Green BL, 1994; Goenjian AK, 2000; Davidson J, 2003). On this subject, in a study of civilian survivors of traumatic events in Israel, 39% had diagnosable PTSD 1 month following trauma, 17% PTSD 4 months after trauma and 10% had PTSD 1 year following trauma (Shalev et al., 1997; Freedmen et al., 1999). Recovery from early PTSD has been estimated, in an epidemiological study, to involve 60% of those initially expressing the disorder (Kessler et

al., 1995). In the National Vietnam Veterans Readjustment Study, the difference between lifetime and current prevalence of PTSD (30% and 15,2%) suggests an overall 50% recovery or remission rate of those once diagnosed as suffering from the disorder (Kulka et al., 1990). Similar recovery rates were obtained in prospective studies (Dunitz, 2000). A longitudinal and retrospective study among older American former prisoners of war from World War II and the Korean War, shows data supporting a PTSD symptom pattern of immediate onset and gradual decline, followed by increasing PTSD symptom levels among older survivors of remote trauma (Port et al., 2001). The reactivation of chronic PTSD in later life was also reported in forty-five World War II veterans, assessed in order to determine war pension disability. The most prominent of the factors implicated in the exacerbation of their symptoms was that of physical ill health. Retirement, loneliness, comorbid psychiatric illness, anniversaries, service reunions, and alcohol and psychotropic medication usage were other factors (Macleod, 1994). In a our previous study about frequency and severity of PTSD after 7 years from a flood on ambulance personnel employed in assistance operation, we found that in lifetime period, 52,9% of patients had full PTSD, 14,7% subthreshold PTSD with impairment, and 14,7% subthreshold PTSD without impairment, while in current period (corresponding with chronic PTSD), 11,8% of patients had full PTSD, 11,8% subthreshold PTSD with impairment and 17,6% subthreshold PTSD without impairment (Di Fiorino et al., in press).

As regard to subthreshold PTSD some findings suggest that this form is associated with level of social and work morbidity comparable to full PTSD. Stein et al. (1997) found subthreshold PTSD with impairment to be prevalent in 2-3% of the normal population at a chronically significant level. Davidson (2002) found in a sample of 630 subjects from normal population, that 26 (4,1%) fulfilled criteria of subthreshold PTSD with impairment and 78 (12,4%) of subthreshold PTSD without impairment. He found no significant differences between full and subthreshold with impairment PTSD, and noticed significant differences between both form and no PTSD. In a survey carried on about a major earthquake struck central Taiwan, ten months after the event, all survivors shown similarly high levels of psychosocial impairment (Lai et al, 2004). In a report examining a sample of treatment-seeking psychiatric patients (Zlotnick et al, 2002), no significative differences were found between subjects with full PTSD (N=156) and subjects with subthreshold PTSD (N=56) in degree of impairment (i.e., social and working functioning, as well as number of suicide attempts). Similarly high levels of psychological impairment were reported between full and subthreshold PTSD among 1999 earthquake survivors in Taiwan (Lai, 2004). In a previous our study (Di Fiorino et al., in press), we found

that scores on the DTS could differentiate both patients with full PTSD and patients with subthreshold PTSD from patients with no PTSD. In fact, even the subthreshold PTSD, with or without impairment, was associated with DTS score significantly greater than no PTSD ($p < .05$). Therefore, dichotomizing people into those with and without PTSD following DSM-IV criteria might be a simplification that obscures the clinical problems and needs of those with some, but not full, symptom criteria of PTSD.

In the National Comorbidity Survey, 61% of men and 51% of women reported experiencing at least one major trauma in their lifetime, and in most cases there were two or more events. PTSD developed in 20% of women and 8% of the men exposed to traumatic events (Kessler et al., 1995). Breslau and colleagues (1991) administered the revised version of the Diagnostic Interview Schedule to a sample of young adults enrolled in an HMO in Detroit and found that 11,3% of the women (30,7% of those exposed to a traumatic event) and 6,0% of the men (14,0% of those exposed) had a lifetime history of PTSD. Moreover, chronic PTSD, has been particularly associated with female gender, concomitant anxiety and depressive disorders, and family history of antisocial behaviour (Breslau & Davis, 1992).

While progress has been made in recent in relation to the understanding and development of aetiological theories, classification, assessment and management strategies and protocols in the adult population, similar advances have lagged behind for the elderly (Bosuttill, 2004). Debate persists about whether people of different ages respond similarly to traumatic events, and whether elderly people are more vulnerable to such events, or better able to cope with them (Chung et al, 2004).

Aim of the study

Italy is one of the European countries at higher risk of natural disasters. In fact in past years, different areas of the country have been hit by earthquakes and landslides which have brought about material and human losses. However, the psychological consequences of these events have received scant attention and, just a few studies on populations implied on these have been carried out (Catapano et al., 2001, Mantero et al., 2001, Maj et al., 1989).

Cardoso is a little village among the mountains Apuan Alps, at 265 m of height, about 100 km from Florence, in the Centre of Italy. It is encircled by a mountain range, whose highest peak is Mount Pania (1859 m of height). Due to their geomorphological characteristics, mountains around Cardoso are exposed to floods, mainly occurring after long periods of heavy rains. In June 1996 Central Italy, and in particular Tuscany region, was hit by heavy rains which gave rise to serious problems for the population. On June 16, in

few hours, the bigger quantity of rain in the last 20 years concentrated in the mountains around Cardoso came down, making up a flooding which involved all the villages sited below. Most material damage were recorded in the village of Cardoso, where many houses were destroyed or damaged. At the moment of the flood, about 300 persons lived in Cardoso. About a half of inhabitants was in the village while a half was elsewhere. Totally 15 persons died. Because in the little community many people were relatives between them a lot of persons had closed persons died. Some people lost their job, because they worked into the village. Even other villages, lying at the foot of Cardoso, were damaged by the flood, but less seriously.

Emergency relief personnel arrived early and stayed longer, helping the villagers to deal with various postflooding adversities. The government sent a team of workers to assist in reconstruction work, and all households had new houses in a brief time. In addition, many volunteers and representatives of various aid organizations visited the village and became involved in reconstruction. Because of these efforts, villagers received solicitude and information from multiple sources and had opportunities to put their requests forward and to get a desirable response, reporting satisfaction with the assistance they received.

Eight years after the disaster, we decided to evaluate post traumatic stress psychopathology (PTSP) on Cardoso's inhabitants.

Methods

Sample

Among all persons who lived in Cardoso at the moment of the flooding, about one third went to live away from the village after the flooding, so that at our survey 198 subjects from 78 families lived in the village. A selection of subjects was made based on age: only the subjects more than 16 years old were considered and included in the study. Thus 183 evaluable subjects from Cardoso, having been exposed to the critical event of the flood, were approached and explained the nature of the study. As most of the respondents had difficulty understanding written material, written informed consent was not considered to be appropriate for the study. After a complete description of the study to the subjects, oral consent was obtained from those willing to participate the study. For privacy reason, we only considered belonging to 2 class of age (first group = 50 years or less; second group = more than 50 years) and, apart from the gender, we didn't ask any other demographic characteristic.

Instruments

In the present survey, it was impossible to repeat the structured interview with CAPS of the previous one (Di Fiorino et al., in press). In fact in this case we were

obliged to use only a self-evaluation instrument, to detect the psychiatric consequences of flood. Traumatized persons are notoriously reluctant to seek help for their symptoms, particularly from mental health practitioners. This reluctance may result in fact from a lack of awareness on part of patients that their symptoms are linked to a traumatic event or from concern that they will be seen as "damaged" or emotionally unstable. The same concerns any kind of interview which implies involvement of mental health practitioners. Thus, we used a self evaluation scale, the Davidson Trauma Scale (DTS) (Davidson et al., 1996) for assessing diagnosis and PTSD symptoms. Detailed description of the scale with advantages in using it in the present work refer to our previous report about rescue squads (Di Fiorino et al., in press).

Moreover still for privacy reason, the questionnaire was performed and coded to mask each individual identity. Distribution and administering to people in Cardoso Village was carried on from December, 2003, to June, 2004.

Diagnoses

On the basis of previous studies (DeLisi et al., 2003), 82,1% of the individuals with diagnosed DSM-IV PTSD reported a score of 24 or higher on the DTS, so that 24 was considered to be a cutoff for an approximate 4 to 1 likelihood that an individual has PTSD. Following this criteria, in our study, we decided to consider three clinical groups of patients: Full PTSD ($DTS \geq 24$), No PTSD ($DTS = 0$), and Subthreshold PTSD ($1 \leq DTS < 24$). In this way we have a group ($DTS = 0$), certainly without PTSD though underdiagnosing it, and another with subthreshold PTSD, probably overdiagnosing it.

Statistical Analyses

The data were analysed using Statistical Package for Social Sciences (SPSS) version 10.0, (Norusis, 1990). Descriptive statistics for each symptom and cluster of DTS were calculated. One way variance analysis, two tails Student's T-test and Chi Square Test with contingency tables to compare groups were carried on.

Results

Among the 183 adults approached, 10 subjects refused to participate the survey and a total of 173 individuals received questionnaires. Response rate was of 43,35% (75 subjects). After a selection of schedules, 61 could be considered reliable for statistical analyses, because 14 schedules were lacking of, or presented unappraising answers.

All participants were born in Italy and Caucasian in race. Females were 60,7% (N=37) and males were 39,3% (N=24). Young subjects (≤ 50 years old) were

50,8% (N=31) and old subjects (>50 years old) were 49,2% (N=30). Groups of young and old subjects resulted homogeneous on gender (see contingency table 1): Chi-Square = 0.467, DF=1, $p = 0.494$.

Table 2,3 and 4 show the mean total DTS score and the mean factorial DTS score on the whole sample, females and males, young and old subjects respectively. No significant differences resulted on DTS totals and factor scores between female and male subjects. On the contrary, table 4 shows significant differences on Hyperarousal Total and Hyperarousal Frequency between young and old subjects.

A total of 45,9% (N=28) of subjects had DTS score 24 or higher. So, people considered having enough symptoms for full PTSD, were 45,9%, while 35,8% (N=20) subthreshold PTSD, and 21,3% (N=13) no PTSD.

Table 5 and 6 show how subjects were distributed in the diagnostic subgroups per gender and age class respectively. Contingency tables show homogeneity regarding gender (Chi Square=3.42, $df=2$, $p=0.181$) and age (Chi Square=2.073, $df=2$, $p=0.335$).

Some interesting results emerge comparing factorial DTS scores within each diagnostic subgroup on the base of age classification.

In the full PTSD subgroup old subject have a mean Hyperarousal Frequency significantly higher than young subjects (see table 7). In the subthreshold PTSD subgroup old subjects have a mean score on Intrusion Frequency, on Intrusion Severity, on Total Intrusion, on Total Frequency and on Total score significantly higher than young subjects (see table 8).

Discussion

PTSD typically has a chronic course of illness, with 53% of patients continuing to meet diagnostic criteria at 5 years (Kessler et al., 1995). It represents a persistent illness, and many subjects who have recovered from PTSD continue to suffer from subthreshold symptoms of the disorder (Zlotnick et al, 2004). In our study, we found that individuals having the Full disease for an approximate 4 to 1 likelihood, are the 45,9% of the whole sample. Moreover, because 21,3% of subjects certainly have no PTSD (DTS score=0), remaining 32,8% have subthreshold PTSD. Full PTSD frequency, although higher than past research (Armenian et al., 2000; Madakasira & O'Brien, 1987; Steinglass & Gerrity, 1990; Lima et al., 1991; Green et al., 1992; Garrison et al., 1995; Wang et al., 2000), give up for a time persistency of the disorder, confirming data from other studies (McFarlane, 1988a; McFarlane, 1988b; Kessler et al., 1995; Shalev et al., 1997; Freedmen et al., 1999; Kulka et al., 1990; Dunitz, 2000). Subthreshold PTSD frequency found in the present survey is similar or higher respect to other studies (Stein et al., 1997;

Davidson et al., 2002). In our previous report about frequency and severity of PTSD on rescue workers participating in aids of Cardoso Village 7 years after the same flood (Di Fiorino et al., in press), percentage of Full and subthreshold PTSD were less than those found in the present report, may be also for the less traumatic impact of the flooding on rescue squads rather than on villagers.

Anyway, caution should be used in comparing rates of postdisaster PTSD identified by using different diagnostic criteria. Infact, in a longitudinal study of earthquake-related PTSD in a randomly selected community sample in north China (Wang et al., 2000), the effects of diagnostic criteria on the frequency of detected PTSD were examined. As results, the rate of earthquake-related PTSD was 24,2% by using DSM IV criteria, and 41,4% by using DSM-III-R criteria. The introduction in DSM-IV of a criterion requiring clinically significant distress or impairment in functioning for a diagnosis of PTSD was a major contributor to the lower rate of DSM-IV PTSD. In the present article we use the DTS, which has not any reference about impairment in functioning, so that we can expect an higher percentage of PTSD.

While we didn't observe a statistical significative difference between men and women as reported in literature (Kessler et al., 1995; Breslau et al., 1991; Breslau & Davis, 1992), we found significative differences between young and old people on post traumatic stress psychopathology.

Epidemiologic data on the prevalence of PTSD in the elderly show different results. Some studies do not show differences between older and younger people regarding post traumatic stress morbidity (Chung et al, 2004; Bosuttill, 2004; Flint et al., 1994), and elderly individuals do not appear more predisposed than young persons to develop PTSD, symptoms of the disorder seeming similar across agegroups : reexperiencing the trauma, avoidance, and hyperarousal (Weintraub et al., 1999). On the contrary, more severe PTSD symptoms related to older age can be found in other studies (Salcioglu, 2003; Yang, 2003; Fernandez, 2004), and reports about which factors are associated with PTSD respectively in Holocaust survivors (Brodaty et al, 2004) and in 1989 Newcastle earthquake (Carr, 1995), identified late life like a period of vulnerability in the aftermath of severe trauma. In a study about Bosnian refugees 1 year after resettlement in the United States, older refugees were significantly more likely to have PTSD than younger refugees, and older refugees had more severe symptoms (Weine et al., 1998). Furthermore, a positive correlation

between age and intrusive thoughts has been described (Yehuda et al, 1997).

Further specific research is anyway needed in the elderly, in order to facilitate a better understanding of PTSD that is present in this unique population.

In conclusion, our data confirm the negative sequelae of a natural disaster on the mental health of civilians even some years later. The psychological impact of the traumatic event is not time-limited, and emphasizes the need for psychosocial interventions, both immediately after the catastrophic event and in the long term (Hodgkinson & Stewart, 1998). Moreover, our study suggest some comments about different impact of PTSD on different group of age.

Limitations

In a previous work we subministrated CAPS to make PTSD diagnosis, and DTS to confirm Davidson's results (Davidson et al., 2002) that its scores can differentiate patients with PTSD and partial PTSD from patients with no PTSD ($p < .05$) (Di Fiorino et al, in press). In the present article, it was impossible to repeat the structured interview with CAPS. For the above mentioned reasons (see methods), we could not use a structured interview like CAPS, but we had to use a self evaluation scale, the DTS. As told before (DeLisi et al. 2003; Wang et al., 2000), this instrument does not permit an accurate estimation of PTSD frequency.

Another limitation, was that we had to reduce to the simplest terms questions about demographics, so that we could use only two variables (class of age and gender), to warrant subjects the requested privacy.

At last, we could not make a comparison with the frequency of PTSP immediately after the flood or lifetime, because DTS evaluates only current period.

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Table 1 - Age*Gender

	<i>Female</i>	<i>Male</i>
<=50 years old	17 (54.8% row) (45.9% col.)	14 (45.2% row) (58.3% col.)
>50 years old	20 (66.7% row) (54.1% col.)	10 (33.3% row) (41.7% col.)

Table 2 – Descriptive Statistics on DTS total score and factorial scores (all subjects N=61)

	<i>Mean</i>	<i>Std. Deviation</i>
<i>Total</i>	29.16	27.71
<i>Intrusion Frequency</i>	5.15	5.16
<i>Intrusion-Severity</i>	5.59	5.27
<i>Avoidance Frequency</i>	4.61	5.07
<i>Avoidance-Severity</i>	4.57	5.25
<i>Hyperarousal Frequency</i>	4.74	4.85
<i>Hyperarousal-Severity</i>	4.51	4.95
<i>Intrusion</i>	10.74	10.13
<i>Avoidance/dumbness</i>	9.18	9.81
<i>Hyperarousal</i>	9.25	9.62
<i>Total Frequency</i>	14.49	14.03
<i>Total Severity</i>	14.67	14.34

Table 3 – Females (N=37) vs Males (24) on DTS total score and factorial scores

	<i>Female (mean)</i>	<i>Female (std.dev.)</i>	<i>Male (mean)</i>	<i>Male (std. dev.)</i>	<i>T</i>	<i>df</i>	<i>p 2 tailed</i>
<i>Total</i>	31.16	29.51	26.08	24.97	0.696	59	0.489
<i>Intrusion Frequency</i>	5.32	5.31	4.88	5.02	0.330	59	0.743
<i>Intrusion-Severity</i>	6.00	5.33	4.96	5.22	0.751	59	0.455
<i>Avoidance Frequency</i>	4.65	5.39	4.54	4.64	0.080	59	0.937
<i>Avoidance-Severity</i>	4.76	5.58	4.29	4.80	0.335	59	0.739
<i>Hyperarousal Frequency</i>	5.24	5.30	3.96	4.04	1.071	57.359	0.288
<i>Hyperarousal-Severity</i>	5.19	5.35	3.46	4.16	1.416	56.941	0.162
<i>Intrusion</i>	11.32	10.37	9.83	9.91	0.558	59	0.579
<i>Avoidance/dumbness</i>	9.41	10.58	8.83	8.70	0.221	59	0.826
<i>Hyperarousal</i>	10.43	10.45	7.42	8.04	1.269	57.179	0.209
<i>Total Frequency</i>	15.22	15.04	13.38	12.56	0.497	59	0.621
<i>Total Severity</i>	15.95	15.08	12.71	13.19	0.859	59	0.394

Table 4 – Young subjects (N=31) vs old subjects (30) on DTS total score and factorial scores

	<i>Young (mean)</i>	<i>Young (std.dev.)</i>	<i>Old (mean)</i>	<i>Old (std. dev.)</i>	<i>T</i>	<i>df</i>	<i>p 2 tailed</i>
<i>Total</i>	23.10	24.29	35.43	29.98	-1.769	59	0.082
<i>Intrusion Frequency</i>	4.13	4.54	6.20	5.61	-1.587	59	0.118
<i>Intrusion-Severity</i>	4.90	5.42	6.30	5.10	-1.035	59	0.305
<i>Avoidance Frequency</i>	3.68	4.43	5.57	5.56	-1.470	59	0.147
<i>Avoidance-Severity</i>	3.45	4.04	5.73	6.12	-1.713	50.023	0.093
<i>Hyperarousal Frequency</i>	3.42	4.23	6.10	5.14	-2.230	59	0.030*
<i>Hyperarousal-Severity</i>	3.52	4.44	5.53	5.31	-1.607	56.520	0.114
<i>Intrusion</i>	9.03	9.66	12.50	10.47	-1.345	59	0.184
<i>Avoidance/dumbness</i>	7.13	8.12	11.30	11.03	-1.686	59	0.097
<i>Hyperarousal</i>	6.94	8.58	11.63	10.18	-1.951	59	0.056*
<i>Total Frequency</i>	11.23	11.96	17.87	15.37	-1.887	59	0.064
<i>Total Severity</i>	11.87	12.91	17.57	15.37	-1.569	59	0.122

Table 5 – Diagnostic subgroups*Gender

	<i>Female</i>	<i>Male</i>
NO_PTSD	8 (61.5% row) (21.6% col.)	5 (38.5% row) (20.8% col.)
SUBPTSD	9 (45.0% row) (24.3% col.)	11 (55.0% row) (45.8% col.)
FULLPTSD	20 (71.4% row) (54.1% col.)	8 (28.6% row) (33.3% col.)

Table 6 – Diagnostic subgroups*Age class

	<i><=50 years old</i>	<i>>50 years old</i>
NO_PTSD	7 (58.3% row) (22.6% col.)	5 (41.47% row) (17.9% col.)
SUBPTSD	12 (63.2% row) (38.7% col.)	7 (36.8% row) (25.0% col.)
FULLPTSD	12 (42.9% row) (38.7% col.)	6 (57.1% row) (57.1% col.)

Table 7 – Young subjects (N=12) vs old subjects (16) on DTS total score and factorial scores in FULLPTSD diagnostic subgroup

	<i>Young (mean)</i>	<i>Young (std.dev.)</i>	<i>Old (mean)</i>	<i>Old (std. dev.)</i>	<i>T</i>	<i>df</i>	<i>p 2 tailed</i>
<i>Total</i>	48.42	19.39	57.69	22.77	-1.134	26	0.267
<i>Intrusion Frequency</i>	8.92	3.58	9.75	5.22	-0.501	25.848	0.621
<i>Intrusion-Severity</i>	10.58	3.90	9.69	4.32	0.566	26	0.576
<i>Avoidance Frequency</i>	7.33	4.72	8.88	5.54	-0.776	26	0.445
<i>Avoidance-Severity</i>	7.08	3.96	9.44	6.10	-1.235	25.588	0.228
<i>Hyperarousal Frequency</i>	7.08	4.25	10.25	2.96	-2.328	26	0.028*
<i>Hyperarousal-Severity</i>	7.42	4.50	9.69	3.75	-1.455	26	0.158
<i>Intrusion</i>	19.50	6.47	19.44	9.17	0.020	26	0.984
<i>Avoidance/dumbness</i>	14.42	8.03	18.31	10.37	-1.079	26	0.290
<i>Hyperarousal</i>	14.50	8.54	19.94	5.97	-1.886	18.697	0.075
<i>Total Frequency</i>	23.33	10.41	28.88	12.37	-1.253	26	0.221
<i>Total Severity</i>	25.08	10.55	28.81	12.18	-0.848	26	0.404

Table 8 – Young subjects (N=12) vs old subjects (8) on DTS total score and factorial scores in SUBPTSD diagnostic subgroup

	<i>Young (mean)</i>	<i>Young (std.dev.)</i>	<i>Old (mean)</i>	<i>Old (std. dev.)</i>	<i>T</i>	<i>df</i>	<i>p 2 tailed</i>
<i>Total</i>	11.25	6.38	17.50	6.07	-2.186	18	0.042*
<i>Intrusion Frequency</i>	1.75	1.22	3.75	1.83	-2.949	18	0.009*
<i>Intrusion-Severity</i>	2.08	2.43	4.25	1.67	-2.192	18	0.042*
<i>Avoidance Frequency</i>	2.17	2.37	3.13	2.03	-0.936	18	0.362
<i>Avoidance-Severity</i>	1.83	1.99	2.63	2.20	-0.836	18	0.414
<i>Hyperarousal Frequency</i>	1.75	2.34	2.38	1.85	-0.633	18	0.534
<i>Hyperarousal-Severity</i>	1.67	2.31	1.38	1.06	0.381	16.471	0.708
<i>Intrusion</i>	3.83	3.38	8.00	2.62	-2.939	18	0.009*
<i>Avoidance/dumbness</i>	4.00	3.81	5.75	4.06	-0.980	18	0.340
<i>Hyperarousal</i>	3.42	4.62	3.75	2.87	-0.181	18	0.858
<i>Total Frequency</i>	5.67	2.81	9.25	3.96	-2.378	18	0.029*
<i>Total Severity</i>	5.58	4.48	8.25	2.71	-1.656	17.912	0.115

References

- American Heritage Dictionary, 2nd edn., Houghton Mifflin Company, Boston, MA, 1982.
- Armenian H.K., Morikawa M., Melkonian A.K., Hovanesian A.P., Haroutunian N., Saigh P.A., Akiskal K., Akiskal H.S. (2000). Loss as a determinant of PTSD in a cohort of adult survivors of the 1988 earthquake in Armenia: implications for policy. *Acta Psychiatr Scand*, Jul 102, (1):58-64.
- Bland S.H., O'Leary E.S., Farinano E., Jossa F., Krogh V., Violanti J.M., Trevisan M. (1997). Social network disturbances and psychological distress following earthquake evacuation. *J Nerv Ment Dis*, Mar; 185(3):188-94.
- Bland S.H., O'Leary E.S., Farinano E., Jossa F., Trevisan M. (1996). Long-term psychological effects of natural disasters. *Psychosom Med*, Jan-Feb;58(1):18-24. Erratum in: *Psychosom Med*, Jul-Aug;58(4):320.
- Bosuttill W. (2004). Presentations and management of Post Traumatic Stress Disorder and the elderly: a need for investigation. *Int J Geriatr Psychiatry*, May;19(5):429-39.
- Breslau N., Davis G.C. (1992). Posttraumatic stress disorder in an urban population of young adults: risk factors for chronicity. *Am J Psychiatry*, May;149(5):671-5.
- Breslau N., Davis G.C., Andreski P., Peterson E. (1991). Traumatic events and posttraumatic stress disorder in an urban population of young adults. *Arch Gen Psychiatry*, Mar;48(3):216-22.
- Brodsky H., Joffe C., Luscombe G., Thompson C (2004). Vulnerability to post-traumatic stress disorder and psychological morbidity in aged holocaust survivors. *Int J Geriatr Psychiatry*, Oct;19(10):968-79.
- Carr V.J., Lewin T.J., Webster R.A., Hazell P.L., Kenardy J.A., Carter G.L. (1995). Psychosocial sequelae of the 1989 Newcastle earthquake: I. Community disaster experiences and psychological morbidity 6 months post-disaster. *Psychol Med*, May; 25(3):539-55.
- Carr V.J., Lewin T.J., Webster R.A., Kenardy J.A. (1997). A synthesis of the findings from the Quake Impact Study: a two-year investigation of the psychosocial sequelae of the 1989 Newcastle earthquake. *Soc Psychiatry Psychiatr Epidemiol*, Apr;32(3):123-36.
- Catapano F., Malafronte R., Lepre F., Cozzolino P., Arnone R., Lorenzo E., Tartaglia G., Starace F., Magliano L., Maj M. (2001). Psychological consequences of the 1998 landslide in Sarno, Italy: a community study. *Acta Psychiatr Scand*, Dec; 104(6):438-42.
- Chung MC, Werrett J, Easthope Y, Farmer S (2004). Coping with post-traumatic stress: young, middle-aged and elderly comparisons. *Int J Geriatr psychiatry*, Apr; 19(4):333-43.
- Davidson J.R., Hughes D., Blazer D.G., George L.K. (1991). Post-traumatic stress disorder in the community: an epidemiological study. *Psychol Med*, Aug; 21(3):713-21.
- Davidson J.R., Tharwani H.M., Connor K.M. (2002). Davidson Trauma Scale (DTS): normative scores in the general population and effect sizes in placebo-controlled SSRI trials. *Depress Anxiety*, 15(2):75-8.
- Davidson J.R.T. (1996). Davidson Trauma Scale. Multi-Health Systems, Inc.
- Davidson J.: Davidson Trauma Scale (DTS) (2003). North Tonawanda, NY, Multi-Health Systems.
- DeLisi L.E., Maurizio A., Yost M., Papparozi C.F., Fulchino C., Katz C.L., Altesman J., Biel M., Lee J., Stevens P. (2003). A Survey of New Yorkers After the Sept. 11, 2001, Terrorist Attacks. *Am J Psychiatry*, 160; 780-783.
- Dew M.A., Bromet E.J., Shulberg H.C., Dunn L.O., Parkinson D.K. (1987). Mental health effects of the Three Mile Island nuclear reactor restart. *Am J Psychiatry*, 144; 1074-1077.
- Di Fiorino M., Massimetti G., Nencioni M., Paoli R.A. (in press). Full and subthreshold Post-Traumatic Stress Disorder seven years after a flooding in rescue squads. *Western and Eastern Psychiatry*.
- Dunitz M. (2000). The course of PTSD. In : *Post Traumatic Stress Disorder. Diagnosis, Management and Treatment*. Chapter 1, pag. 7. Edited by Nutt D., Davidson J.R.T., Zohar J., UK.
- Fernandez W.G., Galea S., Ahern J., Sisco S., Waldman R.J., Koci B., Vlahov D. (2004). Mental health status among ethnic Albanians seeking medical care in an emergency department two years after the war in Kosovo: a pilot project. *Ann Emerg Med*. Feb, 43(2):E1-8.
- Flint A.J. (1994). Epidemiology and comorbidity of anxiety disorders in the elderly. *Am J Psychiatry*, May;151(5):640-9.
- Freddy J.R., Shaw D.L., Jarrell M.P., Master C.R. (1992). Towards an understanding of the psychological impact of natural disasters: an application of the conservation of resources stress model. *J Traumatic Stress*, 5; 441-454.
- Freedmen S.A., Peri T., Brandes D., Shalev A.Y. (1999). Predictors of chronic PTSD a prospective study. *Br J Psychiatry*, 174, 353-9.
- Garrison C.Z., Bryart E.S., Addy C.L., Spurrier P.G., Freedy J.R., Kilpatrick D.G. (1995). Posttraumatic stress disorder in adolescents after Hurricane Andrew. *J Am Acad Child Adolesc Psychiatry*, Sep; 34(9):1193-201.
- Goenjian A.K., Najarian L.M., Pynoos R.S., Steinberg A.M., Manoukian G., Tavosian A., Fairbanks L.A. (1994). Posttraumatic stress disorder in elderly and younger adults after the 1988 earthquake in Armenia. *Am J Psychiatry*, Jun;151(6):895-901.
- Goenjian A.K., Steinberg A.M., Najarian L.M., Fairbanks L.A., Tashjian M., Pynoos R.S. (2000). Prospective study of posttraumatic stress, anxiety, and depressive reactions after earthquake and political violence. *Am J Psychiatry*, 157:911-916.
- Green B.L., Lindy J.D., Grace M.C., Leonard A.C. (1992). Chronic posttraumatic stress disorder and diagnostic comorbidity in a disaster sample. *J Nerv Ment Dis*, Dec;180(12):760-6.
- Green B.L., Lindy J.D. (1994). Post-traumatic stress disorder in victims of disasters. *Psychiatr Clin North Am*, 17:301-309.
- Hodgkinson P.E., Stewart M. (1998). Coping with catastrophe. A handbook of post-disaster psychosocial aftercare. London: Routledge.
- Katz C.L., Pellegrino L., Pandya A., Ng A., DeLisi L.E. (2002). Research on psychiatric outcomes and interventions subsequent to disasters: a review of the literature. *Psychiatry Res*, Jul; 31;110(3):201-17. Review.
- Kessler R.C., Sonnega A., Bromet E., Hughes M., Nelson C.B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Arch Gen Psychiatry*, Dec; 52(12):1048-60.
- Kulka R.A., Schlenger W.E., Fairbank J.A. (1990). Trauma and the Vietnam War Generation: Report of Findings from the National Vietnam Veterans Readjustment Study, Brunner/Mazel: New York.
- Lai T.J., Chang C.M., Connor K.M., Lee L.C., Davidson J.R. (2004). Full and partial PTSD among earthquake survivors in rural Taiwan. *J Psychiatry Res*, May-Jun; 38(3):313-22.
- Lima B.R., Pai S., Santacruz H., Lozano J. (1991). Psychiatric disorders among poor victims following a major disaster: Armero, Colombia. *J Nerv Ment Dis*, Jul; 179(7):420-7.
- Lima B.R., Pai S., Toledo V., Caris L., Haro J.M., Lozano J., Santacruz H. (1993). Emotional distress in disaster victims. A follow-up study. *J Nerv Ment Dis*, Jun 181(6):388-93.
- Macleod A.D. (1994). The reactivation of post-traumatic stress disorder in later life. *Aust N Z J Psychiatry*, Dec; 28(4):625-34.
- Madakasira S., O'Brien K.F. (1987). Acute posttraumatic stress disorder in victims of a natural disaster. *J Nerv Ment Dis*, May; 175(5):286-90.
- Maj M., Starace F., Crepet P., Lobraccio S., De Marco F., Kemali D. (1989). Prevalence of psychiatric disorders among subjects exposed to a natural disaster. *Acta Psychiatr Scand*, 179, 544-549.
- Mantero M., Gozzini C., Gambarini C., Fumagalli S., Crippa L., Penati G. (2001). Clinical and biological aspects of Post Traumatic Stress Disorder (PTSD). *The Italian Journal of Psychiatry and Behavioural Sciences*, vol. 11; No. 1, Settembre.
- Mayou R., Bryant B., Duthie R. (1993). Psychiatric consequences of road traffic accidents. *BMJ*, Sep; 11, 307(6905):647-51.
- McFarlane A.C. (1988a). The aetiology of post-traumatic stress disorders following a natural disaster. *Br J Psychiatry*, Jan; 152:116-21.
- McFarlane A.C. (1988b). The longitudinal course of posttraumatic morbidity. The range of outcomes and their predictors. *J Nerv Ment Dis*, Jan; 176(1):30-9.
- McFarlane A.C., Clayer J.R., Bookless C.L. (1997). Psychiatric

morbidity following a natural disaster: an Australian bushfire. *Soc Psychiatry Psychiatr Epidemiol*, Jul; 32(5):261-8.

North C.S., Nixon S.J., Shariat S., Mallonee S., McMillen J.C., Spitznagel E.L., Smith E.M. (1999). Psychiatric disorders among survivors of the Oklahoma City bombing. *JAMA*, 282:755-762.

North C.S. (2001). The course of post-traumatic stress disorder after the Oklahoma City bombing. *Mil Med*, 166 (suppl 12): 51-52.

Norusis M.J. (1990). *SPSS/PC+ 4.0 Base, Statistics and Advanced Statistics Manuals for the IBM PC/XT/AT and PS/2*. SPSS Inc. Chicago, IL, USA.

Perkonig A., Kessler R.C., Storz S., Wittchen H.U. (2000). Traumatic events and post-traumatic stress disorder in the community: prevalence, risk factors and comorbidity. *Acta Psychiatr Scand*, Jan; 101(1):46-59.

Port C.L., Engdahl B., Frazier P. (2001). A longitudinal and retrospective study of PTSD among older prisoners of war. *Am J Psychiatry*, Sep; 158(9):1474-9.

Renck B., Weisaeth L., Skarbo S. (2002). Stress reactions in police officers after a disaster rescue operation. *Nord J Psychiatry*, 56(1):7-14.

Resnick H.S., Kilpatrick D.G., Dansky B.S., Saunders B.E., Best C.L. (1993). Prevalence of civilian trauma and posttraumatic stress disorder in a representative national sample of women. *J Consult Clin Psychol*, Dec; 61(6):984-91.

Rubonis A.V., Bickman L. (1991). Psychological impairment in the wake of disaster: the disaster-psychopathology relationship. *Psychol Bull*, May; 109(3):384-99.

Salcioglu E., Basoglu M., Livanou M. (2003). Long-term psychological outcome for non-treatment-seeking earthquake survivors in Turkey. *J Nerv Ment Dis*, Mar; 191(3):154-60.

Shalev A.Y., Freedman S., Brandes D. (1997). Predicting PTSD in civilian trauma survivors: Prospective evaluation of self report and civilian administered instruments. *Br J Psychiatry*, 170, 558-64.

Sharan P., Chaudhary G., Kavathekar S.A., Saxena S. (1996). Preliminary report of psychiatric disorders in survivors of a severe earthquake. *Am J Psychiatry*, Apr; 153(4):556-8.

Solomon S.D., Davidson J.R. (1997). Trauma: prevalence, impairment, service use, and cost. *J Clin Psychiatry*, 58 Suppl 9:5-11. Review.

Stein M.B., Walker J.R., Hazen A.L., Forde D.R. (1997). Full and partial posttraumatic stress disorder: findings from a community survey. *Am J Psychiatry*, Aug; 154(8):1114-9.

Steinglass P., Gerrity E.T. (1990). Natural disaster and posttraumatic stress disorder: short-term versus long-term recovery in two disaster-affected communities. *J Appl Soc Psychol*, 21:1746-1765.

Wang X., Gao L., Shinfuku N., Zhang H., Zhao C., Shen Y. (2000). Longitudinal study of earthquake-related PTSD in a randomly selected community sample in north China. *Am J Psychiatry*, Aug; 157(8):1260-6.

Weine S.M., Vojvoda D., Becker D.F., McGlashan T.H., Hodzic E., Laub D., Hyman L., Sawyer M., Lazrove S. (1998). PTSD symptoms in Bosnian refugees 1 year after resettlement in the United States. *Am J Psychiatry*, Apr; 155(4):562-4.

Yang Y.K., Yeh T.L., Chen C.C., Lee C.K., Lee I.H., Lee L.C., Jeffries K.J. (2003). Psychiatric morbidity and posttraumatic symptoms among earthquake victims in primary care clinics. *Gen Hosp Psychiatry*, Jul-Aug; 25(4):253-61.

Yehuda R., Schmeidler J., Siever L.J., Binder-Brynes K., Elkin A. (1997). Individual differences in posttraumatic stress disorder symptom profiles in Holocaust survivors in concentration camps or in hiding. *J Trauma Stress*, Jul; 10(3): 453-63.

Zlotnick C., Franklin C.L., Zimmerman M. (2002). Does subthreshold posttraumatic stress disorder have any relevance? *Compr Psychiatry*, Nov-Dec; 43(6):413-9.

Zlotnick C., Rodriguez B.F., Weisberg R.B., Bruce S.E., Spencer M.A., Culpepper L., Keller M.B. (2004). Chronicity in posttraumatic stress disorder and predictors of the course of posttraumatic stress disorder among primary care patients. *J Nerv Ment Dis*, Feb; 192(2):153-9.