

MENTAL HEALTH ISSUES AFTER THE L'AQUILA (ITALY) EARTHQUAKE¹

PROBLEMAS DE SALUD MENTAL DESPUÉS DEL TERREMOTO EN L'AQUILA (ITALIA)

DOI: 10.22199/S07187475.2012.0001.00002

Recibido: 15 de Octubre del 2011 | Aceptado: 30 de Enero del 2012

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ABSTRACT

The authors describe the psychological consequences of the April 2009 earthquake on L'Aquila population through a revision of the published literature. This population suffered from important psychological distress but capacity of resilience has been relevant. Resilient mechanisms intervened in aftermath of the earthquake but the long-lasting alterations of the social networks need to be monitored. After the first physical, medical and emergency response, identification of psychological distress symptoms is useful in guiding public health efforts in the aftermath of disasters.

KEY WORDS: Earthquake; natural disaster; mental health; resilience.

RESUMEN

Los autores describen las consecuencias psicológicas del terremoto de abril de 2009 en la población de L'Aquila a través de una revisión de la literatura publicada. Esta población sufre de trastornos psicológicos importantes, pero la capacidad de resiliencia ha sido relevante. Mecanismos de resiliencia intervinieron, aún cuando deben ser monitoreadas las alteraciones a largo plazo de las redes sociales. Después de la primera respuesta física, médica y de emergencia, la identificación de los síntomas de angustia psicológica es útil para orientar los esfuerzos de salud pública en las consecuencias de los desastres.

PALABRAS CLAVE: Terremoto; desastre natural; salud mental; resiliencia.

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INTRODUCTION

L'Aquila is the capital city of the Abruzzo region of the central Italy, a town with a population of 72,000 inhabitants. On April 6th 2009, at 3:32 am, an earthquake (Richter Magnitude 6.3) struck the town and its surroundings, with a total of 105,000 inhabitants involved.

The seismic event caused the death of 309 people, with more than 1600 individuals injured, among which 200 were severely injured and hospitalized, and 66,000 displaced in locations within a 150 km area from the town or in tents located in camps near the urban area. Many buildings of L'Aquila and its neighbouring villages, also of ancient historical importance, were destroyed. The residents were directly 'exposed' to the disaster, though with a broad range of possible individual exposures, loss of property and damage to home. 5% were trapped under rubble with minor physical consequences, 15% lost a known person.

12 months after the earthquake, only 25% of the inhabitants were able to return to their homes and till now, more than two years after the event no more than the 50% of the inhabitants came back home, the urban areas have not been rebuilt and a trial to ascertain possible responsibilities of the lack of adequate alert to the population, after a seismic swarm lasting some months, is on course (Nosengo, 2011; Hall, 2011).

Many studies suggest that disasters and other traumatic events have short and long term health consequences, especially on the occurrence of psychiatric disorders, including post-traumatic stress, major depression and anxiety, and on functional disabilities (Silove & Bryant, 2006; Neria, Nandi, & Galea, 2008; Vogel & Vera-Villaruel, 2010; Cova & Rincón, 2010; Leiva, 2010).

We describe here the psychological consequences of the earthquake on L'Aquila population through a selective revision of the published reports. Observations regarding community mental health services utilization, psychotropic drug prescription, psychological consequences in persons with psychiatric or developmental disorders, as well as in the general population are reviewed, because these issues could inform the development of mental health policy interventions after disasters. The literature search has been conducted in Pubmed using the search terms 'L'Aquila' and 'earthquake' as keywords.

The Community Mental Health Service

The Mental Health Centre of the National Mental Health Service (NMHS) is the territorial facility to whom—L'Aquila and surroundings residents refer. The Informative System (IS) (GESMA, GEStione Salute Mentale della regione Abruzzo, <http://sanitab.regione.abruzzo.it>) of the facility recording the performed activities, was able to work from July 1th, with the lost of the first trimester after the earthquake data. During the months following the earthquake the IS recorded a reduction (about 50%), in absolute numbers, of utilization of the facility with an increase of domiciliary visits for individuals with mental disorders. However, considering the number of residents displaced out of the health district territory, the percentage of referrals is not so far from that before the earthquake, or eventually did not increase in the two years after the earthquake.

These observations cannot be considered of epidemiologic value, but are useful to understand what happened in the aftermath of the earthquake in terms of the community public facility utilization. Several factors likely intervened: difficulties in activity recording from sanitary personnel, reduced accessibility to the facility due to the displacement of the population in a wide area mirrored by the increase of domiciliary

interventions. General practitioners in the camps also likely offered mental health assistance, filtering for further specialized intervention. It is likely that persons with psychological problems linked to the earthquake distress did not ask mental health intervention considering that several symptoms, such as re-experiencing of traumatic events, defensive avoidance and denial of trauma related memories and emotions, as a matter of fact core phenomena of the Post Traumatic Stress Disorder (PTSD), were, if not of very high severity, almost common, relatively 'normal' or however 'conceivable' and not relevant for a specialistic intervention.

Similar kind of health services utilization in a post-disaster has been observed in other conditions. Some months post the Katrina disaster, although there was an important increase of serious mental health symptoms yet, no more than 30% of persons with symptoms used mental health services and more than half had stopped using them already (Wang et al., 2007). After the 9-11 attack, only 7% used mental health services, Hispanics and African-American less likely to use/seek services (Boscarino et al., 2004). It is possible that in post disaster, individuals tend to not seek traditional health and mental health services, needing for outreach of services outside clinical settings, such as schools, gyms, libraries, offices.

The Psychotropic Drug Utilization

Information on the pharmacoepidemiology of drug prescriptions after natural disasters is usually limited. Yet the degree of increase in psychotropic drug utilization could help estimate the level of emotional disturbances in the context of general post-disaster difficulties. By using an administrative database record of the National Health Care Service a pharmacoepidemiological assessment of new prescriptions of antidepressants and antipsychotic was performed. A 37% increase in new

prescriptions of antidepressants and a 129% increase of antipsychotics in the first six post earthquake months, especially in older people and females has been observed (Rossi, Stratta, & Allegrini, 2010; Rossi, Stratta, Maggio, & Allegrini, 2010; Rossi, Maggio, Riccardi, Allegrini, & Stratta, 2011).

It is likely that low-dose of antipsychotics have been prescribed to treat agitation, anxiety, stress-related behavioral disturbances, or insomnia. In emergency situations, externalizing behaviors could exceed mood or internalizing disorders leading to more antipsychotic than antidepressant prescriptions. In the post earthquake period a large part of the prescriptions were performed by general practitioners constantly present in the newly built communities of displaced people, where medical inquiry was as a matter of fact increased as well as integrated into social and public activities. Moreover the free distribution of drugs after the earthquake can have increased accessibility or even useless accumulation. Data regarding the following months are now under analysis but preliminary observations suggest a general prescription decrease.

A pharmacoepidemiological analysis that utilizes an administrative database may provide guidance to general practitioners and other health agencies in optimizing the management of emotional disorders in such emergency settings. This kind of study lead to relevant information in drug prescription appropriateness in the aftermath of the earthquake representing a first set of data that should be regarded as a preliminary indicator of response for both the national system and for those subjects directly and indirectly affected by an earthquake.

Psychological Consequences in Persons with Psychiatric Disorders

The literature on adaptive outcomes for people with psychiatric disorder is limited (see Katz, Pellegrino, Pandya, Ng, & DeLisi,

2002 for a review). In the aftermath of the earthquake, people referring to the Mental Health Center facilities in L'Aquila were asked for their psychological subjective adjustment to the event (Stratta & Rossi, 2010). In this short-term perspective, people with schizophrenia and mood disorders showed a better subjective outcome, while subjects with anxiety disorders felt worse. A not negligible amount of patients with schizophrenia and mood disorders even reported a feeling of improvement after the earthquake: among people in charge, only 25% of persons with schizophrenia and 26% affective disorders reported 'worse' outcome. The remaining reported 'equal' (57.1% and 57.9%) or even 'better' (17.9% and 15.8%). After one year, in a medium term perspective, more than 60% of subjects refer to feel "equal" or even "better" than before the earthquake, independently from diagnosis, severity of illness, age and gender. It is likely that resilience facing to adversity might have had a role in this observation. Resilience is a well-established item for describing and explaining unexpected positive outcomes despite high risk of maladjustment when exposed to psychosocial adversities (Bonanno, 2004; Stratta & Rossi, 2010a). Capacity for resilience in subjects with psychiatric disabilities does not end when a diagnosis of major mental disorder is made, even when struggling to recover from psychiatric disorders.

Psychological Consequences in Persons with Autism

A study evaluating the adaptive behavior of adolescents with autism after their exposure to the earthquake compared with an unexposed peer group with the same disorder, has been performed (Valenti et al., 2011). Exposed participants declined dramatically in their adaptive behavior in the aftermath of the earthquake, but an immediate intensive post-disaster intervention allowed to obtain a trend towards partial recovery of adaptive functioning after one year.

This observation reflects the dramatic life changes—experienced by the participants and their families, who have faced uncertainty about their housing, work, health services, environment and social relationships. A partial throwback to relatively stable life conditions and immediate, intensive interventions after the disaster, permitted a tendency to recover the adaptive functioning, although a complete recovery likely will take a longer time. This finding is encouraging for persons with autism and their families and caregivers; resilience and recovery of pre-disaster functioning in persons with autism largely depends on their immediate inclusion in routine, intensive rehabilitation programs and the steadying, as far as possible, of daily life routines.

Psychological Consequences in the General Population

Assessment for psychological distress after the earthquake of several groups of people, using self reported questionnaires, has been performed. Disadvantages aside, studies like these can be a very powerful tool, especially in situations such as in the case of natural disasters, where other kind of interventions or research designs would be very difficult to arrange or not possible, allowing investigation on relatively wide samples. Several groups of population, such as high school and university students, adult people from the new built communities and relatives of these students could be assessed by this methodology.

Young People

Since psychosocial stress is included in most etiological models of mental disorder and severe stress can induce symptoms of mental disorder and interact with vulnerability factors, high school students who survived the earthquake have been evaluated comparing them with a previously obtained database of comparison subjects (Rossi et al., 2011). The questionnaire

administered to the student population was the Community Assessment of Psychic Experiences (CAPE), widely used to assess the frequency of clinical symptoms and symptom-related distress severity in a general population (Spauwen, Krabbendam, Lieb, Wittchen, van Os, 2006). Contrary to the hypotheses of a possible increase of subclinical psychotic experiences as a result of psychosocial stressors due to the earthquake, the CAPE score factors in the exposed group was lower.

In a population of adolescents exposed to the earthquake, resilience and coping abilities have been compared to those of a control population living in a closer area but not directly exposed (Rossi et al., submitted). The resilience was assessed by the Resilience Scale for Adolescents (READ) (Hjemdal, Friborg, Stiles, Martinussen, & Rosenvinge, 2006) and coping was assessed by the Brief COPE (Carver, 1997). Exposed male adolescents reported consistently higher resilience (READ) scores which also activated a better coping skill pattern.

Using the Trauma and Loss Spectrum Self-Report (TALS-SR) (Dell'Osso et al., 2009), the prevalence rates of full and partial PTSD in a population of students attending the last year of high school were investigated ten months after the earthquake (Dell'Osso et al., 2011). The 37.5% of the adolescents reported a PTSD diagnosis and another 29.9% of subjects partial PTSD. Female gender was associated with significantly higher full-blown, but not partial, PTSD. Exploring symptoms of maladaptive coping that might have been developed as consequence of the earthquake exposure, a significantly higher number of women (almost double) than men reported they had stopped taking care of themselves while the opposite was reported for the use of alcohol or medication to calm themselves or to avoid engaging in risk-taking behaviors or suicide attempts. These data can be considered in agreement with another observation in a

mixed sample of young psychiatric patients and high school/university students, of a marked increase in substance abuse, speculating that this behaviour could be a reaction to emotional distress in the absence of other, more adaptive coping mechanisms (Pollice, Bianchini, Roncone, & Casacchia, 2011).

About two years after the event, associations with the loss of close friends or relatives in the framework of the earthquake with full or partial PTSD has been investigated in a sample of adolescents (Dell'Osso et al., 2011a). The results showed a PTSD diagnosis in 30.7% of the adolescents, and a diagnosis of partial PTSD in a further 31.4% of subjects. Bereaved students reported significantly higher PTSD rates and post-traumatic symptoms levels with respect to not bereaved ones.

Globally these findings confirm the pervasive effects of the disaster for mental health in adolescents as also seen in other similar reports (Goenjian et al., 2011; Ma et al., 2011). Further, these results highlight the relevance of gender differences in the response to mass trauma that should be taken into account when facing such events.

The lack of increase of psychotic symptoms could be related to the event characteristics. In fact this kind of event, although extremely stressful and traumatizing, does not necessarily lead to 'social defeat stress', a relevant risk factor for psychosis, but can instead induce positive psychological or personal changes. Post-trauma positive changes or re-appraisal for successful adaptation may explain the lack of increase of psychotic symptoms.

Although male adolescents are at higher risk of alcohol abuse or self harm behaviors, they mostly benefit of the 'protective' effect of resilience mechanisms. These findings are in line with the report of a higher prevalence of 'traumatic symptoms' among

female adolescents (Dell' Osso et al 2011). Further, traumatic bereavement, in combination with exposure to the trauma itself and to the life danger related to it, seems to be a major risk factor for mental health consequences after a natural disaster such as an earthquake (Dell' Osso et al 2011a).

Adult People

The Temperament and Character Inventory – Revised (TCI–R) (Cloninger, Svrakic, & Svrakic, 1997) has been administered to a community sample of adult subjects and to subjects non-exposed to the earthquake, on the basis of the hypothesis that exposure to the trauma would have affected temperament and character domains (Rossi, Capanna, Struglia, Riccardi, & Stratta, 2011). Exposed adult people, within 31–50 years, showed higher Persistence (P) and lower Harm Avoidance (HA) than non-exposed. On the other hand older exposed people showed a different pattern of response characterized by low Self Directedness (SD) and a trend toward higher HA than their non-exposed counterparts.

Persistent persons tend to perceive frustration and fatigue as a personal challenge. They do not give up easily and, in fact, tend to work extra hard when criticized or confronted with mistakes in their work. Persistence has been reported to be related to distress tolerance and it is considered an adaptive construct, a potentially protective aspect within the concept of resilient personality (Skodol, 2009). The pattern of high P and low HA could be a more adaptive reaction to trauma in this middle age sample. SD taps personality aspects related to identity, responsibility and achievement motivation: high scores on SD can be seen as indicative of mature and well-integrated personality functioning. SD is negatively correlated to trait anxiety and neuroticism. HA reflects a personality dimension associated with inhibition of behavior and it

is correlated with anxiety and neuroticism. In this case the personality response seems to be more maladaptive, older people being more sensitive to the distressing event. It is not surprising that citizens of different ages experience the same kind of disaster differently. Changing perceptions, cognitions, resources, roles and responsibilities, all of them related to personality development, are likely to influence reaction to natural trauma.

Interestingly, current findings are in line with the above reported independent study assessing the pharmacoepidemiology of drug prescriptions (Rossi, Maggio, Riccardi, Allegrini, & Stratta, 2011). These two findings could identify the parallel and possible related conditions such as dysfunctional psychological adaptation in older people after trauma. The different pattern of adaptive/maladaptive TCI variation supports the view that age could differentially affect personality adaptation to a traumatic event.

The religious faith after the earthquake

Religious faith does not seem to be a monothetic construct: answers to the meaning and purpose of life are only one of the potential benefits of religious faith. There is also the social support from fellow believers that is available from attending religious services and participating in religious activities, such as prayers and meditation. Relationships with spiritual figures and religious leaders may provide a secure base analogous to a parent attachment. Religious beliefs and practices also mobilize adaptive systems such as self-regulation through prayer or meditation, or social support and regulation through rituals, ceremonies, and rules for living. Within the multidimensional concept of the religious faith, spirituality and religiousness have been therefore considered as discrete factors differently influencing psychological and physical health.

Assessment of the influence of spirituality and religiousness, as constructs of the religious faith, on the psychological traumatic effects of the catastrophic event has been performed (Capanna & Rossi, 2011) utilising the Fetzer Multidimensional Spirituality Measure (Brief Multidimensional Measure of Religiousness/Spirituality – BMMRS- Fetzer Institute 1999) developed to provide relatively brief measures for religiosity/spirituality dimensions. No differences were seen for BMMRS between subjects exposed to the earthquake and non-exposed subjects for religious dimensions but spiritual dimensions instead were significantly different with lower scores in the exposed sample. A weakening of religious faith in persons having troubles coping with trauma is a consistent finding. The authors further observed that religious, more than spiritual factors, helped the community to buffer the earthquake psychological distress. Religious, entailing sharing beliefs and rituals with community, rather than spiritual factors can have been effective on resilience enhancement in the earthquake aftermath through an amplification of the 'social capital'. Religious faith, specifically religiosity dimension, can positively affect coping with traumatic experiences.

Likely an integrative explanation of these results is poorly related to the religious faith, but mostly to religiosity. Insecurity feelings can create a need for order, even if an imaginary order only, through rituality. If a lack of control is the case, as in the aftermath of an unforeseen natural disaster, rituality can go hand in hand with stress. When control is lost, the person can try to restore the situation through rituals, sometimes even superstitious. Paranoid ideation also can, paradoxically, help to explain and make sense of what the person got out of hand. Regulation through rituals, ceremonies, and rules for living are part of the religious dimension that can help the person to fight against uncertainty and maintain control, being both important

variables governing psychological well-being.

In another study an increase of suicidal ideation in the adult population, particularly in women, has been observed one year after the earthquake (Stratta et al., 2011). This finding is associated to 'negative religious coping' and PTSD symptoms. The 'negative religious coping' such as expression of conflict and doubt regarding matters of faith, as well as a feeling of being punished or abandoned by God, can prevail in response to prolonged stress without relief (Ano & Vasconcelles, 2005), as it was experienced by the population exposed to the earthquake. This condition can be due not only to the immediate effects of the event but also to the consequent derived social damage.

These findings contribute to the inclusion of religious faith, specifically religiosity dimension, in the resilient domains that can positively affect the coping with traumatic experiences. Degree of religious affiliation and commitment examination by mental health practitioners can be useful in the clinical practice.

DISCUSSION AND CONCLUSIONS

After more than two years from earthquake the emergency phase is concluded but several emotional, adjustment and psychosocial difficulties still remain (Stratta et al., in press). It is arguable that different periods after disaster could mark different 'resilient' reactions. In the acute phase, energy is directed at minimizing the impact of the stress and stressors. In the reorganization phase, a new reality is faced and accepted in part or in whole with different patterns of resilience (Fine, 1991).

After a first phase in the aftermath of the event, it is likely that mental health needs could become even-more pressing and the traditional health care system could not

intercept new emerging demands (DeLisi, 2006).

From these findings capacity of resilience can be considered a relevant variable intervened after the earthquake, above all in some groups of the population as elsewhere suggested (Davydov, Stewart, Ritchie, & Chaudieu, 2010; Bonanno, 2004). What protects these subjects from succumbing to stress are psychological, biological and social factors that, in the last 30 years of psycho-clinical research, have been grouped under the concept of 'resilience'. Some individuals, even if facing most pernicious adversities, manage to avoiding psychological collapse and maintaining healthy adjustment. Resilience reflects a positive end of the adaptation/maladaptation spectrum in response to risk exposure (Davydov, Stewart, Ritchie, & Chaudieu, 2010; Bonanno, 2004; Stratta & Rossi, 2010).

Resilience concept gives an important alternative perspective, a step beyond the research establishing that severely exposed disaster victims merely develop psychological disorders (Davydov, Stewart, Ritchie, & Chaudieu, 2010). This perspective highlights the personal abilities that lead to maintain or recover mental health in spite of dramatic adversities. Considerations on the features of the trauma the population experienced can help to understand this observation. An earthquake, such as the one that hit L'Aquila, is a catastrophe shared by the population as a whole. The social meaning of the care and rescues offered to the survivors can also have had a role in enhancing personal resilience.

However if resilient mechanisms intervened in the immediate aftermath or the earthquake, important dangers are conceivable in a medium-long-term perspective. Other than the immediate effects of the disaster, the long-lasting alterations of day-to-day life and the disruption of social networks can be well

associated with mental health problems, including depression and hopelessness (Bland et al., 1996; McFarlane, 2010). Stores, bars, clubhouses, or churches, squares and other aggregation places, where people can find social support, have been lost. Following many disasters, the loss of important attachments is a severe consequence, with social and community resources deteriorating just when victims need them the most.

The findings we reported show that stress adaptation may vary across gender, age and social groups (Rossi et al., 2011b; Dell'Osso et al., 2011; Rossi et al., 2011a) so that more attention should be paid to the need of different populations as also reported in a study conducted after Newcastle earthquake (Carr, Lewin, Webster, & Kenardy, 1997). Different subgroups of the population are more or less likely to be affected, so that the required psychosocial interventions would have been tailored to their unique combination of risk and protective factors. A continuous surveillance from mental health services is necessary and it should be promptly translated into interventions. They should mobilize inner resources, strengthen internal locus of control and self-efficacy, increase self care, strengthen community connections, de-stigmatize services, move outside traditional clinical settings (Munir, Ergene, Tunaligil, & Erol, 2004). Unfortunately, we testimony a worrisome fragmentation of psychosocial interventions performed on small numbers, essentially driven from 'bottom-up' observations. If the pessimist sees difficulties in coping with new situations, the optimist sees opportunities. We believe it will be a difficult dilemma for people in L'Aquila.

REFERENCES

- Ano, G. G., & Vasconcelles, E. B. (2005). Religious coping and psychological adjustment to stress: a meta-analysis.

- Journal of Clinical Psychology*, 61, 461–480.
- Bland, S. H., O'Leary, E., Farinero, E., Jossa, F., & Trevisan, M. (1996). Long-Term Psychological Effects of Natural Disasters. *Psychosomatic Medicine*, 58, 18-24.
- Bonanno, G. A. (2004). Loss, trauma, and human resilience: have we underestimated the human capacity to thrive after extremely aversive events? *American Psychology*, 59, 20-8.
- Boscarino, J. A., Galea, S., Adams, R. E., Ahern, J., Resnick, H., & Vlahov, D. (2004). Mental Health Service and Medication Use in New York City After the September 11, 2001, Terrorist Attack. *Psychiatric Services*, 55, 274-283.
- Capanna, C., & Rossi, A. (2011). La spiritualità come fattore di resilienza nel sisma de L'Aquila. *Italian Journal of Psychopathology*, 17(S1): 125.
- 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. *Social Psychiatry and Psychiatric Epidemiology*, 32, 123-136.
- Carver, C. S. (1997) You want to measure coping but your protocol' too long: Consider the brief cope. *International Journal of Behavioral Medicine*, 4 (1), 92-100.
- Cloninger, C. R., Svrakic, N. M., & Svrakic, D. M. (1997). Role of personality selforganization in development of mental order and disorder. *Developmental Psychopathology*, 9, 881–906.
- Cova, F. & Rincón, P. (2010). The Mental Health Consequences of the 27F Earthquake and Tsunami. *Terapia Psicológica*, 28(2), 179-18.
- Davydov, D. M., Stewart, R., Ritchie, K., & Chaudieu, I. (2010). Resilience and mental health. *Clinical Psychological Review*, 30, 479–495.
- DeLisi, L. E. (2006). The Katrina disaster and its lessons. *World Psychiatry*, 5(1), 3-4.
- Dell'Osso, L., Carmassi, C., Massimetti, G., Conversano, C., Daneluzzo, E., Riccardi, I., Stratta, P., & Rossi, A. (2011a). Impact of traumatic loss on post-traumatic spectrum symptoms in high school students after the L'Aquila 2009 earthquake in Italy. *Journal of Affective Disorders*, 134, 59–64.
- Dell'Osso, L., Carmassi, C., Massimetti, G., Daneluzzo, E., Di Tommaso, S., & Rossi, A. (2011). Full and partial PTSD among young adult survivors 10 months after the L'Aquila 2009 earthquake: Gender differences. *Journal of Affective Disorders*, 131, 79-83.
- Dell'Osso, L., Carmassi, C., Rucci, P., Conversano, C., Shear, M. K., Calugi, S., Maser, J. D., Endicott, J., Fagiolini, A., & Cassano, G. B. (2009). A multidimensional spectrum approach to post-traumatic stress disorder: comparison between the Structured Clinical Interview for Trauma and Loss Spectrum (SCI-TALS) and the Self-Report instrument (TALS-SR). *Comprehensive Psychiatry*, 50(5), 485–490.
- Fetzer Institute. (1999). *Multidimensional measurement of religiousness/spirituality for use in health research*. A report of the Fetzer Institute/National Institute on Aging Working Group. Fetzer Institute.
- Fine, S. B. (1991). Eleanor Clarke Slagle Lecture. Resilience and Human Adaptability: Who Rises Above Adversity? *American Journal of Occupational Therapy*, 45, 493-502.
- Goenjian A. K., Roussos A., Steinberg A. M., Sotiropoulou C., Walling D., Kakaki M., & Karagianni S. (2011). Longitudinal study of PTSD, depression, and quality of life among adolescents after the Parnitha earthquake. *Journal of Affective Disorders*, 133(3), 509-515.
- Hjemdal, O., Friborg, O., Stiles, T.C., Martinussen, M., & Rosenvinge, J.H. (2006) A new scale for adolescent resilience: Grasping the central protective resources behind healthy development. *Measurement and Evaluation in Counseling Development*, 39, 84.
- 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 Research*, 110: 201–217.
- Leiva Bianchi, M. (2010). Creation of an indicator of the impact of earthquake data collected from people who lived in the 27-f. *Salud y Sociedad*, 1(3), 178-185.
- Ma, M., Liu, X., Hu, X., Qiu, C., Wang, Y., Huang, Y., Wang Q., Zhang, Z., Li, T. (2011). Risk indicators for post-traumatic

- stress disorder in adolescents exposed to the 5.12 Wenchuan earthquake in China. *Psychiatry Research*, 189(3), 385-391.
- McFarlane, A.C. (2010). The long-term costs of traumatic stress: intertwined physical and psychological consequences. *World Psychiatry*, 9, 3-10.
- Munir, K., Ergene, T., Tunaligil, V., & Erol, N. (2004). A Window of Opportunity for the Transformation of National Mental Health Policy in Turkey Following Two Major Earthquakes. *Harvard Review Psychiatry*, 12(4), 238-251.
- Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: a systematic review. *Psychological Medicine*, 38, 467-480.
- Nosengo, N. (2011). Scientists on trial over L'Aquila deaths. *Nature*, 474(15), doi:10.1038/474015a.
- Pollice, R., Bianchini, V., Roncone, R., & Casacchia, M. (2011). Marked increase in substance use among young people after L'Aquila earthquake. *European Child and Adolescent Psychiatry*, 20, 429-430.
- Rossi, A., Capanna, C., Struglia, F., Riccardi, I., & Stratta, P. (2011b). Temperament and Character Inventory - Revised (TCI-R) 1 year after the earthquake of L'Aquila (Italy). *Personal and Individual Differences*, 51, 545-548.
- Rossi, A., di Tommaso, S., Stratta, P., Riccardi, I., & Daneluzzo E. (2011). How much stress is needed to increase vulnerability to psychosis? A community assessment of psychic experiences (CAPE) evaluation 10 months after an earthquake in L'Aquila (Italy). *European Archives of Psychiatry and Clinical Neuroscience*, DOI 10.1007/s00406-011-0258-7.
- Rossi, A., Maggio, R., Riccardi, I., Allegrini, F., & Stratta, P. (2011a). A quantitative analysis of antidepressant and antipsychotic prescriptions after an earthquake in Italy. *Journal of Traumatic Stress*, 24(1), 129-132.
- Rossi, A., Stratta, P., & Allegrini, F. (2010a). Change in prescription of psychotropics after an earthquake in Italy. *Psychiatric Services*, 61, 845-846.
- Rossi, A., Stratta, P., Maggio, R., & Allegrini, F. (2010b). Un'analisi delle prescrizioni di farmaci antidepressivi e antipsicotici nell'ASL de L'Aquila nei 6 mesi dopo il sisma. *Bollettino SIFO*, 2, 55-58.
- Rossi, A., Struglia, F., Riccardi, I., Daneluzzo, E., Pacifico, R., Cavicchio, A., Di Cosimo, A., Corbi, D., & Stratta P. (Submitted). Resilience And Trauma Exposure In Adolescence: A Cross Sectional Study 2 Year After The Earthquake Of L'Aquila. *Journal of Adolescent Health*.
- Silove, D., & Bryant, R. (2006). Rapid assessments of mental health needs after disasters. *Journal of American Medical Association*, 296 (5), 576-578.
- Skodol, A.E. (2009). The resilient personality. In: Reich JW, Zautra AJ, Hall JS (Ed.). *Handbook of adult resilience* (112-125). Guilford Press.
- Spauwen, J, Krabbendam L, Lieb R, Wittchen HU, & van Os J. (2006). Impact of psychological trauma on the development of psychotic symptoms: relationship with psychosis proneness. *British Journal of Psychiatry*, 188, 527-533.
- Stratta, P., Capanna, C., Riccardi, I., Perugi, G., Toni, C., Dell'Osso, L., Rossi, A. (2012). Spirituality and Religiosity in the Aftermath of a Natural Catastrophe in Italy. *Journal of Religion and Health*, DOI 10.1007/s10943-012-9591-z.
- Stratta P., Capanna, C., Riccardi, I., Carmassi, C., Piccinni, A., Dell'Osso, & L., Rossi, A. (2011). Suicidal intention and negative spiritual coping one year after the earthquake of L'Aquila (Italy). *Journal of Affective Disorders*, doi:10.1016/j.jad.2011.10.006.
- Stratta P, de Cataldo S, Bonanni RL, Valenti M, Masedu F, & Rossi A. (in press) Mental Health in L'Aquila after the earthquake. *Annali Istituto Superiore di Sanità*.
- Stratta, P., & Rossi, A. (2010). Resilience in psychopathology agenda. *Italian Journal of Psychopathology*, 16 (4), 305-308.
- Stratta, P., & Rossi, A. (2010a). Subjective Adjustment of Individuals With Psychiatric Disorders in the Aftermath of the L'Aquila Earthquake. *American Journal of Psychiatry*, 167 (3), 352-353.
- Valenti, M., Ciprietti, T., Di Egidio, C., Gabrielli, M., Masedu, F., Tomassini, A.R., & Sorge, G. (2011). Adaptive Response of Children and Adolescents with Autism to the 2009 Earthquake in L'Aquila, Italy. *Journal of Autism Developmental Disorders*, DOI 10.1007/s10803-011-1323-9.

- Vogel, E. H., & Vera-Villaroel, P. (2010). Psychology and Natural Disasters: Earthquake and Tsunami in Chile on February 27, 2010. *Terapia Psicológica*, 28(2), 143-143.
- Wang, P.S., Gruber, M.J., Powers, R.E., Schoenbaum, M., Speier, A.H., Wells, K.B., & Kessler, R.C. (2007). Mental Health Service Use Among Hurricane Katrina Survivors in the Eight Months After the Disaster. *Psychiatric Services*, 58, 1403-1411.