

The narrative epidemiology of L'Aquila 2009 earthquake

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The authors describe their experience working and living in L'Aquila, where at 3.32 a.m., early in the morning of 6 April 2009, a 6.3 Richter magnitude earthquake caused serious damages to this 13th century town (with a population of 72 000 and a health district of 103 788), in the mountainous Abruzzo region and to several medieval hill villages in the surrounding areas: 309 residents were killed, over 1600 were injured, 66 000 residents were displaced, and, the centre of L'Aquila, the main historical and artistic centre of Abruzzo, was totally destroyed.

Here is described the work done at the Psychiatric Unit of the General Hospital of L'Aquila and in the University. The Authors report the incidence rate of Acute Stress Disorder (ASD) in help-seekers (full ASD 4.9%, and partial ASD 39.3%), and of post-traumatic stress disorder (PTSD) found in different samples of population (range 12–37.5). The authors express their consideration about which real-world variables can reflect the population distress and the naturalistic process of recovery in such natural disasters. After the earthquake they hypothesize that a lot of residents had found their way to recover through 'writing, telling the story', by analogy with what narrative medicine asserts, thus estimating the positive effect of 'emotional disclosure' on health. A large number of materials (books, web-blogs, videos) were produced by residents and a database of memories was implemented. The suffering and struggle to recover in the aftermaths of a traumatic experience often yields remarkable transformations and positive growth. From this point of view, the authors underline the increased virtual relationships of residents through Facebook, to cope with the loss of previous social relationships, to get information about recreational opportunities, or to get organized for public events, despite their displacement. Many collective demonstrations were organized and showed the will to actively participate to the processes of reconstruction of the civil and scientific life of the town. The authors stress the need to prevent natural disasters, instead of preventing mental disorders following natural disasters, reporting that seven Italian seismologists and scientists are on trial for manslaughter, accused to have failed to evaluate the true risks of L'Aquila earthquake.

Key words: Earthquakes, mental health, natural disasters, post-disaster intervention planning.

When the night of 6 April 2009 we were thrown off our beds, and made homeless after 30 s, while in front of us the roof of the Church of Santa Maria Paganica was going down in a surreal mist, we did understand what it truly means to live a natural disaster, like an earthquake.

The earthquake: at 3.32 a.m., early morning, 6 April 2009, L'Aquila was struck by a 6.3 Richter magnitude earthquake, followed by about 20 000 aftershocks. The earthquake caused serious damages to this 13th centuries town (with a population of 72 000 and a health district of 103 788), in the mountainous Abruzzo region and to several medieval hill villages in the surrounding areas. Three hundred and nine residents were killed, over 1600 were injured, 66 000 residents were displaced and, the centre of L'Aquila, the main historical and artistic centre of Abruzzo, was totally destroyed.

L'Aquila 'was' the main historical and artistic centre of Abruzzo. The ancient streets were peppered with churches and monuments of historic and artistic value, a real heritage of its rich medieval past, such as the Fountain of the Ninety-Nine Spouts, the symbol of the city; the massive 16th-century Spanish castle that crowns the city's highest point; the Basilica of St Bernardine, the greatest Renaissance church in Abruzzo; and the Church of Saint Mary in Collemaggio, the most outstanding example of Abruzzo Romanesque architecture, where Peter from Morrone was crowned Pope Celestino V in 1294, leaving to the city the unvaluable gift of the "Perdonanza". The name "Perdonanza Celestiniana", the Celestine Forgiveness, derives from the Papal Bull issued by Pope Celestine V and represents the re-enactment of the extraordinary plenary indulgence to anyone who, confessed and communicated, enter the Basilica of Santa Maria di Collemaggio from vespers to those of August 28, 29.

The earthquake left 66 000 people displaced. Approximately 44 000 found an accommodation in tented camps close to their place of residence, and a

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further 20 000 were housed in hotels on the Abruzzo Adriatic Sea coast. Others stayed with friends and relatives throughout Italy.

The main earthquake was preceded by several foreshocks in the previous 4 months and in the following 10 days, before the mainshock, by strong foreshocks. When the earthquake occurred with a gigantic noise we rushed from our homes and after an hour (the time to find out the way to leave the centre of the town stepping over the rubbles by our car) we reached the General Hospital. The earthquake also caused serious damages to St Salvatore General Hospital in L'Aquila, where our psychiatric inpatient unit and outpatient services were located. In a 15-h period all patients admitted in the General Hospital were transferred to other regional hospitals or services, while hundreds of injured residents reached the Emergency Room and were treated in the courtyard of the Hospital. The day after the earthquake, our Psychiatric Service was relocated into two tents in the camp hospital (one tent for admissions and one for outpatient services). The Psychiatric Inpatient Unit was relocated to a small 'open door' ground-floor ward inside a restored section of St Salvatore Hospital only 3 months later. No compulsory admissions were accepted till June 2010, when the Unit was relocated in its original restored building, although in a narrower area.

The earthquake also caused serious damages to the University buildings. L'Aquila was, and still is, a University town offering a full range of academic programmes, including biotechnologies, sciences, economics, engineering, education, humanities, medicine, psychology, and sport sciences, to 24 699 enrolled students (among them 6857 first-year students), most of them not living in the city where they studied. The University was an important part for the town and for its economy.

The University was badly affected by the 2009 L'Aquila earthquake, with 55 students killed. The student dormitory was half destroyed and eight students killed. Among survivors, six students were pulled out of rubble 15 h after the shocks, after a hard work by the rescuers, followed live by the national media in an emotional suspense climate. Only two buildings on the University's two out-of-town campuses were only partially damaged. Despite the impossibility to use any University building for security reasons, encouraged by the Rector, Prof. Ferdinando di Orio, there in person, with a safety helmet, part of the University staff restarted their activities 3 days after the earthquake. To complete the academic year 2008–09, the academic staff taught their lessons in tents and, when possible, in open spaces, living in tented camps or commuting daily to the nearest safe localities, like all students and the administrative staff. Starting from the academic year 2009–10 the University developed a programme

of reconstruction: new buildings were rented for the faculties which had lost their campuses during the earthquake, a new student residence was created, free transport services were given to the students and the programme of reconstruction of the damaged University buildings started. Anyway, today the great majority of the students cannot find any accommodation in L'Aquila, commuting daily and facing a lot of difficulties in their everyday life. Despite this situation, a lot of students chose to remain to study in the University of L'Aquila, although most of them lived the traumatic experience of the 6 April 2009 night in L'Aquila. Around the same number of students (24 638, first year students 6872) were enrolled during the academic year 2009–10. For 3 solar years the University was supported by a special decree of the Italian Ministry of Education, University and Research, facilitating students' enrollment without taxes payment. The decree has been renewed last July.

Our work 'on the ground'

Help seekers

In the first month after the earthquake we assessed 122 survivors (61.5% women, 38.5% males, mean age 35.5 years \pm 18.7) of the L'Aquila earthquake who subsequently sought help from the General Hospital Psychiatric Unit at San Salvatore Hospital – the only psychiatric emergency facility in the area – during the first month following the earthquake (Casacchia *et al.* submitted). Despite the high level of psychological distress found in 65.6% of the subjects, only 6 subjects (4.9%) could be considered affected by 'full' acute stress disorder (ASD), whereas 48 subjects (39.3%) could be considered affected by 'partial' ASD (Casacchia *et al.* submitted).

Hospital admissions

Eighty-three subjects (55.4% males, 44.6% women) were consecutively admitted in the 'psychiatric ward' of the General Hospital of L'Aquila in the first 6-month period (from 28 April to 6 October 2009), 23% of them admitted in the hospital camp tents. Among them 14.3% were diagnosed with post-traumatic stress disorder (PTSD). Between 6 April 2009 and 30 December 2009, 54 earthquake survivors affected by schizophrenia consecutively admitted to the psychiatric ward were also assessed with a cognitive battery. Nine patients (15%) met the (APA, 2000) Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV TR) criteria for PTSD and showed a more severe positive symptomatology and a statistical significant impairment on

working memory compared to the subgroup of schizophrenic patients not showing PTSD co-morbidity (Pollice *et al.* 2010).

The activity of 'SMILE' (a psychiatric service for young people)

Between 6 April 2009 and 30 September 2009, 323 young survivors (aged 18–30 years, 67.5% women and 32.5% men) were screened for PTSD at the SMILE, a psychiatric service for young people, directed by R.P., started in November 2005 under the auspices of the Department of Mental Health and the University of L'Aquila. The mission of the service is to reduce the burden of mental suffering in 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 also aims at reducing the delays that young people at incipient risk of severe psychiatric illness experience in accessing appropriate psychiatric care.

In the 6-month activity following L'Aquila earthquake, 66.7% of the total sample of SMILE users showed a post-traumatic symptomatology, and 13.8% were diagnosed with PTSD (Pollice *et al.* 2011a).

Until June 2009 the service was located in a tent, although most of the interventions were held on tent villages around the town. After June, the SMILE was located in the garden of the psychiatric ward in a nice prefabricated ecological wooden house, donated by the editorial staff of 'La Stampa', the newspaper of Torino. The Italian Health Minister, Ferruccio Fazio, inaugurated the new structure. A car (Fiat 16) for professionals mobility was donated to the SMILE by Fiat, an Italian automobile manufacturer. A widow of Region Marche donated the car of her dead husband (Fiat 600), too.

The cooperation with General Practitioners (GPs)

A cooperation was established with GPs that in our town were organized in multi-professional and multi-specialized units, i.e. the Community Primary Care Unit (Unità Territoriali di Assistenza Primaria (UTAP)), a voluntary aggregation of GPs on the basis of the new Italian model of primary care, not more centred on the role of the 'family doctor', but on an integrated network of eight to ten GPs taking care of the person.

We worked together with four UTAP and conducted a survey on the psychological conditions of their users (Giordani Paesani *et al.* 2011a), finding a more severe hyperarousal and avoidance post-traumatic symptomatology on subjects housed in hotels compared to those living in tented camps. Compared to the previous physical health conditions, L'Aquila population showed an increase in the body mass

index higher levels of blood pressure and an increase in thyroid pathologies (Mollica *et al.* 2011), and a higher prevalence of metabolic syndrome, confirming the literature results (Jin *et al.* 2009; Weiss *et al.* 2011).

The work at the University

The webserver of the University was in the main University Rector's Office building in the heart of the historical centre of the town of L'Aquila and it was seriously damaged. Only after a couple of days and with great difficulty it was rescued with a risky operation by technicians and by a specialized fire brigade.

Before being recovered, in a 7-day period, new e-mail addresses (on most popular servers) were established for the academic and administrative staff, enabling ongoing dialogue and information sharing between staff within the institution and the wider educational community. University offices were closed and all the administrative staff cooperated working from their temporary accommodation through their mobile phones/personal computer or in tent camps set up in a week in the parking lot near the University Science buildings. In the same parking area, under a tent, less than 3 weeks after the earthquake, 24 April 2009, 11 students of the degree course of psychiatric rehabilitation technicians of the University of L'Aquila, directed by R.R., could defend their thesis and graduated.

Lessons, committees, and academic meetings were conducted in open spaces or under big tents that the Civil Protection Department set up near the University buildings (Science, Medicine, Psychology, Biotechnology) in Coppito, a modern area and the only area where all the other faculties could convey (before the earthquake, Economics, Engineering, Education, Humanities, and Sport Sciences were distributed in different areas of the town). We did not have Internet wireless connections and connections could be established only through personal USB keys.

The activity of SACS (a University Service of guidance and mentoring for students)

In the first 4 months after the earthquake, 140 students (70% women, 30% men, mean age 24.4 ± 5.62) asked help to SACS, a University Service of guidance and mentoring for students, set up in 1992. Of these students, 80% had been exposed to the earthquake, and 12.4% were diagnosed with PTSD (Giordani Paesani *et al.* 2011b). At the beginning of the academic year 2009–10, a sample of students of the Medical and Psychological School (no = 434, 77% women and 33% men; mean age = 21.5 s.d. 2.6) was interviewed about their present condition and asked about their life in the previous 6 months: 16.7% of exposed students

(no = 282), reported a symptomatology that could be diagnosed as 'full PTSD', showing as more distressing symptoms those related to the 're-experiencing' domain (Roncone *et al.* submitted).

The project 'SPES'

The project 'Programma di Supporto Psicossociale Emergenza Sisma' (SPES) (Psychosocial Support and Earthquake Emergency) was carried out in a tent. It was approved on May 2009 and granted by the Italian Minister of Health. Still ongoing, the project includes three main areas of intervention: (1) assessment of the earthquake impact on the general population; (2) cooperation with general practitioners, in order to improve their skills in the identification and psychological management of traumatic events; (3) support of mental health services of our region, in order to learn specific Evidence Based Medicine, EBM, treatments for PTSD and offer a broader range of EBM treatments to survivors.

About the project we found and still find a lot of bureaucratic difficulties: the financial administration of the project was given to the Local Health Unit of L'Aquila, which moved only a few months ago from the tented camp situated in Collemaggio, next to the old offices, towards new buildings.

In the first area, assessment of the earthquake impact on general population, we organized a mail survey about psychological consequences on 2400 subjects living in L'Aquila on 6 April 2009. Only about 13% of the subjects included in the randomized sample of L'Aquila inhabitants mailed back their questionnaire. Because of privacy regulations, we could not access to mobile phone numbers of residents and it was very difficult to reach people through their old mail addresses, especially for destroyed houses.

In the second area, cooperation with GPs, in September 2009, financed by a grant from the United States Embassy in Rome, the Harvard University (Harvard Program in Refugee Trauma, HPRT, directed by Richard Mollica) offered us a 4-day training in Cambridge, USA, at Harvard. Also the Director of Family Medicine for General Practice (Federazione Italiana Medici di Medicina Generale) of the Abruzzo region was invited to plan and implement training for all GPs working in the region struck by the earthquake.

The HPRT introduced to us the adaptation of the *Harvard Battery* in Italian, including the *Harvard Trauma Questionnaire – Revised (HTQ-R)* in its three parts (Mollica *et al.* 1992; Smith Fawzi *et al.* 1997) and the *Hopkins Symptom Checklist-25 (HSCL-25)*, a screening tool designed to detect symptoms of anxiety and depression (Mollica *et al.* 1987) to be used by local GPs and mental health care practitioners for

identifying and treating PTSD and depression, respectively. The cooperation with the HPRT produced a residential training course for GPs in September 2010 'Health and Well-being after April 2009', directed by Richard Mollica, with the participation of about 50 GPs, who were very satisfied and grateful for the theoretical and practical suggestions they received.

In the third project area, support of mental health services, in February 2011, we organized a training course on 'Cognitive-Behavioral Therapy for Distress Following Natural Disaster', held by Jennifer Gottlieb, Research Assistant Professor in the Psychiatry Department at Dartmouth Medical School in the Psychiatric Research Center. Addressed to all mental health professionals of our region, the course described a flexible, low-stress, manualized programme for treating PTSD in special populations (Mueser *et al.* 2009), who often have limited social support and resources and face multiple life challenges. The programme emphasized the use of cognitive restructuring to help users recognize, challenge, and change negative and unhelpful thoughts and feelings related to their past traumatic experiences. The treatment (12–16 sessions) focused on building lasting skills that can be applied to treat the aftereffects of past traumas, lessen the impact of ongoing stressors, and help users to more effectively manage their lives. In contrast to exposure-based treatments for PTSD, this treatment was designed to minimize stress and to help participants increase social supports during and following their treatment. Many clinical applications of the treatment followed the course, appreciated by 30 participants.

A narrative epidemiology?

Usually natural disasters, like earthquakes, involve a great number of people and cause enormous suffering. Various forms of trauma experienced in catastrophic events can cause the loss of multiple factors and pivots like: sense of physical or psychological wholeness (e.g., with serious bodily harm); significant people, roles, and relationships; head of family or community leader; intact family unit, homes, or communities; way of life and economic livelihood; sense of future (e.g., with the loss of children); hopes and dreams for all that might have been, the 'nostalgia for the missed future', as defined by Casacchia (2010); shattered assumptions in core worldview (e.g. loss of security, predictability, or trust) (Walsh, 2007).

People may struggle over a period of time to realize what happened, gain perspective, and make it more bearable. Certain core beliefs ground and orient people, providing them with a sense of reality, meaning, or purpose to life. Assumptions may be that others

can be trusted; that communities are safe; that there is a predictable future; that children outlive their elders; that God is just.

When such assumptions are shattered by a sudden, unexpected catastrophic event, there is a deep need to restore order, meaning, and purpose. And sometimes, for some subjects, this can be very difficult.

Many factors have been identified as having an impact on the mental health of populations affected by disasters and as contributing to the severity of stress reactions: exposure to the trauma, experience of physical injury, closeness to the epicentre, a history of trauma or emotional problems, financial losses, female gender, low educational level, and disruption of social networks (Chen *et al.* 2001; Kiliç & Ulusoy 2003; Priebe *et al.* 2009). Moreover, the disruption of social networks seems to be the main reason for increased psychological distress caused by relocation after a disaster (Najarian *et al.* 2001; Kiliç *et al.* 2006, 2011).

Data about gender were confirmed by the study of Dell'Osso *et al.* (2011a) in a sample of 512 students attending the last year of high school in L'Aquila about 10 months after the earthquake. The authors showed high rates of full (37.5%) or partial PTSD (29.9%) in 512 adolescents who survived the April 2009 L'Aquila earthquake, with women being the most affected (Dell'Osso *et al.* 2011a). In a further study, in a sample of 475 adolescents, exposed to the L'Aquila 2009 earthquake 21 months earlier, attending the last year of High School in L'Aquila, the PTSD rate were similar. Full PTSD was reported in 30.7% students and partial PTSD in 31.4% students (Dell'Osso *et al.* 2011b). There was a significant difference reported in PTSD between bereaved (reporting the loss of a close friend or relative in the framework of the earthquake) and non-bereaved subjects (Dell'Osso *et al.* 2011b).

Can the report of the rate of people affected by ASD or by PTSD fully describe the suffering of the multiple losses? Can real-word epidemiology describe the suffering of large populations out of 'standardized assessments', 'validated questionnaires', and 'clinical interviews' on selected samples? Can the academic rules be respected to ask the permission to use a specific instrument, as a scale to assess ASD when you have to work in very poor conditions in a tent in a camp hospital, without any web connection? We had to beg our pardon officially for such an involuntary accident to the author of a questionnaire that we used to assess ASD in the first 30 days after the earthquake.

The true question could be 'What Kind of Real-world Variables can Reflect the Population Distress? What Kind of Real-World Variables can Reflect the Population Naturalistic Process Of Recovery?'

Maybe catastrophes psychiatric epidemiology should re-think or 'think different' its methodology, considering the poor emergency conditions in which local mental health professionals work after the earthquakes.

Narrative medicine

Narrative medicine offers a model for improving communication between patients and physicians (Charon, 2001), quality of care, and health outcomes. It is based on a clinician hearing the patient's story of what that patient is going through, his or her fears, suffering, and hopes, and a description of how illness has affected him or her (Charon, 2001, 2004).

There are some reports on the effects upon health outcomes of writing about traumatic events (Pennebaker *et al.* 1989; Francis & Pennebaker, 1992; Pennebaker, 1999).

Meta-analyses that examined the effect of writing on health found that doing so improved physical symptoms, but the magnitude of this effect was small (Smyth, 1998; Frisina *et al.* 2004). Although in many of the studies patients wrote about stressful experiences, in other studies patients wrote about their hopes, suffering, and how their disease affected their lives. The latter type of written narrative is called 'emotional writing' or 'emotional disclosure'. Composing emotional narratives may allow patients to understand their needs and emotions, and such insight could lead to better health decisions and outcomes (Cepeda *et al.* 2008). Graf *et al.* (2008) showed that emotional disclosure through homework writing, in conjunction with outpatient psychotherapy, facilitates therapeutic process and outcomes. Users in the written emotional disclosure group showed significantly greater reductions in anxiety and depressive symptoms as well as greater overall progress in psychotherapy in comparison to the writing control group (Graf *et al.* 2008). Recently, autobiographical processes were analysed and a self-narrative improvement was associated to the inpatients' social functioning improvement (Smorti *et al.* 2010).

After L'Aquila earthquake, 'writing the story' was one of the self-medication strategies adopted by the population. Around 70 books have been published since April 2009 on 'L'Aquila earthquake', i.e. diaries of the traumatic experience, novels, reflection, and denunciation.

Emotional disclosure was the opening of hundreds of 'web-blogs' by individuals, regularly updated with new contents, commentaries, descriptions of events, or other materials such as graphics or video.

More than 8800 videos about 'L'Aquila earthquake' were uploaded and shared on You-tube, the largest

worldwide video-sharing community. The videos could be divided roughly into: information broadcasting, life during the emergency, memories of victims, account of survivors, anniversaries, and follow-up of the slow reconstruction process of the 'red zone'.

The Deputazione Abruzzese di Storia Patria, Abruzzo Deputation of State History, a more than 100-year-old Abruzzo association aimed at illustrating and piecing together materials about the history of the region Abruzzo, promoted the implementation of a database for researchers to keep the memory of all materials concerning the 'L'Aquila earthquake' (website *Servizio Informativo sul Sisma Memoria L'Aquila, S.I. S.M.Aq.*, Informative System on L'Aquila Earthquake Memory; <http://poloserviziculturaliabruzzo.it/sismaq/sismaq.html>).

Most of them show the need to 'write the story' and bring to consideration the fact that the 'emotional disclosure' of their authors has found new, and less traditional, ways of expression.

Recovery and resilience and post-traumatic growth

Traumatic stress investigators are increasingly interested in understanding resilience. Studies find out that acute stress symptoms are very commonly experienced immediately after extreme traumatic situations. However, many individuals are resilient in coping and adapting, rebounding within several months, and do not suffer long-term psychological disturbance (Walsh, 2007).

Moreover, a lot of studies report that the suffering and struggle to recover in the aftermaths of a traumatic experience often yield remarkable transformations and positive growth. Studies of post-traumatic growth (Tedeschi & Calhoun, 1996) have found positive individual changes in five areas: (1) emergence of new opportunities and possibilities; (2) deeper relationships and greater compassion for others; (3) feeling strengthened to meet future life challenges; (4) reordered priorities and fuller appreciation of life; and (5) deepening spirituality (Calhoun & Tedeschi, 2006).

In literature people already affected by mental disorders exposed to disasters show conflicting results: some remain clinically stable or even improve after disasters, others show a worsening of their symptoms (Katz et al. 2002; Horan et al. 2007). From a short-term perspective, in users of the mental health services examined from the third to eighth week after the L'Aquila earthquake, Stratta & Rossi (2010) observed that people with schizophrenia and mood disorders showed a better subjective outcome, while patients with anxiety disorders fared more poorly.

Some reports did not show any medium-term positive results about health outcomes after L'Aquila disaster. Six months after the earthquake, an increase in psychotropic prescription was assessed by Rossi et al. (2011), revealing a 37% increase in new prescriptions for antidepressants and a 129% increase in antipsychotic prescriptions. Using an administrative database, the authors found also that older age and female gender were associated with an increased number of prescriptions. A mental health survey conducted between March and December 2010 on a total of 1078 young subjects (mean age 21.4 ± 5.6 years; 8% of the population with the age range of 16–30 and 1.5% of the general population) indicated a marked increase in substance abuse among survivors young people (Pollice et al. 2011b). Out of them, 314 subjects (29.1%) had an ICD-10 diagnosis of anxiety disorders (43%), mood disorders (34%), PTSD (16%), and psychosis (7%). The use of alcohol, tobacco, and cannabis increased both in psychiatric cases and in normal young people. Among psychiatric cases none reported a reduced use of these substances following the disaster.

But also a positive aspect was shown by the Pollice et al.'s study (2011b). In fact, among normal young people, 119 subjects (15.5%) indicated a reduced use of cannabis after the earthquake and these scoring significant improvement on GHQ-12 than those with increased assumption. Those who reduced the use of cannabis reported more intimate relationships, changed sense of priorities, greater appreciation of life, and greater sense of personal strength.

The skill to recover could be estimated by L'Aquila earthquake survivors' wider use of Facebook, one of the most popular web social networking services, that allows one to create a personal profile, add other users as 'friends', and exchange messages, including automatic notifications when a profile is updated. Additionally, users may join common-interest user groups, organized by workplaces, schools or colleges, or other characteristics, and categorize their friends into lists. Over the world, the virtual world of Facebook is in some ways replacing real relationships, especially among adolescents and young adults. But crises and disasters differ from routine situations. The increased use of social media has changed the ways in which people communicate during such events and has created new environments within which individual and collective actions take place. After L'Aquila earthquake, there was a huge increase in the mean number of 'contacts' among survivors and an increase in the number of 'friends' in the profiles of residents, despite their age. Since April 2009, more than 100 'pages/groups' were set up in the name of L'Aquila, divided into four categories: (1) memories of victims – a virtual victims' cemetery

was created by the regional newspaper 'Il Centro'; (2) information, and reciprocal support; (3) protest; and (4) reconstruction.

Recently, Dabner (2011) published an interesting study on Facebook use after the 2010 earthquake in Canterbury, New Zealand. The response from the University of Canterbury was immediate and carefully coordinated, with the University's web-based environment and a responsive site developed on the social media platform 'Facebook' which became a source of information and support for many months.

Residents of L'Aquila seem to have developed a more positive attitude towards Facebook and their engagement with social media has become integrated into their daily lives, in order to cope with the loss of previous social relationships, to get information about recreational opportunities, or to get organized for public events, despite the displacement.

Important and crowded demonstrations were organized on earthquake anniversaries (during at 3:32 a.m. 6 April 2010 and 2011) to remember the victims.

Many demonstrations were organized by people to protest against the slow process of reconstruction and claiming the exclusion of their active participation.

One of the biggest demonstrations was organized on 28 February 2010, when more than 6000 inhabitants entered the 'red zone', the forbidden zone of the historic centre which is controlled by military checkpoints. They organized themselves to prove that positive actions could be taken and started to remove the mountain of rubble still blocking the historic centre of L'Aquila. They took with them several wheelbarrows, shovels, and buckets to remove the debris from the devastated downtown and they built a human chain, passing buckets from hand to hand, claiming to be an active part of the reconstruction. The movement, which was born completely spontaneously and without any political leanings, has been nicknamed the 'wheelbarrow people', already defined as a social movement, developed through Information and Communication Technologies, with particular emphasis on the Internet (Farinosi & Trerè, 2010).

Also our Psychiatric Unit showed its 'resilience'. Despite the low availability of beds in the town (all the hotels of the town were still occupied by homeless residents) in September 2009 we organized a conference on '*Mental Disorders at their Onset*', where Prof. Sir Robin Murray gave a *Lectio Magistralis* on 'The neglected role of the environment in schizophrenia'. In September 2010, we organized in L'Aquila a very successful scientific event, the II National Thematic Conference of the Italian Society of Psychosocial Rehabilitation on '*Recovery from Catastrophes and beyond. From Traumatic Events to Mental Health Rehabilitation*', in an ideal

continuity between recovery from natural and man-made disasters and recovery from serious mental illnesses.

Betrayed by science?

A pressing question is '*Do We Have to Prevent Mental Disorders Following Natural Disasters or Do We Have to Try to Prevent Natural Disasters?*' and in this latter case '*Can the Science Help Us?*'.

A paper published last September on the prestigious journal 'Nature' (Hall, 2011) reports that Italian seismologists are on trial for manslaughter, accused of failing in the evaluation of true risks of the L'Aquila earthquake. The paper is centred on the story of Vincenzo Vittorini, a 48-year-old surgeon who has lived in L'Aquila all his life. On his opinion, his faith in science and scientists may have led to the death of his wife and his daughter.

L'Aquila sits in a seismic area (and had to be mostly rebuilt after the last major quake in 1703), so residents were used to earthquakes and to sleeping outside in the cars in case of particularly strong quakes. Vincenzo Vittorini will never forgive himself for breaking with that tradition on the night of 5 April 2009. After hundreds of low-level tremors over several months, L'Aquila shook with a strong, 3.9 magnitude tremor shortly before 11 p.m. on that Palm Sunday evening and he did not leave his house in the centre of the town.

He lost his wife and his daughter when their house collapsed. Dr Vittorini was pulled out from the debris after 8 h, and his son survived because he happened to be on a field trip. He said that he felt reassured by the encouraging statements some commission members gave to the news media. Without those assurances he would not have stayed in his home.

Dr Vittorini's wife and daughter are among the 37 earthquake victims who have been recognized as injured parties in the trial, begun last 20th September. Seven Italian seismologists and scientists went on trial on manslaughter charges, accused of not adequately warning L'Aquila residents. Prosecutors say that the seven defendants, members of a national panel that assesses major risks, played down the risk of a major earthquake's occurring even though there had been significant seismic activities near L'Aquila, in the months before the quake. The case has drawn the attention of the international scientific community, which argues that it is impossible to predict an earthquake. Prosecutors actually charge that the panel did not fulfil its mandate and instead conveyed 'incomplete, imprecise and contradictory information'.

How we survived

At the time of the earthquake, all the authors lived in L'Aquila. M.C. and R.R. lived in the centre of the town in an ancient building. Only 1 month before, R. P. bought a flat in the centre of L'Aquila. The buildings where they lived were seriously damaged and included in the so-called 'red zone' of the town.

For the first 3 months, the three had to commute daily to reach L'Aquila or live in a caravan placed in the hospital tent camp with serious practical difficulties. From the beginning of November 2009 till February 2010, M.C. and R.R. lived in a room of a restored hostel, near the train station of L'Aquila. In February they could move in a little flat of Progetto CASE, one of the 19 'new towns' erected after the earthquake on the outskirts of the town, Pagliare di Sassa. Since October 2009, R.P. rented an apartment in a town near L'Aquila, Avezzano, commuting daily to work. In April 2010, he moved in L'Aquila, in an apartment available through the municipality.

R.R. experienced a partial PTSD, characterized by a moderate avoidance symptomatology (for about 6 months she did not enter any cement building in the town of L'Aquila).

The three split their lives, living in L'Aquila during the 5-day week and during the weekends living elsewhere (M.C. and R.R. at Pescara, town on the Abruzzo Adriatic Sea coast, and R.P. in Avezzano, town at 53 km from L'Aquila) to try to live 'a normal life'.

The success of the emergency efforts by the government has paradoxically fed the impression that L'Aquila no longer needs urgent help, but L'Aquila is still a 'ghost town'. Buildings and monuments have been secured and part of the rubble removed, but the 'red zone' in the 13th-century city centre is still a no-go area and its residents, relocated elsewhere, are starting to despair of ever returning. We are among those who despair.

Declaration of interest

None.

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