

Comunicazione breve

Trauma- and stressor-related disorders in survivors from a shipwreck: a short report on forensic implications

Disturbi correlati a eventi traumatici e stressanti tra i sopravvissuti a un naufragio: una comunicazione breve inerente ad aspetti medico-legali

RAFFAELLA RINALDI¹, FRANCESCO SAVERIO BERSANI², MARCO STRACCAMORE^{1*},
EDOARDO BOTTONI¹, PIA E. Y. PETRASSO¹, CLAUDIA SCIPIONI¹, ARIANNA CROSTI¹,
SIMONE CAPPELLETTI^{1,3}, COSTANTINO CIALLELLA¹

*E-mail: marco.straccamore@uniroma1.it

¹Section of Legal Medicine, Department of Anatomical, Histological, Forensic Medicine and Orthopedic Sciences, Sapienza University of Rome, Italy

²Department of Human Neurosciences, Sapienza University of Rome, Italy

³State Police Health Service Department, Ministry of Interior, Rome, Italy

SUMMARY. On January 2012 the *Costa Concordia* cruise ship sank after hitting an underwater rock off Isola del Giglio, in Tuscany, this resulting in a number of deaths and injuries. After the disaster, several survivors developed psychological disturbances. This led to medico-legal evaluations aimed at assessing the psychiatric sequelae of the accident in order to quantify the permanent biological impairment and the related compensations. In the present manuscript we provide an overview of the results of clinical and medico-legal evaluations performed between 2013 and 2019 on 177 survivors complaining psychological disturbances. The most frequently diagnosed condition was Post-Traumatic Stress Disorder (PTSD; n=90), followed by Acute Stress Disorder (n=37), Adjustment Disorders (n=29) and Generalized Anxiety Disorder (n=5). The results of such evaluations are consistent with evidence indicating the risk of developing PTSD and other trauma- and stressor-related disorders among disaster survivors; further, they highlight the potential relevance in the forensic context of individual elements increasing or decreasing the possibility to develop PTSD among subjects exposed to similar life threatening experiences.

KEY WORDS: post-traumatic stress disorder, trauma- and stressor-related disorders, permanent impairment, forensic psychiatry.

RIASSUNTO. Nel gennaio 2012 la nave da crociera *Costa Concordia* è affondata dopo aver urtato uno scoglio sottomarino a largo dell'Isola del Giglio, in Toscana, causando morti e lesioni. Dopo il disastro, diversi dei sopravvissuti hanno sviluppato problematiche di ambito psicologico. Tale circostanza ha condotto ad accertamenti medico-legali finalizzati alla valutazione delle conseguenze psichiatriche dell'evento al fine di quantificare il danno biologico permanente e il conseguente risarcimento. Nel presente articolo viene fornita una visione dei risultati di valutazioni cliniche e medico-legali condotte tra il 2013 e il 2019 in 177 sopravvissuti che lamentavano problematiche di ambito psicologico. La condizione più frequentemente diagnosticata è stata il disturbo da stress post-traumatico (DSPT; n=90), seguito dal disturbo da stress acuto (n=37), da disturbi dell'adattamento (n=29) e dal disturbo d'ansia generalizzato (n=5). I risultati di tali valutazioni sono coerenti con i dati che documentano il rischio di sviluppare DSPT o altre condizioni inquadrabili come "disturbi correlati a eventi traumatici e stressanti" tra i sopravvissuti a un evento disastroso; i risultati, inoltre, evidenziano la potenziale rilevanza nel contesto medico-legale delle caratteristiche individuali che aumentano o riducono il rischio di sviluppare DSPT tra persone esposte a simili situazioni che mettono in pericolo la vita.

PAROLE CHIAVE: Disturbo da stress post-traumatico, disturbi correlati a eventi traumatici e stressanti, danno permanente, psichiatria forense.

On January 2012 the *Costa Concordia* cruise ship sank after hitting an underwater rock off Isola del Giglio, in Tuscany, this resulting in a number of deaths and injuries¹. After the disaster, several survivors developed psychological disturbances. This led to medico-legal evaluations aimed at assessing the psychiatric sequelae of the accident in order to quantify the permanent biological impairment (which has been defined as an "impairment in psychophysical integrity directly affecting human value")² and the related compensa-

tions. Consistently with what often observed in relation to psychiatric trauma-related disorders within the forensic arena³, in fact, several of the survivors thought that there was a causal relationship between the disaster and the onset or worsening of their psychopathological disturbances, and, as a consequence, they claimed a compensation.

Some members of our group have been commissioned by the Costa Crociere S.p.A. company to assess psychiatric disturbances and to quantify the related permanent biological

impairment in a portion of adult survivors who complained psychological alterations (n=177).

The evaluations were performed between 2013 and 2019 through accurate clinical interviews, anamnesis, and, when necessary, through the use of assessment scales [Clinician Administered Post-Traumatic Stress Disorder (PTSD) Scale⁴, Minnesota Multiphasic Personality Inventory-2⁵, Davidson Trauma Scale⁶]. Such assessments were not used systematically in all subjects, but rather they were used in relation to the individual clinical picture of each examined person (such data, in fact, have not been collected for experimental purposes, but rather they have been collected following standard clinical and medico-legal practice). Diagnoses were made according to the criteria of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5)⁷. The quantification of permanent impairment was performed following standard medico-legal practice⁸.

In the studied sample (n=177) the ages at the moment of the disaster ranged between 18 and 75 years, the females/males ratio was 97/80; 94 subjects were Italian, while 27 were from United States of America, 10 from Croatia, and the remaining from other countries. The most frequently diagnosed condition in our evaluations was PTSD (n=90), followed by acute stress disorder (ASD, n=37), adjustment disorders (ADs, n=29) and generalized anxiety disorder (GAD; n=5); 16 individuals presented disturbances not classifying for any DSM-defined disease. 87 individuals had been treated, after the disaster, through a combination of pharmacotherapy and psychotherapy, 28 through psychotherapy only, 31 through pharmacotherapy only, 31 did not undergo any treatment. The quantified permanent impairment identified in our evaluations was in the following ranges: 0-30% for subjects with PTSD, 0-6% for subjects with ASD, 0-11% for subjects with ADs, 0-13% for subjects with GAD.

The results of such evaluations are consistent with evidence indicating the risk of developing PTSD and DSM-defined trauma- and stressor-related disorders (i.e. disorders in which being exposed to a traumatic or distressing event is an explicit diagnostic criterion)⁷ among disaster survivors^{9,10}.

The present results highlight the importance of risk and protective individual factors in the aetiology of trauma-related disorders; in fact, despite people in the described sample have been exposed to a similar life-threatening experience (i.e. the *Costa Concordia* sinking), they developed psychopathological disturbances with different degrees of severity. Further, within individuals with the same diagnosis, the psychopathological features were heterogeneous, with subjects who experienced acute or chronic conditions, subjects who did or did not use psychopharmacological treatments, and subjects whose disturbances showed better or poorer course. The measure of permanent impairment was subsequently adapted to this heterogeneity with wide fluctuations within the evaluation ranges indicated for each diagnostic category (PTSD, ASD, ADs, GAD); the absence of permanent impairment corresponded to 0 while the persistence of clinical symptoms in each category was graduated to the maximum expected.

Being exposed to a life threatening condition is necessary for the diagnosis of PTSD⁷. However, research has shown that not all individuals directly or indirectly exposed to a trauma develop PTSD symptoms, with personal characteristics having been suggested as risk factors: the DSM-5 men-

tions pre-traumatic (e.g. childhood adversities, previous mental diseases, exposure to previous traumas, low education level, low socio-economic status, maladaptive coping styles, lower intelligence, being part of ethnic minority groups, being female, certain genotypes), peri-traumatic (e.g. trauma severity, perceived threat, interpersonal violence, persistent dissociation), and post-traumatic (e.g. maladaptive coping styles, financial losses, adverse life events) risk factors for PTSD⁷, while a recent review by Tortella-Feliu et al.¹¹ identified the following factors as having convincing or highly suggestive evidence of association with PTSD: being female, being indigenous people of the Americas (among the sociodemographic factors), history of physical disease, family history of psychiatric disorders (among the pretrauma factors), trauma severity, cumulative exposure to potentially traumatic experiences, and being trapped during an earthquake (among the peritrauma factors). On the other hand, social support prior to the trauma and certain psychological resilient attitudes have been suggested as protective factors^{7,12}.

The role of individual elements increasing or decreasing the possibility to develop PTSD is largely studied in clinical and biological research^{7,11,12}, and attention should be paid to such issue in forensic psychiatry. As stated by Jovanovi et al., «forensic psychiatric aspects of PTSD relevant to litigation for psychological damage refer to the extent to which the harmful event caused a new disorder or exacerbated some preexisting disorder, distinction between causal and contributing factors, the importance of contributing factors for the current disorder, the course of preexisting disorders, eventual impairments in the absence of harmful events, and the role of malingering»¹³.

From a medico-legal perspective, a risk factor is different from a causal factor; however, as the identification of causal and co-causal factors is crucial, it is possible that a careful assessment of the individual characteristics associated with the primary causal factors may contribute to refine the actual role of stressors and the related compensations in the forensic environments.

In general, it is necessary to introduce corrective factors to graduate the compensation and the actual extent of the stress suffered; this evaluation is usually carried out through calibration coefficients of the stress extent in life events in a scale rating from ≤ 0.2 to 1 (the latter value corresponds to a full efficiency damaging of the event). The calibration coefficients are derived from the indications of the Social Readjustment Rating Scale¹⁴, as revised and standardized in 1997¹⁵. Anyway, in survivors from a shipwreck, this aspect plays a marginal role: the accident is classified at the top of proportionate scaling of life events, and in the medico-legal setting this graduation corresponds to a full compensation.

Conflict of interests: Costantino Ciallella has been a paid consultant to Costa Crociere S.p.A.; the other authors have no conflict of interests to declare.

REFERENCES

1. Schröder-Hinrichs J-U, Hollnagel E, Baldauf M. From Titanic to Costa Concordia: a century of lessons not learned. *WMU Journal of Maritime Affairs* 2012; 11: 151-67.

Trauma- and stressor-related disorders in survivors from a shipwreck: a short report on forensic implications

2. Società Italiana di Medicina Legale e delle Assicurazioni. Linee guida per la valutazione medico-legale del danno alla persona in ambito civilistico. Milano: Giuffrè Editore, 2016.
3. Morgan CA, Feuerstein S, Fortunati F, Coric V, Temporini H, Southwick S. Post-traumatic stress disorder within the forensic arena. *Psychiatry (Edgmont)* 2005; 2: 21-4.
4. Bedin AG, Castelli C, Sbattella F. CAPS. Clinician Administered PTSD Scale. Firenze: Giunti Editore, 2011.
5. Butcher JN, Graham JR, Ben-Porath YS, Tellegen A, Dahlstrom, Kaemmer B. Minnesota Multiphasic Personality Inventory-2. Firenze: Giunti Editore, 1992.
6. Davidson JR, Book SW, Colket JT, et al. Assessment of a new self-rating scale for post-traumatic stress disorder. *Psychol Med* 1997; 27: 153-60.
7. American Psychiatric Association. Manuale diagnostico e statistico dei disturbi mentali - Quinta edizione. Milano: Raffaello Cortina Editore, 2014.
8. Società Italiana di Medicina Legale e delle Assicurazioni. Linee guida per la valutazione medico-legale del danno alla persona in ambito civilistico. Milano: Giuffrè Editore, 2016.
9. Neria Y, Nandi A, Galea S. Post-traumatic stress disorder following disasters: a systematic review. *Psychol Med* 2008; 38: 467-80.
10. Farina B, Venturi P, Onofri A, Raja M, Pasquini P, Di Giannantonio M. Screening del disturbo post-traumatico da stress nelle popolazioni a rischio: il caso del disastro civile di via Ventotene a Roma del 27 novembre del 2001. *Riv Psichiatr* 2004; 39: 265-9.
11. Tortella-Feliu M, Fullana MA, Pérez-Vigil A, et al. Risk factors for post-traumatic stress disorder: an umbrella review of systematic reviews and meta-analyses. *Neurosci Biobehav Rev* 2019; 107: 154-65.
12. Agaibi CE, Wilson JP. Trauma, PTSD, and resilience: a review of the literature. *Trauma Violence Abuse* 2005; 6: 195-216.
13. Jovanovi AA, Dunji BD, Milovanovi SD. Forensic aspects of Post-Traumatic Stress Disorder. In: Martin CR, Preedy VR, Patel VB (eds). *Comprehensive guide to Post-Traumatic Stress Disorders*. New York: Springer, 2016.
14. Holmes TH, Rahe RH. The social readjustment rating scale. *J Psychosom Res* 1967; 11: 213-8.
15. Miller MA, Rahe RH. Life changes scaling for the 1990s. *J Psychosom Res* 1997; 43: 279-92.