Disasters and Mental Health

Edited by

Juan José López-Ibor
Complutense University of Madrid, Spain

George Christodoulou
University of Athens, Greece

Mario Maj
University of Naples, Italy

Norman Sartorius
University of Geneva, Switzerland

and

Ahmed Okasha
Ain Shams University, Cairo, Egypt

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List of Contributors

Mordechai Benyakar University of Buenos Aires, Avenida Libertador 4944 9B, Capital Federal, Buenos Aires 1426, Argentina

Linda M. Bierer Bronx Veterans Affairs Medical Center, Mental Health Patient Care Center, 130 West Kingsbridge Road, Bronx, New York, NY 10468-3904, USA

Evelyn J. Bromet Department of Psychiatry and Preventive Medicine, State University of New York at Stony Brook, Putnam Hall, South Campus, Stony Brook, NY 11793-8790, USA

José Miguel Caldas de Almeida Mental Health Unit, Pan American Health Organization, 525 23rd Street NW, Washington, DC 20037, USA

Alain Chiapello Croix-Rouge Ecoute, Croix-Rouge Française, 1 Place Henry Dunante, 75008 Paris, France

George N. Christodoulou Department of Psychiatry, Athens University Medical School, Eginition Hospital, 72-74 Vas. Sofias Avenue, 11528 Athens, Greece

Carlos R. Collazo University of El Salvador, Avenida Pueyredon 1625, Buenos Aires 1118, Argentina

Louis Crocq Cellule d'Urgence Médico-Psychologique, SAMU de Paris, Hôpital Necker, 149 rue de Sèvres, 75015 Paris, France

Marc-Antoine Crocq Centre Hospitalier de Rouffach, 27 rue du 4ème RSM – BP 29, 68250 Rouffach, France

Carole Damiani Association "Paris Aide aux Victimes", 4–14 rue Ferrus, 75014 Paris, France

Lynn E. DeLisi Department of Psychiatry, New York University, 650 First Avenue, New York, NY 10016, USA

Saveta Draganic-Gajic Institute of Mental Health, School of Medicine, University of Belgrade, Palmoticeva 37, 11000 Belgrade, Serbia and Montenegro

Eyad El Sarraj Gaza Community Mental Health Programme, PO Box 1049, Gaza Strip, Palestine

Preface

The mental health consequences of disasters have been the subject of a rapidly growing research literature in the last few decades. Moreover, they have aroused an increasing public interest, due to the dramatic impact and the wide media coverage of many recent disastrous events—from earthquakes to hurricanes, from technological disasters to terrorist attacks and war bombings.

The World Psychiatric Association has had for a long time a great interest and commitment in this area, especially through the work of the Section on Military and Disaster Psychiatry and the Program on Disasters and Mental Health. Several sessions on this topic have taken place in past World Congresses of Psychiatry, and other scientific meetings organized by the Association have dealt exclusively with disaster psychiatry.

Several research and practical issues remain open in this area. Among them, those of the boundary between "normal" and "pathological" responses to disasters; of the early predictors of subsequent significant mental disorders; of the range of psychological and psychosocial problems that mental health services should be prepared to address; of the efficacy of the psychological interventions which are currently available; of the nature and weight of risk and protective factors in the general population; of the feasibility, effectiveness and cost-effectiveness of the preventive programs which have been proposed at the international and national level. Moreover, wherever disasters strike, policy and service organization issues that plague the mental health field worldwide receive even more prominence: the detection and management of mental health problems are assigned less priority than care for physical problems; trained personnel is lacking; community resources for mental health care are poor; a vast proportion of people in need hesitate to ask for or accept mental health care.

However, it is clear that the field is progressing rapidly from the scientific viewpoint (with a refinement of early diagnostic concepts and treatment strategies, and a deeper understanding of resilience factors at the individual and community level) and that in a (slowly) growing number of countries concrete steps have been taken concerning training of personnel, education of the population, and the development of a network of services prepared to deal with psychological emergencies.

This volume aims to portray this evolutionary phase, by providing an overview of current knowledge and controversies about the mental health

consequences of disasters and their management, and by offering a selection of first-hand accounts of experiences in several regions of the world. We were impressed by the liveliness of some of the reports, and particularly touched by some of the chapters dealing with the mental health consequences of armed conflicts, especially on children and adolescents. The authors of these chapters have accepted our advice to be as objective as possible in their descriptions. However, despite the intentions of the authors and the editors, some traces of their unavoidable emotional involvement may have been left in their chapters.

Neither the research overview nor the selection of experiences presented in this volume should be seen as being comprehensive. We hope, however, that the book will throw more light on the issue of mental health consequences of disasters, stimulate acquisition of more knowledge through research, enhance our sensitivity, and contribute to a more effective prevention and management of the behavioural effects of disasters. Disasters have been happening since time immemorial and will continue to happen. We must be prepared to face them and deal with their consequences.

Juan José López-Ibor
George Christodoulou
Mario Maj
Norman Sartorius
Ahmed Okasha

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CHAPTER

1

What is a Disaster?

Juan José López-Ibor

Complutense University of Madrid, Spain

INTRODUCTION

It is almost impossible to find an acceptable definition of what a disaster is. Nevertheless, a definition is unavoidable if we want to be able to face disasters and their consequences. Quarantelli [1] states that, if the experts do not reach an agreement whether a disaster is a physical event or a social construct, the field will have serious intellectual problems, and that defining what a disaster is does not mean becoming involved in a futile academic exercise. On the contrary, it means delving into what are the significant characteristics of the phenomenon, the conditions that lead to it and its consequences. On the other hand, a definition is also needed to guide the interventions following a natural event, for instance, when a government declares a region devastated by a flooding as a "catastrophe area". Furthermore, a definition is needed for understanding, because any concrete disaster poses the question of its meaning.

A danger is an event or a natural characteristic that implies a risk for human beings, i.e., it is the agent that, at a certain moment, produces individual or collective harm. A danger is therefore something potential. A risk is the degree of exposure to the danger, it is therefore something probable. A reef shown on a nautical map is a danger; but it is a risk only for those who sail in waters nearby. A disaster is the consequence of a danger, the actualisation of the risk.

The literature on disasters offers several definitions from different perspectives, as summarised in the following sections.

THE MAGNITUDE OF THE DAMAGE PRODUCED BY THE EVENT

Human losses, number of injured persons, material and economic losses and the harm produced to the environment are often considered in order to

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define a disaster. For some authors (e.g., 2) the number of 25 deceased has to be exceeded; for others (e.g., 3) this figure has to be higher, more than 100 deceased and more than 100 injured or losses worth more than one million US dollars; or even higher (e.g., 4), an event leading to 500 deaths or 10 million US dollars in damages. According to Wright [5], experience shows that when an event affects more than 120 persons, except for cases of war, non-routine interventions and coordination between different organisations are needed, something which is already pointing out another important characteristic of a disaster. For German insurance companies, damages greater than one million marks or more than 1,000 deceased are needed [2]: these figures are obviously given in order to limit responsibilities of insurance policies.

To define a disaster by the magnitude of the damage caused has many inconveniences. First, it may be difficult to evaluate the damages, especially in the initial stages. Second, such definitions are of no use for comparative studies in different countries or social situations and are affected by inflation [6]. Third, disasters have a different impact in different environments: an earthquake of an intensity to cause a fright in California nowadays would have been a catastrophe before 1989 and would be a catastrophe in many developing countries at present. There may even exist disasters with zero harm. The best example of this was the broadcast in 1935 by Orson Welles of *The War of the Worlds* [7]: more than one million persons showed intense panic reactions because of what they believed to be a Martian invasion. But, what is more important, these definitions fail to capture what is essential in a disaster.

EXCEPTIONAL EXTERNAL AGENT

Disasters are often considered as events from the physical environment which are harmful for human beings and are caused by forces which are unfamiliar to them [8,9]. Disasters are normally unforeseen and catch the populations and administrations affected off-guard. However, there are disasters that repeat themselves, for example in areas affected by flooding, and others which are persistent, as in many forms of terrorism. In these cases a culture of adaptation and resignation to disasters develops.

Disasters are normally considered as events that occur "by chance" and therefore unavoidable. In the past they were ascribed to divine punishment, and even nowadays it is not unusual to read that an event "reached Biblical proportions", or that nature's powers have been unchained as they were when God had to punish the evildoing of human beings with the Flood. In fact, the etymology of disaster, from Latin (*dis* "lack" or "ill-", *astrum* "heavenly body", "star"), indicates bad luck or fortune.

An important characteristic of disasters is their centrality [10]. Catastrophes are disasters of a great centrality. A total breakdown of everyday functioning takes place in them, with the disappearance of normal social functioning, loss of immediate leaderships, and the insufficiency of the health and emergency systems, in such a way that the survivors do not know where to go to receive help.

THE NATURE OF THE AGENT

Human-made disasters are normally distinguished from those which are consequences of the inclemency of nature. Among the first sort, some are not intended, i.e., they are the consequence of human error. In this case, the responsibility is considered to be institutional, and compensations from insurance companies are granted.

There are also human-made disasters that are the consequence of a clear intention, as in the case of conventional war. In these cases, individuals are able to start up more or less legitimate or efficient coping or defence mechanisms to confront the aggression. The First World War was a war of fronts that affected little the rearguard, while in the Spanish Civil War and in the Second World War there were as many victims due to combat actions in the rearguard as in the front (settling of scores, bombing of the civil population, and so on). Therefore the psychological and psychopathological reactions were different. During the First World War, those evacuated from the front came to a safe rearguard, in which they were assisted in an attentive way, favouring the appearance of very dramatic conversion symptoms. During the Spanish Civil War [11,12], those evacuated came to a rearguard which was also affected and they presented more psychosomatic symptoms, i.e., more internalised ones. The same happened during the Second World War.

On other occasions, violence is due to terrorist attacks, assaults by rapists or similar events. This is an anonymous violence whose goal is to cause harm to whomever, something that prevents the people affected from developing any kind of defence. This kind of violence may affect any person, in any place of the world, at any time.

In disasters produced by the inclemency of nature, the kind of disaster normally determines the way the pain is perceived and the quantum of guilt. Some are more foreseeable, as for example in hurricane areas, volcano eruptions or floodings, and other are not so foreseeable, as in some earthquakes or massive fires.

However, it is not possible to accept that there are purely natural disasters, since the human hand is always present. This is the thesis of Steinberg [13], who studied a large series of disasters in the USA. It has to be

taken into account that the degree of development of a community is a determinant fact. Between 1960 and 1987, 41 out of the 109 worst natural disasters took place in developing countries, with the death of 758,850 persons, while the remaining 59% of disasters took place in developed countries, with the death of 11,441 persons [14]. It is curious enough that these proportions are similar to those in famine, HIV infection or refugee status [15].

THREAT TO THE SOCIAL SYSTEM

Definitions of disasters based on the idea of an exceptional agent are not fully satisfying. In fact, when reviewing them, other elements appear which are related to social conditions. The flooding of an uninhabited non-cultivated plain with no ecological value is not a disaster; human presence is needed. Carr [16] was the first to point out the importance of the social aspects: "Not every windstorm, earth-tremor, or rush of water is a catastrophe. A catastrophe is known by its works; that is to say, by the occurrence of disaster. So long as the ship rides out the storm, so long as the city resists the earth-shocks, so long as the levees hold, there is no disaster. It is the collapse of the cultural protections that constitutes the disaster proper."

Therefore, the impact of an event on a social group is related to the adaptive mechanisms and abilities that the community has developed. If they are efficient, we can speak of an emergency, not of a disaster. For instance, a traffic accident with ten victims is a disaster in a little village, but not in a city [17]. Disasters have been defined from this perspective as external attacks which break social systems [8], which exert a disruptive effect on the social structure [18]. The social, political and economic environment is as determinant as the natural environment: it is what turns an event into a disaster [19]. Social disruption may create more difficulties than the physical consequences of the event [20].

The United Nations Coordinating Committee for Disasters [21] stipulates that a disaster, seen from a sociological point of view, is an event located in time and space, producing conditions under which the continuity of the structures and of the social processes becomes problematic. The American College of Emergency Medicine [22] points out that a disaster is a massive and speedy disproportion between hostile elements of any kind and the available survival resources. The same appears in a definition by the World Health Organization [23]: "A disaster is a severe psychological and psychosocial disruption, that largely exceeds the ability to cope of the affected community". In the United Nations glossary [24] we find the same: "A serious disruption of the functioning of society, causing widespread

human, material, or environmental losses which exceed the ability of affected society to cope using only its own resources".

Crocq *et al.* [25] point out the importance of the loss of social organisation after a disaster. For them the most constant characteristic is the alteration of social systems that secure the harmonious functioning of a society (information systems, circulation of persons and goods, production and energy consumption, food and water distribution, health care, public order and security, as well as everything related to the corpses and funerary ceremonies in cemeteries).

In summary, disasters are events affecting a social group which produce such material and human losses that the resources of the community are overwhelmed and, therefore, the usual social mechanisms to cope with emergencies are insufficient.

The impact of the disaster can be cushioned by the ability of those affected to adapt psychologically, by the ability of the community structures to adapt to the event and its consequences or by the quantity and kind of external help.

Therefore, three levels of disaster have been described: level I (a localised event with few victims; with local health resources available, adequate to screen and treat; and with transportation means available for further diagnosis and treatment); level II (there are a lot of victims and resources are not enough; help coming from various organisms at a regional level is needed – the definition varies according to the size and kind of territorial organisation of the country); level III (the harm is massive; local and regional resources available are insufficient; and the deficiencies are so significant that national or international help is needed).

Thus, a disaster is something exceptional not only because of its magnitude. Mobilising more material and staff is not sufficient; unfamiliar tasks have to be carried out, changes in the organisation of the institutions are needed, new organisations appear, and persons and institutions which normally do not respond to emergencies are mobilised. Moreover, in some cases, the efficacy of teams and resources commonly utilised for emergencies decreases, and the normal processes aimed at coordinating the response of the community to the emergency may not adapt correctly to the situation.

Disasters induce huge social mobilisations and solidarity [26]. Sometimes a great part of this help is counterproductive, creating the so-called problems of the "second disaster", when excessive and unorganised help arrives causing a slowdown in recovery and interfering with the long-term evolution.

Several things are needed in order to produce a disaster: an extraordinary event capable of destroying material goods, of causing the death of persons or of producing injuries and suffering [27], or an event in the face of which

the community lacks adequate social resources to react [28]. This leads to the need for intervention and external support, to a personal sensation of helplessness and threat, to tensions between social systems and individuals [29], and to a deterioration of the links that unite the population and that generate the sense of belonging to the community [30].

SOCIAL VULNERABILITY

Disasters do not only affect social functioning; they are also the consequence of a certain social vulnerability hardly perceived until they occur. They reveal previous failures.

Vulnerability decreases with the degree of development of civilisation, which in essence precisely aims to protect human beings from the negative consequences of their behaviour and from the forces unleashed by nature [31].

This social vulnerability is present even in the pathological reactions to disasters. Among the risk factors for post-traumatic stress disorder most often identified in the USA are: female sex; Hispanic ethnicity [32]; personal and family history of psychiatric disorders; experiences with previous traumas, especially during childhood; poor social stability; low intelligence; neurotic traits; low self-esteem; negative beliefs about oneself and the world and an external locus of control [33]. Curiously enough, there is a preventing factor which is political activism.

In the toxic oil syndrome catastrophe [34], social vulnerability was particularly evident since the toxin did not cross the haemato-encephalic (blood–brain) barrier and those affected did not suffer from symptoms due to a direct cerebral harm. The factors related to the appearance of psychopathological sequelae were female sex, low socio-economic level, low educational level, and the previous history of "nervous disorders" and of psychiatric consultations.

POST-MODERN PERSPECTIVE

Quarantelli [1] introduced a post-modern perspective considering disasters from the subjective perspective of those affected, including rescue staff and all those who have been involved in any way or even showed interest. Any disaster affects intimately and stirs up the foundations of the world everyone builds for his/her own and where he/she lives. Moreover, a disaster affects a community and is like a magnifying glass that increases the appreciation of the lack of social justice and equity. From this perspective, disasters are part of a social change; they are more

an opportunity than an event; they are social crises which open new perspectives.

DISASTERS ARE POLITICAL EVENTS

If politics is an allocation of values, the link between politics and disasters is determined by the allocation of values by the authorities regarding security in the period previous to the event, the survival possibilities during the emergency stage and the opportunities to survive during recovery and reconstruction [35].

A disaster is also a political opportunity to develop innovative initiatives, essential to diminish the present and future consequences of the danger. However, not all events attract the same degree of attention and unleash a political reaction. Social vulnerability, as mentioned before, and politics play an important role here [36]. A thorough statistical study [37] on the relationship between the severity of a disaster and political stability showed that reactions to a disaster are affected by the repression exercised by an authoritarian regime or by a high level of development, but not by inequality of income.

There is also a political use of disasters, analysed by Edelman [38]. Governments usually behave in different ways when confronted with problems and with a crisis. In the case of problems they try to induce a systematic deflation of the attention to the inequality of the goods and services offered to the population. On the other hand, in the case of a crisis, they try to induce a systematic inflation of the attention to threats, allowing them to legitimise and demand an increase of authority. When a crisis occurs repeatedly, authoritarianism increases.

SCAPEGOATING IN DISASTERS

Disasters are a great opportunity to appoint scapegoats; efforts to lay the burden of guilt on a person or a group are constant. According to Allinson [39],

> Whenever a single cause for any event is sought in the human realm, it is thus very natural for one to look for who, as a singular agent, is responsible. If the event in question is a disaster, then the first inclination is to look for whose fault it is. Once blame can be assigned, the existence of the disaster will have been explained. Finding the guilty party or parties solves the disaster "problem". Of course it does not. What it does do, however, is to create the appearance of a solution, and this

appearance of a solution cannot assist one in the prevention of further disasters.

But scapegoating is not a means for finding and assigning responsibility. It is a means of avoiding finding and assigning true responsibility. Whenever the scapegoat mentality is at work, responsibility has been abrogated, not shouldered.

A DISASTER UNMASKS FALSE MYTHS

A disaster is an empirical falsification of human action, the proof of the incorrectness of human beings' conceptions on nature and culture [2] Not only structures and social functioning are affected; many mental schemes also break down. All of a sudden the loss of the sense of invulnerability becomes obvious [40]. Frankel [41], who survived a Nazi concentration camp, Brüll [42] and others have pointed out that, after such an experience, the vision of the world, of oneself, of the future, changes. Therefore, during the phase of overcoming the trauma, a process of re-adaptation to reality, a re-elaboration of the trauma [43], the establishment of new beliefs, and the overcoming of old and false beliefs ("the world is a safe place") and of new negative ones ("all the worst always happens to me") is needed.

VICTIMS OR DAMAGED?

The worst thing that can happen is the victimisation of those affected and here psychiatry can play an important role. Benyakar [18] has called attention to this. A "victim" is a person who remains trapped by the situation, petrified in that position, who passes from being an individual to becoming an object of the social reality, losing his/her subjectivity. "Damnified" is the person that has suffered a damage, prone to be repaired or irreparable, wholly or partly. The concept "damnified" connotes psychic mobility, as well as the preserving of the individual's subjectivity. Therefore, mental health services have to assist all those affected, not as victims but as damnified.

COMPENSATIONS IN DISASTERS

Reactions to disasters and their definition have always been marked by compensation. The literature on compensation neurosis is an old one [44]. In fact, the definitions that emphasise the presence of a stressing agent of

great magnitude which would affect almost any person, such as that proposed by the DSM-III, turn even witnesses into victims. Since a disaster destroys social frameworks, it is obvious that any individual will turn to society to ask that the harm suffered be repaired. This is why there is a tendency of the victims to maximise "secondary benefits", perpetuating the psychic harm in order to receive a compensation, be it economic, affective or of any other kind. This is reinforced by the fact that the psychic harm usually affects persons who functioned normally before the disaster.

Compensations in disasters are indispensable and have to include psychic harms. However, the repercussion on the mental health of the damnified must also be evaluated. It is true that anybody has the right to change his/her lifestyle and, if the opportunity is given, to change it for another one in which he/she becomes a passive individual prone to the protection (and mending) of the government. But it is also true that mental health professionals are there to avoid iatrogenic effects and should help the damnified to overcome this situation, preventing the disability from becoming chronic. It is also true that society can impose limits to prevent any possible victimisation abuses.

Mental health professionals should participate in the allotting of indemnification and in the decision to include the damnified in a programme of reintegration into their everyday activities [18].

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CHAPTER

2

Psychological and Psychopathological Consequences of Disasters

Carol S. Fullerton and Robert J. Ursano

Uniformed Services University of the Health Sciences, Bethesda, MD, USA

INTRODUCTION

The majority of people exposed to trauma and disasters do well. However, some individuals experience distress, others have behavioral changes and some develop psychiatric illness post disaster. Such illnesses include those that are secondary to physical injury (e.g., organic brain disorders, psychological responses to physical disease) as well as specific trauma-related psychiatric disorders such as acute stress disorder (ASD), post-traumatic stress disorder (PTSD) and trauma-related depression [1]. The extent of the psychiatric morbidity depends on a number of factors, e.g., type of disaster, exposure, degree of injury, amount of life threat, and the duration of individual and community disruption. At times, traumatic events and disasters have beneficial effects by serving as organizing events and providing a sense of purpose and an opportunity for positive growth experiences [2,3]. The effects of trauma and disaster may be rekindled by new experiences that remind the person of the past traumatic event [4]. The effects of trauma and disaster also impact the community, the recovery environment for those affected by the traumatic event. In this chapter we examine the psychiatric responses to trauma and disasters including risk factors and mediators of the psychiatric, psychological and behavioral consequences of trauma and disaster.

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HISTORY

The study of emotional reactions to disasters began with observations of the oldest human-made disaster, war. In the United States during the American Civil War, combat psychiatric casualties were thought to be suffering from "nostalgia", which was considered to be a type of melancholy, or mild type of insanity, caused by disappointment and longing for home [5]. This was also known as "soldier's heart". In World Wars I and II, terms such as "shell shock", "battle fatigue", and "war neuroses" were more common descriptors of the emotional responses to trauma [6,7]. The "thousand-mile stare" described the exhausted foot soldier on the verge of collapse. The symptoms of combat stress varied with the individual and the context but included anxiety, startle reactions and numbness [8] Some of the earliest descriptions of what is now referred to as PTSD came from traumatic injury. For example, in 1871 Rigler described the effects of injuries caused by railroad accidents as "compensation neurosis" [7]. In 1892 Sir William Osler [9], first Chief of Medicine at Johns Hopkins University, described the condition that followed an accident or shock as traumatic neurosis (also known as "railway brain", "railway spine", and "traumatic hysteria"). At the end of the nineteenth and beginning of the twentieth century, railway disasters, the World Wars, the Holocaust, and the atom bomb attacks on Hiroshima and Nagasaki prompted systematic descriptions of symptoms associated with traumatic stress. Labels included "fright neurosis", "survivor syndrome", "nuclearism", "operational fatigue" and "compensation neurosis". Charcot, Janet, Freud and Breurer suggested that psychological trauma caused hysterical symptoms; however, others at the time believed that a traumatic event was not sufficient to cause post-traumatic symptoms and organic causes were sought. This changed with the recognition that many veterans of the Vietnam War had long-term psychiatric and psychological problems and people without prior psychiatric difficulties could develop clinically significant psychiatric symptoms if they were exposed to horrific stressors. Following this the diagnosis of PTSD became a category in DSM-III [10].

Studies of the responses of various populations to traumatic experiences broadened our understanding of the psychiatric and psychological effects of trauma, e.g., concentration camp survivors [11–14], and rescue workers following the Hiroshima devastation [15]. The psychiatric and psychological consequences of several modern disasters have been studied in detail: the 1942 Coconut Grove Nightclub Fire [16,17], the 1972 Buffalo Creek Flood [18–20], the 1980 Mount St. Helens volcanic eruption [21,22], the Granville rail disaster, 1977 in a Sydney suburb [23], the imprisonment and torture of Norwegian sailors in Libya in 1984 [24], and the volcanic eruption in Colombia, 1985 that destroyed the town of Armero [25].

PSYCHIATRIC DISORDERS RELATED TO TRAUMA AND DISASTER

We are only in the infancy of understanding why some people exposed to traumatic events develop post-traumatic psychopathology and some people do not (for a meta-analysis of predictors of PTSD, see 26). Post-traumatic psychiatric disorders are most often seen in those directly exposed to the threat to life and the horror of a traumatic event. The greater the "dose" of traumatic stressors, the more likely an individual or group is to develop high rates of psychiatric morbidity. Certain groups, however, are at increased risk for psychiatric sequelae. Those at greatest risk are the primary victims, those who have significant attachments with the primary victims, first responders, and support providers [27]. Adults, children, and the elderly in particular who were in physical danger and who directly witnessed the events are at risk. Those who were psychologically vulnerable before exposure to a traumatic event may also be buffeted by the fears and realities of, for example, job losses, untenably longer commutes or eroded interpersonal and community support systems overtaxed now by increased demands. Persons who are injured are at higher risk, reflecting both their high level of exposure to life threat and the added persistent reminders and additional stress burden accompanying an injury. The Epidemiologic Catchment Area study of Vietnam veterans [28] documented a higher rate of PTSD in wounded than in non-wounded veterans. Similar findings were noted in the Veterans Affairs study [29,30].

Pre-existing psychiatric illness or symptoms are not necessary for psychiatric morbidity after a traumatic event, nor are they sufficient to account for it [31–34]. Nearly 40% of survivors of the Oklahoma City bombing with PTSD or depression had no previous history of psychiatric illness [35]. Therefore, those needing treatment will not all have the usually expected accompanying risk factors and coping strategies of other mental health populations. The less severe the disaster or traumatic event, the more important pre-disaster variables such as neuroticism or a history of psychiatric disorder appear to be [32,36–39]. The more severe the stressor, the less pre-existing psychiatric disorders predict outcome.

Overall, children and adolescents are at increased risk for psychiatric sequelae following trauma. Psychiatric disorders including PTSD, depression, and separation anxiety disorder [40] as well as the onset of a wide range of symptoms and behaviors [41,42] have been identified in children exposed to trauma. The re-experiencing symptoms common in ASD and PTSD may be evident in children through repetitive play with trauma themes, nightmares, and "trauma-specific reenactment" [43]. Children may also develop avoidant behavior to specific reminders of the tragedy (e.g., avoiding areas of the playground where someone has been killed) and the

wish to stay home rather than be separated from family and loved ones. Other reactions commonly seen in children include fear of recurrence, worries about the safety of others, and guilt. Of special concern are increased risk-taking behaviors sometimes seen in adolescents following trauma [44]. The reactions of significant adults (e.g., parents and teachers) can greatly affect children's responses to trauma [45].

Media exposure is a part of nearly all community disaster events. Media exposure can be both reassuring and threatening. Limiting such exposure can minimize the disturbing effects especially in children [46]. Educating spouses and significant others of those distressed can assist in treatment as well as in identifying the worsening or persistence of symptoms.

Acute Stress Disorder and Post-Traumatic Stress Disorder

Exposure to a traumatic event, the essential element for development of ASD or PTSD, is a relatively common experience. Approximately 50–70% of the US population are exposed to a traumatic event sometime during their lifetime; however, only approximately 5–12% develop PTSD. In a nationally representative study of 5,877 people aged 15–45 in the US, the National Comorbidity Study (NCS) [47] found lifetime prevalence of exposure to trauma to be 60.7% in men and 51.2% in women. In a nationally representative sample of women in the US, the National Women's Study (NWS) [48] found that 69.0% of women were exposed to a traumatic event at some time in their lives. NCS found rates of PTSD to be 7.8%, while the NWS found rates of PTSD to be 12.3%. In an epidemiological study of people belonging to an urban health maintenance organization in the US, Breslau *et al.* [49] found the lifetime prevalence of PTSD to be 9.2% for adults. These studies used the DSM-III and DSM-III-R [50] Criterion A requiring only that the event be outside the range of human experience. In DSM-IV, this was replaced with Criterion A2, which requires that the response to the stressor be one of intense fear, helplessness, or horror.

PTSD has been widely studied following both natural and human-made disasters (for review, see 51). PTSD is not uncommon following many traumatic events, from terrorism to motor vehicle accidents to industrial explosions. In its acute form, PTSD may be more like the common cold, experienced at some time in one's life by nearly all. If it persists, it can be debilitating and require psychotherapeutic and/or pharmacological intervention.

Curiously absent from DSM-III and DSM-III-R was a diagnostic category for acute responses to trauma and disaster events. With the diagnosis of ASD, DSM-IV [52] acknowledged a broader spectrum of responses to traumatic events. Because ASD is a relatively new diagnosis, empirical

investigations are just beginning to examine its course and outcome [53,54]. However, recent studies of war suggest that acute combat-related stress reactions (which could now be thought of as representing an ASD) predict an adverse outcome [32] and are associated with increased rates of somatic complaints [55–57]. Numerous investigations also document that acute symptoms of intrusion, avoidance, and dissociation [58], part of the symptom complex of ASD, predict the development of later psychiatric disorders, particularly PTSD [59–64]. Early symptoms usually respond to education, obtaining enough rest and maintaining biological rhythms (e.g. sleep at the same time, eat at the same time) [65].

The Traumatic Stressor Criterion: Criterion A

Recognizing that traumatic stressors are all too often a part of everyday life, DSM-IV [52] deleted the DSM-III-R [50] requirement that the stressor be "outside the range of usual human experience". An essential feature for ASD and PTSD in the DSM-IV is development of "intense fear, helplessness, or horror" after exposure to a traumatic event that does not need to be outside the normal range of human experience (Criterion A) [43] (see Tables 2.1 and 2.2). Exposure can involve direct experience or witnessing or learning about a traumatic event that caused "actual or threatened death", "serious injury", or "threat to the physical integrity" of oneself or others. Both natural (e.g., tornadoes, earthquakes) and human-made traumatic events (e.g., accidents, rape, assault, war, terrorism) can evoke these symptoms. Some of these traumatic events occur only once while others involve chronic or repeated exposure.

In general, human-made traumatic events (as opposed to natural disasters) have been shown to cause more frequent and more persistent psychiatric symptoms and distress (for review see 66). However, this distinction is increasingly difficult to make. The etiology and consequences of natural disasters often are affected by human beings. For example, the damage and loss of life caused by an earthquake can be magnified by poor construction practices and high-density occupancy. Similarly, humans may cause or contribute to natural disasters through poor land-management practices that increase the probability of floods. Interpersonal violence between individuals (assault) or groups (war, terrorism) is perhaps the most disturbing traumatic experience. Technological disasters may bring specific psychiatric concerns about normal life events – for example, fear of flying after a plane crash or claustrophobia after a mine accident. Each of these requires evaluation and intervention to treat the specific phobia and limit generalization to other areas of life (e.g., "I cannot cook any more because the boiling water reminds me of the explosion").

TABLE 2.1 DSM-IV-TR diagnostic criteria for acute stress disorder (308.3)

A. The person has been exposed to a traumatic event in which both of the following were present:
   1. the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others
   2. the person's response involved intense fear, helplessness, or horror
B. Either while experiencing or after experiencing the distressing event, the individual has three (or more) of the following dissociative symptoms:
   1. a subjective sense of numbing, detachment, or absence of emotional responsiveness
   2. a reduction in awareness of his or her surroundings (e.g., "being in a daze")
   3. derealization
   4. depersonalization
   5. dissociative amnesia (i.e., inability to recall an important aspect of the trauma)
C. The traumatic event is persistently re-experienced in at least one of the following ways: recurrent images, thoughts, dreams, illusions, flashback episodes, or a sense of reliving the experience; or distress on exposure to reminders of the traumatic event.
D. Marked avoidance of stimuli that arouse recollections of the trauma (e.g., thoughts, feelings, conversations, activities, places, people).
E. Marked symptoms of anxiety or increased arousal (e.g., difficulty sleeping, irritability, poor concentration, hypervigilance, exaggerated startle response, motor restlessness).
F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning or impairs the individual's ability to pursue some necessary task, such as obtaining necessary assistance or mobilizing personal resources by telling family members about the traumatic experience.
G. The disturbance lasts for a minimum of 2 days and a maximum of 4 weeks and occurs within 4 weeks of the traumatic event.
H. The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition, is not better accounted for by Brief Psychotic Disorder, and is not merely an exacerbation of a preexisting Axis I or Axis II disorder.

Perhaps the best predictors of both the probability and the frequency of post-disaster psychiatric illness are the severity of the traumatic stressor and the degree of exposure. Shore *et al.* [21,22] found that psychiatric outcome was related to the intensity of disaster exposure following the Mount St. Helens volcanic eruption. They documented higher rates of post-disaster psychiatric illnesses, including PTSD, generalized anxiety disorder, and depression, in those who lived closer to the volcano. Additional evidence for the association of psychiatric illness and severity of the traumatic stressor is seen in the study of war trauma. Higher rates of PTSD, depression and alcohol abuse were significantly related to greater exposure

TABLE 2.2 DSM-IV-TR diagnostic criteria for post-traumatic stress disorder (309.81)

A. The person has been exposed to a traumatic event in which both of the following were present:
   1. the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others
   2. the person's response involved intense fear, helplessness, or horror. Note: In children, this may be expressed instead by disorganized or agitated behavior
B. The traumatic event is persistently re-experienced in one (or more) of the following ways:
   1. recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. Note: In young children, repetitive play may occur in which themes or aspects of the trauma are expressed
   2. recurrent distressing dreams of the event. Note: In children, there may be frightening dreams without recognizable content
   3. acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). Note: In young children, trauma-specific reenactment may occur
   4. intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event
   5. physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event
C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following:
   1. efforts to avoid thoughts, feelings, or conversations associated with the trauma
   2. efforts to avoid activities, places, or people that arouse recollections of the trauma
   3. inability to recall an important aspect of the trauma
   4. markedly diminished interest or participation in significant activities
   5. feeling of detachment or estrangement from others
   6. restricted range of affect (e.g., unable to have loving feelings)
   7. sense of a foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span)
D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following:
   1. difficulty falling or staying asleep
   2. irritability or outbursts of anger
   3. difficulty concentrating
   4. hypervigilance
   5. exaggerated startle response
E. Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month.
F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Specify if:
Acute: if duration of symptoms is less than 3 months.
Chronic: if duration of symptoms is 3 months or more.

Specify if:
With Delayed Onset: if onset of symptoms is at least 6 months after the stressor.

to combat in Vietnam [29]. In an interesting investigation of PTSD in monozygotic twins discordant for service in Vietnam, Goldberg *et al.* [31] found that PTSD was nine times as common in the twins who had been exposed to a high level of combat in Vietnam as it was in those who had not served in Southeast Asia.

Psychiatric morbidity is more likely to be engendered by some dimensions of traumatic events than others. The highest risk of psychiatric morbidity is associated with high perceived threat to life, low controllability, lack of predictability, high loss, injury, possibility that the disaster will recur, and exposure to the grotesque [35,52,67–71]. For example, terrorism often can be distinguished from other natural and human-made disasters by the characteristic extensive fear, loss of confidence in institutions, unpredictability and pervasive experience of loss of safety [72]. In a longitudinal national study of reactions to the September 11, 2001 disaster, 64.6% of people outside of New York City reported fears of future terrorism at 2 months and 37.5% at 6 months [73]. In addition, 59.5% reported fear of harm to family at 2 months and 40.6% at 6 months. Terrorism is one of the most powerful and pervasive generators of psychiatric illness, distress and disrupted community and social functioning [35,74].

Vulnerability to psychiatric distress is increased by knowledge that one has been exposed to toxins (e.g., chemicals or radiation) [75,76]. In this case, information itself is the primary stressor. Toxic exposures often have the added stress of being clouded in uncertainty as to whether or not exposure has taken place and what the long-term health consequences may be. Living with the uncertainty can be exceedingly stressful. Typically uncertainty accompanies bioterrorism and is the focus of much concern in the medical community preparing for responses to terrorist attacks using biological, chemical, or nuclear agents [73,77–79].

Symptoms of ASD and PTSD

The diagnostic criteria for ASD closely resemble those of PTSD (see Table 2.3), with the primary difference being time course and the inclusion of dissociative symptoms required for a diagnosis of ASD. The diagnosis of PTSD applies if the symptoms persist longer than 1 month or if the onset of symptoms begins later than 1 month after the traumatic event. Importantly, the severity of symptoms for both ASD and PTSD must be sufficient to cause "clinically significant distress" or impaired functioning (Criterion F) [43]. Symptoms of ASD and PTSD are categorized into three clusters: persistent re-experiencing of the stressor (Criterion B for PTSD and Criterion C for ASD), persistent avoidance of reminders of the event and numbing of general responsiveness (Criterion C for PTSD and Criteria B and D for ASD), and persistent symptoms

TABLE 2.3 Comparison of acute stress disorder (ASD) and post-traumatic stress disorder (PTSD)

	ASD	PTSD
Nature of the trauma/reaction to the trauma		
• Individual experienced, witnessed, or was confronted with an event that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others	✘	✘
• Individual's response involved intense feelings of fear, horror, or helplessness	✘	✘
Symptom criteria		
• Persistent re-experiencing of the trauma	✘	✘
• Avoidance of reminders of the trauma	✘	✘
• Physical symptoms of hyperarousal	✘	✘
• Symptoms of dissociation during or immediately after the trauma	✘	
• Clinically significant distress or impairment	✘	✘
Time requirements		
• Duration of symptom constellation	2 days–4 weeks	>1 month
• Onset of symptoms in relation to trauma	Within 4 weeks of trauma	Anytime post trauma

of increased arousal (Criterion D). Criterion B for ASD requires that the individual has experienced three or more dissociative symptoms during or following the traumatic event. For ASD, Criterion D requires "marked avoidance of stimuli that arouse recollections of the trauma" [43]. These criteria for ASD overlap with Criterion C for PTSD but are not identical.

The re-experiencing cluster includes symptoms of "recurrent and intrusive recollections" of the event, recurrent distressing trauma-related dreams, acting or feeling as if the event were re-occurring, "intense psychological distress" with exposure to trauma cues, and physiological reactivity to traumatic cues [43]. DSM-IV moved the physiological symptoms related to reminders of the traumatic event from the arousal cluster to the re-experiencing cluster. This change reflects recent advances in understanding the biology of PTSD and its relation to memory [80]. The avoidance/numbing cluster may include purposeful actions as well as unconscious mechanisms, e.g., efforts to avoid trauma-related thoughts, feelings, or conversations; efforts to avoid activities, places, or people reminiscent of the trauma; inability to recall important aspects of the trauma; greatly decreased "interest or participation in previously enjoyed activities"; feeling detached or estranged; restricted range of affect; and a

"sense of a foreshortened future" [43]. Increased arousal includes sleep disturbance, "irritability or outbursts of anger", difficulty concentrating, hypervigilance, and exaggerated startle response [43], not precipitated by reminders of the stressor but representing generalized arousal.

PTSD and ASD differ in the numbers of symptoms from each cluster that are required. For a diagnosis of PTSD, there must be at least one re-experiencing symptom, two arousal symptoms and three avoidance/numbing symptoms and it is required that these be temporally related to the stressor. A diagnosis of ASD requires at least one re-experiencing symptom and "marked avoidance of stimuli that arouse recollections of the trauma", and "marked" anxiety or increased arousal as well as three or more dissociative symptoms. The dissociative symptoms can occur during the traumatic event itself or after it. A common early response to traumatic exposure appears to be a disturbance in our sense of time, our internal time clock, resulting in time distortion – time feeling speeded up or slowed down [81]. Along with other ASD dissociative symptoms, time distortion indicates an over four times greater risk for chronic PTSD and may also be an accompaniment of depressive symptoms.

ASD and PTSD also differ in duration of symptoms and temporal relationship to the traumatic stressor. ASD occurs within 4 weeks of the traumatic event and has a duration of 2 days to 4 weeks. For a diagnosis of PTSD, symptoms must be present for more than 1 month. If symptom duration is less than 3 months, acute PTSD is diagnosed. Chronic PTSD is diagnosed when symptoms persist for 3 months or longer. Symptoms of PTSD usually begin within 3 months of exposure.

Delayed onset PTSD (i.e., symptoms that begin 6 months or more after the stressor) is indicated in DSM-IV-TR [43]; however, "true" delayed PTSD (rather than subthreshold that later meets criteria) appears to be much more uncommon than previously reported. Clinically, in cases of late-onset PTSD or reactivation of previously resolved PTSD, current life events should be explored [35]. At symbolically charged times, such as receiving a diagnosis of cancer or retiring from a long military career, emergence of PTSD symptoms may be thought of as the mind's way of expressing metaphorically in the present significant traumatic events in the past that evoked intense feelings. In such cases, exploration of the patient's current situation is generally more productive than focusing on the past.

Other Trauma-Related Disorders

PTSD is not the only trauma-related disorder, nor perhaps the most common [35,66,82] (see Table 2.4). People exposed to trauma and disaster are at increased risk for depression, generalized anxiety disorder, panic

TABLE 2.4 Trauma-related disorders

Psychiatric diagnoses
- Post-traumatic stress.disorder
- Acute stress disorder
- Major depression
- Substance use disorders
- Generalized anxiety disorder
- Adjustment disorder
- Organic mental disorders secondary to head injury, toxic exposure, illness, and dehydration
- Somatization
- Psychological factors affecting physical disease (in the injured)

Psychological/behavioral responses
- Grief reactions and other normal responses to an abnormal event
- Change in interpersonal interactions (withdrawal, aggression, violence, family conflict, family violence)
- Change in work functioning (change in ability to do work, concentration, effectiveness on the job; absenteeism, quitting)
- Change in health care utilization
- Change in smoking
- Change in alcohol use

disorder, and increased substance use [1,47,49,83]. 45% of survivors of the Oklahoma City bombing had a post-disaster psychiatric disorder. Of these, 34.3% had PTSD and 22.5% had major depression [35]. After a disaster or terrorist event the contribution of the psychological factors to medical illness can also be pervasive – from heart disease [84] to diabetes [85]. Traumatic bereavement [86], unexplained somatic symptoms [87,88], depression [89], sleep disturbance, increased alcohol, caffeine, and cigarette use [83,90], and family conflict and family violence are not uncommon following traumatic events. Anger, disbelief, sadness, anxiety, fear, and irritability are expected responses following trauma. For example, anxiety and family conflict can accompany the distress and fear of recurrence of a traumatic event, the ongoing threat of terrorism and the economic impact of lost jobs and companies closed or moving as a result of a disaster. The role of exposure to the traumatic event may be easily overlooked by a primary care physician. Medical evaluation, which includes inquiring about family conflict, can provide reassurance as well as begin a discussion for referral, and be a primary preventive intervention for children whose first experience of a disaster or terrorist attack is mediated through their parents.

Major depression, generalized anxiety disorder, substance abuse, and adjustment disorders in disaster victims have been less often studied than

ASD and PTSD, but available data suggest that these disorders also occur at higher than average rates [21,22,29,91]. Major depression, substance abuse, and adjustment disorders (anxiety and depression) may be relatively common in the 6–12 months after a disaster and may reflect survivors' reactions to their injuries, to affects and feelings stimulated by the disaster, and/or to their attributions of the cause of the disaster. The occurrence of these psychiatric disorders may also be mediated by secondary stressors [83,92] (i.e., the problems associated with disaster recovery, such as negotiations with insurance companies for reimbursement, or unemployment secondary to destroyed businesses) following a disaster. Major depression and substance abuse (drugs, alcohol, and tobacco) are frequently comorbid with PTSD and warrant further study [90,93–95]. Grief reactions are common after all disasters. Available studies of grief reactions following trauma do not greatly aid our understanding of who is at risk for persistent depression. One investigation indicated that single parents may be at high risk for developing psychiatric disorders since they often have fewer resources to begin with, and they lose some of their social supports after a disaster [95].

Somatization is common after a disaster and must be managed both in the community and individual patients [96] as well as in disaster and rescue workers [88]. Primary care providers must recognize that somatization is a frequent presentation of anxiety and depression in patients seeking care in medical clinics. Such recognition can help in the appropriate diagnosis and treatment of these psychiatric disorders, thereby minimizing inappropriate medical treatments. In addition, sleep disturbances following trauma are common clinical problems that may require treatment. Sleep difficulties can be due to anxiety related to recurrent disaster events (e.g., aftershocks), the ongoing threat of terrorist attacks, or to underlying psychiatric disease such as depression or PTSD [97]. These disorders must be considered in the differential diagnosis and appropriate treatments initiated as indicated.

Hostility with its accompanying social disruption, feelings of frustration, and perception of chaos, is also common following trauma [98,99]. Although in some cases it is helpful for individuals to recognize that the return of anger can be a sign of a return to normal (i.e., it is again safe to be angry and express one's losses, disappointments, and needs), in others hostility should remind the care provider to assess the risks of family violence and substance abuse.

Co-occurring psychiatric symptoms are frequently seen in injured survivors who may be dealing with the stress of their injury [22, 29,35,67,91,100,101]. Since studies indicate a high rate of psychiatric disorder in the physically injured, a proactive consultation liaison plan is a necessary part of a hospital emergency response plan.

Increasingly, traumatic bereavement is recognized as posing special challenges to survivors [39,86,103,104]. While the death of loved ones is always painful, an unexpected and violent death can be more difficult. Even when not directly witnessing the death, family members may develop intrusive images based on information gleaned from authorities or the media. In children traumatic play, a phenomenon similar to intrusive symptoms in adults, is both a sign of distress and an effort at mastery [105].

COMMUNITY/WORKPLACE RESPONSES TO DISASTER

The degree to which the disaster disrupts the community and workplace influences the development of post-traumatic stress disorders. In the immediate aftermath of a disaster or terrorist attack, individuals and communities may respond in adaptive, effective ways or they may make fear-based decisions, resulting in unhelpful behaviors. Psychiatric disease and psychological function, including the subthreshold distress of individuals, is dependent upon the rapid, effective, and sustained mobilization of health care resources. Knowledge of an individual's and community's resilience and vulnerability before a disaster (or terrorist event), as well as understanding the psychiatric and psychological responses to such an event, enables leaders and medical experts to talk to the public, promoting resilient healthy behaviors, sustaining the social fabric of the community and facilitating recovery [79,106]. The adaptive capacities of individuals and groups within a community are variable and should be understood before a crisis in order to target needs effectively.

The community and workplace serves as a physical and emotional support system. The larger the scale of the disaster, the greater the potential disruption of the community and workplace. It is helpful to examine the generic and unique challenges facing survivors of an airplane crash as well as those confronting victims of disasters such as a tornadoes or earthquakes or victims of terrorist attacks. If family members were not on the same aircraft, the plane crash survivor can return home to family, friends, and co-workers. They will most likely go back to a structurally intact house, to a community unaffected by the accident, to the same job with the same financial security, and so forth. In contrast, a tornado involves additional factors that amplify the trauma. Although the tornado survivor may experience and witness comparably gruesome sights, the recovery environment is markedly different: home and work site may have been destroyed, and relatives, friends, and co-workers may be dead, injured, or displaced. Thus, psychiatric morbidity is affected by the degree a disaster impacts the community [61,107,108].

The economic impact and consequences of disasters (and terrorist attacks) on individuals and communities are substantial. Loss of a job is a major post event predictor of negative psychiatric outcome. These effects can be seen at the macro level, for example, in a dip in consumer confidence during or after the sniper attacks in the Washington area in October 2002. Certain economic behaviors and decisions are affected both by various characteristics of a disaster (or a terrorist attack) and by the psychological and behavioral responses to the disaster. For example, after a terrorist attack, decisions and behaviors related to travel, home purchase, food consumption, and medical care visits are altered directly by changes in availability, but also by changes in perceived safety, optimism about the future and belief in exposure to toxic agents. The fact that threats and hoaxes carry with them economic costs and consequences perhaps best illustrates the importance of psychological and behavioral effects on economic decisions and behaviors and their associated economic costs. The impact on the local or national economy ranges from altered food consumption, savings, insurance and investment, to changes in work attendance and productivity and broader national or industry specific consequences such as altered financial and insurance markets or disrupted transportation, communication and energy networks.

While there are many definitions of disaster, a common feature is that the event overwhelms local resources and threatens the function and safety of the community. With the advent of instantaneous communication and media coverage, word of terrorism or disaster is disseminated quickly, often witnessed in real time around the globe. The disaster community is soon flooded with outsiders: people offering assistance, curiosity seekers and the media. This sudden influx of strangers affects the community in many ways. The presence of large numbers of media representatives can be experienced as intrusive and insensitive. Hotel rooms have no vacancies, restaurants are crowded with unfamiliar faces, and the normal routine of the community is altered. At a time when, traditionally, communities turn inward to grieve and assist affected families, the normal social supports are strained and disrupted by outsiders.

Inevitably, after any major trauma, there are rumors circulated within the community about the circumstances leading up to the traumatic event and the government response. Sometimes there is a heightened state of fear. For example, a study of a school shooting in Illinois noted that a high level of anxiety continued for a week after the event, even after it was known that the perpetrator had committed suicide [44].

Outpourings of sympathy for the injured, the dead, and their friends and families are common and expected. Impromptu memorials of flowers, photographs, and memorabilia are frequently erected. Churches and synagogues play an important role in assisting communities' search for meaning from the tragedy and in assisting in the grief process.

Over time, anger often emerges in the community. Typically, there is a focus on accountability, a search for someone who was responsible for a lack of preparation or inadequate response. Mayors, police and fire chiefs, and other community leaders are often targets of these strong feelings. Scapegoating can be an especially destructive process when leveled at those who already hold themselves responsible, even if, in reality, there was nothing they could have done to prevent adverse outcomes. In addition, nations and communities experience ongoing hypervigilance and a sense of lost safety while trying to establish a new normal in their lives.

There are many milestones of a disaster which both affect the community and may offer opportunities for recovery. There are the normal rituals associated with burying the dead. Later, energy is poured into creating appropriate memorials. Memorialization carries the potential to cause harm as well as to do good. There can be heated disagreement about what the monument should look like and where it should be placed. Special thought must be given to the placement of memorials. If the monument is situated too prominently so that community members cannot avoid encountering it, the memorial may heighten intrusive recollections and interfere with the resolution of grief reactions. Anniversaries of the disaster (one week, one month, one year) often stimulate renewed grief.

GENERAL FEATURES OF PATHOLOGICAL AND NORMAL RESPONSES TO DISASTER

Phases of Psychological Response to Disaster

Although individual patterns of psychological response to trauma and disaster vary, several phases generally emerge over time [96]. Cohen *et al.* [109] have identified four phases in the response to disaster. The first, immediately following a disaster, generally consists of strong emotions, including feelings of disbelief, numbness, fear, and confusion. People tend to cooperate, and heroic deeds are sometimes seen. These reactions are best understood as "normal responses to an abnormal event". Rescue personnel, family, and neighbors are generally the support systems that are most heavily used.

The second phase usually lasts from a week to several months after the disaster. At this juncture assistance flows in from agencies external to the community, and the cleanup/rebuilding process begins. In this phase of adaptation, denial alternates with intrusive symptoms. The intrusive symptoms generally arise first and consist of unbidden thoughts and feelings accompanied by autonomic arousal (e.g., a heightened startle

response, hypervigilance, insomnia, and nightmares). Toward the end of the adaptation phase, denial is more prominent. This is often accompanied by an increase in visits to physicians for complaints of somatic symptoms such as fatigue, dizziness, headaches, and nausea [110]. Anger, irritability, apathy, and social withdrawal are often present.

The third phase lasts up to a year and is marked by disappointment and resentment when expectations of aid and restoration are not met. During this period the strong sense of community may weaken as individuals focus on their personal concerns.

The final phase, reconstruction, may last for years. During this period disaster survivors gradually rebuild their lives, making homes and finding work. Recovery from a disaster involves the resolution of the initial psychological and somatic symptoms [3] through reappraisal of the event, assignment of meaning, and integration into a new concept of self.

Police, paramedics and other first responders who assist the injured and evacuate them to medical care, and hospital personnel who care for the injured, are all groups that need opportunities to process what happened, education on normal responses and information on when to seek further help. Those who are charged with cleaning up the site of the tragedy are also vulnerable to persistent symptoms. Overidentification with the victims (e.g., "It could have been me") and their pain and grief can perpetuate the fear response [111]. This normally health and growth promoting mechanism of identification with victims and heroes can turn against us in this setting like an autoimmune disorder. Inevitably, each disaster situation will also contain individuals who are "silent" victims and often overlooked. By paying close attention to the patterns and types of exposure, these individuals can be identified and receive proper care. For example, traumatically bereaved parents of adult children are a group often forgotten as community programs and neighbors remember the spouse or partner and children of the deceased.

Meaning of Traumatic Events

Clinical studies suggest that the psychiatric consequences following trauma are influenced by the meaning ascribed to the traumatic event by individuals, families, and communities [4,69,112]. Beliefs about the cause of the disaster and the ramifications of these beliefs (such as self-blame, the shattering of assumptions about human nature, and rage at "those responsible" when the event is viewed as preventable) should be assessed in psychiatric evaluation and represent potential areas for intervention. Chronic PTSD may be particularly related to the meaning of the trauma experienced. Therapists can assist patients in modifying distorted

attributions (e.g., "It's all my fault; if only I had insisted that we not go away for the weekend, we wouldn't have been caught in the tornado and my wife would still be alive"). Some events are more likely than others to shatter one's faith in a just and safe world [113]. Consider the implications of the following scenarios. An individual has survived an airplane crash in which many people were injured and killed. Various explanations for the crash exist; each would stimulate a different meaning and emotional response. The plane may have crashed because of sudden and unexpected wind shears, because of uncomplicated pilot error, or because of "complicated" pilot error (e.g., the pilot was under the influence of drugs or alcohol). At the far end of this continuum would be a crash caused by an act of terrorism or greed in which the plane was destroyed to further the interests of a group or an individual.

The construction of meaning is an active process that appears to affect the outcome of the traumatic experience and recovery [114,115]. The meaning of a disaster to any one person results from the interaction of his or her past history, present context, and physiological state. The ascribed meaning will then direct individual behaviors of what to do, what to fix, and whom or what to blame. Meaning is dynamic, not static: it changes over time as the individual's psychosocial context changes. Such alterations can aid or inhibit recovery. For example, immediately following the crash of an Air Force C-141 cargo plane, the remaining members of the squadron were convinced that the accident was caused by aircraft failure. However, this belief was modified as the date grew nearer for the squadron members to fly the same type of plane again. By that time, the squadron's belief had changed, and members thought that the crash must have been caused by human error. If it were human error, one could feel safe: "I would never do that."

Resilience

Although the psychiatric consequences of trauma have been associated with debility that can persist for decades, the effects of traumatic events are not exclusively bad. For some people trauma and loss facilitate a move toward health [32,116,117]. A traumatic experience can become the center around which a victim reorganizes a previously disorganized life, reorienting values and goals [3,33]. Traumatic events may function as psychic organizers for memory by linking event-related feelings, thoughts, and behaviors that are later accessed en bloc following symbolic, environmental, or biological stimuli [4]. Many survivors of the 1974 tornado in Xenia, Ohio, experienced psychological distress, but the majority described positive outcomes: they learned that they could handle crises

effectively (84%) and believed that they were better off for having met this type of challenge (69%) [118,119]. This "benefited response" is also reported in the combat trauma literature. Sledge *et al.* [120] found that approximately one-third of US Air Force Vietnam-era prisoners of war reported having benefited from their prisoner-of-war experience; they believed that they had developed an important reprioritization of their life goals, placing new emphasis on the importance of family and country. The prisoners reporting these benefits tended to be the ones who had suffered the most traumatic experiences.

CONCLUSIONS

Psychological/behavioral and psychiatric responses to trauma and disasters have a predictable structure and time course. For some, however, the effects of a disaster linger long after its occurrence, rekindled by new experiences that remind the person of the past traumatic event. Even normal life events can cause anxiety and bring to mind a destroyed home or deceased loved ones. The factors influencing resilience and vulnerability to catastrophic events are only now being identified. Although a growing number of studies have investigated psychiatric response to disaster, more empirical research is needed to determine effective treatments for PTSD.

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