

# The Extent and Impact of Mental Health Problems After Disaster

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Disasters are events that challenge the individual's ability to adapt, which carries the risk of adverse mental health outcomes including serious posttraumatic psychopathologies. While risk is related to degree of exposure to psychological toxins, the unique vulnerabilities of special populations within the affected community as well as secondary stressors play an important role in determining the nature and amount of morbidity. Disasters in developing countries and those associated with substantial community destruction are associated with worse outcome. Although acute responses are ubiquitous, few disasters lead to posttraumatic psychopathology in the majority of people exposed. However, the shortage of human resources in psychiatry, particularly in developing countries, places a considerable burden on psychiatric services even without the additional constraints imposed by disaster. Hence, disasters are events that invite a public health approach to mental health that better serves the needs of the individual and the affected community. Such an approach considers all available human resources and is intended to mitigate the effects of disaster before serious psychopathologic sequelae arise. This community mental health strategy allows peripheral mental health workers to mediate between survivors and specialized mental health professionals while assisting in removing barriers to treatment. To be effective when disaster occurs, this approach requires careful planning in conjunction with community consultation before implementation of formal disaster mitigation policies.

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Disasters are events that collectively have been distinguished from other types of potentially traumatic events by applying a definition of "massive collective stress" or "violent encounters with nature, technology, or humankind."<sup>1,2</sup> Regardless of their scale and consequent likelihood of media reportage, disasters are regular occurrences, with one estimate placing their frequency at an average of 1 per day somewhere throughout the world.<sup>3</sup> Whether by earthquake or tsunami, nuclear mishap or transportation incident, mass shooting or bombing attack, disasters have in common a collective social suffering that requires a supreme effort by individuals, communities, and even entire societies to overcome. They are events that

challenge the individual's capacity for adaptation, which can lead to the onset of a range of adverse mental health outcomes, including serious posttraumatic psychopathologies. These may often persist for a very long time after the event<sup>4,5</sup> and represent a further burden to individuals whose physical and emotional resources have already been depleted by their losses.

Disasters are events with predictable long-term consequences. In general terms, the degree of exposure to a disaster determines risk and level of psychological morbidity,<sup>6,7</sup> although biological, social, and economic factors may all be determinants of vulnerability in special populations.<sup>8,9</sup> While the nature of losses and their documented effects is dependent on the nature of the disaster, individual stressors such as destruction of the family home, bereavement, threat to life, physical injuries, and the individual's behavior during the disaster can all be viewed as "psychological toxins" whose effects are greatest with increasing proximity to the event.<sup>10,11</sup> Moreover, there is evidence that individual loss and community destruction are interrelated, with worse outcomes associated with those individuals who come from communities with a high level of destruction and who suffered high levels of personal loss.<sup>12</sup>

The ample provision of mental health resources is a challenge for all countries, but particularly so in developing countries where the supply of sufficient human resources in mental health is an unmet need.<sup>13</sup> Enhancing the level of service is a health priority at the best of times, but

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in a crisis situation brought on by disaster there is an urgent need to engage existing services with strategies to extend mental health care. For this reason, disasters are events that invite a public health approach in the mental health setting that is conducive to the development and implementation of strategies that serve the needs both of the individual and of the community. By considering the likely impact of a disaster on mental health, it is anticipated that health-care workers, policy makers, and others involved in the delivery of mental health care will be better engaged in both planning and mitigation strategies.

### PSYCHIATRIC RESPONSES TO MASS TRAUMA

The potential effects of a disaster on the mental health of the affected population are highly variable, ranging from minimal and fleeting to severe psychological distress or impairment that may persist for many years after the event.<sup>3</sup> During the minutes and hours that follow a potentially traumatic event, acute reactions are ubiquitous and unstable and typically involve any or all of anxiety, depression, agitation, anger, despair, shock, withdrawal, hyperactivity, conversion, and dissociation.<sup>14</sup> Within a few days and as early as 1 day after exposure, these initial acute responses are replaced with symptoms resembling those of posttraumatic stress disorder (PTSD) and depression, with almost all survivors expressing some symptoms of PTSD in particular.

The almost universal expression of PTSD symptoms, combined with social acceptability of these types of responses (i.e., they effectively communicate a need for help) and the observation that some forms of early intervention are harmful, indicates that there is an element of adaptation involved as the individual moves from survival mode to adjusting to the novelty that accompanies a potentially traumatic event. While such responses can be distressing and transiently disabling, they are seldom associated with gross disorganization or confusion. Acute responses tend to be self-limiting and subside in most cases without deliberate intervention.<sup>14</sup>

In some survivors, the early responses are not accompanied by learning and adaptation, or they fail to remit, and are a prelude to serious mental disorders. Therefore, while most survivors will demonstrate symptoms of intrusive recall, anguish, and social withdrawal in line with their experiences of fear, loss, and processing novelty, severely traumatized survivors additionally describe a sense of profound transformation, dysphoria, irritability, a loss of security, poor-quality sleep, disharmony with others, social isolation, and an inability to share inner experiences.<sup>14</sup>

According to the World Health Organization (WHO), psychological maladaptation to the stress of disaster includes mild, moderate, and severe forms of mental disorder and psychological distress.<sup>15</sup> The WHO estimates that in the general population worldwide, the baseline preva-

lences of mild-to-moderate and severe mental disorder are around 10% and 2% to 3%, respectively. The WHO estimates that after disaster the general overall prevalence rates for mild-to-moderate and severe mental disorder are liable to increase to 20% and 3% to 4% of the affected population, respectively. As noted below, these rates may be higher in the population affected by the Asian tsunami.

Most disasters yield at least moderate psychological impairment of the affected population. In a seminal contribution to the literature on mental health in disaster, Norris et al.<sup>3</sup> reviewed English-language studies published between 1981 and 2001 of 102 natural, technological, or violent disasters affecting more than 60,000 individuals in 29 countries. From a sample of 160 disaster victims, the investigators identified a range of outcomes categorized in order of frequency as specific psychological problems, nonspecific distress, health problems, chronic problems in living, resource loss, and problems specific to youth. Youth-associated problems vary with age and among younger children include increased dependency, aggressive behavior, hyperactivity, and separation anxiety, while in adolescents there may be elevations in behaviors normally associated with this age group as well as deviant and delinquent behaviors.

Specific psychological problems, identified in 74% of the sample, represent the set of outcomes most closely corresponding to mental disorders as defined by the WHO. These incorporate symptoms of posttraumatic stress, depression, anxiety, and other psychiatric problems, as well as specific conditions of PTSD, major depressive disorder (MDD), generalized anxiety disorder, and panic disorder. Minimal or moderate impairment indicative of prolonged stress was observed in 61% of individuals, and severe or very severe impairment, in 29% of individuals. In general terms, severe and very severe impairment tended to be associated with disasters involving mass violence, whereas the majority of natural disasters were associated with moderate impairment.

Of the specific psychological problems reported among survivors of a disaster, PTSD is typically the most commonly identified condition.<sup>3</sup> While PTSD is undeniably prevalent in the disaster setting and has received considerable attention in the literature, its rate is dependent on the sampling used in a study as well as the nature and severity of the event.<sup>16</sup> Knowledge of the likely impact of PTSD is useful in terms of treatment priorities and resource allocation, but there is also a need to adequately consider the importance of other psychopathologies, with depression and anxiety disorders observed in 37% and 20%, respectively, of disaster survivors evaluated by Norris et al.<sup>3</sup> Major depressive disorder is a distinct and frequently comorbid diagnosis. To date, the focus on PTSD has perhaps led to an underestimate of the importance of depression as a source of morbidity, particularly in populations in which there are major levels of loss that have an enduring effect. The demoralization that can follow in the wake of the

prolonged hardships after a disaster is an important contributor to vulnerability to depression.

Among those affected by the Asian tsunami, the WHO estimates the likely prevalence of psychological distress to be on the order of 50% to 90% among the affected populations, with approximately 20% to 40% expected to suffer mild distress and 30% to 50% expected to suffer moderate-to-severe distress.<sup>15</sup> The corresponding set of outcomes of nonspecific distress identified by Norris et al.<sup>3</sup> in 39% of sample populations includes nonsyndromic, stress-related psychological and psychosomatic symptoms, including symptoms of anxiety and depression. These and other outcomes of disaster, including concomitant problems relating to general health, chronic problems in living attributable to secondary stressors, and depletion of psychosocial resources, reflect the collective experience of survivors of disaster and may modulate outcomes not only for the individual, but also for the community.

### ACUTE EXPRESSION OF POSTTRAUMATIC PSYCHOPATHOLOGY

#### Psychological Morbidity

Although the stable expression of acute symptoms of PTSD over time may have a small predictive component in terms of subsequent morbidity, the presence of early symptoms in both survivors who recover and those who do not limits any real predictive value of these symptoms.<sup>14</sup> The predictive ability of risk factors is, therefore, not high, and an overemphasis of predisaster characteristics will tend to underestimate the importance of the severity of exposure. However, during the early recovery period when survivors begin to assimilate their experiences, few do well with distancing themselves from the event, and most will experience repeated and vivid intrusive thoughts and images. Negative appraisal of these early symptoms increases the likelihood of subsequent morbidity.

The epidemiologic research into the impact of disasters has consistently demonstrated that there are few events that lead to posttraumatic psychopathology in the majority of people exposed.<sup>16</sup> While comparison between studies of mental health outcomes in disaster is difficult owing to the variability of sampling processes, it is apparent that the intensity of exposure experienced by the population studied has a major impact on the prevalence of disorders.<sup>6,7</sup> Closer proximity to the event may also impact the duration of symptoms.<sup>17</sup> Disasters causing severe, lasting, and pervasive psychological effects are characterized by at least 2 of the following: a high prevalence of injury, threat to or actual loss of life; extreme and widespread property damage; serious, ongoing financial problems for the affected community; and involvement of human carelessness or intent.<sup>3</sup> Therefore, perception of life threat, injuries to the individual or family members, bereavement, destruction of the family home, loss of possessions, and associated loss of

sense of identity and social integration can all be considered as "psychological toxins" and as such are risk factors for psychological morbidity, determined in part by the degree of exposure, which in itself is also a critical determinant of the level of psychological morbidity.<sup>10,11,16</sup>

An understanding of potential vulnerability and protective factors, in addition to the degree of exposure, is necessary to explain much of the probability of developing post-disaster psychological morbidity, which is a product not only of the environment in which the disaster occurred, but also of the context of the event in the individual's experience, with the latter serving as a base from which the disorder emerges.<sup>14</sup> In a meta-analysis of risk factors for PTSD in adults exposed to trauma, posttrauma characteristics of trauma severity, lack of social support, and additional life stress had a stronger predictive effect for PTSD than pretrauma characteristics.<sup>6</sup> Pretrauma characteristics were far from exempt in terms of having a predictive value and were categorized according to consistency of their predictive value. Therefore, gender, age at trauma, and ethnicity predicted PTSD in some, but not all, populations. Education, previous trauma, and general childhood adversity predicted PTSD somewhat more consistently, while reported childhood abuse and prior or family psychiatric history had a more uniform predictive value.

Similarly, Norris et al.<sup>3</sup> observed that, among adult samples, posttrauma characteristics of exposure severity, inadequate psychosocial resources, and secondary stressors and pretrauma characteristics of female gender, middle age, ethnic minority status, and prior psychiatric history increased the likelihood of an adverse outcome. Among samples of youth, who represent an at-risk population for severe impairment, supportiveness of family environment and level of parental distress were predictive of outcome.

#### Other Presenting Symptoms

Other symptoms arising from the primary disaster experience may also determine in part the occurrence of posttraumatic psychopathology. Somatic complaints such as headaches, musculoskeletal pains, and fatigue are common idioms of distress in the aftermath of disaster. The significance of these complaints is frequently overlooked in primary care settings<sup>18</sup> (for additional information on this subject, see Foa et al., this supplement). Increased alcohol consumption and drug abuse are typically overexpressed in disaster victims relative to control populations.<sup>3</sup> Secondary stressors arising from chronic problems in living, such as troubled interpersonal relationships, financial worries, intercurrent adversity (e.g., the separatist movements in Indonesia and Sri Lanka), lawlessness, threat of epidemic disease, conflict over disaster relief, inequity in distribution of resources, and continued disruption of social infrastructure, are also more abundant in disaster survivors relative to control populations and may mediate the effects of acute response and chronic psychological outcomes.

## LONG-TERM CONSEQUENCES OF MASS TRAUMA

Within most populations affected by disaster, postdisaster symptomatology improves over time.<sup>3</sup> Longitudinal data show, in general, that symptoms reach peak severity during the first year, which is followed by a recovery period marked by a gradual decline in symptoms.<sup>3</sup> In variant patterns, symptoms may peak then initially decline before stabilizing, or stabilize before beginning a new downward trend. Quadratic and cyclical patterns have also been reported, as have late-developing symptoms and symptom progression and persistence. Few people reaching a peak of severity in the first year will spontaneously present for treatment, and for many there is a long delay before seeking assistance. Many postdisaster intervention organizations fail to anticipate this delay and prematurely withdraw services.<sup>19</sup>

Estimates of psychological symptoms in disaster cohorts based on point prevalence data, and longitudinal and follow-up studies are helpful in assessing survivor needs in the months and years following disaster and provide a picture of the variance that is associated with symptom acquisition, recovery, and persistent psychopathology. Following the 1988 Yun Nan earthquake in China, the prevalence of PTSD at 5 months in communities experiencing major, intermediate, or mild damage was 23%, 13%, and 16%, respectively. The respective prevalence rates of disaster-specific PTSD were 13.5%, 6.2%, and 7.1%, respectively, while for the overall group exposed to the earthquake, the estimated prevalence was 8.9%.<sup>20</sup> Among survivors of the Oklahoma City bombing, rates of PTSD, MDD, and panic disorder at 6 months were 34.3%, 22.5%, and 6.6%, respectively, with 15% of the sample having experienced PTSD prior to the event.<sup>21</sup> Disaster victims affected by Mexico's 1999 flood were still experiencing PTSD 2 years later, with rates of PTSD at 1 year and 2 years postdisaster estimated at 24% and 11%, respectively.<sup>22</sup>

A longitudinal study of psychological morbidity in school-aged children exposed to a bushfire disaster found that symptoms at 2 months after exposure were actually lower than those of a control group.<sup>23</sup> However, symptoms increased over the next few months before stabilizing such that psychological morbidity was as great at 26 months postdisaster as at 8 months. Firefighters exposed to the same disaster had a rate of PTSD of 16%, with about half of the sufferers experiencing remission at 42 months.<sup>24</sup> Victims of the Buffalo Creek dam burst of 1972 had a lifetime PTSD rate of 59%, with 25% still meeting PTSD criteria some 14 years after the event.<sup>25</sup>

Two further follow-up studies<sup>4,5</sup> illustrate the potential for ongoing morbidity long after the event. One, a study of survivors of the Piper Alpha oil platform collapse, found that 21% of survivors met the criteria for PTSD over 10 years after the event.<sup>4</sup> The second, a follow-up study of survivors exposed to trauma in childhood, observed a PTSD rate of 46% at some point postdisaster, while 29% met the

criteria for PTSD 33 years after the event.<sup>5</sup> Finally, the National Comorbidity Survey of the general population indicated that of those individuals with PTSD, approximately 60% would be in remission by 5 years, but in those people who continued to experience symptoms at this time, the disorder was likely to run a protracted course.<sup>26</sup>

## IMPACT ON COMMUNITIES

Although there is a paucity of data concerning the possible interaction between community destruction and individual exposures, there is a strong suggestion that collective community losses, such as the destruction of infrastructure, loss of essential services, and potential displacement of large numbers of people, contribute to disaster outcomes.<sup>12,27</sup> Those individuals with poorer outcomes came from communities with a high level of destruction and had high levels of personal loss.<sup>3,12</sup> The impact of community losses on psychological well-being of individuals appears to differ from that of personal losses, in that community destruction is more closely correlated with decreasing positive influences, whereas personal losses are associated with increasing negative effects.<sup>3</sup> Under normal circumstances, communities provide a hub of psychosocial resources that contribute to well-being. Deficits in these resources as a result of disaster diminish self-reliance and optimism and may mediate the effects of acute psychological responses, further influencing outcome. Moreover, rebuilding the community can be difficult when a large proportion of its residents are affected by mental disorders,<sup>22</sup> which is further compounded when existing mental health resources are scarce at the time of disaster or diminishing as a result of disaster.<sup>13</sup> In this regard, disasters occurring in developing countries tend to cause greater impairment than those in developed countries.<sup>28</sup>

## DELIVERY OF MENTAL HEALTH CARE

According to the World Health Report 2003,<sup>29</sup> the most critical issue facing health-care systems throughout the world, and especially those of developing countries, is the shortage of human resources. The report recognizes that all countries are part of a global marketplace competing for the same human resources, with the inevitable net trade of health professionals moving in the direction of developed countries and in the process creating a demand-supply imbalance. The challenge of providing sufficient numbers of mental health professionals in developing countries is an especially large one, which has brought about a reevaluation of how to manage the problem.

Murthy<sup>13</sup> has observed that the shortage of specialist personnel in countries such as India is an opportunity to organize the mental health care systems of developing countries around community-based resources, with a resulting shift from service provision by relatively few



specialists to a wide range of mental health providers. Such an approach is facilitated in 4 key areas: modifying the curriculum within undergraduate medical education to incorporate practical training in psychiatry; developing short training programs that emphasize clinical and practical aspects of mental health for nonspecialists, including medical officers, psychologists, social workers and nurses; using a wide variety of nonprofessionals, including volunteers involved in suicide prevention, patients functioning as therapists in community programs such as Alcoholics Anonymous, and family members adopting a therapy role for other family members; and involving staff in other sectors, such as schoolteachers, the police, and religious leaders. In this way, mental health care becomes "piggybacked" onto community health care, rather than acting as a stand-alone system with accessibility for few.

The WHO has already conducted large-scale testing of a policy of devolving mental health care to less specialized personnel, which has the strategic goal of amplifying human resources in the mental health setting through appropriately tailored, cost-effective training.<sup>30</sup> Within the medical profession, this policy involves developing the clinical component of the undergraduate curriculum and linking medical training in psychiatry with national mental health programs. By far the largest element of the policy is concerned with extending psychiatric training to nonspecialist allied health professionals and workers and volunteers outside the health-care sector. In India, such nonspecialist workers have greatly extended the mental health care resources available with the advantage that these typically indigenous workers and volunteers approach mental health problems with a firsthand understanding of local culture.<sup>13,30</sup>

Peripheral workers are additionally well placed to mediate between survivors struggling to cope with the effects of disaster and scarce specialized staff while helping to break down barriers to treatment. Such barriers to the delivery of mental health care, unlike barriers to general health care delivery, are found universally in developing and developed countries alike and contribute to a low uptake of care for reasons of stigma, distrust, and absence of acknowledgment of impairment, cultural sensitivity, and cultural relevance.<sup>31</sup> As well as helping to break down barriers in developing countries, the strategy discussed also has relevance in developed countries, as was demonstrated in a U.K. study<sup>4</sup> of survivors of the Piper Alpha oil rig disaster. Informal support groups and networking encouraged positive outcomes among survivors of this disaster.<sup>4</sup> The implication of this and other findings is that community-based and nonprofessional support systems are just as important as professional care, but work best when the 2 approaches coexist.

## PLANNING FOR DISASTER: LESSONS FROM HISTORY

History has demonstrated a reluctance among the mental health community and the broader community at large to

retain experience and knowledge about the impact of trauma associated with disaster. Disaster research has played an invaluable role in correcting this situation by assessing morbidity and highlighting the long-term effects of these events, which in the past tended to be overlooked in disaster planning. The challenge for the mental health community now is not only to react to a disaster situation by extending treatment to those affected and exploring outcomes in depth with ongoing research, but also to help combine the lessons learned from previous disasters into plans for future disaster management.<sup>16</sup>

The positive aspect of data on risk is that many of the secondary stressors underlying chronic problems of survival in the postdisaster environment are amenable to social interventions, which appear to be critical to recovery.<sup>6</sup> An illustration of this principle is provided by Goenjian,<sup>32</sup> who described the implementation and outcomes of a mental health relief program in Armenia following the 1988 Spitak earthquake. In the aftermath, the government of the time promised to rebuild the devastated city, but 2 years later the promise remained unfulfilled, which potentially correlated with survivors' symptoms and particularly with the high prevalence, marked severity, and protracted duration of posttraumatic stress. In Goenjian's interpretation, a modifiable, but unmodified, secondary stressor compromised survivors' capacities to adapt after disaster.<sup>32</sup>

The mental health delivery system in place at the time of the Spitak disaster was ill-equipped to deal with the needs of traumatized victims: outpatient mental health clinics were virtually nonexistent, psychologists were predominantly involved in teaching and research and were not certified to provide treatment, there were no trained counselors or social workers to provide primary psychosocial care, and available treatment modalities were not conducive to treating large numbers of people. On a positive note, however, a psychiatric outreach program was subsequently implemented to provide psychological first aid, establish mental health outpatient clinics, train local therapists and teachers, who in turn provided mental health support to victims, and advise local government and relief officials in regard to relief priorities. The range of treatment modalities was expanded to include exploratory, supportive, and educational measures, and interventions were planned to minimize symptom progression and prevent the development of maladaptive behavior. The outcomes from these basic interventions were highly beneficial, with disaster victims involved in treatment reporting improvement in sleep disturbances, social isolation, and regressive symptoms among children. In comparison, recurrent intrusive symptoms and hyperarousal were more resistant to treatment. Family and group therapies benefited not only those receiving treatment but also other families by providing a supportive network that had a positive ripple effect.

Capacity building activities and initiatives to define community vulnerability and strengths are crucial for the

strategic development of disaster preparedness.<sup>33</sup> Identification of special populations, such as women, ethnic minorities, and the marginalized and impoverished, is an important step not only in identifying those individuals and groups within a society that are at increased risk of a poor outcome in the event of disaster, but also in having their needs and views represented during disaster planning.<sup>8</sup> Finally, the experience in India following the 2001 Gujarat earthquake was that disaster relief would have been more effective if the following had been given adequate consideration: development of proper public health indicators to assess the status of public health care and provide indicators of the nature and amount of relief required in the event of disaster; development of effective, centralized, and localized coordination abilities for assigning relief supplies and services; acquisition of agreement on distribution of relief prior to disaster to avoid delays caused by bureaucracy; and development of policy on disaster relief.<sup>33</sup>

### CONCLUDING REMARKS

From a policy perspective, countries and individual communities need to anticipate and prepare for disaster and its associated psychiatric morbidities. No one set of recommendations would be appropriate given the often considerable variation in disaster impact, which is based not only on the nature and intensity of the disaster itself, but also on the unique vulnerabilities of special populations within affected communities. Rather, each new disaster should be considered as a novel event with predictions about rates of morbidity and associated mental health needs of the affected population based on considered and planned disaster mitigation activities. It is critical that the activities match the cultural context and needs of the victims, which is best ensured by involving the community in evaluating its own needs and determining which activities are most appropriate.

*Disclosure of off-label usage:* The authors have determined that, to the best of their knowledge, no investigational information about pharmaceutical agents that is outside U.S. Food and Drug Administration-approved labeling has been presented in this article.

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