Chapter 35

DISASTER PSYCHIATRY

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INTRODUCTION

The US military has made significant contributions to medical relief efforts for many devastating civilian events around the world. More recently, military psychiatrists and allied mental healthcare professionals have played major roles in these relief operations. This chapter outlines general principles of disaster psychiatry and illustrates the application of these principles via the response of military psychiatry to recent mass casualty disasters.

The field of disaster psychiatry continues to evolve and inform the conceptualization of disasters and their behavioral health consequences. Knowledge of the proper psychiatric interventions for times of disaster is essential. Although generally well-trained in war or battlefield psychiatry and the application of PIES (proximity, immediacy, expectancy, simplicity) principles, some military psychiatrists, like many of their civilian colleagues, are less familiar with the care of traumatized patients outside the sphere of standard inpatient or office psychiatric settings. Most psychiatrists may be more experienced with the management of conditions such as acute stress disorder or posttraumatic stress disorder (PTSD) in the office than with management of symptoms in the austere and disrupted postdisaster environment. The treatment of disaster-related behavioral health conditions can challenge psychiatric concepts such as those related to intrapsychic determinants of mental disorders[1] and psychiatrist–patient boundaries (eg, cohabiting a tent with a patient).[2] Although knowledge about individually experienced trauma, such as rape and automobile accidents, along with that of war psychiatry, informs the basic principles of disaster psychiatry, psychiatric reactions to disasters where there are often acute, unexpected, and collectively experienced large-scale traumatic events may be different. Much has been learned in recent years as a result of experience following the September 11, 2001, (9/11) attacks, the devastating Indian Ocean tsunami of 2004, and Hurricane Katrina in 2005. The participation of military psychiatrists in relief teams responding to these events has provided a unique opportunity to practice disaster plans, assess the existing framework of disaster psychiatry knowledge, and consider possible modifications for advancement.

This chapter will outline the historical background for the current principles of disaster psychiatry. Descriptions of military psychiatric response to the 9/11 attack on the Pentagon, the Indian Ocean tsunami, and Hurricanes Katrina and Rita will illustrate not only the application of principles of disaster psychiatry but also what military psychiatrists may expect in disaster situations and how they can best assist in relief and recovery. Finally, areas for future research and training emphasis will be identified.

HISTORICAL BACKGROUND

Substantial empirical data regarding medical and surgical needs at times of catastrophe have been accumulated. However, relatively little is known about mental health needs and appropriate psychiatric services. Nonetheless, the nature and extent of mental health needs of populations affected by a disaster and the appropriate psychiatric response has been well articulated in reports regarding a variety of natural and man-made disasters, wars, and public health emergencies.

In disasters, many experience grief and depression, anxiety, and somatic and dissociative reactions.[3–6] Disaster stress reactions may mimic physiological symptoms anticipated by a specific type of disaster event; for example chest tightness and nausea because of anxiety may follow the explosion of a truck carrying chlorine gas. This phenomenon complicates assessment and care of disaster-affected populations and necessitates the collaborative work of psychiatrists with their medical counterparts. Among people with preexisting mental disorders, anxiety and somatic reactions are compounded by fears regarding community disruption, availability of care, and availability of medication supplies.

Psychological reactions to disaster, resulting in presentation for treatment, are well documented in the literature. For example, during the Persian Gulf War (1990–1991) about 40% of Israeli civilians near Scud missile attacks reported symptoms consistent with a chemical weapons' explosion despite the absence of any such exposure.[7] A similar phenomenon was observed in the 1995 sarin gas attack on the Tokyo subway system.[8–10] In a cross-sectional assessment of 182 survivors from the 1995 Oklahoma City bombing 6 months after the disaster, North and colleagues showed elevated rates of PTSD (15% predisaster and 34.3% postdisaster) and depression (12.6% predisaster and 22.5% postdisaster).[11] Five emergency rooms in lower Manhattan near the World Trade Center collapse experienced a surge in patient care in the aftermath of the 9/11 disaster. Of the 950 patients examined during the first 48 hours in these emergency rooms, 14% reported cardiac, neurological, and psychiatric problems.[12] In the months following the World Trade Center

destruction, a survey of Connecticut, New Jersey, and New York residents showed nervousness, worry, sleep problems, and increased smoking and alcohol use as a result of the attacks.[13]

The terrorist anthrax attacks in Washington, DC, during November 2001 again demonstrated the need for psychological, emotional, and behavioral healthcare of the affected populations. During the 2 weeks following the anthrax attacks on the Hart Senate Office Building, 1,129 patients with symptoms and concerns of anthrax exposure visited the emergency room of Inova Fairfax Hospital, located in nearby northern Virginia. Of these patients, only two were diagnosed with inhalational anthrax.[14] The reactions of civilians to disasters are fairly similar to those documented among troops as early as World War I.[15] Historically, psychiatric reactions (such as those noted above) have been divided along the time phases of a disaster (predisaster, disaster, and postdisaster), with each phase having its own characteristics with differences essentially determined by the nature and duration of the disaster.[16] Thus, the emotional and behavioral consequences of disasters may cause considerable disruptions in the health and functioning of individuals and societies along a significant timeline. Investigations in the fields of social science, psychology, psychiatry, and public health have provided useful information to enhance resilience, promote effective disaster behaviors, and mitigate mental disorders following traumatic exposures. These have been summarized by Ursano, Fullerton, and Norwood[6]; and Ritchie, Watson, and Friedman.[17] Three broad mental health intervention areas that are informed by the empirical evidence are: (1) community support, (2) education, and (3) definitive care (Table 35-1). These domains of intervention areas are consistent with long-standing

TABLE 35-1

ESSENTIAL DOMAINS OF DISASTER MENTAL HEALTH INTERVENTIONS

Community Support	**Basic Needs:** provide safety, security, water, food, shelter/housing, transportation, contact and/or communication with family and friends
	Psychological First Aid: minimize further harm; reduce psychological arousal and physical pain; mobilize support; maintain families and facilitate their reunion; provide information and education; foster communication about risks; contemplate need for translators
	Needs Assessment: assess current status; know predisaster circumstances; consider silent populations like children and the disabled; think of needs on three levels: (1) populations, (2) groups, and (3) individuals
	Monitoring: listen to those affected; gauge the level of basic needs that are met; measure psychological vital signs like attitudes, hope, expectations, and substance misuse; monitor and dispel rumors
	Fostering Resilience and Recovery: encourage social interaction; allow regular activities such as school and work as far as possible; enhance coping skills; strengthen role system; suggest community action to decrease helplessness and instill hope; build on existing community and organizational fabric; encourage protective community rituals (speeches, memorial services, funerals) to reduce distress and enhance cohesion
Education	**Outreach and Information Dissemination:** ensure wide dissemination of practical information and easy-to-do instruction through media and trusted local leaders; inform the public clearly and repeatedly about recommendations and the rationale behind them; educate about risky behaviors and signs and symptoms of abnormal functioning; be available at common gathering places; make informal services as well as referral to formal services available; use the language of the affected people
	Providing Consultation and Training: transfer needed skills to existing community organizations to improve their ability to meet psychological needs; be available to and educate public officials and religious, civic, and business leaders; encourage local participation in recovery efforts
Definitive Care	**Triage and Clinical Assessment:** stabilize and refer cases of mental disorder or dysfunction; screen highly vulnerable populations; hospitalize to avoid harm
	Treatment: reduce or eliminate symptoms; improve functioning; use psychopharmacy and psychotherapy (individual, family, and group interventions); apply multidisciplinary approach coordinating care with clergy, spiritual healers, counselors, and employers

Adapted from: Ritchie EC, Friedman M, Watson P, Ursano R, Wessely S, Flynn B. Mass violence and early mental health intervention: a proposed application of best practice guidelines to chemical, biological, and radiological attacks. *Mil Med*. 2004;169(8):575–579.

psychiatric conceptualizations of trauma and response such as those of Pierre Janet,[18] Sigmund Freud,[19] and Ivan Petrovich Pavlov.[15]

The appropriate balance of community support, education, and definitive care may enhance individual, group, or community capacity to integrate traumatic experiences, thereby reducing depression, anxiety, somatization, and dissociation. The benefit of interventions along these lines will vary depending on the type of disaster as well as its timing and intensity. Also, many of these efforts (eg, support and education) may be conducted by nontraditional mental healthcare providers, highlighting the importance of liaison among mental healthcare providers and disaster rescue workers including volunteers.

Self-triage and self-soothing can also be enhanced by community support, education, and definitive care. Psychoeducation can help reduce somatization by explaining (and normalizing) the impact of traumatic exposure on personal psychology, spirituality, and physiologic function. Knowledge and understanding of stress reaction may boost the ability of affected individuals to contain their anxiety, curb fear, and mobilize psychological defenses in response to distress by assisting survivors in making sense of the disaster and their emotional responses to it. Support and education may reduce disaster-related chaos by providing instruction and may thus minimize "compensation syndromes" by advocating for postdisaster assistance and community rebuilding programs. Educational and support programs can guide survivors with preexisting mental illness to definitive care centers for medication refills, reevaluation, and hospitalization (or other services as indicated). These mental health interventions, when sustained and tied to surveillance and outreach efforts, may lessen the conversion of minor and short-lived emotional symptoms into more serious and long-lasting mental health problems. Community support, education, and definitive care (when clearly available to those who require it) all serve to enhance community ability to integrate frightening and devastating experiences into cognitive, emotional, and behavioral schemes. From a cognitive and neurobiological perspective, this integration may be viewed as the accumulation of "safety memory," which inhibits the expression of fear memory.[20]

"Project Liberty," a government-funded entity set up after 9/11, illustrates the benefits of the provision of support, education, and definitive care. This program, which provided counseling, education, and outreach services to an estimated 1.2 million individuals during the 27 months following 9/11 in the area around "ground zero" in New York City, is an example of successful community support, education, and definitive care interventions. Project Liberty was particularly effective in facilitating survivors' return to predisaster functioning and guiding those survivors with more serious problems, such as depression and PTSD, to definitive care.[21,22]

An emerging area of concern in disaster psychiatry has been the mental health of disaster workers. Although the evidence is somewhat mixed,[23,24] health problems appear to disproportionately affect disaster workers exposed to psychologically traumatizing exposures.[25–29] Traumatic exposures may have lasting effects on volunteers and rescuers and can diminish their mission effectiveness. Traumatic exposures in military disaster relief and humanitarian assistance operations can include: "a) dead bodies, b) orphaned or abused children, c) uncertainty regarding mission . . . [objectives] and d) unclear chain of command."[30(p63)] Every disaster response plan should include mental health interventions for the affected population and also consider the emotional, behavioral, and mental health needs of rescuers. A psychiatrically informed plan for the support of rescuers can improve mission effectiveness by enhancing worker ability and willingness to report to duty.[31,32] In this era of tremendous advances in medicine, including control of infectious diseases and emergency surgical provisions by disaster workers, and given the recognized health burden of long-term psychiatric illness, the refinement of disaster psychiatric interventions would seem a natural next step in reducing disaster-related morbidity and mortality.

RECENT MISSIONS

Military psychiatrists have supported various disaster relief efforts in the past several years. Among these were the response at the Pentagon following the 9/11 attack, the mission in Southeast Asia following the 2004 tsunami, and the relief operations on the US gulf coast after Hurricanes Katrina and Rita, both in 2005. Military disaster mental health interventions for these catastrophes were tailored to enhance safety and security, mitigate negative long-term psychiatric consequences, ameliorate suffering, and address clinically significant psychiatric reactions. Where possible, research and process improvement procedures were established to gather and document lessons learned. These operations were facilitated greatly by the readiness of military psychiatrists to respond. The extent to which responders were successful depended largely on their military psychiatric training, experience with the practice of caring for war-traumatized soldiers, and

access to consultants at national centers of excellence in trauma response and disaster psychiatry such as the Psychiatry Department at the Uniformed Services University of the Health Sciences, located in Bethesda, Maryland.

The September 11, 2001, Attack on the Pentagon

American Airlines Flight 77 crashed into the Pentagon at 9:43 AM EDT on September 11, 2001. It was followed by a rapid, comprehensive, and sustained rescue and recovery response. As part of this response, all military services located near the crash scene dispatched mental healthcare teams to the Pentagon. One rapidly assembled stress management team arrived from Walter Reed Army Medical Center (WRAMC). Other crisis management teams arrived from Andrews, Bolling, and Keesler Air Force bases. A psychiatric intervention team came from the National Naval Medical Center in Bethesda.[33–36] The teams worked with other support personnel, including members of the American Red Cross, Salvation Army personnel, various church volunteers, and Department of Defense (DoD) and fire department chaplains.[34]

Soon after the attack, the DiLorenzo Clinic at the Pentagon was designated as the headquarters for the disaster response. There, on September 12th, more specific plans were developed for the mental health support of personnel at the Pentagon, and the Army was assigned the lead for this mental healthcare effort. Because the Pentagon did not have in-house mental health services for its occupants (beyond a three-person employee assistance program and a single chaplain), Army and Air Force assets were focused on the Pentagon while Navy assets where charged with supporting the Arlington Annex, Marine Corps headquarters,[34] which was a few hundred yards from the crash site.

As observed in other disasters, distressed, sometimes anxious or panicked survivors visited the various organized clinics for assistance and guidance early after the crash. To address the growing need for social and mental health services, a family assistance center was established on September 13th at the Sheraton Crystal City Hotel, which was a short drive from the Pentagon. This facility provided assistance to families of Pentagon personnel as well as families of passengers and crew on Flight 77. Many Air Force mental health personnel, joined by WRAMC mental health team members, supported the mission of this center, including grief counseling, until it was closed 2 weeks after the October 11th memorial service because demand for services had declined.[36]

Consistent with the initial planning, the Air Force established teams that specifically served the personnel falling under the various deputy chiefs of staff in the Pentagon. These teams rotated in the DiLorenzo Clinic generally for 2-week periods until December 10th.[36] The Army divided its charge into an "inside" and an "outside" mission. The "inside" mission included the support of Pentagon personnel while the "outside" mission focused on the large population of first responders encamped on the lawn surrounding the Pentagon. The WRAMC mental health response was based on the accepted premise that most adverse mental health consequences following disasters are "subclinical" (ie, transient and normal responses to trauma).[33] Hence, WRAMC mental health support often took the form of promoting awareness of basic needs such as sleep, food, water, and family contact. It involved modified debriefings through informal conversations and outreach through monitoring of reactions to traumatic exposure among Pentagon employees and responders, particularly high-risk groups such as casualty assistance officers and healthcare workers. This approach allowed for the delivery of support while minimizing the stigma associated with mental health service utilization. When warranted, referral for clinical services was offered for formal evaluation and treatment.[33]

In addition, the WRAMC Psychiatry Consultation Liaison Service (PCLS) team contacted and lent support to attack survivors who were admitted to local civilian hospitals. Using a novel and flexible approach adapted from critical incident stress debriefing models, but with a more targeted emphasis on the observed psychological state of each injured survivor, the WRAMC PCLS team approach helped reduce psychological symptoms, prevent the development of psychopathology, facilitate compliance with medical care, speed recovery, and arrange social support for the 18 attack survivors from the Pentagon who required lengthy hospitalization[37] (Exhibits 35-1, 35-2, and 35-3).

The "therapeutic debriefing" approach advocated mental health contact with all disaster patients and normalization of responses to the disaster with bedside techniques such as cognitive reframing.[37] Here the goal was to help patients integrate their memories in a way that would prevent the disaster experience from "overwhelming" their defenses and that would minimize long-term morbidity.[37] "Therapeutic debriefing" included the use of relaxation breathing, distraction, humor, and creative visualization to speed the return of a sense of agency and mastery to the patient. Addressing the quality of sleep, pain control, and satisfaction with medical treatment was also emphasized.[37] The support provided to the Pentagon was sustained for weeks while psychiatric clinical services and gradu-

EXHIBIT 35-1

GOALS OF PSYCHIATRY CONSULTATION LIAISON SERVICE FOR DISASTER INJURED

- Liaison between medical staff, patients, commands, family, and friends.
- Facilitate medical treatment.
- Reduce psychological-psychiatric morbidity.
- Maintain a flexible evaluation and treatment approach.
- Recognize and reinforce patient's adaptive defense mechanisms.
- Advocate for patient's needs.
- Educate patients and staff.

Adapted from: Wain HJ, Grammer GG, Stasinos JJ, Miller CM. Meeting the patients where they are: consultation-liaison response to trauma victims of the Pentagon attack. *Mil Med*. 2002;167(9 suppl):20.

EXHIBIT 35-2

TREATMENT GOALS OF "THERAPEUTIC DEBRIEFING"

- Establish support.
- Make debriefing a routine preventive measure.
- Emphasize environmental safety.
- Normalize responses and feelings including survivor guilt.
- Reframe loss by recognizing the injured patient's significant sacrifice.
- Help the patient consolidate a narrative of what occurred.
- Console the patient.
- Identify and reinforce healthy coping mechanisms.
- Teach patient mastery techniques using imagery, relaxation, or humor.
- Teach the patient that he or she can be in control.
- Encourage the patient to use social supports.
- Normalize sleep patterns and dietary intake if medical condition permits.
- Clarify patient's medical concerns.
- Educate on the pitfall of self-medication with substance abuse.

Adapted from: Wain HJ, Grammer GG, Stasinos JJ, Miller CM. Meeting the patients where they are: consultation-liaison response to trauma victims of the Pentagon attack. *Mil Med*. 2002;167(9 suppl):20.

ate medical education continued at many of the commands from which the mental health intervention teams came.[33] Psychiatry residents involved in this response reported that their education was enhanced due to their participation in the rescue and recovery operations. The potential benefit of including residents in disaster plans has been echoed by other psychiatry training programs affected by Hurricane Katrina.[38]

Particularly traumatic during the early days of the response to the Pentagon attack were the work of the groups that helped in the recovery of the remains of the dead in the Pentagon.[39] A descriptive report on the effect of recovering human remains on 10 military healthcare workers showed that mental health responses were quite varied and included acute but short-lived—in the order of days—restless sleep, nightmares, and flashbacks. Mission clarity and expectations were cited as ways to enhance coping.[40]

In summary, the military response to the Pentagon attack was rapid; military-specific efforts that were integrated through a series of ongoing planning efforts began immediately after the attack. Sustained mental health outreach efforts helped maximize support for the survivors and rescue workers. The support effort was enhanced by the multidisciplinary composition of the responders, which included psychiatrists, social workers, and chaplains. The "therapeutic debriefing" described by Wain et al[42] stands out as a promising modification of the critical incident stress debriefing model applied in a psychiatry consultation liaison setting. This PCLS approach, which is used with returning injured soldiers at WRAMC, may have contributed to the lower-than-historically observed initial rates of PTSD among battle-injured soldiers and deserves further study in disaster response.[41,42]

Scrutiny of the response to the Pentagon attack points to some weaknesses in terms of coordination and planning of response efforts, as well as mission ambiguity.[33,34,36] Mental healthcare teams that arrived at the Pentagon did not coordinate their initial efforts with the on-scene commander of the disaster response.[34] Each service and each mental health organization came with its own theoretical perspective, response plan, and set of priorities, complicating the response effort. Many have suggested that developing a joint doctrine of disaster response, perhaps along the same lines as the Federal Emergency Management Agency (FEMA) National Incident Management System, and drilling this plan would be a worthy future consideration.[33,34,36,43] Also, the lack of military

EXHIBIT 35-3

PSYCHIATRY CONSULTATION LIAISON SERVICE LESSONS LEARNED IN THE RESPONSE TO THE SEPTEMBER 11, 2001, ATTACKS

- Psychiatric consultation liaison services may need to be exported after a disaster.
- All disaster patients should be seen by mental health providers as a standard protocol.
- Responses of disaster patients should be reframed as normal responses to abnormal events.
- Mental health providers should establish an early therapeutic alliance with other health-care providers and patients.
- Patient's mature psychological defenses should be supported.
- Mental health resources should remain available to patients irrespective of their current medical status.

Adapted from: Wain HJ, Grammer GG, Stasinos JJ, Miller CM. Meeting the patients where they are: consultation-liaison response to trauma victims of the Pentagon attack. *Mil Med*. 2002;167(9 suppl):21.

administrative support was viewed as contributing to some of the difficulties with coordination.[33] This lack of administrative support may have also contributed to the missed opportunity by military providers to fully integrate the civilian assets into combined plans.[33,34] Inclusion of administrative support for disaster mental health response teams should also be considered.

The December 26, 2004, Southeast Asia Tsunami

A powerful earthquake struck the Indian Ocean basin on December 26, 2004. The aftermath was a tsunami that affected many coastal countries, particularly Indonesia, Thailand, and Sri Lanka. Estimates placed the number of dead and missing at over 250,000 people. The affected people, even if physically unharmed, faced profound grief, loss, and guilt.[44] The US military responded to this disaster by organizing Operation Unified Assistance. The magnitude of the disaster was so great that even highly capable and independent nongovernmental organizations (NGOs) needed the assistance of the US military to reach the devastated areas.[45] The US military mission was subdivided into two groups: one was destined for Sri Lanka and the other to Indonesia. A third group from the Armed Forces Research Institute of Medical Sciences led the assessment of needs in Thailand and coordinated the delivery of assistance in that country.[46]

Soon after the tsunami struck, an advance team was dispatched to the region, which helped coordinate the arrival of US military assets with the respective US embassies and other local and international aid agencies. In addition to military members, the group to Indonesia deliberately included civilian volunteers involved with Project HOPE (Health Opportunities for People Everywhere), an NGO, to enhance the prospects of meeting the mounting needs of the affected people there.[47,48] This group was dispatched to Banda Aceh, Indonesia, on USNS *Mercy* in early 2005, while the other groups were air-lifted to Sri Lanka and Thailand. The group in Sri Lanka eventually worked in the northeastern corner of the island. Once in Thailand, the third group began the task of assessing the damage in Thailand's six coastal provinces affected by the tsunami.

As is established practice with disaster relief and humanitarian assistance operations, relief work entailed providing as much care as possible *in situ* and only bringing back to USNS *Mercy* patients who could not be treated ashore. All operations were in the "spirit of cooperation, collaboration, mutual respect, team-building and team participation, trust, interdependency and consensus-building."[49(p33)] Although only the USNS *Mercy* included mental healthcare providers, all three groups considered the mental health needs of the affected populations as well as the disaster responders. For example, when choosing the housing location for the relief team in Sri Lanka, planners considered the psychological benefits of distance from the major concentration of affected people and physical devastation, allowing team members respite from constant traumatic exposure.[50] Although the team in Sri Lanka provided many interventions that can be considered beneficial to improving mental health, they avoided specific psychological counseling and formal evaluation as it was deemed that these services could not be provided in a culturally relevant manner.[50]

Although the care provided by the team sent to Sri Lanka did not involve formal mental health interventions, the mental healthcare team on USNS *Mercy* specifically planned for and engaged in the provision of mental health services in Banda Aceh, Indonesia. And although the team in Thailand did not directly provide mental health services, its rapid needs assessment alerted Thai officials to the poor preparedness of hospitals for meeting the mental health needs of the affected population. This prompted Thai authorities to organize and deploy mental health teams to the disaster-affected areas and consider changes in their

disaster plans that originally did not include mental health elements.[46] The assessment team in Thailand also reported on other facets of disaster response relevant to mental health, such as availability of basic needs, and found them to be well provisioned.[46]

A lesson learned in Operation Unified Assistance was the value of telecommunications. Through data-sharing networks and communication links, the mental health team on the USNS *Mercy* was supported by a virtual group of disaster mental health experts from around the globe. These links enabled the team to assess the needs of the affected population and plan a response. Once it became clear that children were going to be the focus of the team, the same links were invaluable in accessing the latest literature, consulting with experts, and developing an intervention plan.[51,52] With support from consultants, the mental health team aboard USNS *Mercy* was able to implement a program that provided over 80 hours of training in 85 content areas, which reached over 200 child-service staff members and 1,200 teachers in Aceh Province.[53] The data and communication links continue to enhance the effectiveness of the mental health intervention in Aceh Province as they remain in use by mental health providers in the disaster-affected areas.[53]

One study examining rescuers who responded to the tsunami disaster provides some evidence to suggest that certain preventive measures—teaching rescuers about expected traumatic exposures, the range of psychological responses, and appropriate interventions—can reduce the incidence of negative consequences among members of this group. In this study, surveys were used to assess participant health before and 3 months after the mission. Although the small sample size precluded statistically significant conclusions regarding changes from baseline in overall health status, depression, posttraumatic stress disorder, or risk behaviors, responders tended to view favorably and find helpful the mental-health–related briefings and "just-in-time" training they received on the eve of their deployment.[30]

Thus, Operation Unified Assistance rapidly applied validated methods of disaster response. The effort also involved some new components, such as virtual access to global information resources and field experts. This mission illustrated the potential for successful cooperation between military personnel and civilian rescuers. Policies for these types of missions were later enumerated in DoD Directive 3000.05, *Military Support for Stability, Security, Transition, and Reconstruction Operations*.[54] Some areas that require further investigation include those that pertain to clarification of the optimal training for prevention of psychological trauma among disaster workers. One possibility might be the expansion of "just-in-time" training along the same lines as "Battlemind," a training developed for troops before deployment to combat.[55,56]

Hurricanes Katrina and Rita in 2005

Hurricane Katrina struck the coast of Louisiana and Mississippi on Monday, August 29, 2005. As a result of the hurricane's winds, torrential rains, and massive waves, an area the size of the United Kingdom was severely affected. In the aftermath, hundreds of thousands of people remained away from their homes in temporary shelters. Thousands of others less fortunate were stranded in a city that would soon be flooded because of breaches in levees. The contaminated waters pouring into New Orleans flooded hospitals, community mental health centers, pharmacies, and physicians' offices alike, forcing closure of facilities and total displacement of healthcare professionals and patients in the four parishes of Jefferson, Orleans, Plaquemines, and St Bernard.[57–59] Many persons with chronic medical conditions, including those most vulnerable because of psychiatric conditions, were left without care, medication, medical supplies, or support services. Under normal circumstances, Charity Hospital's Crisis Intervention Unit managed about 600 patient encounters each month. These numbers predicted a high post-Katrina demand on mental health services.[60] This potential was identified early on by military disaster psychiatrists and communicated to planners and caregivers.[61,62]

The National Guard mobilized 48 hours before Hurricane Katrina made landfall. The military response, which eventually involved more than 60,000 active duty and National Guard members, accelerated its activities within hours of Hurricane Katrina's landfall despite the presence of half of the Louisiana National Guard in Iraq.[57,63,64] A shelter was established at the Superdome before the hurricane and a medical treatment facility was organized at the convention center 1 day after Katrina made landfall. A field hospital was also established at Louis Armstrong International Airport. By mid-September, Army, Air Force, and Navy medical teams were in and around New Orleans working with the Coast Guard, the US Public Health Service, the Environmental Protection Agency, the Centers for Disease Control and Prevention (CDC), and the Louisiana Department of Health and Hospitals.[57] The first 72 hours following Katrina's landfall were the most hectic. It was during this time that thousands of people were evacuated from the Louis Armstrong International Airport under some of the most distressing conditions.[65]

Health surveillance by the CDC, which commenced

on September 9th (with the assistance of the military), revealed no outbreaks of disease or hazardous environmental exposures as of September 25th. Early surveys noted 42 cases of intentional injuries among the 2,018 cases of injuries reported.[66] The communication of accurate news regarding outbreaks of disease and contamination, as well as education about risks through printed material and the media, were in line with disaster mental healthcare practices that likely calmed public fears of exposure and curbed the propagation of rumors. The rescue of city residents from rooftops kindled hope and strengthened survivors' trust in the arrival of assistance. The hope for outside assistance, at least in terms of augmented medical operations, was realized through the Navy ship USNS *Comfort*. The *Comfort* supported relief efforts at Pascagoula from September 9th through September 20th and at New Orleans from late September to October 8th. Navy medical personnel and volunteers from Project HOPE with experience from the Indian Ocean tsunami helped triage and treat nearly 2,000 patients.[67] However, the confusion regarding the responsibility of recovering human remains and safe travel routes, and the subsequent graphic media coverage, could not have helped allay people's worries and sense of helplessness and abandonment.[57,65]

As the situation in the city stabilized and some degree of order was restored, the mental health burden became more apparent. Hurricane Katrina had caused the deaths of over 1,000 people by early estimates[68]; this would rise to over 1,400 in Louisiana once more accurate counts were available.[69] The dead included two police officers who died by suicide.[70] The news of deaths combined with the realities of scattered families and friends, community destruction, loss of social supports and healthcare, economic devastation, and numerous uncertainties distressed people profoundly, particularly those with existing mental illness. The burden of stress and dysfunction was brought to attention by a CDC survey in October 2005, which showed that 56% of the respondents had a chronically ill family member and only 35% were employed, in contrast to the 73% who were employed before Katrina.[71] Nine hundred New Orleans police officers and about 500 firefighters who completed a CDC survey during October and November 2005 reported mental health problems with symptoms of PTSD and depression, with depression affecting more than a quarter of each group (26% of police officers and 27% of firefighters).[72]

Over half of female caregivers living in FEMA trailers or hotels responding to a February 2006 survey scored at levels consistent with clinically diagnosable depression, anxiety, or other psychiatric disorders.[73] It was not surprising that the New Orleans Coroner's Office reported increased suicide rates from 9 per 100,000 per year to 26 per 100,000 per year in the months from Katrina to the end of 2005.[74] These consequences were exacerbated by the disruption of mental health services at large medical centers like Tulane University and Louisiana State University Health Sciences Center, including problems with methadone clinic patient records.[59,75] Response to Katrina survivors was further complicated by Hurricane Rita, which followed 3 weeks later.

As problems became more evident, programs were organized with the support of local, state, federal, and military organizations. Social workers at Louisiana State University at Baton Rouge arranged for the care of special-needs children displaced by the two hurricanes; Public Health Service staff streamlined credentialing and pharmacy processes for displaced or volunteer physicians.[76] FEMA funding allowed for the start of Project Recovery in Mississippi and supported Louisiana Spirit mental health counselors.[58,70] Project Recovery, which was spearheaded by the Substance Abuse and Mental Health Services Administration (SAMHSA), provided assistance and education to over 1,000,000 people, resulting in more than 10,000 referrals to mental health and substance abuse services. Another SAMHSA program, the Katrina Assistance Project, conducted thousands of counseling sessions.[58] Despite these efforts, the pre-Katrina burden of chronic mental illness in the city, including substance use problems, may have prolonged the "duress" experienced by survivors.[70] Fortunately, psychiatric teaching and treatment programs in New Orleans, borrowing a page from the disaster response literature, were able to return quickly to the city by reestablishing communications, minimizing uncertainty, and applying academic flexibility.[77] Disaster response and recovery in the Gulf Coast still continues, as do efforts to quantify the psychological burden of this disaster and find more effective disaster response paradigms.

SUMMARY

In disaster psychiatry, vast areas of knowledge and practice are by necessity evidence-informed rather than evidence-based. Military psychiatric observation and experience form the basis of much of today's understanding of population response to disaster and mass violence. Considerable knowledge exists with regard to the psychological effects of disasters, but only a smaller body of empirical evidence supports

current disaster response practices. Difficulties in the conduct of studies examining relevant questions in this field largely stem from the nature of the traumatizing event; few disasters are clearly anticipated and still fewer are slow to unfold. Further efforts by military and civilian disaster researchers must include rigorous longitudinal studies with baseline predisaster characterization of populations followed by comprehensive health surveillance and ongoing recharacterization of the disaster-affected populations. Measurements of symptoms and functioning before and after mental health interventions with control population comparisons (if ethical) will help quantify the efficacy of intervention programs and help separate cause from effect and modifiers from mediators.

Another area of focus may be the education of disaster psychiatrists. Much is learned and lost in the field of disaster response as a result of the infrequency of large-scale tragedy. Disaster psychiatry training programs may help preserve the gains made in disaster psychiatry and function as institutional memories and resources to be called upon in times of need. Such training programs should emphasize and develop models for cooperation and coordination among the various agencies such as FEMA, the National Center for PTSD, SAMHSA, Uniformed Services University of the Health Sciences, National Institutes of Mental Health, and Project HOPE. Disaster response programs must also strive to more effectively incorporate various professionals (eg, psychiatrists, emergency medical technicians, public health workers, and community politicians) into disaster preparation, response, and recovery efforts.

Specific areas for consideration by the military psychiatric establishment beyond the support of academic centers and research in this area include:

- the development of a common disaster response doctrine, perhaps along the same lines as the National Incident Management System;
- inclusion of disaster psychiatry in psychiatry residency training programs and possible involvement of residents in disaster relief efforts;
- further integration of psychiatry consultation liaison services in the medical care of disaster survivors to reduce stigma and enhance outreach; and
- further development of the concepts of stress inoculation and resilience to find ways to protect disaster workers.

Direct military correlates may be found in the aims of the "Battlemind" program, as discussed in the attachment to Chapter 4, Combat and Operational Stress Control, in this volume.

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