

Psychological Response to Disaster: Implications for Hawaii

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Given the frequency of natural disasters in Hawaii, it is important for practitioners to be aware of the numerous resulting psychological responses and risk factors, especially those unique to Hawaii. Practical guidelines are presented for practitioners, both in providing leadership during the disaster and in screening for psychopathology thereafter.

Numerous and varied natural disasters occur in Hawaii. Nine hurricanes have caused destruction to the islands since 1950 (Hiki 1950, Della 1957, Nina 1957, Dot 1959, Celeste 1972, Kate 1976, Fico 1978, Iwa 1982), culminating in Hurricane Iniki which resulted in \$1.8 billion damage in 1992. Tsunamis on the Big Island in 1946 and 1960 resulted in 173 and 61 deaths, respectively. Since 1950, 12 earthquakes registering more than 6.0 shook Hawaii, with the 1975 earthquake registering 7.2 and causing both damage and fatalities. The 1950 Mauna Loa lava flow destroyed 2 communities and the 1960 Kilauea flow devastated another. The continuing Kilauea eruption since 1983 has consumed more than 200 homes in 4 communities at a cost of more than \$65 million. Furthermore, Hawaii's flash floods, tornadoes, mudslides, and high winds result at times in property damage and even death.¹

Overview of Disaster Literature.—Initial information regarding psychological responses to trauma was derived from war studies. As far back as 1922, Sargent² described psychological responses to combat, followed by World War II reports,³ holocaust-victim follow-up,⁴ Korean⁵ and Vietnam^{6,7} war veteran data, and Desert Storm reactions.⁸ The classic non-war disaster literature began in 1946 when Adler,⁹ Cobb,¹⁰ and Lindemann¹¹ studied the reactions to the Coconut Grove Nightclub Fire in Boston. In the 1950s Wallace,¹² Tynhurst,¹³ and Glass¹⁴ began studying natural rather than man-made disasters, such as the 1956 Massachusetts tornado. In 1972, Hurricane Agnes with its resultant extensive flooding caused massive property damage and homelessness in northeastern Pennsylvania.¹⁵⁻¹⁷ This prompted the passage of the 1974 Disaster Relief Act which mandated NIMH to provide mental health training

and education for disaster workers.

Since that time, psychological responses have been studied during numerous other natural disasters including hurricanes (Agnes 1989¹⁸ and Iniki 1992¹⁹); tornadoes (Missouri 1973,²⁰ Australia 1974,²¹ North Carolina 1984,²² Alabama 1989²³); floods (Minnesota 1978,²⁴ Illinois 1986²⁵); volcanoes (Mount St Helens 1980,²⁶ Armero 1985²⁷); earthquakes (Mexico 1985,²⁸ San Francisco 1989²⁹⁻³⁴), and brush fires (Australia 1983^{21,35-37}).

Reactions to major technological disasters such as Three Mile Island 1979³⁸ have been analyzed, and smaller scale technological disasters like the plane crashes of 1985³⁹ and 1987⁴⁰ provide additional data. Finally, man-made disasters are reported such as the 1987 mass murder in Arkansas,⁴¹ the 1988 Chicago shooting spree,⁴² and the 1978 Chowchilla school bus kidnapping.⁴³

Expected Response to Disasters.—Twenty-five percent of the population can be expected to survive a disaster without any discernible impairment⁴⁴ while another 25% demonstrate "normal stress reactions." Normal symptoms include anger, sadness, shock, irritability, apathy, agitation and denial.⁴⁵ Lindemann¹¹ emphasized somatic distress among the symptoms of normal grief, including respiration alteration, lack of strength/exhaustion, and digestive symptoms. Horowitz⁴⁶ describes a normal progression of phases from outcry, denial, intrusion, to working through to completion.

When the normal stress responses become disproportionate or prolonged, discernible psychopathology can result. Raphael,²¹ Madakasira²² and Smith⁴⁰ found that 54% to 59% of individuals develop a diagnosable psychiatric disorder immediately after a disaster, up to 41% 10 weeks later, and up to 22% one year later. Most common DSM-III-R⁴⁷ diagnoses, in order, include major depression, post-traumatic stress disorder, generalized anxiety disorder, and substance abuse. Often patients experience more than one such diagnosis after a disaster following a catastrophe. Smith⁴⁰ found a 41% rate of post-disaster major depression, defined as lasting longer than 2 weeks with significant physical symptoms (changes in weight, sleep, energy and activity), morbid preoccupation with worthlessness/guilt, marked functional impairment, and recurrent thoughts of suicide or death. Moreover, 100% of those with a previous diagnosis of major depression had a recurrence after the disaster.

Smith⁴⁰ also reported a post-traumatic stress disorder (PTSD) rate of 22% to 29%, while Madakasira²² found an even higher rate of 59%. PTSD is characterized by at least one month of

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persistently reexperiencing the traumatic event by intrusive thoughts, dreams, or flashbacks; persistent avoidance of stimuli associated with the trauma or numbing of general responsiveness; and persistent symptoms of arousal.

Generalized anxiety disorder (GAD) was reported at 20% to 29%⁴⁰ in disaster victims. GAD is defined as at least 6 months of disproportionate and excessive anxiety or worry with symptoms of motor tension, autonomic hyperactivity, vigilance and scanning.

Finally, post-disaster substance abuse occurs at a rate of 14% to 22%.⁴⁰ Abusers after the disaster are not necessarily the same ones as prior to the event; furthermore, about half of the abusers meet the criteria for dependence.

Hawaii's Risk Factors¹⁹.—Factors unique to Hawaii that could effect psychiatric sequelae include: (1) Island disaster phenomenon, (2) previous disaster experience, (3) prior refugee trauma, and (4) distinct cultural attitudes toward nature.

Hawaii's island disasters have certain elements that distinguish them from those on the Mainland. With discrete boundaries, limited supply lines invariably by sea or air, and insufficient natural resources, Hawaii's residents are particularly vulnerable to isolation, similar to what Black⁴⁸ described in Hurricane Hugo on St Croix.

Prior trauma is included among risk factors for post-disaster psychiatric disorders. Since many of Hawaii's residents have already experienced a natural disaster here, their anxiety responses to future catastrophes may be accentuated. This is supported by DeMan's findings in previous flood victims in California⁴⁹ and Thaggard's findings of PTSD symptoms during bad weather in previous hurricane victims.²³ Furthermore, many Southeast-Asian refugees in Hawaii have recently fled from the traumas in their homeland. These refugee-related traumatic experiences also would be expected to increase the incidence of post-disaster psychopathology.^{30,50}

Finally, the relationship of human beings to nature can be critical in understanding differences in the pattern of disaster response in diverse cultures.⁵¹ A harmonious relationship (*lokahi*) with the environment has always been important to the Hawaiian people. Natural occurrences are attributed to the gods who are respected for both their positive and negative effects. For example, *Pele*, the volcano goddess, is appreciated for her earth-forming gifts as much as she is feared for her destructive abilities. This Hawaiian belief system of interpreting nature as both constructive and destructive may have a tempering effect on psychological sequelae of natural disasters.¹⁹

General Risk Factors.—Demographic risk factors not specific to Hawaii include: Sex, age, support systems, socioeconomic factors, preexisting psychopathology, and the intensity of the disaster.

Shore²⁶ found that about twice as many women as men developed the onset of primary psychiatric disorders following the Mount St Helens' eruption. Frattaroli³⁰ identifies those at the extremes of age (children and elderly) as "situationally vulnerable" to disaster. Both Murphy⁵² and Farberow⁵³ point out that lack of support groups may lead to increased psychopathology, particularly if a support was lost during the catastrophe (eg,

death of a family member). Additionally, Bolin's studies demonstrated that post-disaster psychological problems were correlated with lower socioeconomic status.⁵⁴

Whether or not pre-disaster psychopathology predicts post-disaster disorders remains controversial. Hendin,⁷ in studying Vietnam veterans, found that pre-existing maladaptive coping led to post-disaster psychopathology. Frattaroli³⁰ in post-1989 San Francisco earthquake studies points out that pre-disaster clients of the mental health system are at high risk for developing psychiatric sequelae. North and Smith themselves found conflicting evidence. When studying survivors of a 1987 jet plane crash into an Indianapolis hotel, 90% of those with pre-disaster psychiatric diagnoses developed post-disaster psychopathology.⁴⁰ Conversely, while studying witnesses to a 1987 mass murder in Arkansas, they found that only 20% of subjects with a previous psychiatric diagnosis had a recurrence.⁴¹ Madakasira likewise found no significant statistical difference in PTSD based on previous mental illness after 1984 North Carolina tornadoes.²²

Evidence indicates that profoundly mentally ill patients are capable of coping with stresses associated with natural disasters without exacerbation of their underlying illness. Chronically psychotic patients at Hawaii State Hospital demonstrated no objective signs of immediate decompensation during the Iniki storm, in the midst of visible threat to safety, property damage on the grounds (dormitory roofs blew off, windows broke, trees were uprooted and power was lost), confined quarters, and inability to contact family.¹⁹ Austin⁴⁵ and Black⁴⁶ found that psychotic patients during Hurricane Hugo yielded to the reality principle and rose to a higher level of functioning, requiring surprisingly little antipsychotic medication, at least temporarily. By the fourth day after the hurricane, however, their pre-disaster symptoms returned.

Finally, level and intensity of exposure to the disaster has been found to correspond with increased psychopathology. Elements of terror (ie, threat of injury or death), horror (ie, exposure to grotesque stimuli), suddenness, unexpectedness, unpreparedness, scope of property damage and loss of lives, and directness or degree of involvement with the disaster have been found to affect those involved.⁴⁰ Shore's studies²⁶ demonstrated that persons with the highest levels of exposure to the Mount St Helens volcanic disaster had the greatest increase in onset of psychiatric disorders.

The practitioner should be aware, however, that a person need not actually experience the disaster to result in psychopathology. The mere threat of disaster may be enough to trigger a valid psychiatric response. Kiser⁵⁵ demonstrated a mild but prevalent PTSD-like reaction that arose from exposure to prediction of a New Madrid earthquake that never even occurred. Furthermore, practitioners should be aware of the near-miss phenomenon¹⁷ or survivor guilt. In these cases, psychiatric sequelae result from a disaster situation in which individuals have barely escaped being a victim, shattering psychological defenses which maintain a sense of invulnerability.

Recommendations for Health Care Practitioners.—During the disaster, the practitioner is likely to be placed in a

leadership role. Whether at hospital, clinic, or shelter, the health-care worker may be asked to define an organizational strategy to approach the event.

Arana⁵⁷ believes successful disaster management requires a framework of communication, planning, and flexibility. Black^{39,48} recommends the creation of a nurturing environment or "libidinal cocoon." Comfort⁵⁷ defines effective disaster management as a goal-seeking system with continuous inquiry, fostering cooperation and enabling interaction to increase information between the leaders and the population.

The authors¹⁹ propose that an effective organizational approach during the disaster should include: (1) Keeping the population fully informed with continuous briefings, and purposeful placement of radios and televisions in all occupied areas; (2) Encouraging widespread participation in reality-based preparatory activities, eg, involve the population in securing the building and gathering their essential items should evacuation be necessary; and (3) Involving the population in anticipatory problem solving by openly sharing concerns about potential disaster-related problems while allowing others to

participate in the development of strategies to deal with them. This approach incorporates aspects of Arana,⁵⁷ Black^{39,48} and Comfort's⁵⁷ concepts, leading to the empowerment of the population, cooperation, increased information and broader-based strategic problem solving.

The role of the practitioner after the disaster usually involves staff coordination, population education, mass group process facilitation, and screening for serious psychopathological reactions.

Jarvis³¹ describes the major post-disaster tasks as staff realignment, training, and coordination. Specialized tasks, such as the establishment of a crisis counseling hotline, are described by Blaustein.³² Austin⁴⁵ emphasizes the importance of educating the public about normal versus pathological responses along with information about coping strategies. Ponton³⁴ addresses the need to inform parents about how to deal with child victims, as well as integrating post-disaster education for children into the school process. Cole³³ further recommends that practitioners be available to the media to provide large-scale education for the public.

One of the major services that health-care workers can provide is to serve as mass group-process facilitators. In that role, they can establish a forum to talk about the experience, help with problem solving, suggest realistic limited goals for restorations, encourage time for friends and family, and provide support for the victims.⁴⁵

Furthermore, the practitioner is absolutely critical in screening for psychopathology after the disaster, especially for two reasons: First, as Penick²⁰ and McFarlane³⁶ point out, 26% to 66% of persons with post-disaster psychiatric disorders present with physical symptoms. Many victims are unaware of the link between physical and psychiatric symp-

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toms. Unless the practitioner has a keen awareness of this, patients may be misdiagnosed and treated incorrectly. Second, Swartz's study⁴² demonstrates the reluctance of post-disaster victims to use mental health services. Especially in smaller communities, psychiatric treatment can be hampered by pride in independence and self-sufficiency, limited acceptance of mental illness, and a general tendency to reject the unfamiliar.⁵³ The non-psychiatric practitioner can be instrumental in facilitating acceptance of the appropriate psychiatric referral and treatment.

Finally, health-care workers should be sensitive to the stress of the crisis helpers, including themselves. Many disaster workers are victims themselves, and as such are subject to increased burnout.^{15,37}

Conclusion

Given Hawaii's numerous and varied natural disasters, it is imperative for practitioners to learn from previous disaster studies. Approximately one-half of the victims may develop psychiatric disorders after the event with major depression, post-traumatic stress, generalized anxiety and substance abuse disorders being most common. In addition to general risk factors discussed, those unique to Hawaii include island disaster phenomenon, previous disaster experience, and prior refugee trauma. Cultural attitudes toward nature may actually ameliorate the disaster effects.

Furthermore, it is important for practitioners to be aware of disaster leadership models as it is likely that health-care workers will be placed in leadership roles during such events.

Finally, the practitioner will be crucial in screening for post-disaster psychopathology since many victims present with physical symptoms and are initially reluctant to use mental health services.

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