Behavioral Health and Disasters: Looking to the Future

Lawrence A. Palinkas, PhD

Abstract

Along with other manmade and natural disasters, oil spills produce profound and long-term impacts on the behavioral health of their survivors. Although previous and ongoing research has focused on producing evidence of the breadth and depth of these impacts, future efforts must begin to translate this evidence into developing and implementing policies, programs, and practices that effectively contribute to their prevention and mitigation. Drawing upon a conceptual framework of the behavioral health impacts of oil spills developed from data collected in the aftermath of the Exxon Valdez oil spill in 1989, this paper examines potential interventions designed to prevent or mitigate biopsychosocial, interpersonal, and intrapersonal impacts on behavioral health. Future efforts to translate behavioral health research into effective practice will require the formation and maintenance of academic–community partnerships for the purpose of building resilience to these impacts and providing targeted services to those most vulnerable to their long-term consequences.

For decades, studies of survivors of natural disasters have documented increased rates of psychiatric disorders, alcohol and drug abuse, and physical health problems.[1–5] Studies of survivors of oil spills like the Deepwater Horizon Oil Spill and other technological disasters have documented similar manifestations of behavioral health problems.[6–12] Along with preliminary data collected in affected communities along the Gulf of Mexico, these studies have contributed to the growing consensus that the most profound immediate health impacts of oil spills are likely to be behavioral, emotional, and psychosocial in nature.[9,13,14]

Drawing from the concept of corrosive communities and its relationship to theories of conservation of resources, cognitive activation, and risk and resilience, Palinkas[15] proposed a conceptual model that identifies three levels or tiers of impacts of oil spills: biopsychosocial impacts that are direct consequences of the contamination of the physical environment (Tier I); interpersonal impacts that are both direct consequences of the biopsychosocial impacts and mediators of the relationship between the biopsychosocial and intrapersonal impacts (Tier II); and intrapersonal or behavioral health impacts that are consequences of both the biopsychosocial and the interpersonal impacts (Tier III). Tier I impacts include engagement in cleanup activities, short-

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Address correspondence to Lawrence A. Palinkas, PhD, School of Social Work, University of Southern California, 669 W. 34th Street, Los Angeles, CA 90089-0411, USA. Phone: +1-213-7403990; Fax: +1-213-7400789; Email: palinkas@usc.edu.

and long-term economic and cultural impacts, health effects related to contact with the oil itself, and litigation related to compensation for damages. Tier II impacts include a reduction in levels of social support, increase in levels of social conflict, and increase in collective uncertainty about the future and long-term consequences of the disaster event. Tier III impacts include increases in the incidence of psychiatric disorders, drug and alcohol abuse and dependence, stress-related physical symptoms, domestic violence, and child behavioral problems. Although the conceptual model was largely derived on the basis of research in the aftermath of one oil spill (the 1989 Exxon Valdez disaster) in an effort to better understand the consequences of another oil spill (the 2010 Deepwater Horizon disaster) and has yet to be validated with data collected from this or other disaster events, it offers the potential to identify and predict behavioral health impacts of other technological, manmade, and natural disasters.

The future of disaster behavioral health will undoubtedly include research designed to refine conceptual models such as this or to develop entirely new conceptual models that bring greater specificity and sensitivity to our ability to identify the scope and scale of behavioral health impacts.[16] Greater sensitivity of these models will focus on identifying individuals that are most vulnerable to these impacts, while greater specificity will focus on identifying those individuals that appear to be resilient or resistant to these impacts. However, although we continue to monitor the long-term impacts of events like the Deepwater Horizon Oil Spill or wait until the next disaster to collect more data on its behavioral health impacts, there is also a pressing need to begin to direct our attention to narrowing the gap between the research we conduct and the practice needed to effectively prevent and mitigate these impacts. This paper introduces an array of programs, practices, and policies that could potentially prevent and mitigate behavioral health impacts of disasters at each of the three tiers and offers suggestions for the next generation of research on disaster behavioral health that integrates current efforts to understand the epidemiology of behavioral health impacts with the design, development, evaluation, and implementation of effective services.

Timing and Focus of Behavioral Health Disaster Response

From a behavioral health perspective, disasters must be viewed as involving three temporal phases: pre-disaster, acute, and post-acute. In the pre-disaster phase, the focus of services delivery is on preparedness for the immediate impacts of the disaster event. Although attention has been given to identifying sources of information for the determination of baseline rates of behavioral health problems for the purpose of documenting a causal connection between the disaster event and an increase in behavioral health impacts,[17] such information is also essential to identifying vulnerable populations to determine who is likely to be at risk for a disaster-related problem and thus a candidate for some form of intervention.[18] Such preparedness is generally focused on the development and implementation of plans to ensure timely response to medical emergencies and provision of adequate food and shelter to disaster survivors.[19]

In the acute phase, the focus of services providers is on prevention and mitigation of adverse behavioral health impacts. Prevention activities usually take the form of offering crisis counseling or material support (food, clothing, and housing) to disaster survivors prior to exhibiting adverse behavioral health symptoms while symptom mitigation may involve the same activities but delivered to survivors already exhibiting symptoms of physical or mental illness or substance dependence and abuse.[20] However, it is unclear whether the current "standard of care" for disaster survivors is effective in reducing the likelihood of long-term impacts on behavioral health or whether short- and long-term treatment outcomes can be improved by using evidence-based treatments of traumatic stress and other adverse behavioral health impacts.[21]

In the post-acute phase, the focus is on mitigation of impacts by delivery of direct services to those continuing to exhibit adverse behavioral health symptoms or to those who begin to exhibit

symptoms because of continued exposure to the disaster event or to the depletion of material, social, and psychological resources used to cope with the psychological stress associated with the event. However, what is not clear is whether those individuals affected by oil spills have access to services or use the services to which they have access. Studies conducted in the aftermath of the Hurricane Katrina disaster reported underutilization of behavioral health services among those with a history of service use and those who had an ongoing mood or anxiety disorder.[22,23]

Tier I Interventions

Health impacts of any disaster are influenced by the nature of the disaster itself and the ability of communities to respond to the disaster. Even well-developed plans and resources for disaster response may themselves be affected by the disaster, as was evidenced by the physical damage to the health care systems and dislocation of health services providers in New Orleans during and after the Hurricane Katrina disaster.[24] Nevertheless, several studies have pointed to the importance of having in place certain critical components of the health care system infrastructure prior to such an occurrence. For instance, Meredith and colleagues[19] described two conceptual frameworks to guide hospitals and clinics in managing the behavioral health impacts of disasters. One framework was developed to understand the "psychological triggers" (restricted movement, limited resources, limited information, trauma exposure, and perceived personal or family risk) of the emotional, behavioral, and cognitive reactions following large-scale disasters. Another framework specified structural (internal organizational structure and chain of command, resources and infrastructure, and knowledge and skills) and process (coordination with external organizations, risk assessment and monitoring, psychological support, and communication and information sharing) components of health care systems that should be in place before an event to minimize consequences. With respect to substance abuse treatment, continuity in service delivery is especially important as preexisting substance abuse problems may worsen or recur.[25–27] However, the generalizability of these frameworks to technological disasters such as oil spills is unclear. Moreover, to our knowledge, there has been no research conducted to date to demonstrate that such preparedness can result in a meaningful reduction in the incidence or severity of adverse behavioral health impacts in any type of disaster or whether it can be successfully implemented prior to a disaster event even if it is proven to be effective. Likewise, the integration of physical, mental, and behavioral health services mandated by the Affordable Care Act of 2011[28] may also prove to be critical in responding to disaster events as many survivors suffer from mental health problems, substance abuse problems, and stress-related physical health problems. However, its effectiveness in responding to behavioral health impacts of a disaster has yet to be tested.

During the disaster event itself, policies to ensure equitable distribution of cleanup jobs may prove critical to the behavioral health of individuals in spill-affected communities and individuals working on cleanup efforts. The Exxon Valdez experience and preliminary evidence from the Deepwater Horizon oil spill suggested that unequal distribution of employment opportunities is major source of social conflict and individual stress.[12,15] Research is recommended to identify strategies that can either minimize the likelihood of such an unequal distribution or mitigate its behavioral health impacts. For instance, one potential strategy to address this would be to give preference to local residents in employment. This would minimize the burden on local infrastructure caused by the sudden increase in population and demand for services.[9,29] Another potential strategy is to enforce policies and procedures designed to insure equal access to cleanup employment between households, communities and entire regions affected by the spill. British Petroleum attempted to implement a lottery designed to insure equal access to cleanup-related employment among boat owners in the Gulf of Mexico, but there was anecdotal evidence that the system was subject to manipulation for the benefit of some individuals over others and that some groups of boat owners were deliberately excluded from participation.[9] However, there has been no

research to date to determine whether the behavioral health status of those who ultimately were hired was significantly better than the behavioral health status of those who were not hired, or whether behavioral health status was related to number of days employed in cleanup efforts.

In the post-acute phase of an oil spill, economic redevelopment and employee training programs may prove to be critical in addressing the direct economic impacts of the spill, especially in natural resource-dependent sectors such as fisheries. Short-term programs may include assistance in recovery of oil-spill-related losses and implementation of debt refinancing, loan forgiveness, and tax relief for businesses that experienced spill-related losses.[29] Long-term responses may include investment in economic sectors less likely to be affected by oil spill contamination and financial incentives for continuing education of local residents who lost jobs because of the oil spill. Future research may involve comparisons of changes in symptoms between communities that implement such policies and programs and communities that do not.

Another direct impact of an oil spill is the disruption of cultural activities and systems that are dependent upon individual and social engagement in subsistence and recreational activities dependent upon natural resources. In Alaska, many of the documented behavioral health outcomes were associated with declines in traditional patterns of subsistence hunting and fishing.[30] The destruction of a culturally determined "way of life" was similarly reported by survivors of the Deepwater Horizon oil spill.[15] Native Americans are especially vulnerable to these impacts.[31] To reduce their effects on behavioral health, future research should be conducted to develop and evaluate culturally competent interventions to identify meaningful alternatives to traditional subsistence/recreational activities. Such interventions might be designed according to principles of "cultural exchange"[32] in which cultural transformations occur through global–local collaborations between disaster survivors and outsiders with expertise and/or experience that can help identify culturally appropriate solutions to adverse impacts on subsistence-based cultural activities. Such interventions also may help to provide needed emotional and material support to disaster survivors by facilitating interactions with residents of other communities adversely impacted by previous oil spills or technological disasters. In the Gulf of Mexico, for instance, survivors of the Exxon Valdez oil spill shared their experiences and insights with communities affected by the Deepwater Horizon oil spill.[33]

Policies to speed litigation or reduce need for litigation are also expected to have important consequences for post-disaster behavioral health. For many survivors, the post-acute phase of the Exxon Valdez oil spill may be viewed as having lasted until all claims for damages were resolved through the legal process, which, in that case, ultimately involved a ruling by the US.Supreme Court some 20 years after the accident itself. During that period involvement in litigation was itself a major source of long-term stress among Exxon Valdez survivors.[34] In contrast, legal settlements related to the Deepwater Horizon oil spill appear to be proceeding at a faster pace.[35] In addition to quicker settlements, several potential policies and programs designed to reduce the risk of stress-related behavioral health impacts in litigation participants may be evaluated and implemented, including improved support systems for litigants, access to social and psychological services, access to information on litigation status, and an evidence-informed policy on compensatory and punitive damages that might involve the calculation of quality-adjusted life years (QALYs) associated with exposure to oil spills and Tiers I–III effects.

Tier II Interventions

Many of the adverse behavioral health outcomes that occur in the aftermath of a disaster are directly or indirectly associated with the disruption of interpersonal relations caused by the disaster itself. This is especially true in the aftermath of oil spills where the unequal distribution of damages incurred and opportunities for employment in cleanup activities lead to the formation of "corrosive communities" characterized by social isolation, conflict, and uncertainty.[15] Individuals who

experience a disruption in their interpersonal relations with family, friends and neighbors are more likely to experience mental and behavioral health problems.[12]

To prevent such disruption in interpersonal relations, research should focus on individual and community characteristics that are associated with resilience, including personality (introvert versus extravert), personal and community socioeconomic resources, rituals of recovery, family structure and networks, and faith communities. These characteristics constitute important moderators of the association between Tiers I and II and III effects.[15] Research should also focus on activities that can prepare communities to respond collectively and collaboratively to such events. There are several existing programs designed to prepare community leaders to respond to any form of community emergency or disaster. These efforts usually include the development of an Incident Command System (ICS) for disaster response. The ICS is a standardized, on-scene, all-hazards incident management approach that: (1) allows for the integration of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure, (2) enables a coordinated response among various jurisdictions and functional agencies, both public and private, and (3) establishes common processes for planning and managing resources.[36] Future research efforts may target the effectiveness of adapting existing ICSs to enable communities to respond to oil spills and integrating of local leadership in regional, state, and national disaster response programs. Such research could address the question of whether the level of training community leaders receive is associated with reductions in levels of community uncertainty or whether structured coordination of disaster response is associated with less community level conflict and disruption of social relations. Another potential area for research would be to expand ICS training to the larger community, similar to the model adopted by FEMA's Citizen Corps,[37] and evaluate its effectiveness in reducing interpersonal tension and conflict.

In addition to adopting ICS procedures, reduction of levels of community uncertainty is especially important and may be accomplished through the use of interventions or practices designed specifically for communicating risk. Risk communications interventions have been shown to have beneficial effects, particularly if they include individual risk assessments or focus on treatment options.[38] There are several programs designed to train disaster responders and community leaders in risk communication, including university-based programs like "Introduction to Risk Communication" taught at the Johns Hopkins School of Public Health[39] and the Centers for Disease Control's Crisis and Emergency Risk Communication training program.[40] However, these programs are primarily designed to address the risks associated with natural disasters. Future research should be focused on adapting these interventions to communicating the risks associated with oil spills and other technological disasters, as well as determining the effectiveness of these communication programs in reducing adverse behavioral health outcomes.

While ICS and risk communication training may prepare community leaders for responding to oil spills in addition to other types of emergency, it is not clear whether they adequately prepare them to respond to the social conflicts that often occur after oil spills and other technological disasters. Although social skills and conflict management training programs have been developed for health care providers[41] and individuals undergoing stressful experiences are at risk for behavioral health problems,[42,43] there has been no research to date to determine whether they could be useful for training community leaders who may also be experiencing intense levels of distress or working with communities under stress. Research is recommended to develop and evaluate programs designed to train community leaders prior to the disaster in techniques designed to foster social cohesion and manage social conflicts that may help to reduce the level of social conflict and improve access to social support. During the post-acute phase of a disaster, similar evidence-based practices may be used to build and sustain social support networks. These include Social Skills Training interventions designed to enable individuals to identify positive sources of support, communicate their needs and acquire needed resources, manage demands from their support networks, and manage potential conflicts with others.[44]

A third area of potential focus pertains to the identification and training of community members who can serve as positive influences during and after a disaster. Programs like psychological first aid (PFA) are based on the premise that service delivery is more effective when it involves interaction with peers who share many of the same characteristics or experiences as those who are the target for such services.[45,46] Future research may target the development and evaluation of peer support programs that could be mobilized during and after a disaster to enable individuals to cope with the behavioral health impacts by making available a form of social support and fostering a sense of community cohesion. Although such programs have been shown to reduce symptoms of depression and other mental health problems,[47,48] the extent to which such programs provide social support during the acute or post-acute phases of an oil spill or any other form of disaster has yet to be determined.

Tier III Interventions

Prior to the occurrence of a disaster, interventions that directly address the potential intrapersonal impacts of a disaster would focus on achieving two specific aims: planning for delivery of targeted services to at-risk populations and implementation of evidence-based practices designed to build resilience in individuals and communities. Planning for delivery of targeted services requires an ability to identify those individuals at greatest risk for an adverse behavioral health outcome in the aftermath of a disaster as well as those individuals who are resilient to such outcomes. This identification requires two different types of information: (1) characteristics associated with adverse behavioral health impacts or with resilience to such impacts from prior studies of disasters, and (2) individuals who possess the same or similar characteristics.[17,18,49] Characteristics associated with adverse impacts of disasters in general include a history of psychopathology; preexisting substance abuse problems; prior experience with other traumatic events, including other disasters (e.g., hurricanes and earthquakes), physical or sexual assaults, accidents, and military conflicts; women and children; first responders; underserved ethnic minorities and socioeconomically disadvantaged populations; and persons with physical and intellectual disabilities like the hearing and sight impaired.[3,25–27,50] Characteristics associated with oils spills in particular include workers in natural resource-dependent industries (e.g., fisheries), cleanup workers, and litigation participants.[15]

Programs and practices designed to build behavioral resilience in individuals and communities may also serve to reduce the incidence and magnitude of behavioral health impacts in the aftermath of a disaster. Two examples of such interventions include The Strengthening Families Program,[51] a family skills training program designed to increase resilience and reduce risk factors for behavioral, emotional, academic, and social problems in children 3–16 years old, and Coping with Work and Family Stress,[52] a workplace preventive intervention designed to teach employees 18 years and older how to deal with stressors at work and at home. Although adults are likely to be impacted by such events through loss of employment, property damage, inequitable access to cleanup employment, involvement in litigation, or uncertainty about the future, children are also viewed as especially vulnerable to adverse behavioral health outcomes, which can precipitate adverse outcomes in their parents,[10,12,15] suggesting the need for an integrated approach that includes services to children as well as adults.

A potential approach that may be adapted to prevention of behavioral health problems in both children and adults post-disaster is the Communities That Care Program (CTC)[53,54] a community-based and manualized prevention service delivery system that mobilizes and empowers communities to adopt an evidence-based framework for the implementation of EBPs to prevent adolescent substance use and other behavioral health problems. CTC is designed to increase communication, collaboration, commitment, and ownership among community members and service providers. Communities are provided technical assistance in coalition building, conducting a needs assessment, selection of appropriate evidence-based practices to address needs, and

ongoing evaluation of process and outcomes.[55] Additionally, social development strategies[56] are incorporated in CTC training activities and technical assistance to provide specific guidelines for implementation[57] and to develop positive social bonds through involvement in a social group such as a coalition, family, or class, as well as acquisition of social skills and recognition for their contributions to the group.[58] Thus, a disaster-specific CTC model could potentially address Tier II interpersonal and Tier III intrapersonal impacts simultaneously.

While these activities are intended to prevent adverse behavioral health impacts, there exist numerous evidence-based treatments (EBTs) for these impacts once they have occurred. Examples of such treatments include trauma-focused cognitive-behavioral therapy (TF-CBT),[59] a 12-session individual or conjoint intervention that includes child and parent and typically is delivered in clinics, and cognitive-behavioral intervention for trauma in schools (CBITS),[60] a ten-group session and one to three individual-session intervention designed specifically for use in schools. These interventions have been found to be effective in improving PTSD and other symptoms in children experiencing sexual abuse, multiple trauma, and disaster.[61–63] Motivational interviewing and screening, brief intervention, and referral to treatment are potentially useful interventions for disaster survivors with preexisting drug and alcohol disorders who experience a worsening or recurrence of symptoms.[64,65] Another intervention mentioned earlier that has been increasingly used post-disaster is PFA. PFA includes the provision of information, comfort, emotional support, and instrumental support to those exposed to an event, with assistance provided in a step-wise fashion tailored to the person's needs.[45] This practice is considered to be "evidence informed" rather than "evidence based" as scientific evidence of the intervention's effectiveness is widely considered to be lacking.[66,67] While treatments such as TF-CBT and CBITS may be employed post-disaster, PFA is designed to be used during the disaster itself or in its immediate aftermath. PFA may also be used to address Tiers I and II effects on existing health services by serving as a form of risk assessment and referral to services during a disaster and by providing social support and facilitating connections to social support networks.[26] With respect to treatments like TF-CBT and CBITS, by reducing adverse intrapersonal health outcomes during the post-disaster period, they have potential for addressing interpersonal Tier II impacts as well.

There have been some efforts to implement and evaluate EBTs in the wake of other types of disasters, but to date no such evaluations have been conducted after an oil spill or other technological disaster. For instance, in the aftermath of the September 11 terrorist attacks on the World Trade Center, the Child and Adolescent Trauma Treatments and Services Consortium provided two trauma-treatments to children and adolescents affected by the attacks. The treatments were TF-CBT for children and Trauma/Grief-focused Group Psychotherapy Program[68] for adolescents. Using a quasi-experimental design, the investigators found that while the majority of youth in both the experimental and comparison groups experienced a decrease in trauma symptoms over time, the rate of improvement was significantly greater in the trauma-specific CBT group.[69] Jaycox and colleagues[70] conducted an evaluation of an individual and group-based trauma treatment in 195 New Orleans school children 15 months after Hurricane Katrina. At baseline, 60.5% screened positive for PTSD symptoms and were offered C-BITS at school or TF-CBT at a mental health clinic. Uptake of the mental health care was uneven across intervention groups, with 98% beginning the school intervention, compared to 37% beginning at the clinic. Both treatments led to significant symptom reduction of PTSD symptoms, but many still had elevated PTSD symptoms at posttreatment.

Future research in disaster behavioral health will be focused on determining the effectiveness of these and other EBTs in communities disrupted by the disaster itself, as well as addressing the challenges to implementing these treatments when trained personnel and resources may be unavailable. As many of these treatments were designed and evaluated in nondisaster-related clinical and community contexts, research may be required to determine how they may be adapted for use during or after a disaster and whether such adaptations are similarly effective as the

originally designed version of the treatment. For instance, circumstances post-disaster such as the limited availability of trained therapists or treatment facilities may preclude the use of a recommended 12 sessions of TF-CBT. Research might instead examine the effectiveness of a form of CBT that involves 3 or 6 instead of 12 sessions. Research is also required to evaluate any adaptations required to make these interventions culturally appropriate with historically disadvantaged minorities and communities with special needs and disabilities.[50]

Implications for Behavioral Health

The papers in this series document the importance of continued efforts to understand the short- and long-term risks to behavioral health associated with differing levels of exposure to oil spills. This research is important for identifying characteristics associated with vulnerability to physical, mental and behavioral health problems in some individuals and communities and resilience in others. It is also important to identify and implement programs, policies and practices that can prevent or mitigate adverse behavioral health outcomes, including new cases of post-traumatic stress disorder, depressive disorder, generalized anxiety disorder, and stress-related physical health problems, as well as the exacerbation or recurrence of drug and alcohol use problems. Although many of these behavioral health problems are likely to diminish in the weeks after a disaster event, for some individuals and in the aftermath of particular disasters like oil spills, these problems are likely to persist for extended periods of time.[15,26]

The development of programs, policies and practices designed to prevent or mitigate these risks may be viewed as the first stage of the process of translational research.[71] From there, the process moves to research to evaluate the effectiveness of these programs, policies and practices in real-world settings, and research to support their implementation and sustainment. However, this process often takes as much as 20 years to occur.[72] To date, there has been no effort to develop or evaluate evidence-based programs, policies and practices to prevent or mitigate the behavioral health impacts of oil spills, and relatively little effort to evaluate the effectiveness of existing programs, policies or practices to prevent or mitigate the behavioral health impacts of other types of disasters. Given the scale and magnitude of these impacts, and given the inevitability of disasters in the future, we can ill afford to wait. The sooner we began to translate the results presented in the studies represented in this special section into effective and sustainable programs, policies and practices, the sooner we can begin to ease the behavioral health burden of countless individuals and communities likely to be impacted by these disasters. For those individuals and communities, the future is now.

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