Literature Summary and Review of Disaster Mental Health

NIEHS/WETP

A summary of literature regarding disaster mental health issues, interventions and applications to inform NIEHS/WETP efforts to create a disaster mental health training module.

Prepared by MDB, Inc.

For Review Discussions at Behavioral Health Subject Matter Experts Meeting

3/15/2013

Table of Contents

Introduction

As part of an after action meeting conducted following the Deep Water Horizon (DWH) oil spill, NIEHS determined that disaster worker training and education required revisions to address behavioral health consequences faced by workers who assist with response and recovery activities following disasters. Mental health training and educational materials intended for response workers have not been systematically evaluated to understand how the information is being used, or if it is helpful in preventing or reducing adverse mental health outcomes. In June 2012, the Worker Education and Training Program (WETP) began a Gulf Responder Resilience Training Project (GRRTP) which intends to address behavioral health training and education for disaster workers. The program consists of three phases and includes participation of Gulf Coast Communities and organizations throughout. The program aims to identify resources, gaps and needs in mental health and worker training, develop a curricula or module on mental health and to pilot and evaluate the new module in communities for feedback. The goals is that in the end, communities and workers will be provided with a training module that is applicable for providers, workers and community members which will help to create more resilient communities.

Homeland Security Presidential Directive 21 emphasizes that community resilience is "one of the four most critical components of public health and medical preparedness" and recommends training and (health) curricula that will "Enhance private citizen opportunities for contributions to local, regional and national preparedness and response" (Schoch-Spana 2008). The directive further notes that "achieving resilience can be done through strategic interventions, including: promoting collaborative planning among hospitals and with authorities, building communication networks that link medical providers, health officials and public" (Reported by Schoch-Spana 2008). With this idea in mind, NIEHS has set out to develop a mental health module for disaster responder trainings that will help build stronger, more resilient communities, particularly in regards to post-disaster mental health and to address concerns of responder mental health. While many materials are available regarding resilience of communities, disasters and responder mental health, that which involves strengthening the mental health and response system for both responders and communities, and would be applicable to a new training module, was further reviewed here.

The overarching goal of this review is to gain an understanding of all aspects of responder mental health in disasters and the programs that are widely used, their pro's and con's and applications. While not intended to be comprehensive of all primary literature, the intent is to create a general summary of literature available to ensure that outputs generated from this project remain grounded in science.

Methods

An initial literature search was conducted using PubMed and PsycINFO. The Terms 'CISM' 'Critical Incident Stress Management' 'CISD' 'Critical Incident Stress Debriefing', 'Psychological Debriefing', 'PFA', 'Psychological First Aid', "Post Traumatic Stress in Responders, 'Post-Disaster Mental Health", "Mental Health & Disaster Volunteers", and "Metal Health Disaster Training". More than 800 articles were found. Articles were then identified for potential review based on their relevance to the project. Potential articles were sorted into 3 categories; Interventions, Impacts, and Training Programs & Applications. Through the review process additional results were found using selected Google Searches and specific studies were located if commonly referenced in literature. Additional materials, including organizational guidelines and statements were gathered as necessary.

The Part 1 review of Mental Health interventions (which could be applied in disaster settings as opposed to clinical interventions) yielded 49 potential articles, of which 21 were analyzed after eliminating those unavailable and those that upon review did not adequately address the issue studied or were unclear in scope. Of the 21 reviewed, ten specifically discussed CISM/CISD/Psychological Debriefing, two explored disaster mental health foundations or difficulties in studying and evaluating interventions, three explored clinical guidelines or policies of organizations and six specifically explored Psychological First Aid (PFA). Eight articles discussed or explored the application of interventions in different populations or communities, three utilized case study approaches to suggest evidence, one article was a direct rebuttal of a published literature review and eight were literature review or reviews of the state of the science.

The Part 2 review of Mental Health impacts following a disaster yielded 30 articles, of which 24 were analyzed after eliminating those that did not address specific populations or were unclear in methods or outcome measures. Of the 24 reviewed, five specific disasters were studied including; The September 11, 2001 attacks in New York City and Washington D.C., China Earthquake of 2008, 1999 Chi-Chi Earthquake in Taiwan in 1999, Deep-water Horizon and Hurricane Katrina in the Gulf of Mexico. Studies analyzed multiple populations including professional responders (Firefighters and Police), victims, volunteers (affiliated and unaffiliated), support/clean-up workers, immigrants, ethnic groups, and responders by gender. Seven papers were literature reviews/general reviews of disaster mental health outcomes, one was an editorial and 16 were primary research.

The Part 3 review of Trainings and Application aimed to fill gaps that arose in research as it applied to creating a mental health training program. Articles reviewed were selected purposively (often those cited by others) as they directly answered questions that arose or were judged to be of importance to the next steps in the process.

Interventions

Mental Health Interventions (actions aimed at providing 'helpful services' for 'acute stress' and not 'therapeutic' or clinical treatments (Fox et al. 2012) are surrounded by debate and popular opinion. Very little scientific evidence is available of a high quality (Fox et al 2010, Vymetal, Deistler, Bering, et al 2011, Nash & Watson, 2012) that can definitively prove or show the scientific evidence or strength of any of the number of popular interventions available.

Measuring the impact of mental health interventions following traumatic events, regardless of the intervention, is fraught with difficulties. Inconsistencies in individual mental health status prior to trauma contribute to difficulties in providing a true baseline or control group, yet are thought to play a critical role in a person's likelihood of developing a prolonged stress response (Yamashita 2012). Bias introduced through recall, interview or self-selection into study groups by participants plagues many studies as do small sample sizes and an ethical debate on using a randomized 'control' group in an intervention that may be beneficial (Smith & Roberts 2003), despite its usefulness for science.

Literature and organizations focus predominantly on two intervention methodologies, both of which are often debated; Psychological First Aid and Critical Incident Stress Management/Debriefing. As analysis of *all* original research articles would be beyond the scope of this review, comprehensive literature reviews and meta-analyses of the interventions, as well as selected (those most debated) original research articles, were reviewed. Both interventions, their foundations, uses and criticisms were reviewed and are further summarized and analyzed below.

Psychological First Aid

Psychological First Aid (PFA), an acute stress intervention that has been mentioned in literature since the 1950's is specifically designed to be implemented by responders who are not mental health professionals (Everly & Flynn, 2006). PFA is designed to be used following (rather quickly) a traumatic stress event and is applied to individuals who may be "exhibiting stress reactions, rather than applied to the whole population or high-risk individuals who are nevertheless asymptomatic" (Nash et al 2012).

The core actions of PFA are based on 5 'intervention principals' that have been identified by Hobfoll et al. (2007) as having 'empirical support to guide evolving intervention practices'. Those principals are:

- Promote a sense of safety
- Promote calming
- Promote a sense of self and collective efficacy
- Promote connectedness
- Promote hope

The five principals of PFA act to inform the Eight "Core Actions" of the process which include:

- Contact & Engagement
- Safety & Comfort

- Stabilization
- Information Gathering
- Practical Assistance
- Connection with Social Supports (often Family)
- Information on Coping
- Linkages with Collaborative Services

The eight core actions of PFA are intended to be flexible and tailored to the specific needs (physical, emotional and social) of the individual receiving the intervention (Nash & Watson 2012). This flexibility and ability to asses and customize actions for the individual and their unique situation is one of the perceived strengths of PFA, as many interventions that lack flexibility are criticized for failing to do so (Nash & Watson 2012).

PFA is intended to be implemented by responders who have received PFA training, but does NOT specifically need to be conducted by those who are health or mental health professionals. A survey by Hawley (2007) found that potential responders reported statistically significant increases in (self) perceived knowledge of stress reactions following disaster, of ability to identify etiology for symptoms and in knowledge of resiliency factors following a one day PFA course. Responders to Hurricanes Ike and Gustav also noted that PFA training increased their confidence '"somewhat" to "a lot" and felt that PFA was an 'appropriate' intervention for the response (Allen et al. 2010). In Allen's study (2010), nearly 75% of those trained who responded to the hurricanes used PFA. While self-reported perceptions via survey are not concrete evidence of an interventions impact, positive feedback from those who are trained to used it, particularly in their confidence in using the technique and their perception of its usefulness, is an important consideration for those who may consider implementing the intervention and training responders. No surveys of those who may have received the intervention were found, despite the importance of their feelings and perceptions of the intervention.

Literature supporting the use of PFA most often cites Hobfoll et al. (2007) as the 'evidence' behind PFA, although Hobfoll refers to PFA as an 'evidence informed' intervention as opposed to an 'evidence based' intervention (Fox et al 2012). Studies of PFA use are most often non-peer reviewed case studies or review articles (classified by Fox et al 2012 as Level 5 or Level 6). In his study on behalf of the American Red Cross, Fox noted that while based on 'rational conjecture' and 'supported by expert opinion' in the end there was "neither sufficient evidence to support a treatment standard, nor sufficient evidence to support a treatment guideline", however he notes PFA can be considered an 'option' for non-mental health professionals responding to traumatic events (Fox et al 2012).

Nearly all reviewed articles emphasize the lack of 'evidence' regarding the effectiveness of PFA. Hobfoll and team acknowledge the lack of 'evidence base' in post disaster interventions and set out to explore 'evidence informed practices and to attempt to gain consensus from researchers and practitioners in the fields of trauma and disaster recovery". Their study aimed to identify "core intervention related foci that are best supported by the literature as promoting stress resistant and resilient outcomes". The study team analyzed case studies, peer-reviewed literature and consulted with experts on each principal and looked to ensure each recommended principal 'met standards of reasonable support from

published studies of relevance to disaster environments'. Each recommended principal was supported by studies and accompanied by recommended 'measures' to meet the principal. *These well studied principals and measures are upon which PFA's eight actions are based and are the strongest 'evidence' in favor of PFA*.

PFA has been adapted for use by a number of occupational groups and volunteers. One specific example, as highlighted by McCabe et al. (2008) is its adaptation for religious leader's use. An additional paper by Everly, Barnett, Sperry & Links (2010) builds upon the idea of expanding PFA training into the community by training Nurses as they are often the first to see those who may be struggling after a disaster and are an 'overlooked resource' for mental health (Everly, Barnett, Sperry & Links 2010).

The use of PFA has been increasing in organizations, government and businesses in recent years and one common variation on PFA is that advocated for by the national Child Traumatic Stress Network and the National Center for Posttraumatic Stress Disorder through their PFA Field Operations Guide (Allen et al. 2010). The American Red Cross has recently begun using PFA and has trained more than half their disaster volunteers in the practice, and in one of the most resounding declarations of support for the intervention, the World Health Organization in 2011 published the 'Psychological First Aid; Guide for Field Workers' advocating for the use of the concept (WHO 2011). FEMA and The Department of Homeland Security (DHS) mention the use of PFA in the 'Emergency Support Function-Public Health' annex to the 2008 National Response Guidelines (2008 Response Framework Appendix, Pg 7).

In summary, the majority of literature regarding PFA encourages further research into the effectiveness of the intervention while acknowledging the lack of solid evidence, yet suggests plausible reasons for its benefit to those immediately impacted by a traumatic event and lauds the intervention for its ability to be used by those who are not mental health professionals and its positive reception by those who have used the intervention.

Critical Incident Stress Management: Critical Incident Stress Debriefing & Psychological Debriefing

Critical Incident Stress Debriefing (and later Critical Incident Stress Management) was initially developed by Jeffery Mitchell in the 1980's and both are considered 'structured interventions designed to promote emotional processing of traumatic events" (Smith & Roberts 2003). CISM emerged as a 'comprehensive, systematic and multi-component program' intended to replace the term CISD which referred specifically to a multi-step, group debriefing (which is a component of CISM).

Critical Incident Stress Management, the comprehensive system that incorporates CISD is designed to counter many of the criticisms of CISD alone, notably that it is a one time, inflexible intervention. CISM consists of steps prior to an event and following trauma, and includes CISD. The components of CISM include:

- Pre-incident training and education
- On-Scene Services
- Diffusing

- Debriefing (CISD)
- Community Outreach Programs
- Support services for family and significant others
- Individual Consultations
- Referrals for follow-up services

While CISM is considered comprehensive, the most studied portion, and most debated is that of Critical Incident Stress Debriefing (sometimes just referred to as Psychological Debriefing [PD], despite being different). The core actions of CISD are performed in a 1-3 hour group session held 'as close in time to the traumatic event as possible (usually 1-10 days) (A. Mitchell, Sakraida & Kameg 2003) and is guided by a mental health professional trained in CISD/CISM and a trained peer. The main actions include seven steps:

- Introductory
- Fact
- Thoughts
- Reaction
- Symptoms
- Teaching
- Re-Entry

Through the debriefing process, the group discusses the event as they saw it, how they feel and normal reactions (A. Mitchell, Sakraida & Kameg 2003). CISM/CISD is intended to be performed only by trained mental health professionals and a trained peer. CISD is most often performed only by trained CISM Response teams trained and coordinated by the International Critical Incident Stress Foundation.

While CISM appears to 'fix' many of the criticisms of CISD, the majority of the literature reviewing its effectiveness focuses on the debriefing portion or is not clear as to what portions of CISM were studied. One of the studies that is rarely criticized is that by Irving and Long (2001) which found that women who received CISD following traumatic events perceived having received the intervention as 'beneficial' and noted that it 'gave them some strength and hope'. The study also noted that the women felt they benefited from processing their experiences and that it helped them realize their reactions were normal (Irving & Long 2001).

Despite efforts to distinguish between CISM and PD or CISD, the inclusion of PD within CISM plagues the concept and is a major reason for the criticism of CISM as a whole. Articles, studies, organizations and critics use CISM, CISD and PD interchangeably (as noted by, and then done by Regel 2007) and often don't specify which was actually used in the study.

There are supporters of CISM/CISD, critics of CISD and CISM, and therefore a significant amount of literature debating its effects. The literature surrounding the impacts and effects of CISM/CISD and Psychological Debriefing is mixed.

Studies indicating positive results of CISM and CISD have found reduced clinical symptoms of stress following armed robbery (Richards 2001), decreased in hurricane-related stress and overall stress levels (As reported in Shubert 2011), and lower 'arousal, intrusion and stress related symptoms' in EMS personnel attacked on duty (reported by Shubert 2011).

The most widely cited study critical of CISM/CISD is a Meta-Analysis conducted by Rose et al in 2009 and published as part of the Cochrane Review. Rose et al (2009) use of Cochrane Standards strict inclusion criteria, led to a Meta-analysis of 9 randomized or quasi-randomized trials and looked at a variety of outcomes related to traumatic stress. The review is notable, and often cited, as it found "there is no evidence that single session debriefing is a useful treatment", that 'compulsory debriefing of victims of trauma should cease' and most notably that 'there is some suggestion that it (Debriefing) may increase the risk of PTSD and depression". While the Cochran Review by Rose et al (2009) is criticized for not measuring group sessions (as the intervention recommends) (Mitchell 2004), its findings of even the *potential* for negative outcomes following a debriefing are the most commonly cited reasons for discouraging the use of CISD, PD and/or CISM. While criticized, the scope of the study acknowledges potential errors; however, the reputation for thorough research by the Institute gives weight to the study.

Criticisms of the Cochrane Review of CISM include the fact that CISD was reviewed as a 'psychological treatment' and only involved individuals, despite being intended as a group *intervention* (Regel 2007). The studies included for review are often noted as weak in methods or problematic and for having undefined procedures for the intervention (Shubert 2011, Regel 2007, Mitchell 2004).

One major criticism of PD/CISD is that group interventions assume all exposed group members had the same traumatic experience and lacks an 'assessment' component and that the group approach does not allow for customization based on individual needs (Nash et al 2010). CISM however, does include an opportunity for assessment.

Very few studies that support CISD are included in reviews that refute it and very few negative reviews are included in literature supporting its use. Some literature reviews aimed to include randomized studies only (Rose et al 2009, Bledsoe 2002, & Smith & Roberts 2003) in an effort to show effect; some focus on specific populations (Devilly & Gist, 2006); and very few were able to find a set of studies that include a standard CISM/CISD timeframe among all included studies and most lack knowing the exact intervention given. While the literature is mixed on the effects of CISM/CISD/PD, all acknowledge the need for controlled studies. Most studies of PD are found to have more than one 'shortcoming' and often include small sample sizes, varying trauma or interventions, sampling bias and ignore confounding variables, as was noted by Bisson & Deahl in a review of the literature from 1994 and by Regel in 2007.

In debates (via editorials etc.) supporters of the concept attempt to counter negative results by pointing out that victims with more severe injuries are inherently different that those who do not have severe injury and that their results cannot be compared; however the same treatment protocol is intended for both groups, highlighting the issue posed by many as not being 'flexible'. In attempts to argue against the results found by Rose et al. supporters note that studies of civilians are not the intended audience,

as CISM caters to professionals who have 'some preparation' and have received the 'proper' pre-education about stress. In reality, a system designed to help victims would best be designed to help any victim, not just those who are professionals or who have received prior education. Mitchell also notes in a 2004 reaction to the paper by Devilly & Gist (2006) that 'it is of no surprise that they would generate negative outcomes' when CISD is not performed properly. This admission may be concerning as they do not elaborate on what must be done 'correctly' to ensure harm is not done to the victim. Developers of CISM/CISD have noted that positive results are only expected if CISD is 'provided by properly trained personnel who adhere to acceptable standards' (J. Mitchell 2004).

Following the publication by Rose et al and a number of other studies including one by Devilly & Gist (2006), which found negative outcomes from CISD/CISM, major organizations and businesses have stated their intent to NOT use CISD or interventions that use PD. Fox (et al. 2012) on behalf of the American Red Cross noted that 'Psychological debriefing should not be implemented' (2012), the US Veterans Association Clinical Practice Guidelines note that 'PD cannot be recommended as an early intervention for post-traumatic stress" (Nash et al 2012). The World Health Organization noted as well that Psychological Debriefing has been found 'Ineffective' and now recommends against it (WHO 2011). While a number of organizations have moved away from CISM, CISM continues to be used; most recently in response to the shootings at Sandy Hook Elementary School as well as by the United Nations and US Coast Guard.

Comments and Summary on the Debate

The literature surrounding PFA and CISM in inconclusive for BOTH interventions, partially due to the difficulties and ethical concerns with creating 'Gold Standard' RCT's and the variety of populations that have received emergency mental health interventions under study. A number of organizations have recently moved toward PFA and its peer based approach, however CISM is still widely practiced and contains elements to counter most criticisms of CISD/PD alone.

It is worth noting that both CISM/CISD and PFA have similar goals and aims and neither, despite what some authors imply, aims to disconnect or harm individuals. Shubert notes that 'both seek to stabilize the affected individuals; to help them re-engage with family, social and work networks; and to draw on their strengths and their natural resilience' (Shubert 2011). While each intervention has its strengths, weaknesses and specific methods for approaching impacted populations, the use of each should be evaluated for the specific situation (Shubert 2011) and if further evidence of a desired program is needed, the primary research that most closely matches the intended recipients/situation should be evaluated and considered.

Military and Combat Interventions

While combat is well known to contribute to PTSD, the types of stress and traumatic exposures experienced in combat are often different than those experienced by first responders for a number of reasons. Combat stress is often characterized by prolonged or repeated exposure to traumatic events and the need to 'quickly restore occupational functioning' (as opposed to basic functioning) (Nash & Watson 2012). Many approaches to 'prevention' or treatment of PTSD and traumatic stress reactions are used within the US Military and as with CISM and PFA, many struggle with lack of an evidence base

or research applicable to the military population (Alder et al 2009). The literature on military and combat stress interventions varies from that applicable to first responders in that the intent of an 'intervention' is different, as is the time that many of the interventions take place. Military interventions may take place pre-deployment as part of preparations, in the field with the intent of getting soldiers back to work (Nash & Watson 2012) or following a deployment with a focus on PTSD 'prevention' and re-adjusting to a non-combat lifestyle (Riggs & Sermanian 2012). Debriefings, group sessions, and stress education are reported to be used in all scenarios. The majority of studies, many of which are randomized, focus on re-adjustment interventions which take place well after an individual traumatic event (Alder et al 2012).

Current VA/DOD guidelines outline the need to focus on the *prevention* of PTSD. The guidelines differentiate between Combat Stress and Acute Stress however they recommend four interventions: Psychological First Aid, Combat and Operational Stress First Aid (a modification of PFA to be used in a situation with 'pre-existing social structures and defined leadership'), Skills for Psychological Recovery (SPR) and Families Overcoming Under Stress (FOCUS). The latter two emphasize recovery and re-adjustment in months after an event, whereas the first two are more immediate interventions to be used within the first week of a traumatic event (Nash & Watson 2012). The updated VA/DOD guidelines emphasize NOT using psychological debriefing for an individual or group.

Despite recent recommendations against debriefing, studies by Alder et al and others have found that debriefing is a common practice following traumatic events and/or as part of re-adjustment. One well researched study by Alder et al in 2009 (prior to the guidelines being updated) recognized the debate over debriefing but noted that it is 'rooted in the tradition of after action reviews' to do so. They also note that much of the literature that found negative consequences did not study military populations or exposures. In acknowledging that debriefing occurs, they randomized the use of post-deployment 'Battlemind' interventions and found reduced rates of negative mental health outcomes. The Battlemind intervention contains debriefing aspects similar to CISM, but limits recounting trauma and focuses on 'unit cohesion, safety, relationships and common reactions to combat', which echoes tenants of PFA. The study found improved mental health outcomes for those who received Battlemind interventions as part of both small and large groups.

While military studies of PTSD and Mental Health interventions are important to include when analyzing interventions, the unique situation of the military (strict chain of command, unit cohesion), types of exposures faced, as well as differences in intervention timing must be noted as they may not always correlate to scenarios faced by first responders. Specific studies of interventions in both populations are needed to ensure that interventions are best tailored and used for both populations while generalizations about interventions applicable to both populations should be reviewed with caution. (No studies identified have analyzed the same intervention for both military and civilian populations).

Figure 1: Basic Summary of CISM and PFA

	CISM/CISD/Psych Debriefing	PFA
Goals	Mitigate Impact of event & Accelerate Recovery	Recreate a sense of safety, (2) establish meaningful social connections, and (3) reestablish a sense of efficacy. (Fire Engineering)
Core Concepts/Steps	Pre-incident training and education, On-Scene Services, Diffusing, Debriefing (CISD), Community Outreach Programs, Support services for family and significant others, Individual Consultations, Referrals for follow-up services 'Introductory' 'Fact' 'Thoughts' 'Reaction' 'Symptoms' 'Teaching' 'Reentry'	Contact and Engagement, Safety & Comfort, Stabilization, Information Gathering, Practical Assistance, Connection with Social Supports, Information on Coping, Linkage with Collaborative Services
Timeframe for Intervention (Ideal):	24-72Hrs Following, 1.5-3 hr intervention 1x only Debrief	Immediately following event
Conducted by:	Mental Health Professional & Trained Peer	Those trained (not just MH Prof)
Target Audience	Groups (Reportedly *can be individualized)*	Individuals Only
Notes	Differences between CISM, CISD and PD	
Evidence Supporting*	Mixed	Limited, Supports Concepts
Endorsed/Used by	United Nations, US Coast Guard	World Health Organization (WHO), Medical Reserve Corps, 'Indicated Intervention' by IOM American Red Cross, American Psychological Association, Noted in FEMA National Response Framework, World Vision International

*Very little evidence of high quality research/literature available for either

Mental Health Outcomes of Disasters

The mental health impacts of disasters impact entire communities, including direct victims, responders, community members, support agencies and in some cases, the entire country. Studies of health impacts look at each population separately and therefore are divided for this analysis. The health and mental health outcomes of a disaster vary by the type of disaster, the risk factors possessed by the population, demographic and population characteristic. This analysis aims to briefly summarize the literature on each.

The health and mental health outcomes seen, and their severity, following disasters vary greatly and range from normal reactions to life altering disabilities. Literature on disasters can be complex and contradictory, often because the populations and disasters studied vary in characteristics as do the time periods following the disaster in which the study was conducted. Some general consensus however is available on the types of effects seen following specific disaster types. Research following the September 11th Terrorist attacks in New York and Washington D.C., combined with previous research into natural disasters has found that man-made attacks and events may have greater mental health effects than natural events (Benedek, Fullerton & Ursano 2007 & Neria, DiGrande & Adams 2011). Events and disasters which disrupt large social networks, resources , homes and entire communities (such as earthquakes and hurricanes) have also been found to have greater mental health impacts on responders and communities than isolated events (oil spill offshore, building collapse downtown etc.) (Wang et al. 2012). Research has shown that mental health is positively impacted by networks and having a 'routine' following a disaster, therefore events that disrupt entire systems, and everyone in a social network can compound the negative mental health effects of the disaster (Hyman 2004).

Studies of disasters often focus on the factors that increase one's risk of having a negative mental health reaction. Not all risk factors are similar in all studies, but those factors that routinely appear may be helpful to responders and providers in identifying those with the highest risk following a disaster.

One major risk factor for post-disaster mental health issues which has appeared in research of multiple disasters is having a low, or disaster impacted income. Studies have found that "The most severe, lasting and pervasive psychological effects are often found after disasters that engender serous and ongoing financial problems"(Grattan et al. 2011). Research following 9-11 noted that responders who made less than $25,000 had almost 8x the risk of developing PTSD as those who made more than $100,000 and that workers in Chinatown who lost jobs following 9-11 were also seen to have increased rates of PTSD and mental health issues (Neria, DiGrande & Adams 2011). Pietrzak (2012) found similar results in 9-11 responders with those in the 'low income' or non-union group being more likely to have full PTSD. Following the Gulf-Oil Spill, residents of communities both directly impacted by oil and indirectly impacted (by lost tourism and fishing) who had lost income due to the spill had higher rates of tension, anxiety, fatigue and mood disturbance that those who had a steady income in either community. Similar results were found following the Exxon-Valdez Oil Spill (Grattan et al. 2011). Those with low or disaster impacted incomes often have fewer, or limited resources for re-building and face continued threat of displacement from homes or businesses which adds to the stress and mental health burden.

Additional studies of the relationship between income and post disaster mental health status highlight the importance of neighborhoods and income equality. A study by Ahern & Galea (2006) found that in neighborhoods with wide income inequality, those with lower incomes had higher levels of depression than those in more equitable neighborhoods, even if those neighborhoods were poorer. The introduction provided by Ahern & Galea also noted that those who may be dependent on social systems and others for support, such as the elderly or mothers with dependents, are more likely to also suffer from depression following a disaster.

A number of 'demographic' factors appear in literature and while some are reported to have mixed effects (protective or risk), others are routinely seen as risk factors. Being single, divorced or widowed is reported as a risk factor in multiple studies (Pietrzak 2012, Nair et al. 2012,& Bowler et al. 2012). As social networks and support are important, not having someone to return home to for support (because of single status), similar to when a close family member is lost in a disaster, could explain why single status acts as a risk factor.

Women have been found to be twice as likely to develop PTSD in their lifetime (Thormar et al. 2010) and multiple studies following disasters have shown higher rates of PTSD for women than men (Pietrzak 2012, Bwler2012, Bowler 2010). A study by Bowler et al. (2010) found higher rates of PTSD following 9-11 in women responders and women who did not directly respond than in men but few studies offer suggestions as to why women are more likely to suffer PTSD.

The role of cultural or ethnic heritage in mental health risks following disasters is complex. Some cultural traits and practices can actually help create resilient communities (such as emphasis on community as reported by Vu & VanLandingham 2011), while others can contribute to difficulties in re-building and accessing services (such as an emphasis on keeping original culture noted by Drogendijk, van der Velden, Kleber 2012). Norms and practices of first-generation immigrants can vary compared to local counterparts who still identify with a specific heritage or ethnicity (Vu & VanLandingham 2011 & Drogendijk, van der Velden, Kleber 2012). In studies of multiple disasters, those who more closely identify with their homeland or heritage (aka being less 'adapted' to the new culture) face more barriers to services following a disaster and have a higher risk of mental health issues than their better adjusted counterparts (Drogendijk, van der Velden, Kleber 2012 & Vu & VanLandingham 2011).

Being a *responder* of Hispanic ethnicity was reported in multiple studies to be a risk factor for developing PTSD following 9-11(Bowler 2010, Bowler 2012, Nair et al. 2012, Neria, DiGrande & Adams 2011), however Adams & Boscarino (2005) found no association between PTSD and ethnicity (including Latin American ethnicity) following 9-11 in the *general population* (non-responders). The only statistically significant variable found in their study was that African Americans and Puerto Ricans (non responders) were twice as likely as whites to meet criteria for panic attack (Adams & Boscarino 2005). Their study did not consider those who do not speak English or Spanish, despite language being a known factor that can impact mental health and create a barrier to assistance following disasters (Drogendijk, van der Velden, Kleber 2012).

Cultural values and norms can be both protective and deleterious following a traumatic event or disaster. In a study of Vietnamese immigrants following Hurricane Katrina, "statistically significant declines in health status" were seen for physical and mental health in the year following the event, but health status returned to pre-storm levels in the second year following the storm (Vu & VanLandingham 2011). This phenomenon is thought to have occurred as this specific cultural group places a strong emphasis on community and family and was among the first to re-build (with assistance from each other and outside Vietnamese communities) following the storm, therefore re-establishing norms and networks which improves mental health (Vu & VanLandingham 2011). Rates of PTSD in Vietnamese populations were near the population average of 5% following Katrina, drastically less than the estimated 25-30% of most displaced populations following the storm (Vu & VanLandingham 2011). In contrast to resilient Vietnamese populations who were aided by their sense of community, a study by Drogendijk, van der Velden & Kleber (2012) highlighted the struggles of community minded immigrants to find care following a fireworks disaster in the more independently minded Dutch society. The study noted that when faced with a disaster, these immigrants (mainly Turkish and Moroccan) faced an additional strain due to the conflicting emphasis of recovery (individualistic) and their beliefs and attitudes (collective).

Studies that analyzed age as a risk factor were mixed with some reporting young age as a risk factor (Brackbill et al. 2013 & Neria, DiGrande & Adams 2011), and others reporting older age as a risk factor (Pietrzak et al. 2012, Bowler et al. 2012). As each study focused on a specific population, relationships between age and risk that were found may also be related to occupation and exposure, therefore further investigation as to the role of age in risk for developing PTSD is needed.

It should also be noted that, as would be expected, having a prior history of psychological diagnoses or poor mental health has been found to be related to higher risk of PTSD after a traumatic event (Benedek, Fullerton & Ursano 2007 & Pietrzak 2012).

A number of factors were also identified as 'protective' against developing PTSD or mental health symptoms. Among those found including having social support/networks, being part of a union, having more than a high school education, having high or positive self-esteem, having high confidence in job performance ability, high feelings of belonging, and notably, having received prior disaster training (Pietrzak et al. 2012, Benedek Fullerton & Ursano 2007, Pietrantoni & Prati 2008, Bowler et al. 2012).

Common Mental Health Issues Following Disasters

There are a number of mental health issues that appear following a disaster, some of which are normal and others which require intervention and/or professional help. Benedek, Fullerton & Ursano (2007) outline three understandable, basic levels of reactions: Normal, which can be characterized by mild sleep disturbances etc.., Moderate, which may appear as altered behaviors but not impairment of function and Severe, which is most often manifests as PTSD and includes impairment of normal functioning, flashbacks and "repetitive re-experiencing of the event" (Stellman et al. 2008).

PTSD is the most commonly reported mental health disorder following a disaster (Neria, DiGrande & Adams 2011 & Thormar et al. 2010) and general rates among the US population are usually 3.6%

(Bowler et al. 2012). Following a disaster PTSD rates can run as high as 40%, however Thormar et al. (2012) and Watson, Brymer & Bonanno (2011), point out that rates rarely reach above 35%, even in the most traumatic of events. PTSD is often studied as is it is also associated with increased smoking rates, alcohol and drug abuse as well as increased physical morbidity and mortality (Thormar et al. 2010). Those who screen positive for PTSD (or probable PTSD from surveys) are more likely to screen positive for depression, alcohol use, panic disorders and potential suicide risk (Pietrzak et al. 2012, Stellman et al. 2008). PTSD has also been found to be co-occurring with physical symptoms such as Lower Respiratory Infection (Nair et al. 2012). A study by Nair et al. in 2012 found that 'co-occurring physical illness may affect the diagnosis, treatment and prognosis of PTSD" and that 38% of those with LRI following 9-11 also had PTSD due to 'shared 9-11 risk factors". Repeated studies have noted that those with PTSD are at risk for long term physical illness (Nair et al. 2012). These physical co-morbidities are important to note as their presence may assist primary care providers in diagnosing an otherwise un-mentioned or undiagnosed mental health condition.

Studies of the mental health outcomes following disasters generally focus on PTSD, however many note other co-morbid conditions and 'sub-syndromal' PTSD (Pietrzak et al. 2012) that can be present in a disaster exposed population. A study of sub-syndromal PTSD by Pietrzak et al. (2012) found rates among responders to 9-11 to be as high as 15.7% and an additional study by Stellman et al. (2008) found that more than half of responders who did not have PTSD suffered from 'a substantial stress reaction'. These are important findings as those who do not report 'full' PTSD symptoms often do not receive the same social and professional support following an event, despite presenting symptoms and having a greater risk for alcohol problems and social dysfunction (Stellman et al. 2008).

Additional disorders seen following disasters include, alcohol abuse, social dysfunction, panic disorder, depression (Stellman et al. 2008), 'suicidal ideation' (Pietrzak et al. 2012), stress disorders (Brackbill et al 2013), and chronic fatigue (Thormar et al. 2010).

The literature on PTSD that appeared following 9-11 may help to shed new light on PTSD and those exposures and populations most at risk to develop it. Using the standard DSM IV Definition[1] of PTSD (unlike older studies that used relative symptom scales) and a clearly defined population of registry participants, some of which have been able to follow cohorts since 9-11, many of these studies have been able to control for a number of factors previously un-controlled for and have highlighted different PTSD rates in sub-populations as well as the health outcomes for more than 10 years following the event. (See 9-11 related sub-population PTSD rates in Figure 2 below). One important finding from all 9-11 studies is that PTSD rates not only vary by population, but with time following the event. Those studies conducted closer to the event found differing prevalence than many of those conducted 4+ years following. Some studies have actually found *increased* rates of PTSD 3-5 years after the event, higher than those rates immediately following (6months –1 year) (Bowler et al. 2012). This 'delayed

[1] Probable full PTSD was PCL score >= 50 and 'endorsement of each of three DSM IV criteria for PTSD' (1/5 for Intrusion, 3/7 for Avoidance/numbing and 2/5 for Hyperarousal (Pietrzak et al 2012)

onset' of symptoms has been seen in multiple responder groups, including fire-fighters at 4-6 years post event (Neria, DiGrande & Adams 2011).

Populations and Specific Exposures

A number of studies have been conducted which analyze risks for PTSD and other trauma related stressors for specific populations. These reactions are often closely related to specific exposures faced by occupational groups. A summary table of Mental Health disorders in specific populations and occupational groups is below (Figure 2).

Police officers have been found to have some of the lowest rates of PTSD among disaster responders, with rates 2-3 years following an event of 5-7% (Bowler et al. 2012 & Pietrzak et al. 2012). It should be noted however, that Pietrzak found that police were more likely to experience 'sub-syndromal' PTSD (having some symptoms but falling below the defined threshold for PTSD). Theories as to why Police suffer at lower rates than most responders include under-reporting out of fear of consequence (loss of rights to carry weapon etc.) (Bowler et al. 2012), self-selection to the position, prior training for disasters (Guo 2004), social support of comrades and jobs that put them in more control of the situation and farther from threats to life (Benedek, Fullerton & Ursano 2007 & Thormar et al. 2010).

Firefighters have been found to have lower PTSD rates than many groups, but may have 'delayed onset' of symptoms years following an even and/or higher diagnosis rates than police (Thormar et al. 2010). These trends may be due to low job satisfaction, high levels of exposure to the event, high threats to life/high risk and continued and 'great physical strain and extreme environments' (Thormar et al. 2010). Additional research is needed to investigate why firefighters have higher rates of PTSD than firefighters, despite many common resilience factors (camaraderie, early arrival on scene, self-selection etc.).

Some of the highest rates of PTSD and mental health struggles following a disaster are found in volunteers and those not traditionally thought of as 'responders' or 'disaster professionals'. Guo et al. 2004 found that general volunteers who responded to an earthquake had rates of PTSD almost twice that of professionals (30% vs. 18%). There are a number of 'sub-categories' of volunteers that have been further examined in research of recent disasters and who present with different PTSD and mental health disorder rates.

Volunteers who are 'affiliated' with an organization have been found to have high rates of PTSD (~14%), but the highest were found among 'unaffiliated' volunteers who did not participate as part of an organization, with some studies finding PTSD prevalence above 30% (Debchoudhury et al. 2011). Un-affiliated volunteers often have roles similar to those of professionals, despite not having prior training in response or recovery (Thormar et al. 2010). These unaffiliated volunteers were found to have higher rates of Mental Health diagnoses, PTSD and of increased rates of lower respiratory disease than affiliated volunteers and have lower utilization rates of programs offering support (Debchoudhury et al. 2011). Many unaffiliated volunteers struggle with a lack of 'workplace (response)' structure and upon returning home face a lack of available support, perceived lack of understanding for what they experienced and loss of connections that may have been formed with other responders/volunteers (Thormar et al. 2010).

Unaffiliated volunteers often become responders out of necessity as they are in the 'right place at the right time', and fall into an even more vulnerable category; that of a Victim Volunteer. Victims as volunteers, normally unaffiliated with an organization, are often available to respond because they are at the scene, or have no employment due to the disaster (Thormar et al. 2010). Because of their presence at or close to the site of a disaster they often have very high rates of exposure to traumatic events, bodies and physical/environmental hazards (Debchoudhury et al. 2011). Volunteers from communities that have been impacted may face additional risks related to the destruction of support networks, conflicts between personal and volunteer roles (being there for both family and co-workers), identification with or of victims, and loss of a loved one or friend. Following 9-11 these volunteers were likely to return to a home with dust from the 'plume' and to know someone who was killed (Debchoudhury et al. 2011, Thormar et al. 2010). In an extreme example from an earthquake in Asia, 62% of volunteer responders involved in relief had lost a loved one and reported 'deep grief' and very few stress reducing/limiting behaviors (Wang et al. 2013). These volunteers often put re-building their own lives or homes on hold in order to help their communities and friends/neighbors (Wang et al. 2013), which can unfortunately have negative mental health consequences for the responder.

An additional occupational group who may be involved in disasters include truck drivers, heavy equipment operators, laborers, engineers, sanitation workers and carpenters who "work to restore basic needs" (Benedek, Fullerton & Ursano 2007) but who may also struggle with mental health. Studies on this population are extremely limited with the exception of case studies which outline increased drug and alcohol use, self-reported used of anti-depressants and self-reported depression (Johnson et al. 2005).

These populations, generally referred to as Site Support Personnel (SSP), are particularly vulnerable to mental and physical consequences of disaster work and often do not receive recommended trainings. Lee and Weinstock (2011) note that 'many health problems that resulted from working in disaster zones could have been minimized, and possibly prevented if SSP had proper training and education prior to being deployed to the work zone". The immediate need for support following a disaster often means that full trainings are overlooked, despite these workers often having very little to no experience in hazardous materials or disaster settings (Lee & Weinstock 2011).

Health care workers are another population who have been found to suffer from negative mental health following a disaster. In a study conducted following the Washington D.C. sniper attacks, medical providers (Doctors, nurses etc.) reported increased alcohol use, increased depression and PTSD as well as an increase in self-reported avoidance behaviors (altered driving patterns etc.) (Summarized by Benedek, Fullerton & Ursano 2007). Very few additional studies looked at mental health outcomes for medical providers, despite their importance in disaster response.

The mental health of general populations can be impacted following a traumatic event or disaster. Following the 9-11 attacks, self-reported alcohol use increased in NYC (Bowler et al. 2012), rates of PTSD in the indirectly impacted NYC population were found to be as high as 11% (Neria, DiGrande & Adams 2011) and general anxiety disorder in Manhattan was more than 10% (Neria, DiGrande & Adams 2011). Beyond NYC and Manhattan, a national study found that 65% of working adults reported 'accomplishing

less work', 24% reported avoiding public gatherings and 38% reported using alcohol to 'relax, sleep better or feel better', and 43% reported 'being unable to share terrorism-related thoughts and feelings because it made others uncomfortable' (Burkle 2011). Emerging evidence on indirect exposures, such as those of most of the USA on September 11, has found 'probable association between indirect exposure and PTSD (Neria, DiGrande & Adams 2011& Watson, Brymer & Bonanno 2011). Some have proposed that some of the indirect effects may be due to repeated viewing of traumatic/fearful events through media (Neria, DiGrande & Adams 2011).

Children are also adversely impacted by disasters, either through direct exposure or indirect exposure. Studies of Children following 9-11 in New York City found rates of PTSD as high as 29% among children who lost at parent in the disaster (4 months after the event) and general prevalence of PTSD among four to seven year olds ranged from 7-26% (6 months after the event). Risk factors for PTSD in children following September 11th include high exposure to the event, repeated viewings of the event on TV, loss of a parent or loved one, seeing parents cry and exposure of a family member to the disaster (Neria, DiGrande & Adams 2011). The relationship between parents exposure or reactions to children's mental and behavioral health was also noted by Stellman et al. (2008) who found that parents who suffered probably PTSD were more likely to report 'psychological symptoms and behavioral problems' in their children than those who did not meet the definition of PTSD.

Exposures

While many studies look at exposures related to a specific disaster for risk factors, general categories emerge from all disasters that impact one's risk of developing PTSD. One of the common exposures related to PTSD risk is exposure to bodies or remains (Pietrzak et al. 2012, Thormar et al. 2010,). Those working in body recovery have been found to have nearly 3x the rate of somatic complaints and increased levels of PTSD (Thormar et al. 2010). A study of responders in Israel found that the lack of "emotional reward for saving lives" that body handlers face, combined with difficulty of speaking about body handling made it 'particularly stressful' (Hyman 2004).

Suffering an injury or facing an immediate threat to life, as often faced by victims, firefighters and first responders, has repeatedly been found to be one of the most important risk factors for developing PTSD (Debchoudhury et al. 2011, Neria, DiGrande & Adams 2011, Pietrzak 2012). Knowing a victim (death) of the disaster has also been shown to be a risk-factor (Pietrzak et al. 2012, Neria, DiGrande & Adams 2011, Wang et al. 2013, Stellman et al. 2008) for responders to develop PTSD. Exposure to remains and/or traumatic events (Also called horrific events, such as people jumping from a building/falling bodies) was strongly associated with PTSD (Debchoudhury et al. 2011, Benedek, Fullerton & Ursano 2007). Time at a disaster site as well as arrival at a site are often studied as risk-factors with mixed results, however these may be explained by the presence of these exposures.

While there are a number of exposures and occupational populations that put responders and volunteers at risk for mental health issues following a disaster, access and care seeking remain hurdles for these victims. Studies have found that 64% of those who have mental health symptoms did not seek help, despite almost 70% reporting diminished functioning (Brackbill et al. 2013). Unmet need continues to be a major hurdle in helping those suffering from Mental Health issues following a disaster.

Studies have found that even when care is sought, there remains unmet need, especially for those who have a clear diagnosis of a mental health disorder (Brackbill et al 2013). With additional population groups struggling with mental health issues despite not 'meeting' the definition of PTSD, it is repeatedly suggested that "targeted interventions" be available following a traumatic event or disaster for anyone, particularly rescue, recovery and support workers, as they have been shown to aid recovery (Watson, Brymer & Bonanno 2011).

Figure 2: Reported Mental Health Issue Prevalence Following Disasters in Specific Populations

Population/Status	Disaster	Disorder	Prevalence	Notes/Source
US Baseline PTSD	General Prevalence	PTSD	3.6%	Bowler et al 2012
US Veterans	Post-Afghanistan Deployment	PTSD	11%	Reported by Stellman et al. 2008
Police	9-11	PTSD	5.4%	Pietrzak 2012
Police	9-11	Partial PTSD	15.4%	Pietrzak 2012
Police (Male)	9-11	PTSD	5.3%	Pietrzak 2012
Police (Male)		Partial PTSD	15.3%	Pietrzak 2012
Police (Female)	9-11	PTSD	6%	Pietrzak 2012
Police (Female)	9-11	Partial PTSD	15.7%	Pietrzak 2012
Police (Men)	9-11	PTSD	25.1% to 29.9%	Bolwer et al 2012
Police (Female)	9-11	PTSD	*28.6% to 32.2%*	Bolwer et al 2012
Police Overall	9-11	PTSD (2003-2007)	7.8% to 16.5%	Bowler et al 2012
WTCMMTP Cohort	9-11	PTSD	11%	Stellman et al. 2008
WTCMMTP Cohort	9-11	Depression	8.8%	Stellman et al. 2008
Clean-up Workers	Chernobyl	Stress Disorders	44% 8 years later	Reported by Brackbill 2013
New Orleans Residents during Katrina	Hurricane Katrina	PTSD	25-30%	Reported by Vu & VanLandingham 2012
Vietnamese Residents of New Orleans during Katrina	Hurricane Katrina	PTSD	5%	Reported by Vu & VanLandingham 2012
Lay Volunteers	9-11	PTSD	34%	Debchoudhury
Affiliated Volunteers	9-11	PTSD	13.3%	Debchoudhury
Professional Responders	Taiwan Earthquake	PTSD	19.8%	Guo 2004
Volunteer Responders	Taiwan Earthquake	PTSD	31.8%	Guo 2004
NYC Population Indirectly Exposed	9-11	PTSD	11%	Neria, DiGrande & Adams 2011

Training Programs and Applications

Training for responders (volunteer and professional), both in mental health and in response procedures, has been found to be effective in helping prevent mental health issues following response. The incorporation of mental health training into pre-disaster training as part of prevention, however, is a newer approach (As noted by Beaton et al. 2009) and few if any statistical studies (of training alone) report its statistical efficacy.

A number of studies that utilize regression in their analysis of disaster mental health outcomes note that 'pre-disaster preparation' or 'training' is a protective factor from developing later mental health issues (Benedek, Fullerton & Ursano 2007). A number of post 9-11 studies additionally hypothesize or suggest that lower rates of PTSD in police and firefighters (compared to other responders) is partially due to previous trainings those occupational groups receive (Bowler et al. 2012). High rates of mental illness in SSP and volunteers (as opposed to professionals) can be attributed to lack of preparedness and training (Lee & Weinstock 2011). Worker safety and health preparedness are critical for "protecting workers and promoting resiliency among personnel involved in disaster response, recovery and cleanup (Reissman & Howard 2008).

Research has also shown that workers who are often on the front line of disasters need training to recognize 'adverse mental health and behavioral outcomes' in order to be able to provide assistance and referrals (Beaton et al. 2009). A positive note is that pre-disaster mental health trainings have been found to increase knowledge of core mental health response principals (Jordans et al. 2012) and knowledge of symptoms and reactions (Hawley et al. 2007).

While studies have been inconclusive about the relationship between perception of training and its relationship to mental health outcomes, Foran et al. (2012) pose that 'positive views may result in greater attention, support and enthusiasm for that program" which can lead to 'positive implications for long term and organizational acceptance" (Foran et al. 2012). With that in mind, many studies have found that participants feel training in mental health is 'helpful' or 'beneficial'. A study of 'just in time' training to Project Hope Volunteers prior to deployment to the South-East Asian Tsunami in 2004 found levels of PTSD in volunteers to be 'no higher than population levels', despite the survey sample not being of a size to generate significance (Benedek & Ritchie 2006). Those respondents who received the training however found it helpful and those who did not receive the training expressed a desire to have received it. Perceptions none the less, are important to consider in creating a training program.

Very few studies have been able to properly 'control' for the effects of training in groups of disaster responders (partially due to the ethical ramifications in doing so) and therefore limited data is available regarding what trainings are most efficacious, what populations benefit most and the timeframe of protection that may be offered.

Applications

Web-Based Services

One popular mental health 'intervention' used in areas where there may be issues with stigma, access or high costs that deter people from seeking mental health care is 'e-health' or online programs. Studies of these programs often find positive results despite high dropout rates which may negate positive findings. A 2012 study on the use of web-based services for mental health by Price et al. aimed to look at why people do, or do not use and complete online mental health services. The study provides valuable insight into reasons and rates of online use. One element of the commentary that is of note was that in the wake of disasters, people often face competing responsibilities or may lack access to basic resources (internet) which could make use of an online mental health service difficult. Online mental-health tools often involve a screening tool to help determine which modules (depression symptoms, PTSD, general anxiety disorder, panic disorder, alcohol abuse, marijuana abuse, cigarette smoking etc) are most applicable to the individual (including screening for sub-clinical symptoms) as studies have found that use of tools increases when people feel they have more relevance to their situation. The findings by Price et al. (2012) were notable compared to previous studies as they analyzed rates and reasons for dropout. Fourty-Eight percent of those contacted did not access the site at all, and additional 30% did not use a module (but did take the screening). Follow up calls determined that having considered seeking mental health treatment and having used the internet for health related information increased the likelihood of a person using the tool. The authors noted however that actual need (higher prevalence of mental health symptoms) was NOT associated with higher use nor was baseline mental health status, indicating that targeting the intervention to the most vulnerable may not benefit them as they may not perceive the need even if symptoms are present (Price et al. 2012). The authors conclude that "Web based treatment may be of most relevance to those who have considered or have had some experience with mental health treatments" and can be used as a 'booster session' to those who have previously accessed care or may reach portion of the population who would not otherwise be able to seek out care.

Religious Groups

Studies have found that often people seeking help following a disaster turn to trusted religious or spiritual leaders (McCabe et al. 2008 & Aten, Topping, Denney & Bayne 2010). Multiple studies of religious leaders have found that many of them are interested in receiving more mental health training (McCabe et al. 2008). McCabe notes that Spiritual Leaders are an ideal population to train (he recommends training in PFA) as they are already trusted community members and can serve as additional mental health resources, particularly in areas that have a shortage of true mental health professionals (McCabe et al. 2008). Results from a 2006 survey of African American religious leaders in the Gulf Coast confirmed these ideas, with a majority of pastors responding that they needed more information on the impacts and effects of disasters on mental health, on how to distinguish 'normal' symptoms from those severe enough to warrant clinical treatment, and desired education and outreach materials for their congregations (Aten, Topping, Denney & Bayne 2010). The survey further found that pastors felt "uncertain about knowing when to refer" and believed that they did not 'explicitly attend to the mental health needs seen' following Katrina, often because they were uncertain how to do so (Aten, Topping, Denney & Bayne 2010).

Like McCabe, Everly (year), in his article suggesting PFA training be given to nurses, notes that nurses have been found to be interested in learning more about mental health and are ideally located in a community to provide expanded mental health services (Everly et al. 2010). While neither paper is scientifically rigorous, both offer well thought out suggestions for additional community members who may benefit from mental health training and whose skills can help to increase population resiliency

Example Programs

While a number of programs and efforts have been made to increase post-disaster mental health services, one in particular, ReachNOLA, could be particularly useful for analysis moving forward in this project:

ReachNOLA, a collaborative effort between community, medical and university partners in New Orleans following Hurricane Katrina developed a mental health training module which could be beneficial to examine in creating a new curricula for WETP. The Mental Health Infrastructure and Training Project was a 'disaster recovery model specifically focused on developing mental health services and building capacity for agencies and providers within a disparities focused, community-Academic participatory partnership framework". The program included financial support to local agencies to increase mental health services, emphasized linkages between clinical care providers and community organizations/community health workers and developed a training program for depression, trauma and other disaster exposures.

The program worked closely with community organizations to develop curricula that were applicable to therapists, providers, CHW's and case managers. Components of the curricula included self-care, recognition of mental health symptoms, addressing stigma, referrals, relapse prevention and safety strategies (as well as others). Educational techniques included mixing providers and community members, role playing, theory based explanations, self-assessments and networking. The training modules received positive feedback (4.5+ out of 5) from a number of respondents and was well received as it was perceived as relevant to those attending.

Conclusion

Disaster Mental Health and responder mental health is a complex subject with room for further research. Efforts to improve resilience in responders must target a variety of personal, demographic and occupational, as well as exposure factors that impact a responder's resilience. The literature on interventions is mixed and no current program is better supported than others. Programs aiming to address disaster mental health must consider target populations, communities and known needs in determining the best intervention and technique in moving forward. Further research should address gaps in knowledge and help to better explore potential risk factors as well as the efficacy of training and interventions in improving and preventing mental health issues.

References

Part 1 Citations

Allen, B., Brymer, M., Steinberg, A., Vernberg, E., Jacobs, A., Speier, A., Pynoos, R. (2010). "Perceptions of psychological first aid among providers responding to Hurricanes Gustav and Ike". Journal of traumatic stress (0894-9867), 23 (4), 509.

Adler, A, Bliese, P, McGurk, D, Hoge, C, & Castro, C (2009), 'Battlemind Debriefing and Battlemind Training as Early Interventions With Soldiers Returning From Iraq: Randomization by Platoon', *Journal Of Consulting & Clinical Psychology*, 77, 5, pp. 928-940.

Bisson, J., Deahl, M., (1994). "Psychological debriefing and prevention of post-traumatic stress. More research is needed". British journal of psychiatry (0007-1250), 165 (6), 717.

Bledsoe, B. (2003). "Critical incident stress management (CISM): benefit or risk for emergency services?". Prehospital emergency care (1090-3127), 7 (2), 272.

Castro C., Adler, A., McGurk, D., Bliese, P. (2012). "Mental health training with soldiers four months after returning from Iraq: randomization by platoon.". Journal of traumatic stress (0894-9867), 25 (4), 376.

Devilly, G, Gist, R, & Cotton, P. (2006). 'Ready! Fire! Aim! The Status of Psychological Debriefing and Therapeutic Interventions: In the Work Place and After Disasters', *Review Of General Psychology*, 10, 4, pp. 318-345

Everly, G., & Flynn, B. (2006). "Principles and practical procedures for acute psychological first aid training for personnel without mental health experience". International journal of emergency mental health (1522-4821), 8 (2), 93.

Everly, G., Barnett, D., Sperry, N., Links, J. (2010). "The use of psychological first aid (PFA) training among nurses to enhance population resiliency". International journal of emergency mental health (1522-4821), 12 (1), 21.

Forbes, D., Lewis, V., Varker,T., Phelps, A., O'Donnell, M., Wade, D., Ruzek, J., Watson, P., Bryant, R., Creamer, M. (2011). "Psychological first aid following trauma: implementation and evaluation framework for high-risk organizations". Psychiatry (0033-2747), 74 (3), 224

Fox, J, Burkle, F, Bass, J, Pia, F, Epstein, J, & Markenson, D (2012), 'The effectiveness of psychological first aid as a disaster intervention tool: research analysis of peer-reviewed literature from 1990-2010', *Disaster Medicine And Public Health Preparedness*, 6, 3, pp. 247-252.

Garcia, Evangeline (02/2003). "Supporting the Federal Emergency Management Agency Rescuers: a variation of critical incident stress management". Military medicine (0026-4075), 168 (2), 87.

Hawley, S., Hawley, G., St. Romain, T., Ablah, E. (2007). "Quantitative impact of mental health preparedness training for public health professionals". Biosecurity and bioterrorism (1538-7135), 5 (4), 347.

Hobfoll, S, Watson, P, Bell, C, Bryant, R, Brymer, M, Friedman, M, Friedman, M, Gersons, B, de Jong, J, Layne, C, Maguen, S, Neria, Y, Norwood, A, Pynoos, R, Reissman, D, Ruzek, J, Shalev, A, Solomon, Z, Steinberg, A, & Ursano, R 2007, 'Five Essential Elements of Immediate and Mid--Term Mass Trauma Intervention: Empirical Evidence', *Psychiatry: Interpersonal & Biological Processes*, 70, 4, pp. 283-315

http://www.fireengineering.com/articles/print/volume-158/issue-12/features/psychological-first-aid-replacement-for-critical-incident-stress-debriefing.html

Irving, P., Long, A. (2001). "Critical incident stress debriefing following traumatic life experiences". Journal of psychiatric and mental health nursing (1351-0126), 8 (4), 307.

McCabe, O., Lating, J., Mosley, A., Links, J., Everly, G., Teague, P., Kaminsky, M. (2007). "Psychological first aid training for the faith community: a model curriculum". International journal of emergency mental health (1522-4821), 9 (3), 181.

Mitchell, A., Sakraida, T., Kameg, K. (2003). "Critical incident stress debriefing: implications for best practice". Disaster management & response (1540-2487), 1 (2), 46.

Mitchell, JT (2004), 'A response to the Devilly and Cotton article, "Psychological Debriefing and the Workplace ..."',

Australian Psychologist, 39, 1, pp. 24-28,

Nash, W., Watson, P. (2012). "Review of VA/DOD Clinical Practice Guideline on management of acute stress and interventions to prevent posttraumatic stress disorder". Journal of rehabilitation research and development (0748-7711), 49 (5), 637.

Regel, S 2007, 'Post-trauma support in the workplace: the current status and practice of critical incident stress management (CISM) and psychological debriefing (PD) within organizations in the UK', *Occupational Medicine (Oxford, England)*, 57, 6, pp. 411-416,

Richards, D (2001), 'A field study of critical incident stress debriefing versus critical incident stress management', *Journal Of Mental Health*, 10, 3, pp. 351-362, Academic Search Premier,.

Riggs, D, & Sermanian, D 2012, 'Prevention and Care of Combat-Related PTSD: Directions for Future Explorations', *Military Medicine*, pp. 14-20, International Security & Counter Terrorism Reference Center,.

Rose, S, Bisson, J, Churchill, R, & Wessely, S (2002). 'Psychological debriefing for preventing post-traumatic stress disorder (PTSD)', *Cochrane Database Of Systematic Reviews (Online)*, 2, p. CD000560

Schoch-Spana, M. (2008). "Community resilience roundtable on the implementation of Homeland Security Presidential Directive 21 (HSPD-21)". Biosecurity and bioterrorism (1538-7135), 6 (3), 269.

Shubert, J. (2011). *CISM and CISD Controversy*. Comprehensive Assessment Essay thesis, Fielding Graduate University.

Smith, A., & Roberts, K. (2003). "Interventions for post-traumatic stress disorder and psychological distress in emergency ambulance personnel: a review of the literature". Emergency medicine journal: EMJ (1472-0205), 20 (1), 75.

Stevan E. Hobfoll; Patricia Watson; Carl C. Bell; Richard A. Bryant; Melissa J. Brymer; Matthew J. Friedman; Merle Friedman; Berthold P.R. Gersons; Joop T.V.M de Jong; Christopher M. Layne; Shira Maguen; Yuval Neria; Ann E. Norwood; Robert S. Pynoos; Dori Reissman; Josef I. Ruzek; Arieh Y. Shalev; Zahava Solomon; Alan M. Steinberg; Robert J. Ursano (2007), *Five Essential Elements of Immediate and Mid-Term Mass Trauam Intervention; Empirical Evidence.* Psychiatry 70(4)

Vymetal, S, Deistler, A, Bering, R, Schedlich, C, Rooze, M, Orengo, F, Zurek, G, & Krtickova, M 2011, 'European Commission project: European Guideline for Target Group-Oriented Psychosocial Aftercare-Implementation', *Prehospital And Disaster Medicine*, 26, 3, pp. 234-236

Yamashita, Jun; A review of psychosocial assessments for disaster mental health studies. Psychological Trauma: Theory, Research, Practice, and Policy, (2012) Vol 4(6), 560-567. doi: 10.1037/a0025952

Part 2 Additional References

Adams, R, & Boscarino, J (2005). 'Differences in Mental Health Outcomes among Whites, African Americans, and Hispanics Following a Community Disaster', Psychiatry, 68, 3, pp. 250-265

Ahern, J., Galea, S. (2006). "Social context and depression after a disaster: the role of income inequality". Journal of epidemiology and community health (1979) (0143-005X), 60 (9), 766.

Benedek, D., Fullerton, C., Ursano, R. (2007). "First responders: mental health consequences of natural and human-made disasters for public health and public safety workers". Annual review of public health (0163-7525), 28, 55.

Bowler, R, Harris, M, Li, J, Gocheva, V, Stellman, S, Wilson, K, Alper, H, Schwarzer, R, & Cone, J (2012). 'Longitudinal mental health impact among police responders to the 9/11 terrorist attack', American Journal Of Industrial Medicine, 55, 4, pp. 297-312, MEDLINE,

Bowler, R, Han, H, Gocheva, V, Nakagawa, S, Alper, H, DiGrande, L, & Cone, J (2010), 'Gender differences in probable posttraumatic stress disorder among police responders to the 2001 World Trade Center terrorist attack', American Journal Of Industrial Medicine, 53, 12, pp. 1186-1196, MEDLINE,

Brackbill, R., Stellman, S., Perlman, S., Walker, D., & Farfel, M. (2013). "Mental health of those directly exposed to the World Trade Center disaster: Unmet mental health care need, mental health treatment service use, and quality of life". Social science & medicine (1982) (0277-9536)

Burkle, F. (2011). "The limits to our capacity: reflections on resiliency, community engagement, and recovery in 21st-century crises". Disaster medicine and public health preparedness (1935-7893), 5 Suppl 2 (supplement_2), S176.

Debchoudhury, I., Welch, A., Fairclough, M., Cone, J., Brackbill, R., Stellman, S., Farfel, M. (2011). "Comparison of health outcomes among affiliated and lay disaster volunteers enrolled in the World Trade Center Health Registry". Preventive medicine (0091-7435), 53 (6), 359.

Drogendijk, A, van der Velden, P, & Kleber, R (2012), 'Acculturation and post-disaster mental health problems among affected and non-affected immigrants: A comparative study', Journal Of Affective Disorders, 138, 3, pp. 485-489

Foran, H, Adler, A, McGurk, D, & Bliese, P (2012), 'Soldiers' perceptions of resilience training and postdeployment adjustment: Validation of a measure of resilience training content and training process', Psychological Services, 9, 4, pp. 390-403

Grattan, L, Roberts, S, Mahan, W, McLaughlin, P, Otwell, W, & Morris, J (2011), 'The Early Psychological Impacts of the Deepwater Horizon Oil Spill on Florida and Alabama Communities', Environmental Health Perspectives, 6, p. 838

Guo, Y., Chen, C.H., Lu, M.L., Tan, H.K.L., Lee, H.W., Want, T.N., (2004). "Posttraumatic stress disorder among professional and non-professional rescuers involved in an earthquake in Taiwan". Psychiatry research (0165-1781), 127 (1-2), 35.

Hyman, O. (2004). "Perceived social support and secondary traumatic stress symptoms in emergency responders". Journal of traumatic stress (0894-9867), 17 (2), 149.

Johnson, S, Langlieb, A, Teret, S, Gross, R, Schwab, M, Massa, J, Ashwell, L, & Geyh, A (2005). 'Rethinking First Response: Effects of the Clean Up and Recovery Effort on Workers at the World Trade Center Disaster Site', Journal Of Occupational & Environmental Medicine, 47, 4, pp. 386-391

Nair, H, Ekenga, C, Cone, J, Brackbill, R, Farfel, M, & Stellman, S (2012), 'Co-occurring Lower Respiratory Symptoms and Posttraumatic Stress Disorder 5 to 6 Years After the World Trade Center Terrorist Attack', American Journal Of Public Health, 102, 10, pp. 1964-1973

Neria, Y., DiGrande, L., Adams, B., (2011). "Posttraumatic stress disorder following the September 11, 2001, terrorist attacks: a review of the literature among highly exposed populations". The American psychologist (0003-066X), 66 (6), 429.

Pearson, J, & Weinstock, D (2011), 'Minimizing Safety and Health Impacts at Disaster Sites: the Need for Comprehensive Worker Safety and Health Training Based on an Analysis of National Disasters in the U.S', Journal Of Homeland Security & Emergency Management, 8, 1, pp. 1-16, International Security & Counter Terrorism Reference Center

Pietrantoni, L., & Prati, G. (2008). "Resilience among first responders". African health sciences (1680-6905), 8 Suppl 1, S14.

Pietrzak, R. H., Schechter, C. B., Bromet, E. J., Katz, C. L., Reissman, D. B., Ozbay, F., Sharma, V., Crane, M., Harrions, D., Herbert, R., Levin, S., Luft., Moline, J., Udasin., Stellman, J., Landrigan, P., & Southwick, S. M. (2012). The burden of full and subsyndromal posttraumatic stress disorder among police involved in the World Trade Center rescue and recovery effort. Journal of psychiatric research.

Stellman, J, Smith, R, Katz, C, Sharma, V, Charney, D, Herbert, R, Moline, J, Luft, B, Markowitz, S, Udasin, I, Harrison, D, Baron, S, Landrigan, P, Levin, S, & Southwick, S (2008). 'Enduring Mental Health Morbidity and Social Function Impairment in World Trade Center Rescue, Recovery, and Cleanup Workers: The Psychological Dimension of an Environmental Health Disaster', Environmental Health Perspectives, 9, p. 1248

Thormar, S, Gersons, B, Juen, B, Marschang, A, Djakababa, M, & Olff, M (2010), 'The mental health impact of volunteering in a disaster setting: A review', Journal Of Nervous And Mental Disease, 198, 8, pp. 529-538

Vu, L, & VanLandingham, M (2012). 'Physical and Mental Health Consequences of Katrina on Vietnamese Immigrants in New Orleans: A Pre- and Post-Disaster Assessment', Journal Of Immigrant & Minority Health, 14, 3, pp. 386-394

Wang, X., Chan, C., Shi, Z., Wang, B. (2013). "Mental health risks in the local workforce engaged in disaster relief and reconstruction". Qualitative health research (1049-7323), 23 (2), 207.

Watson, P., Brymer, M., Bonanno, G., (2011). "Postdisaster psychological intervention since 9/11". The American psychologist (0003-066X), 66 (6), 482.

Part 3 Additional References

Beaton, R., Murphy, S., Houston, B., Reyes, G., Bramwell, S., McDaniel, M., Reissman, D., Pfefferbaum, B. (2009). "The role of public health in mental and behavioral health in children and families following disasters". Journal of public health management and practice (1078-4659), 15 (6), E1.

Benedek, D, & Ritchie, E (2006), '"Just-in-Time" Mental Health Training and Surveillance for the Project HOPE Mission', *Military Medicine*, 171, pp. 63-65, International Security & Counter Terrorism Reference Center

Foran, H, Adler, A, McGurk, D, & Bliese, P (2012), 'Soldiers' perceptions of resilience training and postdeployment adjustment: Validation of a measure of resilience training content and training process', *Psychological Services*, 9, 4, pp. 390-403

Jordans, M, Luitel, N, Poudyal, B, Tol, W, & Komproe, I (2012), 'Evaluation of a brief training on mental health and psychosocial support in emergencies: a pre- and post-assessment in Nepal', *Prehospital And Disaster Medicine*, 27, 3, pp. 235-238

Price, M., Gros, D., McCauley, J., Gros, K., Ruggiero, K. (2012). "Nonuse and dropout attrition for a web-based mental health intervention delivered in a post-disaster context". Psychiatry (Washington, D.C.) (0033-2747), 75 (3), 267. PMID: 22913502 DOI: 10.1521/psyc.2012.75.3.267

Reissman, D, & Howard, J (2008), 'Responder Safety and Health: Preparing for Future Disasters', *Mount Sinai Journal Of Medicine*, 75, 2, pp. 135-141

Springgate, B., Wennerstorm, A., Meyers, D., Allen, C., Vannoy, S., Bentham, W., Wells, K. (2011). "Building community resilience through mental health infrastructure and training in post-Katrina New Orleans". Ethnicity & disease (1049-510X), 21 (3 suppl 1), S1.