Vicarious Trauma In Aid Workers Following The World Trade Center Attack In 2001*

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This study investigated the prevalence of secondary trauma in volunteers who were involved in the emergency response after the World Trade Center (WTC) attack. Secondary or vicarious trauma is defined as therapists’ emotional reactions to their clients’ traumatic material. A total of 163 caseworkers, non-clinicians involved in addressing victims’ concrete needs, participated in a semi-structured phone interview that assessed their background and volunteer experience and a mailed survey that assessed their psychological status. Outcome data were the PTSD Checklist (PCL) and the Beck Depression Inventory (BDI). Responses identified two distinct categories of volunteers: volunteers from out of town tended to be older, more experienced in disaster relief work, and had less levels of exposure to the attack than volunteers from the New York area. Most volunteers found the experience rewarding and enriching. However, 7.4% of the sample met diagnostic criteria for PTSD and a fifth had BDI scores indicating moderate to severe depression. Prior trauma, exposure to the event, self-reported unmet needs, and beginning or increasing substance use after 9/11 were significantly associated with post-traumatic stress symptoms and depression. Post-traumatic stress and depression symptoms were negatively correlated with age. Having had previous disaster experience and living with a partner appeared to have a protective effect on mental health status. In conclu-

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tion, relief agencies should pay particular attention to providing support for volunteers with prior traumatic experiences. Furthermore, they should ensure ongoing support after the end of the relief work.

Key Words: Volunteers, WTC attack, terrorism, post-traumatic stress disorder, New York

Introduction

The magnitude of the relief effort after the WTC attack on September 11, 2001 was enormous. Thousands of mental health professionals, workers redeployed from other jobs, and volunteers filled new positions bringing services to the survivors. The “Family Assistance Center,” situated on a large Hudson River pier under tents, was the centralized location for providing services—ranging from DNA collection, to massage, to counseling, to emergency financial assistance—for people affected by the collapse of the World Trade Center Towers. Over a thousand people from at least 20 agencies worked at the pier daily, and as many as five thousand went to the pier for services seven days a week. Many of the relief workers were recruited on very short notice and placed nearly immediately. Three agencies had a particularly large presence, and each utilized a large cadre of volunteers: Safe Horizon (which was the conduit for the September 11th Fund), the American Red Cross, and the Salvation Army. Many of these volunteers and redeployed staff had extensive direct interactions with clients who lost family members, jobs, property and/or residences as a result of the disaster. The massive relief effort created the potential for secondary trauma, also known as vicarious trauma, in a large cadre of people, many of whom had no prior training or experience in dealing with the aftermath of violence.

Research on vicarious trauma

Vicarious trauma is defined as a therapist’s emotional reactions to a client’s traumatic material (Sexton 1999). Empathy with a victim who reports trauma and extreme loss may lead to feelings of fear and pain and to similar reactions of post-traumatic stress symptoms and depression in the counselor. Vicarious trauma is a well-established phenomenon, documented in those who counsel victims of violent crime, such as rape crisis counselors). Several factors were found to predispose therapists to vicarious trauma. These variables include previous personal
trauma history, therapist training, and intensity of exposure to clients’ victimization (Crothers 1995; Luce, Fitz-Cozens, Midgley and Burges 2002; Pearlman and Saakvitne 1995; Schauben and Frazier 1995).

Pearlman and Maclan (1995) found in a survey of 188 trauma therapists that less experienced therapists were more likely to experience psychological difficulties than more experienced therapists, as measured by the Traumatic Stress Institute Belief Scale (Adams, Matto, & Harrington 2001) and the Symptom Checklist-90 revised. Therapists with a higher number of prior traumatic life events also showed more negative effects from the work than those without a personal trauma history. Stressful life events within six months after a major disaster significantly contributed to the development of PTSD in a group of 355 medical care workers who were involved with the Ramstein Air Force Base disaster in 1988 (Epstein et al 1998).

The onset of PTSD and depression in relief workers may be delayed for several reasons. Relief workers may not feel “entitled” to negative emotional reactions considering the loss that “real” victims experienced. Firefighters, for example, reportedly inhabit a culture that expects them to “step up to the plate” and “tough it out” during difficult times—a culture in which it can be both socially and professionally detrimental to acknowledge that they are having a difficult time and need support (Eränen & Liebkind 1993). Hence they may find it hard to step out of the caregiver role to focus on their own reactions and needs (Mitchell & Dyregrow 1993). The onset of emotional problems may also be mitigated by the mutual support and camaraderie that occurs during the intensive disaster relief phase (Mitchell & Dyregrow 1993; Moran 1995).

Direct or indirect exposure to extreme life events has also the potential to cause personal growth. The framework of post-traumatic growth stipulates that major traumatic life events are psychosocial transitions that have the potential for both positive and negative outcomes. Extreme life events and trauma can result in a perceived change in self, a changed sense of relationships with others, and a shift in life priorities (Tedeschi & Calhoun 1996). For example, breast cancer patients were found to show greater post-traumatic growth in relating to others, appreciation of life, and spiritual change than a matched healthy comparison group (Cordova et al 2001). Findings of posttraumatic growth were also observed after major traumatic life events such as bereavement (Calhoun & Tedeschi 1989-1990; Folkman 1997), fires (Thompson 1985), disaster (McMillen, Smith & Fisher 1997), and childhood sexual abuse (McMillen, Zuravin, & Rideout 1995).
Lessons from the Oklahoma City bombing

This study built upon lessons learned about vicarious trauma from the relief effort after the bombing of the Murrah Building in Oklahoma City. The publication “Responding to Terrorism Victims—Oklahoma City and Beyond” (Office for Victims of Crime, US Dept. of Justice 2000) noted that “significant levels of secondary traumatic stress were experienced by a wide range of professionals and were exacerbated in many cases by the cumulative effect of exposure to other traumatic events.” It was also reported that many of these secondary victims did not utilize resources offered through their Employee Assistance Programs in the weeks immediately following the bombing. Task-oriented supervisors brought in from outside the region to deal with the disaster often were insensitive to the traumatized state of the workforce. Thus, the workers themselves, as well as their supervisors, underestimated the long-term psychological vulnerability of the workers and volunteers. Therapists brought in to work with the victimized families were not linked with the relief workers; the need was overlooked and there was no mechanism for providing psychological services to the workers at the many different agencies involved in the relief effort. The OVC report noted the absence of ongoing mental health support for secondary and tertiary victims who experienced “grief, bouts of severe depression, substance abuse, rage, domestic violence and stress-related physical disorders.”

Little is known about the impact on others who provide more concrete services to victims—for example, those who conducted interviews to determine eligibility for emergency financial assistance or those who provided interpreter services. Because these workers were hearing firsthand the stories of death, injury, or displacement, they were likely to be at risk for vicarious trauma, as well. Relief agencies were concerned that the emotional fallout of involvement in the relief effort would be delayed and even masked by the long work hours and the fast-paced but supportive environment. Volunteers and redeployed workers might only begin to feel the full impact of the work as they began returning to their usual jobs. Yet at the time of return to “normal life,” the supportive camaraderie among the relief workers and access to psychological assistance were diminished or lost.

Study purpose

The purpose of the study was to assess the impact of relief work on volunteers and redeployed workers serving the relief effort in various capacities. We were particularly interested in assessing the potential for
vicarious trauma among relief workers who did not provide mental health interventions. We will describe the prevalence of vicarious trauma and depression in volunteers, variables associated with these mental health symptoms, and coping and support mechanisms that mitigate the development of symptoms.

**Methodology**

**Sample and Inclusion Criteria**

The three major relief agencies, the American Red Cross, Salvation Army, and Safe Horizon, were contacted to obtain their consent to participate in the study. Representatives of each agency were invited to participate in the Advisory Board and participated in the design of the study methodology. The study received approval from Safe Horizon’s Human Research Ethics Committee.

The primary criterion for inclusion in the study was having served in the relief effort for a minimum of 35 hours in direct interaction with clients, as either a volunteer or a redeployed staff member. Mental health professionals were excluded from this study.

Staff of the American Red Cross and the Salvation Army contacted eligible volunteers and staff from their respective databases and obtained consent for a project recruiter to contact the individual. If consent to be contacted was given, an interviewer called the volunteer to explain the study in more detail, obtain informed consent, and conduct the phone interview portion of the study. Volunteers and staff who worked for Safe Horizon received an e-mail asking them to call if they met the eligibility criteria and wanted to participate in the study. This recruitment methodology resulted in a total of 163 telephone interviews (62 from Safe Horizon, 51 from the American Red Cross, and 50 from the Salvation Army). A total of 122 volunteers also completed and returned a supplementary written questionnaire mailed immediately after the telephone interview (75%). Data collection was conducted eight to twelve months after the WTC attack.

**Variables and Instruments**

Each volunteer who agreed to participate in the study completed a phone interview to collect qualitative data, and received a mailed survey using standardized instruments to collect quantitative data. A structured phone interview outline was developed to provide a descriptive picture of
the needs and levels of trauma symptoms among relief workers and to identify factors that might exacerbate or mitigate traumatic stress. Participants were also asked open-ended questions about their own sense of the long-term impact of the event and their relief work, whether support was available when they needed it, what additional services they felt they needed or would utilize, and how they would prefer to access those services. Finally, they were asked about any positive impact the volunteer experience may have had upon them. The interview outline was developed with the guidance of program administrators who had been involved in the relief effort. The classification of needs was guided by a list of needs developed for a large-scale national study of victim needs (Brickman et al. 2002). Questions, response options, and the overall flow of the interview were then pre-tested with volunteers who would not be eligible for the study.

After the telephone interview, a packet of standardized self-report measures was mailed to the respondent. These measures assessed prior exposure to traumatic events; traumatic stress; depression; social support received and self-reported behavior change. Standardized instruments included the Life Events Scale; the PTSD Checklist–Civilian Version (PCL–C) developed by the National Center for PTSD (Blake et al. 1990; Blanchard et al. 1996); and the revised Beck Depression Inventory (Beck and Steer 1993). The type and severity of prior traumatic events was assessed by the Life Events Scale used in the Clinician Administered PTSD survey (Blanchard et al. 1996). The PCL is a self-report rating scale of post-traumatic stress symptoms experienced in the past month, and is based on the Clinician-Administered PTSD Scale (CAPS). It is used to screen for PTSD in community settings, and contains 17 items that correspond to DSM-III criteria for PTSD. Reliability and validity of the scale are high: Test-retest reliability is (.96), and convergent validities with the Mississippi scale (.93), PK scale of MMPI-2 (.72), and Impact of Events Scale (.90) are good to excellent. The Beck Depression Inventory (BDI) is one of the most widely used instruments for assessing the intensity of depression in psychiatric patients and for detecting depression in normal populations. The 21 items are self-rated from 0 to 3 in terms of intensity.

Findings

Description of the Volunteers

Demographic Information. The majority of the volunteers (78 percent) were female. They ranged in age from 21 to 75 years, with a mean age of 44 years. The group was relatively well educated, with 3/4 hav-
ing attended college or graduate school. Over half of the sample (55 percent) reported living with a spouse or partner; nineteen percent had children under 18 years old living in the household. Sixty percent were employed immediately before they began their relief work.

**Exposure to the Attack.** The group was split between those who were in New York (60 percent) and those who were outside New York (40 percent) at the time of the attack. Twelve percent of the sample reporting having been below 14th Street at the time of the attack, and a third of the volunteers (32 percent) reported that they had directly witnessed the attack.

Emotional exposure was also relatively high in this sample: 42 percent stated that they were concerned about the well-being of a loved one during the day of the attack and 34 percent knew somebody who was killed. Typically, it was not a person they were very close to: relationships included a distant relative, a relative of friends, a neighbor and a family member of a colleague. Forty percent indicated that they knew somebody who was involved in the rescue efforts. These data suggest that a large proportion of New Yorkers who came forward to participate in the immediate relief efforts had been touched by the attack, albeit not as directly as immediate victims or survivors.

**Table 1: Exposure to the attack**

<table>
<thead>
<tr>
<th>Frequencies for exposure to the attack</th>
<th>Number (n=163)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directly witnessed</td>
<td>52</td>
<td>32</td>
</tr>
<tr>
<td>Loved one close to disaster</td>
<td>47</td>
<td>29</td>
</tr>
<tr>
<td>Concern that loved one might have been hurt</td>
<td>68</td>
<td>42</td>
</tr>
<tr>
<td>Knew somebody who was injured</td>
<td>31</td>
<td>19</td>
</tr>
<tr>
<td>Knew somebody who was killed</td>
<td>55</td>
<td>34</td>
</tr>
<tr>
<td>Knew somebody who was involved in rescue</td>
<td>65</td>
<td>40</td>
</tr>
<tr>
<td>Were involved in rescue and recovery</td>
<td>7</td>
<td>4</td>
</tr>
</tbody>
</table>

**Life Events.** Respondents were asked whether they had experienced each of a list of 16 life events, and if so, how intense their exposure had been to this event (e.g. happened to them directly; they witnessed it happening to someone else). The life events on the list included standard items, such as being a victim of assault, death of someone close, etc., but added the World Trade Center attack and the plane crash of Flight 587 bound from New York to the Dominican Republic that occurred in October 2001, killing Queens residents on the ground as well as all on
the plane. Respondents could also indicate additional life stressors in an open-ended question. The highest proportion of stressors indicated by the volunteers had natural causes, such as illness (52.1%) or unexpected death of a family member (50.4%), natural disaster (39.6%) or a transportation accident (58.2%). Next most common was exposure to violence: a third of the sample reported having experienced or witnessed physical assault (33.6%), an assault with a weapon (22.4%), sexual assault (9.9%) or other unwanted sexual advances (25.1%), or being affected by the suicide or homicide of someone close (12.7%).

The responses to the Life Events Checklist were recoded to assess the overall severity of life stressors (0 = not sure or doesn’t apply; 1 = learned about it happening to someone close to me; 2 = witnessed it; 3 = happened to me). The Life Event Severity scores ranged from 2 to 38 (out of a possible score of 48) with a mean of 14.6 (SD = 7.1).

**Previous Experience with Relief Efforts or Working with Traumatized Persons.**

Thirty-two percent of the participants had worked with traumatized people before. Twenty-four percent indicated that they had participated in previous relief efforts, and the average number of prior relief efforts for this group was 9.6. Most of those relief efforts were responses to natural disasters such as hurricanes (10%), fires (12%), floods (18%) and earthquakes (4%). Some of the participants reported having been involved for many years in relief efforts. One participant had worked in relief efforts for 115 different disasters over a 38-year period. When this volunteer was excluded from the analysis, volunteers had participated on average in 7.8 relief efforts over a seven-year period.

**Volunteer Experience In The WTC Relief Effort**

**Training.** There was considerable variation in the amount of training that participants reported receiving in preparation for their relief work, but half received little or no training: 22 percent reported receiving no training at all and another 26 percent said that they had only received a few hours of training. Half of the sample (52 percent) reported receiving training that lasted a full day or more. According to participants, most training consisted of information about eligibility requirements and protocols for information and referral. Only 15 percent reported that a mental health professional was involved in delivering any part of the training. Forty percent reported having dis-
cussed how to deal with the traumatized population and/or with emotional aspects of the relief work, as part of their training.

### Table 2: Training content

<table>
<thead>
<tr>
<th>Training Content (n=163)</th>
<th># who received</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client assistance policies (e.g., eligibility criteria)</td>
<td>107</td>
<td>66</td>
</tr>
<tr>
<td>How to complete paperwork</td>
<td>104</td>
<td>64</td>
</tr>
<tr>
<td>Special skills for dealing with population (e.g., counseling)</td>
<td>66</td>
<td>40</td>
</tr>
<tr>
<td>Logistical (computer systems, etc.)</td>
<td>65</td>
<td>40</td>
</tr>
<tr>
<td>Preparation for emotional aspects of relief work</td>
<td>64</td>
<td>39</td>
</tr>
</tbody>
</table>

**Type of Volunteer Work.** Nearly every participant had worked with displaced workers (89 percent) and/or displaced residents (85 percent). More than half had worked with injured persons (60 percent) or family members who had lost a loved one in the attack (52 percent), for at least part of the time. Most of the relief work consisted of providing information and referral services; assessment of financial or other service needs; escorting clients to other agencies; or disbursing checks. A third of the sample indicated that they had provided counseling services as part of their duties and 25 percent reported having provided interpreting services.

**Met and Unmet Needs during and after the Relief Effort**

**Desired Support from Other Persons.** During their relief work, participants wanted other persons to listen to them so that they could talk about their feelings (66 percent), to acknowledge the importance and intensity of the work (59 percent), or to “check in” with them (51 percent). Volunteers also wanted others to understand that they might be tense or irritable because of the stress of the work (44%), and also would not be as available to others as usual (44%). In the initial interviews, most volunteers reported receiving the types of support that they wanted from others. For example, 73% of those who wanted others to listen to them reported that others did, in fact, do so; similarly, 75% of those who wanted acknowledgment of the intensity of their work reported receiving that acknowledgment.

**Ongoing Support and Service Needs.** In addition to the support needs delineated above, 16 percent of the respondents said in the inter-
view 8-12 months after the attack that there were “other things they still want from other people” to help them deal with the experience of relief work. About half of the sample (46%) provided suggestions in responses to the open-ended question about things that the agencies could offer them on an ongoing basis. Suggestions mentioned by several volunteers were additional volunteer opportunities (11%), counseling (7%); organizing meetings with other relief workers after the end of the engagement (7%) and updates and debriefing (3%).

Impact of the Relief Experience. Volunteers were asked about the overall impact of the relief work experience on their lives. Comments were generally very positive. Participants reported that they had become more aware and understanding of the needs of other people (19%); that they felt good about the experience and saw their engagement as a growth opportunity (14%); and that the experience had changed their perspective about values and how to interact with other persons (13%). A smaller number of participants commented that they had become more skeptical and impatient (6%), and more upset, emotional, stressed, and worried (3%) and even reclusive (1.5%).

<table>
<thead>
<tr>
<th>Type of Volunteer Work Performed</th>
<th>#</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information and referrals to other services</td>
<td>153</td>
<td>94</td>
</tr>
<tr>
<td>Assessment of financial needs</td>
<td>139</td>
<td>85</td>
</tr>
<tr>
<td>Assessment of other service needs</td>
<td>139</td>
<td>85</td>
</tr>
<tr>
<td>Escorting clients to service providers</td>
<td>125</td>
<td>77</td>
</tr>
<tr>
<td>Provision of other concrete assistance to clients</td>
<td>102</td>
<td>63</td>
</tr>
<tr>
<td>Counseling</td>
<td>55</td>
<td>34</td>
</tr>
<tr>
<td>Writing and distributing checks</td>
<td>48</td>
<td>29</td>
</tr>
<tr>
<td>Interpreting</td>
<td>42</td>
<td>26</td>
</tr>
<tr>
<td>Legal assistance</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Hospitality (e.g., serving food, greeting)</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Clerical</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Notarizing</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>
Impact of the World Trade Center Attack

Concerns and Behavior Changes. Participants were asked whether each of eleven issues was a source of concern to them at the time of the interview. Safety concerns were still highly prevalent in the population: 92 volunteers (56 percent) reported being concerned about their own safety and 55 percent were concerned about their family’s safety. Other major concerns were about prejudice and discrimination (45 percent) and about their own or family members’ emotional well-being.

Table 4: Concerns As a Result of WTC Disaster

<table>
<thead>
<tr>
<th>Worries after WTC Attack (n=163)</th>
<th>#</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own safety</td>
<td>92</td>
<td>56</td>
</tr>
<tr>
<td>Family's safety</td>
<td>90</td>
<td>55</td>
</tr>
<tr>
<td>Prejudice or discrimination</td>
<td>73</td>
<td>45</td>
</tr>
<tr>
<td>Own emotional well-being</td>
<td>63</td>
<td>39</td>
</tr>
<tr>
<td>The emotional well-being of a loved one</td>
<td>63</td>
<td>39</td>
</tr>
<tr>
<td>Flying</td>
<td>61</td>
<td>37</td>
</tr>
<tr>
<td>The air quality where respondents works or lives</td>
<td>51</td>
<td>31</td>
</tr>
<tr>
<td>Getting a job</td>
<td>47</td>
<td>29</td>
</tr>
<tr>
<td>Safety and security concerns</td>
<td>39</td>
<td>24</td>
</tr>
<tr>
<td>Keeping a job</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>War and global security</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>Ability to stay in the country</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>The ability of a loved one to stay in the country</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>16</td>
<td>10</td>
</tr>
</tbody>
</table>

Volunteers were also asked about specific behavioral changes after the volunteer experience. Changes included positive coping mechanisms such as beginning or increasing activities they enjoyed (57 percent), physical exercise (29 percent), religious/spiritual activities (30 percent) and yoga (14 percent). A significant proportion reported potentially problematic behaviors since 9/11, such as eating more or less (33 percent), and beginning or increasing alcohol (12 percent) or tobacco (10 percent) use.
Table 5: Behavior Change After Relief Work

<table>
<thead>
<tr>
<th>Behavior Change</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>More time in activities they enjoy</td>
<td>93</td>
<td>57</td>
</tr>
<tr>
<td>Eat more or eat less</td>
<td>53</td>
<td>33</td>
</tr>
<tr>
<td>Began or increased religious/spiritual activities</td>
<td>47</td>
<td>29</td>
</tr>
<tr>
<td>Began or increased physical exercise</td>
<td>48</td>
<td>30</td>
</tr>
<tr>
<td>Began or increased alcohol use</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Began or increased yoga/relaxation</td>
<td>23</td>
<td>14</td>
</tr>
<tr>
<td>Began or increased tobacco use</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Began or increased use of prescription drug</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

Mental Health Outcomes

The mailed survey contained the Life Events Scale and the PTSD Checklist—Civilian Version (PCL-C), both developed by the National Center for PTSD; the Beck Depression Inventory (BDI); and questions about behavior change, social support needs and social support received.

To assess the representativeness of those who returned the mailed questionnaires, we compared key variables of individuals who returned the questionnaires with those who participated in the telephone interview but did not return the questionnaires. No significant differences between responders and non-responders were found in gender, education, living with spouse/partner, or having children under 18 years in household.

PTSD and Depression Scores. The average PCL score was 12.5 (SD=11.5). Summary scores were computed for each of three symptom clusters: Re-experiencing, avoidance/numbing, and hypervigilance. A clinical diagnosis of PTSD requires that scores meet or exceed cut-off criteria for all three clusters. Seven percent of this sample met these criteria and can be classified as having post-traumatic stress disorder. Less than half of those who met the criteria for PTSD reported that they had talked to a mental health counselor during or after the relief work.

A total of 119 participants completed the Beck Depression Inventory as part of the mail survey completed after their phone interview. The average depression score was 7.9, with a standard deviation of 8.5. Depression scores were categorized according to the guidelines...
suggested in the 1993 edition of the BDI manual (Beck and Steer, 1993). The large majority (71.4%) had BDI scores that indicated minimal or no depression (scores under 10) and 16 participants (13.4%) had scores suggesting mild depression (scores of 10-16). Fifteen respondents (12.6%) indicated responses that suggest moderate depression (17-29) and the scores of three (2.5%) fell in the range of severe depression (total score of 30 and over). Only 36% of those with moderate to severe depression at time 1 indicated that they had talked to a mental health counselor during or after their relief work.

The summary scores for post-traumatic stress symptomatology and depression were highly correlated (r = .72) in this sample.

**Multivariate Analysis**

**Variable Transformation and Model Building**

We constructed an analytic model to assess the association of volunteer characteristics, situational variables, and attitudinal and behavioral responses to the attack with PTSD and depression symptomatology, respectively.

**Volunteer characteristics** included age, gender, living with a spouse or partner, and prior traumatic events (a weighted combination of frequency and severity of life events).

**Situational variables** included the geographic and emotional exposure to the event, and intensity of their relief work. Geographic exposure was defined by either proximity to the WTC attack, i.e., being below 14th Street, or having directly witnessed the attack (some respondents observed the attack from Brooklyn or a midtown Manhattan window). The values of the emotional exposure variable ranged from 0 to 3. One point was given for a positive response to the each of the following questions: (a) whether a loved one was close to the disaster or, if not, whether they were concerned that a loved one might have been hurt; (b) whether they knew somebody who was injured; and (c) whether they knew somebody who was killed. Intensity of the relief work for each individual was created by combining duration of their relief work, hours worked per week, and percentage of time spent in face-to-face interaction with victims.

**Attitudinal and behavioral responses** included in the model because of their potential association with the development of PTSD or depression were: increased concern about their environment, perception of unmet needs, and self-reported change in substance use after 9/11. Perception of unmet needs was given a code of 1, if the participant
responded affirmatively to any of the following questions: “During or after relief effort, were there things that you wanted from other persons but did not get?” or “Are there still things that you want from other people but do not get?” and “Are there still things that you want from agencies but do not get?” A code of 1 was given for behavioral responses if the participant indicated that after September 11th he/she began or increased use of one of the following: tobacco, alcohol, prescription drugs, and recreational drugs.

As the outcome variables were not normally distributed, we decided to conduct a logistic regression, in which the outcome variable is conceptualized as a dichotomous (rather than continuous) one. For depression, we compared respondents who indicated mild to severe depression (over 10, 28.6%) with those who indicated minimal depression (71.4%). For post-traumatic stress symptoms, we compared those who had a score of 17 and higher (25%) with those who had a lower score.

**Variables Associated with Depression**

A logistic regression was run with the following variables: Age, gender, prior trauma, living with spouse, intensity of relief effort, physical exposure to the World Trade Center Attack, emotional exposure to the event, unmet needs, concerns and worries, substance use after 9/11 (began or increased use of tobacco, alcohol, prescription drug, or recreational drug use).

The model Chi-square was 38.475 (p<.05) with the Nagelkerke R-square of .436 (the Cox and Snell R square =.300) with a -2 log likelihood = 87.189. In this model Prior Trauma and Substance Use Change after 9/11 were significant predictors at the .05 level. Volunteers who reported a higher level of prior trauma (in intensity and/or frequency) were more likely to have elevated depression scores, when the model included the demographic, situational, and response variables discussed above. While holding other variables in the model constant, an increase in prior trauma reflected a 9% increase in the odds of being depressed (defined by cutoff).

Volunteers who reported any increase in substance use after 9/11 were more likely to have a higher depression score, when the model included the demographic, situation, and response variables discussed above. While holding other variables in the model constant, a change in drug use reflected a 305% increase in the odds of displaying PTSD symptomatology (defined by cutoff).
Variables Associated with Post-Traumatic Stress Disorder

A logistic regression on PTSD was run with the following variables: Age, gender, prior trauma, living with spouse, intensity of relief effort, physical exposure to the World Trade Center Attack, emotional exposure to the event, unmet needs, concerns and worries, substance use after 9/11.

The model Chi-square was 33.475 (p<.05) with the Nagelkerke R-square of .453 (the Cox and Snell R square =.305) with a -2 log likelihood = 70.224. In this model, Prior trauma and Substance Use Change After 9/11 were significant predictors at the .05 level. Volunteers with prior trauma were more likely to display higher PTSD symptomatology. While holding other variables in the model constant, an increase in prior trauma reflected a 12% increase in the odds of having PTSD (defined by cutoff). Volunteers who reported a change in substance use pattern after 9/11 were more likely to display PTSD symptomatology. While holding other variables in the model constant, a change in drug use reflected a 446% increase in the odds of displaying PTSD symptomatology (defined by cutoff).

Discussion

Volunteers who were involved in the 9/11 relief work fell into two major categories: Those from out of town tended to have more previous disaster relief experience and to have received more training in disaster intervention before the WTC attack. This group of volunteers tends to reflect the profile of the relief workers described in the literature. The group of volunteers who lived in the New York area was more likely than their out-of-town counterparts to have been directly exposed or to know somebody who had been affected by the WTC attack. This exposure may have triggered their decision to volunteer. They also had to deal with the aftermath of living in the New York area long after their volunteer experience ended. This is manifested in ongoing concerns about air quality and using the subway and may impact ongoing mental health status and elevated post-traumatic stress and depression scores. Thus, it is difficult to distinguish between the direct impact of the attack on the volunteers, ongoing post-disaster stressors, and the secondary trauma caused by the relief work among this group.

Training and Follow-up

Those with previous disaster experience had worked mostly in relief efforts after natural disasters, such as floods, earthquakes, and hurri-
canes. These volunteers may be seasoned but still not prepared to deal with the horror of human-made disasters.

Even though training was generally fairly short and focused on pragmatics, and follow-up supervision and monitoring of how volunteers were doing after the relief effort was sketchy, most volunteers appeared to be doing well. In fact, most reported that they had found the experience enriching. The experience helped them to reevaluate their lives, and they reported that they would now spend more time on activities they enjoy. Some people even considered career changes as a result of their engagement in the social service sector. Several volunteers commented that being able to provide concrete assistance to the victims helped them to overcome the feeling of helplessness after the attack, providing them with a sense of purpose “when many in the city felt aimless and anxious” (Fraenkel 2002: 22).

These findings are consistent with the concept of post-traumatic growth after a major trauma event. Future research should explore further the association of positive benefits with negative outcomes and variables such as existing social support or training and debriefing activities, that facilitate or prevent these outcomes among relief workers who may be at risk of vicarious trauma. Post-traumatic experience could be assessed by standardized instruments such as the Posttraumatic Growth Inventory (Tedeschi & Calhoun 1996). The knowledge of the extent that positive reinterpretation and reframing prevent the onset of vicarious trauma would provide useful insights into the development of support mechanisms for relief workers.

Identification of Volunteers with Mental Health Problems

The very strong association between depression and post-traumatic stress in this sample is noteworthy from both a supervisory and a clinical perspective. While depression and PTSD may overlap, and may have some common symptoms, they are conceptually distinct and often require different interventions and treatments. Our data suggest that those who show signs of depression should also be screened or evaluated for PTSD, and vice versa.

It is noteworthy that only half of the volunteers indicated that the WTC attack was the most traumatic event in their lives. Several of those who had indicated that the WTC attack was the most traumatic event in their life had experienced other traumatic events as well. This finding is especially important in light of the finding that frequency and severity of prior traumatic life events was a significant predictor of both depressive and post-traumatic symptomatology in this sample. Gist et al (1998) suggest that individuals with prior exposure to trauma may still have unresolved
issues that make them more vulnerable to vicarious traumatization. While we cannot demonstrate an additive or other effect of the volunteer work on those who already had prior trauma, this finding suggests that agencies can look for a “red flag” both in screening volunteers and in identifying who may need more support during their relief work. Most of those with prior non-WTC trauma had reported experiencing either illness or the sudden death of a loved one. While these events may elicit different responses than a terrorism attack, those involved in screening and/or training volunteers should be aware of the potential for resurgence of prior trauma, particularly when volunteers are extensively involved in dealing with family members around a sudden death. If trainers are able to sensitize volunteers to the possibility that the relief work may bring up traumatic memories and emotions for them, volunteers may be better equipped to identify and handle such memories and emotions.

Another “red flag” that emerged from this study was the onset of or increase in use of alcohol, tobacco, and/or prescription or recreational drugs. This behavioral change was also significantly associated with higher levels of both depressive and post-traumatic stress symptoms. The co-occurrence of PTSD and substance use should be of concern to program managers. Substance use might be a strategy to alleviate post-traumatic stress symptoms. The temporary relief from symptoms through the use of alcohol may replace the search for positive coping strategies (Evans & Sullivan 1995; Dayton 2000; Pfefferbaum & Doughty 2001). A fifth of 133 firefighters (19%) who participated in a survey after the Oklahoma City bombing indicated that they had used alcohol as a way to cope with their feelings after the bombing (North et al 2002a). However, only half of the 24 rescue and recovery workers with clinical post-traumatic stress symptoms had sought counseling within three years after the Oklahoma City attack (North et al 2002b). While alcohol use among volunteers may be less prevalent than among firefighters and rescue and recovery workers, it is useful to consider because it may be easier to assess an observable behavior marker such as alcohol use than emotional problems. It should be pointed out that the question assessed self-reported initiation or intensification of behaviors (for example, increase in alcohol use), not whether the behaviors were displayed at all and therefore do not assess the overall prevalence of substance use behaviors.

The number of individuals who met the criteria for PTSD diagnosis or had moderate to severe depression scores was too small to be of significance in the multivariate analysis. However, it is noteworthy that nearly all of the volunteers who met the criteria for PTSD diagnosis reported having been in the New York City area at the time of the event.
We cannot assume that the reported post-traumatic stress and depression symptoms were a direct result of their volunteer effort because we do not have a pre-9/11 baseline assessment. The fact that prior trauma was one of the significant predictors of emotional reactions to the WTC attack suggests the likelihood of reawakening of previous traumatic events. The prevalence of post-traumatic stress symptoms (7%) was slightly lower to the prevalence found in a community sample of New York residents after the WTC attack (Galea et al., 2002). However, the prevalence of elevated depression scores (14%) was considerably higher than in the community (9%).

These findings are consistent with research on mitigating factors of secondary traumatic stress effects in working with survivors of criminal victimization (Salston and Figley, 2003). They highlight the need to review the screening mechanism for volunteers, provide training and on-going support for aid workers, and strengthen the support mechanisms both during and after the relief work. Follow-up support after the completion of the relief work should include a mechanism to identify and refer volunteers who may be in need of special and more intense services.

References


