Predictors of Post-Traumatic Stress Symptoms in Oklahoma City: Exposure, Social Support, Peri-Traumatic Responses

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Abstract

Eighty-five adults seeking mental health assistance six months after the Oklahoma City bombing were assessed to determine which of three groups of variables (exposure, peri-traumatic responses, and social support) predicted development of post-traumatic stress disorder (PTSD) symptoms. Variables most highly associated with subsequent PTSD symptoms included having been injured (among exposure variables), feeling nervous or afraid (peri-traumatic responses), and responding that counseling helped (support variables). Combining primary predictors in the three areas, PTSD symptoms were more likely to occur in those reporting counseling to help and those feeling nervous or afraid at the time of the bombing. Implications of these findings are discussed for behavioral health administrators and clinicians planning service delivery to groups of victims seeking mental health intervention after terrorist attacks and other disasters.

The Oklahoma City metropolitan area was rocked by the destruction of its Alfred P. Murrah Federal Building on April 19, 1995, representing the most deadly terrorist act to date on U.S. soil. As a result, 168 individuals were killed, more than 700 were injured and treated by physicians, and more than 16,000 in the downtown area at the time experienced the effects of the blast and of exposure to the disaster scene. Another 12,000 individuals were involved in rescue efforts, ranging from supplying food and comfort to victims to handling bodies and treating the seriously injured and dying.

Catastrophic events such as this bombing are linked with a variety of emotional and behavioral sequella. Follow-up of Dutch victims of terrorist acts over nine years found one-third to have negative aftereffects, with 12% still needing professional treatment nine years later.[1] Sequella typically include post-traumatic stress symptoms and disorder (PTSD), major depression, generalized anxiety, substance abuse, other psychiatric disorders, and, for many, effective coping with no apparent adverse effects. PTSD symptoms, which encompass features of re-experiencing and avoiding reminders of the trauma as well as physiological hyperarousal, have been noted to occur in varying

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degrees in survivors. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (Washington, D.C., American Psychiatric Association, 1994) (DSM-IV) estimates that 3% to 58% of survivors of traumatic events will suffer from diagnosable PTSD. Many more may suffer from subclinical PTSD symptoms.

Several factors have been identified that appear to influence the likelihood of an individual's developing PTSD. The severity of the trauma and degree of exposure are risk factors often cited. Survivors of concentration camps[2] and former prisoners of war[3] have been noted to have high rates of chronic PTSD (approximately 50%). Crime victims, especially those surviving rapes,[4] also have PTSD symptoms, with estimates as high as 80%. Israeli adolescent survivors of terrorist attack were more likely to have worse long-term adjustment 17 years later if they had "intense victimization," particularly physical injury.[5] Individuals who have experienced previous trauma appear to be more vulnerable. For example, Holocaust survivors in Israel whose homes were damaged by SCUD missiles in the Gulf War almost 50 years later were more likely to develop PTSD than community members with damaged homes but without this prior trauma.[6] Presence of a predisaster psychiatric history[7] and certain personality styles have predicted susceptibility to PTSD.[8] Another variable, social support, was an important protective factor for older adults exposed to a severe flood.[9]

Age and gender are also implicated in vulnerability to disaster. Studies attempting to identify age ranges most susceptible to trauma-related symptoms have had conflicting results, reflecting the complexity of this variable; age is related to both exposure to additional environmental stressors and to more cumulative experience with coping. Thus, Taylor and Frazer[10] found that older rescue workers were less distressed than younger ones in the same disaster. Similarly, an inverse relationship was found between age and several symptoms after a Texas tornado by Bolin.[11] In contrast, Hansson, Nouelles, and Bellorich found that older age and prior experience with flooding predicted higher psychological distress scores in floodplain residents.[12] And mid-age-range victims (25 to 54 years) were more severely affected than those age 16 to 24 or older than 54 years after the Buffalo Creek Dam disaster.[13]

Several studies have suggested that women are more affected by disaster than men. An assessment of 182 direct victims of the Oklahoma City Bombing six months postdisaster found that female gender predicted postdisaster psychiatric diagnosis, with women having twice the rate of PTSD as men.[14] More women than men surviving a mass shooting in Killeen, Texas, developed PTSD in the month following.[15] Women were more likely than men to be referred to a psychiatrist after exposure to widespread deadly food poisoning in Spain.[16] However, survivors of terrorist attacks in France who developed PTSD were no more likely to be female than male.[17] Other studies have suggested that the genders may respond differently to trauma, with women experiencing more anxiety, depression,[13] and somatization[19] and men showing more symptoms of actual physical illness,[20] belligerence, and alcohol abuse.[13, 19] Immediate emotional or behavioral responses to disaster have been noted to be predictive of later development of PTSD in several studies. Koopman, Classen, and Spiegel[21] found that immediate peri-traumatic dissociation, feelings of loss of personal autonomy, and subsequent stressful life experiences predicted PTSD symptoms 7 to 9 months later in survivors of the 1991 Oakland/Berkeley, California, firestorm. Marmar and colleagues[22] found that greater peri-traumatic dissociation was associated with more PTSD symptoms in Vietnam veterans more than 20 years later; subjects' peri-traumatic reactions were recalled after more than 20 years had elapsed. A preliminary report of the same population used in the current study (Oklahoma City's Project Heartland survivors) singled out two immediate responses:[23] feeling anxious and being "upset by how other people acted" to be the peri-traumatic reactions most predictive of PTSD symptoms six months later.

The Oklahoma City bombing offered a unique opportunity to study the effects of disaster on a community. Because the city is relatively small and the population has been stable geographically over time, most who worked in the downtown area or who were affected by the trauma remained within the community. Moreover, large numbers of community members were exposed to the disas-

ter in many ways—by being close in proximity to the blast, participating in the rescue efforts, having friends and family members who were injured or killed, or losing property or jobs due to the destruction.

Realizing that mental health utilization was likely to increase in the community, the governor established Project Heartland with funding from the Federal Emergency Management Agency within several weeks of the disaster. Clients were first seen on May 15, 1995, to address emotional or behavioral problems resulting from physical or emotional proximity to the blast. Consistent with the approach of FEMA to provide crisis intervention rather than formal psychiatric treatment, psychiatric diagnoses were not routinely given to the almost 9,000 individuals who sought assistance at the center through November 30, 1997. Individuals seeking assistance participated in various forms of crisis intervention, including individual and group debriefing, support groups, outreach, and consultation. Those who were highly symptomatic were referred to mental health professionals in the community for more comprehensive evaluation and treatment.

This study reports the results of a survey conducted on 85 individuals seeking help for disaster-related problems at Project Heartland during the sixth month after the disaster. Levels of exposure, immediate responses after the bomb, PTSD symptoms in the past week, and social support used in coping were examined.

To assist behavioral health administrators and clinicians responding to similar future disasters to identify victims at greater risk among those seeking mental health intervention, the following questions were addressed in analyzing results of this survey:

1. Among individuals seeking assistance after a terrorist disaster, which variables within groups of variables—levels of exposure, immediate (peri-traumatic) physiological and stress responses, and type of social support—were associated with higher PTSD symptoms?
2. In comparing the above three groups of variables for this population, which were most predictive of developing PTSD symptoms?

Method

Participants

Eighty-five adult members of the Oklahoma City community who sought help from Project Heartland six months after the terrorist attack in April 1995 were surveyed. All new clients age 18 years and older receiving services at Project Heartland during the period October 12 to November 7, 1995, were given the opportunity to complete the survey described below. Because victims of this high-profile disaster were often pursued by the media, recruitment efforts were conservative to respect their needs for privacy. Of 170 adults offered the survey, 85 (50.0%) agreed to participate. After complete discussion of the study with participants, written informed consent was obtained as required by the protocol approved by the University of Oklahoma Health Sciences Center Institutional Review Board.

Instrument

The clinical needs assessment instrument was designed specifically for the Oklahoma City bombing to include measures of exposure, initial (peri-traumatic) response to the explosion, PTSD and other symptoms present at the time of administration, and sources of support. Seventeen items examined level of exposure, such as participants' proximity to the blast, assisting victims, relationship to victims killed or injured, attending funerals, and watching bomb-related television coverage. Six items identified social support used after the bombing to cope.

The measure of initial response included 11 items assessing emotional and physiological reactions (Physiological Reactivity and Stress Scale [PRSS]). The items on the PRSS were adapted from

those developed by the UCLA Trauma Psychiatry Service for use after the 1994 Northridge earthquake[24] and by Freedy, Kilpatrick, and Resnick.[25]

The measure of post-traumatic stress was adapted from the Impact of Event Scale-Revised (IES-R).[26] The IES-R consists of 22 items representing the three PTSD symptom clusters. It includes items from the Revised Impact of Event Scale[27] and items assessing arousal added by Weiss and Marmar.[26] The basic psychometric properties of the IES-R have been established.[26] Participants were asked to rate the frequency of the 22 symptoms in "the past seven days" on a scale with four categories of response: *not at all, rarely, sometimes,* and *often.* The post-traumatic stress symptom (PTSS) score was a summation of all items on this scale.

Procedure

Questionnaires were self-administered. Implementation of this study was delayed by six months after the disaster because investigators were involved in extensive mental health assessment and service delivery in the weeks and months immediately following the incident.

Statistical Analyses

Means and standard deviations were obtained for each item. To determine which of several groups of variables were most highly correlated with elevated total PTSS scores, the data were rationally divided into three sets. The first set included the exposure variables, the second included the immediate physiological reaction and stress variables (the PRSS variables), and the third included the support variables. These are depicted in Table 1. The relation between current PTSD symptomatology as indicated on the PTSS and each of these three categories was explored through correlational and stepwise discriminant function analyses (DFA). Because of the quasi-complete separation in some of the variables, making a maximum likelihood estimate impossible, DFA rather than other techniques was used to examine these relationships. From each of these preliminary analyses of the three categories of variables, the strongest predictor from each set was then combined into a single stepwise DFA (seen in Table 2) to test its usefulness in identifying persons at risk for negative outcome. Thus, the final DFA attempted to identify among the three groups of variables those most predictive of increased PTSD symptoms, as indicated by PTSS scores. Because gender has been shown to be a potent predictor of risk for psychiatric symptomatology and is related to willingness to seek treatment, it was included in all of the preliminary analyses. However, gender was not significantly correlated ($p > .05$) with the outcome measure (PTSS) for the initial DFAs and thus was not included in the final stepwise DFA.

Results

A total of 85 individuals completed the assessment. The mean age of the Heartland respondents was 42 ($SD = 12.4$) years, with a range from 21 to 84 years. The median was 41 years. As expected from the literature on help seeking, the majority were female ($n = 60$, 71.4%). Most were Caucasian ($n = 55$, 67.1%); almost a quarter were African American ($n = 20$, 24.4%). The remainder were Native American ($n = 4$, 4.9%), Asian ($n = 2$, 2.4%), or Hispanic ($n = 1$, 1.2%). Almost half of the sample was single ($n = 38$, 48.7%), while 48.7% ($n = 38$) were married and two persons were widowed (not from the event). In comparing respondents to the general population of 170 new clients served from October 12 to November 7, 1995, the general clientele included 116 females (68.2%). The larger group's mean age was 41.1 ($SD = 12.7$), ranging from 21 to 84 years. Most of the general population were Caucasian ($n = 110$, 64.7%), with a quarter being African American ($n = 42$, 24.7%), 7.1% Hispanic ($n = 12$), 2.9% Native American ($n = 5$), and 0.6% Asian ($n = 1$). The lower representation of Hispanics responding compared to the population served by Project Heartland may be explained by the lack of Spanish versions of the questionnaire; although interpreters were avail-

Table 1
Correlations between Specific Items
and Post-Traumatic Stress Symptom Scores

	r	*p*
Exposure items		
Did you hear the bomb?	.24	.034
Did you feel the bomb?	.27	.043
Was there damage to nearby buildings?	−.11	.336
Were you told to leave your building?	.04	.725
Were you injured?	.40	.0003
Were people near you injured?	.29	.0095
How much bomb-related TV did you watch?	.04	.741
How many times have you gone to the site?	.30	.007
How many funerals did you attend?	.27	.014
How close to the federal building were you?	.18	.108
Did you go immediately to the site?	.35	.002
Were there bomb threats to your building?	.20	.080
Immediate family member injured[a]	.19	.084
Relative injured[a]	.22	.050
Friend injured[a]	.21	.060
Someone that you know injured[a]	−.01	.933
Immediate family member killed[b]	.25	.027
Friend killed[b]	.01	.990
Someone that you know killed[b]	.21	.658
Immediate response		
Dazed and confused	.30	.006
Thought I would die	.39	.0003
Trembling or shaking	.40	.0003
Heart beating fast	.39	.0004
Nervous or afraid	.54	.0001
Made me jump	.26	.019
On "automatic pilot"	.32	.004
Scared someone in family would be hurt	.40	.0002
Upset by how I acted	.23	.043
Upset by how others acted	.32	.0045
Helpless	.34	.002
Support		
Talking with others helped	−.15	.175
Religion helped	−.17	.131
Work helped	−.29	.008
Keeping busy helped	.12	.290
Counseling helped	.58	.0001
Exercise helped	.21	.058

a. Dichotomous item "knowing someone injured."
b. Dichotomous item " knowing someone killed."

Table 2
Overall Model: Stepwise Discriminant Function Analysis (DFA) and Reclassification Table

Item	Order Entered	Partial r^2	$F(1, 38)$	p
Counseling helped	1	.46	33.67	.0001
Nervous and afraid	2	.18	8.33	.0064

	Statistically Assigned Group (DFA)	
Observed Group	Low PTSS	High PTSS
Low PTSS		
N	19	1
Percentage	95	5
High PTSS		
N	6	15
Percentage	29	71

NOTE: Only those in the upper ($n = 21$) and lower ($n = 20$) quartiles on the PTSS scale were used in the DFA. PTSS = post-traumatic stress symptom.

able on demand, none was used in this study. Thus, with this single exception, respondents were, for the most part, demographically representative of the general population of individuals seeking help at this center for bombing- related distress.

The Influence of Exposure on Post-Traumatic Stress at Six Months

Correlational analyses determined the relation between the total PTSS score and the three areas of exposure, immediate response, and support and are listed in Table 1. The items "knowing someone injured" and "knowing someone killed" were originally scaled by relationship to the respondent (friend, relative, etc.). To maintain consistency with the other items, these items were reduced to a dichotomous scale (yes or no). Four exposure variables were significant at a .01 level of significance; these were the following: (1) Were you injured? (2) Were people near you injured? (3) How many times did you visit the site? and (4) Did you go immediately to the site?

As described above, these four variables were next subjected to DFA. The primary objective of the analysis was to determine the strongest predictor and identify overlapping variance. To enhance the distinction between groups of affected versus unaffected patients, a quartile split of the PTSS score distribution was applied. The outcome groups of interest were the upper quartile ($n = 21$) and the lower ($n = 21$) quartile so that the middle quartiles were ignored.

Using this strategy, the first variable to enter the function was "Were you injured?" This variable accounted for 24% of the variance in the group effect: partial $r^2 = .236$, $F(1, 35) = 11.43$, $p = .0017$. The next variable was, "How many times have you gone to the site?" accounting for an additional 10% of the variance: partial $r^2 = .0996$, $F(1, 35) = .82$, $p = .058$. The variable, "Did you go immediately to the site?" accounted for an additional 7% of the variance: partial $r^2 = .0723$, $F(1, 35) = 2.73$, $p = .1075$. The remaining variable, "Were people near you injured?" did not add significantly to the dif-

ferential prediction of PTSS scores. The resulting discriminant function had a sensitivity of 0.76 and a specificity of 0.80.

Immediate Physiological and Emotional Response and Post-Traumatic Stress at Six Months

Many of the individual items regarding physiological responsiveness were significantly correlated with the total PTSS score. Consistent with the overall analysis strategy, a DFA was conducted. The first variable that emerged was the item "nervous or afraid," which accounted for 39% of the variance: partial $r^2 = .39$, $F(1, 30) = 22.5$, $p = .0001$. The second variable that entered the equation was the item "thought I would die," accounting for an additional 16% of the variance: partial $r^2 = .16$, $F(1, 30) = 6.68$, $p = .0142$. The final variable that contributed significantly to the variance was "upset by how others acted," accounting for an additional 13% of the variance: partial $r^2 = .13$, $F(1, 30) = 5.05$, $p = .0315$. Thus, these three variables accounted for 67% of the variance in PTSS scores and produced a discriminant function with a sensitivity of 0.90 and a specificity of 0.89. Variables "scared someone in family would be hurt" and "upset by how I acted" did not achieve significance.

Social Support and Post-Traumatic Stress at Six Months

The support variables included those items identifying persons and activities that facilitated recovery. The options included talking with friends and family, religion, work, counseling, and staying busy. There were only two that met current criteria for significance and inclusion in the discriminant function. They were responding that "counseling helped" ($r^2 = .58$) and "work helped" ($r^2 = .29$).

The DFA revealed that the strongest predictor of PTSS scores from these variables was that counseling helped. This variable accounted for 46% of the variance: partial $r^2 = .463$, $F(1, 38) = 33.67$, $p = .0001$. Work helped accounted for an additional 12% of the variance: partial $r^2 = .121$, $F(91, 38) = 5.25$, $p = .0275$; the original correlation between this variable and the PTSS total score was negative. Thus, these two variables accounted for 58% of the variance. Sensitivity of this DFA was 0.71, with specificity of 0.95.

Overall Model to Predict Post-Traumatic Stress at Six Months

In the final step, the primary predictor from each of the three sets above was combined in a single stepwise DFA. Entering first was the item measuring whether counseling helped; this accounted for 46% of the variance. The second variable to enter the function was retrospectively reporting being nervous or afraid at the time of the bombing; it accounted for 18% of the variance. The final discriminant function and resulting resubstitution classification table, detailed in Table 2, has a sensitivity of 0.70 and a specificity of 0.90.

Discussion

In this sample of 86 individuals from the Oklahoma City area seeking help for bombing-related emotional distress, interesting patterns emerged in models for predicting who was at greater risk to develop PTSD symptoms six months later. When variables were grouped in clusters of exposure to the trauma, physiological response immediately after the bombing, and social support, several variables within and across groups foretold distress.

Among exposure variables, preliminary correlations identified four variables for further analysis. Discriminant function applied to these variables, and the upper and lower quartiles of the total PTSS

scores found that those who were injured accounted for more of the variance in the group effect, followed by those who more often visited the site.

The detrimental effects of physical injury in civilians surviving the Oklahoma City disaster are consistent with other studies, including Desivilya's long-term follow-up of adolescent Israeli victims of terrorism.[5]

The association of PTSD symptoms with frequent visits to the bomb site in the current study may arise from several factors. Individuals who returned repeatedly to the site may have been attempting to master feelings of distress associated with disaster. An alternative explanation is that some of the individuals who revisited the site may have been among the 12,000 rescue workers, including firefighters, police officers, emergency medical teams, staff from the medical examiner's office, American Red Cross volunteers, and even untrained citizens, who responded to the crisis. Such individuals have been noted in several studies to be vulnerable to emotional sequella from disaster.[11,28,29] It is unknown how many, if any, participants in this study were rescuers, although Project Heartland did serve any interested individuals affected through physical or emotional proximity to the bombing; this issue is further clarified as limitations of the study are discussed. The disaster scene in Oklahoma City was particularly grisly, replete with severely injured children and adults and mutilated bodies. Junior or untrained rescue workers would have had little or no preparation for such experiences.

Preliminary correlations of physiological responsiveness items (PRSS) identified many to be significantly associated with higher PTSS scores. Thus, those with PTSD symptoms 6 months later reported retrospectively that they had many arousal symptoms, perhaps indicating a generalized recall of peri-traumatic distress. After DFA, having been nervous or afraid was the most robust of these peri-traumatic reactions in predicting later problems, followed by recalling a fear of dying and being upset by how others acted.

These findings differ from other studies[21,22] in which peri-traumatic reactions describing dissociation were significantly predictive of later PTSD. In the current study, dissociative equivalents of being "dazed or confused" and feeling as if on "automatic pilot" were not found to be significant. This is consistent with a preliminary study of the same Project Heartland population reported by this group, in which the peri-traumatic reaction of feeling nervous or afraid was most problematic, followed by upset by how others acted.[23] It also is similar to findings by Shalev that peri-traumatic symptoms of denial and intrusion among Israeli victims of terrorism did not predict PTSD 10 months later; he suggested that arousal should be measured as well as cognitive symptoms.[30] Comparisons may be difficult, as different wording and numbers of items were used in various studies. Moreover, varying periods of time had elapsed between the event and measurement of peri-traumatic symptoms (assessments made immediately after by Koopman, 20 years later in Marmar's study, 10 months later by Shalev, and 6 months after the trauma for our group). Nonetheless, the nature of a sudden, unpredictable terrorist trauma may have had a unique effect among our population and Shalev's in their immediate reactions; in fact, this is the goal of terrorists—to produce terror and fear.

Preliminary correlations and DFA singled out those who reported that counseling helped as more distressed (46% of variance), far ahead of those who found work to help (12% of variance, with a negative correlation). While we might on the surface expect that those who report benefits from counseling might be less symptomatic, endorsement of this item by those with more PTSD symptoms may reflect higher utilization of mental health care by those who needed it most. In fact, in the first weeks and months after the disaster, many mental health professionals offered free services to bombing victims, and additional assistance was available through charitable organizations and grants. Individuals endorsing the benefits of counseling may have been "in the system" previously, reflecting a risk for chronicity of symptoms. A difficulty in interpreting this item arises from lack of clarification of what constitutes "counseling"; as all 86 subjects were in the process of seeking men-

tal health intervention, some may have equated this with counseling, while others assessing counseling's benefit may have been describing prior treatment.

The other support variable predictive of PTSD symptoms—finding that work helped—had a negative correlation. This suggests that those who found support in the workplace (by either remaining in a socially supportive environment or focusing on their jobs) had less symptomatology. Or, alternatively, this may reflect that those who were the most symptomatic did not return to work and therefore did not endorse this item. Some highly symptomatic individuals may have lost their jobs due to injury or destruction of their place of employment. Finally, for some, work may have served as a reminder of the disaster, especially for those who worked downtown. Among rescue workers, work would be a continued source of retraumatization.

Finally, in the last stepwise DFA combining the primary predictor from each of the above three areas, the item most predictive of PTSD symptoms was the social support variable reporting that counseling helped. This was followed by the peri-traumatic response of feeling nervous or afraid. In this analysis, the exposure item of having been injured was not linked significantly with PTSD symptoms. The relatively low incidence of physical injuries in this sample (15 individuals, most injured "a little") may have attenuated the effect of this exposure item in the final analysis. Moreover, the Oklahoma City bombing was characterized by many levels of exposure (physical proximity to the blast, receiving injuries, knowing someone killed or injured, witnessing horrific scenes in rescue work, losing property or source of income, or a combination of two or more); this may make it difficult to compare exposure items with other types of variables in predictive models.

The current study did not find gender to be associated with higher PTSD symptoms when considering the effects of disaster exposure, peri-traumatic responses, and social support. This may be due in part to the preponderance of females surveyed (71.4% of the sample), which is entirely consistent with the literature describing women as more likely to seek formal mental health treatment. (It is unknown if affected Oklahoma City males sought help from other providers, such as clergy members, or whether they respond through "acting out" behaviors, increasing alcohol consumption,[13, 19] or developing physical illness.[20]) Thus, our study of individuals self-identified as needing mental health intervention found that males and females were comparable in levels of PTSD symptoms. North's survey sampled approximately equal numbers of males and females who were directly exposed to the Oklahoma City bombing, accessing them through a confidential registry. Women were found, as stated previously, to have twice the rate of PTSD as men and to have a greater risk for postdisaster psychiatric diagnoses.[14]

Several limitations of this study must be considered. The response rate of 50% and the relatively small sample size may bias conclusions. Generalizability is limited by the study's focus on a specific segment of the community, those distressed enough to seek mental health assistance, rather than sampling the general Oklahoma City population; however, this focus is necessary to characterize variables associated with increased psychopathology among those self-identified as needing help. Additionally, because Project Heartland was established primarily as a crisis intervention program, formal psychiatric evaluations were not available; thus, nothing is known of premorbid psychiatric conditions or current DSM-IV diagnoses that can influence susceptibility to PTSD symptoms.[14] Further limitations include the lack of information about exposure of subjects to previous or subsequent traumatic events, which has been noted to contribute to vulnerability. It is unknown how many of the subjects were rescuers, who may have had prolonged exposure or several layers of traumatization. In retrospect, additional questions that would strengthen conclusions would be the following: (1) Did respondents have a history of prior counseling or psychiatric treatment for PTSD or other mental illnesses? (2) Who were rescuers, either as volunteers or by profession, and what was their role? (3) What were reasons for returning to the bombing site (repeated rescue attempts, memorial services, or attempts at mastery)?

Many of the above limitations draw in large part (as previously stated) from investigators' desires to minimize intrusion on victims' privacy through the use of brief surveys. In fact, the University

Institutional Review Board scrutinized all bomb-related research to prevent this. Moreover, authors themselves were intensely involved in mental health service delivery and even in immediate physical rescue work; they were thus perhaps more reluctant to burden their fellow community members due to their own traumatization.

However, despite these limitations, the current study provides a rare opportunity to identify predictors of PTSD symptoms in a group impacted emotionally by terrorism.

Implications for Behavioral Health Services Delivery

In targeting mental health efforts to help-seeking victims of a large terrorist act in the months following, this study suggests that efforts should be focused especially on those who report or show an initial fear response, as opposed to dissociation, a variable emphasized in investigations of some other disasters. The association between psychopathology and reporting counseling to be beneficial suggests that early provision of counseling may be important to target individuals at risk for developing chronic problems. Other individuals who may be at risk for PTSD symptoms are those who receive injuries, whose immediate responses include a fear of death, who are upset by others' actions, and who do not receive support from work. Given that terrorism appears to be increasing in the world and in the United States and its embassies, continued studies of its victims who seek mental health treatment are essential to meet the unique needs of these populations.

Acknowledgments

Authors thank Project Heartland for providing results of this client survey.

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