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The Mental Health Consequences of Disaster-Related Loss: Findings from Primary Care One Year After the 9/11 Terrorist Attacks

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Abstract

This study examines the long-term psychiatric consequences, pain interference in daily activities, work loss, and functional impairment associated with 9/11-related loss among low-income, minority primary care patients in New York City. A systematic sample of 929 adult patients completed a survey that included a sociodemographic questionnaire, the PTSD Checklist, the PRIME-MD Patient Health Questionnaire, and the Medical Outcomes Study Short Form-12 (SF-12).

Approximately one-quarter of the sample reported knowing someone who was killed in the attacks of 9/11, and these patients were sociodemographically similar to the rest of the sample. Compared to patients who had not experienced 9/11-related loss, patients who experienced loss were roughly twice as likely (OR = 1.97, 95% CI = 1.40, 2.77) to screen positive for at least one mental disorder, including major depressive disorder (MDD; 29.2%), generalized anxiety disorder (GAD; 19.4%), and posttraumatic stress disorder (PTSD; 17.1%). After controlling for pre-9/11 trauma, 9/11-related loss was significantly related to extreme pain interference, work loss, and functional impairment. The results suggest that disaster-related mental health care in this clinical population should emphasize evidence-based treatments for mood and anxiety disorders.

Disasters can lead to widespread property damage, ongoing economic burden, and extensive loss of life. The attacks of September 11 were caused by human design and were instigated to kill civilians and disrupt the American economy. More than 3,000 lives were lost in one day, affecting a large network of individuals who knew the victims. National studies conducted after the 9/11 attacks suggested that between 4% and 11% of the U.S. adult population knew someone who was killed in the attacks of September 11, 2001 (Schlenger et al., 2002; Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002). Although previous reports suggest that unpredictable loss by malicious violence is one of the most psychologically harmful human experiences (Pfefferbaum et al., 2001; Rynearson & McCreery, 1993), only a few investigations have characterized the psychological sequelae of disaster-related loss among those who experienced loss due to the 9/11 attacks (Galea et al., 2002; Neria et al., 2007; Silver et al., 2002).

While emerging findings suggest that most people are able to accommodate to loss and regain functioning (Bonanno et al., 2002), a significant minority develop persistent psychopathology, manifested by enduring bereavement reactions referred to as complicated (Prigerson et al., 1996) or traumatic (Prigerson et al., 1997) grief. Previous research suggests

that the experience of loss may also result in a broader range of mental and physical problems (Kuo et al., 2003). People who experience loss have been found to be at increased risk for PTSD (Neria et al., in press), depression (Bruce, Kim, Leaf, & Jacobs, 1990), alcohol abuse (Glass, Prigerson, Kasl, & Mendes de Leon, 1995), sleep abnormalities (Brown et al., 1996), functional impairment (Neria et al., in press), suicidality (Latham & Prigerson, 2004), hospitalization (Li, Laursen, Precht, Olsen, & Mortensen, 2005) and mortality (Li, Precht, Mortensen, & Olsen, 2003).

It has become increasingly evident that general medical settings are an important source of care for individuals with a history of trauma (McQuaid, Pedrelli, McCahill, & Stein, 2001). There is strong support for a relationship between trauma exposure and physical health problems (reviewed in Schnurr & Green, 2004), and between trauma exposure and medical service utilization (reviewed in Elhai, North, & Frueh, 2005). Moreover, the mental health implications of large scale terrorist events, such as the 9/11 attacks, have rarely been studied in general medical settings. We previously reported that the 9/11 attacks had an enduring impact on poor primary care patients in New York City, and that PTSD was common in this patient population (Neria et al., 2006).

This report is based on data from a systematic sample of 929 low-income primary care patients attending a large primary care clinic in New York City (Das et al., 2005; Neria et al., 2006). We examine the frequency and distribution of loss due to the attacks of 9/11 within this sample, and the relationships between loss and risk of long-term psychiatric consequences, pain interference in daily activities, work loss, and impairment.

METHODS

Subjects and Procedure

During the 7- to 16-month period following the 9/11 attacks, we systematically sampled consecutive adult patients seeking primary care who presented to the waiting rooms of the Associates in Internal Medicine (AIM) practice. A detailed description of sample recruitment can be found elsewhere (Das et al., 2005; Neria et al., 2006). AIM is the faculty and resident group practice of the Division of General Medicine at the College of Physicians & Surgeons of Columbia University Medical Center. Each year AIM provides primary care services to approximately 18,000 adult patients from the surrounding northern Manhattan community. Patients eligible for the study were between 18 and 70 years of age, had made at least one prior visit to the practice, were able to speak and understand Spanish or English, were waiting for a scheduled appointment with a primary care physician, and were in adequate general health to complete the survey. Of the 1,118 patients who met eligibility criteria, 992 (88.7%) consented to participate. Of these patients, 929 (93.6%) completed the 9/11 module of the survey. This group constitutes the analytic sample of this paper.

All assessment forms were translated from English to Spanish and back-translated by a bilingual team of mental health professionals. The translated Spanish forms were reviewed and approved by the Hispanic Research and Recruitment Center at Columbia University Medical Center. The Institutional Review Boards of the Columbia University Medical Center and the New York State Psychiatric Institute approved the study protocol, and all participants gave informed written consent. Subject recruitment started on April 1, 2002, and was completed on January 16, 2003.

Measurements

All participants completed a sociodemographic form that assessed age, gender, ethnicity, race, marital status, and socioeconomic variables. For the purposes of analysis, race/ethnicity was based on self-designated national origin and race. Patients were classified as

Hispanic if they identified their nation of origin as Spain or a Latin American country or if they chose to complete the study forms in Spanish.

Experience of loss due to the 9/11 attacks was defined as a positive response to the question: "Did you know somebody who was killed by the World Trade Center disaster?" Exposure to trauma prior to 9/11/2001 was determined by the report of at least one trauma exposure from the Life Events Scale (Gray, Litz, Hsu, & Lombardo, 2004) ("happened to me" or "witnessed it"). We added two recent events, the "World Trade Center (September 11th, 2001) attack" and the "Plane crash of Flight 587 to the Dominican Republic," the latter being potentially relevant to a large segment of the clinic population who were born or have family in the Dominican Republic. Patients were classified as having or not having pre-9/11 traumatic exposure only when there were sufficient data regarding dates of earliest and latest traumas.

The PTSD Check List-Civilian Version (PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993) was used to screen for probable current PTSD related specifically to the terrorist attacks of 9/11. The PCL-C consists of 17 items corresponding to each DSM-IV PTSD symptom. The extent to which each symptom bothered the patient in the last month is rated from 1 (not at all) to 5 (extremely). It is a widely used, internally consistent, and diagnostically efficient PTSD screening instrument that is strongly correlated with other measures of PTSD (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Forbes, Creamer, & Biddle, 2001).

The survey forms included the Primary Care Evaluation of Mental Disorders (PRIME-MD) Patient Health Questionnaire (PHQ; Spitzer, Kroenke, & Williams, 1999) to assess current symptoms of DSM-IV major depressive disorder (MDD), panic disorder (PD), general anxiety disorder (GAD), and past-year probable alcohol abuse/dependence. A drug abuse/dependence section patterned after the PRIME/MD PHQ alcohol use disorder assessment was also administered. Suicidal ideation was considered to be present for subjects who reported on the PHQ that they had been bothered by "thoughts that you would be better off dead or thoughts of hurting your self in some way" for at least several days in the last two weeks. There is good agreement between diagnoses reported on the PHQ and those reported by independent mental health professionals (Spitzer et al., 1999).

Physical and mental health functioning were measured with the Physical and Mental Component Summary scores of the Medical Outcomes Study 12-Item Short Form Health Survey (SF-12; Ware, Kosinski, & Keller, 1996). Interference with daily activities related to somatic pain was indexed with the following SF-12 item: "During the past 4 weeks, how much did pain interfere with your normal work (including both outside the home and housework)?" Responses are coded "not at all," "a little bit," "moderately," "quite a bit," and "extremely."

Impairment was evaluated with the 10-point self-rated social life and family life/home responsibilities subscales of the Sheehan Disability Scale (0 = none, 1-3 = mild, 4-6 = moderate, 7-9 = marked, 10 = extreme) (Leon, Shear, Portera, & Klerman, 1992). Because only 186 (20.0%) of the patients were gainfully employed, the work subscale of the Sheehan Disability Scale was not used in the following analyses. Subjects were also asked how many days in the past month they had missed work (paid or unpaid) or school. Work loss (yes/no) was defined as missing seven or more days of these activities.

Statistical Analysis

The sample was partitioned into two mutually exclusive groups on the basis of whether participants knew someone who died in the 9/11 attacks. In order to assess the

sociodemographic distribution of loss, descriptive methods were used to examine background characteristics of the entire sample.

Prevalence of loss was stratified by patient age (18–54 vs. 55–70 years), gender, race/ethnicity, immigrant status, marital status (defined as married or cohabiting vs. not), educational attainment, annual household income, and employment status. Chi-square analysis was used to compare the proportions of patients who did and did not experience 9/11 loss on dichotomous variables. Logistic regression was used to obtain odds ratios (OR) and 95% confidence intervals (CI) for the effect of 9/11 loss on binary outcomes (PTSD, MDD, panic disorder, GAD, alcohol or drug use disorder, suicidal ideation, pain interference, and work loss) while controlling for relevant covariates. Linear regression was used to assess the effect of loss on SF-12 and Sheehan Disability Scale scores.

All tests were two-tailed and alpha was set at .05. Statistical analyses were conducted with SAS software version 9.1.3 (SAS Institute Inc., Cary, NC).

RESULTS

Sociodemographic Characteristics

More than a quarter of the patients (27.1%) reported that they knew somebody who died in the attacks of 9/11. There were no significant differences in the distribution of background characteristics between patients who did and did not report 9/11-related loss (see Table 1). Accordingly, we did not adjust for these characteristics in the main analyses.

Psychiatric Disorders

Patients who reported 9/11 loss were roughly twice as likely (OR = 1.97, 95% CI = 1.40, 2.77) to meet screening criteria for one or more mental disorders, compared to those who did not report 9/11-related loss (see Table 2). The most frequent disorders in the “loss” group were MDD (29.2%), GAD (19.4%), and 9/11-related PTSD (17.1%). After adjusting for pre-9/11 trauma exposure, the experience of loss on 9/11 remained significantly associated with GAD, PTSD and MDD. However, 9/11-related loss was not significantly related to the likelihood of panic disorder, alcohol/drug use disorder, or suicidal ideation (Table 2).

Pain, Work Loss, Health, and Impairment

As compared with patients who did not report 9/11-related loss, those who reported loss were almost 3 times as likely to report extreme pain interference as to report none at all. The difference remained significant after controlling for pre-9/11 trauma history. Similarly, after controlling for previous trauma, work loss was significantly more likely among patients who experienced 9/11 loss than among those who did not experience such a loss (see Table 3). Finally, indicators of mental and physical health-related quality of life and functional impairment were significantly worse for those who reported 9/11 loss compared to those who did not (Table 3). Group differences in SF-12 Mental Component Summary scores and Sheehan Disability scores remained statistically significant after controlling for previous trauma, whereas differences in SF-12 Physical Component Summary scores did not.

DISCUSSION

Approximately one-quarter of our sample of primary care patients in northern Manhattan reported knowing someone who was killed in the terrorist attacks of 9/11, and these patients were sociodemographically similar to the rest of the sample. Roughly one year after the attacks, almost one-half of the patients who experienced loss on 9/11 met screening criteria for one or more mental disorders, as compared to less than a third of those who did not

experience such a loss. The disorders were most frequently MDD, GAD, and 9/11-related PTSD. A 9/11-related loss was also associated with increased pain interference in daily activities, functional impairment, and work loss.

Our findings extend previous research on reactions to 9/11 loss. Community studies have found relatively high rates of new onset PTSD and MDD after the 9/11 attacks (Galea et al., 2002; Neria et al., in press; Schlenger et al., 2002; Silver et al., 2002). In addition to replicating these findings in a primary care sample, we report that persons who suffered a loss on 9/11 have elevated rates of GAD, work loss, extreme interference with functioning due to physical pain, and functional impairment. This suggests that sudden unexpected loss might be associated with increased risk for a broader, more enduring, and more debilitating set of mental health problems than previously reported in general medical settings.

Pain is often reported among primary care patients who suffer from depression (Bair et al., 2004; Vaeroy & Merskey, 1997). Our finding that pain is related to the experience of loss has not been previously reported. Compared to patients who did not report 9/11 loss, we found that patients who experienced loss were more than twice as likely to have pain that results in extreme interference in daily activities. These findings are consistent with a previous study suggesting that reactions to loss may extend beyond the emotional level to somatic comorbidity (Prigerson et al., 1997).

Considerable research in recent years has sought to determine whether psychological reactions to loss are clinically distinct from other forms of distress. For example, it has been suggested that complicated grief might be a separate and unique diagnostic entity (Lichtenthal, Cruess, & Prigerson, 2004; Prigerson et al., 1996) characterized by various depressive symptoms such as dysphoria and social withdrawal, PTSD symptoms such as intrusive thoughts and images and avoidant behaviors, and symptoms of acute separation distress such as intense pining or yearning for the deceased. Our findings suggest that post-loss reactions might include not only symptoms of PTSD and MDD, but also a broader range of anxiety and exaggerated worry as manifested in GAD, as well as severe functional impairment and possibly psychosomatic pain.

The study has several limitations. First, patients were asked to report about 9/11 loss in general rather than the effects of different types of loss. Second, this study did not include a specific measure of complicated grief. It is likely that in addition to the DSM-IV disorders studied here, some patients developed specific grief reactions associated with post-trauma psychopathology (Neria & Litz, 2004; Neria et al., 2007). Third, because the study was undertaken in an urban general medical practice serving a low-income population, the results may not generalize to primary care settings with different populations (Bruce, Takeuchi, & Leaf, 1991).

Taken together, these findings highlight the specific needs for care associated with post-disaster psychopathology among primary care patients exposed to loss. Because many poor and ethnic minority patients tend to avoid seeking (Howard et al., 1996) or receiving specialty mental health care (Leaf et al., 1998), they rely heavily on primary care health professionals for the provision of their mental health care (Olfson et al., 1996). Our findings shed light on the importance of identifying patients who have experienced losses after community disaster and terrorist attacks, as they are at increased risk for a number of mental disorders and functional impairments. Developing effective mental health services within general medical practice remains a key challenge for the service system. Our research suggests that special attention should be paid to patients who have experienced loss, since early detection and treatment may help to prevent long-term, chronic morbidity.

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TABLE 1

Prevalence of Reported Loss Due to the 9/11 Attacks, by Patient Background Characteristics

Characteristic	Yes	No	χ^2 (df = 1)	P Value
	%	%		
Entire sample (N = 929)	27.1	72.9		
Age				
18-54 (n = 535)	27.1	72.9	0.0	.99
55-70 (n = 394)	27.2	72.8		
Gender				
Female (n = 646)	27.6	72.5	0.2	.66
Male (n = 283)	26.2	73.9		
Ethnicity				
Hispanic (n = 761)	26.5	73.5	0.7	.40
Non-Hispanic (n = 168)	29.8	70.2		
Immigrant status				
Born outside the US (n = 753)	27.0	73.0	0.1	.81
Born in the US (n = 176)	27.8	72.2		
Marital status				
Separated/divorced, widowed, or never married (n = 630)	28.9	71.1	2.9	.09
Married/cohabiting (n = 297)	23.6	76.4		
Education level				
Not a high school graduate (n = 508)	26.2	73.8	0.8	.36
High school graduate (n = 412)	28.9	71.1		
Annual household income				
< \$12,000 (n = 699)	26.9	73.1	0.3	.57
\$12,000 (n = 222)	28.8	71.2		
Gainfully employed				
No (n = 743)	27.5	72.5	0.2	.65
Yes (n = 186)	25.8	74.2		

TABLE 2
Rates of Mental Disorder Diagnoses Among Patients With and Without Loss Due to the 9/11 Attacks

Outcome	Loss (n = 252)		No Loss (n = 677)		Odds Ratio (95% CI)	
	%	(n)	%	(n)	Crude	Adjusted [*]
Mental Disorder						
PTSD (9/11-related)	17.1	(43)	7.7	(52)	2.47 (1.60, 3.81)	2.58 (1.59, 4.18)
Major depressive disorder	29.2	(73)	18.9	(127)	1.77 (1.27, 2.48)	1.77 (1.20, 2.61)
Panic disorder	4.4	(11)	3.9	(26)	1.14 (0.55, 2.34)	1.25 (0.57, 2.73)
Generalized anxiety disorder	19.4	(49)	8.0	(54)	2.78 (1.83, 4.22)	2.92 (1.85, 4.59)
Alcohol or drug use disorder	9.4	(23)	7.6	(49)	1.27 (0.76, 2.13)	1.21 (0.71, 2.07)
Any of the disorders above	46.3	(114)	31.1	(201)	1.91 (1.42, 2.58)	1.97 (1.40, 2.77)
Suicidal Ideation	6.4	(16)	4.0	(27)	1.64 (0.87, 3.10)	1.42 (0.69, 2.90) [‡]

Note. PTSD = posttraumatic stress disorder. CI = confidence interval. Results significant at $p < .05$ are bolded. Mental disorders and suicidal ideation were assessed with the PRIME-MD Patient Health Questionnaire.

^{*} Adjusted for a history of at least one traumatic event prior to 9/11.

[‡] Adjusted also for the presence of major depression.

TABLE 3
 Impairment/health Status Among Patients With and Without Loss Due to the 9/11 Attacks

Outcome	Loss (n = 252)		No Loss (n = 677)		Tests	
	%	(n)	%	(n)	Crude OR (95% CI)	Adjusted OR (95% CI) [*]
Pain interference						
Extremely	7.2	(18)	3.0	(20)	2.77 (1.38, 5.57)	2.60 (1.24, 5.48)
Quite a bit	27.6	(69)	20.7	(139)	1.53 (1.02, 2.29)	1.16 (0.73, 1.83)
Moderately	16.8	(42)	21.4	(144)	0.90 (0.58, 1.40)	0.83 (0.50, 1.36)
A little bit	23.2	(58)	26.0	(175)	1.02 (0.68, 1.54)	0.91 (0.58, 1.41)
Not at all (reference group)	25.2	(63)	28.9	(194)	1.00 –	1.00 –
Work loss						
At least 7 days lost in past month	42.7	(76)	26.7	(112)	2.04 (1.41, 2.95)	1.92 (1.31, 2.83)
Health/impairment						
SF-12 Mental Component Summary [†]	42.9 ± 12.4		47.0 ± 12.1		-4.09 (-5.89, -2.30)	-3.89 (-5.81, -1.97)
SF-12 Physical Component Summary [†]	38.0 ± 11.9		40.4 ± 11.3		-2.38 (-4.06, -0.70)	-1.81 (-3.64, +0.02)
Sheehan Disability Scale [‡]	6.2 ± 5.7		4.6 ± 5.4		1.60 (0.77, 2.42)	1.43 (0.56, 2.29)

Note. 9/11 = September 11, 2001 terrorist. OR = odds ratio. CI = confidence interval. Results significant at $p < .05$ are bolded. Pain interference was assessed with an item from the Medical Outcomes Study Short Form Health Survey (SF-12).

^{*} Adjusted for a history of at least one traumatic event prior to 9/11.

[†] Higher scores denote better health/functioning.

[‡] Modified version (i.e., no work item) with possible score range of 0-20. Higher scores denote worse functioning.