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Anger and posttraumatic stress disorder in disaster relief workers exposed to the 9/11/01 World Trade Center Disaster: One-year follow-up study

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Abstract

While anger is an important feature of posttraumatic stress disorder (PTSD) it is unclear whether it is simply concomitant or plays a role in maintaining symptoms. A previous study of disaster workers responding to the terrorist attacks of September 11, 2001 (Evans et al., 2006) indicated that those with PTSD evidenced more severe anger than those without. The purpose of this study was to conduct a one-year follow-up to assess the role of anger in maintaining PTSD. Workers with PTSD continued to report more severe anger than those without; there were statistically significant associations between changes in anger, PTSD severity, depression, and psychiatric distress. Multiple regression analysis indicated initial anger severity to be a significant predictor of PTSD severity at follow-up, which is consistent with the notion that anger maintains PTSD. One implication is that disaster workers with high anger may benefit from early intervention to prevent chronic PTSD.

Keywords

Anger; PTSD; Disaster Workers; Longitudinal

Research studies indicate anger to be a central feature of the posttraumatic response in survivors of a variety of traumatic events, including combat (e.g., Kulka et al., 1990; Rosen et al., 2001), physical or sexual assault (e.g., Riggs et al., 1992), terrorism attacks (Evans, 2006), and motor vehicle accidents (Mayou, Ehlers, & Bryant, 2002).

There is, however, a dearth of empirical evidence to address whether anger is simply concomitant to PTSD or whether it plays a role in maintaining the disorder. Anger has been implicated in the development of PTSD in sexual assault victims (e.g., Riggs et al., 1992), but studies do not clarify if its presence perpetuates the disorder. Other studies showed that, while anger predicted the onset of PTSD in crime victims one month post trauma, it did not

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play a role in maintaining it at six months post trauma (Andrews, Brewin, Rose, & Kirk, 2000). In contrast, another set of studies demonstrated that anger in response to intrusive memories predicted PTSD at one-year and three-year follow-up in motor vehicle accident victims (Mayou, Ehlers, & Bryant, 2002). We are not aware of any studies in the literature that have examined these issues in disaster workers.

The mechanisms by which anger could perpetuate PTSD are by contributing to perceptions of external threat (Ehlers & Clark, 2000), diminishing treatment response or preventing help seeking or (e.g., Stevenson & Chemtob, 2000). Research to clarify the role of anger in maintaining PTSD is warranted as this may aid in treatment and in identification of persons at risk for chronic PTSD.

The purpose of this study was to explore the relationship over time between anger and PTSD in disaster workers involved in the recovery processes at the World Trade Center disaster. It was hypothesized that (a) PTSD diagnosis would continue to be associated with higher levels of anger; (b) the course of anger symptoms over time would be related to the course of PTSD symptoms; and (c) anger severity at initial evaluation would be a significant predictor of PTSD severity at follow-up.

Methods

The participants, procedure, and measures for this study are more fully described in a cross-sectional study of anger in this population (Evans, Giosan, Patt, Spielman, & Difede, 2006) and a study of the psychiatric consequences of disaster work in this population (Difede, Roberts, Jayasinghe, & Leck, 2006).

Participants

Participants in this study were 1,040 disaster rescue and recovery workers deployed to the WTC site during or in the aftermath of 9/11/01.

Procedure

The psychological screenings consisted of structured clinical interview and self-report measures administered by doctoral-level clinicians.

Measuring Anger—The State-Trait Anger Expression Inventory-2 (STAXI-2), a 57-item, revised version of the State-Trait Anger Expression Inventory (Spielberger, 1988). This study utilized the 15-item State Anger (S-Ang) subscale that assesses three domains: “Feeling Anger,” “Feel Like Expressing Anger Verbally,” and “Feel Like Expressing Anger Physically.”

Measuring PTSD—The Clinician-Administered PTSD Scale is a structured interview that assesses the frequency and intensity of 17 PTSD symptoms and has well-established psychometric properties (Blake et al., 1995). The items were keyed to the WTC attacks. The PTSD Checklist (PCL), a self-report measure of PTSD (Weathers, Litz, Herman, Huska & Keane, 1993) was also administered.

Additional Measures of Distress—The Structured Clinical Interview for Diagnostic Statistical Manual (SCID) is a semi-structured clinical interview with well-established reliability and validity that is used to determine diagnoses according to the Diagnostic and Statistical Manual-IV criteria (Skre, Onstad, Torgensen, & Kringen, 1991). Major Depressive Disorder (MDD), Generalized Anxiety Disorder (GAD), and Panic Disorder (PD) modules were administered during the screening. The Beck Depression Inventory (BDI) is a widely used self-report measure of depression with well-established psychometric properties (Beck et al., 1961). The Brief Symptom Inventory (BSI) is a 53-item version of the Symptom Checklist-90-Revised (Derogatis & Melisaratos, 1983) that measures psychiatric distress. For the purposes of this study, the Global Severity Index (GSI) has been used.

Background Measures—Trauma Events Interview (TEI) is a 13-item measure that documents lifetime trauma history on a broad array of events (e.g., natural disasters, injury, unwanted sexual contact, etc.) (Foa & Rothbaum, 1985). The WTC Attack Exposure Questionnaire is an instrument developed for the screening program to assess a broad range of types of trauma exposure both on the day of the attack, and during any subsequent disaster work. This study utilized the exposure variable most predictive of PTSD in the larger sample, namely, the perception of being in immediate danger during the course of disaster operations (Difede, Roberts, Jayasinghe, & Leck, 2006).

Statistical Analyses

Independent t-tests compared workers who met criteria for PTSD with workers who did not meet criteria for PTSD on anger severity, depression, and psychiatric distress. Next, bivariate correlations were performed using change from Time 1 to Time 2 in anger severity, PTSD severity, depression, and psychiatric distress, in order to explore whether changes in anger were related to change in other symptoms. Finally, multiple regression analyses were performed to assess whether anger severity at Time 1 was an independent predictor of PTSD at time 2.

Results

The sample consisted primarily of middle-aged, white, married men with high school education. (See Table 1). The mean number of months between Time 1 and Time 2 was 11.22 (SD=1.89). The following psychiatric diagnoses were determined: PTSD (6.8% full current, 6.1% subsyndromal current), MDD (4.6% current, 11% past), GAD (2.2% current, 2.1% past), and PD (2.4% current, 4.2% past). A third (31%) reported trauma unrelated to WTC.

Independent t-tests indicated that workers with PTSD had significantly more severe symptoms on anger, depression, and psychiatric distress than those without at both time points (see Table 2). The findings suggest that anger is a central feature of PTSD over time.

Results showed that change in anger was significantly related to changes in all other symptoms, with reductions in anger associated with reductions in PTSD (see Table 3). The

findings demonstrate that the course of anger symptoms over time is related to the PTSD course.

Table 4 displays the results of multiple regressions to predict PTSD severity at Time 2. Anger severity at Time 1 accounted for a statistically significant, though small (2%), of variance in PTSD severity at Time 2. The finding is consistent with the hypothesis that anger plays a role in maintaining PTSD.

Discussion

This study suggests that anger may make a unique contribution to the maintenance of PTSD symptoms in disaster workers. The findings bolster the limited amount of longitudinal data about this issue and extend findings on victims of motor vehicle accident, physical assault, or sexual assault to a new population. Although the variance explained (2%) was small, this is consistent with other studies and the potential importance of anger should not be minimized (Mayou, Ehlers & Bryant, 2002). Implications of these findings are that careful assessment of anger should be included in screening of disaster-exposed workers and that disaster workers with high levels of anger may benefit from early intervention as they may be at risk for chronic symptoms.

One limitation of this study is that data are not available on anger symptoms in the acute aftermath of disaster exposure. In addition, as the population under study is predominantly male, there may be limits to generalizability. Because this study examined state anger rather than trait anger, future study of global and stable patterns of anger may prove informative in clarifying the relationship between different forms of anger and PTSD. Finally, the findings do not shed light on the specific mechanisms accounting for the role of anger in maintaining PTSD. Future research is warranted that explores issues such as continued threat perception, interpersonal functioning difficulties, and barriers to treatment utilization, among others.

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Table 1

Sociodemographic Characteristics (n = 1,040)

Background characteristic		
Age (<i>M, SD</i>)	45.90	(9.55)
Gender		
Men	981	95.2%
Women	49	4.8%
Race/ethnicity		
White	608	58.5%
African-American	194	18.7%
Hispanic	147	14.1%
Other	24	2.3%
Education		
Some or no high school	24	2.4%
High school graduate	422	41.8%
Some college	373	37.0%
College graduate	134	13.3%
More than college	56	5.4%
Marital status		
Married/cohabitating	753	73.2%
Separated/divorced	95	9.2%
Single	176	17.1%
Widowed	4	0.4%

Table 2

Anger, Depression, and Distress According to PTSD Diagnosis: Means and Standard Deviations

	Measure	PTSD		No PTSD		<i>t</i>	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Time 1	STAXI-2	21.21	9.01	15.71	3.39	12.61	***
	BDI	13.67	7.66	3.05	4.52	15.30	***
	BSI	0.92	0.62	0.17	0.29	13.43	***
	PCL	42.27	12.71	22.51	7.29	17.16	***
	STAXI	18.50	5.51	15.94	4.10	6.44	***
	BDI	14.42	8.64	2.60	4.48	13.67	***
Time 2	BSI	0.92	0.60	0.15	0.31	12.94	***
	PCL	39.79	14.62	22.84	8.63	9.37	***

= $p < .001$

Table 3

Relation of Change in Anger to Change in Other Symptoms: Bivariate Correlations

<i>Measure</i>	1	2	3	4	5
1. STAXI-2	-----				
2. BDI	.321**	-----			
3. GSI	.430**	.750**	-----		
4. PCL	.322**	.640**	.668**	-----	
5. CAPS	.289**	.520**	.533**	.584**	-----

**
 $p < .01$

Table 4

Summary of Multiple Regression Analyses Predicting PTSD Severity at Time 2

Step	Variable	R ²	F	Beta	t	p
1		.013	2.68			
	Race			-.04	1.22	
	Education			-.02	0.77	
	Marital Status			-.01	-1.99	*
	Age			.09	2.40	*
2		.019	3.19			
	Other trauma			.08	2.28	*
3		.144	19.53			
	# Current diagnoses			.32	8.99	***
	# Past diagnoses			.08	2.39	*
4		.192	24.08			
	Felt serious danger			.22	6.93	***
5		.456	75.48			
	CAPS Severity Time 1			.61	19.84	***
6		.476	71.12			
	STAXI-2 (S-Ang) Severity Time 1			.12	4.22	***

*
: p < .5**
: p < .01***
p: < .001