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Predictors of Treatment Utilization in World Trade Center Attack Disaster Workers: Role of Race/Ethnicity and Symptom Severity

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ABSTRACT: *This study examined treatment utilization in disaster workers deployed to the World Trade Center (WTC) during or after the terrorist attacks of September 11, 2001. Among 174 workers who accepted psychotherapy referrals following psychiatric screening for WTC-related symptoms, 74 (42.5%) attended at least one session, while 100 (57.5%) chose not to attend at all. The study assessed whether treatment utilization was associated with sociodemographic background, trauma history, psychiatric history, WTC attack exposure, diagnoses, or symptom severity. Analyses indicated that, of study variables, race/ethnicity and clinician-rated Post Traumatic Stress Disorder (PTSD) symptom severity distinguished workers who utilized treatment from those who did not. Implications for outreach and referral are discussed. [International Journal of Emergency Mental Health, 2005, 7(2), pp. 91-100].*

KEY WORDS: *disaster workers, treatment utilization, race, ethnicity*

This study examined treatment participation in disaster workers referred for psychotherapy following their work at the site of the World Trade Center (WTC) attacks of September 11, 2001. Although effective treatments for Post Traumatic Stress Disorder (PTSD) and other post-trauma reactions exist (Rothbaum, Meadows, Resick, & Foy, 2000), the majority of trauma survivors either delay or never seek treatment (Kessler, 2000; Koenen, Goodwin, Struening, Hellman, & Guardino, 2003). Disaster workers may be less likely than

others to participate in treatment. National and community surveys indicate that rates of participation in psychotherapy tend to be highest among women, persons with three or more years of college education, and persons who are single, separated, or divorced (Greenley, Mechanic, & Cleary, 1987; Leaf, Bruce, Tischler & Holzer, 1987; Leaf et al., 1988; Olfson & Pincus, 1994; Olfson, Marcus, Druss, & Pincus, 2002). Disaster workers in a number of professions, such as fire fighters and police, tend to be married men who have less formal education. In addition, clinicians have observed that the coping methods disaster workers rely on in disaster situations (logical analysis, distancing from emotion, distrust of outsiders) may be antithetical to seeking professional help (Young, Ford, Ruzek, Friedman, & Gusman, 1998).

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Studies reveal rates of PTSD or comorbid conditions in disaster workers ranging from about 9% to 40% (Difede, et al., under review). Because post-trauma conditions such as PTSD are potentially chronic and impact physical health, relationships, and occupational functioning (Kessler, 2000), it is important to understand the extent to which disaster workers are amenable to treatment and what factors play a role in their willingness to participate in treatment interventions. However, treatment utilization in disaster workers has rarely been studied.

A variety of factors are likely to come into play that are related to "the individual's propensity to use mental health services...the means by which the individual might access mental health services...and the level of the individual's illness," (Koenen, et al., 2003, p. 6). Koenen and colleagues compared adults with PTSD who had ever been in treatment with those who had never been in treatment. They found that older age, interference of symptoms with everyday life, and comorbid diagnosis of Panic Disorder were positively associated with having been in treatment while minority status was negatively associated with having been in treatment.

To shed light on these issues in disaster workers, we examined whether utility workers who accepted psychotherapy referral *and* attended at least one psychotherapy session for WTC attack-related mental health issues differed from those who accepted referral but did not attend even one session with respect to sociodemographic background, trauma history, psychiatric history, WTC attack exposure, diagnosis, or symptom severity.

METHOD

Participants

Participants were utility workers who had been deployed to the WTC site in the aftermath of the September 11, 2001 terrorist attacks to secure gas, steam, and electricity supplies, and who were deemed during a psychological screening to be sufficiently symptomatic to warrant treatment for WTC attack-related distress.

Procedure

All utility workers deployed to the WTC attack site were scheduled to participate in a comprehensive screening program consisting of medical and psychological evaluations that were conducted at two sites of the company's Occupa-

tional Health department. The purpose of the psychological screenings was to evaluate workers for WTC attack-related symptoms and provide appropriate treatment referral. The company specifically contracted with the Program for Anxiety and Traumatic Stress Studies (PATSS) to conduct screenings in order to ensure screeners' expertise with trauma as well as confidentiality for workers. Information from psychological screenings was kept strictly confidential in accordance with HIPAA regulations. The Committee on Human Rights in Research of Weill Medical College approved use of archival data from screenings and record of treatment appointments made and kept for the purposes of research.

The psychological evaluation consisted of a series of self-report measures and structured interviews administered by PATSS clinicians (licensed psychologists and postdoctoral fellows) that took approximately 1.5 hours to complete. Clinicians offered workers psychotherapy referrals for treatment of full or subthreshold PTSD. Because the psychiatric consequences of disaster work are not limited to PTSD (e.g., North, et al., 2002), workers were also offered psychotherapy if they suffered Major Depressive Disorder (MDD), Panic Disorder (PD), Generalized Anxiety Disorder (GAD), traumatic grief, or experienced significant difficulty with role functioning.

Workers were given two options for referral: (1) up to 26 sessions of psychotherapy at PATSS in Manhattan with fees paid by the utility company or; (2) twelve sessions of free psychotherapy through a research protocol conducted free of charge at various locations in the New York City area. The treatment was confidential and workers had the option of scheduling appointments during or after their work hours. Workers who expressed interest in either program and provided their contact information for follow-up scheduling were deemed to have *accepted* the referral. This study examined treatment participation among a sample of 174 workers who accepted psychotherapy referrals more than one year post-disaster to either PATSS or the research protocol.

Measures

Treatment participation was measured as attendance at one or more sessions of psychotherapy in the PATSS program or research protocol. The clinician-administered scales were comprised of the Clinician-Administered PTSD Scale (CAPS), the Trauma History Questionnaire (THQ), the Structured Clinical Interview for Diagnostic and Statistical Manual-IV (SCID), and the WTC Attack Exposure Questionnaire. The self-report

measures were comprised of the Beck Depression Inventory (BDI), the Brief Symptom Inventory (BSI), and the PTSD Checklist (PCL).

The *Clinician-Administered PTSD Scale* (Blake, et al., 1990) is a structured interview for PTSD that yields both a dichotomous (present/absent) diagnosis of PTSD and a continuous measure of PTSD symptom severity. The CAPS assesses the frequency and intensity of each PTSD symptom on separate 5-point rating scales (0-4). Frequency and intensity may be summed for each item to yield a nine-point (0-8) severity rating, and severity ratings may be summed across items to yield severity scores for each of the three PTSD symptom clusters (i.e., re-experiencing, avoidance/numbing, and hyperarousal) and for the full PTSD syndrome. The CAPS has excellent psychometric properties and is a widely accepted criterion measure of PTSD (Weathers, Keane, & Davidson, 2001). For the purposes of the screening, the CAPS was administered with respect to the WTC attacks.

Participants qualified for a diagnosis of full PTSD if they met the standard criteria on the CAPS for three symptom clusters (i.e., re-experiencing, avoidance, hyperarousal), and for subthreshold PTSD if they met criteria for two out of three symptom clusters (Blanchard, et al., 1995; Weathers, Ruscio, & Keane, 1999). To meet criteria for diagnosis, these symptoms also had to be of at least one month's duration.

The *Structured Clinical Interview for DSM* (SCID) is a semi-structured diagnostic interview designed to determine diagnoses according to criteria of the Diagnostic and Statistical Manual (Spitzer & Williams, 1985). Its psychometric properties have been well established (Skre, Onstad, Torgersen, & Kringlen, 1991). The SCID has acceptable joint interview interrater reliability with kappas between .70 - .94. In a multi-site, test-retest reliability study, kappas were .6 or above for current and lifetime diagnoses in major diagnostic categories in patient samples.

The *Trauma Events Interview* (TEI) is a 13-item measure that documents lifetime trauma history. Only the first eight items of this instrument were administered. Participants were asked if they ever witnessed or experienced any of the following traumatic events: (1) natural disasters; (2) serious accident or injury; (3) sudden, life-threatening illness; (4) military combat or military service in a war zone; (5) death of a friend/family member in an accident or by murder; (6) sudden, unexpected death of a close family member; (7) assault with a weapon; and (8) assault without a weapon. For each event, participants

were asked "How many times did it occur?"; "How old were you at the time of the worst incident?"; and "In the worst incident did you feel terrified, horrified, or helpless?" Interrater reliability is acceptable ($\kappa = .83$) (Foa & Rothbaum, 1985).

The *WTC Attack Exposure Questionnaire* is an instrument designed by clinicians at PATSS to assess severity of utility workers' WTC trauma exposure both on the day of 9/11/01 and during any subsequent disaster work. Specific information regarding exposure includes location during the attacks (e.g., at WTC, south of Canal Street, or location from which attacks were visible); presence of loved one in the WTC or vicinity; injury or death of a family member, friend, or colleague; attendance at funerals or memorials; displacement from home; and/or, providing assistance to those affected by the disaster. Additional information is collected regarding participation in the disaster relief work following the attacks: duration of work on the site (e.g., start date, end date, hours of shifts), nature of work at the site (e.g., areas of operation); perceived danger while working at the site; exposure to bodies, body parts, or body bags.

The *Beck Depression Inventory* is one of the most widely used self-report measures of depression. The 21 BDI items consist of four statements, scored 0 to 3, that reflect increasing severity of a given symptom of depression. Items are summed to yield a total depression score. The psychometric properties of the original BDI are well established (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961).

The *Brief Symptom Inventory* is a 53-item abbreviated version of the Symptom Checklist 90-Revised. Items are rated on a five-point rating scale (0 = "not at all," 4 = "extremely"), and are summed to yield scores for nine symptom dimensions and three global indices, including the Global Severity Index, which is an overall measure of psychopathology. The SCL-90-R and the BSI are widely used self-report measures of psychopathology with well-established psychometric properties (Derogatis & Melisaratos, 1983).

The *PTSD Checklist-Civilian Version* is a DSM-IV-correspondent, 17-item self-report measure of PTSD. Using a five-point rating scale (1 = "not at all", 5 = "extremely"), respondents indicate how much they were bothered in the past month by each of the DSM-IV PTSD symptoms. The PCL is psychometrically sound and has been used in hundreds of studies across a variety of trauma populations (Weathers, Litz, Herman, Huska, & Keane, 1993).

Data Analytic Strategy

The first step was to examine the percentage of workers in the sample who attended at least one appointment in order to assess the extent of treatment utilization in the sample.

The second step was to examine the potential role of sociodemographic background, trauma and psychiatric history, WTC attack exposure, diagnosis, and symptoms in treatment utilization. The following variables were available for study: (1) sociodemographic background—age, race/ethnicity (non-Hispanic white vs. racial/ethnic minority), education (high school vs. some college or more), and marital status (married/cohabitating vs. other); (2) trauma history—lifetime trauma (trauma other than WTC attacks vs. no other trauma); (3) psychiatric history—treatment (prior mental health treatment vs. no prior mental health treatment), past diagnosis (Major Depressive Disorder [MDD], Panic Disorder [PD], or Generalized Anxiety Disorder [GAD] prior to screening vs. no prior MDD, PD, or GAD); (4) WTC attack exposure—witnessed attacks from the WTC area, south of Canal street, or another location (yes vs. no); knew someone in/near the WTC (yes vs. no); knew someone killed (yes vs. no); attended funerals or memorials (yes vs. no); worked at WTC site on 9/11/01 (yes vs. no); number of days worked at the site; experienced danger while working at the site (yes vs. no); or saw bodies, body parts, or body bags (yes vs. no); (5) diagnoses at time of screening—PTSD diagnosis (full/sub-threshold PTSD vs. no PTSD), other diagnosis (MDD, PD, or GAD vs. no MDD, PD, or GAD); (6) symptom scores—CAPS total severity, PCL total, BDI total, and GSI score.

Chi square analyses were performed for categorical variables while independent *t*-tests were performed for continuous variables. In this preliminary study, it was more important to identify potential variables for further exploration than to eliminate variables that might be discounted with further study (Kutter, Wolfe, & McKeever, 2004; Perneger, 1998), hence a Bonferroni correction was not applied and thus statistical significance level was set at .05.

In order to identify the best predictors of treatment utilization, variables shown by independent *t*-tests and chi square analyses to be significantly related to treatment participation were entered into the first step of binary logistic regression with treatment participation serving as the dependent variable. Interactions warranting exploration were entered as a second step. The significance of the model was assessed using chi square. The Hosmer-Lemeshow Goodness of Fit

Test assessed the fit of the model. This test follows a chi square distribution with 8 degrees of freedom and a nonsignificant result indicated a good fit (Koenen, et al., 2003).

RESULTS

Sociodemographic Characteristics

Table 1 presents the sociodemographic profile of study participants. The average age of participants was 43 years ($M = 43.01, SD = 8.77$). The majority of participants were male (97.6%), non-Hispanic whites (67.3%), married/cohabitating (82.8%), high school graduates (45.2%). Seventy-four percent reported having experienced a traumatic event other than the WTC attacks.

Table 2 presents the WTC attack exposure profile of participants. Workers had been deployed to secure and restore gas, steam, and electricity supplies to the downtown New York City area either during or after the WTC attacks, and had spent an average of 29 days at the site ($M = 28.78, SD = 45.85$). During the course of their duties, workers were exposed to physiological stressors (e.g., long work hours,

Table 1.
Sociodemographic Characteristics

Characteristic	<i>n</i>	% ^a
Gender		
Male	165	97.6
Female	4	2.4
Race/Ethnicity		
White	109	67.3
Hispanic	26	16.0
Black	23	14.2
Asian	2	1.2
Other	2	1.2
Relationship Status		
Married	131	78.0
Separated/divorced	16	9.5
Single	12	7.1
Cohabitating	8	4.8
Widowed	1	0.6
Formal Education		
High school graduate	75	45.2
Some college	61	36.7
College graduate	21	12.7
More than college	6	3.6
Some or no high school	3	1.8

^a Valid percent calculated using non-missing cases.

limited sleep) as well as psychological stressors (e.g., witnessing destruction at the site, seeing human remains, and working in potentially dangerous conditions).

Table 3 details participants' prior psychiatric history, treatment status, and diagnoses at screening.

Treatment Utilization

Of the 174 workers who accepted referrals for psychotherapy, 74 (42.5%) attended at least one session, while 100 (57.5%) did not. Analyses revealed two variables to be related to treatment utilization. First, chi square analysis revealed that workers who were non-Hispanic white were significantly more likely to enter treatment than those from racial/ethnic minority groups. That is, 50.5% of non-Hispanic white workers entered treatment compared to 22.6% of ethnic minority workers, $\chi^2(1, N = 162) = 11.38, p = .001$, Cohen's $d = 0.55$. Results were non-significant for all other analyses, suggesting that workers who participated in treatment did not differ significantly from those who did not with respect to any of the remaining categorical variables. Second, results of independent t -tests indicated that workers who entered treatment had significantly higher clinician-rated PTSD symptoms ($M = 41.44, SD = 15.49$) than those who did not enter treatment ($M = 36.47, SD = 15.72$), $t(172) = -2.077, p = .039$, Cohen's $d = 0.32$. Independent t -tests failed to reveal significant differences between groups with respect to other continuous variables.

As a step towards building a regression model, the relation of symptom severity, treatment utilization, and race/ethnicity was explored using 2 x 2 ANOVA. Race/ethnicity

(non-Hispanic white vs. racial/ethnic minority) and treatment utilization (entered treatment vs. did not enter treatment) served as independent variables and clinician-rated PTSD symptom severity served as the dependent variable. Table 4 presents CAPS scores by race/ethnicity and treatment utilization. There was a significant main effect of treatment utilization, $F(1, 158) = 7.92, p = .006, \eta_p^2 = .05$. This effect indicated that workers who entered treatment had significantly higher CAPS total scores than those who did not enter treatment. There was no significant main effect of race/ethnicity on CAPS scores, $F(1, 158) = .303, p = .583$. This suggested that CAPS scores for non-Hispanic white and racial/ethnic minority workers did not differ significantly. However, there was a significant interaction of treatment participation and race/ethnicity, $F(1, 158) = 4.69, p = .032, \eta_p^2 = .03$. Tukey's post-hoc tests indicated that racial/ethnic minority workers who entered treatment had significantly higher CAPS scores than those who did not ($p < .05$). CAPS scores were *not* significantly different when non-Hispanic white workers who entered treatment were compared with non-Hispanic white workers who did not, when racial/ethnic minority workers who entered treatment were compared with non-Hispanic white workers who entered treatment, or when racial/ethnic minority workers who did not enter treatment were compared with non-Hispanic white workers who did not enter treatment (all p 's $> .05$).

To further specify the relation of ethnicity, symptom severity, and treatment-participation as another step in the process of building a regression model, the sample was stratified according to clinician-rated PTSD severity using a cut-off score of 45 on the CAPS (Weathers, Ruscio, & Keane, 1999).

Table 2.
WTC Attack Exposure Characteristics

Characteristic	<i>n</i>	% ^a
Witnessed attacks	70	42.2
Knew someone in WTC or vicinity	80	53.43
Knew someone injured	14	8.5
Knew someone killed	90	60.4
Attended funerals or memorials	48	29.8
Worked at/around WTC on 9/11/01	49	29.0
Worked at or visited Ground Zero/Pile	140	82.8
Experienced danger while working at site	88	52.4
Saw bodies, body parts, or body bags at site	105	64.8

^a Valid percent calculated using non-missing cases.

Table 3.
Psychiatric History and Diagnosis

Characteristic	<i>n</i>	% ^a
Prior Mental Health Treatment	47	28.7
Past MDD, PD, or GAD	52	30.2
Current Mental Health Treatment	12	7.1
Current PTSD (full or subsyndromal)	142	81.6
Current MDD, PD, or GAD	71	42.0

^a Valid percent calculated using non-missing cases.

Among workers with CAPS scores below the cut-off, non-Hispanic white workers were more likely to accept referrals than racial/ethnic minority workers, $\chi^2(1, N = 109) = 11.87, p = .001$, Cohen's $d = 0.70$. However, among workers with CAPS scores equal to or above 45, non-Hispanic white workers were no more likely to accept referrals than racial/ethnic minority workers, $\chi^2(1, N = 53) = .498, p = .480$.

Non-Hispanic white and racial/ethnic minority workers were compared on all other study variables to identify additional variables for entry into a binary logistic regression model. Independent *t*-tests indicated that non-Hispanic white workers were significantly older ($M = 44.47, SD = 9.00$) than racial/ethnic minority workers ($M = 40.35, SD = 7.60$), $t(151) = 2.79, p = .006$, Cohen's $d = 0.49$. Chi square analyses indicated that non-Hispanic white workers were significantly more likely to be married/cohabitating (89%) than racial/ethnic minority workers (72%), $\chi^2(1, N = 162) = 7.68, p = .006$, Cohen's $d = 0.45$. In addition, non-Hispanic white workers were significantly more likely (68%) to report knowing someone killed in the attacks than racial/ethnic minority workers (43%), $\chi^2(1, N = 141) = 7.81, p = .005$, Cohen's $d = .48$. Finally, non-

Hispanic white workers were more likely to report attendance at funerals, wakes, or memorial services (39%) than racial/ethnic minority workers (14%), $\chi^2(1, N = 149) = 9.99, p = .002$, Cohen's $d = .54$.

Table 5 summarizes the results of the binary logistic regression analysis. The overall model was significant, $\chi^2(7, N = 127) = 23.44, p < .001$ and the Hosmer-Lemeshow Chi Square value indicated a good fit, $\chi^2(8, N = 127) = 8.76, p = n.s.$ The model explained almost 23% of the variance in treatment utilization (Nagelkerke's $R^2 = 22.8%$). In the context of other variables in the model, CAPS symptom severity and race/ethnicity were the strongest predictors of treatment utilization. Each one-point increase in CAPS symptom severity was positively associated with entering treatment. The odds of entering treatment for racial/ethnic minority workers were .33 times the odds of non-Hispanic white workers entering treatment. There was also a significant interaction between minority status and CAPS symptom severity: higher CAPS scores increased the odds of racial/ethnic minority workers entering treatment.

DISCUSSION

Our study revealed that a high proportion of disaster workers in the sample who expressed willingness to accept professional help in the form of psychotherapy referral did not access available services. Of the 174 workers who accepted referrals for psychotherapy, 74 (42.5%) attended at least one session, while 100 (57.5%) did not attend even one. This result is consistent with findings in the general population that a significant number of trauma survivors in general, and those with PTSD in particular, do not receive appropriate mental health services (Kessler, 2000).

Table 4.
CAPS Scores According to Race/ethnicity and Treatment Utilization: Means and Standard Deviations

Race/ethnicity	Treatment utilization	
	Entered trx	Did not enter trx
Minority	48.67 (12.20)	33.98 (15.08)
Non-Hispanic white	40.65 (15.92)	38.74 (16.07)

Note: Levene's test for homogeneity of variances is non-significant.

Table 5.
Predictors of Treatment Utilization

Predictor	B	SE ^a	Odds Ratio	95% CI ^b
Age	-0.04	.02	1.04	0.99 - 1.08
Marital status	0.03	.59	1.03	0.31 - 3.22
Knew someone killed	-0.57	.48	0.57	0.22 - 1.46
Attended funerals	0.56	.48	1.75	0.69 - 4.50
Race/ethnicity	-1.12*	.50	0.33	0.12 - 0.87
CAPS severity	0.03*	.01	1.04	1.00 - 1.06
Race/ethnicity x CAPS severity	0.08*	.04	1.08	1.01 - 1.16

^a Standard Error.

^b CI = Confidence Interval.

* $p < .05$.

Our finding that racial/ethnic minority workers were less likely than non-Hispanic white workers to attend psychotherapy is consistent with findings from the National Anxiety Disorders Screening Day survey (Koenen, et al., 2003). Results from the survey indicated that although race/ethnicity was not significantly associated with self-reported readiness to use professional help, "minority race was associated with decreased likelihood of having been in treatment," (p. 9). The findings are also broadly consistent with the finding that individuals from racial/ethnic minority groups that are in need of care are less likely to receive mental health treatment than non-minority individuals (U.S. Department of Health and Human Services, 2001). In our sample, race/ethnicity interacted with symptom severity: increases in symptom severity increased the odds of racial/ethnic minority workers entering treatment. This is again consistent with observations that some racial and ethnic minorities are likely to delay seeking treatment until symptoms are severe (U.S. Department of Health and Human Services, 2001).

It is notable that other study variables, particularly aspects of exposure (such as knowing someone killed), did not predict treatment utilization. It may be that extent of trauma exposure plays a more significant role in the short-term aftermath of disaster than in the long-term aftermath. For instance, Boscarino and colleagues (2004) found that amount of exposure predicted WTC disaster-related mental health visits made by New York City residents within approximately a year of the attacks. However, disaster workers in the cur-

rent study were referred more than one year post-disaster. It is also important to keep in mind that the relation of trauma exposure to symptom severity is often complex and dose-response effects are not ubiquitous (Kroll, 2003).

A potential implication of these findings is that clinicians should pay particular attention to motivating racial/ethnic minority disaster workers with mild or moderate symptoms for treatment. However, it will be important in the future to clarify what might account for treatment reluctance among such workers. Explanations offered to account for why racial and ethnic minorities are less likely to access mental health treatment include cost, fragmentation of services, stigma, mistrust of mental health professionals, and limited English proficiency. Further research to clarify the influence of minority race/ethnicity on treatment readiness, treatment utilization, and treatment dropout in disaster workers is warranted.

A limitation of the study is that it is unclear whether workers who did not participate in the psychotherapy offered sought help from other sources. Because treatment utilization was examined with respect to participation in a specialty psychotherapy program it is also unclear whether the findings generalize to other forms of mental health treatment. In addition, because disaster workers perform diverse roles and hail from diverse organizational backgrounds (Young, et al., 1998), it will be important to assess whether similar patterns of treatment utilization apply to other groups of disaster workers.

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