Mental health service use among American Red Cross disaster workers responding to the September 11, 2001 U.S. terrorist attacks

Jon D. Elhai [a,b,*], Gerard A. Jacobs [a,b], Todd B. Kashdan [c], Gary L. DeJong [b], David L. Meyer [a,b], B. Christopher Frueh [d,e]

[a] *Disaster Mental Health Institute, University of South Dakota, 414 East Clark Street-SDU 114, Vermillion, SD 57069-2390, USA*
[b] *Department of Psychology, University of South Dakota, Vermillion, SD 57069-2390, USA*
[c] *Department of Psychology, George Mason University, Fairfax, VA, USA*
[d] *Veterans Affairs Medical Center, Charleston, SC, USA*
[e] *Department of Psychiatry and Behavioral Sciences, Medical University of South Carolina, Charleston, South Carolina, USA*

Abstract

In this article, we explored 1) the extent of mental health (MH) service use by American Red Cross disaster relief workers, both before (lifetime) and 1 year after the September 11, 2001 terrorist attacks, and 2) demographic, disaster and MH variables predicting (1-year) post-September 11, MH service use in this population. A sample of 3015 Red Cross disaster workers was surveyed 1 year after the attacks, regarding demographic characteristics, MH service use before and since the attacks, and posttraumatic stress disorder (PTSD) symptoms. Findings revealed that while 13.5% used MH services before the attacks, 10.7% used services after. Variables increasing the likelihood of MH service use after the attacks included the following: no previous MH treatment, younger age, being divorced/widowed, and higher PTSD intrusion or hyperarousal symptoms. Findings support other recent research on MH service use after the September 11 attacks.
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1. Introduction

Surviving a disaster has serious mental health (MH) consequences for victims, detailed in a growing body of literature (Norris et al., 2002a,b). Furthermore, numer-

ous studies reveal disaster-related psychiatric difficulties among disaster and other emergency relief workers (Ursano et al., 1999; Alexander and Klein, 2001; Fullerton et al., 2004).

Recently, several studies have been published on MH problems and treatment seeking associated with the September 11, 2001 terrorist attacks (Resnick et al., 2004). However, no published data are yet available on the thousands of government and non-government disaster workers who responded to the attacks. Understanding the MH service use trends of disaster workers

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* Corresponding author. Disaster Mental Health Institute, University of South Dakota, 414 East Clark Street-SDU 114, Vermillion, SD 57069-2390, USA. Tel.: +1 605 677 6575 or +1 800 522 9684.
E-mail addresses: jonelhai@fastmail.fm, jelhai@usd.edu (J.D. Elhai).

is important in assisting disaster organizations with planning, allocating and referring MH resources for responders after a major disaster.

We examined MH service use reported before (i.e., lifetime use) and 1 year after September 11 among national disaster relief workers from the American Red Cross responding to the attacks, using a cross-sectional, retrospective survey. The Red Cross is a non-governmental organization with a congressional mandate and history of responding to disasters in the United States (U.S.) (Jacobs, 1995). The study had two aims in exploring this population: 1) to describe the extent of responders' MH service use before and within 1 year after the attacks; and 2) to discover possible demographic, disaster, and MH status characteristics predicting MH use following the attacks.

In the disaster response literature, there is a lack of research examining predictors of MH service use. Therefore, we selected MH service predictor variables from investigations in a related line of research — that of traumatic event survivors (Walker et al., 2004; Elhai et al., 2005). We grounded our research in the Behavioral Model of Health Service Use (Andersen, 1995), and focused on those variables classified as individual "predisposing," "illness," or "enabling" factors previously found to affect health service use (Andersen, 1995).

2. Method

2.1. Participants

Participants were 3055 members of the Red Cross Disaster Services Human Resources (DSHR) system (a national network, excluding local, event-specific volunteers). These individuals were volunteer and paid staff members assigned to any disaster relief operation in response to the September 11, 2001 terrorist attacks during the first 3 months of operations. All participants were aged 18 or older, and treated ethically as human subjects, with Institutional Review Board approval obtained. A complete written description of the study was included for subjects to review, instructing them to complete and return the survey measures if they consented to participate.

The sample's socio-demographic characteristics can be found in Table 1. In addition, disaster experience was fairly extensive, with a mean of 11.4 previous disaster responses (S.D.=42.3). Many reported working ($n=1224$, or 41.2%), delivering supplies ($n=534$, or 18.0%), or visiting ($n=1118$, 37.7%) the disaster site (Ground Zero, the Pentagon or Pennsylvania crash

Table 1
Socio-demographic characteristics of the sample ($n=3055$)

Variable	n	$\%$	M (S.D.)
Gender			
Men	1006	36.0	
Women	1792	64.0	
Race			
Caucasian	2619	92.6	
Racial minority	208	7.4	
Education level			
High school or less	643	20.6	
College	1225	40.4	
Graduate school	1163	38.3	
Red Cross status			
Paid staff	280	9.3	
Volunteer	2742	90.7	
Marital status			
Single	377	12.7	
Married	2004	67.3	
Divorced/widowed	598	20.1	
Age			56.8(12.5)

Note. Because of missing values, numbers within a variable do not add to the full sample size of 3055.

site); only 848, or 28.6%, had no direct contact with a disaster site, but were primarily stationed nearby. The most prevalent disaster functions were disaster mental health ($n=648$, 21.8%), family assistance ($n=611$, 20.6%), mass care ($n=561$, 18.9%), and disaster health services ($n=321$, 10.8%).

2.2. Measures

In the present study, we report data from three survey measures. This was part of a larger, previously unpublished dataset (primarily assessing responders' MH functioning).

2.2.1. Demographics survey
This survey inquired about the following characteristics: demographics, Red Cross work status (e.g., paid staff or volunteer), disaster response experience (e.g., number of previous responses), and September 11-specific work experience (e.g., proximity to attack sites, contact with survivors).

2.2.2. MH service use items
Several "yes/no" questions were asked regarding whether participants had sought MH services at any time before, during, and/or (within the year) since their September 11 disaster response. Specific services inquired about were "inpatient mental health services," "any other mental health services," "inpatient treatment for alcohol or other substance use problems," "outpatient treatment for alcohol or other substance

use problems," and "12-step program such as AA for alcohol or other substance use problems."

2.2.3. Impact of Event Scale-Revised (IES-R)

The IES-R (Weiss and Marmar, 1996) is a 22-item, Likert scale (0="not at all" to 4="extremely") self-report measure of the intrusion, avoidance, and hyperarousal symptoms of posttraumatic stress disorder (PTSD). Internal consistency ranges from 0.79 to 0.86 (Weiss and Marmar, 1996; Creamer et al., 2003), with test–retest reliability between 0.57 and 0.92 (Weiss and Marmar, 1996). The IES-R demonstrates adequate construct validity, correlating 0.85 and 0.70 with other established PTSD measures in community and clinical samples, respectively (Creamer et al., 2003). Respondents were instructed to complete the IES-R generally, without reference to a particular traumatic event. The IES-R's established subscales were examined: intrusion (8 items), avoidance (8 items), and hyperarousal (6 items).

2.3. Procedure

Of the 6300 Red Cross DSHR members who responded to the terrorist attacks during the first 3 months, 6055 had valid U.S. mailing addresses. These participants were mailed a survey packet, containing the above-mentioned measures and additional personality and life event instruments not relevant to the present article. Survey packets were mailed in early September 2002 (approximately 1 year after the attacks). Participants were asked to complete the measures and return them anonymously using pre-stamped and addressed envelopes.

2.4. Analyses

Descriptive statistics are reported for the MH service use variables. Additionally, we assessed the relationship between MH service use before and after the attacks with a chi-square analysis.

Hierarchical logistic regression analysis was next conducted, with MH service use in the year since the attacks as the criterion variable. Predictor variables were chosen based on previous MH service use prediction research with trauma survivors (Walker et al., 2004; Elhai et al., 2005), and were entered in two sequential blocks. Block 1 involved MH service use before the terror attacks (to control for past MH treatment history). Block 2 included age, number of previous disaster responses, and IES-R PTSD intrusion, avoidance, and hyperarousal scores (continuous vari-

ables); as well as gender, marital status, race, education level, whether the participant worked, delivered supplies, or visited the disaster site, and whether s/he had contact with survivors or victims' families (categorical variables).

P values were considered significant if <0.05. All analyses were two-tailed, computed with SPSS 12.

3. Results

We had a 50.5% survey response rate ($n=3055$), with 92.7% ($n=2832$) of data packets returned before October 2002 (98.2%, or 3000, were returned by November). Forty respondents failed to complete the MH Service Use Survey, and were removed from analyses, leaving an effective sample size of 3015. No other exclusion criteria were used.

Lifetime MH service use (before the attacks) was reported by 408 (13.5%) participants. Specifically, 52 (1.7% of the effective sample) had previously used inpatient MH, 329 (10.9%) used other MH, 30 (1.0%) used inpatient substance use, 39 (1.3%) used outpatient substance use, and 84 (2.8%) used 12-step services (numbers are not mutually exclusive, because some participants used more than one service type).

Regarding the year since the attacks, 324 (10.7%) participants reported using MH services. Specifically, 48 (1.6%) used inpatient MH, 260 (8.6%) used other MH, 10 (0.3%) used inpatient substance use, 17 (0.6%) used outpatient substance use, and 50 (1.7%) used 12-step services.

Interestingly, there was a significant relationship between MH service use before and during/after the attacks, $\chi^2(1, n=3015)=352.1$, $P<0.001$, effect size $r=0.34$, representing a "medium" effect. Respondents reporting no MH services before the attacks were 50% *more* likely to seek MH services during/after. On the other hand, respondents with a prior history of MH service use were 80% *less* likely to seek MH services since the attacks.

For hierarchical regression analysis, missing continuous-scaled data were replaced with sample means; due to missing values on categorical variables, the analysis included 2387 respondents. Results indicated that Block 1 (lifetime previous MH service use) was significantly related to MH service use during/after the attacks, $\chi^2(1, n=2387)=209.8$, $P<0.001$, contributing 17.3% variance (Nagelkerke's R^2). Block 2 significantly contributed variance above Block 1, $\chi^2(1, n=2387)=130.2$, $P<0.001$, adding 9.9% variance. The final model therefore predicted 27.2% variance in (and correlating 0.52 with) MH service use during/

Table 2
Final hierarchical logistic regression model predicting mental health service use after the terrorist attacks (1="no"/2="yes") (n=2387)

Variable	B	SE B	Wald test (df)	P	Odds ratios
MH service use before attacks[a]	−2.08	0.16	172.48 (1)	0.001	0.13
Age	−0.02	0.01	10.92 (1)	0.01	0.98
Gender[b]	−0.03	0.17	0.04 (1)	ns	0.97
Number of disaster responses	−0.00	0.00	0.24 (1)	ns	1.00
Marital status[c]	–	–	17.10 (2)	0.001	–
–Married vs. single[c]	0.04	0.23	0.03 (1)	ns	1.04
–Divorced/widowed vs. single[c]	0.77	0.27	8.22 (1)	0.01	2.17
Race[d]	−0.03	0.28	0.01 (1)	ns	0.97
Education[e]	−0.04	0.20	0.03 (1)	ns	0.96
Visited disaster site[a]	−0.26	0.18	1.96 (1)	ns	0.77
Contact with survivors/families[a]	−0.17	0.27	0.39 (1)	ns	0.85
IES-R intrusion	0.42	0.14	9.03 (1)	0.01	1.53
IES-R avoidance	0.03	0.13	0.06 (1)	ns	1.03
IES-R hyperarousal	0.43	0.16	7.46 (1)	0.01	1.54

Note. IES-R=Impact of Event Scale-Revised; MH=mental health; NS=not significant.
  [a] 1="no"/2="yes".
  [b] 1="female"/2="male".
  [c] 1="married"/2="divorced or widowed"/3="single".
  [d] 1="Caucasian"/2="racial minority".
  [e] 1="high school or less"/2="at least college education".

after the attacks, a "large" effect. Final model variables and regression coefficients are presented in Table 2. Controlling for the effect of previous MH service use (leading to an 87% decreased likelihood) on MH service use in the year since the attacks, several characteristics were significant in the final model, including age (2% less likely with each increase in year), divorced/widowed (117% more likely than single status), IES-R intrusion (53% more likely with each 1-point item increase) and hyperarousal symptoms (54% more likely with each 1-point item increase).[1]

4. Discussion

Overall, we found that roughly 14% of Red Cross disaster workers reported using MH services before September 11, 2001, compared with about 11% within a year after the attacks. Contrary to expectations, workers with pre-September 11 MH treatment histories were *less* likely to use MH services in the year since the attacks, whereas those without prior MH treatment histories were *more* likely to use MH services. When controlling for past MH service use, the

following characteristics were related to post-September 11 MH service use: being younger, divorced or widowed, and having higher PTSD intrusion or hyperarousal scores.

Of note, in our sample, the 11% prevalence of MH services within the year since the terrorist attacks is roughly 2% *lower* than 12-month MH service use estimates from the general U.S. population (Kessler et al., 1999). One important caveat, however, is that our sample is likely different from the general population (including more women, being older and more educated). Nonetheless, our data support other work demonstrating that despite initially high expectations of MH problems (e.g., PTSD) resulting from the September 11 attacks (Resnick et al., 2004), there was no substantial increase in MH services used (Boscarino et al., 2002; Rosenheck and Fontana, 2003), and a relatively quick drop-off in PTSD symptoms was evidenced (Galea et al., 2003).

Our finding that younger age was related to a greater likelihood of MH service use should be tempered by the fact that our sample was a predominantly older sample (i.e., the mean age was 57 years old). In fact, the effect of age on MH service use reveals mixed findings, at least in the broader trauma survivor literature (Walker et al., 2004; Elhai et al., 2005). We also found that being divorced or widowed was related to greater MH service use, supported by at least one other study in the trauma literature (Koenen et al., 2003). However, it is unclear whether this marital status correlation is confounded with social support, which shows evidence of buffering

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[1] We re-analyzed our data in two ways: 1) excluding paid staff, because of the concern that paid and volunteer staff are two substantially different groups of responders, and 2) excluding individuals older than 70 years of age, because of concern that the elderly may not be "active" responders. However, both re-analyses yielded nearly identical results, with extremely similar findings, significant variables, and amounts of variance accounted for.

MH reactions after a disaster, at least among disaster victims (Norris et al., 2002b).

Our significant result for PTSD intrusion and hyper-arousal symptoms is fully consistent with past research, finding that the diagnosis or severity of PTSD is related to greater MH treatment seeking (Walker et al., 2004; Elhai et al., 2005). However, previous studies have not separated PTSD into its symptom clusters, which can reveal interesting relationships with service use.

An interesting finding was that prior MH service users were *less* likely, and those without previous MH treatment were *more* likely, to seek such services after the attacks. A number of possible explanations exist for this finding. First, it is possible that the skills and insights acquired in MH treatment before the attacks helped protect people from the need to seek treatment in response to the attacks. Second, individuals without previous experience of being in MH treatment may have sought MH services in response to the media's public education on the acceptability and usefulness of treatment. However, we do not have data to directly support these explanations, and this may represent an issue worthy of future inquiry.

Of relevance to the present study, the emphasis and practice of the Red Cross regarding MH services should be addressed. In fact, an increasing emphasis on MH services has been demonstrated within the organization since the 1990s (Jacobs, 1995). Disaster MH Services is an independent function within the Red Cross, requiring specific MH training for clinicians before responding to any disaster. Furthermore, short-term MH services are provided by local Red Cross chapters, for disaster responders returning from disaster work. Thus, our sample likely had experienced positive attitudes by the Red Cross about MH services, and had access to Red Cross MH services. However, it is possible that they had unique barriers to MH treatment associated with their 9/11 work experience.

Limitations of cross-sectional and mail survey research apply to this study. For example, we received only a 50% survey response rate, introducing a possible response bias, and it is possible that our resulting sample is not representative of the entire population. In addition, several other limitations merit comment. First, we inquired about MH services via self-report, which although common in health services research, is not always consistent with actual records-based service use patterns (Wallihan et al., 1999). In fact, our queried time frames for "prior to" and "since" the attacks were different from each other (lifetime previous use vs. 12-month prospective use). Second, our results may only be representative of national Red Cross workers, and

may not generalize well to members of other disaster relief agencies responding to the September 11 attacks, which may have different standards for recruiting, screening and training disaster response workers. Last, it should be emphasized that MH service use is not the same as need for services.

Our results add to the literature supporting that there may not have been a substantial increase in MH service use as a result of the September 11 attacks. Furthermore, our findings are consistent with that of recent resilience research, demonstrating that individuals may have the capacity to be emotionally resilient to the effects of traumatic events (Bonanno, 2004). Our study suggests that screening for such demographic factors as age and marital status (or possibly social support), and perhaps PTSD history, could be helpful among disaster workers in reducing MH treatment costs, and in identifying those who may benefit most from disaster-related MH services. Future studies should further assess MH service use and cost patterns resulting from circumscribed disasters.

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References

Alexander, D.A., Klein, S., 2001. Ambulance personnel and critical accidents: impact of accident and emergency work on mental health and emotional well-being. British Journal of Psychiatry 178, 76–81.

Andersen, R.M., 1995. Revisiting the behavioral model and access to medical care: does it matter? Journal of Health and Social Behavior 36, 1–10.

Bonanno, G.A., 2004. Loss, trauma, and human resilience: have we underestimated the human capacity to thrive after extremely aversive events? American Psychologist 59, 20–28.

Boscarino, J.A., Galea, S., Ahern, J., Resnick, H., Vlahov, D., 2002. Utilization of mental health services following the September 11th terrorist attacks in Manhattan, New York City. International Journal of Emergency Mental Health 4, 143–156.

Creamer, M., Bell, R., Failla, S., 2003. Psychometric properties of the Impact of Event Scale-Revised. Behaviour Research and Therapy 41, 1489–1496.

Elhai, J.D., North, T.C., Frueh, B.C., 2005. Health service use predictors among trauma survivors: a critical review. Psychological Services 2, 3–19.

Fullerton, C.S., Ursano, R.J., Wang, L., 2004. Acute stress disorder, posttraumatic stress disorder, and depression in disaster or rescue workers. American Journal of Psychiatry 161, 1370–1376.

Galea, S., Vlahov, D., Resnick, H., Ahern, J., Susser, E., Gold, J., Bucuvalas, M., Kilpatrick, D., 2003. Trends of probable post-traumatic stress disorder in New York City after the September 11 terrorist attacks. American Journal of Epidemiology 158, 514–524.

Jacobs, G.A., 1995. The development of a national plan for disaster mental health. Professional Psychology: Research and Practice 26, 543–549.

Kessler, R.C., Zhao, S., Katz, S.J., Kouzis, A.C., Frank, R.G., Edlund, M.J., Leaf, P., 1999. Past-year use of outpatient services for psychiatric problems in the National Comorbidity Survey. American Journal of Psychiatry 156, 115–123.

Koenen, K.C., Goodwin, R., Struening, E., Hellman, F., Guardino, M., 2003. Posttraumatic stress disorder and treatment seeking in a national screening sample. Journal of Traumatic Stress 16, 5–16.

Norris, F.H., Friedman, M.J., Watson, P.J., 2002a. 60,000 disaster victims speak: Part II. Summary and implications of the disaster, mental health research. Psychiatry 65, 240–260.

Norris, F.H., Friedman, M.J., Watson, P.J., Byrne, C.M., Diaz, E., Kaniasty, 2002b. 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981–2001. Psychiatry 65, 207–239.

Resnick, H.S., Galea, S., Kilpatrick, D., Vlahov, D., 2004. Research on trauma and PTSD in the aftermath of 9/11. PTSD Research Quarterly 15, 1–7.

Rosenheck, R.A., Fontana, A., 2003. Use of mental health services by veterans with PTSD after the terrorist attacks of September 11. American Journal of Psychiatry 160, 1684–1690.

Ursano, R.J., Fullerton, C.S., Vance, K., Kao, T., 1999. Posttraumatic stress disorder and identification in disaster workers. American Journal of Psychiatry 156, 353–359.

Walker, E.A., Newman, E., Koss, M.P., 2004. Costs and health care utilization associated with traumatic experiences. In: Schnurr, P.P., Green, B.L. (Eds.), Trauma and Health: Physical Health Consequences of Exposure to Extreme Stress. American Psychological Association, Washington, DC, pp. 43–69.

Wallihan, D.B., Stump, T.E., Callahan, C.M., 1999. Accuracy of self-reported health services use and patterns of care among urban older adults. Medical Care 37, 662–670.

Weiss, D.S., Marmar, C.R., 1996. The Impact of Event Scale-Revised. In: Wilson, J.P., Keane, T.M. (Eds.), Assessing Psychological Trauma and PTSD. Guilford Press, New York, pp. 399–411.