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Health Service Use Predictors Among Trauma Survivors: A Critical Review

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This article had 2 aims: (a) to comprehensively review and synthesize the literature on predictors of health service utilization in survivors of traumatic events and posttraumatic stress disorder (PTSD) patients and (b) to discuss methodological issues in examining service utilization in this population. PsycINFO was searched for relevant articles published through April 2004. Included studies had to primarily sample trauma survivors or PTSD patients and statistically explore health service use determinants. Although some findings conflicted across studies, increased mental health service use was generally related to being female, having a previous trauma history, and having a PTSD diagnosis. Increased medical service use was found among those with a PTSD diagnosis. Methodological recommendations are made for future health service use studies.

Keywords: posttraumatic stress disorder, emotional trauma, health services research, service utilization, methodology

Anecdotal and some empirical evidence (Schwarz & Kowalski, 1992) suggests that survivors of traumatic events and posttraumatic stress disorder (PTSD) patients may avoid using mental health (MH) services, perhaps because of PTSD's trauma-related avoidance symptoms. However, the literature actually demonstrates increased service use and health care costs for this population (Walker, Newman, & Koss, 2004).

Trauma survivors' health service use has not been sufficiently reviewed, except for one article that reviewed a small number of well-designed studies and focused more on health care costs (Walker et al., 2004). Thus, this article's aims were to (a) comprehensively review and synthesize the literature on service utilization predictors among traumatic event survivors and PTSD-diagnosed individuals and (b) discuss methodological issues in how service use was examined across studies.

This topic is important for several reasons. First, traumatic events and PTSD are significant clinical concerns, with lifetime trauma exposure prevalence reported between 50% and 70% and lifetime PTSD prevalence estimated at 8% of the general population (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Second, service use data can inform time-intensive treatment decisions for this population (e.g., prolonged exposure with trauma survivors). Third, service use data provide information on treatment accessibility for trauma survivors (important to hospital administrators and policymakers). Fourth, service use can be used as a real-world gauge of outcome, treatment costs, and conditions under which MH interventions work for this population, which are significant concerns in the modern health care system.

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Background and Rationale

Trauma and PTSD Service Use Literature: Findings From General Samples

Nationally representative community-based empirical studies have found that trauma history increases the likelihood of seeking both MH and medical services (Rosenheck & Massari, 1993; Sorenson & Siegel, 1992). Additionally, a PTSD diagnosis increases MH service intensity (e.g., number of sessions, length of hospital stay; Greenberg et al., 1999).

Among samples of primary care medical patients, trauma exposure has been linked with an increased likelihood of obtaining MH and medical care (Walker et al., 1999) and increased intensity of medical service use (Koss, Koss, & Woodruff, 1991). PTSD has also been linked with an increased likelihood of seeking medical services (Walker et al., 2003) and greater utilization intensity (Deykin et al., 2001; Samson, Bensen, Beck, Price, & Nimmer, 1999).

Recent studies of MH patients (not trauma or PTSD specific) have found increased MH service use rates in patients with trauma history and PTSD (Hoff & Rosenheck, 2000; Simpson, 2002; Switzer et al., 1999; Williams, Weiss, Edens, Johnson, & Thornby, 1998). However, conflicting findings are apparent in the few studies predicting medical service use (Druss & Rosenheck, 1997; Kramer, Booth, Han, & Williams, 2003).

The relationship between trauma history and/or PTSD and a high use of health (MH and medical) services could be explained by this population's significant psychiatric comorbidity (Kessler et al., 1995) as well as increased medical comorbidity (Beckham et al., 1998; Deykin et al., 2001). However, studies demonstrate that psychiatric comorbidity alone does not account for this relationship (Brown, Stout, & Mueller, 1999; Schnurr, Friedman, Sengupta, Jankowski, & Holmes, 2000).

The Behavioral Model of Health Services Use

One established framework for predicting health service use is the behavioral model of health service use (Andersen, 1995), which incorporates personal and health care system variables. Within the model, personal characteristics are most frequently examined, including *predisposing*, *illness–need*, and *enabling* factors.

Predisposing factors include personal history and demographic characteristics existing prior to the illness for which services are sought (Andersen, 1995). Illness–need factors involve illness perception and severity characteristics. Enabling factors relate to one's ability and resources to seek services (e.g., health insurance possession, transportation access). The following review was organized within the framework of the behavioral model.

Method

Article searching was conducted through April 2004 with PsycINFO, an electronic bibliographic database for scholarly literature in behavioral sciences and MH fields. Search terms included such keywords as *posttraumatic stress disorder*, *emotional trauma*, *service utilization*, *help seeking*, and others. Some studies (not discovered through PsycINFO) were found cited in others and were considered for inclusion. Studies included met the following criteria (regardless of degree of methodological rigor): (a) sampling of trauma survivors or PTSD-diagnosed individuals as the primary sample (addition of a control group was acceptable) and (b) statistical exploration of health service use determinants. Results of these studies are displayed separately in Tables 1 (traumatized samples) and 2 (PTSD-diagnosed samples). In addition to a sample description and corresponding citation, the tables specify type of service use criterion (e.g., MH services), how the criterion was measured (e.g., as a continuous variable), time frame (e.g., services used in the past 6 months), how service data were collected (e.g., by examining medical records), and relationship with predictors analyzed (e.g., positively related to a PTSD diagnosis). A summary of findings is presented below, separating MH from medical service use findings.

Results

We discovered 34 studies meeting our inclusion criteria (25 with samples of trauma survivors, 9 with PTSD-diagnosed samples). Studies varied widely in how *trauma* was defined (pos-

(*text continues on p. 12*)

Table 1
Determinants of Health Service Use in Trauma Victims

Sample (citation)	Service use criterion	Criterion type	Time frame assessed	Service data type	Predictors
382 frontline male combat veterans treated for combat stress and 334 matched controls (Solomon, 1989)	MH	D	During war	SR	(+) SCL–90 positive symptoms, IES scores, somatic problems; (−) combat self-efficacy, social functioning, number of negative life events; (0) age, marital status, educational level, family environment
24 shooting witnesses screened and 11 declining screen at 6 months postshooting (Schwarz & Kowalski, 1992)	MH	D	At 6 months	SR	(−) PTSD symptoms from Reaction Index
608 child and 318 adult crime victims with victim compensation for MH treatment (New & Berliner, 2000)	MH	C	1994–1997 service records	REC	(+) female, Caucasian, Native American, sexual assault victim, weapons involvement, PTSD (relative to other disorders), female racial minority, female with PTSD Dx; (0) age, sexual assault duration and severity, insurance type
231 adults evacuated from home after volcano eruption (Goto et al., 2002)	MH	C	1 year postdisaster	SR	(+) age, IES–R intrusion and avoidance, CES–D, help sought from physician predisaster; (0) educational level, years resided at home, help sought by MH professional predisaster
1,698 male Vietnam veterans (from NVVRS data; Rosenheck & Fontana, 1994)	MH	D	Lifetime	SR	(0) race; [(−) African American, Mexican Hispanic (after controlling for predisposing, illness, and enabling factors)]
	Non-VA MH				(−) African American, Mexican Hispanic
1,008 randomly sampled community participants living near World Trade Center during 9/11 attacks (sampled within 2 months post-9/11; Boscarino et al., 2002)	Increase in MH	C	1 month post vs. 1 month prior	SR	(+) age, female, cohabitating with significant other, at least 1 life trauma, at least 1 past year stressor, involvement with rescue operations, close associate killed, peritraumatic panic attacks, depression Dx, DIS PTSD Dx; (0) race, educational level, thought would be killed, witnessed attacks, media exposure, residential location, relocated, social support, alcohol use postattacks, income, health insurance

(*table continues*)

Table 1 (*continued*)

Sample (citation)	Service use criterion	Criterion type	Time frame assessed	Service data type	Predictors
619 women sexual assault victims (from NCS data), using CIDI (Ullman & Brecklin, 2002)	MH in child victims	C	Lifetime	SR	(+) educational level, Caucasian, more recent assault; (0) marital status, assault duration, relationship to offender, number of traumatic events, social support, PTSD Dx, alcohol dependence, health insurance
	MH in adult victims				(+) racial minority, number of traumatic events, number of stressful events, social support, health insurance; (0) marital status, assault duration, time since assault, relationship to offender, PTSD Dx, alcohol dependence
308 outpatients at psychiatric and primary care clinics 150–200 miles from New York and Washington, DC, 2–3 weeks after 9/11 attacks (Franklin et al., 2002)	9/11-related MH	D	Past month (since 9/11)	SR	(+) PDS PTSD Dx
251 crime victims, identified by court or corrections department records (Freedy et al., 1994)	MH regarding crime	D	Past year	SR	(+) sexual assault victim, homicide victim, DIS PTSD Dx; (−) victim of less violent crime (burglary, robbery)
175 violent and 328 property victims, 304 nonvictims in random sample using National Crime Survey battery (Norris et al., 1990)	MH regarding crime	D	Past 3–6 months	SR	(+) female, formerly married, violence, depression (and violent crime victims who were previously victimized and high in social support, had an internal locus of control, and lived in urban settings)
29 Bosnian refugees seeking and 28 never seeking MH services (diagnosed with PSS); (Weine et al., 2000)	Refugee MH	D	Past year vs. never	REC and SR	(+) greater trauma exposure, PSS scores, CES-D, worse SF-36 health status scores
554 male veterans (mostly Vietnam) at 6 VA PCTs (Fontana & Rosenheck, 1996)	PCT	C	1 year postevaluation	SR	(0) patient satisfaction
5,475 veterans at VA PCTs (Rosenheck & Fontana, 1996)	MH	C	Lifetime	SR	(0) race
	PCT	C	1 year postevaluation	REC	(−) African American (because of decreased treatment duration)
	Substance use	C	Lifetime	SR	(+) African American

Table 1 (*continued*)

Sample (citation)	Service use criterion	Criterion type	Time frame assessed	Service data type	Predictors
641 Australian Vietnam combat veterans from a national survey (Marshall et al., 1998)	Health care	C	Past 2 weeks	SR	(+) educational difficulty, discrimination regarding deployment, noncombat stress during war, combat exposure intensity, SCID-based PTSD Dx, greater depression severity, level of anxiety, number of phobia symptoms, medical Dx, marital problems, VVA membership; (0) age, alcohol use
641 Australian Vietnam combat veterans from a national survey (Marshall et al., 1997)	VA health care	D	Lifetime	SR	(+) noncombat stress during war, PTSD Dx, level of depression, number of social phobia symptoms, number of agoraphobia symptoms, medical Dx, marital problems, Vietnam war supporter, surrounded by antiwar individuals, discrimination regarding deployment; (−) did not want to go to war, positive homecoming attitude
33 church explosion victims, 30 victims' family members, and 30 neighbors; (sampled 15 months after explosion; Farhood & Noureddine, 2003)	Physician visits	C	This year and last year	SR	(+) victim group
	Increase in physician visits		This year vs. last year	SR	(+) self-reported severe injury during event, self-reported severe impact of the traumatic event
Of 1,000 callers to ADAA, 80 with MINI PTSD diagnosis, 111 with subclinical MINI PTSD, and 97 with a TQ trauma history but no MINI Dx (Zhang et al., 2004)	Medical	C	Past 6 months	SR	(+) PTSD Dx, subclinical PTSD, number of lifetime traumas
	% of visits for emotional problems				(+) PTSD Dx, subclinical PTSD
1,773 male Vietnam veterans, from NVVRS and HVVP data (Schnurr et al., 2000)	VA medical	C	Lifetime, past year	SR	(+) African American, M-PTSD-based Dx (but not for recent outpatient services); (−) Native American, Japanese American
49 community subjects with subclinical PTSD and 147 controls (from ECA data; Amaya-Jackson et al., 1999)	MH	D	Past 6 months	SR	(+) subclinical PTSD group
		C			(0) subclinical PTSD group
	Medical	D			(+) subclinical PTSD group
		C			(0) subclinical PTSD group

(*table continues*)

Table 1 (*continued*)

Sample (citation)	Service use criterion	Criterion type	Time frame assessed	Service data type	Predictors
150 individuals with subclinical DIS PTSD Dx, part of ECA study (Connor et al., 2002)	MH	C	Past 6 months	SR	(+) comorbid borderline personality disorder (from DIS Borderline Index)
	Medical				(0) comorbid borderline personality disorder (from DIS Borderline Index)
115 women sexual assault victims at rape crisis center, 87 nonvictims (Kimerling & Calhoun, 1994)	MH Medical	C	1 month (12 times, over year)	SR	(0) sexual assault, social support (+) sexual assault (at 4 months postassault and after, low social support (initially); (0) sexual assault (initially)
1,676 male Vietnam veterans (from NVVRS data; Rosenheck & Fontana, 1995)	VA MH Non-VA MH VA care	D	Lifetime	SR	For all criterion variables: (+) M-PTSD-based PTSD Dx
996 male combat veterans at VA PCT (Calhoun et al., 2002)	VA MH inpatient VA MH outpatient	C	1 year postevaluation	REC	(+) M-PTSD PTSD severity (+) older age, younger PTSD patients receiving VA disability payments, greater M-PTSD PTSD severity in patients without VA disability payments
	VA medical inpatient				(−) higher educational level; (0) PTSD diagnosis
	VA medical outpatient				(+) PTSD diagnosis in younger patients, VA disability payments
627 male Vietnam combat veterans homeless for more than 1 month (Rosenheck et al., 1992)	MH inpatient	D	Past 6 months	SR	(+) combat stress group (at least 2 PTSD Criterion B symptoms)
	MH outpatient				(+) combat stress group
	VA outpatient				(+) combat stress group
	VA inpatient				(+) combat stress group
	Non-VA MH				(0) combat stress group

Table 1 (*continued*)

Sample (citation)	Service use criterion	Criterion type	Time frame assessed	Service data type	Predictors
Of 2,755 randomly sampled community participants living near World Trade Center during 9/11 attacks sampled 6 months post-9/11, 364 individuals reporting asthma problems (Fagan et al., 2003)	Emergency room regarding asthma	D	Since 9/11 attacks (about past 6 months)	SR	(+) National Women's Study PTSD module Dx, number of PTSD symptoms, DIS peritraumatic panic attacks; (0) SCID MDD Dx [(+) PTSD Dx; (0) peritraumatic panic attacks, MDD Dx (after controlling for pre 9/11 asthma severity, demographics, and 9/11 exposure)]
	Unscheduled physician visit regarding asthma				(+) PTSD dx, number of PTSD symptoms, peritraumatic panic attacks; (0) MDD Dx [(+) PTSD Dx; (0) peritraumatic panic attacks, MDD Dx (after controlling for pre-9/11 asthma severity, demographics and 9/11 exposure)] 9/11 exposure)]

Note. For "Criterion type," D = dichotomous (presence or absence of services used) and C = continuous (intensity of services used). For "Service data type," REC = records based and SR = self-report. For "Predictors," statistically significant (at least as stringent as $p < .05$) relationships (where criterion variable reference category is presence of or more service use) are noted as significant positive association (+), significant negative association (−), and no significant relationship (0). When "Time frame assessed" was not specified in article, this information was obtained by contacting the author. MH = mental health; SCL-90 = Symptom Checklist 90; IES = Impact of Event Scale; PTSD = posttraumatic stress disorder; Dx = diagnosis; IES-R = Impact of Event Scale—Revised; CES-D = Center for Epidemiological Studies Depression scale; NVVRS = National Vietnam Veterans Readjustment Study; VA = Veterans Affairs Medical Center; DIS = Diagnostic Interview Schedule; NCS = National Comorbidity Survey; CIDI = Composite International Diagnostic Interview; PDS = Posttraumatic Diagnostic scale; PSS = Posttraumatic Stress Disorder Symptom scale; SF-36 = Short-Form-36 Health Survey; PCT = Veterans Affairs Medical Center Posttraumatic Stress Disorder Clinical Team (specialty clinic); SCID = Structured Clinical Interview for the *DSM-IV;* VVA = Vietnam Veterans Association; ADAA = Anxiety Disorders Association of America; MINI = Mini International Neuropsychiatric Interview; TQ = Trauma Questionnaire; HVVP = Hawaiian Vietnam Veterans Project; M-PTSD = Mississippi Combat Posttraumatic Stress Disorder scale; ECA = Epidemiological Catchment Area Study; MDD = major depressive disorder.

Table 2
Determinants of Health Service Use in PTSD Patients

Sample (citation)	Service use criterion	Criterion type	Time frame assessed	Service data type	Predictors
2,713 individuals screened positive for PTSD on National Anxiety Disorders Screening Day (Koenen et al., 2003)	MH	D	Lifetime	SR	(+) older age, separated/divorced, White, unemployed/disabled; (0) gender, educational level, rural residence [(+) comorbid depression or anxiety disorder, functional impairment (after controlling for predisposing variables)]
84 male SCID-Dx PTSD inpatients (Ford, 1999)	MH inpatient	D	Past year	REC	(+) DESNOS Dx (by Structured Interview for DESNOS)
			Lifetime		(+) DESNOS and MDD Dx
2,358 VA PTSD inpatients (Fontana & Rosenheck, 2001)	VA MH inpatient length of stay	C	Inpatient stay	REC	(+) racial minority, more combat exposure and atrocities, longer treatment wait time; (−) more education, married
Male combat veterans 60–80 years old (n = 26) and 30–50 years old (n = 26) with CAPS PTSD Dx at VA PCT (Frueh, Elhai, Hamner, et al., 2004)	MH	C	1 year postevaluation	REC	(0) age group
	PCT				(0) age group
	Primary medical care				(+) age group
	Specialty medical care				(0) age group
133 male combat veterans with CAPS PTSD Dx at VA PCT (Frueh, Elhai, Monnier, et al., 2004)	PCT	C	1 year postevaluation	REC	For all criterion variables: (0) race
	Primary medical care				
	Specialty medical care				
68 male combat veterans evaluated for PTSD at VA PCT (Grubaugh et al., 2004)	PCT	C	1 year postevaluation	REC	For all criterion variables: (0) disability seeking status
	Primary medical care				
	Specialty medical care				
100 male combat veterans with CAPS PTSD Dx at VA PCT (Elhai, Baugher, et al., 2004)	PCT	C	1 year postevaluation	REC	For all criterion variables: (0) rural–urban residence (even when adjusting for mileage and drive time to VA)
	Primary medical care				
	Specialty medical care				
87 male combat veterans with CAPS PTSD Dx at VA PCT (Elhai, Reeves, & Frueh, 2004)	PCT and primary medical care	C	1 year postevaluation	REC	(0) age, marital status, educational level, race, BDI, PTSD severity (M-PTSD), PTSD overreporting (MMPI–2 Fptsd), health problems (MMPI–2 Hs), anxiety (MMPI–2 Pt), thought problems (MMPI–2 Sc), income, employment status, disability seeking status, mileage to VA

Table 2 (*continued*)

Sample (citation)	Service use criterion	Criterion type	Time frame assessed	Service data type	Predictors
87 male combat veterans with CAPS PTSD Dx at VA PCT (Elhai, Reeves, & Frueh, 2004) (*continued*)	Specialty medical care				(−) PTSD overreporting (MMPI–2 Fptsd), anxiety (MMPI–2 Pt); (0) age, marital status, educational level, race, BDI, PTSD severity (M-PTSD), health problems (MMPI–2 Hs), thought problems (MMPI–2 Sc), income, employment status, disability seeking status, mileage to VA
197 primary care patients with SCID PTSD Dx, assessed with the TAA and SCID (Rodriguez et al., 2003)	Any MH	D	Current and past 6 months	SR	(−) GAF; (0) age number of lifetime traumas, MDD Dx, social anxiety disorder, generalized anxiety Dx, panic disorder, agoraphobia
	Psychotherapy				(−) number of lifetime traumas, GAF; (0) age, MDD Dx, social anxiety disorder, generalized anxiety Dx, panic disorder, agoraphobia

Note. For "Criterion type," D = dichotomous (presence or absence of services used) and C = continuous (intensity of services used). For "Service data type," REC = records based and SR = self-report. For "Predictors," statistically significant (at least as stringent as $p < .05$) relationships (where criterion variable reference category is presence of or more service use) are noted as significant positive association (+), significant negative association (−), and no significant relationship (0). When "Time frame assessed" was not specified in article, this information was obtained by contacting the author. PTSD = posttraumatic stress disorder; MH = mental health; SCID = Structured Clinical Interview for the *DSM-IV;* Dx = diagnosis; DESNOS = disorder of extreme stress not otherwise specified; MDD = major depressive disorder; VA = Veterans Affairs Medical Center; CAPS = Clinician Administered Posttraumatic Stress Disorder scale; PCT = Veterans Affairs Medical Center Posttraumatic Stress Disorder Clinical Team (specialty clinic); BDI = Beck Depression Inventory; M-PTSD = Mississippi Combat Posttraumatic Stress Disorder scale; MMPI-2 = Minnesota Multiphasic Personality Inventory—2; Fptsd = Infrequency Posttraumatic Stress Disorder scale; Hs = Hypochondriasis scale; Pt = Psychasthenia scale; Sc = Schizophrenia scale; TAA = Trauma Assessment for Adults; GAF = Global Assessment of Functioning scale.

sibly explaining some conflicting findings). We included studies only where the trauma could reasonably meet the *Diagnostic and Statistical Manual of Mental Disorders'* (4th ed.; American Psychiatric Association, 1994) PTSD Trauma Criterion A, regardless of the degree of exposure. Encouragingly, 33 studies used standardized assessments of trauma history and/or PTSD, and only 1 used archival records to document trauma and/or PTSD. Studies included 16 with veterans (e.g., combat–war zone exposure), 6 with disaster-exposed victims, 3 with general crime victims, 2 with sexual assault victims, 1 with refugees, and 6 with various types of trauma survivors. These studies did not explore the effect of different trauma types on health service use.

Other varying methodologies used across studies should be taken into account in this review (these issues are comprehensively discussed later in this article). Slightly more than half (18/34 studies) sampled community participants, whereas the rest sampled individuals already seeking MH services from clinical settings. Twenty studies measured health service use as a continuous variable (use intensity), and 14 included only a dichotomous measure (e.g., "use" or "nonuse" of services). Only 11 studies used some form of medical records to assess health service use (2 of these additionally assessed self-report), whereas 23 studies relied solely on the respondent's self-report. Among the 25 studies incorporating some self-report assessment of service use, 19 queried about a recent and circumscribed period of use, and 6 inquired more generally about lifetime use. Regarding sample size (which influences statistical power), the majority of studies (21) included at least 200 participants, 6 studies had at least 100 but fewer than 200 participants, and only 7 studies had fewer than 100 participants.

Predisposing Determinants of Health Service Use in Trauma Survivors and PTSD Patients

MH service use. Studies of trauma survivors and those diagnosed with PTSD have revealed that either age is unrelated to MH service use (Elhai, Reeves, & Frueh, 2004; Frueh, Elhai, Hamner, et al., 2004; New & Berliner, 2000; Rodriguez et al., 2003; Solomon, 1989) or older age predicts increased use (Boscarino, Galea, Ahern, Resnick, & Vlahov, 2002; Calhoun, Bosworth, Grambow, Dudley, & Beckham, 2002; Goto, Wilson, Kahana, & Slane, 2002; Koenen, Goodwin, Struening, Hellman, & Guardino, 2003). For gender, although most studies include men only (often conducted at Veterans Affairs [VA] Medical Centers), the remaining studies indicate that female trauma survivors use more MH services than do male trauma survivors (Boscarino et al., 2002; New & Berliner, 2000; Norris, Kaniasty, & Scheer, 1990; however, two of those three studies involved crime victim samples, possibly representing a statistical artifact). Nonetheless, non-VA services are used more by female than male veterans (for a review, see Suffoletta-Maierle, Grubaugh, Magruder, Monnier, & Frueh, 2003). Only one study, of PTSD-diagnosed individuals, found no association with gender (Koenen et al., 2003).

Racial group status has produced mixed results. Several studies revealed no association with race for overall MH consumption (Boscarino et al., 2002; Elhai, Reeves, & Frueh, 2004; Frueh, Elhai, Monnier, Hamner, & Knapp, 2004; Rosenheck & Fontana, 1994, 1996). However, when other relevant behavioral model variables were controlled for, African American and Mexican Hispanic veterans were less likely to use MH services (Rosenheck & Fontana, 1994). Furthermore, African Americans have revealed fewer PTSD-specific services but more substance use services (Rosenheck & Fontana, 1996). Still other (mostly civilian) studies discovered more MH use in Caucasians (Koenen et al., 2003; New & Berliner, 2000; Ullman & Brecklin, 2002), Native Americans (New & Berliner, 2000), and racial minorities in general (Fontana & Rosenheck, 2001; Ullman & Brecklin, 2002).

Marital status has been explored as a predictor of MH use. Several studies have revealed no association (Elhai, Reeves, & Frueh, 2004; Solomon, 1989; Ullman & Brecklin, 2002) for marital status. Others revealed increased use among the cohabiting or previously married, including those cohabiting with a significant other (Boscarino et al., 2002), formerly married (Norris et al., 1990), and separated or divorced (Koenen et al., 2003). One investigation observed married individuals use less service intensity (Fontana & Rosenheck, 2001).

The majority of studies reveal no relationship

between educational level and psychiatric services use (Boscarino et al., 2002; Elhai, Reeves, & Frueh, 2004; Goto et al., 2002; Koenen et al., 2003; Solomon, 1989). However, one study found increased (Ullman & Brecklin, 2002) and another found decreased (Fontana & Rosenheck, 2001) service use with higher education.

Trauma characteristics have been explored in predicting psychiatric service use. Combat self-efficacy among veterans was related to decreased use (Solomon, 1989), with greater combat exposure intensity associated with increased service use (Fontana & Rosenheck, 2001). Previous trauma history to a disaster or crime has predicted higher levels of service use (Boscarino et al., 2002; Norris et al., 1990). The number of lifetime traumatic events experienced was related to greater general MH service use but less psychotherapy (Rodriguez et al., 2003). Survivors of more violent crime (Norris et al., 1990), including sexual assault (Freedy, Resnick, Kilpatrick, Dansky, & Tidwell, 1994; New & Berliner, 2000) and homicide (Freedy et al., 1994), demonstrated increased use, whereas survivors of less violent crime (e.g., burglary, robbery) have used fewer services (Freedy et al., 1994). Sexual assault duration or severity have yielded no service use relationship (New & Berliner, 2000; Ullman & Brecklin, 2002). In the September 11, 2001, New York terrorist attacks, rescue operations involvement, losing a close associate, and experiencing panic attacks increased service use; fearing death during the attacks, personal or media exposure, residential location, and relocation were not related to service use (Boscarino et al., 2002).

Medical service use. Age has demonstrated no relationship with general medical services (Marshall, Jorm, Grayson, & O'Toole, 1998) or specialty care use (Frueh, Elhai, Hamner, et al., 2004) in PTSD-diagnosed patients. However, studies of primary care use have been mixed, with one study showing no relationship (Elhai, Reeves, & Frueh, 2004) and the other showing increased use in older adults (Frueh, Elhai, Hamner, et al., 2004).

For racial group membership, African Americans evidence increased medical service use, and Native Americans and Japanese Americans evidence decreased service use (Schnurr et al., 2000). Other studies demonstrate no relationship for race (Elhai, Reeves, & Frueh, 2004; Frueh, Elhai, Monnier, et al., 2004).

Marital status was not related to medical service use (Elhai, Reeves, & Frueh, 2004) in a study of PTSD-diagnosed persons. However, other studies revealed a significant relationship for marital problems and increased use (Marshall, Jorm, Grayson, Dobson, & O'Toole, 1997; Marshall et al., 1998).

Educational level has been related to decreased inpatient medical use (Calhoun et al., 2002), whereas another study found no relationship with outpatient use (Elhai, Reeves, & Frueh, 2004). Previous educational difficulties have been linked with increased medical service use (Marshall et al., 1998).

Trauma characteristic determinants of medical service consumption have been explored. Combat exposure intensity has been positively associated with medical care use (Marshall et al., 1998). The severity of injury during a traumatic event and the perceived traumatic impact were related to greater medical service use (Farhood & Noureddine, 2003). The number of lifetime traumatic events was related to greater medical care use (Zhang, Ross, & Davidson, 2004).

Illness–Need Determinants of Health Service Use in Trauma Survivors and PTSD Patients

MH service use. Most trauma survivor studies demonstrated that PTSD diagnoses (Boscarino et al., 2002; Franklin, Young, & Zimmerman, 2002; Freedy et al., 1994; New & Berliner, 2000; Rosenheck & Fontana, 1995; Zhang et al., 2004) and severity (Calhoun et al., 2002; Goto et al., 2002; Solomon, 1989; Weine et al., 2000) are related to increased MH service use. A minority of studies reported conflicting results, with some revealing no relationship with psychiatric service use on the basis of PTSD diagnoses (Ullman & Brecklin, 2002) or severity (Elhai, Reeves, & Frueh, 2004), or showed decreased use from greater PTSD severity (Schwarz & Kowalski, 1992). Of interest, subclinical PTSD has been associated with an increased likelihood of seeking services (Amaya-Jackson et al., 1999) and intensity of care in one study (Zhang et al., 2004) but not another (Amaya-Jackson et al., 1999). Having at least two PTSD reexperiencing symptoms has been linked with greater VA MH service

use, but not for non-VA use (Rosenheck, Leda, & Gallup, 1992).

A depression diagnosis (Boscarino et al., 2002) and depression severity from the Center for Epidemiological Studies–Depression scale (Goto et al., 2002; Weine et al., 2000) or Brief Symptom Inventory (Norris et al., 1990) have been related to greater psychiatric service consumption. Other studies found no such relationship for a depression diagnosis (Rodriguez et al., 2003) or depression severity from the Beck Depression Inventory (Elhai, Reeves, & Frueh, 2004). Alcohol use has revealed no relationship with service consumption (Boscarino et al., 2002; Ullman & Brecklin, 2002). In addition to a full or subclinical PTSD diagnosis, comorbid psychopathology—including borderline personality disorder (Connor et al., 2002), disorder of extreme stress not otherwise specified (Ford, 1999), and anxiety or mood disorder (Koenen et al., 2003)—has been associated with increased use. Another study found no relationship for a variety of anxiety disorders comorbid with PTSD (Rodriguez et al., 2003). Health-related problems are associated with increased MH services used (Solomon, 1989; Weine et al., 2000), with no relation found in another study (Elhai, Reeves, & Frueh, 2004).

Last, social support revealed a relationship to greater service use in one study (Norris et al., 1990) and among adults exposed to trauma in adulthood (but not childhood; Ullman & Brecklin, 2002). Other studies have found no relationship (Boscarino et al., 2002; Kimerling & Calhoun, 1994).

Medical service use. PTSD diagnoses have predicted increased medical care (Fagan, Galea, Ahern, Bonner, & Vlahov, 2003; Marshall et al., 1997, 1998; Zhang et al., 2004). Although subclinical PTSD predicted an increased likelihood of medical care (Amaya-Jackson et al., 1999), it predicted greater intensity of care in one study (Zhang et al., 2004) but not in another (Amaya-Jackson et al., 1999). PTSD showed no relationship with inpatient medical use but was related to increased outpatient use in younger patients (Calhoun et al., 2002). PTSD severity was not related to medical care used among PTSD patients in one study (Elhai, Reeves, & Frueh, 2004) and was related in another study when unadjusted for relevant covariates (Fagan et al., 2003).

A depression diagnosis was unrelated to medical service use in one study (Fagan et al., 2003). Greater depression severity was linked with increased medical care (Marshall et al., 1997, 1998), whereas another study found no relation (Elhai, Reeves, & Frueh, 2004). Higher levels of anxiety and phobias have been associated with greater medical use (Marshall et al., 1997, 1998), whereas another study found lower anxiety was related to increased specialty (but not primary) medical care (Elhai, Reeves, & Frueh, 2004). Additionally, alcohol use has revealed no relation with medical service use (Marshall et al., 1998). A borderline personality disorder diagnosis in addition to PTSD has not been linked with increased medical service use (Connor et al., 2002). Finally, health-related problems have been linked with greater medical care (Marshall et al., 1997, 1998), but another study using the Minnesota Multiphasic Personality Inventory—2 found no relation (Elhai, Reeves, & Frueh, 2004).

Enabling Determinants of Health Service Use in Trauma Survivors and PTSD Patients

MH service use. Health insurance possession has revealed no relationship with service use in some trauma survivor or PTSD patient studies (Boscarino et al., 2002; New & Berliner, 2000). However, one study of adults demonstrated health insurance predicted service use in those with adult but not child trauma exposure (Ullman & Brecklin, 2002). Additionally, household income has shown no relationship with service use (Boscarino et al., 2002; Elhai, Reeves, & Frueh, 2004).

Unemployment has predicted greater psychiatric service use in one study (Koenen et al., 2003), whereas employment status showed no relation in another (Elhai, Reeves, & Frueh, 2004). One study showed that individuals with a disability used more MH services (Koenen et al., 2003). Other studies showed no relationship between whether patients were seeking VA disability payments and psychiatric service intensity (Elhai, Reeves, & Frueh, 2004; Grubaugh, Elhai, Monnier, & Frueh, 2004).

Distance to one's VA has shown no relationship to service use (Elhai, Reeves, & Frueh, 2004). Rural living was not related to service use (Elhai, Baugher, Quevillon, Sauvageot, & Frueh, 2004; Koenen et al., 2003), even when

the distance to one's VA was controlled for (Elhai, Baugher, et al., 2004). Another study found that urban living was related to increased use (Norris et al., 1990).

Medical service use. Only one study has explored whether medical service use is related to household income, employment status, or distance to one's VA clinic among PTSD-diagnosed individuals. However, no relationship was found (Elhai, Reeves, & Frueh, 2004).

Seeking VA disability payments was not related to medical service use in one study (Elhai, Reeves, & Frueh, 2004). However, receipt of VA disability payments has revealed increased outpatient medical service use (Calhoun et al., 2002). Furthermore, psychiatric symptom overreporting has been linked with decreased specialty medical care consumption (Elhai, Reeves, & Frueh, 2004).

Summary of Service Use Determinants Among Trauma Survivors and PTSD Patients

Although numerous instances of inconclusive findings exist, several general conclusions can be drawn across studies (with at least a ratio of 3:1 studies supporting a given conclusion and at least three studies examining the given variable). Increased MH service use was found for women, people with previous or lifetime trauma histories, and people with a PTSD diagnosis. Increased medical service use was found for people with a PTSD diagnosis.

However, these conclusions are influenced by the fact that some studies may not possess adequate statistical power to reveal significant effects. Therefore, we reassessed our general conclusions after removing from consideration the seven small-sample ($N < 100$) studies. As a result, the only modification to our conclusions (across studies) would be the addition of PTSD severity as a variable associated with increased MH service use.

Caveat

One particular limitation of this review should be emphasized. We included studies that sampled very different types of trauma survivors, an approach we acknowledge as particularly inclusive. Traumatic experiences reported by war soldiers, for example (being both victims and trained agents of inflicting trauma), are very different from those experienced by disaster survivors (being unexpected victims of natural or man-made disasters). Additionally, the resulting psychopathology from different types of traumatic events can vary widely; for example, combat exposure and sexual assault are associated with much higher PTSD rates than is disaster (Kessler et al., 1995).

Additionally, the services available to different types of trauma survivors can vary. Veterans of war trauma can qualify for services within the VA Medical Center, a relatively closed health care system, which is inexpensive to veterans but can yield relatively long wait times. Conversely, civilian trauma survivors must seek services in the community, perhaps through their health insurance plans (and in the case of criminal victimization, they may have access to crime victim compensation).

Methodological Issues

A number of methodological concerns are apparent in reviewing articles on service utilization determinants in trauma survivor and PTSD samples. These issues primarily involve measurement of the service use criterion variable and should be considered by future investigators. At a minimum, we recommend that investigators report the types of visits included or excluded, whether service consumption was analyzed as a dichotomous or continuous variable, time frame of service use assessed, and whether data were collected from patient self-report or medical records.

Most trauma and PTSD studies assessing service use involve prospective surveys, relying on participant self-report of health services used. However, significant discrepancies exist between patient self-report and documented use from medical records, with a particular bias toward underreporting visits (Roberts, Bergstralh, Schmidt, & Jacobsen, 1996; Wallihan, Stump, & Callahan, 1999). Therefore, although potentially more time consuming, records-based services data collection is strongly preferred. It should be noted, however, that a limitation of records-based service use data is that it only pertains to the particular health care system from which the records were collected, and any

services used outside that system will be ignored in analyses.

Studies vary considerably in terms of time frame assessed for service utilization. Most studies inquire about "past year," "past 6 months," or "lifetime" service use. Because shorter time frames improve accuracy for self-reported service use ("past 2 weeks" was more accurate than "past year"; Roberts et al., 1996), prospective self-report studies should use brief time periods for service use inquiries. However, although minimizing self-reporting inaccuracies is crucial, many investigators will find a brief time frame (e.g., "past 2 weeks") insufficient in discovering more complex use patterns, particularly for specialty services less commonly used. Therefore, perhaps time frames between 3 and 6 months' duration would be ideal for many researchers' purposes.

Next, numerous studies have examined services used in general, without specifying which types of visits should be included or excluded. In prospective surveys, providing behaviorally specific questions about treatment use is recommended in standardizing the term *mental health services* across study participants (e.g., "Have you seen a psychiatrist, other physician, psychologist, counselor, social worker, clergy, or other health professional for emotional problems in the past 6 months?"). Conversely, archival studies examining medical records for service use patterns should consider whether any types of visits should be excluded from service use counts, as was done by Koss and colleagues (1991), who excluded some types of specialty care visits. Additionally, investigators should separate general MH from specialty PTSD clinic visits and should ideally separate primary from specialty care medical visits.

Whereas numerous studies assess overall access to MH or medical care (i.e., likelihood of seeking services), others focus on intensity of care by evaluating number of clinic visits, hospital admissions, or treatment duration. Both access and intensity are important in evaluating service use. However, different reasons may drive an investigator to evaluate one rather than the other. For example, in epidemiological research investigating community samples of nontreatment seeking individuals, studying access to care (rather than intensity) may prove most useful. However, for clinical care research examining a treatment seeking (or treated) sample, focusing on intensity of care would be more appropriate (or alternatively, investigating overall access to other kinds of care for which the patients may be seeking treatment).

Although many studies have examined the diagnosis of PTSD as a service use predictor, several improvements have begun to appear in the literature and are recommended for future studies. In particular, PTSD could be more comprehensively analyzed as a predictor by (a) exploring PTSD's diagnostic components, (b) investigating PTSD severity, and (c) analyzing comorbid psychiatric disorders.

Finally, one caveat should be mentioned. Increased service use does not necessarily imply increased health status or patient satisfaction. In fact, patient satisfaction was found unrelated or negatively related to MH service use intensity (Fontana & Rosenheck, 1996; Rosenheck & Fontana, 1996). Furthermore, little is known about the relationship between service use and treatment outcome in trauma survivors and those with PTSD. The complex relationship among service use, treatment outcome, and patient satisfaction deserves attention and should be explored in future studies.

Conclusion

This review demonstrates that across studies, increased MH service use was associated with some demographic (female gender, previous trauma history) and psychiatric illness variables (PTSD diagnosis), whereas increased medical service use was associated only with psychiatric illness variables (PTSD diagnosis). Given the relatively high prevalence of trauma exposure and PTSD, service use determinants in this population are important and should be further investigated by researchers.

Specifically, service use data can provide important information in improving clinical care to trauma survivors and PTSD-diagnosed persons. Information that can be gleaned from service use studies includes that of disease burden, accessibility of services, and proxy health care indicators such as outcome and treatment costs for this population.

References

Amaya-Jackson, L., Davidson, J. R., Hughes, D. C., Swartz, M., Reynolds, V., George, L. K., & Blazer,

D. G. (1999). Functional impairment and utilization of services associated with posttraumatic stress in the community. *Journal of Traumatic Stress, 12,* 709–724.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

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.

Beckham, J. C., Moore, S. D., Feldman, M. E., Hertzberg, M. A., Kirby, A. C., & Fairbank, J. A. (1998). Health status, somatization, and severity of posttraumatic stress disorder in Vietnam combat veterans with posttraumatic stress disorder. *American Journal of Psychiatry, 155,* 1565–1569.

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. *International Journal of Emergency Mental Health, 4,* 143–156.

Brown, P. J., Stout, R. L., & Mueller, T. (1999). Substance use disorder and posttraumatic stress disorder comorbidity: Addiction and psychiatric treatment rates. *Psychology of Addictive Behaviors, 13,* 115–122.

Calhoun, P. S., Bosworth, H. B., Grambow, S. C., Dudley, T. K., & Beckham, J. C. (2002). Medical service utilization by veterans seeking help for posttraumatic stress disorder. *American Journal of Psychiatry, 159,* 2081–2086.

Connor, K. M., Davidson, J. R. T., Hughes, D. C., Swartz, M. S., Blazer, D. G., & George, L. K. (2002). The impact of borderline personality disorder on post-traumatic stress in the community: A study of health status, health utilization, and functioning. *Comprehensive Psychiatry, 43,* 41–48.

Deykin, E. Y., Keane, T. M., Kaloupek, D., Fincke, G., Rothendler, J., Siegfried, M., & Creamer, K. (2001). Posttraumatic stress disorder and the use of health services. *Psychosomatic Medicine, 63,* 835–841.

Druss, B. G., & Rosenheck, R. A. (1997). Use of medical services by veterans with mental disorders. *Psychosomatics, 38,* 451–458.

Elhai, J. D., Baugher, S. N., Quevillon, R. P., Sauvageot, J. A., & Frueh, B. C. (2004). Psychiatric symptoms and health service utilization in rural and urban combat veterans with posttraumatic stress disorder. *Journal of Nervous and Mental Disease, 192,* 701–704.

Elhai, J. D., Reeves, A. N., & Frueh, B. C. (2004). Predictors of mental health and medical service use in veterans presenting with combat-related posttraumatic stress disorder. *Psychological Services, 1,* 111–119.

Fagan, J., Galea, S., Ahern, J., Bonner, S., & Vlahov, D. (2003). Relationship of self-reported asthma severity and urgent health care utilization to psychological sequelae of the September 11, 2001 terrorist attacks on the World Trade Center among New York City area residents. *Psychosomatic Medicine, 65,* 993–996.

Farhood, L. F., & Noureddine, S. N. (2003). PTSD, depression, and health status in Lebanese civilians exposed to a church explosion. *International Journal of Psychiatry in Medicine, 33,* 39–53.

Fontana, A., & Rosenheck, R. (1996). Improving the efficiency of outpatient treatment for posttraumatic stress disorder. *Administration & Policy in Mental Health, 23,* 197–210.

Fontana, A., & Rosenheck, R. (2001). A model of patients' satisfaction with treatment for posttraumatic stress disorder. *Administration & Policy in Mental Health, 28,* 475–489.

Ford, J. D. (1999). Disorders of extreme stress following war-zone military trauma: Associated features of posttraumatic stress disorder or comorbid by distinct syndromes. *Journal of Consulting and Clinical Psychology, 67,* 3–12.

Franklin, C. L., Young, D., & Zimmerman, M. (2002). Psychiatric patients' vulnerability in the wake of the September 11th terrorist attacks. *Journal of Nervous and Mental Disease, 190,* 833–838.

Freedy, J. R., Resnick, H. S., Kilpatrick, D. G., Dansky, B. S., & Tidwell, R. P. (1994). The psychological adjustment of recent crime victims in the criminal justice system. *Journal of Interpersonal Violence, 9,* 450–468.

Frueh, B. C., Elhai, J. D., Hamner, M. B., Magruder, K. M., Sauvageot, J. A., & Mintzer, J. (2004). Elderly veterans with combat-related posttraumatic stress disorder in specialty care. *Journal of Nervous and Mental Disease, 192,* 75–79.

Frueh, B. C., Elhai, J. D., Monnier, J., Hamner, M. B., & Knapp, R. G. (2004). Symptom patterns and service use among African American and Caucasian veterans with combat-related PTSD. *Psychological Services, 1,* 22–30.

Goto, T., Wilson, J. P., Kahana, B., & Slane, S. (2002). PTSD, depression and help-seeking patterns following the Miyake Island volcanic eruption. *International Journal of Emergency Mental Health, 4,* 157–172.

Greenberg, P. E., Sisitsky, T., Kessler, R. C., Finkelstein, S. N., Berndt, E. R., Davidson, J. R. T., et al. (1999). The economic burden of anxiety disorders in the 1990s. *Journal of Clinical Psychiatry, 60,* 427–435.

Grubaugh, A. L., Elhai, J. D., Monnier, J., & Frueh, B. C. (2004). Service utilization among compensation-seeking veterans. *Psychiatric Quarterly, 75,* 333–341.

Hoff, R. A., & Rosenheck, R. A. (2000). Cross-system service use among psychiatric patients: Data from the Department of Veterans Affairs. *The*

Journal of Behavioral Health Services & Research, 27, 98–106.

Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52,* 1048–1060.

Kimerling, R., & Calhoun, K. S. (1994). Somatic symptoms, social support, and treatment seeking among sexual assault victims. *Journal of Consulting and Clinical Psychology, 62,* 333–340.

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.

Koss, M. P., Koss, P. G., & Woodruff, W. J. (1991). Deleterious effects of criminal victimization on women's health and medical utilization. *Archives of Internal Medicine, 151,* 342–347.

Kramer, T. L., Booth, B. M., Han, X., & Williams, D. K. (2003). Service utilization and outcomes in medically ill veterans with posttraumatic stress and depressive disorders. *Journal of Traumatic Stress, 16,* 211–219.

Marshall, R. P., Jorm, A. F., Grayson, D. A., Dobson, M., & O'Toole, B. I. (1997). Help-seeking in Vietnam veterans: Post-traumatic stress disorder and other predictors. *Australian and New Zealand Journal of Public Health, 21,* 211–213.

Marshall, R. P., Jorm, A. F., Grayson, D. A., & O'Toole, B. I. (1998). Posttraumatic stress disorder and other predictors of health care consumption by Vietnam veterans. *Psychiatric Services, 49,* 1609–1611.

New, M., & Berliner, L. (2000). Mental health service utilization by victims of crime. *Journal of Traumatic Stress, 13,* 693–707.

Norris, F. H., Kaniasty, K. Z., & Scheer, D. A. (1990). Use of mental health services among victims of crime: Frequency, correlates, and subsequent recovery. *Journal of Consulting and Clinical Psychology, 58,* 538–547.

Roberts, R. O., Bergstralh, E. J., Schmidt, L., & Jacobsen, S. J. (1996). Comparison of self-reported and medical record health care utilization measures. *Journal of Clinical Epidemiology, 49,* 989–995.

Rodriguez, B. F., Weisberg, R. B., Pagano, M. E., Machan, J. T., Culpepper, L., & Keller, M. B. (2003). Mental health treatment received by primary care patients with posttraumatic stress disorder. *Journal of Clinical Psychiatry, 64,* 1230–1236.

Rosenheck, R. A., & Fontana, A. (1994). Utilization of mental health services by minority veterans of the Vietnam era. *Journal of Nervous and Mental Disease, 182,* 685–691.

Rosenheck, R. A., & Fontana, A. (1995). Do Vietnam-era veterans who suffer from posttraumatic stress disorder avoid VA mental health services? *Military Medicine, 160,* 136–142.

Rosenheck, R. A., & Fontana, A. (1996). Ethnocultural variations in service use among veterans suffering from PTSD. In A. J. Marsella, M. J. Friedman, & R. M. Scurfield (Eds.), *Ethnocultural aspects of posttraumatic stress disorder: Issues, research, and clinical applications* (pp. 483–504). Washington, DC: American Psychological Association.

Rosenheck, R. A., Leda, C., & Gallup, P. (1992). Combat stress, psychological adjustment, and service use among homeless Vietnam veterans. *Hospital and Community Psychiatry, 43,* 145–149.

Rosenheck, R. A., & Massari, L. (1993). Wartime military service and utilization of VA health care services. *Military Medicine, 158,* 223–228.

Samson, A. Y., Bensen, S., Beck, A., Price, D., & Nimmer, C. (1999). Posttraumatic stress disorder in primary care. *Journal of Family Practice, 48,* 222–227.

Schnurr, P. P., Friedman, M. J., Sengupta, A., Jankowski, M. K., & Holmes, T. (2000). PTSD and utilization of medical treatment services among male Vietnam veterans. *Journal of Nervous and Mental Disease, 188,* 496–504.

Schwarz, E. D., & Kowalski, J. M. (1992). Malignant memories: Reluctance to utilize mental health services after a disaster. *Journal of Nervous and Mental Disease, 180,* 767–772.

Simpson, T. L. (2002). Women's treatment utilization and its relationship to childhood sexual abuse history and lifetime PTSD. *Substance Abuse, 23,* 17–30.

Solomon, Z. (1989). Untreated combat-related PTSD: Why some Israeli veterans do not seek help. *Israel Journal of Psychiatry & Related Sciences, 26,* 111–123.

Sorenson, S. B., & Siegel, J. M. (1992). Gender, ethnicity, and sexual assault: Findings from a Los Angeles study. *Journal of Social Issues, 48,* 93–104.

Suffoletta-Maierle, S., Grubaugh, A. L., Magruder, K., Monnier, J., & Frueh, B. C. (2003). Trauma-related mental health needs and service utilization among female veterans. *Journal of Psychiatric Practice, 9,* 367–375.

Switzer, G. E., Dew, M. A., Thompson, K., Goycoolea, J. M., Derricott, T., & Mullins, S. D. (1999). Posttraumatic stress disorder and service utilization among urban mental health center clients. *Journal of Traumatic Stress, 12,* 25–39.

Ullman, S. E., & Brecklin, L. R. (2002). Sexual assault history, PTSD, and mental health service seeking in a national sample of women. *Journal of Community Psychology, 30,* 261–279.

Walker, E. A., Katon, W., Russo, J., Ciechanowski, P., Newman, E., & Wagner, A. W. (2003). Health care costs associated with posttraumatic stress disorder symptoms in women. *Archives of General Psychiatry, 60,* 369–374.

Walker, E. A., Newman, E., & Koss, M. P. (2004). Costs and health care utilization associated with traumatic experiences. In P. P. Schnurr & B. L. Green (Eds.), *Trauma and health: Physical health consequences of exposure to extreme stress* (pp. 43–69). Washington, DC: American Psychological Association.

Walker, E. A., Unutzer, J., Rutter, C., Gelfand, A., Saunders, K., VonKorff, M., et al. (1999). Costs of health care use by women HMO members with a history of childhood abuse and neglect. *Archives of General Psychiatry, 56,* 609–613.

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.

Weine, S. M., Razzano, L., Brkic, N., Ramic, A., Miller, K., Smajkic, A., et al. (2000). Profiling the trauma related symptoms of Bosnian refugees who have not sought mental health services. *Journal of Nervous and Mental Disease, 188,* 416–421.

Williams, W., Weiss, T. W., Edens, A., Johnson, M., & Thornby, J. I. (1998). Hospital utilization and personality characteristics of veterans with psychiatric problems. *Psychiatric Services, 49,* 370–375.

Zhang, W., Ross, J., & Davidson, J. R. T. (2004). Posttraumatic stress disorder in callers to the Anxiety Disorders Association of America. *Depression and Anxiety, 19,* 96–104.