

22 Utilization of Mental Health Services after Disasters

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22.1. INTRODUCTION

This chapter deals with the use of mental health care among individuals affected by disasters. First, we present background literature on correlates of mental health care use among victims of traumatic events and theoretical models used to explain treatment utilization. Second, we review the literature on correlates of mental health care use among disaster-affected persons in particular. Finally, we discuss methodological and statistical issues and advances in examining mental health treatment use in the disaster-affected population.

22.2. BACKGROUND ON TRAUMA-RELATED MENTAL HEALTH CARE UTILIZATION

Traumatic event exposure, especially when resulting in posttraumatic stress disorder (PTSD), is associated with a serious mental health toll, including substantial emotional impairment, risk of suicide, and enormous societal costs (Kessler, 2000). Thus, trauma victims and PTSD-diagnosed persons should be more likely than both nonvictims and non-PTSD-diagnosed persons to need and utilize mental health treatment (including a greater frequency of visits). Consistent with this view, studies demonstrate greater mental health care seeking for trauma victims (compared with nonvictims) among large-scale community samples (Lewis et al., 2005; Sorenson & Siegel, 1992). Evidence from national community samples of civilians (Greenberg et al., 1999; Lewis et al., 2005) and military personnel (Elhai, Richardson, & Pedlar, 2007) also supports a relationship between both PTSD diagnosis and severity with mental health care utilization.

Additionally, among trauma-exposed samples, a large body of research demonstrates significant correlates of mental health care use including the female gender, the extent of previous trauma, and PTSD (reviewed in Elhai, North, & Frueh, 2005; Gavrilovic, Schutzwohl, Fazel, & Priebe, 2005; Walker, Newman, & Koss, 2004). Furthermore, these correlates were revealed in studies including diverse types of traumatized samples, such as war veterans and survivors of assault or disaster. Finally, PTSD's robust association with treatment use does not seem to be accounted for by the disorder's substantial psychiatric comorbidity (i.e., having more than one mental disorder) that could potentially also affect the use of treatment (Brown, Stout, & Mueller, 1999; Schnurr, Friedman, Sengupta, Jankowski, & Holmes, 2000).

It should be noted that in an early relevant investigation, Schwarz and Kowalski (1992) found that PTSD symptom severity was associated with a *decreased* likelihood of mental health treatment seeking. These authors suggested that the effortful avoidance of trauma-related reminders in PTSD (e.g., preferring not to discuss the trauma, becoming distressed when reminded of the trauma) may interfere with treatment seeking. However, subsequent research has not corroborated a relationship between PTSD's avoidance symptoms and treatment use (Elhai, Jacobs, et al., 2006; Goto, Wilson, Kahana, & Slane, 2002; Marshall, Jorm, Grayson, Dobson, & O'Toole, 1997).

22.3. MODELS EXPLAINING MENTAL HEALTH TREATMENT UTILIZATION

Several models explaining *health care* utilization have been proposed, including the Illness

Behavior Model, Health Belief Model, and others, all of which are relevant to *mental health care* utilization (reviewed in Bruce, Wells, Miranda, Lewis, & Gonzalez, 2002). Perhaps the most accepted and validated model of health care use is Andersen's Behavioral Model (Andersen & Newman, 1973), which has garnered decades of empirical support (Andersen, 1995) and has been validated in studies of trauma victims (e.g., Koenen, Goodwin, Struening, Hellman, & Guardino, 2003).

The Behavioral Model theorizes that three personal factors can account for an individual's use of health care. First, *predisposing* variables are historical or sociodemographic characteristics dating before one's current health condition. Predisposing variables can include demographic features, such as gender and racial background; personality or attitudinal characteristics, such as attitudes toward treatment; historical stressors, such as trauma exposure history; and social network variables, such as social support or family structure. Second, *enabling* variables are characteristics involving access to and availability of treatment resources. Enabling variables can include availability factors, such as whether one lives in a geographical area void of mental health care (e.g., a remote rural setting), and treatment access variables, such as employment and health insurance. Third and most important for determining mental health care use (Bland, Newman, & Orn, 1997; Elhai & Ford, 2007), are *need* or illness variables related to one's health condition. Need can include subjective perceptions of illness, such as self-perceived need for treatment, and objective indices, such as a clinician-assigned PTSD diagnosis or psychiatric disability (Andersen, 1995). On the basis of these three factors, the Behavioral Model can be useful in defining equitable access to treatment (i.e., when need is more important than predisposing or enabling variables). It can also elucidate potential inequitable treatment access disparities (i.e., when predisposing or enabling variables overshadow need) (Andersen, 1995).

Given the acceptance of and empirical support for the Behavioral Model of health-care use, we will now review the literature detailing

correlates of disaster-affected individuals' mental health care use, organized around this model.

22.4. REVIEW OF POSTDISASTER MENTAL HEALTH CARE UTILIZATION

22.4.1. Disaster-Related Study Types

Despite the extensive research literature on mental health care use correlates among trauma victims, relatively fewer studies have examined this issue specifically in disaster-affected individuals. We now discuss three types of these studies, defined on the basis of the characteristics of their samples. These investigations studied (1) individuals directly exposed and/or in close proximity to a disaster (e.g., Manhattan residents surveyed after the New York City September 11, 2001, terrorist attacks), (2) disaster relief workers (e.g., Red Cross personnel providing services to disaster victims), and (3) individuals not directly exposed to disaster, but living within a driving distance and queried about their disaster-related experiences (e.g., Connecticut residents after the September 11th New York City attacks).

22.4.2. Studies Included in This Review

Through searching bibliographic databases (i.e., Medline, PsycINFO), we located 25 studies of disaster-affected individuals that investigated formal mental health care use. Of these investigations, we included in our review subsequently only those that sampled at least one of the types of disaster-affected groups mentioned earlier and that statistically explored correlates of some form of professional/formal mental health care use. Thus, we excluded one study (Fishbain, Aldrich, Goldberg, & Duncan, 1991) that purported to examine disaster victims (witnesses to a riot) where the "disaster" is not traditionally defined as such in the traumatic stress literature. We excluded two papers that did not present data analysis test statistics (Covell et al., 2006; Stuber, Galea, Boscarino, & Schlesinger, 2006), thus limiting our ability to draw conclusions from their findings while quantifying a reasonable margin of error. An additional two studies were eliminated

because utilization of mental health-related and other medical treatment was not distinguished (de Bocanegra & Brickman, 2004; Franklin, Young, & Zimmerman, 2002). We excluded one study that examined the prediction of follow-up crisis counseling sessions and thus did not fit well with this intended review's focus on predicting overall receipt of treatment (Donahue, Covell, Foster, Felton, & Essock, 2006). Two additional studies were sorted out because their mental health care use outcome variable involved the offer and acceptance of a referral to additional, enhanced mental health services among crisis counseling participants (Covell, Essock, Felton, & Donahue, 2006; Norris et al., 2006); we cannot infer from those data whether the additional services were actually used.

The remaining 17 reports explored the relationship of a wide variety of variables with mental health care use among disaster-affected persons. The vast majority of these studies examined whether participants used mental health treatment (a dichotomous "use"/"nonuse" variable) as the outcome. The definition of "mental health treatment" varied across investigations, where some only included mental health specialists (e.g., mental health counseling), and others included mental health care delivered in any service sector (e.g., clergy, primary care physician). Nearly all of these studies assessed mental health care use by participant self-report rather than on the basis of medical records. Participants were initially assessed in these investigations as early as 2 weeks after the disaster, with some following them longitudinally for up to 4 years later. Studies varied in how mental health problems were assessed; most of the New York-conducted September 11th studies used structured diagnostic interviews, while the remaining studies used self-report measures, and one used only records-based diagnoses (Dorn, Yzermans, Kerssens, Spreeuwenberg, & van der Zee, 2006).

With two exceptions (Adams, Ford, & Dailey, 2004; Ford, Adams, & Dailey, 2006), these studies did not use a conceptual framework to guide service use analyses. However, many of the variables studied fit well within the Behavioral Model's framework. Some investigations used an error

rate (p value) >0.05 to judge significant associations, but only p values ≤ 0.05 will be interpreted as significant in this review to minimize conclusions on the basis of potentially spurious findings. Samples ranged in size from over 1,000 participants in epidemiological studies to mostly in the 200 to 600 range for remaining nonepidemiological examinations; only one study had less than 100 subjects (thus compromising statistical power to detect true associations).

When a particular study included predictor models of several different types of services used (e.g., mental health specialists, overall mental health care), we report here on analyses detailing overall mental health care received. Additionally, two papers presented analyses predicting both general mental health care utilization, and utilization specifically related to the disaster (Boscarino, Adams, & Figley, 2004; Boscarino, Adams, Stuber, & Galea, 2005); we report only the latter analyses, which should be more sensitive in explaining service use patterns. Finally, some studies reported correlates of informal, in addition to formal, mental health care use (Adams et al., 2004; Ford et al., 2006), but we only discuss analyses of formal care in this paper. These methodological issues are specified in Tables 22.1 through 22.3 and will be discussed later in this chapter.

22.4.3. Correlates of Mental Health-Care Use among Directly Exposed Disaster Victims

Eleven studies examined mental health care use correlates among victims directly exposed to disaster. Most of these investigations sampled New York City residents after the September 11th attacks (ranging from 5 to 8 weeks to 18 months after the attacks) (Boscarino, Adams, et al., 2004; Boscarino et al., 2005; Boscarino, Galea, et al., 2004; Boscarino, Galea, Ahern, Resnick, & Vlahov, 2002, 2003; DeVoe, Bannon, & Klein, 2006; Stuber et al., 2002). The remaining studies sampled Gulf Coast residents living in counties affected by Hurricane Katrina several months after the disaster (Wang et al., 2007), evacuees 1 year after a volcano eruption

Table 22.1. Determinants of mental health service use in directly exposed disaster victims

Sample (Citation)	Service Use Criterion	Criterion Type	Time Frame Assessed	Service Data		Predictors
				Type	Type	
1,008 randomly sampled community subjects living near World Trade Center during 9/11 attacks (sampled within 2 months, post -9/11) (Boscarino et al., 2002)	Increase in MH	D	1 month post versus 1 month before 9/11	SR		<i>Bivariate results:</i> (+) younger age, female gender, unmarried couple, previous trauma, close associate killed, recent stressful events, rescue operation involvement, peridisaster panic attack, current depression, current PTSD; (0) race, education, residence's proximity to WTC, displaced, believed could be killed, social support, witnessed attacks, post media exposure, income, health insurance, lost work, alcohol consumption postdisaster <i>Significant multivariate results:</i> (+) younger age, female gender, previous trauma, recent stressful events, some rescue operation involvement, highest income, peridisaster panic attack
1,008 randomly sampled community subjects living near World Trade Center during 9/11 attacks (sampled within 2 months post -9/11) (Boscarino, et al., 2003)	New Psych Med	D	1 month post versus 1 month before 9/11	SR		<i>Significant multivariate results:</i> female gender, two or more past traumas, health insurance, peridisaster panic attack, PTSD
122 parents of child in home, among 1,008 randomly sampled community subjects living near World Trade Center during 9/11 attacks (sampled within 2 months post-9/11) (Stubert, et al., 2002)	Disaster-Related Child MH	D	Since 9/11 (past 1–2 months)	SR		<i>Bivariate results (child characteristics unless otherwise noted):</i> (+) unmarried parents, residence's proximity to WTC, saw parents cry about disaster, current parent disaster-related PTSD; (0) age, gender, race, siblings in home, away from home during disaster, location of school/daycare, parent witnessed disaster, parent lost close associate, knew someone lost in disaster, time until reunited with parents, parental concern about child's safety during disaster, displaced, parent lost possessions, parent lost job, TV exposure, parent income, difficulties with other children, concentration problems, depression, recent parent depression, parent peridisaster panic attack, parent MH visit since disaster <i>Significant multivariate results (child characteristics):</i> male gender, sibling in home, current PTSD

(continued)

Table 22.1 (continued)

Sample (Citation)	Service Use		Criterion Type	Time Frame Assessed	Service Data		Predictors
	Criterion	Med			Type	SR	
2,011 randomly sampled community subjects living in New York City (sampled 4–5 months post-9/11) (Boscarino, Galea, et al., 2004)	MH Psych Med		D	Past month		SR	<i>MH Bivariate results:</i> (+) middle-aged, graduate school versus < high school education, closer distance to WTC, two or more previous traumas, one or more recent stressors, had primary care provider, increased alcohol use, peridisaster panic attack, current PTSD, depression; (–) African American race, Hispanic ethnicity <i>MH significant multivariate results:</i> non-African American, non-Hispanic, 4 or more past traumas, two or more recent stressors, current PTSD, depression or more recent stressors, had primary care provider, two or more Psych Med bivariate results: (+) age 25+, previously married, two or more past traumas, one or more recent stressors, had primary care provider, health insurance, peridisaster panic attack, increased alcohol use, current PTSD, depression; (0) social support, one past trauma; (–) African American race, Hispanic ethnicity
180 parents of children (less than age 5 on 9/11), recruited in childhood centers in New York City in summer 2002 (DeVoe, et al., 2006)	Child MH		D	Since 9/11 attacks		SR	<i>Psych Med significant multivariate results:</i> Caucasian, Asian, age 25–64, one or more recent stressors, had primary care provider, current depression <i>Bivariate results (child characteristics unless otherwise noted):</i> (+) saw WTC attack in person, less 9/11 media exposure, PTSD, afraid of new things, parent anxiety, parent depression, parent sought MH treatment for self; (0) more aggressive since disaster, clingy/dependent, upset when separated, parent PTSD, sleep difficulty <i>Significant multivariate final model results (child characteristics unless otherwise noted):</i> afraid of new things, witnessed attack in person, less 9/11 media exposure, parent depression, parent MH treatment for self
2,368 randomly sampled community subjects living in New York City near World Trade Center during 9/11 attacks (sampled 1 year post-9/11) (Boscarino, Adams, et al., 2004)	Disaster-Related MH Disaster-Related Psych Med		D	Past year		SR	<i>Disaster-related MH multivariate results:</i> (+) younger age, college education, at least moderate disaster exposure, two or more negative life events, peridisaster panic attack, higher anxiety, low to moderate self-esteem, past-year PTSD, past-year depression; (0) gender, marital status, previous trauma, income, health insurance, had primary care doctor; (–) African American race, low social support

					<p><i>Disaster-related Psych Med multivariate results:</i> (+) middle-aged, female gender, high disaster exposure, two or more negative life events, higher anxiety, low self-esteem, past-year PTSD, past-year depression; (0) education, marital status, social support, previous trauma, income, health insurance, had primary care doctor, peridaster panic attack; (–) African American race</p> <p><i>Disaster-related MH bivariante results:</i> (+) at least moderate disaster exposure, had regular primary care doctor, peridaster panic attack; (0) gender, age, health insurance, borough of residence; (–) African American race</p> <p><i>Significant disaster-related MH multivariate results:</i> non-African American race, at least moderate disaster exposure, had regular primary care doctor, peridaster panic attack</p> <p><i>Disaster-related Psych Med bivariante results:</i> (+) middle-aged, at least high disaster-related exposure, had regular primary care doctor, peridaster panic attack; (0) borough of residence, gender, health insurance; (–) African American race</p> <p>Significant disaster-related Psych Med multivariate results: non-African American race, middle-aged, peridaster panic attack</p>
473 participants diagnosed with PTSD or major depression, among 2,368 randomly sampled community subjects living in New York City near World Trade Center during 9/11 attacks (sampled 1 year post-9/11) (Boscarino, et al., 2005)	Disaster-Related MH Disaster-Related Psych Med	D	Past year	SR	
1,034 adult residents of counties affected by Hurricane Katrina, randomly sampled on the basis of random digit dialing and from those individuals seeking disaster relief assistance (evaluated 4–6 months posthurricane) (Wang, et al., 2007)	MH	D	Since Hurricane Katrina	SR	<p><i>Multivariate results for postdisaster treatment use, controlling for clinical variables:</i> (+) middle-aged, married at some point in life</p> <p><i>Multivariate results for current treatment use, controlling for clinical variables:</i> (+) Caucasian race, low or high education level, married at some point in life, own home without a mortgage remaining, current health insurance</p> <p><i>Multivariate results for dropping out of treatment (among those reporting some treatment use postdisaster), controlling for clinical variables:</i> (+) Hispanic race, other race/ethnicity (aside from Caucasian, African American, Hispanic), not previously married, own home with a current mortgage</p>

(continued)

Table 22.1 (continued)

Sample (Citation)	Service Use Criterion	Criterion Type	Time Frame Assessed	Service Data		Predictors
				Type	Type	
231 adults evacuated from homes after volcano eruption (evaluated 1 year post) (Goto, et al., 2002)	MH	C	Past year	SR		(+) Older age, PTSD's intrusion and hyperarousal symptoms, depression severity, help sought from physician predisaster; (0) educational level, years resided at home, help sought by MH professional predisaster, PTSD's avoidance symptoms
286 fire victims, 802 victims' family members, 3,722 community control subjects from family medical practices, 10,230 patients from a national reference population (Dorn, et al., 2006)	MH to family practitioner	C	1 year prefire, and 3 years postfire	REC		(+) victim group, time period postfire, uninjured victims, loss of a child
662 affected residents of fireworks explosion, assessed 2–3 weeks after, at 18 months, and at 4 years. Comparison group was included starting at 18 months (Van der Velden, et al., 2006)	MH	D	Past year	SR		(+) affected group across time points, affected group with severe depression across time points (compared with comparison group with severe depression), affected group with severe anxiety in first 12 months only (compared with comparison group with severe anxiety)

Notes: For *criterion type*, C, continuous (intensity of services used); D, dichotomous (presence or absence of services used). For *service data type*, REC, records-based; SR, self-report. For *predictors*, statistically significant (at least as stringent as $p < 0.05$) relationships (where criterion variable/reference category is presence of or increased 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. Psych Med, psychiatric medication use; MH, mental health treatment use; PTSD, posttraumatic stress disorder; WTC, World Trade Center.

Table 22.2. Determinants of mental health service use in disaster relief workers

Sample (Citation)	Service Use		Service Data	
	Criterion	Criterion Type	Time Frame Assessed	Predictors
3,015 Red Cross disaster workers 1 year after 9/11 attacks (Elhai, Jacobs, et al., 2006)	MH	D	Past year	SR <i>Multivariate final results controlling for MH use before 9/11:</i> (+) younger age, previously married, posttraumatic intrusion and hyperarousal symptoms; (0) gender, race, education, number of previous disaster responses, visited disaster site, contact with families of victims, posttraumatic avoidance; (–) previous MH use
174 disaster utility workers from 9/11 attacks accepting psychotherapy referral (Jayasinghe, et al., 2005)	MH	D	Past year since 9/11	REC <i>Bivariate results:</i> (+) non-Hispanic Caucasians, PTSD severity; (0) age, education, marital status, previous trauma, prior MH treatment, past mental disorder (depression, panic or generalized anxiety disorder), witnessed disaster, knew someone in WTC, knew someone killed in WTC, attended funeral/memorial, worked at WTC, number of days worked at WTC, experienced danger at WTC, saw dead bodies, current PTSD diagnosis, current other diagnosis (depression, panic or generalized anxiety disorder), depression severity, distress severity <i>Significant multivariate results:</i> race/ethnicity, PTSD severity, race × PTSD severity interaction
207 disaster/rescue workers exposed to an airplane crash, and 421 nonexposed control disaster/rescue workers, assessed 2, 7, and 13 months after (Fullerton, et al., 2004)	MH	D	Past 2 months, past 7 months, past 13 months	SR (+) exposed group (at each time point)
54 disaster workers working in a mortuary after an explosion on a U.S. naval ship, assessed 1, 1–4, and 4–13 months after (Ursano, et al., 1999)	MH	D	Past month, past 1–4 months, past 4–13 months	SR (0) identification with the victim as oneself, friend or family member

Notes: For *criterion type*, C, continuous (intensity of services used); D, dichotomous (presence or absence of services used). For *service data type*, REC, records-based; SR, self-report. For *predictors*, statistically significant (at least as stringent as $p < 0.05$) relationships 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 treatment use; PTSD, posttraumatic stress disorder; WTC, World Trade Center.

Table 22.3. Determinants of mental health service use in other affected individuals of a disaster

Sample (Citation)	Service Use		Criterion		Time Frame		Service		Predictors
	Criterion	Type	Type	Assessed	Data Type				
Random phone survey of 1,762 Connecticut residents, within first 3 mos of 9/11 attacks (Adams, et al., 2004)	MH	D	D	Since 9/11 attacks	SR				<i>Bivariate results:</i> (+) victim status, smoker, at least one poor physical health day in past month, at least one poor mental health day in past month, at least one mental health problem, sleep problems, increased substance use; (0) gender, age, race, 9/11 location, alcohol use, health insurance, attended 9/11 funeral <i>Significant multivariate results:</i> relationship to victim, sleep problems, increased substance use, informal help used
Random phone survey of 4,640 Connecticut residents, 5–15 mos after 9/11 attacks (Ford, et al., 2006)	MH	D	D	Since 9/11 attacks	SR				<i>Bivariate results for formal help received:</i> (+) unmarried, unemployed, disabled, smokes, nondrinker, 1 or more poor physical health days in past month, 1 or more poor mental health days in past month, depression, one or more days of worry in past month, increased smoking; (0) date assessed, gender, age, race, ethnicity, health insurance, sleep problems, increased alcohol use <i>Significant multivariate results for formal help received:</i> number of poor mental health days

Notes: For *criterion type*, C, continuous (intensity of services used); D, dichotomous (presence or absence of services used). For *service data type*, REC, records-based; SR, self-report. For *predictors*, statistically significant (at least as stringent as $p < 0.05$) relationships 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 treatment use; Mos, months.

(Goto et al., 2002), fire victims 3 years later (Dorn et al., 2006), and fireworks explosion victims 2 to 3 weeks later and at intervals up to 4 years afterward (Van der Velden et al., 2006).

Mental health treatment use prevalence was reported in the September 11th studies, ranging from 19% for services and 12% for medication specifically in the weeks after the September 11th attacks (Boscarino et al., 2002), falling to roughly 8% for medication and services use after 4 to 5 months (Boscarino, Galea, et al., 2004), with services climbing back up to 20% and medication use stabilizing at 8% after 1 year (Boscarino, Adams, et al., 2004). Mental health care use prevalence within 4 to 6 months after Hurricane Katrina among those affected was 16%, mostly involving the general medical service sector (11% of the entire sample) and pharmacotherapy exclusively without combined psychotherapy (9% of the entire sample). It is important to note, however, that these rates of treatment use are not higher than recent estimates from the general population (20%, Wang et al., 2007).

For each of these studies, Table 22.1 describes the samples, methods, and associations with mental health care use. Several correlates of mental health care utilization are apparent across these studies, in terms of both mental health care use and psychiatric medication use. Three predisposing variables were consistently related to treatment use. First, younger age was consistently associated with a greater likelihood of mental health care use in studies of adults that examined age as a potential correlate. Younger age is in fact a consistently demonstrated predictor of mental health care use in general adult community samples (e.g., Kessler, Olfson, & Berglund, 1998), and in fact recent work demonstrates progressively more positive attitudes toward such treatment in both more recent decades and generational cohorts (Mojtabai, 2007). However, age has been found to be variably related to postdisaster distress across nationalities and cultures (Norris, Kaniasty, Conrad, Inman, & Murphy, 2002), so it may be that older adults are more willing than young or midlife adults to seek mental health

care in some populations (e.g., Goto et al., 2002). Four of the studies of postdisaster mental health care found that midlife adults were most likely to report utilization (Boscarino et al., 2005; Boscarino, Adams, et al., 2004; Boscarino, Galea, et al., 2004; Wang et al., 2007), consistent with prior findings that postdisaster distress has been associated with midadulthood rather than younger or older adulthood (Norris, Friedman, et al., 2002). Thus, midlife adults appear to both experience and acknowledge the most severe distress following disaster, and some evidence suggests that this age group is more willing than others to seek treatment for distress or mental health concerns in the wake of disaster.

Second, African-Americans were less likely than Caucasians to report mental health care use, with Hispanic ethnicity also associated with a lower likelihood of utilization in one study (Boscarino, Galea, et al., 2004) and increased likelihood of treatment drop-out in another (Wang et al., 2007) as well as possibly in a third study that grouped all "non-Caucasian" respondents (Boscarino et al., 2005). A greater likelihood and intensity of mental health care use by Caucasians, with comparably less use by racial minorities, has been consistently demonstrated in community samples of adults as well (e.g., Kessler, Chiu, Demler, & Walters, 2005). Third, the extent of exposure to the disaster was consistently associated with the likelihood of mental health care utilization. The postdisaster exposure-treatment use relationship is consistent with the results of previous reports for other types of trauma exposure (Sorenson & Siegel, 1992; Walker et al., 1999) and thus extends findings on this relationship to now include disaster exposure as well. Little evidence was found for enabling variables as correlates of mental health care use. This lack of a potent relationship for enabling characteristics supports recent work demonstrating that need overshadows such enabling variables (Elhai & Ford, 2007).

Consistently demonstrated need-related correlates of treatment use included panic attacks during the disaster, and diagnoses of major depressive disorder and PTSD, supporting

previous findings of a robust association between mental health care use and the presence of anxiety and mood disorders (Elhai & Ford, 2007; Parslow & Jorm, 2000). PTSD was particularly associated (across studies) with mental health treatment use in our review. PTSD is not as often studied as other disorders or symptoms of psychological distress in general epidemiological studies for correlates of mental health care utilization. The results of the postdisaster studies that we reviewed suggest that PTSD should be considered a robust need factor in directly exposed populations with regard to mental health care utilization. Given recent evidence for PTSD's role in mediating the relationship between disaster exposure and physical health problems (Norris, Slone, Baker, & Murphy, 2006), PTSD also may warrant further investigation in postdisaster studies as a potential mediator of the relationship between disaster exposure and mental health care utilization.

Two studies investigated mental health care use by children (as reported by their parents) following the New York City September 11th terrorist attacks. In the first 2 months after the disaster, correlates of mental health care utilization by children included exposure (i.e., proximity of residence to the World Trade Center) but also largely related to their parents' relational stability (i.e., unmarried parents were more likely to seek help for their child) and posttraumatic stress or grief reactions (Stuber et al., 2002). Several months later (9–11 months postdisaster) these two factors again were associated with mental health care use by children but with different specific indicators: exposure to the disaster involved directly witnessing the events; parental difficulties included depression and seeking mental health treatment for oneself (DeVoe et al., 2006). Factors associated with parents' seeking of mental health care for their child in the wake of disaster warrants further study in relation to other types of disaster, but in the wake of the September 11th terrorist attacks, exposure and parental acute distress or persistent depression appeared to be key correlates of child mental health care use. This pattern of findings is consistent with a robust empirical

literature demonstrating that parental reactions and coping in the aftermath of children's exposure to psychological trauma is a key influence on their child's risk for posttraumatic problems (Aisenberg & Ell, 2005).

Interestingly, associations for the need-based predictor variables (e.g., PTSD, depression, panic attacks) remained stable across the longitudinal time points examined across investigations. However, ethnoracial minority background began appearing as a significant treatment use correlate only at the 1-year time point (with one exception finding minority status as a significant correlate of medication use at 4 to 5 months after September 11th [Boscarino, Galea, et al., 2004]). Other predisposing (e.g., gender, unmarried status) and need (e.g., increased alcohol use) factors were associated with mental health care utilization in the first months after disaster but not at later time points. Systematic research is needed to identify factors associated with mental health care use that are stable over time and those that are associated with specific phases in the wake of disaster.

22.4.4. Correlates of Mental Health Care Use among Disaster Relief Workers

Four studies examined mental health treatment correlates among disaster relief workers. Two of these papers sampled disaster workers 1 year after responding to the September 11th attacks (Elhai, Jacobs, et al., 2006; Jayasinghe et al., 2005). Other studies sampled disaster workers longitudinally for up to 13 months postdisaster in response to an airplane crash (Fullerton, Ursano, & Wang, 2004) and a naval ship explosion (Ursano, Fullerton, Vance, & Kao, 1999). Mental health care use prevalence 1 year postdisaster ranged from 11% among Red Cross workers responding to the September 11th attacks (Elhai, Jacobs, et al., 2006) to 15% among exposed relief workers responding to an airplane crash (Fullerton et al., 2004). Across these investigations, PTSD severity was the strongest and most consistent correlate of mental health care use. As discussed previously, younger age and Caucasian race were also associated with mental health care utilization, but the

pattern of findings was not as consistent as that for PTSD. Little support was found for any other predisposing or enabling variables as correlates of mental health care use (see Table 22.2).

Relief workers vary greatly in not only their personal characteristics but also their extent of preparation (i.e., ranging from no training for utility workers, to brief training for some Red Cross workers, to extensive technical training for professional rescue teams and experienced Red Cross responders) and exposure to psychological trauma. However, of the four studies with disaster relief workers, only two systematically assessed such a range of potential correlates. Thus, much more research is needed to empirically examine and establish the factors associated with mental health care use following disasters by relief workers.

22.4.5. Correlates of Mental Health-Care Use among Other Affected Individuals of a Disaster

Two studies examined mental health care use correlates among affected individuals residing outside of New York City but within driving distance of the World Trade Center during the September 11th attacks. These papers sampled Connecticut residents within the first 3 months of the attacks (Adams et al., 2004) and subsequently at 5 to 15 months after the attacks (Ford et al., 2006). A small proportion of respondents (<5%) either were directly exposed (i.e., in New York City at the time of the attacks) or were family members of, or personally knew, a deceased victim. Mental health care use prevalence ranged from 6% (3% for formal treatment) in the first 3 months to 9% after 5 to 15 months.

In these studies, sleep difficulty – which can be a symptom of PTSD – was consistently related to mental health care utilization. Consistent support was also found for an increased likelihood of mental health care utilization as the number of days of self-reported poor health or mental health in the past month increased (see Table 22.3). In the first 3 months following the terrorist attack, direct exposure to the attack or having a personal relationship with a deceased victim and increased alcohol

use were associated with an increased likelihood of mental health care use. During the following year, poor overall mental health was the only unique correlate of mental health care use. Thus, acute postdisaster mental health care utilization appeared to be associated primarily with immediate need due to exposure or sleep or alcohol use problems, while mental health-care use over the longer term appeared to be primarily related to general mental health problems.

To the extent that the brief subjectively reported mental health variables assessed in these studies are related to more objective mental health indices (e.g., clinician-assigned diagnoses based on structured diagnostic interviews), these results suggest that acute posttraumatic distress related to disaster exposure is critical to mental health care utilization even in a population in which most persons were not directly affected. Furthermore, general mental health problems (which are more accurately assessed by objective diagnostic indices) may become the primary correlate of mental health care utilization a year or more after the disaster. As with disaster relief workers, more research is needed to replicate findings of the few studies that have been conducted with the at-risk but less intensely disaster-affected populations.

22.4.6. Result Trends across Studies of Disaster-Affected Individuals' Mental Health-Care Use

Across the three study types of disaster-affected individuals, we find that need (especially PTSD) variables were consistently related to mental health treatment use. Enabling variables were infrequently associated with mental health care utilization. Additionally, although some predisposing variables were consistently related to mental health care use among adults (e.g., age, race), other variables expected to be related on the basis of general community study findings (e.g., female gender and nonmarried status [Bland et al., 1997; Kessler et al., 2005]) in fact were inconsistently (and generally only in the acute postdisaster period) related to mental health care utilization among disaster-affected individuals.

Odds ratios reported in these studies can inform the reader about the magnitude of associations with mental health care use, with an odds ratio of 2.5 indicating that the positive presence of the characteristic of interest (e.g., presence of PTSD) is associated with a 150% increased likelihood of treatment use (approximating a medium effect size). Across investigations, need variables, especially depression, anxiety, and PTSD (and increased alcohol use in the acute postdisaster period) tended to be associated with the largest odds ratios, typically exceeding 3.0. Aside from age, stressful life events, trauma and disaster exposure, which also tended to possess respectable odds ratios, other predisposing and enabling variables did not appear to be strongly related to mental health care use.

22.5. METHODOLOGICAL AND STATISTICAL ISSUES IN EXAMINING DISASTER-AFFECTED INDIVIDUALS' MENTAL HEALTH CARE UTILIZATION

Several methodological issues are important in exploring mental health care use, specifically in trauma victims, as detailed elsewhere (Elhai et al., 2005). Furthermore, the statistical analysis of mental health care utilization data is associated with several sensitive issues that are often difficult to overcome, limiting previous investigations' findings (Elhai, Calhoun, & Ford, 2008). These methodological and statistical issues are discussed next.

22.5.1. Methodological Issues in Examining Disaster-Affected Individuals' Mental Health-Care Use

Inquiring about mental health treatment utilization first requires that the investigator and respondent are in agreement about what is meant by both mental health "*problems*" and "*treatment*." Thus, the investigator should ideally use questions that are as behaviorally specific as possible, without leaving ambiguity about what these terms mean. Fortunately, many of the studies included in the earlier review defined mental health problems using several possible

terms ("emotional problems," "family problems," "mental health problems"), orienting the respondent to answer about treatment received for such specific problems.

We have recommended specifying to respondents examples of the types of providers visited to ensure that respondents accurately recall and report their previous visits to providers of interest to the investigators (Elhai et al., 2005). For example, an investigator may ask about mental health care from a "psychiatrist, other physician, psychologist, counselor, social worker, clergy, or other health professional." An even more sophisticated approach would involve providing a list of such providers so that respondents can indicate previous service use (and recent visit frequency) for each individual type of provider. This issue is important, since people have various preferences about the types of health care sectors in which they prefer to obtain mental health care (e.g., primary care, mental health specialty sector, clergy), with different sets of correlates found for various sectors (Elhai & Ford, 2007; Wang et al., 2006). Thus, asking more globally about mental health treatment, without respect to specific providers, can potentially lose important information when examining service utilization predictor models. Many of the studies reviewed here provided examples of the types of providers inquired about, and some inquired about visits to several specific types of providers using questions adapted from the National Comorbidity Survey's service use items (Kessler et al., 1999).

Providing a time frame for self-reported previous service use is crucial as well. Prior research has discovered that inquiring about shorter time frames (e.g., past month) is associated with substantially more accurate recall than longer time frames (e.g., past year) when validating self-reported use and frequency of use against medical records as many respondents underestimate their actual previous services used (Roberts, Bergstralh, Schmidt, & Jacobsen, 1996; Wallihan, Stump, & Callahan, 1999). Several of the studies reviewed in this chapter inquired about service use using short time frames (e.g., 1 month); however, a minority implemented

time frames of longer than 1 year. Even more sophisticated, but rarely found within our review, is the use of records to define services used; however, such records-based data are time-consuming to extract and are generalizable only to the clinic or provider network to which the individual presented. The use of continuous time sampling designs (Adams et al., 2004; Ford et al., 2006) provides a more complete description of trends and factors in mental health care use over time following disaster, but the most informative design, a fully prospective study with repeated pre- and postdisaster assessments, has not as yet been reported in this research area.

Most of the investigations reviewed here inquired about mental health services used in general. However, some studies inquired about such services specifically related to one's disaster experience (Boscarino, Adams, et al., 2004; Boscarino et al., 2005). Services may be sought at any time because of a variety of precipitating factors; thus, disaster research should attempt to link one's mental health care use specifically to the disaster being studied for more precise and sensitive (and less error-prone) modeling of service utilization.

Two studies inquired about informal sources of help as well as formal mental health care services, revealing different patterns of correlates for these types of services (Adams et al., 2004; Ford et al., 2006). Further study of the full range of supports and services from which people receive help for mental health problems will provide a fuller understanding of where, when, and how people seek help for the emotional impact of disaster as well as for preexisting mental health needs.

Only two studies reviewed here inquired about barriers to seeking or continuing mental health treatment among disaster victims (Boscarino et al., 2005; Wang et al., 2007). Wang et al. (2007) found that among participants who dropped out of treatment postdisaster, the most common reasons cited included factors related to decreased need for treatment (52%) and factors related to inadequate resources to continue treatment, such as lack of adequate finances or transportation (42%). Additionally, Boscarino

et al. (2005) found that the most frequently reported treatment barrier in their study was the belief that one did not have a problem needing treatment, endorsed by nearly three-quarters of those victims diagnosed with PTSD or major depressive disorder. Thus, aside from those papers' findings, little is known about disaster-affected individuals' barriers to either initiating treatment or continuing treatment once started. One advantage of Boscarino and colleagues' (2005) study is that they used open-ended questions to inquire about potential barriers to treatment, and thus their results may have less bias than previous studies on treatment barriers among the general population (e.g., Wells, Robins, Bushnell, Jarosz, & Oakley-Browne, 1994). In both quantitative and qualitative studies, it will be important in the future to distinguish between people who intended to but did not or could not access mental health care from people who neither intended to nor actually utilized mental health care. These are very different subgroups of nonutilizers who may have distinguishing predisposing, access, or need characteristics that can facilitate the development of approaches to enhancing access by overcoming barriers to the access of services.

One limitation of the disaster studies reviewed is the way in which PTSD was analyzed as a correlate variable of service use. First, many of these studies examined PTSD as a dichotomous diagnostic variable (diagnostic "presence" or "absence") and thus neglected to capture the dimensionality (i.e., severity) of the disorder's symptoms. Furthermore, even those studies measuring PTSD dimensionally tended to examine the disorder as a global PTSD construct, without further analyzing specific PTSD symptom clusters that may be more or less associated with treatment use. Finally, two studies separately analyzed PTSD's intrusion, avoidance, and hyperarousal symptom clusters (Elhai, Jacobs, et al., 2006; Goto et al., 2002), but recent research suggests that the avoidance cluster is best conceptualized by splitting its symptoms into effortful avoidance and emotional numbing (passive avoidance) symptoms (Asmundson, Stapleton, & Taylor, 2004).

22.5.2. Statistical Issues in Examining Disaster-Affected Individuals' Mental Health-Care Use

Nearly all studies reviewed in this chapter examined disaster-affected persons' use versus nonuse of treatment. However, classifying individuals into crude "use"/"nonuse" categories neglects to capture the dimensionality that can be associated with mental health care utilization. Importantly, it classifies an individual with only one recent treatment visit into the same category as someone with weekly or daily visits. Thus, while this review derived conclusions on the correlates of use versus nonuse of treatment among disaster-affected persons, little is known about correlates of the intensity of disaster-related treatment use.

In fact, until recently it was highly problematic to model the frequency of mental health care visits. Mental health visit count variables quite often possess substantial heteroscedasticity (i.e., error variance is unequally distributed across participants), a positive skew with most participants falling on the low end of the frequency distribution and many zero values (since many subjects have not sought any mental health care in a recent time-frame) (Elhai et al., 2008). Thus, using traditional general linear model analyses (e.g., linear regression) is contraindicated for modeling such an outcome variable because results would produce biases in regression coefficient standard errors, test statistic values, and effect size estimates (Gardner, Mulvey, & Shaw, 1995). Even conducting a two-step approach, first modeling use from nonuse (e.g., using logistic regression) and then modeling the continuum of service use among only those with at least one visit (e.g., with linear regression), is problematic because of the resulting substantially skewed distribution of those participants with at least one visit.

Other solutions to such complexly distributed visit count data can be just as problematic. Arbitrarily assigning visit counts to categories (e.g., "no visits," "one to nine visits," "ten or more visits"), while providing richer information than a simpler dichotomous "use"/"nonuse" variable, still loses important information, as such

continuous variable dichotomization has undesirable effects, such as loss of power and biased significance levels and effect size estimates (MacCallum, Zhang, Preacher, & Rucker, 2002). Previously, the best possible solution was to conduct data transformations on the outcome variable (e.g., square root, logarithmic, or inverse transformation), but transformations can lead to uninterpretable regression coefficients, and more importantly, mental health visit counts are often too skewed for any transformation to result in a successfully normalized distribution (Elhai et al., 2008).

More recently, however, statistical methods specifically designed for count data (e.g., visit counts) have been developed. Poisson and negative binomial regression are basic count regression analyses, using the *generalized* rather than *general* linear model, and assume data distributions that more closely resemble visit count data, including Poisson and gamma distributions, respectively. These methods function by linearizing the nonlinear visit count outcome variable and using maximum likelihood estimation to model the outcome. More applicable to mental health visit counts are zero-inflated versions of Poisson and negative binomial regression, which account for the substantial proportion of zero values in visit counts by modeling use versus nonuse and weighing cases accordingly in Poisson/negative binomial analyses. (Perhaps less relevant, but worth mentioning, are the zero-truncated versions of Poisson/negative binomial regression, designed for instances where no zero values are present, such as when modeling the continuum of visit counts among individuals who already visited a clinic at least once.) For a review of such statistical analyses, see Elhai and colleagues (2008).

In fact, such contemporary analytic methods are effective in modeling zero-laden data (Hall & Zhengang, 2004; Long, 1997) and have outperformed other statistical analyses in modeling mental health visit counts in particular (Bao, 2002; Elhai et al., 2008). Finally, recent evidence indicates that modeling mental health care use *intensity* with such analyses results in different findings than when modeling "use"/"nonuse" of

treatment (Elhai & Ford, 2007), suggesting that additional information can be gained by adding the exploration of service use intensity to service use investigations.

Thus, such contemporary analyses represent a promising method of more comprehensively examining models of treatment use intensity among disaster victims. Furthermore, recent studies have implemented these methods in modeling the relation of mental health care use with both trauma victimization and PTSD (Elhai, Patrick, Anderson, Simons, & Frueh, 2006; Elhai et al., 2007; Elhai & Simons, 2007). Elhai and colleagues (2008) offer additional descriptions of these analyses and current software packages that implement them.

22.6. CONCLUSION

This chapter reviewed empirical findings on the correlates of mental health care use among disaster victims, organized within the Behavioral Model of health care use. Among samples of individuals directly affected by disaster, disaster relief personnel, and other individuals living near disasters, need variables (especially PTSD) appear most consistently related to the use of mental health care, with some predisposing variables such as age and racial background also demonstrating some consistent relationships.

Methodological issues that should be considered when reviewing this literature or conducting future relevant studies include the use of behaviorally specific definitions of mental health problems and services (including distinguishing specific types of mental health treatment providers), distinction between use in the acute and subsequent postdisaster periods, and the inclusion of longer time frames and prospective research designs when surveying mental health care use, querying service use specifically related to the disaster in question, and assessing PTSD dimensionally and its symptom clusters and comorbid problems and disorders (e.g., depression, substance abuse). Statistical issues that should be considered in future research include analyzing the continuum of visit counts and using contemporary analytic methods designed for such

complexly distributed data. Extant research on the correlates of mental health care utilization in the wake of disaster provides a small but solid foundation for more methodologically sophisticated studies that can identify the prospective predictors of mental health care utilization in the wake of a range of types of disaster.

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