Use of Outpatient Mental Health Services by Homeless Veterans After Hurricanes

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Little is known about the impact of hurricanes on people who are homeless at the time a disaster occurs. Although researchers have extensively studied the psychosocial consequences of disaster produced homelessness on the general population, efforts focused on understanding how homeless people fare have been limited to a few media reports and the gray literature. In the event of a hurricane, homeless veterans may be at increased risk for negative outcomes because of their cumulative vulnerabilities. Health care statistics consistently document that homeless veterans experience higher rates of medical, emotional, substance abuse, legal, and financial problems compared with the general population. This study used the 2004 to 2006 Veterans Health Administration (VHA) Outpatient Mental Health Dataset to examine the effects of hurricanes on use of outpatient mental health services by homeless veterans. Homeless veterans residing in hurricane-affected counties were significantly more likely to participate in group psychotherapy (32.4% vs. 13.4%, \( p < .002 \)), but less likely to participate in individual 30–40-min sessions with medical evaluations (3.5% vs. 17.3%, \( p < .001 \)). The study findings have implications for homelessness programs and the provision of VHA mental health services to homeless veterans postdisaster.

\textbf{Keywords:} homeless, disaster, veterans, hurricane, mental health

The interaction between disasters and housing is well documented. More than 300 scholarly articles published since 2005 have noted the adverse effects experienced by residents who became homeless after hurricanes. In contrast, little is known about the impact of extreme weather events on people who are homeless at the time a disaster occurs. Previous efforts focused on understanding how homeless people fare have been limited to a few media reports and the gray literature (Dunn, 2003; Edgington, 2009; Jervis, 2008). Homeless veterans may be at particular risk for experiencing negative outcomes after disasters because of mental health problems, compromised physical health status, and general lack of resources. Under normal conditions and despite receiving care through Veterans Health Administration (VHA) specialized mental health programs, homeless veterans with mental illnesses are at increased risk of mortality compared with the general population (Kasprow & Rosenheck, 2000). In the general population, disasters exacerbate existing mental health conditions and amplify the risk for morbidity and mortality (Domino, Fried, Moon, Olinick, & Yoon, 2003; Galea et al., 2007; Katz, Pellegrino, Pandya, Ng, & Delisi, 2002; Wang et al., 2008). Hurricane survivors have been shown to experience marked changes in patterns of general care, including decreased use of medical services, increased financial problems, and storm-related social stressors that influence the duration of posttraumatic stress disorder (PTSD) symptoms (Acierno et al., 2007; Galea, Tracy, Norris, & Coffey, 2008). Recent research has also demonstrated an increase in substance abuse following hurricanes (Flory, Hankin, Kloos, Cheely, & Turecki, 2009; Kishore et al., 2008).
To date, the impact of disasters on homeless veterans has not been documented. This study used the VHA Outpatient Medical Dataset to examine pre- and posthurricane use of outpatient mental health services by homeless veterans living in Florida. Knowledge of mental health service utilization patterns and subsequent disruptions following natural disasters among homeless veterans may have implications for disaster preparedness policy.

Method

Mental Health Diagnosis

Outpatient data for a primary mental health diagnosis was abstracted from the International Classification of Diseases—9th Revision (ICD-9-CM) to include veterans who were coded ICD-9-CM 290–319 (Centers for Disease Control & Prevention, 2010).

Homelessness Status

Homelessness was defined by the VHA Decision Support System (DSS) as a “point-in-time” measure at the time of the encounter. The VHA DSS is a national, longitudinal database that matches VHA costs to select clinical services and products provided to the veteran (VA Information Resource Center, 2010). Our definition of homelessness was abstracted directly from the VHA Outpatient Medical Dataset. The VHA definition addresses homelessness only at the time of the specific outpatient visit. Veterans may have been homeless only at the time of the service encounter and not for an extended period of time. Veterans who self-identified as homeless prior to the start of the service encounter and not for an extended period of time.

Hurricane Status

Counties impacted by category 3 or 4 storms were identified using National Oceanic Atmospheric Administration (NOAA) tracking data (United States National Oceanic Atmospheric Administration’s National Hurricane Center, 2011). Veterans residing in the following counties were considered residents of a hurricane-affected area: Charlotte, De Soto, Hardee, Hillsborough, Lee, Martin, Orange, Osceola, Palm Beach, Pinellas, Polk, St Lucie, and Sarasota. A review of VHA facilities located in these counties was conducted to determine if buildings were closed or damaged after the hurricanes (Olney et al., 2010).

Outpatient Mental Health Service Use

Data from the VHA Outpatient Medical Dataset during fiscal years 2004 to 2006 was used to capture all outpatient mental health encounters by homeless veterans for select Current Procedural Technology (CPT) codes. Within the Unites States, CPT codes are the primary standardized billing codes and the most specific coding mechanism available to identify health care utilization within the VHA. Specific CPT codes of interest were as follows: CPT 90804 = Individual psychotherapy, 20–30 min, face-to-face w/patient; CPT 90805 = Individual psychotherapy, 20–30 min, face-to-face w/patient and w/medical evaluation; CPT 90806 = Individual psychotherapy, 30–40 min, face-to-face w/patient; CPT 90807 = Individual psychotherapy, 30–40 min, face-to-face w/patient and w/medical evaluation; and CPT 90853 = Group psychotherapy.

Approach

These CPT codes were chosen as they represented the top five CPT codes for mental health encounters within VHA and represent approximately 75% of all CPT mental health codes during this period. We specifically focused on the monthly frequency and rate of veteran outpatient encounters. Five separate mixed effects models were calculated, one for each of the five codes, to assess the relationships of hurricane county residence, homelessness, age, gender, service connection status, and marital status on average monthly CPT service utilization rate per veteran.

Veterans may have as many as 20 CPT codes per encounter with multiple encounters per day, leading to a potential daily CPT summary involving dozens of unique codes. For each CPT code selected for this analysis, each patient’s daily visit was flagged to calculate only one visit per specific CPT per day. In the event that a veteran presented with three separate CPT codes on a given day, each specific CPT analysis only counted as one for that day. In calculating CPT rates, the specific CPT code associated with psychological services was assumed to be one per day. This strategy eliminated a small fraction of daily CPT codes that may have been due to error or multiple clinic encounters. For a specific CPT code, the maximum possible frequency count for that month would be dependent on the number of days in that month. Monthly CPT rates were calculated by dividing the total number of visits for a select CPT code by the total number of mental health visits per month. For example, a veteran with five visits in one month per CPT code and 25 total mental health visits for that same month would have a CPT rate for that month of 5/25 = 20.0%. These rates were then averaged per month per CPT code. Continuous data is presented as mean ± standard deviation. Categorical data is presented as frequency and percent.

Lastly, separate repeated measures, linear mixed models were run for each of the five CPT codes of interest, with adjustment for potential confounding and moderating effects. For each model, the average monthly outpatient mental health rate served as the dependent variable. The primary independent variables were homeless (yes/no) and hurricane affected (yes/no). All models were nested within subject (e.g., veteran), and an autoregressive covariance matrix was found to best fit each model. Covariate independent variables of interest were marital status (yes/no), White (yes/no), male (yes/no), service connected percentage (VHA disability rating score), age (years), PTSD flag (any ICD-9-CM = 309.81 as of August 1, 2004; yes/no), anxiety flag (any ICD-9-CM = 309.28, 309.24, or 300.00 as of August 1, 2004; yes/no), and prior depression (yes/no). An interaction term for homeless and hurricane affected was included in all models. Least-square means representing estimated population effects were calculated with covariates set at mean values. Statistical significance was set at \( p < .05 \), two-tailed.

Results

Within the study cohort, homeless veterans comprised 0.7% \( (n = 1,033) \) of all Florida veterans \( (n = 153,511) \). Veterans from
hurricane-affected counties comprised 39.6% (n = 60,840) and of these veterans, 0.9% (n = 551) were homeless. Overall, during the 3-year study period, 153,511 Florida veterans accounted for 836,518 daily mental health encounters (see Table 1). Among homeless veterans, veterans residing in hurricane-affected counties were significantly more likely to have a greater service-connected disability (23.4% vs. 17.9%, p < .012), be White (68.4% vs. 46.3%, p < .001), and have a greater frequency of prior visits for mental health (69.7% vs. 28.8%, p < .001). Additionally, they were significantly more likely than homeless veterans living in nonaffected counties to have received prior treatment for PTSD (20.0% vs. 12.9%, p < .002; Table 1).

Table 2 presents the frequency distribution of the five major CPT codes utilized by veterans during the study period. CPT 90805 (Individual psychotherapy, 20–30 min) comprised 23.8% (n = 198,775) of all visits, followed by CPT 90853 (Group psychotherapy), which accounted for 14.7% of all visits (n = 122,643). Among homeless veterans, those residing in hurricane-affected counties were significantly more likely to have participated in group psychotherapy (CPT 90853, 32.2% vs. 13.5%, p < .001) vs. 13.5% who have participated in group psychotherapy (CPT 90853, 23.8% (20.0% vs. 12.9%, p < .001) than those residing in non-hurricane-affected counties. However, those residing in hurricane-affected counties were less likely to have participated in face-to-face individual psychotherapy, 20–30 min (CPT 90804, 8.7% vs. 14.3%, p < .001); individual psychotherapy, 20–30 min with medical evaluation (CPT 90805, 20.9% vs. 25.3%, p < .001); and individual 30–40-min sessions with medical evaluation (CPT 90807, 3.5% vs. 17.5%, p < .001).

Estimates of mixed models per CPT are presented in Table 3 with least-square means presented in Table 4. All estimates were significantly associated with average monthly mental health outpatient visits. After controlling for covariates such as age, gender, service-connection, and marital status, homeless veterans averaged an estimated 0.8 and 3.60 more visits per month for CPT 90804 (Individual psychotherapy, 20–30 min) and CPT 90807 (Individual psychotherapy with medical evaluation, 30–40 min) than nonhomeless veterans, respectively, but fewer average visits per month for CPT 90805 (Individual psychotherapy with medical evaluation, 20–30 min, β = −4.94, p < .001), CPT 90806 (Individual psychotherapy, 30–40 min, β = −3.36, p < .001), and CPT 90853 (Group psychotherapy, β = −2.20, p < .001).

Living in a hurricane-affected area increased estimated average visits per month for CPT 90804 (Individual psychotherapy, 20–30 min, β = 0.44, p < .001) and CPT 90853 (Group psychotherapy, β = 1.80, p < .001), respectively, but decreased estimated average visits per month for CPT 90805 (Individual psychotherapy with medical evaluation, 20–30 min, β = 2.18, p < .001) and CPT 90807 (Individual psychotherapy with medical evaluation, 30–40 min, β = 1.52, p < .001).
Table 2
Frequency Distribution of Veterans With PTSD and Hurricane-Affected Counties

<table>
<thead>
<tr>
<th>CPT–current procedural codes</th>
<th>Non-hurricane-affected counties</th>
<th>Hurricane-affected counties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nonhomeless</td>
<td>Homeless</td>
</tr>
<tr>
<td>Total daily visits, n = 836,518 (%)</td>
<td>330,774 (39.5)</td>
<td>5,528 (0.7)</td>
</tr>
<tr>
<td>CPT 90804—Individual psychotherapy, 20–30 min</td>
<td>40,994 (12.4)</td>
<td>792 (14.3)</td>
</tr>
<tr>
<td>CPT 90805—Individual psychotherapy with medical evaluation, 20–30 min</td>
<td>126,311 (38.2)</td>
<td>1,400 (25.3)</td>
</tr>
<tr>
<td>CPT 90806—Individual psychotherapy, 30–40 min</td>
<td>63,289 (19.1)</td>
<td>595 (10.7)</td>
</tr>
<tr>
<td>CPT 90807—Individual psychotherapy with medical evaluation, 30–40 min</td>
<td>30,910 (9.3)</td>
<td>965 (17.5)</td>
</tr>
<tr>
<td>CPT 90853—Group psychotherapy</td>
<td>65,064 (19.7)</td>
<td>747 (13.5)</td>
</tr>
</tbody>
</table>

Note. Values presented reflect frequency with percent of total daily visits per select CPT in parentheses; statistical comparisons are homeless versus non-hurricane-affected county versus homeless within hurricane-affected county and nonhomeless within non-hurricane-affected county versus nonhomeless within hurricane-affected county. PTSD = posttraumatic distress disorder; CPT = current procedural terminology.

** p < .001.

Discussion

Homelessness is associated with a degraded quality of life that is marred by substantial economic, health, and psychological stressors that are worsened by unstable residence. Although research has extensively studied the psychosocial consequences of disaster produced homelessness on the general population, little has been documented on how homeless people fare at all stages (i.e., preparedness, response, recovery) of such events. As a step toward addressing this gap in knowledge, this study examined the patterns of mental health service use by homeless veterans following hurricanes.

It is of concern that although homeless veterans in hurricane-affected areas may benefit from frequent visits or more intensive services, such as longer individual therapy sessions, because of their experience, they were less likely to receive these kinds of services compared with veterans in nonaffected areas. This study also revealed a distinct difference between use of group and individual mental health services among homeless veterans. If the number of available staff is reduced because they also have been preparedness, response, recovery of such events. As a step toward addressing this gap in knowledge, this study examined the patterns of mental health service use by homeless veterans following hurricanes.

Table 3
Mixed Model Regression Estimates and Standard Errors for Average Monthly Outpatient Visit Rates for the 36-Month Study Interval Among Veterans Residing in Florida

<table>
<thead>
<tr>
<th>Parameter</th>
<th>CPT 90804</th>
<th>CPT 90805</th>
<th>CPT 90806</th>
<th>CPT 90807a</th>
<th>CPT 90853</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>5.66 (0.13)**</td>
<td>18.09 (0.25)**</td>
<td>15.50 (0.16)**</td>
<td>3.60 (0.11)**</td>
<td>5.03 (0.17)**</td>
</tr>
<tr>
<td>Homeless</td>
<td>0.80 (0.35)**</td>
<td>−4.94 (0.66)**</td>
<td>−3.36 (0.43)**</td>
<td>3.60 (0.29)**</td>
<td>−2.20 (0.51)**</td>
</tr>
<tr>
<td>Hurricane County</td>
<td>0.44 (0.05)**</td>
<td>−3.89 (0.10)**</td>
<td>−0.68 (0.07)**</td>
<td>−1.03 (0.05)**</td>
<td>1.80 (0.07)**</td>
</tr>
<tr>
<td>Married</td>
<td>0.57 (0.05)**</td>
<td>1.57 (0.10)**</td>
<td>0.92 (0.07)**</td>
<td>−0.18 (0.05)**</td>
<td>−1.05 (0.07)**</td>
</tr>
<tr>
<td>White</td>
<td>0.64 (0.06)**</td>
<td>3.13 (0.11)**</td>
<td>−0.26 (0.07)**</td>
<td>0.80 (0.05)**</td>
<td>−0.24 (0.08)**</td>
</tr>
<tr>
<td>Male</td>
<td>−0.74 (0.09)**</td>
<td>−3.39 (0.18)**</td>
<td>−2.73 (0.11)**</td>
<td>−0.20 (0.08)**</td>
<td>2.99 (0.12)**</td>
</tr>
<tr>
<td>Service connection (%)</td>
<td>−0.01 (0.001)**</td>
<td>0.06 (0.00)**</td>
<td>0.01 (0.000)**</td>
<td>0.01 (0.001)**</td>
<td>0.01 (0.001)**</td>
</tr>
<tr>
<td>Age</td>
<td>(0.0002)†</td>
<td>0.02 (0.004)**</td>
<td>−0.11 (0.00)**</td>
<td>−0.01 (0.001)†</td>
<td>−0.04 (0.003)†</td>
</tr>
<tr>
<td>Prior PTSD</td>
<td>0.79 (0.07)**</td>
<td>3.39 (0.14)**</td>
<td>4.35 (0.09)**</td>
<td>1.04 (0.06)**</td>
<td>10.39 (0.10)**</td>
</tr>
<tr>
<td>Prior anxiety</td>
<td>2.17 (0.10)**</td>
<td>2.79 (0.20)**</td>
<td>2.60 (0.13)**</td>
<td>0.64 (0.09)**</td>
<td>0.37 (0.15)**</td>
</tr>
<tr>
<td>Prior depression</td>
<td>1.69 (0.09)**</td>
<td>6.26 (0.18)**</td>
<td>2.44 (0.11)**</td>
<td>1.96 (0.08)**</td>
<td>−0.78 (0.13)**</td>
</tr>
<tr>
<td>Homeless Hurricane County</td>
<td>−3.39 (0.05)**</td>
<td>2.53 (0.95)**</td>
<td>0.94 (0.60)†</td>
<td>−4.95 (0.41)**</td>
<td>9.67 (0.70)**</td>
</tr>
</tbody>
</table>

Note. Values are β, with standard error in parentheses; CPT = current procedural terminology; PTSD = posttraumatic distress disorder; CPT 90804 = Individual psychotherapy, 20–30 min, face-to-face w/patient; CPT 90805 = Individual psychotherapy, 30–40 min, face-to-face w/patient and w/medical evaluation; CPT 90806 = Individual psychotherapy, 30–40 min, face-to-face w/patient; CPT 90807 = Individual psychotherapy, 30–40 min, face-to-face w/patient and w/medical evaluation; CPT 90853 = Group psychotherapy.

** a Values are LS means.
† NS. ** p < .05. *** p < .001.
Disruptions in mental health services may lead to greater mental health needs in the short-term due to the highly vulnerable nature of this population. The existing literature suggests that disaster-induced destabilization adversely affects mental health status (DeWolfe, 2000; Eisenman et al., 2009; Norris et al., 2002). One study reported that preexisting anxiety and mood disorders, and not psychotic illness, were associated with increased psychopathology after a disaster (Katz et al., 2002). Although most people with well-controlled mental illness prior to a disaster tend to function fairly well during the recovery phase, those with mental illnesses that were not adequately managed are more likely to experience an exacerbation of psychiatric symptoms, especially if medication or essential services were interrupted (DeWolfe, 2000; Katz et al., 2002).

Race and marital status were found to significantly influence service use, with White veterans being more likely to use all services except for shorter individual therapy sessions (20–30 min), whereas married veterans received fewer longer (30–40 min) therapy sessions with a medical evaluation or participated in group therapy. Although it is not possible to determine from our dataset the relative contribution of staff or veteran for the effect of race and marriage on mental health service use, it is well recognized that social support influences recovery from disasters (Weems et al., 2007). Those with extended, well-functioning, and supportive networks tend to fare better. It is likely that the adverse conditions precipitated by the hurricanes further disrupted the amount and stability of already limited social ties. It is possible that some homeless veterans went without longer treatment sessions during the recovery period to assist their spouses, because of difficulties in securing transportation, or to deal with more pressing needs, such as obtaining water, food, and shelter.

At present, veterans who receive care as outpatients at the VHA and require assistance in preparing for a disaster are referred to the local county Emergency Operations Center. During the time period immediately prior to a hurricane, homeless veterans should be specifically targeted and given information about local shelters, provided sufficient resources, and advised about possible mechanisms to communicate postdisaster should the infrastructure be significantly damaged. Providers of mental health treatment should consider assisting veterans under their care with pre- and postdisaster planning. Individual disaster plans for homeless veterans could mean the difference between a traumatic event and a tragedy.

The need for a disaster prepared population is increasing. Currently in the United States, disaster evacuations of more than 1,000 people occur on average more than three times per month; slightly more than one presidentially declared disaster occurs weekly (Federal Emergency Management Agency, 2010). Although the federal government has granted more than $11 billion for state and local governments to develop comprehensive emergency management plans since the terrorist attacks of September 11, 2001, it is rare that these plans expressly mention the needs of homeless people (Edgington, 2009).

The Veterans Affairs (VA) has approximately 4,000 agreements with community partners (United States Department of Veteran Affairs, 2010). Unlike hospitals, nursing homes, and other health care systems that are well integrated with existing emergency operation centers, public officials, and emergency planners, disaster preparedness for community agencies providing care and services to homeless people has not galvanized federal and state governments to develop comprehensive emergency management plans.

### Table 4

**LS Means From Mixed Model Regression Estimates and SEs for Average Monthly Outpatient Visit Rates for the 36-Month Study Interval Among Veterans Residing in Florida**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>CPT 90804</th>
<th>CPT 90805</th>
<th>CPT 90806</th>
<th>CPT 90807</th>
<th>CPT 90853</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homeless</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>8.01 (.07)**</td>
<td>25.60 (.14)**</td>
<td>12.71 (.09)**</td>
<td>5.41 (.06)**</td>
<td>9.85 (.11)**</td>
</tr>
<tr>
<td>Hurricane County</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7.00 (.18)**</td>
<td>22.45 (.36)**</td>
<td>11.16 (.23)**</td>
<td>4.2 (.16)**</td>
<td>14.48 (.26)**</td>
</tr>
<tr>
<td>No</td>
<td>8.25 (.19)**</td>
<td>25.07 (.37)**</td>
<td>11.37 (.24)**</td>
<td>7.7 (.16)**</td>
<td>7.85 (.27)**</td>
</tr>
<tr>
<td>Homeless’ Hurricane County</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes, Yes</td>
<td>5.71 (.35)**</td>
<td>21.24 (.67)**</td>
<td>9.95 (.43)**</td>
<td>3.52 (.29)**</td>
<td>18.22 (.49)**</td>
</tr>
<tr>
<td>No, Yes</td>
<td>8.65 (.35)**</td>
<td>22.61 (.69)**</td>
<td>9.69 (.44)**</td>
<td>9.53 (.30)**</td>
<td>6.76 (.51)**</td>
</tr>
<tr>
<td>No, No</td>
<td>8.30 (.08)**</td>
<td>23.66 (.16)**</td>
<td>12.37 (.10)**</td>
<td>4.89 (.07)**</td>
<td>10.75 (.11)**</td>
</tr>
<tr>
<td>No, No</td>
<td>7.85 (.08)**</td>
<td>27.55 (.15)**</td>
<td>13.05 (.10)**</td>
<td>5.93 (.07)**</td>
<td>8.95 (.11)**</td>
</tr>
</tbody>
</table>

*Note.* Values are least-squares means with standard error in parentheses. CPT 90804 = Individual psychotherapy, 20–30 min, face-to-face w/patient and w/medical evaluation; CPT 90805 = Individual psychotherapy, 20–30 min, face-to-face w/patient; CPT 90806 = Individual psychotherapy, 30–40 min, face-to-face w/patient and w/medical evaluation; CPT 90807 = Individual psychotherapy, 30–40 min, face-to-face w/patient and w/medical evaluation; CPT 90853 = Group psychotherapy, SE = standard error.

*p < .05. **p < .001.
officials. At present, little is known about the ability of community agencies to assist homeless veterans before, during, and after a disaster. Policymakers should consider a review of existing programs to ensure that their disaster plans are comprehensive and integrated with local nonprofits and government agencies responsible for disaster preparation, response, and recovery.

Our results also revealed that homeless veterans living in hurricane-affected counties were significantly more likely to have a service-connected disability, to have greater frequency of prior visits for mental health, and to have received prior treatment for PTSD. The percentage of enrolled veterans with service-connected disability ratings ranging from 20% to 100% for Priority Groups 1 to 2 was high in Florida counties impacted by the hurricanes.

Priority Groups allow Veterans with certain types of conditions to enroll in health care programs before others who are seeking treatment. Based on a variety of factors, eligible veterans are assigned to a Priority Group, ranging from 1 to 8, with 1 having the highest priority for enrollment. For example, Priority Group 1 includes veterans who have a service-connected disability rated 50% or more or who were assigned a total disability rating for compensation based on unemployability, and Priority 2 includes those with a service-connected disability rating of 30% to 40%.

An analysis based on data from the Veterans Integrated Service Network (VISN) Support Services Center Enrollment Report, revealed that the coastal counties struck by hurricanes during that study time period had higher percentages of service-connected veteran enrollees compared with other Florida counties. The statewide average was 51% across all counties. These coastal affected counties had percentages ranging from 52% to 74% of their enrolled veterans with service-connected disabilities.

Age, income, employment status, and access to non-VA insurance (Medicare, private insurance) affect the reliance of VHA for veteran enrollees with service-connected disabilities. The VHA has consistently revealed higher percentages of service-connected disability among veteran enrollees. The state-wide average was 51% across all counties. These coastal affected counties had percentages ranging from 52% to 74% of their enrolled veterans with service-connected disabilities.

Age, income, employment status, and access to non-VA insurance (Medicare, private insurance) affect the reliance of VHA for health care among veteran enrollees. The VHA has consistently found that veterans with service-connected disabilities, especially Priority 1 veterans (veterans with 50–100% service-connected disabilities), tend to rely on the VHA for more of their care than veterans without service-connected disabilities, especially mental health and substance abuse services. Several studies conducted on enrolled veterans’ use of VHA versus Medicare services have demonstrated that service-connected disability levels are associated with increased service use and reliance upon the VHA for selected types of services (French, Margo, & Campbell, 2010; Lapcevic, French, & Campbell, 2010).

The limitations of this study are similar to all retrospective studies using secondary datasets: retrospective data collection and lack of randomization. Although the large sample size and standardized approach to the definition of mental health utilization lends credibility to our findings, a limitation is the subjective definition of both hurricane-affected and homelessness. Prospective studies of hurricanes and mental health service utilization are difficult because of the unpredictable path and size of such storms. Although we attempted to fit NOAA geographic data to VHA data by focusing on size of the wind band and path of the storm, some veterans may have been miscategorized. Also, although we were able to verify that VHA buildings were open and providing services, we do not know if the clinicians who were typically responsible for providing a given service, such as individual psychotherapy, were available to work. Thus, it is possible that veterans who normally received individual psychotherapy may have been scheduled to attend group therapy sessions. Additionally, we could not specify the severity of the mental health disorder, the focus of the mental health treatment, the quality of care among those who did, and why many homeless veterans received no treatment. Lastly, even though the VHA has committed numerous resources to both identify and eliminate homelessness among veterans, at present, there is no single code or identifier that is consistently used to indicate homeless status. Moreover, because this study used the 2004 to 2006 VHA Outpatient Medical Dataset, we are unable to determine exactly when use of mental services returned to prehurricane level.

Despite these limitations, this study is the first to document the effects of hurricanes on the use of outpatient mental health services by homeless veterans. These findings have implications for homeless programs and the provision of VA mental health services to homeless veterans postdisaster. At minimum, it underscores the need for additional research to elucidate the barriers to care and the importance of providing targeted intervention after disasters.

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