Chronicity of Posttraumatic Stress Disorder and Risk of Disability in Older Persons

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Although much is known about the strong relationship between geriatric depression and disability, few studies have examined the effect of anxiety disorders on disability into later life. Most studies of late-life psychiatric disorders and function have focused on depression and generalized anxiety disorder. Of these studies, most have considered the association between generalized anxiety disorder (GAD) and disability. However, little research has investigated the burden of posttraumatic stress disorder (PTSD) and the occurrence of disability into later life.

Previous research has focused mainly on young veteran populations to assess PTSD and functional impairment. In examining archival data from the National Vietnam Veterans Readjustment Study, investigators found that middle-aged veterans with combat-related PTSD were at a higher risk of physical limitations, not working, compromised physical health, and diminished well-being compared with veterans without PTSD. Research using the Veterans Affairs Normative Aging Study examined the relationship between depressive symptoms and domains of functioning but did not consider the effect of PTSD symptoms on similar domains. In studies that have assessed community-based samples of older adults, anxiety symptom scales have consistently found a strong association between symptoms of anxiety and functional impairment. However, to our knowledge, the association between PTSD and disability has not been studied in a national sample using DSM-IV clinical diagnosis criteria.

IMPORTANCE Little is known about the association between posttraumatic stress disorder (PTSD) and disability into later life. Most studies of late-life psychiatric disorders and function have focused on depression and generalized anxiety disorder.

OBJECTIVES To determine the association between PTSD and disability among older adults and investigate if association differs by chronicity of PTSD.

DESIGN, SETTING, AND PARTICIPANTS In total, 3287 participants 55 years and older (mean [SD] age, 66.0 [8.7] years, 60.1% women) involved in the Collaborative Psychiatric Epidemiology Surveys (2001-2003), including 3 aggregated, nationally representative studies (National Comorbidity Survey Replication, National Survey of American Life, and National Latino and Asian American Study). Analyses used weights and complex design-corrected statistical tests to infer generalizability to the US population.

MAIN OUTCOMES AND MEASURES Disability defined by 5 domains (out of role, self-care, mobility, cognition, and social) using the World Health Organization Disability Assessment Schedule.

RESULTS Of the 3.7% older adults who had a history of PTSD defined by DSM-IV criteria, 1.8% had persistent PTSD into later life (age of onset <55 years as well as a recent diagnosis). Frequency of any disability was 79.7% for persistent PTSD, 69.6% for pre–late life (age of onset <55 years and age at last diagnosis <55 years), and 36.9% for no PTSD (P < .001). In logistic regression analyses, adjusting for demographics, smoking, individual medical conditions, depression, generalized anxiety disorder, and substance use disorders, respondents with persistent PTSD were 3 times more likely to have any disability than were respondents with no PTSD (odds ratio, 3.18; 95% CI, 1.32-7.64). Global disability results were nonsignificant for pre–late life relative to no PTSD (odds ratio, 1.99, 95% CI, 0.97-4.08).

CONCLUSIONS AND RELEVANCE Disability in older Americans is strongly associated with PTSD, particularly PTSD that persists into later life. These findings suggest that monitoring and treatment of PTSD are important over the long term.
The purpose of our study was to determine the association between PTSD and disability in a large diverse probability sample of older adults. Moreover, we examine the chronicity of PTSD and its association with disability. We hypothesize that pre–late-life PTSD and persistent PTSD will be associated with disability; however, persistent PTSD will have a much higher magnitude of association compared with no PTSD. In addition, disability will be attributed to PTSD above and beyond its relationship to major depressive disorder (MDD), GAD, and other comorbidities.

Methods

Participants

The Collaborative Psychiatric Epidemiology Surveys (CPES 2001-2003), combining 3 national studies (National Comorbidity Survey Replication, National Survey of American Life, and National Latino and Asian American Study), are nationally representative surveys of 20 013 noninstitutionalized participants 18 years and older in the United States. The sampling designs and methods of the CPES have been described in detail elsewhere.18

The current sample consisted of 3287 community-based adults 55 years and older with a mean (SD) age of approximately 66.0 (8.7) years. The distribution was 60.1% women, 34.0% white, 35.5% black, 17.7% Hispanic, and 12.8% Asian. The CPES data were obtained from the Inter-university Consortium for Political and Social Research.19 The institutional review boards of the University of California, San Francisco, and the San Francisco Veterans Affairs Medical Center approved this study. Since this was an analysis of secondary data, patient consent was not required.

Measures

Diagnostic Assessment

The CPES psychiatric diagnoses were determined using the World Health Organization’s World Mental Health (WMH) Survey Initiative version of the Composite International Diagnostic Interview (CIDI).20 The WMH-CIDI is a fully structured lay interview that generates lifetime and respondent’s lifetime: (1) no history of PTSD; (2) pre–late-life PTSD, which included age of onset and age at last diagnosis younger than 55 years; and (3) persistent PTSD in later life, which included both age of onset younger than 55 years and a recent diagnosis of PTSD at 55 years or older. Using this definition, most (95.6%) respondents with persistent PTSD had a diagnosis within the 12 months before their interview (65 of 68), while 2 respondents had a diagnosis 1 year before and 1 had a diagnosis 7 years previously. Because we were interested in the chronic nature of PTSD into later life, we excluded 27 respondents first diagnosed with PTSD after age 55 years. In addition, 7 respondents with missing data on age of onset and most recent PTSD diagnosis were excluded from the original sample.

Disability

Disability was defined by 5 domains (out of role, self-care, mobility, cognition, and social) of the World Health Organization Disability Assessment Schedule.22-23 Out of role was measured by number of days during the past 30 days when the respondent was completely unable to work or carry out his or her normal activities because of physical or mental health problems. The other domains were a product of the frequency (number of days) and severity of problems (none, mild, moderate, or severe) that respondents reported experiencing in the past 30 days. All domains were scored on a 0 to 100 scale, with higher scores indicating worse functioning. Because the domains were highly skewed, we examined binary outcomes of any disability (>0) in each domain. In addition, we created two global disability measures: (1) any disability measure, defined as any difficulty in at least 1 of the 5 disability domains, and (2) a standardized global disability score, computed by averaging z scores of all 5 domains.

Other Variables

The demographic variables included in analyses were age, sex, race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, or Asian), educational attainment (completed 0-11 or ≥12 years), marital status (married or cohabitating; divorced, separated, or widowed; or never married), and income defined by the poverty index (ie, the ratio of household income to poverty threshold used in the 2001 US census and adjusted for household size; categorized as low [<1.5 times the poverty line], middle [1.5-6.0 times], and high [>6.0 times]).24-26 In addition, we determined smoking status, creating a dichotomous variable for current smoking (yes or no). The medical conditions included in the analyses were those that are prominent in older adults and associated with disability and mental health disorders, that is, a history of stroke, myocardial infarction or heart disease, diabetes mellitus, chronic lung disease, cancer, and arthritis.

Statistical Analysis

To produce nationally representative estimates, we implemented clustering and weighting techniques to reduce systematic bias and imprecision imbedded in the complex sampling design. Thus, percentages represent weighted proportions by PTSD group, with statistical differences estimated based on the Rao-Scott χ², which corrects for the complex design.27

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Table 1. Characteristics of 3287 Adults 55 Years and Older From the CPES by No, Pre–Late-Life, and Persistent DSM-IV/WMH-CIDI PTSD

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No PTSD (n = 3131)</th>
<th>Pre–Late Life PTSD (n = 88)</th>
<th>Persistent PTSD (n = 68)</th>
<th>F Value or Rao-Scott, χ² [df]</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SE), y</td>
<td>68.3 (0.4)</td>
<td>62.6 (1.0)</td>
<td>59.9 (0.6)</td>
<td>86.2 [2,157]</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Female sex</td>
<td>55.8 (1.7)</td>
<td>76.7 (6.6)</td>
<td>77.1 (6.7)</td>
<td>15.1 [2]</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>79.6 (1.5)</td>
<td>82.9 (4.6)</td>
<td>76.8 (5.6)</td>
<td>4.6 [6]</td>
<td>.60</td>
</tr>
<tr>
<td>Non-Hispanic black</td>
<td>8.9 (0.7)</td>
<td>10.1 (2.8)</td>
<td>13.4 (3.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>6.8 (0.7)</td>
<td>2.9 (1.1)</td>
<td>5.5 (2.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>4.7 (0.6)</td>
<td>4.2 (2.9)</td>
<td>4.3 (2.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married or cohabitating</td>
<td>61.4 (1.6)</td>
<td>51.8 (7.5)</td>
<td>49.7 (8.9)</td>
<td>3.4 [2]</td>
<td>.18</td>
</tr>
<tr>
<td>Educational level, &lt;12 y</td>
<td>26.7 (1.8)</td>
<td>24.3 (7.1)</td>
<td>27.2 (7.3)</td>
<td>0.11 [2]</td>
<td>.95</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>22.2 (1.2)</td>
<td>39.0 (9.0)</td>
<td>33.5 (7.3)</td>
<td>7.8 [4]</td>
<td>.10</td>
</tr>
<tr>
<td>Middle</td>
<td>56.5 (1.8)</td>
<td>48.3 (9.1)</td>
<td>45.7 (7.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>21.3 (1.7)</td>
<td>12.7 (4.7)</td>
<td>20.7 (8.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking, current</td>
<td>16.3 (1.0)</td>
<td>35.6 (6.3)</td>
<td>21.1 (7.6)</td>
<td>11.3 [2]</td>
<td>.004</td>
</tr>
<tr>
<td>Medical conditions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arthritis</td>
<td>52.8 (1.7)</td>
<td>59.2 (7.8)</td>
<td>70.8 (8.5)</td>
<td>5.2 [2]</td>
<td>.07</td>
</tr>
<tr>
<td>Stroke</td>
<td>5.8 (0.9)</td>
<td>2.1 (1.5)</td>
<td>16.4 (7.5)</td>
<td>6.4 [2]</td>
<td>.04</td>
</tr>
<tr>
<td>Heart disease or myocardial infarction</td>
<td>17.1 (1.6)</td>
<td>16.9 (5.7)</td>
<td>24.1 (9.6)</td>
<td>0.9 [2]</td>
<td>.64</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>15.8 (0.9)</td>
<td>13.6 (4.8)</td>
<td>26.1 (7.2)</td>
<td>3.7 [2]</td>
<td>.16</td>
</tr>
<tr>
<td>Chronic lung disease</td>
<td>4.6 (0.7)</td>
<td>10.6 (4.6)</td>
<td>10.4 (4.9)</td>
<td>4.9 [2]</td>
<td>.09</td>
</tr>
<tr>
<td>Cancer</td>
<td>15.4 (1.5)</td>
<td>17.2 (5.2)</td>
<td>10.0 (5.3)</td>
<td>0.89 [2]</td>
<td>.64</td>
</tr>
<tr>
<td>Psychiatric conditions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDD</td>
<td>10.8 (0.8)</td>
<td>47.7 (8.8)</td>
<td>37.8 (8.8)</td>
<td>79.3 [2]</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>GAD</td>
<td>4.1 (0.5)</td>
<td>23.7 (4.3)</td>
<td>26.8 (8.1)</td>
<td>115.0 [2]</td>
<td>.001</td>
</tr>
<tr>
<td>Substance use disorders</td>
<td>7.1 (0.7)</td>
<td>27.4 (8.7)</td>
<td>22.9 (8.8)</td>
<td>23.1 [2]</td>
<td></td>
</tr>
</tbody>
</table>

SEs were determined from a recalculation of variance using the Taylor series linear approximation method.28

We examined the association between the PTSD groups and global disability, first by assessing weighted logistic regression analyses and then validating our findings by linear regression analyses. All analyses were also adjusted for demographic variables, current smoking, individual medical conditions (ie, arthritis, stroke, heart disease or myocardial infarction, diabetes mellitus, chronic lung disease, and cancer), and lifetime MDD, GAD, and substance use disorders. We used any disability (ie, difficulty in any of the 5 disability domains) for logistic regression analyses and standardized global disability scores (z scores) for the linear regression analyses.

Next, logistic regression analyses were assessed in greater detail, estimating the association of pre–late-life and persistent PTSD in later life with the 5 disability domains. The reference group was no PTSD. To assess the confounding influence of other psychiatric disorders (ie, MDD, GAD, and substance use disorders), we examined 3 separate models: model 1, an unadjusted model; model 2, adjusted for demographic characteristics, current smoking, and medical conditions; and model 3, adjusted for variables in model 2 plus lifetime psychiatric disorders. Odds ratios (OR) and 95% CIs were estimated, along with design-corrected likelihood ratio statistics and Wald χ² tests.

Statistical tests were 2-tailed with P < .05 defining statistical significance. All analyses were performed using SAS Survey Procedures, version 9.1.3 (SAS Institute, Inc). Unless otherwise specified, all results presented are based on weighted analyses.

Results

In unweighted analyses, the age distribution for the overall sample was as follows: 49.7% for those aged 55 to 64 years, 31.7% for those aged 65 to 74 years, 15.6% for those aged 75 to 84 years, and 3.0% for those 85 years and older. Among the individual PTSD groups, the age distribution was as follows, respectively: (1) no PTSD: 48.8%, 32.2%, 15.9%, and 3.1%; (2) pre–late life: 63.6%, 25.0%, 11.4%, and 0%; and (3) persistent: 75.0%, 19.1%, 4.4%, and 1.5%.

In weighted analyses, we found that 3.7% of older adults had pre–late-life PTSD, with approximately half of these (1.8%) persisting into later life. Weighted bivariate analyses of demographic characteristics, current smoking, medical conditions, and lifetime psychiatric disorders by PTSD group are presented in Table 1. Respondents with PTSD were younger on average than those with no PTSD (60-62 vs 68 years old; P < .001). Nearly 40% of respondents with pre–late-life PTSD...
smoked compared with 16.3% with no PTSD and 21.1% with persistent PTSD in later life (P = .004). Of the medical conditions, stroke showed the strongest significant association with PTSD. As expected, psychiatric disorders were strongly related to PTSD. Nearly 50% of respondents with pre–late-life PTSD had a diagnosis of MDD in their lifetime, while for those with persistent PTSD and no PTSD, it was approximately 40% and 11%, respectively. The patterns were similar for GAD and substance use disorder, but the prevalence was lower.

PTSD and Global Disability Score

Across the PTSD groups, frequency of any disability was 79.7% for persistent PTSD in later life, 69.6% for pre–late-life, and 36.9% for no PTSD (P < .001). In logistic regression analyses, adjusting for demographics, smoking, and medical conditions, respondents with pre–late-life PTSD were 3 times more likely to have any disability than respondents with no PTSD (OR, 3.12; 95% CI, 1.50-6.48), while respondents with persistent PTSD were more than 4 times more likely to have any disability relative to those with no PTSD (OR, 4.34; 95% CI, 2.01-9.36) (Table 2). After additional adjustment for MDD, GAD, and substance use disorders, the association between pre–late-life PTSD and disability became nonsignificant (OR, 1.99; 95% CI, 0.97-4.08; P = .06); however, although there was slight attenuation, the association remained strong and significant for persistent PTSD (OR, 3.18; 95% CI, 1.32-7.64; P = .01).

For the standardized global disability score analyses, we found similar results. In linear regression models, adjusting for demographics, current smoking, medical conditions, MDD, GAD, and substance use disorders, we found a statistically significant difference for persistent PTSD compared with no PTSD (β = 0.40, SE = 0.16, t1 = 2.50, P = .01) but no difference for pre–late-life PTSD compared with no PTSD (β = 0.08, SE = 0.10, t1 = 0.80, P = .43).

<table>
<thead>
<tr>
<th>PTSD Occurrence</th>
<th>Any Disability</th>
<th>Out of Role</th>
<th>Self-Care</th>
<th>Mobility</th>
<th>Cognition</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1, unadjusted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre–late lifea</td>
<td>3.92</td>
<td>(2.11-7.28)</td>
<td>3.60</td>
<td>(2.01-6.45)</td>
<td>2.39</td>
<td>(0.83-6.88)</td>
</tr>
<tr>
<td>Persistentab</td>
<td>6.73</td>
<td>(3.17-14.28)</td>
<td>5.76</td>
<td>(2.80-11.87)</td>
<td>2.58</td>
<td>(0.96-6.93)</td>
</tr>
<tr>
<td>Model 2, adjustedc</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre–late lifea</td>
<td>3.12</td>
<td>(1.50-6.48)</td>
<td>2.61</td>
<td>(1.24-5.48)</td>
<td>1.89</td>
<td>(0.66-5.39)</td>
</tr>
<tr>
<td>Persistentab</td>
<td>4.34</td>
<td>(2.01-9.36)</td>
<td>3.40</td>
<td>(1.63-7.04)</td>
<td>2.53</td>
<td>(1.04-6.15)</td>
</tr>
<tr>
<td>Model 3, adjustedd</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre–late lifea</td>
<td>1.99</td>
<td>(0.97-4.08)</td>
<td>1.66</td>
<td>(0.78-3.52)</td>
<td>1.22</td>
<td>(0.45-3.41)</td>
</tr>
<tr>
<td>Persistentab</td>
<td>3.18</td>
<td>(1.32-7.64)</td>
<td>2.54</td>
<td>(1.14-5.69)</td>
<td>1.95</td>
<td>(0.61-6.22)</td>
</tr>
<tr>
<td>P value</td>
<td>&lt;.001</td>
<td>.06</td>
<td>.04</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Abbreviations: OR, odds ratio; PTSD, posttraumatic stress disorder; WMH-CIDI, World Mental Health Survey Initiative version of the Composite International Diagnostic Interview.
a Reference group is no PTSD.
b Defined as pre–late–life onset with persistence in later life.
c Estimates are based on a multivariable logistic regression model, where PTSD occurrence is adjusted for demographic characteristics, smoking, and medical conditions.
d Estimates are based on a multivariable logistic regression model, where PTSD occurrence is adjusted for other lifetime psychiatric disorders (ie, generalized anxiety disorder, major depressive disorder, and substance use disorders) as well as demographic characteristics, smoking, and medical conditions.

PTSD and Domains of Disability

Prevalence of disability increased from no PTSD to pre–late-life to persistent PTSD in later life for all domains of the World Health Organization Disability Assessment Schedule (Figure). For example, prevalence of impairment in mobility was 22.3%, 49.0%, and 58.9%, respectively. Prevalence for self-care was least impressive (5.3%, 11.8%, and 12.6%, respectively).

In model 1 (unadjusted models) of Table 2, associations were strong and statistically significant for both pre–late-life PTSD (3- to 6-fold increased odds of disability compared with no PTSD) and persistent PTSD (5- to 12-fold increased odds) across all individual domains of disability, except self-care. After adjusting for demographic variables, smoking, and medical conditions (model 2), results remained similar but attenuated. Estimates were reduced even more after the addition of MDD, GAD, and substance use disorders to the model with meaningful changes (model 3). For example, the association between persistent PTSD and difficulties in cognition reduced from an OR of 9.00 (model 1) to an OR of 4.88 (model 2) to an OR of 3.48 (model 3) (95% CI, 1.63-7.45). In model 3, the only domains that remained significantly associated with pre-
late-life PTSD were mobility (OR, 2.24; 95% CI, 1.26-4.00) and social disability (OR, 2.31; 95% CI, 1.09-4.87), with difficulties in cognition marginally significant, while, although attenuated, all persistent PTSD effects remained.

Discussion

This study provides evidence that persistence of PTSD in later life is a prominent predictor of disability in late life above and beyond other psychiatric disorders and medical conditions. In summary, the findings show that persistent PTSD is associated with global disability. Moreover, persistent PTSD has a strong association with all individual World Health Organization Disability Assessment Schedule domains of disability. Although the statistical difference between persistent PTSD and pre–late-life PTSD was not tested directly, persistent PTSD had a higher magnitude of association with disability compared with no PTSD. This study confirms that PTSD is a highly chronic disorder and that such chronicity compromises function in later life.

Few previous studies have considered the association between PTSD and disability, and no study that we are aware of has examined the chronicity of PTSD and its association with disability in older adults. Our findings are consistent with results from Vietnam veterans who experienced severe combat-related trauma. The National Vietnam Veterans Readjustment study found that PTSD increased the odds of any physical limitation by 3-fold and raised the odds of not working by 7-fold (P < .05) in more than 1000 middle-aged male veterans, adjusting for demographics and medical and psychiatric comorbidities. Furthermore, in a study of more than 1000 female veterans (mean age, 46 years), those with PTSD had 2 and 4 times more impairment in role functioning and social functioning, respectively, than those without PTSD. However, unlike these other studies, our study is generalizable to the larger population of older Americans, assessing chronicity of PTSD into later life and examining global disability as well as multiple individual domains of disability.

Of the previous nonmilitary studies, only one recent study that we are aware of targeted older adults. Although this study found that lifetime PTSD was related to multiple physical health issues, including a reduction in role functioning in late life, the authors did not assess other specific domains of disability or chronicity of PTSD. Other studies examined small samples that included young adults. For example, a study of 368 primary care patients 18 years and older found that those with current (1-month) PTSD were more impaired in work, family, and social functioning scales than those without PTSD. In a more recent study of 321 trauma-exposed primary care patients 18 years and older, the authors found results similar to our study, where current PTSD was associated with the most impairment (ie, work loss and social and family impairment), followed by history of PTSD, compared with no current PTSD. In a sample of 95 individuals 19 years and older who survived the 2001 World Trade Center attack, high PTSD symptoms were particularly associated with social-occupational impairment. Another study, which assessed 49 patients with 2 or more posttraumatic stress symptoms during their lifetime and 147 control participants 18 years and older in the community, found that social, financial, physical (chronic illness and bed days), and psychological domains of disability were related to posttraumatic stress symptoms. Our findings build on this previous work by showing that the effect of clinically based PTSD on function is evident at the population level and into later life, when individuals are most vulnerable to disability. In addition, we assessed domains of disability, besides role and social functioning, particularly pertinent to older age, including mobility, cognition, and self-care.

Multiple studies have provided evidence that depression is associated with functional impairment. However, findings that PTSD is associated with disability independent of MDD and other prominent psychiatric disorders has important implications. These findings suggest that, if left unresolved, PTSD in older adults will have significant functional consequences. Therefore, by identifying chronicity of PTSD as a prominent predictor, we are able to show that monitoring and treatment of PTSD are imperative over the long term. In addition, although not as encompassing as persistent PTSD, pre–late-life PTSD was significantly associated with specific domains of disability (ie, mobility and social functioning) and only marginally associated with cognition. These findings could be explained by persistent effects of trauma exposure on functional status that are not related to having the diagnosis of PTSD or MDD.

The effect of chronic PTSD on disability in late life can potentially be explained by similar underlying mechanisms of MDD and disability. It is possible that PTSD itself is disabling or causes increased disability from other sources, such as poorer health behaviors. The persistence of symptomatic distress arising from trauma exposure over the long term may have an adverse influence on health similar to models of allostatic load. This may be why individuals with persistent PTSD into
later life are more disabled. One possible pathway is through dysregulation of the hypothalamic-pituitary-adrenocortical axis following exposure to trauma.\textsuperscript{36} It is hypothesized that dysfunction of the hypothalamic-pituitary-adrenocortical system leads to increased glucocorticoid signaling and hippocampal degeneration, which, with repetitive stress responses to trauma cues, may predispose an individual to adverse health outcomes. Another possible pathway may be through executive-type cognitive impairments associated with PTSD.\textsuperscript{37}

Furthermore, our findings suggest that the persistent PTSD group may be different in other ways besides their risk associated with function. The higher prevalence of adverse medical conditions in this group may suggest that persistent PTSD is an indicator of other health risks. Future studies need to examine other important adverse outcomes potentially associated with this group, such as stroke, heart disease, and diabetes mellitus.

The strengths of this study include a large nationally representative sample of community-dwelling older Americans, information on clinically relevant DSM-IV PTSD, and carefully measured disability domains. In addition, we attempted to carefully adjust for possible confounding from medical and psychiatric comorbidities. Finally, we focused on the effect of chronic PTSD. To our knowledge, our study is the first to examine the chronicity of PTSD into later life and its association with disability.

There are limitations of this study. First, the CPES surveys underrepresent older homeless and institutionalized adults, as well as old-old (75-84 years) and oldest-old (≥85 years) adults. Thus, given this is a community-based sample of non-institutionalized older respondents, power for analyses and interpretation of results for the oldest-old respondents are limited. Second, even though the WMH-CIDI was shown to have good concordance with the Structured Clinical Interview for the DSM-IV,\textsuperscript{38} it is still a lay-administered interview rather than a clinically administered assessment. Third, there may be issues of stigma, whereby older adults with mental illness might be less inclined to participate in a mental health survey. Some respondents with PTSD also may have been excluded from the study because of difficulty recalling symptoms. Although it is possible that older adults may be less likely to remember past trauma, retrospective reporting of serious events such as trauma is minimally affected by bias.\textsuperscript{39} Instead, there may be a mortality effect, whereby traumatized adults are more likely to die at a younger age, resulting in an overrepresentation of nontraumatized older respondents.\textsuperscript{40} Fourth, the study was not able to take the number of years with the disorder into account either in the definition or in the analyses. Furthermore, future research needs to examine other important covariates not accounted for in the current study such as dementia. Finally, the association between PTSD and disability may be bidirectional, which suggests further investigation in longitudinal analyses.

Conclusions

Our study emphasizes the importance of improving the monitoring and treatment of PTSD over the long term. The impairment in role functioning, mobility, cognition, and social functioning reflects diminished quality of life for older Americans with pre–late-life PTSD, particularly PTSD that persists into later life. Considering the projected expansion of the elderly population, increased life expectancy, and the health and economic costs of mental health disorders, the potential public health burden of PTSD implicated by this study is concerning. Thus, future studies are needed to identify the reasons underlying PTSD’s effect on disability and to investigate better interventions that will reduce the risk of impairment.
REFERENCES


