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- Assess for exacerbated posttraumatic stress disorder (PTSD) symptoms in older patients, particularly among those with cognitive difficulties

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Late-Life Exacerbation of PTSD Symptoms in US Veterans: Results From the National Health and Resilience in Veterans Study

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ABSTRACT

Objective: More than 60% of US military veterans are 55 years or older. Although several case studies have suggested that older age is associated with a higher likelihood of reactivated or delayed-onset posttraumatic stress disorder (PTSD) symptoms in veterans, population-based data on the prevalence and determinants of this phenomenon are lacking.

Method: Using data from the National Health and Resilience in Veterans Study (NHRVS: Wave 1 = October 2011–December 2011; Wave 2 = September 2013), a nationally representative, cohort study of US veterans, we evaluated the prevalence and determinants of exacerbated PTSD symptoms in 1,441 veterans 55 years or older using a *DSM-IV*–based measure in 2011 and a *DSM-5*–based measure in 2013. Veterans whose worst trauma occurred at least 5 years prior to Wave 2 of the NHRVS (mean = 28.6 years) and who reported a clinically significant increase (ie, ≥ 0.5 standard deviation [SD]; mean = 1.27, SD = 0.78) in PTSD symptoms from Wave 1 (lifetime) to Wave 2 (past-month) were identified as having exacerbated PTSD symptoms.

Results: Results revealed that 9.9% of older US veterans experienced exacerbated PTSD symptoms an average of nearly 3 decades after their worst trauma. A multivariable logistic regression model indicated that greater self-reported cognitive difficulties at Wave 1 independently predicted exacerbated PTSD symptoms at Wave 2. Post hoc analysis revealed that this association was driven by greater severity of executive dysfunction (adjusted odds ratio range, 1.27–3.22).

Conclusions: Approximately 1 in 10 older US veterans experiences a clinically significant exacerbation of PTSD symptoms in late life. Executive dysfunction may contribute to risk for exacerbated PTSD symptoms. These results suggest that exacerbated PTSD symptoms are prevalent in US veterans and highlight potential targets for identifying veterans at risk for this phenomenon.

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Clinical Points

- Case studies have suggested that reactivated or delayed-onset posttraumatic stress disorder (PTSD) may be more likely to occur with older age in veterans, but few quantitative studies exist examining the prevalence and determinants of exacerbated PTSD symptoms in older age.
- Greater cognitive difficulties and, in particular, difficulties with executive function and concentration, were found to be determinants of late-life exacerbation of PTSD symptoms in US veterans.
- Mental health professionals working with older veterans should assess for exacerbated PTSD symptoms, particularly among those experiencing cognitive difficulties.

Although risk for the emergence of posttraumatic stress disorder (PTSD) symptoms is greater early after exposure to a traumatic event,[1] case studies have suggested that PTSD symptoms may emerge or become exacerbated in older age. American military veterans 55 years or older comprise more than 60% of the country's veteran population,[2] and from the limited quantitative studies published to date, the prevalence of late-emergent PTSD has varied widely from 11.0%–34.0%. For example, a retrospective self-report study of World War II prisoners of war (WWII POWs) reported that 11.0% of participants had a reactivated course of PTSD symptoms, ie, the early abatement of PTSD symptoms followed by exacerbations 25–30 years later.[1] An additional 2.0% of participants in this study displayed a rare, long-delayed onset course in which PTSD symptoms first presented more than 2 decades following stress exposure. In a study of combat-exposed male Israeli veterans who were followed after the 1982 Lebanon War, the prevalence of delayed-onset PTSD at the 20-year follow-up was 7.9%.[3] The authors posited that aging-related reminiscence and subsequent Israeli wars contributed to PTSD symptom exacerbation.[3] Reactivated and/or delayed-onset PTSD trajectories have also been identified in other samples of Israeli veterans, as well as Holocaust survivors.[4–6] However, not all studies have found evidence of long-delayed exacerbation of PTSD symptoms in veterans.[7] Thus, there is a need for population-based studies of aging veterans in order to characterize the burden of this phenomenon, as previously reported prevalence estimates have been ascertained from selected trauma-exposed samples and may not be representative.

In addition to a dearth of data regarding the prevalence of exacerbation or onset of PTSD symptoms in late life, only a few studies have systematically evaluated factors that contribute to this phenomenon. Initial studies have implicated multiple factors, including chronic physical illness, cognitive decline, retirement, reduced social support and loss of a spouse, war-related triggers, and an increased propensity to reminisce about past traumatic events.[8–15] It has been posited that PTSD symptoms can occur among older adults who think frequently of past traumas and have difficulty coping with those recollections.[9] In the study of WWII POWs described above, those with new-onset PTSD at the second assessment reported a higher prevalence of lifetime alcohol use disorder, worse self-reported health, higher PTSD symptom severity at the first time point, and less education relative to those with no PTSD.[1] However, POWs have also been shown to have a higher prevalence of delayed-onset PTSD than non-POW veterans,[4] and thus they may represent a select segment of the veteran population with unique determinants of exacerbated PTSD. In the study of combat-exposed male Israeli veterans, those with 20-year delayed-onset PTSD displayed more severe psychiatric symptomatology and a higher prevalence of combat stress reaction at baseline than participants with no PTSD.[3] These studies are limited by their sampling strategy, their focus on males, and their focus on war-related traumatization. Thus, to better understand the prevalence and determinants of exacerbated PTSD symptoms, there is a need for population-based studies of this phenomenon. This information may be useful in guiding efforts to improve the assessment, monitoring, and treatment of PTSD symptoms in older US veterans.

To address these gaps in the literature, we evaluated the prevalence and determinants of exacerbated PTSD symptoms among older veterans who participated in a contemporary, nationally representative, prospective cohort study. On the basis of prior studies,[1,3,15] we hypothesized that between 8.0% and 15.0% of the sample would experience exacerbated PTSD symptoms and that greater medical burden, cognitive difficulties, and loneliness would be associated with this phenomenon.

METHOD

Participants

The National Health and Resilience in Veterans Study (NHRVS) is a prospective, nationally representative study of US military veterans. Veterans 55 years or older were included in the current study (Wave 1: October 2011–December 2011; n = 2,119; Wave 2: September 2013, n = 1,441). The sample was ascertained from KnowledgePanel, a survey panel of US households that is maintained by GfK Knowledge Networks, Inc (Menlo Park, California). The GfK Knowledge Networks recruitment protocol relies on probability-based sampling of residential addresses from the US Postal Service's Delivery Sequence File (DSF). This address-based sampling methodology allows sampling of approximately 98% of US households. All households are reached and contacted through postal mail. Participants are provided with a computer and Internet access if necessary.

Comparisons of basic sociodemographic variables, mental health history, and physical health conditions between older veterans who did and did not complete Wave 2 revealed that veterans who completed Wave 2 were less likely to have been combat exposed (28.4% vs 39.5%, $\chi^2_1 = 25.1$, $P < .001$), had lower rates of lifetime depression (8.3% vs 14.7%, $\chi^2_1 = 19.0$, $P < .001$) and PTSD (2.7% vs 6.7%,

$\chi^2_1 = 18.3$, $P < .001$), and reported fewer medical conditions (mean [SD] = 2.9 [1.9] vs 3.2 [2.1], $t = 3.3$, $P = .001$); they did not differ with respect to gender, education, marital status, race/ethnicity, or retirement status (all P values > .08). GfK Knowledge Networks statisticians computed post-stratification weights based on demographic distributions of veterans in KnowledgePanel and calibrated them against the demographic composition of the US adult population using data from the most contemporaneous US Census Bureau Current Population Survey[16] (ie, gender, age, education, ethnic status, Census region, metropolitan area). These weights were applied in inferential statistical analyses in order to permit generalizability to the entire US veteran population. The VA Connecticut Healthcare System Human Subjects Subcommittee approved this study, and individuals provided informed consent prior to participation.

Assessments

At both survey waves, veterans completed an anonymous online survey that assessed a comprehensive range of psychosocial and health variables, including PTSD symptoms, cognitive functioning, the presence of physical health conditions, and protective psychosocial factors.[17]

Assessment and Operationalization of Exacerbated PTSD Symptoms

The PTSD Checklist-Specific (PCL-S)[18] was used to assess PTSD symptoms, and veterans were asked to complete items by "thinking about your WORST stressful experience." At Wave 1, the PCL-S was used assessed lifetime symptoms according to *DSM-IV* diagnostic criteria (range, 17–85), and at Wave 2, the PTSD Checklist for *DSM-5* (PCL-5)[19] was used to assess past-month PTSD symptoms in accordance with *DSM-5* diagnostic criteria (range, 0–80). We chose to examine lifetime rather than past month PTSD symptoms at Wave 1 in order to capture, as part of our definition of exacerbated PTSD symptoms, those cases whose dormant PTSD symptoms have reemerged or become exacerbated in later life. Due to the different versions of the PCL used at Waves 1 and 2, all PCL scores were standardized among survey participants ages 55 years and older who had completed both waves in order to examine change in PTSD symptom severity over the 2 time points. At Wave 1, participants were asked to report the age of occurrence of their worst trauma, which was also the event used to assess Wave 1 PTSD symptoms.

Exacerbated PTSD was operationalized as a minimum 0.5 standard deviation increase in standardized PCL scores from Wave 1 to Wave 2 and report of the worst traumatic event occurring at least 5 years prior to the Wave 1 assessment (n = 147; mean number of years since worst trauma = 28.6 years [SD = 18.1]; range, 5–72 years). A change of at least 0.5 standard deviation is recognized as a measure of a minimally clinically important difference for a broad range of clinical measures, including PTSD symptoms.[20–22] Further, the decision to consider time since trauma in our definition of exacerbated PTSD symptoms was made in order to capture veterans whose symptoms reemerged or emerged for the first time years following their worst traumatic event. The reference group for all analyses consisted of trauma-exposed veterans who maintained no PTSD symptoms or a low level of symptoms at both time points, defined as a standardized score of 0 or lower (n = 575). This operationalization of no/low symptoms corresponded to a mean raw score of 19.9 (SD = 2.3; range, 17–24) on the lifetime PCL-S at Wave 1 and a mean score of 1.3 (SD = 1.5; range, 0–5) on the past month PCL-5 at Wave 2.

Table 1. Other Assessment Measures

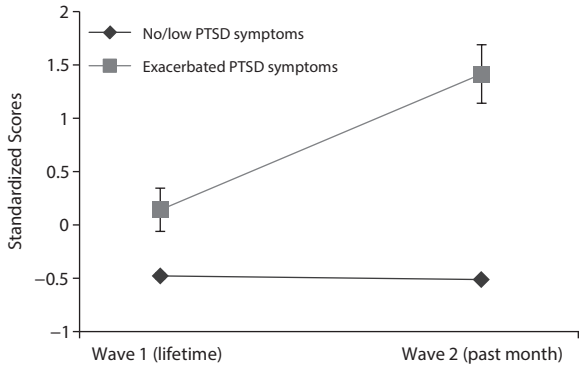
Sociodemographic variables	Age, gender (male, female), education (less than high school, high school, or more), marital status (married/cohabiting, other), race (white, other), and retired status
Cumulative trauma history	Wave 1: THS[23] assessed lifetime exposure to traumatic events. "Life-threatening illness or injury" added as an additional event. Count variable created for number of lifetime traumas Veterans were also asked, "Which of these experiences was the WORST for you?" Wave 2: Participants were readministered the THS (excluding childhood events) and asked whether each event had happened in the last 2 years. Count variable created for number of traumas in the past 2 years
Combat status	"Did you ever serve in a combat or war zone?" (no/yes dichotomous variable)
Substance use history	Lifetime alcohol and drug abuse and dependence assessed using the MINI[24] according to *DSM-IV* diagnostic criteria; nicotine dependence assessed using the Fagerström Test for Nicotine Dependence.[25] Summary variable of any substance use disorder created
Medical conditions	"Has a doctor or health care professional ever told you that you have any of the following medical conditions? (Please check all that apply to you)." 19 physical health conditions assessed (eg, heart disease, chronic pain). Count variable of number of medical conditions created
Loneliness	Assessed using 3 items adapted from the Revised UCLA Loneliness Scale.[26] Items summed (range, 3–9)
Cognitive difficulties	Assessed using the MOS Cognitive Functioning Scale-Revised.[27] Items were reverse scored and summed so that higher scores reflect greater cognitive dysfunction
Community integration	Assessed using the item, "I feel well integrated in my community (eg, regularly participate in community activities)" (range, 1–7)
Structural social support	Number of reported close friends and relatives
Functional social support	Total score on the MOS Social Support Scale-5[28]

Abbreviations: MINI = Mini-International Neuropsychiatric Interview, MOS = Medical Outcomes Study, THS = Trauma History Screen.

Other Assessment Measures

Table 1 describes the other assessment measures included in the current study. The selection of variables examined

Figure 1. Change in Standardized Scores Between Waves 1 and 2 in the No/Low and Exacerbated PTSD Symptom Groups[a]



[a]Error bars represent 95% confidence intervals of the mean.
Abbreviation: PTSD = posttraumatic stress disorder.

in relation to exacerbated PTSD symptoms was guided by previous literature of common determinants of reactivated or late-onset PTSD.[9]

Data Analysis

To reduce bias related to item-level missing data on the PCL-S, PCL-5, and other quantitative scales (< 2% per scale), which were missing completely at random (all Little's MCAR test *P* values > .9), these values were multiply imputed using an iterative Markov chain Monte Carlo (MCMC) method. Data analyses proceeded in 5 steps. First, a weighted frequency analysis was conducted to calculate the prevalence of exacerbated PTSD symptoms in the US veteran population. Second, within the exacerbated PTSD symptoms group, mean increases in standardized scores between Waves 1 and 2 were examined for total PCL score and for each of the 5 PTSD factors (reexperiencing, avoidance, emotional numbing, dysphoric arousal, anxious arousal).[29] The irritability/anger item from the PCL-S and the 2 externalizing behavior items from the PCL-5 were excluded such that comparable factors could be created across PCL versions. We also examined the association between number of years since worst trauma and magnitude of exacerbated PTSD symptoms within the exacerbated symptom group using a Pearson correlation. Third, bivariate logistic regression analyses were conducted to examine the associations between each potential determinant and exacerbated PTSD symptom group membership. Fourth, potential determinants of PTSD symptom group membership found to be statistically significant in bivariate analyses at the $P < .05$ level were entered simultaneously into a multivariable logistic regression model; exacerbated PTSD vs low PTSD symptoms was entered as the dependent variable in this analysis. Fifth, for determinants that emerged as statistically significant in the multivariable model, post hoc analyses were conducted to examine the individual components of each determinant associated with exacerbated PTSD symptoms. To control for possible Type I error, $P < .01$ was considered statistically significant in these analyses. All regression models were adjusted for lifetime PCL-S scores at Wave 1.

RESULTS

The weighted prevalence of exacerbated PTSD in veterans 55 years and older was 9.9%. Figure 1 shows standardized PCL scores at Waves 1 and 2 for both the low symptom and exacerbated PTSD symptom groups. The mean score of the exacerbated PTSD symptom group increased an average of 1.27 SDs (SD = 0.78; range, 0.50–5.42) between the 2 survey waves. Analyses revealed large magnitude increases in all symptom clusters (mean increase of 0.98–1.21 standard deviations across factors), with the largest magnitude change observed for anxious arousal (Cohen *d* range, 0.69–0.90). No association was observed between number of years since worst trauma and magnitude of exacerbated PTSD symptoms within the exacerbated symptom group ($r = -0.05$, $P = .62$).

Table 2 shows results of bivariate analyses that compared the exacerbated PTSD symptom and no/low symptom groups with respect to each of the potential determinants. These analyses revealed that, relative to the no/low symptom group, the exacerbated PTSD symptom group reported a greater number of traumas between Wave 1 and Wave 2, greater cognitive difficulties and loneliness, and lower functional social support.

Table 3 shows results of a multivariable logistic regression analysis predicting exacerbated PTSD group membership. In this model, cognitive difficulties emerged as an independent determinant of exacerbated PTSD symptoms. Post hoc analysis of individual items from the MOS Cognitive Functioning Scale-Revised revealed that greater difficulties with activities involving concentration and thinking (AOR = 3.22; 95% CI, 1.86–5.59; $P < .001$) and reasoning and problem-solving (AOR = 2.79; 95% CI, 1.72–4.52; $P < .001$) were independently associated with exacerbated PTSD symptoms.

DISCUSSION

To our knowledge, this study is among the first to examine the prevalence and determinants of exacerbated PTSD symptoms in later life in a nationally representative sample of US military veterans. Results revealed that the overall prevalence of exacerbated PTSD among older veterans was 9.9%. This finding is within the range of the 7.9% prevalence of delayed-onset PTSD observed in Israeli veterans[3] and combined 13.0% prevalence of both reactivated and delayed-onset PTSD courses observed in WWII POWs.[1] Within the exacerbated PTSD symptom group, large magnitude increases were observed between Waves 1 and 2 for all 5 PTSD factors, with the largest magnitude change evident for anxious arousal (ie, hypervigilance and exaggerated startle response) symptoms. This finding accords with the PTSD symptom presentation that was observed in older versus younger adults in a sample of earthquake survivors.[30] It is possible that a loss of executive modulation of hypervigilance and

Table 2. Results of Bivariate Logistic Regression Analyses of Predictors of Late-Life Exacerbated PTSD in Veterans

	No/Low PTSD Symptoms (n = 575)	Exacerbated PTSD Symptoms (n = 147)	AOR (95% CI)[a,b]	Wald χ^2	*P*
Sociodemographic characteristics					
Age, mean (SD), y	70.0 (7.6)	69.1 (7.8)	1.00 (0.97–1.03)	0.01	.93
Female gender, n (%)	20 (3.7)	9 (6.6)	1.17 (0.39–3.49)	0.08	.78
Some college or higher, n (%)	489 (64.5)	127 (70.5)	1.16 (0.72–1.86)	0.38	.54
Married/cohabiting, n (%)	466 (77.2)	120 (79.3)	1.15 (0.68–1.94)	0.28	.60
Non-Caucasian, n (%)	69 (18.5)	15 (15.6)	0.84 (0.46–1.54)	0.32	.57
Potential determinants					
Retired status, n (%)	373 (67.4)	94 (66.9)	1.25 (0.77–2.04)	0.80	.37
No. of medical conditions, mean (SD)	2.8 (1.8)	3.2 (2.0)	0.92 (0.81–1.05)	1.51	.22
Substance use history, n (%)	217 (39.0)	87 (54.5)	1.09 (0.69–1.71)	0.13	.72
Combat status, n (%)	192 (31.8)	48 (31.7)	0.85 (0.52–1.38)	0.44	.51
Cumulative trauma exposure, mean (SD)	2.7 (1.7)	3.5 (2.3)	0.98 (0.86–1.12)	0.08	.78
No. of traumatic events since Wave 1, mean (SD)	0.5 (0.7)	0.9 (0.9)	**1.34 (1.02–1.76)**	**4.33**	**.04**
Cognitive difficulties, mean (SD)	1.2 (1.8)	4.1 (4.6)	**1.27 (1.15–1.40)**	**22.57**	**<.001**
Loneliness, mean (SD)	3.6 (1.1)	4.6 (1.8)	**1.22 (1.05–1.43)**	**6.50**	**.01**
Community integration, mean (SD)	4.7 (1.5)	4.3 (1.8)	1.04 (0.90–1.20)	0.20	.62
Functional social support, mean (SD)	20.7 (4.3)	18.8 (4.3)	**0.95 (0.93–0.98)**	**4.15**	**.04**
Structural social support, mean (SD)	10.3 (10.7)	8.2 (8.3)	0.99 (0.96–1.02)	0.47	.46

[a]Regression analyses are adjusted for lifetime PTSD symptom severity at Wave 1.
[b]Statistically significant findings ($P < .05$) are in bold.
Abbreviations: AOR = adjusted odds ratio, CI = confidence interval, PTSD = posttraumatic stress disorder, SD = standard deviation.

Table 3. Multivariable Logistic Regression Model of Predictors of Late-Life Exacerbated PTSD in Veterans

	AOR (95% CI)[a–c]	Wald χ^2	*P*
Number of traumatic events since Wave 1	1.32 (0.99–1.75)	3.51	.06
Cognitive difficulties	**1.27 (1.15–1.40)**	**22.97**	**<.001**
Loneliness	1.14 (0.93–1.41)	1.59	.21
Functional social support	0.98 (0.92–1.05)	0.37	.54

[a]Adjusted for lifetime PTSD symptom severity at Wave 1.
[b]Statistically significant findings ($P < .05$) are in bold.
[c]Nagelkerke $R^2 = 0.33$.
Abbreviations: AOR = adjusted odds ratio, CI = confidence interval, PTSD = posttraumatic stress disorder.

startle symptoms occurs in older adults that could account, in part, for the particularly large increase in anxious arousal symptoms. That approximately 1 out of every 10 older US veterans experiences a clinically significant exacerbation of PTSD symptoms in later life underscores the importance of routine assessment and monitoring of PTSD symptoms, particularly anxious arousal, in aging veterans, even among those who have not previously been symptomatic.

Bivariate analyses of potential determinants of exacerbated PTSD revealed that greater number of traumas between Wave 1 and Wave 2, greater cognitive difficulties and loneliness, and lower functional social support were associated with an increased likelihood of developing exacerbated PTSD symptoms. Although greater number of traumas, greater loneliness, and lower functional social support did not emerge as determinants of exacerbated PTSD in the multivariable model, it is possible that veterans with recent trauma exposure and greater loneliness may represent at-risk groups for PTSD symptom exacerbation in later life. Greater loneliness and reductions in social support may lead to more time for reminiscence of past traumas on account of less social engagement and thus more time for prolonged rumination.[31] Further, the role of recent stressors in reactivating or triggering PTSD symptoms is documented in several case studies,[12] and Horesh and colleagues[3] observed in their study of Israeli veterans that the delayed expression of PTSD symptoms may have been increased due to the ongoing violent conflicts occurring at the time. Further, in the same sample of Israeli veterans, those who developed delayed-onset PTSD for the first time 20 years following the Lebanon War experienced more recent stressful life events than veterans without PTSD.[32] These results suggest the potential importance of inquiring about heightened PTSD symptoms in older veterans who have recently experienced traumatic events or who lack social supports.

Greater cognitive difficulties, in particular, difficulties with executive function and concentration, emerged in the multivariable model as the only independent determinant of exacerbated PTSD symptoms. Prior case studies support the concept that cognitive decline and dementia might contribute to late-emergent PTSD symptoms in older individuals.[12,15] Quantitative studies also demonstrate worse cognitive performance in several domains among older adults with PTSD, including attention and executive functioning.[33] Deficits in executive functioning in PTSD suggest that reduced prefrontal cortical function, perhaps via decreased "top-down modulation,"[34] may contribute to the exacerbation of PTSD symptoms in late life.[35] Further, directing attentional resources to emotionally salient trauma-related memories may negatively affect general attentional functioning.[36] Longitudinal studies are needed to objectively assess aspects of executive function, such as difficulties with problem-solving and inhibitory control, in relation to exacerbated PTSD symptoms. Further work would also be useful in evaluating the efficacy of

cognitive-enhancing interventions in possibly preventing or mitigating the exacerbation of PTSD symptoms in later life. For example, cognitive training has been shown to be effective in improving cognitive functioning (eg, reasoning, processing speed) among older adults,[37,38] and there are promising pharmacologic (eg, serotonin-norepinephrine reuptake inhibitors) and nonpharmacologic (eg, cognitive remediation) treatments for the improvement of cognitive functioning among individuals with major depressive disorder.[39]

This study has a number of limitations. First, symptoms of PTSD were assessed using a self-reported instrument as opposed to a clinician-administered diagnostic interview. However, the PCL is a widely used measure of PTSD symptoms that has consistently demonstrated good-to-excellent reliability and validity.[18,40] Second, different versions of the PCL were administered at Wave 1 and Wave 2 (ie, PCL-IV vs PCL-5), resulting in differences in symptoms and score ranges based on *DSM-IV* and *DSM-5* diagnostic criteria, respectively. However, the standardization of PCL scores helped to place these scores into a comparable metric, and operationalization of a minimum 0.5-SD increase in scores represents a widely recognized assessment of clinically significant change.[18] It should be noted that in the exacerbated PTSD symptoms group, the magnitude increase in standardized scores for overall PTSD symptoms was greater than for any of the 5 factors. This was largely related to the removal of some symptoms in the examination of symptom change for the individual factors (eg, anger/irritability, externalizing symptoms) to allow for comparability in score changes over time. Third, the THS was used to assess trauma exposure, and some items do not necessarily fulfill criterion A1 of *DSM-IV* PTSD or criterion A of *DSM-5* PTSD. Fourth, retrospective bias in self-reporting of age of worst trauma at Wave 1 may have biased results at this wave. Further, since the assessment of worst event occurred at Wave 1, a proportion of exacerbated PTSD cases may reflect worsening symptoms driven by other, newer traumas. Fifth, it should be noted that, relative to veterans who did not complete Wave 2 of the NHRVS, those who did reported a lower rate of any combat exposure, lower rates of lifetime depression and PTSD, and fewer medical conditions. However, the application of post-stratification weights in inferential analyses helps to ensure the national representativeness of the sample at both waves. Finally, our study did not differentially examine reemergent PTSD symptoms versus the delayed onset of any symptoms in later life. However, when examined as a single phenomenon, findings of first onset of symptoms years after a traumatic event are rare.[3,9] Future research is needed to investigate possible individual trajectories.[1]

Notwithstanding these limitations, results of the current study suggest that approximately 1 in 10 older US veterans experiences a clinically significant exacerbation of PTSD symptoms in older age. Increased cognitive difficulties, particularly executive dysfunction and difficulties with concentration and thinking, were the strongest predictors of exacerbated PTSD symptoms. Future research is needed to clarify the nature and determinants of exacerbated PTSD symptoms by examining longitudinal trajectories of PTSD symptoms in older adults; elucidate neurobiological factors underlying the association between cognitive decline, inhibitory response, and exacerbated PTSD symptoms in later life; and evaluate the efficacy of cognitive-enhancement strategies in mitigating risk for exacerbated PTSD symptoms in older veterans and other trauma survivors at-risk for exacerbation or onset of PTSD symptoms in late life.

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POSTTEST

To obtain credit, go to PSYCHIATRIST.COM **(Keyword: March) to take this Posttest and complete the Evaluation.** A nominal processing fee is required.

1. **According to the results of this study, approximately what percentage of older US veterans experiences late-life exacerbation of posttraumatic stress disorder (PTSD) symptoms?**
   a. 2
   b. 10
   c. 30
   d. 80
2. **Mr A is a 66-year-old veteran who reports a recent reemergence of combat-related PTSD symptoms after more than 30 years of experiencing minimal symptoms. According to the current study, difficulties with which 2 aspects of cognitive functioning are most likely to be associated with the reemergence of Mr A's PTSD symptoms?**
   a. Memory and concentration
   b. Concentration and problem-solving/reasoning
   c. Problem-solving/reasoning and memory
   d. Executive functioning and memory