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RESEARCH ARTICLE

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Symptom profiles and treatment status of older adults with chronic post-traumatic stress disorder

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Abstract

Objective: Failure to diagnose and treat post-traumatic stress disorder (PTSD) may help explain the substantial disability, increased cognitive decline, and adverse health outcomes suffered by older adults with this disorder. To evaluate this possibility, we examined symptom differences among older and younger individuals with PTSD and measured the frequency with which older adults receive standard of care treatment.

Methods: Clinician-Administered PTSD Scale for DSM (CAPS) scores were compared between younger and older adults with PTSD. Profiles were calculated for the most dominant CAPS symptom cluster reported by each participant, and the age cutoff best differentiating symptom clusters between individuals was determined. Clinical interview data (older adult sample only) were evaluated by trained raters to determine rates at which PTSD participants accessed treatment.

Results: Among 108 individuals with PTSD, 69% of participants <67 years old had Criterion C (avoidance) symptoms as the most dominant cluster compared to 39% of participants ≥67 ($p = 0.016$). Eight percent of participants <67 years had Criterion E (hyperarousal) symptoms as the most dominant cluster compared to 30% of participants ≥67 ($p = 0.016$). Less than 25% of the older adults (N = 53 subsample) were receiving a first-line pharmacotherapy option for PTSD, and 0% of participants were currently participating in an evidence-based psychotherapy for PTSD.

Conclusions: Clinicians evaluating patients should be aware that different symptom profiles may be present between younger and older adults with PTSD. Despite their high risk for adverse neuropsychiatric and other health consequences, older adults with PTSD appear to infrequently receive first-line clinical treatment.

KEYWORDS

dementia, phenomenology, post-traumaticstress disorder, treatment

Key Points

- Hyperarousal and avoidance symptomatology differ between younger and older adults with post-traumatic stress disorder (PTSD)

- Less than a quarter of older adults with PTSD report receiving adequate medication treatment for PTSD
- Differences in PTSD symptomatology in younger and older adults may contribute to reduced treatment-seeking behavior and under-diagnosis in older adults

1 | INTRODUCTION

Post-traumatic stress disorder (PTSD) affects 6.8% of adults in the United States[1] and is associated with high rates of disability,[2] comorbid medical and psychiatric disorders,[3] and suicide.[4,5] Recent studies report increasing prevalence rates of PTSD among older adults,[6] perhaps related to the paucity of effective treatments for PTSD, low treatment-seeking behavior among patients, and the aging of the population.[7] Persistent PTSD in later life is associated with at least one disability in nearly 80% of cases.[6] Compared to those without PTSD, individuals with chronic PTSD have exceedingly high rates of major depressive disorder (MDD), triple the rates of drug abuse, and significant functional impairment.[8] For these reasons, it is imperative to better characterize PTSD as it occurs in aging populations.

As individuals with PTSD grow older, they may suffer from conditions commonly associated with advanced age at an increased rate and with earlier onset.[9] For example, PTSD patients have more severe age-associated medical problems and experience poorer health outcomes compared to those without PTSD.[10–12] Even after adjustment for sociodemographic characteristics and psychiatric comorbidity, PTSD is associated with greater odds of metabolic syndrome, cardiovascular diseases, peptic ulcers and gastritis, arthritis, and Type II diabetes in adults over 60 years old.[13–16] PTSD patients frequently develop the syndrome of frailty, which represents physiological decline characterized by weakness, fatigue, low physical activity, slowness, and shrinkage.[17–20] Even more strikingly, older patients with PTSD exhibit performance deficits compared to individuals without PTSD across diverse cognitive domains such as memory, processing speed, and learning.[21] They exhibit faster cognitive decline and have increased risk of dementia compared to individuals without PTSD.[22,23] For example, a cohort study examining 10 years of medical records for over 10,000 Veterans (mean age 73 at study baseline) found that the odds of dementia diagnosis in PTSD patients were two times as high as those without PTSD.[24]

Given this significant morbidity and mortality, which stem from the direct effects of PTSD on mental health and its indirect effects on aging, prompt diagnosis and institution of effective treatment for PTSD in older adults is critical. Yet, diagnosis of PTSD in later life can be complicated owing to differing phenomenology of the syndrome in older compared to younger adults and age-related changes in treatment seeking.[25] The available data suggest that overall symptom severity, intrusive thoughts, and avoidance behaviors are lower among older adults with PTSD.[7] Older adults more frequently report somatic problems (e.g., pain, insomnia, gastrointestinal upset) relative to emotional issues (e.g., specific aspects of the trauma).[26] Conflicting data exist with respect to hyperarousal cluster symptoms, as some studies, including a comprehensive analysis of survey data from 204 older adults, report fewer hyperarousal symptoms in older compared to younger adults,[7,27] while other groups have found the opposite result of increased hyperarousal symptoms.[28,29] Older patients may not spontaneously report traumatic experiences or minimize their importance, use generic terms such as "stress," and generally present to primary medical doctors rather than specialty mental health settings.[30]

While the available evidence base is limited by the relatively few individuals aged 60 years and older that have been enrolled in randomized trials, both medications and evidence-based psychotherapy appear to be effective for older adults with PTSD. Systematic reviews of exposure-based psychotherapies report effectiveness for trauma symptoms in older adults,[31] though few of these studies are randomized and almost none evaluate the most evidence-based psychotherapy for PTSD, Prolonged Exposure. Pharmacotherapy, such as with selective serotonin reuptake inhibitors (SSRIs), is indicated for PTSD across age groups, and analyses of prescribing trends using Veterans Affairs (VA) databases suggest that 50%-60% of veterans (all ages) with PTSD receive first-line pharmacotherapy agents.[32] The frequency with which older adults specifically receive adequate pharmacologic treatment is less clear, though one available report suggests lower rates of medication prescription in older compared to younger adults.[33]

In this study, we characterized symptom profiles of older adults with PTSD and examined the frequency with which they accessed first-line treatments in order to better understand the alarming rise in PTSD prevalence among aging populations. Data on participant clinical characteristics and current/past mental health treatment were abstracted and combined from two ongoing research studies in our laboratories, one enrolling younger adults and one enrolling older adults. We analyzed the data to identify differing patterns of symptom clusters on the Clinician-Administered PTSD Scale for DSM-5 (CAPS) characterizing older versus younger adults and to calculate the frequency with which symptomatic older adults with PTSD were receiving an evidence-based psychopharmacologic or psychotherapeutic treatment for their condition. Our hypotheses were that older and younger adults would differ on the frequency of hyperarousal symptoms reported, and we anticipated less than 50% of older adults would currently be receiving first-line PTSD treatment.

2 | METHODS

2.1 | Subjects

Data presented here represent those collected to date from participants in Study 1, a recently completed study of the neural signature

of fear overgeneralization in younger adults, and Study 2, an ongoing study examining the influence of chronic PTSD on biological aging processes in older adults. All study procedures were approved by the New York State Psychiatric Institute Institutional Review Board. PTSD patients from both studies were men and women aged ≥18 years old (≥50 in Study 2) who were currently diagnosed with DSM-IV (Study 1) or DSM5 (Study 2) PTSD using the Structured Clinical Interview for DSM (SCID) and were willing to and capable of providing informed consent and complying with study procedures. Individuals were excluded from both studies for past or current diagnosis with traumatic brain injury, bipolar disorder, psychotic disorder, or dementia, recent severe Substance Use Disorder, acute, unstable, or severe medical disorder, and contraindication to magnetic resonance imaging (MRI scan was a separate portion of both studies). Distinct selection criteria between the two studies included Study 2 requiring PTSD duration at least 6 months, Post-traumatic Stress Disorder Checklist (PCL-5) score ≥ 33, and Clinician-Administered PTSD Scale for DSM-5 (CAPS-5) score ≥ 25. Study 1 (but not Study 2) excluded subjects who were currently taking psychotropic medications or who had a significant depressive disorder requiring treatment. Due to the exclusion of participants receiving psychotropic medications in Study 1, the examination of current/past treatment described below was only conducted with participants from Study 2 (older adults).

2.2 | Clinical assessments

Demographic characteristics including age, sex, gender, marital status, race/ethnicity, years of education, employment status and income, drug/alcohol/tobacco use, and family history were recorded. Subjects underwent SCID interviews and completed ratings with the Post-traumatic Stress Disorder Checklist (PCL-5), Life Events Checklist (LEC), and CAPS (Study 1 used CAPS-IV and Study 2 used CAPS-5). Additionally, participants were assessed with the Hamilton Anxiety Rating Scale (HARS) 14-item scale, 24-item Hamilton Rating Scale for Depression (HRSD), and CGI Severity and Improvement. The Cumulative Illness Rating Scale-Geriatric (CIRS-G) measured chronic medical illness burden in Study 2.

2.3 | Evaluation of current and past PTSD treatment

During clinical interviews, participants in Study 2 only were queried as to whether they were currently participating in medication and/or psychotherapy treatment, and the details of these treatments were recorded insofar as the participant could provide them. A similar procedure was followed for past treatments until all lifetime treatment received by participants was covered. For medications, the specific drug name, dosage, and starting date were recorded. These data were reviewed by a physician on the research team (BR) to evaluate the adequacy of treatment, where an adequate medication trial was defined as one in which a medication class that is considered first-line treatment for PTSD (i.e., SSRI or selective serotonin norepinephrine reuptake inhibitor [SNRI]) was prescribed at greater than or equal to one-half the *Physicians' Desk Reference* (PDR) maximum recommended dosage for at least four weeks. For example, paroxetine 30 mg administered for four weeks would be considered an adequate trial, whereas lower doses or briefer durations would not meet adequacy criteria. Similarly, participants were asked about the name, frequency, and starting date of all psychotherapy treatments. If he/she did not know the name, research staff provided prompts with the names and descriptions of common psychotherapies for PTSD. An adequate psychotherapy trial was defined as receiving any evidence-based treatment for PTSD (i.e., prolonged exposure, cognitive processing therapy, or eye movement desensitization reprocessing) regardless of visit frequency for at least four weeks.

2.4 | Data analyses

Because one of the studies used CAPS-IV and the other used CAPS-5, we used the index developed by Powers et al. (2019) for combining the two versions.[34] The analysis began by testing continuous variables for normality using the Kolmogorov Smirnoff test. Since normal distribution was not established for any variable, all statistical tests involving continuous variables were nonparametric. Univariate analysis comparing participants in Study 1 and Study 2 was performed using two-sample Wilcoxon tests, chi-square tests, or Fisher's exact tests. Spearman correlation coefficients were calculated to test the associations between age and PTSD symptom clusters.

To create profiles of the most dominant symptom cluster reported by each participant, we used within-individual ranking. The ROC technique was used to search for an optimal cutoff of age that best differentiated between individuals according to their dominant symptom cluster. The optimal cutoff was determined by point-maximizing the Youden function,[35] which is the difference between sensitivity rate and specificity rate over all possible cut-point values. A Fisher's exact test was performed to examine the association between the age cut-off and the most dominant symptom clusters. In cases where results of the overall test were significant in categorical variables having three or more categories, each category was compared between the two samples using the Z-test for proportion. The False Discovery Rate method for adjustment of significance level was used. A p value of 0.05 was considered significant. All statistical analyses were performed using SAS for windows version 9.4.

3 | RESULTS

3.1 | Subject characteristics

Table 1 summarizes clinical and demographic characteristics of the included subjects across Study 1 and Study 2. Consistent with their differing selection criteria, participants in Study 1 were significantly

TABLE 1 Clinical and demographic characteristics of the combined study sample

Variable	Study 1 ($N = 34$) Mean ± SD	Study 2 ($N = 74$) Mean ± SD	Comparison p value
Age	37.3 ± 13.6	62.2 ± 8.7	<0.001
Years of education	14.6 ± 2.8	14.5 ± 2.4	0.82
Clinician Administered PTSD Scale[a]	34.6 ± 9.3	34.9 ± 9.1	0.90
Hamilton Anxiety Rating Scale	15.3 ± 7.7	17.4 ± 8.5	0.22
Hamilton Rating Scale for Depression	13.2 ± 6.2	15.1 ± 7.1	0.19
	N (%)		*p* value
Sex (% male)	24 (71%)	42 (57%)	0.17
Hispanic	12 (35%)	13 (18%)	0.047
Race			0.24
Asian	2 (6%)	1 (1%)	
Black	14 (41%)	28 (38%)	
White	12 (35%)	7 (9%)	
Other	6 (18%)	38 (51%)	
Diagnosis of major depressive disorder	7 (21%)	37 (50%)	0.016

Abbreviations: CAPS, Clinician-Administered PTSD Scale; PTSD, post-traumatic stress disorder.
[a]Study 1 utilized CAPS-IV, whereas Study 2 utilized CAPS-5.

younger than those in Study 2 (mean ages 37.3 ± 13.6 vs. 62.2 ± 8.7, $p < 0.001$). Compared with those enrolled in Study 1, individuals in Study 2 were less often Hispanic (18% vs. 35%, $p = 0.047$) and more frequently met MDD criteria (50% vs. 21%, $p = 0.016$). There were no significant differences between the studies in sex, race, or years of education.

3.2 | Age-related differences in PTSD symptoms

Participants did not demonstrate significant differences in total CAPS scores between studies (34.6 ± 9.3 in Study 1 [range 19–60] vs. 34.9 ± 9.1 in Study 2 [range 50–84], $p = 0.90$). However, as shown in Table 2, a significant Spearman correlation was found between Criterion C cluster symptoms and participant age, such that older age was associated with lower scores on the C cluster ($r = -0.21$, $p = 0.02$). No significant correlations were found between age and the other symptom clusters.

To create profiles of the most dominant symptom cluster reported by each participant, we used within-individual ranking. For 62.9% of the sample, Criterion C symptoms (avoidance) were the most dominant cluster. Next was Criterion D (alterations in mood and cognition; 14.81%), followed by Criteria E (alterations in arousal and reactivity; 12.96%) and B (intrusions; 9.26%). The ROC technique was used to search for an optimal cutoff of age that best differentiated between individuals according to their dominant symptom cluster. A significant optimal cutoff was found only for Criterion E symptoms. The optimal cutoff was 67 years old, and it was chosen by point maximizing the Youden function, which is the difference between sensitivity rate and specificity rate over all possible cut-point values. In the combined sample, 85 participants were younger than 67 years old, while 23 participants were older. We used this cutoff for all symptom clusters.

A Fisher's exact test examining the association between the 67 year-old age cut-off and the most dominant symptom clusters was significant ($p = 0.008$). A post hoc Z-test for proportion of difference between two samples using FDR multiple comparison adjustment revealed that 69% of participants younger than 67 years had Criterion C symptoms (avoidance) as the most dominant cluster compared to 39% of participants older than 67 ($p = 0.016$). Furthermore, 8% of participants younger than 67 years had Criterion E symptoms (arousal and reactivity) as the most dominant cluster compared to 30% of participants older than 67 ($p = 0.016$).

As a *post-hoc* exploratory analysis, we compared individuals younger than 67 years old to those aged 67 years or older on each of the 15 CAPS items that are shared in common across the CAPS-IV and CAPS-5 versions, using a series of t-tests. Only two of the items were significant and survived the multiple comparisons false discovery rate (FDR) adjustment[1]: Avoidance of or effort to avoid external reminders (Avoidance cluster, $p < 0.001$); and[2] Markedly diminished interest or participation in significant activities (Negative alterations in mood and cognition cluster, $p = 0.005$). In the case of both items, the older participants displayed fewer symptoms than the younger participants.

3.3 | PTSD treatments received by older adults

Analysis of current and past treatments was limited to participants in Study 2 for whom these data were available ($N = 53$). As shown in

TABLE 2 Spearman correlation coefficients for the associations between age and post-traumatic stress disorder symptom clusters

Spearman Correlation Coefficients, $N = 108$ Prob > |r| under H0: Rho = 0										
	Cluster B Intrusions		Cluster C Avoidance		Cluster D Mood/ Cognitive		Cluster E Arousal/ Reactivity		Total score	
	r	*p* value	R	*p* value	R	*p* value	*r*	*p* value	*r*	*p* value
Age	0.08	0.77	−0.21	0.02	−0.12	0.21	0.02	0.84	−0.11	0.25

TABLE 3 Pharmacologic and psychotherapy treatments received by older adults with chronic post-traumatic stress disorder (PTSD)

	Older adults with chronic PTSD ($N = 53$)	
Variable	***N***	**%**
Current treatment		
Any	23	43%
Antidepressant medication, adequate dose and duration	11	22%
Psychotherapy, evidence based	0	0%
Past treatment		
Any	29	60%
Antidepressant medication (any)	18	34%
Psychotherapy (any)	25	47%

Table 3, 43% of these individuals with symptomatic PTSD were currently receiving any kind of medication or psychotherapy treatment for their condition, while 70% had received treatment at any point in their lifetimes. Twenty-two percent of older adults were currently receiving an adequate dose and duration of first-line pharmacotherapy for PTSD, while a total of 34% reported any past medication treatment. Twenty-six percent of participants were currently receiving any psychotherapy treatment, but none of these (0%) were evidence-based psychotherapies for PTSD. Forty-seven percent of older adults with PTSD had past psychotherapy trials, but only $N = 2$ of these cases (4% overall) were with an evidence-based psychotherapy for PTSD.

4 | DISCUSSION

In this combined sample of community-dwelling adults with PTSD, we found evidence for a lower frequency of avoidance symptoms and a higher frequency of hyperarousal symptoms in older adults relative to younger PTSD patients. Despite a high degree of symptomatology (mean CAPS = 34.9), these older adults with PTSD were receiving treatment for their condition at strikingly low rates. Less than 25% of the sample was receiving a first-line pharmacotherapy option for PTSD, and 0% of participants were currently participating in an evidence-based psychotherapy for PTSD.

Slightly different selection criteria between the studies contributing data, most notably Study 2 requiring a CAPS minimum threshold whereas Study 1 did not, confound direct comparisons of total symptom severity scores between younger and older adults in this analysis. However, despite having CAPS total scores that were not significantly different from one another, older and younger adults with PTSD differed markedly in their characteristic symptom profiles. This finding suggests, though does not conclusively demonstrate, that while total symptom severity may remain relatively constant, an individual's specific symptom profile may change over time. If this is the case, then total CAPS scores may be less informative assessments of an individual's changing illness across the lifespan than examining alterations in specific symptom constellations.

A lower frequency of avoidance symptoms in older compared to younger adults is consistent with past findings. Avoidance-based coping strategies that are effective for managing PTSD symptoms earlier in life (e.g., drinking alcohol, spending increased time at work) may be less available or effective as individuals age.[36] However, it is possible that a finding of diminished avoidance symptoms in older adults may also reflect the longer duration of symptomatology experienced. Older adults may have become accustomed to lifestyle practices they once may have considered avoidant and may not recall all of the premorbid behaviors they have curtailed. Previously reported findings on the relative frequency of hyperarousal symptoms across the lifespan have been divergent, though the finding here of a greater preponderance of these symptoms characterizing PTSD in older adults is most common in the literature.[28,29] One possible explanation for this finding is a greater occurrence of difficulty concentrating and insomnia in older adults (both Criterion E symptoms), which may also occur as symptoms in the context of depression. As PTSD and MDD are highly comorbid[37] and subthreshold depressive symptoms are common in older adults,[38] it is critical for studies of age-effects on PTSD phenomenology to comprehensively assess depression.

It is reasonable to consider whether age-related neurobiological changes may help explain these symptom differences, including altered structure and function of the locus coeruleus (LC) over the lifespan. Histological studies show the number of adrenergic neurons in the LC increases until age 60, after which it decreases.[39,40] Structural MRI studies quantifying the amount of neuromelanin in the LC (a measure of neuronal number) report low values in young and elderly subjects compared to relatively higher values in middle-

aged subjects.[41] Age-related change in the LC is germane to PTSD, because norepinephrine (NE) derived from LC neurons is a principal mediator of stress responses: increased baseline CSF NE concentrations and increased CSF NE responses to psychological stressors are observed in PTSD patients.[42,43] As studies suggest increased NE release induces flashbacks and increases autonomic responses in patients with PTSD[44] in addition to contributing to hyperarousal, increased startle, and encoding of fear memories, one might have expected older adults to demonstrate reduced hyperarousal symptoms (i.e., opposite the pattern of results found here).[45] However, complexity may be introduced by compensatory processes such as modulation of norepinephrine transporter (NET) and/or adrenergic receptor number occurring in the context of decreasing NE availability. Future studies may investigate the degree to which alterations in noradrenergic tone and signaling may underlie symptom differences between younger and older adults.

Perhaps the most dramatic findings of the present study were the low rates of adequate treatment being received by older adults. As these data come from participants who were not systematically sampled across a population but rather were self-selected volunteers for an ongoing research study, our ability to generalize these results is limited. Nonetheless, it is striking, given what is known about the serious adverse mental and physical health effects of untreated PTSD in older adults and the high degree of symptomatology suffered by the study participants, that so few were currently receiving first-line treatment. One might ask whether the low rates of current treatment are explained by participants having tried and failed pharmacotherapy and psychotherapy options in the past. While the studies contributing data to this analysis were not originally designed to comprehensively assess past treatments, the data we were able to analyze did not appear to support this explanation. Less than half of the older adults evaluated had ever been treated with psychotherapy, and approximately two-thirds had never received PTSD pharmacotherapy. A compelling future direction for research is to study whether effective treatment of PTSD may be capable of mitigating the accelerated aging and dire longitudinal health trajectories experienced by these older adults.

While these findings of differences in the clinical presentation of PTSD and low rates of adequate treatment among older adults with PTSD are consistent with several past studies, they must be interpreted in light of several limitations. Most notably, the older adults in Study 2 had experienced a mean duration of illness of 24.8 ± 15.6 years prior to their evaluation. Since older participants have the opportunity for greater passage of time since their index trauma compared to younger individuals, we cannot be certain whether the symptom differences observed are caused by aging or increased duration of time since the trauma. Second, the studies contributing data to the present analysis were not originally designed for this purpose, and there could be other differences between participants in Study 1 and Study 2 that help to explain the symptom differences found. Most notably, the two studies utilized differing diagnostic classification systems (DSM-IV for Study 1, DSM5 for Study 2), were staffed by differing research personnel and clinicians, and were separated in time (Study 2 began two years after Study 1). Significant depressive disorders requiring treatment as well as psychotropic medication use were exclusionary in Study 1, which contributed to a greater proportion of the sample being diagnosed with MDD in Study 2. Interestingly, mean HRSD scores did not differ significantly between the two studies, possibly mitigating the severity of this limitation. Third, the sample size for the analyses presented was relatively small, and larger future studies should endeavor to replicate the findings here. Despite these limitations, the current study raises the intriguing possibility that differing symptom profiles may contribute to under-diagnosis and/or decreased treatment-seeking behavior in older adults and therefore suggests that outreach efforts screening for PTSD in the elderly are warranted.

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CONFLICT OF INTEREST

Dr. Rutherford had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Drs. Rutherford, Zilcha-Mano, Yehuda, Neria, and Roose; Ms. Chrisanthopoulos, Salzman, and Zhu; and Mr. Cimino have no disclosures or conflicts of interest to report. This paper has not been previously presented.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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