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Comparing clinical characteristics and treatment outcomes between Veterans and non-Veterans with hoarding disorder

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Abstract

Background: Because Veterans have higher rates of mental health conditions and both physical and mental health comorbidities are known to affect treatment outcomes, the purpose of this investigation was to compare the rates of risk factors for poor hoarding treatment outcomes between Veterans and non-Veterans with hoarding disorder (HD). This is the first study to investigate differences between Veterans and non-Veterans with HD.

Material and methods: Baseline data were used from three different treatment studies of adults with hoarding disorder ($n = 159$). Demographic characteristics, baseline hoarding symptom severity, baseline medical and psychiatric comorbidities, and treatment attrition and response were compared between Veterans and non-Veterans.

Results: Veterans were significantly less likely to be employed than non-Veterans. Veterans did not report significantly more severe hoarding symptoms at baseline when compared to non-Veterans. Veterans reported having a greater mean number of overall medical and psychiatric comorbidities. Veterans were more likely than non-Veterans to meet criteria for major depressive disorder and post-traumatic stress disorder. There was no significant difference in the rate of attrition between Veterans and non-Veterans and Veterans were not significantly more likely to be classified as treatment responders.

Conclusion: Many similarities were observed between the two groups, including demographic characteristics, hoarding symptom severity, and rates of treatment response. Given that Veterans with HD may suffer from greater medical and psychiatric comorbidities, clinicians should ensure

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that their clients are receiving adequate medical care and that any other psychiatric comorbidities should be addressed in conjunction for treatment with HD.

Keywords

Hoarding disorder; Veterans; Characterization

1. Introduction

Hoarding disorder (HD) is a chronic and progressive obsessive-compulsive spectrum disorder characterized by persistent difficulty discarding possessions, urges to save items, and distress associated with discarding objects regardless of their value [1]. Between 2 and 6% of the general population have HD [2-4], and HD has been linked with multiple negative outcomes, including health problems, functional impairment, diminished quality of life, and safety hazards [5-9]. Hoarding is associated with increased rates of comorbid anxiety and depression, social, occupational, and family problems, falls and fire within the home, and poor nutrition [8,10]. Thus, HD represents a noteworthy public health concern that is costly to both individuals and society [11].

There are approximately 18.5 million Veterans in the US making up 7.4% of the population [12]. Evidence has shown an association between military service and negative physical [13] and mental health outcomes [14]. In a sample of 211 Veteran and 554 non-Veteran community college students, Veterans had a significantly higher prevalence of positive screens for depression (33.1% versus 19.5%), post-traumatic stress disorder (PTSD) (25.7% versus 12.6%) and suicidal ideation (19.2% versus 10.6%) [15]. Even when controlling for demographic factors, including age, gender and race/ethnicity, Veterans were significantly more likely than non-Veterans to screen positive for depression and suicidal ideation [15].

Because Veterans have higher rates of mental health conditions [15] and both physical and mental health comorbidities are known to affect treatment outcomes [16], Veterans may be less likely to respond to treatment for HD. Furthermore, given the deleterious effects of HD observed in community-dwelling samples [5-9], Veterans with HD may be particularly susceptible to the psychosocial and functional impairments associated with hoarding. The main purpose of this investigation was to compare the rates of treatment barriers between Veterans and non-Veterans with HD. We further sought to compare treatment outcomes and examine associations between the number of comorbidities and treatment outcomes between Veterans and non-Veterans with HD. This is the first study to investigate differences between Veterans and non-Veterans with HD. Given the established association between HD and negative psychosocial outcomes, investigating these questions in individuals with HD may provide additional insights into differences between Veterans and non-Veterans. We hypothesized that Veterans would have 1) more severe hoarding symptoms, 2) more psychiatric and mental health conditions, and 3) higher attrition from hoarding treatment than would their non-Veteran counterparts. Due to these factors, we further hypothesized that Veterans would not respond as well to treatment compared to non-Veterans with HD.

2. Material and methods

2.1. Participants

Baseline data were used from three different treatment studies of adults with hoarding disorder (n = 159). The outcome results of two of these studies, which recruited from the community and included both Veterans (n = 76) and non-Veterans (n = 83), have previously been published [17,18]. The third study is an ongoing treatment study for Veterans with hoarding disorder. Post-treatment assessment scores from the two completed studies were also used in the current investigation to examine the impact of Veteran status on study attrition and treatment outcomes. There were four treatment conditions across the two completed studies: individual care management, individual Cognitive Rehabilitation and Exposure/Sorting Therapy (CREST), group CREST, and group exposure therapy only. More details about treatment conditions can be found in the original articles [17,18]. Within each study, participants received only one type of intervention (e.g., individual care management **OR** individual CREST).

Twelve individuals participated in multiple studies; only the participants' data from their first instance of participation was included. All participants provided written informed consent and all studies were approved by the local Institutional Review Board. All participants were required to meet the HD criteria from the fifth edition of the *Diagnostic and Statistical Manual of Mental Health Disorders* (DSM-5) [1] as determined by clinical interview.

2.2. Measures

Hoarding severity was assessed using the Saving Inventory Revised (SI-R) [19] and the Clutter Image Rating (CIR) [20]. The SI-R is a 23-item Likert-type scale that can be summed to create a total score in which higher scores indicate more severe hoarding symptom severity. Total scores on the SI-R range from 0 to 92. The SI-R also has three subscales which reflect the three core symptoms of hoarding disorder: acquisition, difficulty discarding, and excessive clutter. The SI-R demonstrated adequate internal consistency in the current sample (α = 0.89). The CIR is a three-item pictorial assessment of clutter volume in the participant's home. The participant's ratings (from 1 to 9) of the clutter volume in their living room, bedroom, and kitchen are averaged together to create a mean score in which higher scores indicate increased clutter volume. The CIR demonstrated adequate internal consistency in the current sample (α = 0.84).

Psychiatric comorbidities were determined using the Mini International Neuropsychiatric Interview (M.I.N.I.) [21,22]. The M.I.N.I. for the DSM-IV was used to determine the psychiatric comorbidities for the participants in the two previously published studies. The M.I.N.I. for the DSM-5 was used to determine the psychiatric comorbidities for the participants in the ongoing treatment study. Medical comorbidities were self-reported by the participants.

2.3. Data analysis

All analyses were performed using Stata version 13.0 [23]. The distribution of all continuous variables was examined for normality and homogeneity of variance. All variables met the assumptions of normality. Pairwise deletion was used to handle missing data. Demographic characteristics, baseline hoarding symptom severity, and baseline medical and psychiatric comorbidities were compared between Veterans and non-Veterans using X^2 analyses and *t*-tests. Attrition and treatment response were compared between Veterans and non-Veterans from the two previously published treatment outcome studies using X^2 analyses ($n = 106$). Treatment response was defined as scoring <41 on the SI-R or <4 on the CIR at post-treatment. Participants who dropped out of treatment prior to the post-treatment assessment were categorized as non-responders [17,18]. Due to the exploratory nature of the investigation, no corrections were applied for multiple comparisons.

3. Results

3.1. Demographic characteristics

Table 1 displays descriptive statistics for the demographic characteristics of the Veteran and non-Veteran groups. Veterans were significantly less likely to identify as female than were non-Veterans ($p < .001$). There was no significant difference between Veterans and non-Veterans in mean age, years of education, race (% Caucasian), or marital status (% married or living with a partner). Veterans were significantly less likely to be employed than non-Veterans (% employed full- or parttime; $p < .001$).

3.2. Hoarding symptom severity

Hoarding symptom severity and medical and psychiatric comorbidities are displayed in Table 2. Veterans did not report significantly more severe hoarding symptoms at baseline when compared to non-Veterans on the SI-R Total. There was also no significant difference between Veterans and non-Veterans on participants' ratings of their baseline home clutter levels on the CIR.

3.3. Medical and psychiatric comorbid conditions

Veterans reported having a greater mean number of overall medical and psychiatric comorbidities ($p < .0001$). Veterans reported having a greater mean number of medical illnesses ($p < .001$). In particular, Veterans were more likely to report having hypertension ($p = .003$), sleep apnea ($p = .016$), kidney disease ($p = .006$), diabetes ($p = .004$), history of head injury ($p = .028$), and gout ($p = .043$). There was no difference in reported incidence of stroke, cancer, emphysema, ulcers, hepatitis, bleeding tendencies, seizures, heart disease, high cholesterol, asthma, tuberculosis, colitis, anemia, or arthritis.

Significantly more Veterans than non-Veterans met criteria for at least one psychiatric comorbidity (72.37% vs. 56.10%; X^2 (1) = 4.53, $p = .033$) and Veterans met criteria for significantly more comorbid psychiatric conditions than did non-Veterans ($p = .02$). Veterans were more likely than non-Veterans to meet criteria for major depressive disorder ($p = .002$) and post-traumatic stress disorder ($p = .001$). Veterans were not significantly more likely

than non-Veterans to meet criteria for social anxiety disorder, obsessive-compulsive disorder or generalized anxiety disorder.

3.4. Treatment response and attrition

Of the participants who participated in completed treatment outcome studies (n = 106), 21.7% were Veterans. Descriptive statistics for treatment response and attrition variables in Veterans and non-Veterans are presented in Table 3. Of the 23 Veterans who participated in completed treatment studies, 13% dropped out of treatment before the post-treatment assessment. There was no significant difference in the rate of attrition between Veterans and non-Veterans. Across both studies and all four treatment conditions, Veterans were not significantly more likely to be classified as treatment responders on the SI-R or on the CIR for either group treatment or individual psychotherapy for hoarding disorder.

Because Veterans reported significantly more comorbid conditions at baseline assessment, the number of medical and psychiatric comorbidities was also investigated as a potential predictor of attrition and treatment response. Table 4 displays the characteristics of participants who did and did not drop out of treatment for hoarding disorder. Participants who dropped out of treatment prior to the post-treatment assessment did not have a significantly greater mean number of medical and psychiatric comorbid conditions at baseline.

Participants who were classified as responders on the CIR had significantly fewer comorbid conditions at baseline (p = .008). Followup tests suggested that this was true both for number of medical comorbid conditions (non-responders: 3.15, SD = 2.53; responders: 2.30, SD = 1.70; t (99) = 2.01, p = .024) and for number of psychiatric comorbidities (non-responders: 1.31, SD = 1.22; responders: 0.89, SD = 1.08; t (103) = 1.86, p = .033). However, participants who were classified as responders on the SI-R Total did not have significantly greater mean number of medical and psychiatric comorbid conditions at baseline.

4. Discussion

This investigation is the first study to compare the presentation of Veterans and non-Veterans in a sample of individuals with HD. Many similarities were observed between the two groups, including demographic characteristics and hoarding symptom severity. However, consistent with prior studies [15], Veterans in this sample were more likely than non-Veterans to meet criteria for at least one comorbid psychiatric condition and for multiple psychiatric comorbid conditions, with the most common including major depressive disorder (about twice as common in Veterans) and post-traumatic stress disorder (about five times more common in Veterans). Veterans reported higher rates of hypertension, sleep apnea, kidney disease, diabetes, history of head injury, and gout than did non-Veterans. This finding is congruent with previous research suggesting a linkage between Veteran status and physical health comorbidities [13,14], which may be the result of lower social economic status [24]. Despite differences in potential treatment barriers (i.e., medical and psychiatric comorbidities), there was no observed difference in study attrition or treatment outcomes between Veterans and non-Veterans.

In addition to Veterans having more co-morbid mental health and medical diagnoses, they were also more likely to be unemployed or on disability. It is not surprising that Veterans had higher rates of PTSD, depressive disorder, and history of head injury given their military service. It is remarkable that despite a number of factors that could potentially interfere with treatment, Veteran treatment outcomes were similar to those of non-Veterans. Given that comorbidities were associated with less treatment response on the CIR, one could speculate that there is something resilient about Veterans that allows them to succeed in treatment despite higher levels of comorbidities. For example, Veterans may use persistence or social support from other Veterans or family, friends, or community in order to be successful. Future work in Veterans may want to incorporate resiliency and coping as possible moderators of treatment response and may examine associations between risk factors and treatment outcomes to see if similar patterns are observed.

Although this study benefited from several strengths, such as the use of the DSM-5 criteria to diagnose HD and a relatively large and equivalent sample size, it also has limitations that limit generalizability. First, these groups were treatment seeking samples; thus, their clinical features may not be similar to individuals who do not have insight into their symptoms or who do not seek treatment. The lack of difference observed in treatment response between Veterans and non-Veterans may be an artifact of the manner in which treatment response was calculated. The current investigation used the same definition of treatment response as the original treatment outcome studies [17,18]; using a different definition of treatment response may have revealed a difference between Veterans and non-Veterans that was not observed in the current investigation. Furthermore, because this is an older age group that we know may differ in clinical characteristics to younger individuals with HD [25], results may only be relevant to HD in older samples. Finally, no corrections were made for the multiple comparisons analyzed, which may have resulted in erroneous conclusions.

5. Conclusions

Given that Veterans with HD may suffer from greater medical and psychiatric comorbidities, clinicians treating Veterans should ensure that their patients are receiving adequate medical care and that any other psychiatric comorbidities are being addressed in conjunction with treatment for HD. Clinicians working with Veterans should conduct a thorough clinical examination to understand the potential treatment barriers that Veterans may face, including increased rates of unemployment. However, the increased treatment comorbidities and treatment barriers experienced by Veterans may not affect the ability of Veterans to engage in and benefit from treatment for HD. Clinicians treating Veterans HD should consider targeting hoarding behaviors before focusing on comorbid psychiatric symptoms. Future research should focus on examining differences in treatment response in various subgroups of individuals with HD and how aspects of resiliency may moderate outcomes.

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Table 1

Descriptive statistics for the demographic characteristics of Veterans and non-Veterans with hoarding disorder.

	Veterans (*n* = 76)	**Non-Veterans (*n* = 83)**	χ^2	***df***	***p***
Age, mean (*SD*)	61.09 (10.93)	62.36 (8.97)	*t* = 0.80	157	0.212
Education, mean (*SD*)	15.5 (3.06)	15.96 (2.12)	*t* = 1.07	148	0.144
Women, *n* (%)	23 (30.26%)	74 (89.16%)	57.84	1	<0.001
Race, *n* (%)					
White	53 (69.74%)	65 (78.31%)	1.52	1	217
Black	5 (6.58%)	3 (3.61%)			
Asian	4 (5.26%)	5 (6.02%)			
Hispanic	3 (3.95%)	5 (6.02%)			
Native American	2 (2.63%)	0 (0.00%)			
Biracial	7 (9.21%)	4 (4.82%)			
Other	2 (2.63%)	1 (1.20%)			
Marital status, *n* (%)					
Married or living with someone	23 (30.26%)	24 (29.27%)	0.019	1	0.891
Never married	24 (31.58%)	25 (30.49%)			
Separated/divorced	25 (32.90%)	28 (34.15%)			
Widowed	4 (5.26%)	5 (6.10%)			
Employment status, *n* (%)					
Employed full- or part-time	12 (15.79%)	35 (42.68%)	13.65	1	<0.001
Retired	40 (52.63%)	36 (43.90%)			
Not working; receiving disability income	11 (14.47%)	3 (3.66%)			
Unemployed	13 (17.11%)	8 (9.76%)			

Table 2

Hoarding symptom severity and medical and psychiatric comorbid conditions in Veterans and non-Veterans with hoarding disorder.

	Veterans (*n* = 76)	**Non-Veterans (*n* = 83)**	χ^2	***df***	***p***
Hoarding symptom severity, mean (*SD*)					
Savings inventory – revised (SI-R) Total	58.99 (14.82)	60.51 (11.43)	*t* = 0.73	156	0.234
Clutter image rating (CIR)	3.77 (1.83)	4.22 (1.67)	*t* = 1.63	157	0.052
Number of overall medical and psychiatric comorbidities, mean (*SD*)	5.12 (2.85)	3.32 (2.24)	*t* = 4.31	149	<0.001
Number of medical conditions, mean (*SD*)	3.74 (2.65)	2.36 (1.89)	*t* = 3.72	150	<0.001
Number of psychiatric comorbidities, mean (*SD*)	1.37 (1.14)	1.00 (1.14)	*t* = 2.02	156	0.020
Presence of medical comorbid condition, *n* (%)					
Hypertension	47 (61.84%)	30 (37.97%)	8.83	1	0.003
Sleep apnea	31 (40.79%)	18 (22.78%)	5.81	1	0.016
Kidney disease	7 (9.21%)	0	7.62	1	0.006
Diabetes	20 (26.32%)	7 (8.86%)	8.20	1	0.004
History of head injury	19 (25%)	9 (11.39%)	4.85	1	0.028
Gout	8 (10.53%)	2 (2.53%)	4.10	1	0.043
Stroke	5 (6.58%)	3 (3.80%)	0.61	1	0.434
Cancer	14 (18.42%)	11 (13.92%)	0.58	1	0.447
Emphysema	4 (5.26%)	1 (1.27%)	1.98	1	0.159
Ulcers	5 (6.58%)	3 (3.80%)	0.61	1	0.434
Hepatitis	6 (7.89%)	5 (6.33%)	0.14	1	0.700
Bleeding tendencies	6 (7.89%)	3 (3.80%)	1.19	1	0.280
Seizures	4 (5.26%)	4 (5.06%)	0.003	1	0.955
Heart disease	13 (17.11%)	6 (7.59%)	3.26	1	0.071
High cholesterol	32 (42.67%)	37 (46.84%)	0.27	1	0.603
Asthma	11 (14.47%)	9 (11.39%)	0.33	1	0.567
Tuberculosis	3 (4.00%)	1 (1.27%)	1.14	1	0.286
Colitis	2 (2.63%)	1 (1.27%)	0.38	1	0.537
Anemia	9 (11.84%)	8 (10.26%)	0.10	1	0.754
Arthritis					
Presence of psychiatric comorbid diagnosis, n (%)					

	Veterans (n = 76)	Non-Veterans (n = 83)	χ^2	df	p
Obsessive-compulsive disorder (OCD)	11 (14.47%)	19 (23.17%)	1.94	1	0.164
Generalized anxiety disorder (GAD)	15 (19.74%)	20 (24.39%)	0.50	1	0.482
Major depressive disorder (MDD)	47 (61.84%)	30 (36.59%)	10.07	1	0.002
Post-traumatic stress disorder (PTSD)	18 (23.68%)	4 (4.88%)	11.64	1	0.001
Social anxiety disorder (SAD)	13 (17.11%)	9 (10.98%)	1.24	1	0.266

Table 3

Treatment attrition and response in Veterans and non-Veterans with hoarding disorder.

	Veterans (*n* = 23)	**Non-Veterans (*n* = 83)**	χ^2	*df*	p
Attrition					
Dropped out of treatment prior to post-treatment assessment	3 (13.04%)	20 (24.10%)	1.30	1	0.255
% treatment responders for group treatment					
Savings inventory – revised (SI-R) total	4 (36.36%)	9 (24.32%)	0.62	1	0.430
Clutter image rating (CIR)	6 (54.55%)	21 (56.76%)	0.017	1	0.897
% treatment responders for individual treatment					
Savings inventory – revised (SI-R) total	6 (50%)	18 (39.13%)	0.46	1	0.496
Clutter image rating (CIR)	7 (58.33%)	24 (52.17%)	0.15	1	0.703

Table 4

Characteristics of participants in treatment outcome studies for hoarding disorder.

	Number of overall medical and psychiatric comorbidities, mean (*SD*)	*t*	*df*	*p*
Attrition				
Dropped out of treatment (*n* = 23)	4.43 (3.31)	1.48	98	0.072
Completed treatment (*n* = 83)	3.56 (2.21)			
Treatment response on the savings inventory – revised (SI-R) total				
Responder (*n* = 37)	3.26 (2.15)	1.48	98	0.072
Non-Responder (*n* = 69)	4.03 (2.67)			
Treatment response on the clutter image rating (CIR)				
Responder (*n* = 58)	3.19 (2.09)	2.47	98	0.008
Non-responder (*n* = 48)	4.40 (2.81)			