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ORIGINAL PAPER

Profiles of Clinical Need Among Homeless Individuals with Dual Diagnoses

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Abstract

This study explored patterns of clinical need among homeless individuals with dual diagnoses, and explored whether certain profiles are characteristic of different demographic groups. Data were drawn from two larger studies conducted with dually diagnosed, homeless individuals ($n=373$). Hierarchical cluster analysis identified four subgroups: (1) Clinically least severe, characterized by less frequent psychological symptoms and no history of physical or sexual abuse; (2) Moderate clinical needs, including shorter history of substance use and less frequent psychological symptoms, but symptoms consistent with severe mental illness; (3) Clinically severe, with frequent anxiety, depression, past and recent physical or sexual abuse, and long history of substance use; (4) Least frequent psychological symptoms, but frequent history of physical or sexual abuse and long history of drug use. Women veterans were mostly likely to be classified in cluster 3, and male civilians in cluster 2. Subgroups of homeless individuals with dual diagnoses demonstrated different clusters of clinical needs, having implications for service delivery to the population.

Keywords Homeless · Cluster analysis · Women · Veterans · Substance use

Homelessness stems from a complex interaction of intrapersonal and structural factors (Fazel et al. 2014), with substance abuse and mental illness primary among the intrapersonal contributors (Jainchill et al. 2000; Tsai et al. 2013). According to the 2016 Department of Housing and Urban Development (HUD) continuum of care report on homeless populations, of the 549,928 homeless persons in the United States (US), 107,801(19.6%) have severe mental illness, 94,496 (17.2%) have chronic substance abuse, and 39,471 (7.2%) are Veterans (HUD, United States Department of Housing and Urban Development 2016). Furthermore, among those with mental illness, 50–70% have dual diagnoses—both psychiatric and substance use disorders (Padgett et al. 2006). Additionally, research has shown that homeless individuals with dual diagnoses often have worse treatment engagement and outcomes (e.g., social and clinical adjustment, return to homelessness) compared to homeless individuals without co-occurring disorders or with SUD only (SAMHSA 2013; Ibabe et al. 2014). Empirical evidence has shown mixed results on the efficacy of housing interventions for homeless individuals with SUD (Kertesz et al. 2009; Somers et al. 2015), which may be impacted by the heterogeneity of clinical needs among this population. As in the broader field of treatment research (Kazdin 2007), examining the heterogeneity among homeless individuals seeking care may inform best approaches to providing wraparound services and other therapies.

Thus, it is possible that the efficacy of treatment for dually diagnosed homeless individuals may be dependent on the heterogeneity of clinical presentation. However, much of the existing research among this sub-population examines the presence of clinical issues in isolation—for example, rates of trauma, certain psychological disorders, or general substance use as independent issues. Examining the presence

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of multiple clinical issues as they cluster together, using a person-centered statistical approach rather than focusing on clinical needs in a variable-centered approach (e.g., comparing rates of individuals with trauma to those without trauma), may more adequately capture the heterogeneity of clinical needs.

Several studies have taken a similar approach to classifying needs among the general population of homeless, but not dually diagnosed, individuals (Kuhn and Culhane 1998; Morse et al. 1992; Munoz et al. 2005; Bonin et al. 2009; Aubry et al. 2012). While these studies each examined different variables and found different numbers of clusters (between three and six), there were some similar findings across studies. All of these studies found a cluster that was higher functioning, with economic disadvantage as a characteristic feature, with one study finding that women were more represented in this cluster than men (Bonin et al. 2009). These studies did not report any further gender differences across clusters. While some studies found separate clusters of individuals with mental health conditions versus substance abuse conditions (e.g., Morse et al. 1992; Aubry et al. 2012), all but one (Morse et al. 1992) of these studies found at least one cluster characterized by co-occurring substance abuse and mental health conditions. Another study which focused on mental health needs among homeless young adults found three somewhat similar clusters: (1) minimal mental health or substance abuse conditions; (2) mood and conduct disorder, and substance use; and (3) post-traumatic stress disorder, mood, and anxiety symptoms (Hodgson et al. 2015). In this study, cluster membership was associated with gender, with men being more likely to fall into cluster 2, and women into cluster 3 (Hodgson et al. 2015); additionally, cluster membership was associated with follow-up measures, including mental health status, service use, and suicide risk. Thus, studies examining profiles of clinical needs among homeless individuals regularly identify at least one cluster that is characterized by the presence of dual mental health and substance abuse diagnoses, and large epidemiological studies suggest that these individuals are a significant portion of the homeless population who are in need of specialized care (Morse et al. 1992); however, fewer studies have examined the clinical issues that are characteristic of these more severely affected homeless individuals. Therefore, the goal of the current study was to explore patterns of clinical needs, specifically among homeless adults with dual diagnoses. Based on these previous studies examining clusters of need among homeless individuals, we examined the clustering of symptoms related to internalizing psychiatric symptoms (e.g., anxiety, depression, cognitive difficulties), externalizing symptoms (violent behavior, substance use), and trauma exposure (physical and/or sexual abuse specifically). We additionally sought to explore whether certain profiles of need would be characteristic of different demographic groups, including gender and veteran status (the latter of which, to our knowledge, has yet to been examined).

Methods

Procedure

Baseline data were drawn from two studies examining a wraparound intervention called maintaining independence and sobriety through systems integration, outreach, and networking (MISSION), for homeless adults with dual diagnoses (Smelson et al. 2013, 2016). MISSION is designed as a 12-month wraparound intervention which centers around five treatment components that are integrated into one system of care: critical time intervention case management (to provide housing support and service linkages in the community), dual recovery therapy (thirteen therapeutic sessions), peer support, vocational/educational support, and trauma informed care (see Smelson et al. 2016 for additional details). Both study samples were comprised of chronically homeless individuals with dual diagnoses, allowing us to examine clinical needs among this population. The first study used a quasi-experimental design to compare the MISSION wraparound intervention to treatment as usual among dually diagnosed homeless veterans. Participants in this first study were veterans who met eligibility criteria (described below) and had entered a domiciliary for homeless veterans in New Jersey. The second study was a single-group, open pilot study intended to examine the feasibility of providing MISSION along with permanent supportive housing for homeless veterans and civilians living in both rural and urban communities in Massachusetts. Participants enrolled in this second study were those who met eligibility criteria (detailed below) and were interested in receiving MISSION for 1 year along with supportive housing. All data used in the current analyses were taken from the baseline intake interviews for these two studies; larger study outcomes were reported elsewhere (Smelson et al. 2013, 2016).

Participants

Participants for both studies were chronically homeless, as defined by the U.S. Department of HUD (Housing and Urban Development 2011). While those in the second study were recruited from the community ($n = 106$), individuals in the first study were entering the Domiciliary for Homeless Veterans Program and were recruited for the study within a week of arrival ($n = 267$). Participants in study one were recruited within a week of presenting at the Domiciliary for Homeless Veterans Program at the VA New Jersey Health Care System. A waitlist control design was used to test

MISSION to MISSION + Treatment as usual. Study recruitment was embedded within the residential VA program, as patients were admitted. Participants in study two were recruited from a state regional network of individuals who were tasked with tracking information on homeless individuals within one of ten Massachusetts cities. The network would meet weekly to discuss disposition of homeless individuals, and referrals were directly made to the MISSION program. Given that MISSION was offering transportation, housing, and job support to these chronically homeless individuals, rates of refusal by referred individuals was minimal in both studies.

The total sample, across studies, included in analyses was $n = 373$. Inclusion criteria were as follows: 1. Current *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*) diagnosis of substance abuse or dependence and a co-occurring psychiatric disorder (e.g., depression, anxiety, or personality disorder); 2. Chronic homelessness; in study 1, participants needed to be unemployed; in study 2 individuals with a history of substance abuse/dependence and concern about potential relapse were also eligible. Exclusion criteria were: 1. *DSM-IV* diagnosis of schizophrenia, schizoaffective disorder, or bipolar I disorder (in study 2, participants with bipolar I without psychotic features were eligible); 2. Serious risk of suicide; 3. Unable to provide informed consent. In study 1, participation in a methadone maintenance program was exclusionary; in study 2, participants in need of immediate medical attention were excluded. Participants with more severe mental illness were excluded from these original studies, considering those studies' goals, as there are fewer programs existing exclusively for individuals with less severe mental illness and a co-occurring substance abuse problem (Smelson et al. 2016).

Participants' mean age was 47.2 ($SD = 8.8$) and they had been homeless an average of 4.7 years ($SD = 6.5$) over their lifetime. A majority of the sample (89.7%) was male and veteran (82.1%). With regard to race/ethnicity, 34.0% of participants were White/Non-Hispanic, 53.2% Black/Non-Hispanic, 11.7% Hispanic, and 1.1% Other/Non-Hispanic. See Table 1 for a break-down of characteristics by study.

Measures

All measures were administered via baseline semi-structured interview with study staff. In both studies, participants' psychiatric diagnoses and rule out for more severe mental illness (as outlined in the exclusion criteria) were established via the structured clinical interview for DSM-IV disorders (SCID-IV) (First and Gibbon 2004). Individual items of interest for the current analyses were derived from the addiction severity index (ASI) (McLellan et al. 1980), and the Government Performance and Results Act Questionnaire

Table 1 Participant information by study

	Study 1 $n = 267$ (71.6%)	Study 2 $n = 106$ (28.4%)	p value from t-test or χ^2 comparing studies
Age *M (SD)*	46.1 (8.2)	47.8 (10.9)	.12
Gender *(n, % male)*	250 (93.6%)	79 (74.5%)	.00**
Veteran status *(n, % Veteran)*	267 (100%)	27 (25.5%)	.00**
Years Homeless *M(SD)*	4.0 (6.7)	7.7 (7.0)	.00**
Ethnicity & race *n* (% of each study *n*)			.00*
White non-hispanic	86 (32.2%)	55 (51.9%)	
Black non-hispanic	154 (57.7%)	22 (20.8%)	
Hispanic	23 (8.6%)	24 (22.6%)	
Other non-hispanic	1 (0.4%)	5 (4.7%)	
Cluster analysis variables			
Years alcohol use *M(SD)*	21.4 (12.2)	1.7 (5.2)	.00**
Years illicit drug use *M(SD)*	19.2 (11.3)	14.9 (12.1)	.00**
Years alcohol + drug use *M(SD)*	13.0 (11.4)	10.4 (12.0)	.05
Past 30 days anxiety/tension *M(SD)*	13.9 (11.6)	12.7 (11.3)	.36
Past 30 days trouble concentrating *M(SD)*	11.0 (12.6)	10.9 (12.2)	.91
Past 30 days depression *M(SD)*	12.1 (11.9)	11.3 (10.9)	.57
Past 30 days hallucinations *M(SD)*	0.7 (3.6)	2.2 (6.5)	.02*
Past 30 days violent behavior *M(SD)*	1.2 (4.6)	1.0 (3.8)	.74
Lifetime physical abuse *(n, % Yes)*	100 (24.2%)	1 (0.01%)	.00**
Lifetime sexual abuse *(n, % Yes)*	66 (16.0%)	40 (28.6%)	.01*

*$p < .05$; **$p < .01$

(GPRA) (Substance Abuse and Mental Health Administration/SAMHSA 2010). The ASI assesses substance abuse severity and has been used extensively among individuals with co-occurring conditions (McLellan et al. 1992). Multiple studies have reported evidence of reliability and validity across age, race, sex, and primary drug problem (McLellan et al. 1992). The GPRA was a requirement for the both projects' funding and provided information on demographics, recent mental health symptoms, and past physical or sexual abuse (SAMHSA 2010). Ten individual items were selected from these measures, as they assessed the experiences and symptoms in which we were interested; these questions, along with descriptive statistics for the variables, are written in full in Table 2. Descriptive statistics for each variable included in the cluster analysis are in Table 1, and Table 2 provides variable descriptive statistics based on cluster membership.

Data Analysis

We conducted a hierarchical cluster analysis using Ward's method in SPSS to identify distinct profiles of clinical need. Cluster analysis was based on individual items from the ASI or GPRA, using the following ten items: 1. Years of regular substance use, defined as 3–4 times per week for at least 6 months (alcohol, drugs, and both); 2. Number of days of past 30 in which the participant experienced individual psychological symptoms (anxiety, problems concentrating, depression, hallucinations, trouble controlling violent behavior); 3. Physical and sexual abuse history [if anyone abused participant physically (causing physical harm) or sexually (forced sexual advances/acts)]. All variables were first range-corrected (Milligan and Cooper 1988), and a hierarchical tree diagram and an agglomeration table were used to identify clusters of clinical needs across participants (Henry et al. 2005). For the agglomeration table, a larger coefficient between two clusters indicates a larger distance and a more distinct cluster, whereas smaller coefficients indicate greater similarity between clusters. Once the clusters were identified, we then used ANOVA and Chi square analyses to examine whether demographics, including age, employment, race/ethnicity, education, gender and veteran status (male civilian, female civilian, male veteran, female veteran), was associated with cluster membership.

Results

Across Study Comparisons

See Table 1 for demographics and comparisons across studies. While participants in study 2 (civilian and veteran population) had significantly more years of homelessness and were more likely to report sexual abuse, participants in study 1 (veteran population) reported more years of substance use and were more likely to report physical abuse. These

Table 2 Mean scores (SD) or percentage of participants endorsing clinical issues, across clusters

	Cluster 1 $n=142$, 38.1%	Cluster 2 $n=127$, 34.0%	Cluster 3 $n=47$, 12.6%	Cluster 4 $n=57$, 15.3%
Mean (SD) days out of past 30 experiencing psychological symptoms				
In the past 30 days, not due to your use of alcohol or drugs, how many days have you experienced ….				
Serious anxiety or tension?	***7.61 (8.48)***^{ab}	**19.39 (11.17)**^{acd}	**25.15 (6.23)**^{bce}	***5.70 (6.85)***^{de}
Trouble understanding, concentrating or remembering?	***3.04 (5.19)***^{ab}	**20.99 (12.15)**^{acd}	**15.68 (13.09)**^{bce}	***4.61 (7.11)***^{de}
Serious depression?	***6.06 (7.57)***^{ab}	**17.46 (11.73)**^{acd}	**24.43 (7.85)**^{bce}	***3.49 (4.99)***^{de}
Hallucinations?	***0.17 (1.20)***^{a}	**2.13 (6.44)**^{a}	1.89 (5.37)	0.56 (3.97)
Trouble controlling violent behavior?	***0.15 (0.65)***^{a}	**2.06 (6.23)**^{a}	1.83 (5.35)	0.84 (2.72)
Mean (SD) number of years of substance use				
In your lifetime, how many years have you used …				
Any alcohol?	14.53 (14.08)^{f}	***12.66 (13.30)***^{g,h}	**25.13 (12.18)**^{f,g,i}	**18.30 (12.92)**^{h,i}
Both alcohol and drugs (on the same day)?	10.59 (11.19)^{f}	***11.05 (11.45)***^{g}	**18.87 (12.06)**^{f,g,i}	**13.91 (10.92)**^{i}
Any illegal drugs?	***16.13 (12.13)***^{f}	**17.14 (11.66)**^{h}	**22.09 (10.93)**^{f}	**21.00 (10.08)**^{h}
Percent reporting physical and sexual abuse history				
Did anyone physically abuse you in your life?	0.0%	8.7%	100%	75.4%
Did anyone sexually abuse you in your life?	0.0%	33.1%	63.8%	59.6%

Superscripted letters represent significant differences ($p<.05$) between clusters based on ANOVA Bonferroni-corrected post hoc tests

Bold + underlined statistically highest rates; Bold statistically 2nd highest rates; Bold + italicized statistically lowest rates

differences across studies are likely due, at least partly, to the fact that study 1 was comprised of veterans and, while both studies were primarily male, there was a greater percentage of women in study 2. There were no differences across studies with regard to the majority of the psychological symptoms assessed. The differences across these studies reflect the diversity of the sample of homeless individual with co-occurring conditions included in these analyses; the differences do not map exactly onto the results of the cluster analysis (as described below), therefore the results do not appear to be an effect of study belongingness.

Cluster Analysis

We used the agglomeration schedule to distinguish distinct clusters of clinical needs. A larger coefficient between two clusters (e.g., transition from one to two or two to three clusters) indicates a larger distance and a more distinct cluster, whereas smaller coefficients indicate greater similarity between clusters. The results revealed that the step from one cluster to two clusters resulted in a change of 89.6; from two to three clusters, 64.2; from three to four, 34.6; plateauing at the transition from four to five clusters, 34.0. Thus, and in addition to examining the tree diagram, we determined that four clusters were optimal for describing the data, and further clustering yielded few additional benefits.

Cluster 1 was characterized by the least number of days experiencing psychiatric symptoms, the least number of years (along with cluster 2) of alcohol and/or drug use, and no physical or sexual abuse history. Cluster 2 was characterized by the most days experiencing psychiatric symptoms consistent with serious mental illness (SMI; hallucinations, trouble controlling violence, poor concentration), the least number of years of alcohol and/or drug use (along with cluster 1), and were less likely than clusters 3 and 4 to report history of physical and/or sexual abuse (yet 8.7% reported physical abuse and 33.1% reported sexual abuse). Cluster 3 was characterized by the highest number of days of anxiety and depression, the most number of years of using alcohol or alcohol and drugs, and had very high rates of physical and/or sexual abuse history (see Table 2 for exact numbers). Lastly, Cluster 4 was characterized by the least number of days experiencing psychiatric symptoms (with cluster 1) but the most years' drug use (specifically—not alcohol), and, along with cluster 3, were likely to report history of physical or sexual abuse. See Table 2 for additional data.

Comparing Clusters by Background Characteristics

Chi square analyses showed that the clusters differed significantly with respect to veteran status and gender, $\chi 2(9) = 54.61$, $p < .001$, but not the other demographics assessed (Bonferroni-corrected $p < .003$). See Table 3. Post-hoc tests with Bonferroni correction showed that women veterans were mostly likely to be classified as cluster 3 and least likely to be in cluster 1. Additionally, there was a greater proportion of male civilians (and lower proportion of male veterans) in cluster 2. There was also a lower proportion of male civilians in cluster 4 (comprised instead of women—civilian and veteran—and male veterans).

Discussion

While there have been several studies identifying clusters among the general population of homeless individuals, the current analyses looked within one particular sub-population that has been previously identified in those other studies—the cluster characterized by co-occurring mental health and substance abuse conditions. In our analyses, all participants had co-occurring conditions, and the cluster analysis still identified variation in clinical needs—a least severe cluster of individuals with the shortest history of mental health or substance abuse conditions (Cluster 1), a cluster with primarily mental health concerns (Cluster 2), a cluster primarily with history of sexual and/or physical abuse and substance abuse concerns (Cluster 4), and a cluster with significant mental health and substance abuse histories (Cluster 3). Male civilians were more likely to present with primarily mental health histories, and female veterans were most likely to present with significant mental health and substance use histories, including lifetime physical and sexual abuse.

Our findings build on previous research indicating differences in clinical needs of homeless individuals based on gender (Jainchill et al. 2000; Montgomery et al. 2015) and veteran status (Bowe and Rosenheck 2015). However, our research did not focus on a single demographic characteristic, instead examining patterns of needs. This allowed for a more person-centered approach that acknowledges the co-occurrence of symptoms within an individual. Past work identifying clusters within samples of homeless individuals has suggested the need for additional, specialized services for those with psychiatric or alcohol problems (Morse et al. 1992), and this research contributes to that work by identifying the nature of those needed services. For example, these findings suggest that certain profile groups were more heavily comprised of veterans, which has not, to our knowledge, been previously examined.

The clusters, and particularly the gender differences, found in this study were similar to those found among homeless young adults (Hodgson et al. 2015). In that study, young adult women were more likely to be characterized by the cluster characterized by substance use and poor mental health, including post-traumatic stress disorder (PTSD). In our sample, 78.9% of women reported a lifetime history of sexual abuse (vs. 17.9% in men) and 63.2% of women had

Table 3 Clusters by background characteristics

	Cluster 1: Clinically least severe	Cluster 2: Moderate psychological symptoms/Low substance use	Cluster 3: High anxiety, depression, substance use	Cluster 4: Low psychiatric symptoms, high trauma/drug use
Mean age	47.5 (10.0)	45.8 (10.2)	46.9 (6.2)	46.3 (6.1)
% Unemployed	93.8	94.4	95.5	92.9
Lifetime years homeless	5.0 (6.2)	5.5 (7.7)	4.8 (6.4)	5.2 (7.9)
Percent break-down of each veteran/gender group; percent of each group in respective clusters				
Male civilian	45.3	52.8[a]	1.9	0.0[b]
Male veteran	41.3	27.9[b]	14.1	16.7
Female civilian	15.4	57.7	0.0	26.9
Female veteran	0.0[b]	38.9	38.9[+]	22.2
Race/ethnicity—percent of each cluster				
White non-hispanic	38.3	40.4	7.8	13.5
Black non-hispanic	39.2	27.3	17.0	16.5
Hispanic	34.0	40.4	10.6	14.9
Other	50.0	50.0	0.0	0.0
Education				
< 12 years	36.4	57.6	3.0	3.0
12 years	53.6	35.7	3.6	7.1
Some college	50.0	28.6	0.0	21.4
BA/BS degree	33.3	66.7	0.0	0.0

Results of Chi square/ANOVA analyses (using Bonferroni correction) testing association between demographics and cluster membership. Only veteran/gender group was differentially associated with cluster

[a]Represents higher proportion represented in cluster than expected

[b]Represents lower proportion represented in cluster than expected; Bonferroni-corrected $p = .003$; Female civilians in cluster 2 was near-significant at $p = .008$

experienced sexual abuse *in the past 30 days* (vs. 9.7% of men). Furthermore, among women veterans, 85.2% reported lifetime sexual abuse. These women also reported frequent psychiatric symptoms. While traumatic experiences are common among homeless individuals (Ibabe et al. 2014), these findings suggest that trauma (specifically, sexual and physical abuse in our study) and post-trauma sequelae may be particularly relevant for women, and perhaps especially for women veterans who are homeless and have co-occurring mental health and substance abuse conditions. Although our sample of women was small, replication of these findings would suggest that that homeless women with dual diagnoses may benefit from routine assessment and treatment for the physical and psychological sequelae of sexual abuse. Additionally, while cluster 4 also had high rates of physical and sexual abuse (75% and 69%, respectively) and long history of drug use, this cluster was differentiated from cluster 3 (comprised primarily of women veterans) in that it was also characterized by infrequent psychological symptoms—whereas cluster 3 also reported frequent anxiety and depression. While our total sample was an overall clinically severe group—homeless individuals with dual diagnoses—this difference between clusters 3 and 4 may be suggestive of some resiliency factors in cluster 4 (at least with regard to mental health symptoms), given their high rates of physical and/or sexual abuse but lower frequency of psychiatric symptoms. Given the complications of treatment adherence associated with co-occurring psychological symptoms in homeless populations, this distinction may be an important area for research.

By grouping homeless individuals based on their clinical presentation, we can study potential sources of resiliency within these clinically severe populations, which may help identify therapeutic targets. Additionally, identifying clusters of clinical needs among this population can help direct assessment efforts which then indicate potential foci of treatment—for example, having wrap-around, trauma-informed care may be more or less important for certain populations of homeless individuals. Additionally, understanding variation between sub-groups of homeless individuals may inform research on moderators of treatment efficacy. Different approaches to working with homeless individuals may work more or less effectively based on clinical presentation or demographics, such as gender and/or veteran status. As described in the introduction, research identifying clusters of clinical need do show consistent results—such that there are clusters of individuals with homelessness alone, homelessness and

SUD, homelessness, SUD, and psychiatric conditions. Past literature that has taken a clustering approach has shown the relevance of trauma exposure as a distinguishing factor between clusters. The current study further "breaks down" the last cluster of homeless individuals with co-occurring conditions, along with examining history of physical and sexual abuse. Results demonstrate important variation within that more severe cluster, which can inform clinical or case management approaches. For example, therapeutic approaches to trauma-exposed individuals differs from those for non-trauma exposed individuals, suggesting that different treatments or approaches may be needed for different populations. Further replication of these findings among a homeless population with co-occurring conditions is needed, particularly among larger populations of women; however, these findings would help to elucidate what treatments or housing approaches work best, and for whom those approaches work best. A clearer understanding of clusters of clinical needs among clinically complicated individuals is an initial step in understanding how to personalize or tailor care.

These results should be interpreted in light of the study's limitations. There were uneven samples based on gender and veteran status, with the sample being primarily male (89.7%) and veteran (82.1%; 4.9% being female veterans). Further testing of these findings with an evenly balanced sample would provide more stable findings; however, given the scarcity of research comparing veteran to civilians and overall low rates of female veteran involvement in research, these findings contribute to the literature. Additionally, while dually diagnosed individuals are overrepresented in the general population of homeless individuals, we cannot say that the results would generalize the whole homeless population. Indeed, continued research on needs of dually diagnosed homeless individuals—and moderators of these clinical needs—would help advance our understanding of how to enhance treatment engagement and outcomes with this population.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments, or comparable ethical standards. Study one was approved by the VA New Jersey Health Care System and by the Universities of Massachusetts and of Medicine and Dentistry of New Jersey IRBs; Study two was approved by the University of Massachusetts, Worcester and Boston campus, IRBs.

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