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## Clinical and cognitive correlates of unsheltered status in homeless persons with psychotic disorders

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### ABSTRACT

Homeless persons with psychosis are particularly susceptible to unsheltered homelessness, which includes living on the streets, in cars, and other places not meant for human habitation. Homeless persons with psychosis have distinct barriers to accessing care and comprise a high-need and hard-to-serve homeless subpopulation. Therefore, this study sought to understand unsheltered homelessness in persons with psychosis and its relationship to cognitive impairment, clinical symptoms, and community functioning, examined both categorically and dimensionally. This study included 76 homeless participants with a history of a psychotic diagnosis who were enrolled in a supported housing program but had not yet received housing. This study used two different housing stability thresholds (literally homeless at any point vs. literally homeless >20% of days) for comparing homeless Veterans with psychosis living in sheltered versus unsheltered situations on cognition, clinical symptoms, and community integration. Dimensional analyses also examined the relationship between percentage of days spent in unsheltered locations and cognition, clinical symptoms, and community integration. Sheltered and unsheltered Veterans with psychosis did not differ on clinical symptoms or community integration, but there was an inconsistent group difference on cognition depending on the threshold used for determining housing stability. In the unsheltered group, cognitive deficits in overall cognition, visual learning, and social cognition were related to more days spent in unsheltered locations. Rehabilitation efforts targeting specific cognitive deficits may be useful to facilitate greater access to care and successful interventions in this population.

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### 1. Introduction

Homeless adults have higher rates of chronic medical and mental health conditions, injury, and mortality rates compared to the general population (Cheung and Hwang, 2004; Gozdzik et al., 2015; Hwang, 2000; Morrison, 2009). The homeless population is very heterogeneous, which has led to attempts to identify meaningful subgroups of individuals. One key distinction is whether homeless people live primarily in unsheltered or sheltered situations. Unsheltered homelessness refers to places not meant for human habitation, such as streets, abandoned buildings, vehicles, or parks; whereas sheltered homelessness includes emergency shelters, transitional housing programs, or safe havens (Henry et al., 2016).

It is important to understand how sheltered and unsheltered living conditions are associated with cognitive and clinical factors, because persons living in unsheltered situations are particularly vulnerable and

may require greater outreach and more intensive health and housing services than sheltered persons. For example, those in unsheltered situations have higher rates of medical and mental health needs (Shern et al., 2000), are more likely to be chronically homeless (Cousineau, 1997; Montgomery et al., 2016b; O'Toole et al., 1999; Shern et al., 2000; Tsai et al., 2014), and have higher rates of substance use disorders and severe mental illness (Byrne et al., 2016) than their sheltered counterparts. People living in unsheltered situations comprise one of the highest-need and hardest-to-serve homeless subpopulations (Byrne et al., 2016) and they receive more fragmented care (Lam and Rosenheck, 1999; Levitt et al., 2009; Montgomery et al., 2016b).

Unfortunately, homeless persons with psychosis are particularly susceptible to unsheltered situations (Foster et al., 2012) and we do not know the specific reasons why. Psychosis may be associated with unsheltered homelessness because people with psychosis often have poor independent living skills, impaired cognition, and few interpersonal relationships (Foster et al., 2012; Kuno et al., 2000; Stergiopoulos et al., 2010). Further, persons with psychotic disorders often have difficulties managing even routine landlord-tenant conflicts (Lamb and Bachrach, 2001). Moreover, they are less likely to engage in rehabilitative services that facilitate sheltered housing (Foster et al.,

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2012; Lincoln et al., 2009). Beyond these factors, the degree of psychotic and negative symptoms might distinguish between those in sheltered and unsheltered locations (Drake et al., 1991); for example, distrust and paranoia may create obstacles to obtaining or maintaining housing. Cognitive impairment is also an important factor for explaining poor housing and community integration outcomes (Backer and Howard, 2007; Burra et al., 2009; Seidman et al., 1997; Spence et al., 2004). A review of cognition in homeless adults found considerable cognitive impairment in the homeless population (Depp et al., 2015). Cognitive dysfunction may lead to difficulties navigating the social service system and planning and prioritizing shelter and treatment. While cognitive dysfunction is a core feature of psychosis (Green et al., 2000; Heinrichs and Zakzanis, 1998), we know very little about cognition in homeless unsheltered persons (Depp et al., 2015).

A key limitation in resolving these questions is that unsheltered homelessness is usually treated as a categorical variable (Byrne et al., 2016; Montgomery et al., 2016b; Tsemberis et al., 2007), but we do not know if the relationships (e.g., with clinical symptoms or cognition) are dimensional in nature. Persons experiencing homelessness often vacillate between sheltered and unsheltered living arrangements. We do not know if persons experiencing any days in unsheltered homelessness comprise a meaningful subgroup, or if those with low percentages of unsheltered days closely resemble those who had sheltered housing. To address this question, it is necessary to examine the relationship between duration of unsheltered homelessness and specific cognitive, clinical, and functional features in both a categorical and dimensional manner. Understanding these relationships may help improve homeless services and outcomes for homeless persons with psychosis.

The U.S. Department of Veterans Affairs (VA) has prioritized ending Veteran homelessness (HUD, 2011; USICH, 2010) employing a Housing First model in the U.S. Department of Housing and Urban Development – Veterans Administration Supported Housing (HUD-VASH) program. A Housing First approach provides homeless individuals with independent housing and supportive services without traditional treatment-related preconditions for housing entry (Kertesz et al., 2017). The HUD-VASH program combines a permanent housing subsidy provided by HUD's Housing Choice Voucher Program and clinical services through the VA. Although the program has been successful in housing homeless Veterans (CRS, 2015; Rosenheck et al., 2003), it may have more difficulty reaching homeless Veterans with psychosis who live in unsheltered situations (Montgomery et al., 2016a).

Thus, the purpose of this study is to understand unsheltered homelessness in persons with psychosis and its relationship to cognitive impairment, clinical symptoms, and community functioning, examined both categorically and dimensionally. We hypothesized that unsheltered homelessness would be associated with greater severity of clinical symptoms and greater cognitive impairment. We examined this in a sample of homeless Veterans with psychotic disorders. Although unsheltered populations present substantial challenges to data collection, this study had the advantage of examining homelessness while participants were at the same point in the housing process; all participants were Veterans newly enrolled in the HUD-VASH program who had received a Housing Choice Voucher and were currently searching for housing with assistance from the VA.

## 2. Methods

### 2.1. Participants

This study included 76 Veteran participants who: 1) were homeless; 2) had a history of psychosis; and 3) had recently enrolled in the HUD-VASH program at the VA Greater Los Angeles Healthcare System (GLA) but had not yet received housing. This study is based on the baseline assessments of a three-year longitudinal study designed to identify the determinants of successful community integration in a large sample of homeless Veterans with psychotic disorders who have recently received

HUD-VASH vouchers. A VA administrative database (VA Informatics and Computing Infrastructure; VINCI) was used to identify all Veterans enrolled in HUD-VASH at GLA in the preceding month who received inpatient or outpatient mental health care for major depressive disorder with psychotic features, any bipolar disorder, psychosis not otherwise specified, schizoaffective disorder, and schizophrenia (identified by International Classification of Diseases and Related Health Problems-9 (ICD-9) codes) in the preceding five years. Opt-in letters were mailed to Veterans from this list, and Veterans who did not respond to the letter were subsequently contacted by phone. Additionally, research assistants attended patient orientation sessions for the HUD-VASH program and distributed information about the study.

To obtain DSM-5 diagnoses, participants were assessed by trained interviewers using the Structured Clinical Interview for DSM-5 Disorders (SCID; First et al., 2016). All SCID interviewers were trained to a minimum kappa of 0.75 for key psychotic and mood items through the Treatment Unit of the Department of Veterans Affairs VISN 22 Mental Illness Research, Education, and Clinical Center (MIRECC). Twenty-two participants were excluded because they did not meet the DSM-5 diagnostic criteria for a psychotic disorder. The final sample consisted of the following DSM-5 diagnoses: schizophrenia, schizoaffective disorder, other specified/unspecified schizophrenia spectrum disorder, or mood disorder with psychotic features (see Table 1 for breakdown). Participants were included if they were between 18 and 60 years of age, had an estimated premorbid IQ > 70 (based on reading ability as assessed with the Wide Range Achievement Test), understood spoken English sufficiently to comprehend testing procedures, had no clinically significant neurological disease, and no history of serious head injury (such as loss of consciousness longer than 1 h based on self-report and medical chart review). Seven participants were excluded due to head injury (n = 4) and premorbid IQ (<70; n = 3). All participants provided written informed consent to participate in the study after all procedures were fully explained in accordance with procedures approved by the IRB at the GLA.

#### 2.1.1. Symptom assessment

Psychotic symptoms and depression/anxiety in the previous month were evaluated using the Expanded Brief Psychiatric Rating Scale (BPRS) (Ventura et al., 1993). The Clinical Assessment Interview for Negative Symptoms (CAINS) (Kring et al., 2013) was used to assess negative symptoms. The CAINS is comprised of two subscales: 1) The Motivation and Pleasure (MAP) subscale (9 items) assesses motivational symptoms (e.g., internal experiences of motivation, drive, and interest); 2) the Expression subscale (4 items) assesses affective flattening and alogia. For the BPRS and CAINS, higher scores indicate the presence of more symptoms. Symptom raters were trained to a minimum intraclass correlation coefficient of 0.80.

#### 2.1.2. Cognitive assessment

The MATRICS Consensus Cognitive Battery (MCCB) (Green et al., 2004; Nuechterlein and Green, 2006) was used to assess cognition. The MCCB includes 10 measures within 7 separable cognitive domains, including speed of processing, verbal learning, visual learning, working memory, reasoning and problem solving, attention/vigilance, and social cognition. T-scores for each cognitive domain and an overall composite score served as dependent variables. T-scores were based on established age and gender norms for the MCCB (Kern et al., 2008).

#### 2.1.3. Community functioning

The Role Functioning Scale (RFS) (McPheeters, 1984) assesses degree of work, independent living, social connections, and family interactions. Higher scores indicate better functioning. All clinical interviewers had a masters or doctoral-level degree and were trained through the Treatment Unit of the VA VISN 22 MIRECC.

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