Cognitive Impairment and Disability Determination in the Sheltered Homeless

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Abstract

With lifetime prevalence as high as 7% in the United States, homelessness continues to be a major social and financial problem. In the context of a homeless shelter, homeless individuals who are also cognitively impaired may be at a disadvantage when navigating the application process for Supplemental Security Income (SSI) and Social Security Disability Insurance (SSDI). While successful application for such benefits may be affected by cognitive abilities, the relationship between cognitive impairment and application for SSI/SSDI benefits has not been formally examined. To address this gap in the research literature, the following hypothesis is proposed: of those who have previously applied for SSI, those with cognitive or functional capacity impairments will be more likely to have been denied benefits in the past than those without cognitive or functional capacity impairments. We also explored the demographic, homelessness history, cognitive, psychiatric and physical disability profiles of homeless shelter residents with and without SSI/SSDI benefits at the time of entry to the shelter, as well as those who stated an intention of applying for benefits after entering the shelter.

A secondary data analysis was performed using data from a study of cognitive impairment and housing outcomes in the sheltered homeless. Participants (n=100) were recruited from a large urban homeless shelter. Measures of cognitive functioning included measures of premorbid functioning, IQ, processing speed, as well as a screening test for mild cognitive impairment. A measure of functional capacity encompassing financial and communication skills was also administered. History and current SSI/SSDI information, as well as psychiatric and health status were obtained from each resident's intake interview and, if available, their medical records from the onsite clinic.

In the 49 participants who answered the question about prior application for SSI during their intake interview, cognitive impairment was not associated with prior denial of SSI. This analysis is limited by a small number of individuals who previously received benefits (n=12). However, worse functional capacity predicted higher likelihood of a successful SSI application. In the full sample of 100 participants, only four individuals were receiving SSI or SSDI at shelter entry, which limited our ability to profile those currently receiving benefits. Eighty-six participants stated whether or not they intended to apply for benefits, 40% of whom planned to apply during their shelter stay. Those who planned to apply were more likely to have a medical or psychiatric diagnosis recognized by the Social Security Administration (SSA), a history of one or more years of continuous homelessness, and impaired processing speed performance.

Although we did not find a clear connection between cognitive impairment and previous denial of SSI/SSDI benefits, we did find evidence that those with worse functional capacity were more likely to have received SSI benefits. It is therefore possible that those with impaired functional capacity may be recognized by SSA as functionally impaired and disabled.

Introduction

With lifetime prevalence as high as 7% in the United States (Link et al., 1994), homelessness continues to be a major problem despite city, state, federal and non-governmental agency efforts to reduce its prevalence. In the 2013 U.S. Department of Housing and Urban Development's (HUD) 2013 Homeless Assessment Report to Congress, it was reported that 109,132 individuals were currently "chronically homeless," defined as having a severe disability and long history of homelessness (Henry, Cortes, Morris, Khadduri, & Culhane, 2013), of which only 27% were sheltered individuals. Common reasons why individuals become homeless and seek shelter include poverty, unemployment, substance abuse, and mental illness. Cognitive and functional impairments may also contribute to homelessness and make it more difficult to obtain housing without the appropriate resources. Common causes of such impairments are intellectual disabilities, learning disabilities, acquired brain dysfunction due to traumatic brain injury (TBI), substance use disorders, severe mental illness, and/or other neurological conditions. In a recent study at a large urban homeless shelter, 45% of the shelter residents screened positive for TBI, and 87% of those who screened positive had at least one reported head injury before they became homeless (Topolovec-Vranic et al., 2014). Cognitive deficits are also associated with substance use disorders, alcohol use disorders (Grant, Gonzalez, Carey, Natarajan, & Wolfson, 2003; Oscar-Berman, Shagrin, Evert, & Epstein, 1997; Scott et al., 2007), as well as severe mental illness including schizophrenia (Heinrichs & Zakzanis, 1998), depression (McDermott & Ebmeier, 2009), bipolar disorder (Mann-Wrobel, Carreno, & Dickinson, 2011) and post-traumatic stress disorder (Johnsen & Asbjornsen, 2008). TBI, substance use disorders, and a number of psychiatric illnesses are associated with cognitive impairment, and, as stated above, are often more prevalent in homeless populations than in the general public (Fazel, Khosla, Doll, & Geddes, 2008).

Most studies examining the relationship between cognitive impairment and homelessness have utilized brief cognitive screening measures. In a recent meta-analysis, which is now under review for publication, global cognitive screening measures and full scale intelligence quotient (IQ) were summarized from 24 unique studies of homeless individuals (n = 2,969) (Depp, Vella, Orff, & Twamley, submitted). This meta-analysis found that cognitive impairment rates ranged from 16-25% on global cognitive screening measures and mean full scale IQ score was in the low average range (mean IQ = 85) across studies. The few studies that assessed cognitive impairment more comprehensively found much higher levels of impairment, ranging from 52-80% (Bousman et al., 2010; Gonzalez, Dieter, Natale, & Tanner, 2001; Seidman et al., 1997). Most studies have found IQ estimates and general cognitive impairment highly variable, and dependent on the type of homeless population that was sampled (Adams, Pantelis, Duke, & Barnes, 1996; Bremner, Duke, Nelson, Pantelis, & Barnes, 1996; Buhrich, Hodder, & Teesson, 2000; Fichter et al., 1996; Foulks, McCown, Duckworth, & Sutker, 1990; Gonzalez et al., 2001; Lovisi, Mann, Coutinho, & Morgado, 2003; Munoz, Vazquez, Koegel, Sanz, & Burnam, 1998; Oakes & Davies, 2008; Seidman et al., 1997; Solliday-McRoy, Campbell, Melchert, Young, & Cisler, 2004; Teesson & Buhrich, 1993). We are currently conducting a study examining the relationship between cognitive impairment and homelessness, including the chronically homeless, in a sheltered population.

While there is some information available about the prevalence of cognitive impairment

in homeless populations, there is no information about the relationship between cognitive impairment and the disability determination process. There is, however, research available examining the receipt and maintenance of entitlement benefits. One study examining receipt of Supplemental Security Income (SSI) and Social Security Disability Insurance (SSDI) in a homeless veteran population found that SSI/SSDI recipients were less impulsive than non-recipients (Rosenheck, Dausey, Frisman, & Kasprow, 2000). It is plausible that this impulsive behavior is related to frontal-lobe mediated cognitive deficits. In a study of homeless residents of Alameda County, California (Zlotnick & Robertson, 1996), recipients of entitlement income who also had a substance use disorder were more likely to have sporadic, as opposed to constant, entitlement income (i.e., SSI/SSDI, General Assistance, Aid to Families with Dependent Children). Although 91% of this sample kept their entitlement income over a 15 month follow-up, those with a dual diagnosis of a major mental disorder and a substance use disorder were more likely to have their benefits terminated during this time. Zlotnick, Robertson, and Lahiff (1998) reported data on SSI and SSDI in a subsample of the Alameda cohort. More individuals with a severe or serious mental illness (25.8%) reported receiving SSI/SSDI than did individuals with a dual diagnosis (12%). It is probable that at least a subset of those with substance use disorders have cognitive impairment (Grant et al., 2003; Scott et al., 2007) and homeless individuals with alcohol use histories have been found to have high rates of alcohol related brain damage (Gilchrist & Morrison, 2005). While these findings do not apply specifically to the SSI/SSDI application processes, it is possible that cognitive impairment plays a part in the maintenance of benefits.

Many homeless individuals may qualify for SSI and SSDI, and in order to best serve this population, any risk factors that may affect ability to effectively and appropriately obtain these benefits must be understood. Cognitive impairment may be a basis for disability claim ("Disability Evaluation Under Social Security ", 2008), and is also associated with both employment status (Holthausen et al., 2007; Newnan, Heaton, & Lehman, 1978) and ability to perform activities of independent living (Cahn-Weiner et al., 2007; Teng, Becker, Woo, Cummings, & Lu, 2010), both of which are key factors in disability determination. Also, in order for homeless individuals to transition out of sheltered housing, they may have to rely on case management services, sometimes provided by a shelter, to obtain employment or disability benefits. In a study examining effect of cognitive impairment on outpatient service utilization in individuals with schizophrenia, McGurk, Mueser, Walling, Harvey, and Meltzer (2004) found that individuals with poorer executive functioning (i.e., problem solving) required greater amounts of case management services. A homeless individual's ability to navigate and understand these types of services may impact long term outcomes like obtaining disability benefits, obtaining housing, and living independently.

There is some evidence that programs designed to assist individuals at risk for homelessness to apply for benefits, like the SSI/SSDI Outreach, Access, and Recovery (SOAR) Program, can increase access and approval of entitlements for those with disabilities (Dennis, Lassiter, Connelly, & Lupfer, 2011). Access to case management can also increase the likelihood of entitlement income receipt in individuals who are both homeless and have a mental and/or substance use disorder (Zlotnick et al., 1998). The SSI/SSDI application process requires verification of identity and immigration status, detailed work history, medical documentation, and contact information for follow up (Rosen, McMahon, & Rosenheck, 2007). However,

successful navigation of the services designed to better facilitate application for SSI/SSDI may hinge on intact cognitive abilities such as organization and planning, both of which are necessary when attempting to obtain documentation of disability in the context of financial and transportation barriers. Functional capacity, the ability to function independently in areas like communication and finance, may also be related to navigating the disability application process. This functional domain has only been examined in one sample of homeless individuals. Homeless inpatients diagnosed with schizophrenia or schizoaffective disorder performed worse on a measure of financial functional capacity than did housed inpatients with the same diagnoses (Stergiopoulos, Burra, Rourke, & Hwang, 2011). Although successful application for such benefits may be affected by cognitive abilities, and possibly functional capacity, the relationship between cognitive/functional capacity impairment and application for SSI/SSDI benefits has not been formally examined.

We aimed to examine cognitive, as well as functional capacity, impairment and attainment of SSI/SSDI in a sample of sheltered homeless individuals. The data used in the current study were from a larger study examining the relationship between cognitive impairment and homelessness. First, we examined the relationship between cognitive and functional capacity impairment and previous application for SSI benefits, hypothesizing that in those who had previously applied for SSI, individuals with cognitive or functional capacity impairments would be more likely to have been denied benefits. Second, we explored the demographic, cognitive, psychiatric, physical, and homelessness history profiles of individuals receiving SSI/SSDI benefits and those interested in applying for benefits at the time of entry into the shelter.

Methods

Participants

This sample included 100 consecutively enrolled clients residing at the St. Vincent De Paul Village (SVDPV), all of whom were enrolled over a 14 month period. This study was a secondary analysis of data from a larger study of cognitive impairment, functioning and housing outcomes in the sheltered homeless. Study participants were over the age of 18, currently residing at SVDPV, and gave voluntary informed consent for participation. Individuals were excluded if they were unable to complete any testing in English or were on a conservatorship and therefore unable to provide legal consent. SVDPV provides transitional housing for up to two years, and residents meet regularly with case managers who help them with financial planning, referrals to internal and external social services, vocational rehabilitation, education, and follow-up services. All participants were enrolled in the parent study after they completed an initial intake interview, were assigned to a team (i.e., Veterans, Supported Income, Employment, and Family) and track (i.e., employment or benefits), and then had their first case management meeting. Case managers notified all new clients of the study during the study period, and clients were giving the ability to call research staff or take a flyer.

Neuropsychological and Functional Capacity Measures

Five neuropsychological measures were given at the time of assessment, after participants' first case management meeting. The reading subtest from the Wide Range

Achievement Test – Fourth Edition (WRAT-IV) was used to estimate premorbid IQ (Wilkinson & Robertson, 2006). The two test version of the Wechsler Abbreviated Scale of Intelligence (WASI), which includes the Vocabulary and Matrix Reasoning subtests, was used to assess full scale IQ (FSIQ) (Wechsler, 1999). To screen for mild cognitive impairment, we used the Montreal Cognitive Assessment (MoCA) (Nasreddine et al., 2005). The Coding subtest from the Wechsler Adult Intelligence Scale - Fourth Edition (WAIS-IV) (Wechsler, 2008) was also administered as an estimate of processing speed that is also particularly sensitive to brain injury and general cerebral integrity (Lezak, Howieson, Loring, Hannay, & Fischer, 2004; Russell, 1972). Age adjusted normative conversions for all neuropsychological measures, except the MoCA, were derived from the referenced test manuals. Means and standard deviations from the Rossetti, Lacritz, Cullum, and Weiner (2011) longitudinal, population-based study of cardiac risk factors were used to create the age and education corrected z-scores for the MoCA.

Our measure of functional capacity was the UCSD Performance-based Skills Assessment–Brief (UPSA-B) (Mausbach, Harvey, Goldman, Jeste, & Patterson, 2007). This measure utilizes role-play scenarios to assess everyday functioning skills in the domains of finance and communication. Scaled scores for the UPSA-B were calculated from norms from an unpublished manuscript (Vella et al.).

Cognitive impairment was measured at two different levels: (1) greater than 1 standard deviation below the mean (i.e., $T < 40$, $ss < 7$, $SS < 85$, $z < -1$), and (2) greater than 1.5 standard deviations below the mean (i.e., $T < 35$, $ss < 5.5$, $SS < 78$, $z < -1.5$).

Other Variables

Responses from the SVDPV intake interview, given at the time of admission, were used to gather the following information: history of homelessness, educational level, physical health status, disability status, psychiatric diagnoses, substance use history, employment history, and current and past benefit status (i.e., SSI, SSDI). For those who accessed the SVDPV medical clinic, current medical and psychiatric diagnoses were also collected.

Data Analysis

Hypothesis 1: *In those who have previously applied for SSI, individuals with cognitive or functional capacity impairment will be more likely to have been denied on an application in the past than those without cognitive or functional capacity impairments.*

The first hypothesis was examined using 2x2 chi-squared analyses, using prior SSI application status (i.e., those received SSI/SSDI and those who were denied SSI/SSDI) vs. cognitive/functional capacity (impaired and non-impaired) on each of six tests. Residents were asked only if they had previously applied for SSI but not SSDI during the intake interview, so we were not able to examine the relationship between SSDI and cognitive/functional capacity impairment. A set of twelve 2x2 chi-squared analyses were performed, defining cognitive and functional impairment at two levels (below 1 SD and below 1.5 SDs). The impairment levels for each cognitive/functional capacity variable were as follows: (1) standard score less than 85 and 78 on the WRAT-IV Reading test, (2) T score less than 40 and 35 on the WASI Matrix

Reasoning test (3) T score less than 40 and 35 on the WASI Vocabulary test, (4) scaled score less than 7 and 5.5 on the WAIS-IV Coding subtest, (5) MoCA z score less than -1 and -1.5, and (6) scaled score less than 7 and 5.5 on the UPSA-B.

After the initial chi-squared analyses were completed, two logistic regressions were run with the dependent variable being those who applied and received SSI/SSDI vs. those who applied and were denied. The independent predictors of the first model were the MoCA total score, WRAT-IV reading score, WASI Matrix Reasoning score, WASI Vocabulary score, WAIS-IV Coding score, and the UPSA-B total score. The independent predictors of the second model were the normative scores of each measure: MoCA z score, WRAT-IV reading standard score, WASI Matrix Reasoning T score, WASI Vocabulary T score, WAIS-IV Coding scaled score, and the UPSA-B total scaled score.

Age, gender, race, and education were assessed for possible confounding, and were not correlated with the independent and dependent variables. Multicollinearity of the predictor variables was assessed using tolerance (tolerance < 0.1) and variance inflation factor (VIF; > 10).

Exploratory analyses: *The exploratory analyses examined the demographic, cognitive, psychiatric, physical, and homelessness history profiles of individuals receiving SSI/SSDI benefits and those interested in applying for benefits at the time of entry into the shelter.*

The second analysis used 2x2 chi-squared tests and t-tests to examine the demographic, cognitive, psychiatric, physical, and homelessness history profiles of shelter residents with and without SSI/SSDI prior/current benefits at the time of entry into the shelter. A separate analysis examining characteristics of those who stated an intention of applying for benefits after entering the shelter was also conducted. Cohen's d effect sizes for t-test analyses and phi (φ) effect sizes for chi-squared analyses were calculated. Effect size guidelines from Cohen (1988) were used to judge size of the effect (i.e., Cohen's d: small = 0.2, medium = 0.5, and large = 0.8; φ: small = 0.1, medium = 0.3, and large = 0.5).

Psychiatric and physical diagnoses were defined using diagnoses outlined in the Social Security Administration's *Disability Evaluation Under Social Security* handbook (2008). Chronic homelessness was defined using the HUD definition: "either (1) an unaccompanied homeless individual with a disabling condition who has been continuously homeless for a year or more, OR (2) an unaccompanied individual with a disabling condition who has had at least four episodes of homelessness in the past three years" (Office of Community Planning and Development, 2007). However, while we were able to accurately assess the housing criteria of the chronic homelessness definition, as these questions are asked at shelter intake, the psychiatric and physical disability diagnoses relied on self-report. These diagnoses were sometimes verified by clinicians, but we were not able to verify whether or not the individuals had long term functional impairment from those diagnoses, an essential component of the disability determination process.

All tests were two-tailed and used an alpha level for significance of 0.05; all analyses were performed in IBM SPSS (version 22).

Results

Sample Description

A total of 626 individuals were assigned to teams during the recruitment period and 28% of those individuals contacted the study. Of those who contacted the study, 25 individuals were not eligible for the study (e.g., no longer residing at SVDPV, not assigned a case manager, etc.), and 24 individuals did not return staffs return phone calls. Another 18 individuals who were eligible cancelled or no-showed to their testing appointment. Eight individuals refused to participate after learning more about the study at the first visit or after reading the study consent form. Sixteen percent of all residents assigned to a team at the shelter during the recruitment period participated in the study. Almost half (49%) of the sample came from Veteran's team case manager referrals. Participants were tested, on average, 110 days (SD = 48.7) after entry into the shelter, as it took 8-202 days to have their first case management meeting, which was the point of referral to the study. During the intake interview individuals were asked the following questions: (1) have you ever applied for SSI, and (2) have you been denied for SSI in the past. Only 49 out of the 100 total participants reported they had previously applied for SSI and had complete data in their record about receipt and denial of SSI. Eighty-six participants answered the question about intention to apply for benefits while at the shelter.

Table 1 presents demographics and history of homelessness descriptors for the full sample and for the sample used to test hypothesis 1. On average, participants were middle aged, male, and had less than 12 years of education. Thirty five percent of the sample was non-Caucasian, with African Americans being the majority in that group. Veterans made up about half of the sample. Rates of clinically verified alcohol abuse were about 22% in the hypothesis 1 sample, and rates of clinically verified drug abuse were 18% in the same sample. Thirty-nine percent (n=19) of the hypothesis 1 sample met at least one of the housing criteria to be considered chronically homeless. Fifty-three percent (n=26) of the hypothesis 1 sample had a medical or psychiatric condition that would possibly meet the criteria for SSI/SSDI, with unknown level of functional disability. Examples of medical and psychiatric conditions found in this sample are: chronic obstructive pulmonary disease, congestive heart failure, hepatitis C, chronic kidney disease, epilepsy, degenerative disk disorder, schizophrenia, post-traumatic stress disorder, bipolar disorder, and major depression. These diagnoses were clinically verified by either shelter staff or practitioners at the onsite medical clinic.

Hypothesis 1

Of the 49 individuals who reported that they had previously applied for SSI, 76% (n=37) indicated they were denied benefits and 24% (n=12) indicated they had received benefits at some time. Chronic homelessness (per HUD definition) was not associated with prior receipt of SSI benefits ($\chi^2(1) = 1.104$, p = 0.466). Table 2 presents the 2x2 chi-squared results comparing received vs. denied to cognitive impairment at either the mild (1 SD) or moderate (1.5 SDs) range. Cognitive impairment at either impairment level was not associated with receiving SSI (ps ≥ 0.093). Worse functional capacity was associated with receiving SSI at the more moderate impairment level (p = 0.048), but not the more mild impairment level (p = 0.321). Functional capacity impairment rates within the group that received SSI were double that of the denied group (67% vs. 32%, respectively).

Table 3 presents all model parameter estimates for two separate logistic regression models: (1) raw total scores for each cognitive and functional capacity variable, and (2) normative scores for each cognitive and functional capacity variable. Multicollinearity was not indicated for either model (tolerances ≥ 0.230 and TIFs ≤ 4.355). Age, gender, race, and education were not associated with the dependent variable (ps ≥ 0.137), and therefore were not entered into any of the logistic models.

The logistic regression model with raw score independent predictors was not statistically significant, $\chi^2(6) = 6.331$, p = 0.387. The model explained 18.1% (Nagelkerke R^2) of the variance in receiving SSI in the past and correctly classified 77.6% of participants. None of the six predictor variables was significant (ps ≥ 0.130).

The logistic regression model with normative score independent predictors was also not statistically significant, $\chi^2(6) = 9.093$, p = 0.168. The model explained 25.2% (Nagelkerke R^2) of the variance in receiving SSI in the past and it also correctly classified 77.6% of participants. The UPSA-B scaled score significantly predicted receiving SSI in the past $\chi^2(1) = 4.326$, p = 0.038. Every single unit increase in the UPSA-B scaled score (i.e., better functional capacity performance) was associated with lower odds of receiving SSI in the past. None of the remaining five predictor variables were significant (ps ≥ 0.088).

Exploratory Analyses

SSI/SSDI at Shelter Entry

Only four participants had SSI (n=3) or SSDI (n=1) upon entry to the shelter. Table 4 presents all demographic, cognitive, psychiatric, physical, and homelessness history variables for those who had SSI/SSDI at entry compared to those who did not. Effect sizes were all in the small range, and there were no statistically significant differences between the two groups. We did not have a large enough sample of those with benefits upon entry to accurately examine any differences.

Intention to Apply for SSI/SSDI at Shelter Entry

Of the 86 participants who answered the question about intention to apply for benefits while at the shelter, 40% (n=34) reported they planned to apply. Ninety-four percent of those who responded that they did not intend to apply for benefits also reported interest in gaining employment (n=47 of 50 individuals answering both questions). Seventy percent of those who responded that they did intend to apply for benefits also reported interest in gaining employment (n=21 of 30 individuals answering both questions). Table 5 presents all demographic, cognitive, psychiatric, physical, and homelessness history variables for those who had intended to apply for benefits while at the shelter compared to those who did not initially intend to apply. Effect sizes were all in the small to medium range. There was a small association between planning to apply for benefits and the HUD estimate of chronic homelessness ($\varphi = 0.29$, p = 0.015). There were also small to medium associations between planning to apply for benefits and being continuously homeless for one year or more ($\varphi = 0.26$), as well as having a medical or psychiatric diagnosis matching those specified by SSA (φs = 0.29 and 0.37, respectively; ps ≤ 0.024). There was a medium association between planning to apply for benefits and the Coding scaled score (Cohen's d = 0.48, p=0.031), with those planning to apply scoring below the 1 SD cut off for

impairment, on average.

Discussion

This study had two major aims: (1) to examine the relationship between cognitive and functional capacity impairment and previous application for SSI benefits in a sheltered homeless population, and (2) to explore the demographic, cognitive, psychiatric, physical, and homelessness history profiles of individuals receiving SSI/SSDI benefits the time of entry to the shelter, as well as those interested in applying for benefits while at the shelter. In our sample of 49 participants who answered the question about prior application to SSI during their intake interview, only moderate impairment on a functional capacity measure was associated with receipt of SSI in the past. In this sample, cognitive impairment was not associated with prior denial of SSI. In the full sample of 100 participants, only four individuals were receiving SSI or SSDI at shelter entry, which limited our ability to profile those receiving benefits. However, 40% of the 86 participants who answered the question about intention to apply for benefits while at the shelter reported they planned to apply during their stay. Those that planned to apply were more likely to have a medical or psychiatric diagnosis recognized by SSA, as well as a history of one or more year of continuous homelessness than those who did not plan to apply. They were also more likely to score in the impaired range on a measure of processing speed.

The results of both sets of analyses did not provide evidence for the relationship between cognitive impairment and successful application for benefits. However, we found evidence that those with better functional capacity (i.e., everyday functioning) were less likely to receive SSI in the past, providing evidence that individuals who may be functionally impaired are more likely to receive benefits. Our measure of chronic homelessness, which did not account for level of functional disability, was related to those who intended to apply for benefits, but not to prior receipt of SSI. It is therefore unclear from these data whether chronic homelessness would be an adequate proxy measure for SSI/SSDI eligibility.

Unfortunately, our dataset proved to be more limited than originally anticipated, with only four individuals having SSI/SSDI benefits at shelter entry. This study also captured only 16% of the total population residing at the shelter during the recruitment period, making it difficult to generalize the findings to the greater shelter population. Data interpretation has the added complication of the long wait period until initial case management meeting, a time in which many shelter residents, with unknown levels of cognitive impairment, may have dropped out. We also did not measure all domains of cognitive functioning, including attention, memory, and organization and planning. It is possible that impairment in these domains would better predict those who would have difficulty quickly and efficiently applying for benefits.

It still may be true that individuals with cognitive impairment in the areas of attention, memory, organization and planning may fail to follow instructions and follow up with necessary appointments in everyday life, skills needed to successfully apply for SSI/SSDI benefits. We found evidence that those with greater functional capacity were less likely to have received SSI benefits. We did not find clear evidence that chronic homelessness is associated with SSI/SSDI benefit status, but we did find that chronicity was related to interest in applying for benefits. It is still unclear, at least from these data, whether chronic homelessness could be used as an early indicator for meeting the disability criteria.

Human suffering, poverty, and homelessness are not addressed and time, government resources, and money are wasted if individuals repeatedly apply for benefits and are denied due to inability to follow through with instructions or obtain proper documentation for their disabilities. It is therefore important for research to continue in this area, to identify either the correct domains of cognitive impairment, or other characteristics, that may pose a barrier to quick and efficient application. The cognitive battery used is appropriate for the general adult population and can address specific cognitive questions directly related to the needs of a homeless population seeking housing and applying for benefits. Early identification of cognitive impairment in an individual's stay at a shelter may vastly improve the SSI/SSDI claimant process. Once cognitive impairment is detected, case managers will be better able to successfully support a claimant with completing the application and increase the likelihood of an approval on the initial decision. This streamlined process would benefit the Social Security Administration by saving limited time and resources.

It is still possible that if cognitive status is known early in the application process, individuals can be given more structured assistance. For those agencies that work with persons experiencing homelessness, knowledge of cognitive impairment in applicants could be useful so that they can provide specific kinds of assistance. This assistance could include simple aids like (1) concrete, written directions for each step of the application, (2) frequent reminders to attend meetings or doctors' appointments needed to complete the claim, (3) encouraging the claimant to take written notes, etc. While results of this study did not provide concrete evidence that cognitive impairment is related to denial of benefits, further research in this area would be greatly strengthened by the use of claimant data from the SSI/SSDI databases and a cognitive battery that includes more varied cognitive domains (e.g., memory and executive functioning).

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Table 1. Demographic and Homelessness History Descriptors

	Full Sample (n=100)		Hypothesis 1 Sample (n=49)	
	Range/n	Mean (SD)/%	Range/n	Mean (SD)/%
Demographics				
Age	18-66	48.9 (9.2)	18-65	48.3 (9.3)
Female	19	19%	11	22%
Education (Years)	0-18	11.7 (2.2)	7-16	11.6 (2.0)
Hispanic/Latino	10	10%	3	6%
Non-Caucasian	35	35%	17	35%
Ever married	62	62%	32	65%
Veteran	52	52%	21	43%
Years worked at longest held job	0-38	7.3 (6.0)	0-21	5.3 (4.5)
Homelessness History				
Number of homeless episodes	1-25	3.4 (3.8)	1-25	4.2 (4.3)
Greater than 1 time homeless	64	64%	38	78%
Transitional housing within the last 3 years	37	37%	21	43%
Continually homeless for ≥ 1 year	26	26%	17	35%
At least 4 episodes in past 3 years	11	11%	8	16%
Months homeless (Lifetime)	0.5-300.00	38.2 (53.1)	1.8-180.0	43.5 (45.1)
Months homeless (Current episode)	0.5-238.4	19.1 (36.7)	1.8-127.3	18.7 (26.3)

Note. SD = Standard Deviation

Table 2. Percentage Impaired on Cognitive and Functional Capacity Tests by SSI Application Outcome

Cognitive Test	% Impaired		Chi Square	Fisher Exact p-value
	Denied SSI	Received SSI		
Impaired below 1 SD				
MOCA (z<1)	16%	0%	2.217	0.314
Reading (SS<85)	35%	8%	3.189	0.139
Matrix Reasoning (T<40)	24%	8%	1.426	0.414
Vocabulary (T<40)	27%	0%	4.075	0.093
Coding (ss<7)	38%	33%	0.079	1.000
UPSA-B (ss<7)	46%	57%	1.557	0.321
Impaired below 1.5 SDs				
MOCA (z<1.5)	5%	0%	0.676	1.000
Reading (SS<78)	11%	0%	1.413	0.560
Matrix Reasoning (T<35)	16%	0%	2.217	0.314
Vocabulary (T<35)	22%	0%	3.101	0.173
Coding (ss<5.5)	27%	17%	0.526	0.703
UPSA-B (ss<5.5)	32%	67%	4.396	**0.048**

Note. MoCA = Montreal Cognitive Assessment; SD = Standard Deviation; UPSA-B = UCSD Performance-based Skills Assessment – Brief.

Table 3. Logistic Regression Results for Received/Denied SSI in the Past.

Variables	Odds Ratio	95% Confidence Interval		Wald Chi-Square	p-value
		Lower	Upper		
Logistic Regression #1: Raw Scores					
Word Reading Total	1.09	0.94	1.26	1.179	0.278
Matrix Reasoning Total	1.05	0.87	1.26	0.255	0.613
Vocabulary Total	1.03	0.90	1.18	0.156	0.693
Coding Total	1.05	0.98	1.13	2.127	0.145
MoCA Total	0.78	0.55	1.09	2.076	0.150
UPSA Total	0.94	0.88	1.02	2.287	0.130
Logistic Regression #2: Normative Scores					
Word Reading Standard Score	1.00	0.89	1.11	0.005	0.946
Matrix Reasoning T-Score	1.13	0.98	1.30	2.878	0.090
Vocabulary T-Score	1.00	0.87	1.15	0.001	0.971
Coding Scaled Score	1.37	0.95	1.96	2.917	0.088
MoCA Z Score	0.41	0.13	1.29	2.327	0.127
UPSA Scaled Score	0.67	0.46	0.98	4.326	0.038

Note. MoCA = Montreal Cognitive Assessment; SD = Standard Deviation; UPSA-B = UCSD Performance-based Skills Assessment – Brief.

Table 4. Characteristics of those receiving SSI/SSDI at shelter entry

Chi-Squared tests	Receiving SSI/SSDI (n=4)		No SSI/SSDI (n=96)		Chi-Squared	Fisher Exact Test p-value	Phi (φ)
	n	%	n	%			
Demographic Characteristics							
Female	0	0%	19	20%	0.977	1.000	0.10
Non-Caucasian	0	0%	45	47%	3.409	.125	0.18
Hispanic/Latino	0	0%	10	10%	0.463	1.000	0.07
Ever married	3	75%	59	61%	0.299	1.000	0.05
Veteran	4	100%	48	50%	3.846	.119	0.20
IQ < 70	0	0%	6	6%	0.266	1.000	0.05
Homelessness Characteristics							
Chronically homeless	0	0%	15	16%	0.735	1.000	0.09
Continually homeless for ≥ 1 year	1	25%	25	26%	0.002	1.000	0.00
At least 4 episodes in past 3 years	0	0%	11	11%	0.515	1.000	0.07
Greater than 1 time homeless	3	75%	61	64%	0.219	1.000	0.05
SSA Medical and Mental Health Diagnoses							
Medical disorder diagnosis	1	25%	18	19%	0.097	.576	0.03
Psychiatric diagnosis	1	25%	23	24%	0.002	1.000	0.00
t-tests	Mean	SD	Mean	SD	t	p-value	Cohen's d
Demographic Characteristics							
Age	59.00	2.83	48.46	9.16	2.288	0.024	0.46
Education (Years)	11.00	1.15	11.73	2.19	-0.660	0.511	0.13
Years worked at longest held job	8.67	10.79	7.24	5.83	0.406	0.686	0.09
Homelessness Characteristics							
Number of homeless episodes	3.75	2.99	3.35	3.82	0.204	0.839	0.04
Months homeless (Lifetime)	16.03	9.35	39.11	54.02	-0.850	0.398	0.17
Months homeless (Current episode)	5.75	3.41	19.70	37.39	-0.743	0.459	0.15
Cognitive and Functional Capacity Characteristics							
Word Reading Raw Score	62.00	4.08	56.11	9.89	1.181	0.241	0.24
Word Reading Standard Score	100.25	9.50	92.05	13.86	1.169	0.245	0.24
Matrix Reasoning Raw Score	22.75	4.27	21.25	6.69	0.444	0.658	0.09
Matrix Reasoning T-Score	56.00	6.48	49.64	11.79	1.069	0.287	0.22
Vocabulary Raw Score	57.75	5.74	53.71	11.65	0.688	0.493	0.14
Vocabulary T-Score	51.25	5.32	45.91	11.67	0.909	0.366	0.18
FSIQ	106.00	5.03	97.34	16.35	1.052	0.295	0.21
Coding Raw Score	61.00	18.11	52.57	15.04	1.090	0.278	0.22
Coding Scaled Score	10.25	3.50	7.68	2.75	1.816	0.072	0.37
MoCA Raw Score	22.00	2.58	23.13	3.86	-0.575	0.566	0.12
MoCA Z-Score	0.34	0.74	0.15	1.10	0.337	0.737	0.07
UPSA - B							
Financial Subscale Raw Score	44.32	2.27	39.87	8.14	1.086	0.280	0.22
Communication Subscale Raw Score	26.39	12.32	33.39	8.70	-1.553	0.124	0.31
Total Raw Score	70.71	14.26	73.26	13.88	-0.360	0.720	0.07
Total Scaled Score	6.25	3.50	7.09	3.15	-0.523	0.602	0.11

Note. IQ = Intelligence Quotient; MoCA = Montreal Cognitive Assessment; SD = Standard Deviation; UPSA-B = UCSD Performance-based Skills Assessment – Brief.

Table 5. Characteristics of those intending to apply for benefits at shelter entry

Chi-Squared tests	Plan to Apply (n=34)		No Plan to Apply (n=52)		Chi-Squared	Fisher Exact Test p-value	Phi (φ)
	n	**%**	**n**	**%**			
Demographic Characteristics							
Female	6	18%	10	19%	0.034	1.000	0.02
Non-Caucasian	17	50%	29	44%	0.275	.662	0.06
Hispanic/Latino	5	15%	5	10%	0.518	.507	0.08
Ever Married	22	65%	29	56%	0.68	.502	0.09
Veteran	16	47%	27	52%	0.195	.826	0.05
IQ < 70	3	6%	2	4%	0.93	.380	0.10
Homelessness Characteristics							
Chronically homeless	10	29%	4	8%	7.116	**.015**	0.29
Continually homeless for ≥ 1 year	14	41%	9	17%	5.978	**.024**	0.26
At least 4 episodes in past 3 years	5	15%	6	12%	0.185	.746	0.05
Greater than 1 time homeless	24	71%	29	56%	1.909	.183	0.15
SSA Medical and Psychiatric Diagnoses							
Medical disorder diagnosis	11	32%	5	10%	7.019	**.011**	0.29
Psychiatric diagnosis	14	41%	5	10%	11.898	**.001**	0.37
t-tests	**Mean**	**SD**	**Mean**	**SD**	**t**	**p-value**	**Cohen's d**
Demographic Characteristics							
Age	46.68	8.34	49.10	9.77	-1.188	0.238	0.26
Education (Years)	11.24	1.92	12.08	2.43	-1.699	0.093	0.37
Years worked at longest held job	6.06	3.95	8.03	6.86	-1.430	0.157	0.32
Homelessness Characteristics							
# Homeless Episodes	11.24	1.92	12.08	2.43	-1.699	0.093	0.37
Months Homeless (Lifetime)	53.01	68.77	31.70	44.70	1.581	0.120	0.45
Months Homeless (Current Episode)	24.05	44.09	18.62	36.18	0.624	0.534	0.14
Cognitive and Functional Capacity Characteristics							
Word Reading Raw Score	55.41	11.98	56.81	8.88	-0.620	0.537	0.14
Word Reading Standard Score	90.94	15.94	93.46	12.92	-0.806	0.423	0.18
Matrix Reasoning Raw Score	20.97	8.14	22.08	5.41	-0.698	0.488	0.19
Matrix Reasoning T-Score	47.82	14.25	51.63	9.72	-1.366	0.178	0.38
Vocabulary Raw Score	54.24	13.51	54.54	9.77	-0.113	0.910	0.03
Vocabulary T-Score	46.38	13.43	46.63	10.04	-0.094	0.926	0.02
FSIQ	97.12	19.59	98.96	13.46	-0.480	0.633	0.13
Coding Raw Score	49.29	16.96	54.69	14.23	-1.593	0.115	0.35
Coding Scaled Score	6.85	2.95	8.19	2.65	-2.193	**0.031**	0.48
MoCA Raw Score	22.38	5.23	23.65	2.81	-1.300	0.200	0.39
MoCA Z-Score	-0.03	1.50	0.24	0.79	-0.952	0.346	0.28
UPSA - B							
Financial Subscale Raw Score	38.37	10.51	40.82	6.33	-1.223	0.227	0.35
Communication Subscale Raw Score	31.70	10.64	34.72	7.61	-1.434	0.157	0.39
Total Raw Score	70.07	17.21	75.54	11.57	-1.630	0.109	0.45
Total Scaled Score	6.71	3.82	7.44	2.76	-1.038	0.302	0.23

Note. IQ = Intelligence Quotient; MoCA = Montreal Cognitive Assessment; SD = Standard Deviation; UPSA-B = UCSD Performance-based Skills Assessment – Brief.