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Housing Status, Psychiatric Symptoms, and Substance Abuse Outcomes Among Sober Living House Residents over 18 Months

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Abstract

Studies show individuals entering sober living recovery houses (SLHs) make significant, sustained improvement on measures of substance abuse problems, employment, and arrests. The current study assessed changes in housing status among SLH residents over 18 months and the relative influences of housing status and psychiatric distress on substance abuse outcomes. Two hundred forty one men and 58 women, all age 18 and older, were interviewed within their first week of entering 20 SLHs and again at 6-, 12-, and 18-month follow-up. Between entry into the SLHs and 18-month follow-up homelessness declined from 16% to 4%, marginal housing declined from 66% to 46%, and stable housing increased from 13% to 27%. Psychiatric severity was generally mild to moderate in severity, but nevertheless showed improvement over the 18-month study period. Multivariate models showed worse substance abuse outcomes for residents with higher psychiatric distress and unstable housing. Relative to persons with stable housing, those who were homeless or marginally housed had worse outcomes and those in SLHs had better outcomes. Overall, we conclude that individuals entering SLHs show improvement in housing status and psychiatric distress, both of which are associated with better substance abuse outcomes.

Keywords

Homelessness; Housing First; Substance Abuse; Mental Health; Recovery Home; Residential Treatment

Introduction

On any given day in the US, over half a million persons have no stable housing arrangement and over 123,000 of these persons have been described as chronically homeless.[1] The public health implications of homelessness are significant and include syndemic interactions with health problems, HIV risk, mental health disorders, and addiction to drugs and alcohol.[2–4]

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Mortality rates among homeless persons are more than three times that of persons with some type of housing [5]. Individuals who are homeless are at increased risk to be involved in the criminal justice system, especially for nuisance crimes such as trespassing.[6] In addition, lack of stable housing leaves individuals vulnerable to being victims of crime.[7]

Public health advocates in the U.S. have examined various options to address homelessness and related problems. The passage of the McKinney Homeless Assistance Act in 1987 created services for homeless persons that evolved into the creation of the continuum of care, with a linear approach to housing.[8] The continuum of care approach emphasizes substance abuse and mental health treatment as integral to eventually obtaining permanent stable housing. Thus, stable housing is an end product. In contrast, a more recent approach, known as “housing first” (HF) takes the view that provision of free or at least subsidized housing should occur first.[9] While case management services are typically offered to residents, there is a low threshold policy that emphasizes personal choice about whether to address substance abuse, mental health, and other problems.

Research to date has supported both models. When individuals in the HF model have their rent paid or subsidized without contingencies, retention in housing is excellent. Tsemberis, et al[10] reported 80% of 99 individuals in a HF study condition remained housed at 24-month follow-up. Although some studies have compared HF and “usual care” approaches that used the continuum of care model and reported comparable or better outcomes for HF, reviews of these studies have cited a variety of limitations, including characteristics of the samples used, selection of inclusion and exclusion criteria, measures used to assess problems, neglect of specific behaviors (e.g., assessment of heavy drinking), and retrospective data collection methods such as clinical chart reviews.[11,12] An additional concern in some of these studies was the use of unclear comparison conditions that did not define “usual care” or identify what services were offered or received. When continuum of care was identified as a comparison condition few of those programs had resources for long term housing after completion of treatment despite the fact that permanent housing is supposedly an integral component of the continuum of care approach.

A limited number of studies have examined housing outcomes for individuals enrolled in continuum of care systems that included time limited provision of housing during or after treatment. For example, using an abstinent-contingent housing and treatment approach known as the Birmingham model, Milby and colleagues[13] demonstrated that abstinent contingent housing had better cocaine outcomes than non-abstinent contingent housing. Sixty five percent of the study participants completed the maximum length of stay in the abstinent contingent housing, which was provided over a 6-month period of time. Despite these favorable findings, questions remained about how participants would maintain abstinence after they left. Without provision of permanent housing after the 6 month time period expired, participants were vulnerable to homelessness and relapse even if they successfully completed treatment.

Lost in mst of the current debates about housing for homeless persons with substance abuse and psychiatric disorders is the potential role of peer managed residential recovery homes as a way to provide long-term housing.[11] Two widely prevalent models are California Sober

Living Houses (SLHs)[14] and Oxford Houses (OHs).[15] These residences often provide housing to persons who complete residential treatment programs, but they also provide living spaces to persons attending outpatient treatment or seeking non-treatment alternatives for recovery. Oxford Houses and SLHs both require abstinence within an alcohol- and drug-free living environment and rely on peer support to facilitate recovery from substance abuse disorders. In addition, both rely on the residents themselves to be actively involved in decisions affecting the houses and managing operations. Thus, these settings provide important opportunities for residents to learn the skills necessary for transitioning into independent, stable housing. Unlike formal treatment or HF approaches, most of the costs are paid by the residents themselves. If residents need professional services they are referred to services in the surrounding community. Most homes encourage or require residents to be involved in 12-step recovery groups such as Alcoholics Anonymous. Residents are welcome to remain in these facilities as long as they like provided they abide by house rules such as abstinence from alcohol and drugs, pay rent and other costs, and participate in upkeep and operation of the house. The homes thereby provide an environment that supports sustained abstinence and development of recovery and other life skills. Methods for implementing the "social model" approach to recovery that facilitates peer support in the homes have been described elsewhere.[16]

Residential recovery homes have been studied minimally in terms of their appropriateness for homeless persons suffering from co-occurring psychiatric and substance abuse disorders,[11] yet a number of authors suggest they might be able to play important roles within homeless service systems.[17,18] Studies that have been conducted of SLHs and OHs where significant proportions of the residents were homeless at entry have shown favorable outcomes. For example, in a study of 53 residents of OHs in St. Louis half were found to have a history of homelessness.[19] Outcomes for residents over a 6-month time period showed 42% continued to reside in the houses and 27% left the house on good terms. Over 78% had some type of psychiatric comorbidity. Interestingly, 30% reported their reason for choosing an OH was because they had no other place to live.

Studies of SLHs using subsamples of the current work show that many persons with histories of homelessness and psychiatric problems have favorable alcohol, drug, and psychiatric outcomes. In a study of 55 residents in SLHs in California over 33% indicated their primary living situation during the past six months was homeless or living in a shelter and another 16% indicated primary residency as incarceration.[20] Positive screening for DSM-IV Axis I disorders were high for some symptom areas, including social phobia (56%), post-traumatic stress disorder (46%), and psychotic disorders (42%).[21]. It must be emphasized that the screening instrument used, the Psychiatric Diagnostic Screening Instrument (PDSQ),[22] does not indicate the presence of a psychiatric diagnosis. It indicates the presence of some symptoms within diagnostic areas that requires further assessment. Scores on the PDSQ showed few of the study participants evidenced symptom levels suggesting the presence of severe mental illness. This finding was not surprising because most persons with serious mental illness are screened out during the initial application interview. Overall, severity of psychiatric symptoms tended to be higher than general population samples but lower than treatment populations.[23] Even with high levels of homelessness or unstable housing and the common presence of psychiatric symptoms,

residents made significant improvement in terms of substance abuse, arrests, and employment. Importantly, these improvements were maintained at 18-month follow up even though most participants no longer resided at the house. Additional research examining trajectories of psychiatric symptoms among 300 SLH residents showed a decline in symptom severity over 18 months.[23] Global psychiatric severity as well as subscale scores for depression, and phobic anxiety showed significant decreases. However, higher severity of psychiatric symptoms consistently predicted worse outcome.[24,23, 16]

Purpose

Previous analyses of sub-samples of the dataset used for the current study showed significant improvement on measures of substance use, alcohol and drug problems, arrests, employment, and psychiatric symptoms between baseline and 6-month follow up.[24,25] Moreover, the improvements noted at 6 months were maintained at 12 and 18 months. However, lacking in these and other studies of SLHs are examinations of how housing status for SLH residents changes over time and how housing status is associated with substance abuse outcome.

The current study assessed changes in housing status over 18 months and whether housing status was predictive of substance abuse outcomes. Because psychiatric problems are relatively common among persons who are homeless or in unstable living arrangements and previous studies using sub-samples of the current data have shown psychiatric distress to be predictive of worse outcome in SLHs,[26] we wanted to parse out the relative influences of housing and psychiatric distress using multivariate models. There were two research questions: 1) does housing status improve over time? and 2) how are housing status and psychiatric severity associated with substance abuse outcomes over18-months? We anticipated that substance abuse outcomes would be better for those residing in SLHs compared to those in stable housing and those residing in stable housing as compared to those who were homeless or living in marginal housing. We also expected psychiatric distress would predict worse outcome controlling for the influence of housing status.

Methods

Sober Living House Providers

Data were collected from two SLH organizations, Options Recovery Services (ORS) and Clean and Sober Transitional Living (CSTL), both of which are located in Northern California. CSTL residences are freestanding in that they are not affiliated with any formal treatment program, whereas ORS houses are targeted living arrangements for individuals attending an outpatient treatment program. Both types of houses have standard SLH rules and policies, such as mandated abstinence, required involvement in 12-step recovery groups, and participation in upkeep of the facility. Residents in both types of homes are welcome to stay as long as they wish. For a more extensive description the housing programs see.[14,27,28]

Sample

To maximize generalization of results we employed few inclusion/exclusion criteria. All study participants were age 18 or older and competent to provide informed consent. We

recruited a total of 300 individuals entering houses from CSTL and ORS. A total of 299 responded to the baseline housing measure.

Procedures

This study was funded by the National Institute on Drug Abuse and all study procedures were approved by the Public Health Institute Institutional Review Board. A federal certificate of confidentiality was obtained to provide further protection to participants. Study participants were recruited and interviewed within their first week of entering the houses and interviewed again at 6-, 12-, and 18-month follow up from January 2004 to July 2006. Among the sample of 299, 89% (n =266) participated in at least one follow-up interview. Follow-up rates for each time point included 76% (n=227) at 6 months, 73% (n=218) at 12 months, and 75% (n=224) at 18 months. There was strong support for the study among the residents and only one refused to participate.

To assess potential sample bias due to attrition differences between those who completed follow-ups and those we were not able to locate, we used methods described by Gerstein et al (1994) comparing baseline demographic characteristics, overall psychiatric distress, and substance use in the baseline sample to among those who completed interviews and those who did not at each of the follow-ups. No demographic differences were found at any time point between individuals who completed follow-ups and those who did not. Length of stay in the house was associated with completion of the 6- and 12-month follow-up interviews, but not with completion of the 18-month interview.

A more detailed description on study procedures has been published elsewhere.[27]

Measures

The following measures were collected at baseline only:

1) Demographic Characteristics—Age, gender, ethnicity, marital status and education were collected at the baseline interview and length of stay (LOS) was recorded as the number of days between baseline interview and exit from the SLH.

2) DSM-IV Checklist (past 12 months)—This instrument assesses past 12-month alcohol and drug dependence with items based on DSM-IV diagnostic criteria[29,30] to describe the types of dependencies of this sample at the baseline interview.

The following measures were collected at baseline and 6-, 12-, and 18-month follow-up:

1) Housing Status (past 180 days)—Participants were asked their usual living situation over the past 180 days. Responses were divided into four categories of principle housing status: 1) stably housed (owned or rented a residence with or without housemates), 2) living at a SLH, 3) marginally housed (prison, inpatient treatment, or temporarily staying with friends or family) and 4) homeless (shelter or homeless). Housing status was collected at all interviews.

2) Brief Symptom Inventory (BSI)[31] (past 7 days)—The BSI was designed to assess psychiatric symptoms among psychiatric and medical patients as well as community non-patient individuals. This self-administered 53-item measure is specifically designed to profile nine primary symptom dimensions and three global indices for distress to measure current psychological symptom status (past 7 days). The indices and subscale scores have demonstrated good internal consistency (Cronbach's alpha ranging from .71 to .85) and test-retest reliability (coefficients ranging from .68 to .91) in a normative study. As well, the BSI has high convergence with the Minnesota Multiphasic Personality Inventory (MMPI) scales for the nine dimensions.

We used one of the global indices, the Global Severity Index (GSI), to assess overall psychiatric severity. The GSI is inclusive of all BSI subscales. While the BSI is currently viewed by most researchers as appropriate for measuring general psychiatric distress (i.e., the GSI), some have questioned the validity of the nine subscales.[32] However, understanding the specific psychiatric symptoms influencing substance abuse measures was an important aim of the study. To assess the psychometric properties of these subscales we conducted our own factor analytic analyses. Analyses of data at each wave yielded five factors with Eigenvalues greater than 1.0. Review of the items that loaded onto these factors (varimax rotated factor loadings > 0.4) revealed that some of the items from the original symptom dimensions clustered together. In addition to using the global severity index (GSI), we retained the somatization, depression, phobic anxiety and hostility subscales. The overall GSI and these four subscales demonstrated good internal consistency across administrations (α=.75–.98). All scales were used as continuous raw scores.

3) Addiction Severity Index Lite (ASI) (past 30 days)—The ASI is a standardized, structured interview that assesses problem severity in six areas: medical, employment/support, drug/alcohol, legal, family/social and psychological. The ASI measures a 30-day time period and provides composite scores between 0 and 1 for each problem area. The ASI has demonstrated excellent reliability and validity in numerous studies.[33] Only alcohol and drug severity scores are used for the present study and, although the instrument includes a measure of psychiatric severity as well, we opted to use a more comprehensive measure for psychiatric symptoms, the Brief Symptom Inventory, which is described above.

4) Peak Density (past 6 months)—Taken from Gerstein et al,[34] this measure assesses the number of days of any substance use (i.e., any alcohol or drug) during the month of highest use over the past 6 months and ranges from 0 to 31. This outcome variable skewed toward zero in follow-up interviews and was dichotomized to express 0 to 14 days of use versus 15 or more days for interpretability of decreased substance use.

Analysis

Data were analyzed using Stata, Version 13.[35] Analyses began with calculation of baseline characteristics, including demographics, housing status prior to entering the SLH, and percent meeting DSM IV criteria for drug and alcohol dependence during the past 12 months. Baseline data were also calculated for ASI alcohol and drug severity, peak density (percent using substances 15+ days during the month of highest use) and psychiatric

symptoms on the BSI. Bivariate analyses of baseline variables included chi square for comparison of categorical variables and ANOVA for comparison of continuous measures.

We then examined how housing status changed over the four data collection time points using the following categories: Stable Housing, SLH, Marginal Housing, and Homeless. Because few participants reported homelessness as their primary living situation, particularly at 18 month follow-up (N=8), we combined individuals marginally housed with those who were homeless in our multivariate analyses.

Generalized Estimating Equation (GEE) models were used to test the associations between housing status and alcohol and drug outcomes. GEE was used because it can assess the relative influences of predictor variables on outcomes using longitudinal data and can accommodate interval and categorical data, both of which were used in our study. These analyses included all four data collection time points for an overall assessment of how variables were associated over the 18-month time period. A prime advantage of the GEE model is that it allows for interpretation of within-individual change in the outcome over time and simultaneous associations with time varying covariates of interest. This method uses all available data and, because the repeated measures within each subject are not independent of each other, a correction is made for these within-subject correlations.[3636] We used xtee commands specifying robust variance estimation to adjust for clustering effects.

Because psychiatric severity was shown to be a predictor of outcome among SLH residents in previous analyses[23] and is known to be associated with housing status,[11] we assessed separate models for each of our BSI scales with housing status included in each of the models. This enabled us to parse out the relative influences of housing and psychiatric distress on substance abuse outcomes. Robust error estimation was used to marginalize Type 1error.[37] In addition to controlling for time, models controlled for variables found to be significantly associated with substance abuse outcomes (age and length of stay). Because data were collected at two separate sites we also controlled for site.

Results

Baseline Housing

Of the 299 residents (Table 1), 13% (n=40) reported a stable housing arrangement during the 6 months prior to entering the SLH, 5% (n=16) came from another SLH facility, 16% (n=47) reported being homelessness, and the majority (66%, n=196) indicated they were living in marginally housed situations. Of the 196 that were marginally housed, 47% (n=93) were arriving from jail or prison, 36% (n=70) were temporarily living with family or friends, 15% (n=30) were arriving from alcohol and drug treatment facilities and 2% (n=3) were at a hotel or motel (not tabled).

Data Collection Sites

As Table 1 indicates, most participants were recruited at the CSTL site (n=244), while 55 were recruited at ORS. At baseline, both groups had similar proportions reporting they were in stable housing prior to entering the SLH facility. Similar proportions were also reported for living in a in a different SLH. However, ORS residents were more likely to report

homelessness prior to entry (35% versus 12%) and CSTL were more likely to report being in marginal housing situations (69% versus 49%). Because of the small percentage of those coming from another SLH house at baseline, *p* values reflected in the final column of Table 1 compare stable, marginal, and homeless groups.

Demographics

The combined sample was mostly male (80%), white (65%), and had completed a high school education (78%). About half (49%) had never been married. The mean age was 38.5(sd= 10.1). Gender, education, marital status, race, and age did not significantly differ by housing status (Table 1). The most common substance dependencies over the past year were alcohol (n=162), methamphetamine (n=135) and cocaine (n=89) (not tabled). Assessments of substance use and severity of substance abuse problems varied by housing status. Peak Density during the 6-month period prior to entering the SLH was highest among persons who were homeless (83%). ASI alcohol and drug severity during the 30 days prior to entering the SLHs was highest among those with stable housing.

Psychiatric Distress

Assessment of psychiatric distress using the BSI scales suggested that severity of psychiatric symptoms was higher than that in non-treatment general population samples but on average lower than that of persons engaged in outpatient psychiatric treatment.[23] Global psychiatric severity at baseline as measured by the GSI scale was 0.80 (s.e.=0.04). Baseline scores for the individual clinical scales of the BSI were 0.56 (s.e.=0.04) for hostility and somatization scales, 0.56 (s.e.=0.05) for phobic anxiety, and 1.03(s.e.=0.06) for depression. No significant differences were observed for any of the BSI psychiatric measures among housing categories. Previous analyses of this dataset noted psychiatric severity improved over time and higher severity was associated with worse substance abuse outcome.[22]

Changes in Housing Status

Figure 1 displays the percent within the four housing categories at each interview. The figure is grouped by housing status to show how each category changed over time. Change in housing status over the four data collection time points was common. Among the residents reporting at least one follow-up interview (89% of the sample), 23% did not change their initially reported housing situation over the 18-month data collection time peroid, but 42% reported a change in housing status at least twice since the baseline interview (not tabled). The preponderance of individuals arrived from a marginal housing situation (66%), which dropped to 46% by the 18-month interview. Stable housing increased from 13% at baseline to 27% at the final interview. Most individuals were still at the SLH by the 6-month interview (56%) but less than a quarter (22%) reported living in a SLH by the last interview at 18 months.

The mean length of stay in the SLHs ranged from 135.3(sd=159.2) days for those who were in a different SLH prior to entering the current house to 237.5(sd=168.2) for those who were homeless. Post hoc comparisons showed persons who were homeless had significantly longer stays than those who were marginally housed (mean=159.9, sd=158.6, p=.01). The

SLH category was not included in comparisons with other housing categories due to the low number (n=16).

Homelessness

When we examined the subgroup of residents entering SLHs who indicated homeless as their usual living situation over the last 180 days we found several notable findings. Homelessness declined over time, from 16% at entry into the study to 4% by the final 18-month follow-up interview, a fourfold decrease. Of the residents that were homeless at SLH entry (n=47), 41 were reached for follow-up (87%). Of these, 85% improved their living circumstances and were either stably housed (n=7), residing at a SLH (n=13), or in some type of marginal housing (n=15) at final follow-up (not tabled). Over 31% of those homeless at baseline remained in a SLH environment for at least one year.

Multivariate Models

We used repeated measures GEE models (Table 2) to assess how housing status and psychiatric distress were associated with alcohol and drug outcomes over time. Dependent variables included the ASI alcohol scale, ASI drug scale, and peak density of substance use (dichotomized as 15+ days of use during the month of highest use). All four waves of data were used for these analyses. Five models were tested, each using one of the BSI scales and housing status (SLH versus stable housing and marginal/homeless versus stable housing) controlling for the influences of time and selected baseline covariates. The table shows that each of the five BSI scales was associated with most of the outcome measures tested. Higher psychiatric distress was consistently associated with worse outcome on ASI alcohol, ASI drug and peak density. Housing status consistently predicted outcomes for ASI drug severity and peak density, but not ASI alcohol severity. Compared to stable housing, marginal housing/homeless predicted higher peak density of substance use, although the results for phobic anxiety and hostility were marginal ($p<.10$). However, marginal housing/homeless did not similarly predict higher ASI alcohol or drug severity.

Relative to stable housing, living in a SLH environment was associated with lower ASI drug severity and lower peak density in all of the five models teste. However, the SLH category did not differ significantly from stable housing in prediction of ASI alcohol severity in any of the models.

Discussion

Previous analyses of subsamples of our data showed psychiatric severity among residents of SLHs improves over time.[26] Findings from the current study showed housing status improves as well. These improvements are obviously important by themselves, but they are also important because multivariate analyses showed both housing status and psychiatric distress were associated with improved substance abuse outcomes. During the 6 months before entering the SLHs, 82% of the sample indicated they were in unstable living situations (66%) or homeless (16%). At 18-month follow up those proportions declined significantly to 46% in unstable living situations and only 4% indicating they were homeless. In addition, the percent stably housing more than doubled between entry into the

house and 18 month follow-up. At the final wave of data collection, nearly half of the sample were either still residing in a SLH or in other stable living situations. Residence in stable living is an obvious positive outcome. However, continued residence in the SLH at 18 months was also viewed as a positive outcome that is consistent with the intent of SLHs.

Overall, study findings demonstrate that sober living recovery homes can be an appropriate referral source for individuals suffering from the combined effects of substance dependence and unstable housing or homelessness. However, because our multivariate analyses assessed aggregate associations across the entire 18-month time period, we cannot describe causal mechanisms of change. In addition, further research is needed to more comprehensively examine proximal factors related to improvement of housing status among SLH residents.

The improvements in housing status are particularly noteworthy because improved housing status was found to predict peak density of substance use and drug problem severity. We hypothesized outcomes would be better for persons residing in SLHs than those in residing in other stable housing and better for those in stable housing than those who were homeless or in marginal housing. Hypotheses were confirmed for housing status having an influence on substance use (peak density) and severity of drug problems (ASI drug severity), but not severity of alcohol problems (ASI alcohol severity). Given that alcohol as well as drug problems were widespread among the sample it was expected that both ASI drug and alcohol problem areas would be impacted by housing status.

The strongest associations we found were between housing status and peak density of substance use. Both housing status and peak density variables assessed six month periods of time and that consistency may have made it easier to show associations. For the ASI analyses our models had housing status over five months predicting ASI measures assessing 30-day time periods. Variation of alcohol and drug problems over the five months not assessed by the ASI but included in the housing status assessment may have contributed to difficulty finding associations.

As expected, persons who were homeless or in marginal living situations had higher substance use compared to persons in stable housing. However, residing in a SLH environment appeared to have a protective influence. Relative to persons in stable housing, those in SLHs had less substance use and lower severity of drug problems. Characteristics of SLHs that go beyond being a stable place to live may be important, such as requirements for abstinence, mandated attendance at 12-step recovery groups, and peer support for recovery. Previous interviews with managers of SLHs suggest that the interpersonal connections among residents within the SLHs and extent to which those relationships are valued provide strong motivation to maintain recovery.[38]

Previous research on SLHs has shown that psychiatric problems improve over time and that higher psychiatric distress is associated with worse substance abuse outcome.[26] Because psychiatric problems are associated with homelessness and unstable housing we wanted to assess its relative influence on substance abuse outcomes by including housing status in our models. Results showed all of the BSI scales were strong predictors of all of the substance abuse outcomes. Thus, the presence of psychiatric symptoms appears to yield a significant

influence even when housing and other variables were controlled. It should be noted that relatively few of our participants presented severe mental illness. Thus, the influences of psychiatric distress appear to be significant even at relatively modest levels of severity.

Implications for Housing Models

Results demonstrate that persons entering SLHs make improvements in housing status and psychiatric distress, both of which predict outcome. Our data suggest SLHs may be an appropriate option for persons with unstable housing combined with substance abuse problems and moderate levels of psychiatric impairment. Because the sample included few persons with severe mental illness, those individuals might be better served in other supported living environments, such as treatment or HF programs. Previous focus groups with SLH managers suggests significant modifications of standard SLHs need to be made to effectively address the needs of persons with co-occurring severe mental illness and substance abuse.[38] However, it should be noted that persons with severe mental illness constitute a minority of persons who are homeless.[1]

One of the biggest criticisms of the continuum of care model for addressing substance abuse problems among homeless persons is the failure of clients to access and maintain long-term housing. After completion of treatment, far too many are unsuccessful in finding stable housing, which puts them at risk for relapse and other problems. Results here demonstrate that SLHs might be capable of playing an important role in providing long-term housing because housing status improves over time and very few residents report being homeless at follow-up. Funders of treatment and housing services should consider subsidies for persons who are unable to pay the costs of residing in a SLH. Such an investment would very likely be cost effective, an issue that could be empirically investigated.

Residence in SLHs may not be a good option for some persons. For example, some individuals are unwilling or unable to adhere to the requirement of abstinence in SLHs. Others, due to mental health problems or other issues, may have difficulty participating in the daily milieu of the SLH which can be hectic and stressful at times. Many of these individual might fare better in low demand settings, such as HF or other housing options that suit resident characteristics. It has been argued that a significant limitation in current homeless services is the failure to fund different housing options that would present choices to consumers.[17,18] While the U.S. Department of Housing and Urban Development provides funding or some types of housing programs (e.g., HF), it does not provide funds for others (e.g., SLHs and other types of recovery residences).

Limitations

There are a number of limitations to the study that bear noting:

1. We did not use a randomized design so we cannot make statements about causality. However, as described in detail elsewhere, [39] there can be serious limitations to using randomized designs when studying recovery residences. Problems can include recruitment of study participants and generalization of results.

2. Our aims were to show that housing status improved over time and that housing status and psychiatric distress (which also improved over time) were associated with substance abuse outcomes. Toward that end, our multivariate analyses were designed to show aggregate relationships between study variables across the 18-month data collection period. Thus, we cannot be certain about the causal pathways leading to the association found. For example, in addition to the possibility that living in a SLH has a protective effect against substance abuse, it could be that successful abstinence causes one to remain in a SLH longer. Additional research will be necessary to disentangle causal mechanisms.

3. While SLHs may be a viable solution for those ready to maintain a lifestyle of sobriety, those who are unmotivated or prone to relapse may require different services.

4. Changes in housing status among the sample common and we did not collect information on the pathways to stable housing or factors associated with it.

Future Directions

The study findings reported here support recommendations made by Paquette and Winn,[17,18] who suggest a better approach to co-occurring problems of substance abuse problems among persons who are homeless or unstably housed would be to provide funding for a broader based system of choices that includes HF, SLHs, and other housing options. The availability of these distinct housing options would provide greater responsivity to individuals. When determining appropriate referrals, such a system could consider individual motivation for abstinence, level of psychiatric distress, and capacity to engage in a recovery oriented milieu. Rather than reviewing housing as a permanent choice at one given point in time, housing could be assessed in an ongoing basis assessing how well the person's current housing fit with individual needs and alternative options could be discussed and pursued based on changing needs and motivation over time.

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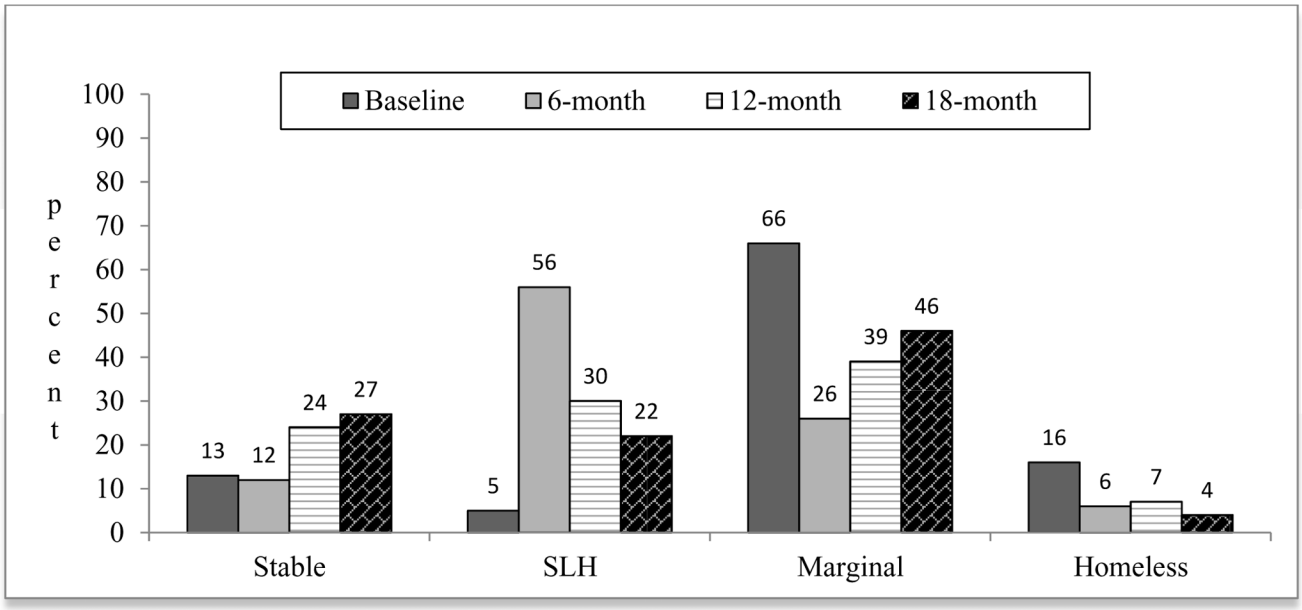

Figure 1.
Housing status at each interview (in percent).

Table 1

Baseline characteristics and length of stay by housing status (N=299).

	Stable (A) (n=40)	SLH (B) (n=16)	Marginal (C) (n=196)	Homeless (D) (n=47)	*p-value*[&]
	%	%	%	%	
SLH Program					
Options (n=55)	10.9	5.5	49.1	34.5	0.00
CSTL (n=244)	13.0	5.3	69.3	11.5	
Demographics					
Male	80.0	75.0	80.6	80.9	*Ns*
High School Graduate	85.0	87.5	63.5	78.7	*Ns*
Never married	37.5	62.5	51.0	46.8	*Ns*
White race	71.8	81.3[*]	65.1	53.2	*Ns*
Length of Stay over 12 months	34.3	8.3	16.4	31.0	0.02
Peak Density[^]	82.5	50.0	59.2	83.0	0.001
Continuous Measures[+]					
Mean Age (sd)	39.9(8.9)	40.1(13)	37.3(10)	47.5(9.7)	*ns*
ASI Alcohol (sd)	0.19(0.25)	0.16(0.21)	0.10(0.18)	0.10(0.16)	0.04
ASI Drug (sd)	0.11(0.11)	0.07(0.09)	0.06(0.09)	0.05(0.08)	0.01
BSI Scales					
Global Severity Index (GSI)	1.02 (0.87)	0.73 (0.67)	0.76 (0.73)	0.78 (0.71)	*Ns*
Depression	1.34 (0.82)	0.82 (0.75)	0.98 (1.00)	1.02 (1.01)	*Ns*
Somatization	0.75 (0.94)	0.64 (0.80)	0.52 (0.74)	0.54 (0.64)	*Ns*
Phobic anxiety	0.72 (1.05)	0.53 (0.78)	0.55 (0.85)	0.51 (0.66)	*Ns*
Hostility	0.55 (0.72)	0.35 (0.27)	0.58 (0.77)	0.57 (0.84)	*Ns*

[&]p-values reflect X^2 comparisons between stable, marginal and homeless groups

[+]ANOVA comparisons between stable, SLH, marginal, and homeless groups

[^]peak density = 15+ days of use in the month of heaviest use during the past 180 days

[~]criteria based on Brief Symptom Inventory and reflects symptomatology but not does not denote

A clinical diagnosis of mental illness

* p<0.05 X^2 comparing homeless and SLH housing groups using Fisher's Exact

Table 2

Generalized estimating equation models of housing and BSI clinical scales predicting ASI alcohol, ASI drug, and peak density.

	ASI Alcohol		ASI Drug		Peak density	
	β	***95% CI***	***β***	***95% CI***	***OR***	***95% CI***
BSI scale						
Global Severity Index (GSI)						
GSI	**0.07*****	0.05, 0.09	**0.04*****	0.03, 0.05	**1.11*****	1.07, 1.16
Housing (ref=stable)~						
SLH	−0.02	−0.05, 0.01	**−0.02****	−0.04, −0.01	**0.81*****	0.74, 0.88
Marginal/homeless	−0.01	−0.04, 0.02	0.00	−0.01, 0.01	**1.14****	1.06, 1.23
Depression						
Depression	**0.05*****	0.04, 0.07	**0.03*****	0.02, 0.04	**1.10*****	1.06, 1.13
Housing						
SLH	−0.02	−0.06, 0.01	**−0.02****	−0.03, −0.00	**0.81*****	0.75, 0.89
Marginal/homeless	−0.02	−0.04, 0.01	0.00	−0.01, 0.01	**1.14****	1.05, 1.23
Somatization						
Somatization	**0.07*****	0.04, 0.09	**0.03*****	0.02, 0.04	**1.11*****	1.06, 1.16
Housing						
SLH	−0.03	−0.06, 0.01	**−0.02****	−0.04, −0.01	**0.81*****	0.74, 0.89
Marginal/homeless	−0.01	−0.04, 0.02	0.00	−0.01, 0.02	**1.14****	1.06, 1.24
Phobic Anxiety						
Phobic Anxiety	**0.03*****	0.02, 0.05	**0.02*****	0.01, 0.03	**1.04**^	1.00, 1.09
Housing						
SLH	−0.03	−0.06, 0.00	**−0.02****	−0.04, −0.01	**0.80*****	0.73, 0.87
Marginal/homeless	−0.01	−0.05, 0.02	−0.00	−0.01, 0.01	**1.13**^	1.05, 1.23
Hostility						
Hostility	**0.04*****	0.03, 0.06	**0.03*****	0.02, 0.04	**1.10**^	1.06, 1.13
Housing						

	ASI Alcohol		ASI Drug		Peak density	
	β	*95% CI*	*β*	*95% CI*	*OR*	*95% CI*
SLH	−0.03 *	−0.07, 0.00	**−0.02** **	−0.04, −0.01	**0.80** ***	0.73, 0.87
Marginal/homeless	−0.02	−0.05, 0.02	0.00	−0.02, 0.01	**1.13**∫	1.05, 1.22

All models control for SLH program, LOS, age and time.

~ All models use 'Stable Housing' as the housing reference category

* p<0.05;

** p<0.01;

*** p<0.001

∫ p<0.10