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Long-Term Housing and Work Outcomes Among Treated Cocaine-Dependent Homeless Persons

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Abstract

Communities across the United States have initiated plans to end chronic homelessness. In many of these communities, addiction treatment programs remain the default point of entry to housing and services. This study examined the percentage of cocaine-using homeless persons (all with psychiatric distress) attaining stable housing and employment 12 months after entering a randomized trial of intensive behavioral day treatment, plus one of the following for 6 months: no housing; housing contingent on drug abstinence; housing not contingent on abstinence. Of 138 participants, the percentages with stable housing and employment at 12 months were 34.1% and 33.3%, respectively. Analyses suggested superior outcomes in trial arms that offered housing as part of the behavioral treatment. The majority of participants, however, did not achieve housing or employment, in part because of the limited capacity of the local housing programs to accommodate persons who had not achieved perfect abstinence. The findings demonstrate a helpful role for addiction treatment, and suggest a role for services to support housing of persons who reduce but do not eliminate all substance use.

Keywords

homeless persons; randomized controlled trials; addiction treatment; rehabilitative outcomes; employment; contingency management; health policy

Introduction

Since 2002, the United States federal government has articulated a commitment to ending chronic homelessness, offering targeted funding, logistical support, and aggressively promoting community planning at the state and local levels.¹⁻⁵ As of August, 2006, 222 communities had announced 10-year planning processes dedicated toward this goal (Personal Communication, Mary Ellen Hombs, United States Interagency Council on Homelessness, August 3, 2006). An estimated 1.4-2.1 million adults experience homelessness each year in the United States.⁶ Although homelessness reflects a complex array of structural and personal vulnerabilities,^{6, 7} substance abuse and dependence are contributing factors.^{8, 9} In many communities, residential addiction treatment programs are the major point of entry to the network of available services. In light of the rejuvenated national focus on ending chronic homelessness^{4, 5, 10} it is important to document how, and whether, addiction treatment can contribute to improvements in long-term housing and employment, especially because treatment services are heavily used. In national survey data, among homeless persons with a drug abuse history (58% of the total), 17% reported receipt of inpatient or residential treatment within the past year (most reporting 2 or more episodes), potentially reflecting up to ½ million inpatient treatment episodes per year among homeless persons.¹¹

In most communities, homeless addiction treatment is intensive, time-limited (1-6 months), and fortified with referrals to a range of services that in principle should be “seamless” with the treatment itself.¹² Successful clients may return to work and housing or advance to transitional residential programs as part of a local “continuum of care” that can include private recovery homes, federally funded transitional housing, or long-term supportive housing with federal or local support. An objective assessment of the rehabilitative outcomes obtained from addiction treatment programs could be helpful to the communities now planning to end chronic homelessness.² However, the success of these programs in facilitating long-term housing and employment among homeless substance-abusing persons remains unclear, for at least 3 reasons:

First, some observational studies that profile housing after addiction treatment lack specific data on the particular treatments offered.¹³

Second, a number of prospective addiction treatment trials among homeless individuals failed to show that one trial arm was more effective than another.¹⁴⁻¹⁶ While such findings may be compatible with treatment benefit insofar as improvements are noted among all participants who attended (regardless of trial arm), the lack of differences by trial arm limits the strength of causal attributions.

Third, published treatment outcome findings may be suboptimum from a policy perspective when intervention effects are analyzed in terms of continuous outcomes such as “number of days housed.”^{17, 18} A report that case management or short-term housing interventions produced, on average, 4-6 additional days of housing can be difficult to translate to policymakers who are required by funders to track the absolute number of persons housed successfully.

Therefore, this project sought to characterize the proportion of homeless, psychiatrically distressed cocaine-dependent clients for whom a 6-month evidence-based, behaviorally-oriented addiction treatment (in which 2 out of 3 trial arms experienced significantly superior abstinence outcomes, as previously reported¹⁹) was followed by stable housing and employment at 12 months. All participants were offered behavioral day treatment services, and randomly assigned to receive either no program-provided housing during treatment (No Housing), program-provided housing contingent upon abstinence (Abstinence-Contingent Housing), or program-provided housing not contingent upon abstinence (Nonabstinence-Contingent Housing).²⁰ Elements of the 6-month treatment service package (including psychoeducational groups, work therapy, therapeutic goal management and, in 2 trial arms, housing) had efficacy in reducing substance use in a series of randomized controlled trials.²⁰⁻²² Published trial results showed superior week-to-week abstinence during treatment for the two housing intervention groups (Abstinence-Contingent Housing & Nonabstinence-Contingent Housing) compared to No Housing, and an advantage for the Abstinence-Contingent Housing group versus Nonabstinence-Contingent Housing over time.²⁰

To provide policy-relevant information, categorical measures for stable housing and employment at one year were developed based on the treatment outcomes data. One research goal was descriptive, i.e. to quantify the proportion of homeless, psychologically distressed cocaine-abusing persons with rehabilitative success 1 year after entering a 6-month treatment. Secondarily, and consistent with the original trial, this study assessed whether 12-month work and housing outcomes were superior among persons who had received the program-provided housing interventions (Abstinence-Contingent Housing & Nonabstinence-Contingent Housing) during treatment.

Methods

The details of the source trial have been published²⁰ but are summarized here.

Participants

The trial recruited cocaine-using persons with significant psychological distress who met federal criteria²³ for homelessness, or were at imminent risk of becoming homeless (based on report of doubling up and susceptibility to being asked to leave at any time). Recruitment occurred at the largest homeless health care agency in Birmingham (Birmingham Health Care, BHC). Participants had to have used cocaine at least once in the last 2 weeks, although prior studies in the same population showed that >90% qualified for a formal cocaine dependence diagnosis.²⁴ The psychological distress criterion was a score of ≥ 2 standard deviations above the mean on one or more psychopathology symptom scales of the Symptom Checklist Revised-90²⁵ (formal interview by a psychologist showed that 75% and 51%, respectively, qualified for formal DSM-III-R nonsubstance abuse Axis I and Axis II diagnoses). Exclusions included unwillingness to participate after informed consent, or conditions that would preclude day treatment such as very severe cognitive impairment, overt psychosis, mental retardation, or an illness requiring immediate hospitalization.

The treatment program

For all 3 trial arms, the first 6 months of treatment included a combination of outpatient treatment and paid work therapy developed over 2 previous trials funded by the National Institute on Drug Abuse, provided at BHC under direction of the investigators.^{21, 22} This program was divided into Phase I (day treatment, months 1-2), Phase II (work therapy and aftercare, months 3-6), and an additional 6 months of once-weekly aftercare group meetings and individual counseling, if desired (see Figure 1). Phase I and Phase II were designed to build a nondrug-use-based repertoire of activities, rewards, and sources of self-efficacy. Phase I day treatment lasted 6-1/4 hours daily with lunch and transportation to and from the housing/shelters. It included counseling, psycho-educational groups, psychological evaluation, twice-weekly random urine drug testing, and therapeutic goal management. The latter [like goal intervention techniques²⁶] involved a weekly process of setting/revising goals in major domains (housing, employment, drug/alcohol, mental health, family relationships, socialization, HIV risk), group evaluation and voucher rewards for goal attainment (Wal-Mart debit cards of \$5 or \$10 value).

In Phase II, all 3 trial arms were offered aftercare (at BHC) and work therapy (6-1/2 hours per day) consisting of food service, landscaping, or refurbishing houses for homeless persons at a wage of \$5.25 per hour. This component was intended to prepare participants for job market reentry. Abstinence-Contingent Housing and Nonabstinence-Contingent Housing groups were charged \$161 per month to remain in program housing. Funds could be earned through work therapy but participants were not removed from housing if they failed or were unable to pay.

Housing interventions varied by trial arm. In Phase I, Abstinence-Contingent Housing participants received furnished, rent free, abstinence-contingent housing (i.e. a furnished apartment with flatware) after 2 consecutive drug free urine tests. By contrast, Nonabstinence-Contingent Housing participants received equivalent program housing in a different neighborhood after offering 2 urine samples, regardless of results. This housing was a treatment intervention (maximum 6 months) and not a permanent housing program. Participants in the No Housing trial arm were free to seek their own accommodations while receiving the same outpatient treatment program, and they typically stayed in residential recovery homes or shelters. Twice-weekly urine testing was required of all participants. For Abstinence-

Contingent Housing participants, a positive urine caused immediate removal from housing and transportation to a shelter; with 2 consecutive clean urines the subject could return to program housing. By contrast Nonabstinence-Contingent Housing participants remained in housing as long as they provided 2 urines per week, regardless of result. All groups were offered day treatment (transportation provided) even if they were living in emergency shelters. All groups were eligible to seek housing referrals from the host agency or any other agency in the city.

Eligibility for this analysis

Participants analyzed for this paper were those available for follow-up 12 months after trial entry (6 months after completion of Phase II). Follow-up of inner-city addiction cohorts is a recognized challenge.²⁷ Participants were given a 12-month follow-up date reminder card, and the offer of \$25 compensation for showing up. This study also relied on a community “tracker” who had long familiarity with the street, shelter and service-center populations. The analyzed follow-up cohort consisted of 138 persons (71% of inception cohort), referred to as the “Analysis Cohort.”

Comparison of the Analysis Cohort (n=138) to those unavailable at 12 months (n=57) showed the former were more likely to be African American (94.9% vs. 80.7%, $p < .01$), had higher mean attendance in the 6-month treatment period (53.1 vs. 29.9 days, $p < 0.01$), and a greater mean number of weeks abstinent in the 6-month treatment period (7.4 vs. 4.0 weeks, $p < 0.01$). Of 195 participants originally assigned to Abstinence-Contingent Housing, Nonabstinence-Contingent Housing and No Housing trial arms, 71.4%, 81.8% and 59.1% respectively, were available for follow-up ($p = 0.01$). Finally, it should be noted that this paper references 195 trial entrants, reflecting all original trial entrants (n=196) save 1, whose data was significantly corrupted at time of dataset preparation, and who could not be analyzed for this paper.

Outcome Variables

Principle outcomes were binary indicators of stable housing and stable employment, based on participants' responses to a 60-day recall instrument derived from the widely-used, reliable Personal History Form,^{28, 29} administered at 12 months. Days spent in the following settings [similar to Orwin's “stably housed” category³⁰] counted toward stable housing: own apartment/house, parent/guardian's apartment/house, own single-resident occupancy (SRO), boarding house or board and care facility, group home and long-term alcohol/drug free facility. Settings such as shelter, treatment or recovery program (including those within shelters), corrections/halfway house, hospital, jail/prison, did not qualify. Similarly, stable employment included full time, regular part time, student and military service, but not day labor. The cut point for stable housing and stable employment (≥ 45 days) was based on both clinical experience and viewing a histogram of days achieved for each endpoint, which turned out to be biphasic, as will be shown in Figure 2. It should be noted that some participants entered the trial based on having no stable place to live on the actual day of trial entry, but did meet the post-trial analytic criteria for Stable Housing at baseline, since they could have been housed ≥ 45 days in the prior 60.

Analyses

Histograms showing the distribution of days housed and employed (in prior 60) at 12 months were used to identify logical cut points for the binary outcomes, and to visually contrast the trial arms. The percentage of participants achieving stable housing and employment was computed, and the 3 trial arms (No Housing, Nonabstinence-Contingent Housing and Abstinence-Contingent Housing) were compared using a generalized Mantel Haenszel Chi-squared test, which assumes ordinality among the treatment exposure categories and produces a more powerful test statistic if a linear trend is present across exposure categories (No Housing,

Nonabstinence-Contingent Housing, Abstinence-Contingent Housing). These comparisons were repeated after stratification by gender.

Trial arms (including all 195 participants at baseline and the 138 in the analysis cohort) were compared with respect to baseline variables potentially relevant to housing and employment outcomes, including: age, gender, high school graduate status, days housed (in last 60) at baseline, days employed (in last 60) at baseline, DSM-III-R Axis I or Axis II nonsubstance abuse disorder (as diagnosed by a doctoral-level psychologist), chronic medical problems, history of criminal convictions, driver's license, and access to particular benefits and veteran status. Indicators of treatment participation and follow-up, including treatment attendance (the number of days of outpatient treatment participation, with work therapy considered part of treatment) were compared. Finally, the longest consecutive number of weeks abstinent across Phases I and II (i.e. months 0-6, based on twice-weekly random urine testing; missed tests counted positive) was compared.

Exploratory multivariable logistic regression models could include only a few variables because of the small number of events being modeled. In view of limited statistical power and the previously reported finding of similar reductions in substance use for two trial arms (Abstinence-Contingent Housing and Nonabstinence-Contingent Housing),²⁰ these 2 trial arms were compared ("Combined Housing Arms") to No Housing. Each multivariable regression was specified to adjust only for the following variables (based on clinical interest and the need to address apparent imbalances between trial arms in baseline employment/housing experience): trial arm (Combined Housing versus No Housing), age, sex, and an indicator of whether the subject met criteria for stable housing (or employment) at baseline. To assess whether attendance or abstinence during treatment could have mediated any potential trial arm benefit (and because both measures predicted 12-month follow-up), models were repeated with these 2 variables. While this study was insufficiently powered to permit formal testing of interactions, a single interaction (gender-by-trial arm) was explored in light of apparent gender differences in outcomes for employment. Because the multivariable analyses were explicitly exploratory and of low power, p-values are offered as evidence regarding the strength of potential association; they are not intended to represent formal hypothesis testing, but may contribute to thinking for future studies.

Because of concern about potential trial arm imbalance in the percentage of participants qualifying as stably housed or stably employed at baseline, all analyses were repeated after restricting to participants who did not have stable employment (or housing) at baseline, and results were unchanged.

Power

Given the size of the analysis cohort (n=138, Abstinence-Contingent Housing=45, Nonabstinence-Contingent Housing=54, No Housing=39), this study had only moderate power to detect large differences by trial arm in the proportions achieving stable housing and employment at 12 months. In a comparison of 3 arms assuming an ordinal relationship (Abstinence-Contingent Housing>Nonabstinence-Contingent Housing>No Housing) among outcomes, and assuming that 25% of No Housing subjects would have stable housing at 12 months, then the power to detect a true difference of 25% in this outcome between the No Housing and Abstinence-Contingent Housing groups, with the Nonabstinence-Contingent Housing group at the midpoint of the other two groups, was 0.67 (alpha=.05, two-sided). In contrast, the power was only 0.31 to detect absolute improvement of 15% between the Abstinence-Contingent Housing and No Housing groups (which is approximately the observed effect size). Accordingly, the multivariable models should be viewed as exploratory in nature.

This study was approved by the Institutional Review Board of the University of Alabama at Birmingham. All participants provided informed consent.

Results

Overall Housing and Employment

At baseline, 10.9% of participants met the stable employment and 12.3% met the stable housing criteria (Figure 2A and 2C show baseline employment and housing by trial arm).

Twelve months later (6 months after active treatment ended), the distribution of Days Housed and Days Employed had shifted rightward (Figures 2B and 2D). Overall, 34.1% achieved Stable Housing and 33.3% achieved Stable Employment (only 22 participants, 15.9%, achieved both). Among persons in the top tertile for treatment attendance over 6 months, 38.8% and 40.8%, respectively, achieved Stable Housing and Employment at 12 months.

Comparisons of trial arms

At baseline, the 3 randomly assigned trial arms (n=195) were balanced with respect to most but not all characteristics (Table 1A).

Although the median number of days stably housed and employed at baseline was the same across all 3 trial arms (i.e. 0 days), a greater percentage of Abstinence-Contingent Housing participants met criteria (≥ 45 days) for stable employment at baseline [20.6% (13 of 63) for Abstinence-Contingent Housing versus 6.1% (4 of 66) for Nonabstinence-Contingent Housing versus 7.6% (5 of 66) for No Housing, $p=.02$]. There was a similar, but less pronounced, difference for the baseline housing comparison ($p=0.28$). Consistent with published data, the Abstinence-Contingent Housing and Nonabstinence-Contingent Housing arms had achieved higher treatment attendance and a greater median number of abstinent weeks during treatment.²⁰ These same 2 arms were also more likely to be located for follow-up. Accordingly, the 12-month Analysis Cohort (n=138) included 71.4% of Abstinence-Contingent Housing, 81.8% of Nonabstinence-Contingent Housing and 59.1% of No Housing participants. Within this Analysis Cohort, however, baseline differences between trial arms in days housed and employed were less pronounced (Table 1B).

In this study's primary outcome comparison, the percentages achieving stable housing and employment at 12 months were highest for participants assigned to Abstinence-Contingent Housing, lowest for participants assigned to No Housing, and intermediate for Nonabstinence-Contingent Housing ($p=0.17$ for Stable Employment, $p=0.11$ for Stable Housing) (Table 2). Both housing and employment were approximately 15% better for Abstinence-Contingent Housing versus No Housing (a relative difference of 60%).

After stratification by gender, comparisons among males showed an ordinal trend for Stable Employment, with Abstinence-Contingent Housing > Nonabstinence-Contingent Housing > No Housing (Mantel-Haenszel $p=.04$). Among men, 53.2% of Abstinence-Contingent Housing participants achieving Stable Employment, compared to 27.6% of the No Housing group. There was a similar but weaker finding for Stable Housing outcomes among men (Table 2). Although the numbers were small (n=37), no similar patterns were seen among women (Table 2).

Because the largest trial arm difference was observed for the employment outcome among men (with no similar pattern among women), the employment multivariable model was parameterized to examine the potential effect of trial arm within each gender. Similar to the unadjusted results, the Combined Housing Arm (compared to the No Housing Arm) was potentially associated with increased odds of Stable Employment among men (OR 2.20, 95%

CI 0.85-5.69, $p=0.11$) but not among women (OR 0.55 95% CI 0.08-4.08, $p=0.56$) (Table 4). Among men, the predicted percentage expected to achieve Stable Employment in the Combined Housing Arm, adjusted for other factors in the model, would be 45.2% (95% CI 33.7%-56.7%), compared to 27.3% (95% CI 11.1%-43.5%) in the No Housing Arm (similar to the unadjusted findings in Table 2). Among females, the predicted percentages are much less stable due to smaller numbers, but were computed as 11.6% (95% CI 0%-31.5%) in the Housing Arm versus 19.2% (4.4%-34.1%) in the No Housing Arm.

After including the potential mediating variables of treatment attendance and abstinence, the association between Combined Housing Arm and Employment among men (OR 1.84, 95% CI 0.67-5.05, $p=0.24$) was slightly weaker, suggesting that trial arm benefits for employment were mediated through improvements in attendance and abstinence.

In models for housing at 12 months, the data were less supportive of a differential effect of trial arm by gender (interaction $\chi^2=0.66$, d.f.=1, $p=0.42$). Models showed a suggestively better 12-month housing outcome for the Combined Housing Arm versus the No Housing Arm (OR 1.72, 95% CI 0.75-3.96, $p=0.20$), an association that remained similar after potential mediating variables (abstinence and attendance) were added to the model. The predicted percentage of subjects expected to achieve Stable Housing in the Combined Housing Arm, adjusted for other factors in the model, would be 40.1% (95% CI 24.7%-55.4%), compared to 28.0% (95% CI 19.2%-36.9%) in the No Housing Arm. The above models controlled for baseline employment and housing, respectively; repetition of all models after dropping participants with baseline stable housing and/or employment produced similar findings.

Discussion

Homelessness and addiction, often accompanied by nonsubstance abuse mental illness, represent a difficult, but prevalent, combination of threats to health, and a policy challenge.

³¹ Between 2002 and August of 2006, 222 communities in the United States undertook comprehensive planning processes to end chronic homelessness, with some offering direct access to permanent housing to addicted persons without preconditions for addiction treatment or sobriety.³²⁻³⁴ Nevertheless, addiction treatment remains the default point of entry to care in many communities, where drug-free status is often seen as a prerequisite for long-term housing. Housing and employment outcomes data, based on a scientific addiction treatment proven to reduce substance use in homeless persons,²⁰⁻²² could help communities craft realistic service plans.

In this randomized trial, where all participants received treatment for addiction, the data suggest enhanced 1-year housing and employment outcomes in the 2 trial arms that included program-provided housing as part of behavioral treatment. Although small numbers limit statistical certainty, the 1-year housing and employment outcomes were approximately 60% better (in relative terms) for participants in the trial arms that offered housing as part of treatment. If this pattern of results holds up in larger studies, they suggest that for men, the assurance of program-provided housing as part of 6 months' addiction treatment (with or without an abstinence contingency) could double the percentage of male clients achieving stable employment at 12 months (absolute improvement 18%). Similarly, if this pattern holds up in larger studies, then the assurance of program-provided housing as part of treatment might result in 12% more clients achieving stable housing at 12 months.

Conversely, the data demonstrate a very concerning ceiling to what was achievable after 6 months' intensive treatment in an addiction treatment-seeking subpopulation and setting. Only 33% and 34% of participants achieved satisfactory 12-month employment and housing, respectively (40% and 42% in the abstinence-contingent housing group); 16% achieved both.

Even among participants with high levels of treatment attendance, fewer than 50% achieved stable work and housing at 1 year. Understanding these findings requires consideration of how the treatment could have proven helpful for some participants, and why it might have proven insufficient for others.

Potential benefits

A finding that participants in the Abstinence-Contingent Housing and Nonabstinence-Contingent Housing trial arms appeared to show better employment and housing at 12 months (Table 2) contrasts with other reported interventions for homeless, mentally ill individuals, including a Housing First intervention (permanent housing without required service participation)³³ and a program that combined housing subsidies with intensive case management.³⁵ The latter two interventions improved housing outcomes without reducing substance use. The present intervention appeared to enhance employment (at least among men) and housing outcomes while also reducing substance use (as reported¹⁹). Effective components of this treatment likely included housing during treatment, an essential security need.³⁶ Contingency management techniques, like those used in this study for housing (in one trial arm) and goal attainment (in all 3), have documented efficacy in addiction treatment.³⁷⁻³⁹ Other elements of the day treatment and work therapy program attempted to fully replace the social cues and conditions of the drug using life. Components included group treatment meetings, individualized goal-setting in multiple life domains, weekly feedback on goal attainment, tangible incentives for goal attainment and paid work therapy. While the day treatment elements were common to all trial arms, they have been helpful components in prior trials conducted this population.²⁰⁻²² A randomized trial in which components of day treatment were randomly allocated is nearing completion. Finally, the treatment setting was a homeless multiservice agency that could meet primary medical care and case management needs onsite, and had access to federally-subsidized housing resources, i.e. an arguably “seamless” system of care.¹²

Although there were fewer female subjects ($n=37$), it is notable that in the unadjusted results (Table 2) women were much less likely than men to achieve stable employment (absolute difference 27%), while having similar likelihood of achieving housing. The analyses suggested the trial arm interventions were more likely to enhance employment outcomes among men than among women. These data highlight considerations that could be important to future studies of treatment for women. First, the work intervention, involving physical labor, may not have been matched to women's capacities. Second, the consistent, albeit anecdotal impression of treatment staff was that many women prioritized employment lower than a return to family and/or childcare. Finally, in regard to housing, it has been suggested that the dynamic factors governing homelessness and its resolution differ for women as opposed to men⁸ but these data do not readily elucidate those factors (e.g. history of interpersonal abuse, availability of family resources, child responsibilities).

For each subject who improved in housing or employment, the study data are insufficiently detailed to elucidate the specific rehabilitative pathway, i.e. did program participation lead to work and housing via substance use reductions or via other mechanisms? Did participants mainly achieve housing through federally subsidized units, paying their own way, or a return to family? Why did so many males achieve employment but not housing? These questions reinforce the value of descriptive studies that longitudinally profile how treatment programs articulate with community resources.¹³

Why didn't more succeed?

Only a minority of participants achieved favorable employment or housing outcomes at one year. This should be considered in light of emerging perspectives on addiction treatment, and

then reconsidered in light of how treatment relates to the sociological and policy environment that affects homelessness and its resolution.

From the standpoint of addiction treatment, it remains possible that this treatment, resource-intensive as it was, was insufficient to help many participants with both homelessness and high levels of psychological distress. For instance, 2 nonsubstance-abuse services accessible through referral (psychiatric and medical specialty care) may not have been sufficiently available relative to need. Additionally, the period of intensive treatment (6 months), followed by 6 months of once-weekly aftercare, could have been too short, limiting the maximum benefit achievable, a challenge for any time-limited treatment approach. Among the very few published addiction treatment studies to report housing/employment results categorically, one reported that whereas 2% of clients overall had “stable housing” at baseline, roughly one-quarter did at 10 months’ follow-up (with no differences by trial arm).¹⁶ A compelling analogy compares addiction to common chronic medical conditions (e.g. diabetes), where no one is particularly surprised if the disease recurs after treatment is terminated.⁴⁰ That analogy lends support to a “continuing care” model of treatment for this population.⁴¹ Such continuing treatment could prove helpful, but costly.

This study’s housing and employment results should also be considered in light of what is known about homelessness in general, and what rehabilitative pathways were available to participants in the community where this study was conducted. The sociological literature suggests that the interrelationships between homelessness and substance abuse are anything but simple.^{8, 9, 42} The path to homelessness may reflect loss of employment, and/or the loss of potential avenues of support (family, friends, or public benefits) and/or a range of personal vulnerabilities including addiction or mental illness.⁶ Analogously, homeless substance abuse clients vary in the paths through which they regain housing, or work, and in how they prioritize these goals.

The influence of policies for supportive housing

Acknowledging these client-specific factors, many did apply to a federally-subsidized housing program (Shelter Plus Care⁴³), which operates in most U.S. metropolitan areas. The supply of supportive housing units and the prerequisites for entry to these units are likely to influence housing outcomes in communities planning to end chronic homelessness. One bipartisan commission estimated the national shortfall of supportive housing units to exceed 100,000.⁴⁴ Equally important, while federal statutes do not set abstinence requirements for housing entry, local authorities may do so in order to reduce the chance of an unstable placement. Because the federal Shelter Plus Care program does not directly fund services to help retain clients in housing, the availability of alternative funding sources can influence whether a program will attempt to accommodate potentially difficult clients. Accordingly, a common approach for Shelter Plus Care programs to assure stable placements is to restrict housing access to persons with very high levels of abstinence. In Birmingham, the abstinence requirement at the time of this trial was 12 continuous weeks (a standard met by 21.7% of participants, and only 40% of the Abstinence-Contingent Housing participants). The 12-week standard was later revised to 16 weeks, which only 12.3% of this study’s participants ever achieved. To the extent that Shelter Plus Care programs currently use similar policies nationally, many homeless persons with drug dependence and high levels of psychological distress (as in this sample) are likely to remain completely ineligible for the major housing resource that, in principle, was established to help them.

Strengths and Limitations

This study had limitations and strengths. A one-year follow-up of 71% has been described as acceptable,⁴⁵ and compares favorably with other studies with substance-abusing homeless. 14, 16, 46, 47 Participants found for follow-up had achieved more favorable attendance and abstinence during treatment. Inclusion of persons not found for follow-up would have produced worse overall outcomes. The present results are unlikely to reflect biased attrition. Lower follow-up for the No Housing trial arm (59.1%, compared to 71.4% and 81.8% in the Abstinence-Contingent Housing and Nonabstinence-Contingent Housing arms) could only have produced findings favorable to the other 2 trial arms if the No Housing participants lost to follow-up were actually *more* likely to have obtained successful housing and work compared to the other 2 trial arms. This seems less plausible since the predictors of 12-month follow-up were abstinence and attendance during treatment, and these were worse among No Housing participants.¹⁹ Further, these characteristics were analytically adjusted for without changing the main findings. Lastly, adjustment for baseline employment/housing (including dropping entirely those subjects who met criteria housing/employment at baseline) did not alter the findings.

Finally, while this study compared 3 approaches to the management of housing during treatment (i.e. the 3 trial arms), there were factors biasing toward the null. All participants had access to intensive outpatient services and work therapy.^{21, 22} Additionally, No Housing participants often stayed in residential recovery homes during treatment, which could further bias toward a null comparison with the Abstinence-Contingent Housing and Nonabstinence-Contingent Housing trial arms.

This study's strengths included prior demonstration of treatment effectiveness for reduction in substance use,¹⁹ allowing a more robust assessment of what can be achieved through an abstinence-oriented, behaviorally based treatment approach to homeless drug abusers. Multiple aspects of the treatment model had demonstrated effectiveness in previous trials with the same population.^{21, 22} Most importantly, this study involved unambiguous, policy-relevant rehabilitative outcomes of interest to policymakers and the treatment services literature.⁴⁸

Implications for Behavioral Health

The implications of this study are threefold. First, the findings underscore important components of addiction treatment for homeless persons with cocaine addiction and high levels of psychological distress. The value of tending to shelter needs during treatment for this population is confirmed.^{36, 47, 49} Outpatient programs, absent a secure residence, appear to be disadvantageous. The Abstinence-Contingent Housing and Nonabstinence-Contingent Housing trial arms benefited from apartment-quality housing provided as part of the treatment program. Additionally, an apparently effective component of treatment was the replacement of life on the streets with a new social environment and a comprehensive program of new behavioral opportunities and reinforcers.

Second, since a meaningful percentage of participants did not achieve stable work and housing through this approach, future addiction treatment interventions may require a continuing care treatment approach⁴⁰, and/or an effective pharmacotherapy for cocaine dependence.⁵⁰

Third, for communities planning to end chronic homelessness, these results suggest an important nuance to the tension between homeless rehabilitative policies that emphasize Housing First^{32, 33, 51} and more traditional programs that position rehabilitation first. Specifically, the findings lend some support to both approaches.

The default approach for homeless substance abusers, involving time-limited intensive addiction treatment followed by referral to housing, clearly has its limits. These data suggest many participants, even those with high treatment attendance, will not achieve the sustained periods of abstinence that transitional or permanent housing programs often required as a condition of housing entry. If a reduction in homelessness is a goal, then communities and governments may consider either (a) augmenting the service supports available to housing programs so that higher-risk clients can be accepted to programs such as Shelter Plus Care, or (b) direct housing interventions that do not require successful addiction treatment.

Conversely, more favorable 12-month outcomes for cocaine-dependent homeless persons who received a more intensive form of addiction treatment (including program-provided housing) buttresses the argument favoring addiction treatment. While small numbers precluded statistical significance at the customary $p < 0.05$ for most comparisons, the substance use reductions were entirely consistent with 2 similar trials previously conducted by this team with the same population.^{21, 22} In short, it is premature to discount a high-demand, intensive behavioral treatment approach, when these data suggest the Abstinence-Contingent Housing intervention improved housing and employment at 12 months.

At present, it remains difficult to predict who will attain long-term rehabilitative success with a behavioral treatment approach like the present one, and who will not. Absent large randomized trials, communities planning a comprehensive response to homelessness should consider promoting both empirically-validated “high demand” addiction treatments and low-demand Housing First approaches. Persons proceeding through either path are likely to require significant service supports in order to achieve a stable housing placement. Limitations in the available funding for such services constrain the capacity of housing programs to accommodate persons whose recovery does not include perfect abstinence, and perfect abstinence was uncommon following treatment of cocaine-dependent homeless persons like those in the present study. Therefore, the enhancement of supportive services for substance-dependent individuals in housing should be a priority for proponents of both treatment/rehabilitation and Housing First approaches.

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Randomized Trial Design and Derivation of Analysis Cohort

Figure 1.

Randomized Trial Design and Derivation of Analysis Cohort The figure presents the randomized trial design and summarizes differences between the 3 trial arms. The trial arm designations refer to types of housing provided by the treatment program in months 0-6. The “No Housing” participants were free to seek their own accommodations outside of the treatment program, including emergency shelters and independent recovery homes. Behavioral Day Treatment included counseling, psycho-educational groups, and therapeutic goal management groups. All 3 trial arms were offered paid work therapy during months 0-6. All subjects had access to a once-weekly aftercare group during months 6 through 12 (Phase 3). From left to right this figure indicates the total subjects entering the trial (n=195), and the number available for outcome comparisons at 12 months (“Analytic Cohort,” n=138).

Figure 2A: Days Employed (in last 60) as Reported at Baseline (0 months) (n=138)

Figure 2B: Days Employed (in last 60) as Reported at 12 months (n=138)

Figure 2C: Days Housed (in last 60) as Reported at Baseline (0 months) (n=138)

Figure 2D: Days Housed (in last 60) as Reported at 12 Months (n=138)

Figure 2.

Days Housed and Employed for Participants Available at Baseline and 12 Month Follow-up (n=138) Panels show the distribution of subject responses indicating total days employed (2A and 2C) or housed (2B and 2D) in prior 60, for the 138 participants who were available at baseline interview and at 12 month' follow-up (6 months after the 6-month treatment course ended).

Table 1A
Baseline and Participation Characteristics by Trial Arm (N=195, all trial entrants)

Characteristic	Abstinence- contingent Housing (n=63)	Nonabstinence -contingent Housing (n=66)	No Housing (n=66)	p ^a
Baseline Characteristics				
Age (median, 25 th -75 th %)	38 (34-43)	41 (36-47)	38.5 (34-43)	0.08
Female, %	25.4%	24.2%	24.2%	0.98
African American, %	87.3%	95.5%	89.4%	0.25
Education, yrs (median, 25 th -75 th %)	12 (11-13)	12 (11-14)	12 (11-12)	0.41
Married	0%	1.7%	3.3%	0.38
Axis I Disorder	77.8%	81.8%	65.2%	0.07
Axis II Disorder	52.4%	57.6%	42.4%	0.21
Any Chronic Medical Problems, % ^b	32.8%	27.1%	29.5%	0.80
Median Days Employed in Prior 60, Baseline (25 th -75 th %)	0 (0, 41)	0 (0, 0)	0 (0, 0)	0.12
Employed ≥45 days in Prior 60, Baseline	20.6%	6.1%	7.6%	0.02
Median Days Housed in Prior 60, Baseline (25 th -75 th %)	0 (0, 9)	0 (0, 0)	0 (0, 0)	0.23
Housed ≥45 days in Prior 60, baseline	14.3%	9.1%	6.1%	0.28
Any Criminal Convictions, Life	58.7%	65.2%	62.1%	0.74
Driver's License ^b	22.4%	20.3%	21.0%	0.96
Noncash Support (housing or food voucher) ^b	3.5%	3.5%	3.3%	0.72
Current Social Security or Pension Benefit ^b	17.0%	8.6%	15.3%	0.38
Veteran ^b	19.6%	20.7%	18.0%	0.93
Treatment Participation & Follow-up				
Outpatient Treatment Attendance, total days over months 1-6 (median, 25 th -75 th %)	54 (25, 72)	57.5 (35, 81)	27.5 (7, 52)	<0.01
Consecutive Weeks Abstinent, longest during months 1-6 (25 th -75 th %)	6 (2, 13)	5 (2, 9)	3 (1, 6)	<0.01
Availability for Analysis				
Available for Follow- up at 12 months (Analysis Cohort, n=138)	71.4%	81.8%	59.1%	0.02

Table 1A Notes:

^a Categorical characteristic comparisons are by Chi-square and Fisher's exact test, where appropriate. Continuous variables are compared by Wilcoxon Rank Sums

^b Number of participants with missing data, by characteristic: Married (n=17), Chronic Medical Problems (n=17), Driver's license (n=16), Noncash support (n=18), Social Security/Pension (n=19), Veteran status (n=20)

Table 1B

Baseline and Participation Characteristics by Trial Arm (N=138 Trial Participants at Follow-up)

Characteristic	Abstinence -contingent Housing (n=45)	Nonabstinence- contingent Housing (n=54)	No Housing (n=39)	p ^a
Baseline Characteristics				
Age	37 (32-43)	41.5 (32-43)	36 (32-43)	0.03
Female, %	28.9%	25.9%	25.6%	0.93
African American, %	91.1%	96.3%	97.4%	0.43
Education, years	12 (11-12.5)	12 (11-13)	12 (11-13)	0.97
Married ^b	0.0%	0.0%	2.8%	0.29
Axis I Disorder	82.2%	83.3%	71.8%	0.35
Axis II Disorder	51.1%	61.1%	48.7%	0.43
Any Chronic Medical Problems, % ^b	39.0%	27.7%	28.6%	0.47
Median Days Employed in Prior 60, Baseline (25 th -75 th %)	0 (0-16)	0 (0-0)	0 (0-0)	0.80
Employed ≥45 days in Prior 60, Baseline, %	15.6%	7.4%	10.3%	0.40
Median Days Housed in Prior 60, Baseline (25 th -75 th %)	0 (0, 9)	0 (0, 0)	0 (0, 0)	0.18
Housed ≥45 days in Prior 60, Baseline	17.8%	11.1%	7.7%	0.35
Any Criminal Convictions, Life	57.8%	61.1%	66.7%	0.70
Driver's License ^b	20.0%	21.3%	13.9%	0.67
Noncash Support (housing or food voucher) ^b	5.0%	2.2%	2.8%	0.72
Current Social Security or Pension Benefit ^b	12.2%	8.7%	17.7%	0.49
Veteran ^b	12.5%	21.7%	22.9%	0.44
Treatment Participation & Follow-up				
Outpatient Treatment Attendance, total days over months 1-6, Median (25 th -75 th %)	63 (35-82)	59.5 (38-85)	34 (15-56)	<0.01
Consecutive Weeks Abstinent, longest during months 1-6 (25 th -75 th %)	9 (4-14)	5 (2-9)	3.0 (2-7)	<0.01

^a Categorical characteristic comparisons are by Chi-square and Fisher's exact test, where appropriate. Continuous variables are compared by Wilcoxon Rank Sums

^b Number of participants with missing data, by characteristic: Married (n=15), Chronic Medical Problems (n=15), Driver's License (n=15), Noncash support (n=17), Social Security or pension benefit (n=17), Veteran Status (n=17)

Table 2

Stable Housing and Employment Outcomes 12 months after treatment entry, Comparing 3 Trial Arms¹ for All Available Participants (n=138)²

	Total	All Participants (n=138) ACH (n=45)	NACH (n=54)	NH (n=39)	p ⁴
Stably housed ³	34.1%	42.2%	33.3%	25.6%	0.11
Stably employed ³	33.3%	40%	33.3%	25.6%	0.17
	Total	Men (n=101) ACH (n=32)	NACH (n=40)	NH (n=29)	p ⁴
Stably housed ³	35.6%	43.8%	37.5%	24.1%	0.11
Stably employed ³	40.6%	53.1%	40%	27.6%	0.04
	Total	Women (n=37) ACH (n=13)	NACH (n=14)	NH (n=10)	p ⁴
Stably housed ³	29.7%	38.5%	21.4%	30%	0.62
Stably employed ³	13.5%	7.7%	14.3%	20%	0.40

¹ ACH indicates Abstinence-Contingent Housing; NACH indicates Nonabstinence-contingent housing; NH indicates No Housing provided by the addiction treatment program. The 3 trial interventions lasted from months 0-6, and outcomes compared are at month 12.

² Participants compared are those trial participants available at 12 months' follow-up (138 of 195, 71% of trial entrants).

³ Stably Housed and Stably Employed refers to ≥45 of prior 60 days housed or employed, respectively, 12 months after entering trial-provided addiction treatment.

⁴ P-value for comparison of trial arms % housed/employed reflects Mantel-Haenszel chi-square (df=1).

Table 3

Multivariable Predictors of Stable Employment and Stable Housing 12 Months after Addiction Treatment Entry (n=116)*

Predictors of Stable Employment at 12 Months (≥45 days in last 60)		p-value
	Odds Ratio (95% CI)	
Trial Arm (Combined Housing vs No Housing) Among Men	2.20 (0.85-5.69)	0.11
Trial Arm (Combined Housing vs No Housing) Among Women	0.55 (0.08-4.08)	0.56
Age (+1 year)	1.0 (0.95-1.05)	0.86
Stably Employed at Baseline	2.97 (0.94-9.35)	0.06
Predictors of Stable Housing at 12 Months (≥45 days in last 60)		p-value
	Odds Ratio (95% CI)	
Trial Arm (Combined Housing versus No Housing)	1.72 (0.75-3.96)	0.20
Age (+1 year)	1.00 (0.95-1.05)	0.88
Female	0.73 (0.32-1.69)	0.47
Stably Housed at Baseline	1.37 (0.48-3.93)	0.55

* A single regression model is shown for each outcome (stable employment, stable housing). Because the findings for employment hinted at potentially different effects by gender (Chi-square=1.50, df=1, p=.22), the employment model was reparameterized to estimate the association of trial arm and outcome within gender strata. Exploration of the housing model data did not support testing for trial arm effects within gender strata.

† Two trial arms involving the provision of housing during 6 months of treatment (Abstinence-contingent and Nonabstinence-contingent housing) were combined to render the “Combined Housing” trial arm.