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ORIGINAL PAPER

Predictors of Mental Health Recovery in Homeless Adults with Mental Illness

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Abstract
For people with mental illness, experiences of homelessness can complicate mental health recovery processes. This study used longitudinal data from a randomized controlled trial of housing first (HF) to examine predictors of recovery among homeless people with mental illness. Findings showed that health and community predictors were most strongly associated with mental health recovery. Receipt of HF did not have any effect on changes in recovery scores at follow-up. Overall, the findings suggest that interventions aimed at preventing chronic homelessness, strengthening social networks and community involvement, and providing case management services will facilitate mental health recovery.

Introduction

In recent decades, mental health service systems have undergone a reorientation prioritizing "recovery" as a key outcome of community mental health services. Recovery has been described as a process of change that enables individuals with mental illness to live satisfying and meaningful lives in the community (Anthony 1993). The elements that are central to recovery include having hope and optimism about the future, clarifying self-identity, becoming empowered, experiencing connectedness to others, and exercising citizenship (Davidson et al. 2005). Because there are many recovery elements and pathways, it is necessary to understand the factors that may spur or impede recovery to increase the effectiveness of recovery-oriented service delivery. Using data from a multisite randomized controlled trial of housing first (HF), this study will examine predictors of mental health recovery among people with mental illness who are experiencing homelessness.

A four-dimensional framework comprised of health, home, purpose, and community factors has been proposed as the foundations that support mental health recovery (SAMSHA 2012). The health dimension refers to managing symptoms of mental illness and substance use problems, as well as making healthy choices that promote emotional wellbeing. Given the elevated rates of comorbid medical conditions among people with mental illness (Sokal et al. 2004), the role of physical health in mental health recovery must also be considered as a component of the dimension. When people are effectively managing and coping with their symptoms of mental illness, substance use problems, and medical conditions, there is less impairment of functioning (Ecker et al. 2012; Zhornitsky et al. 2013). This enables people to explore and make personal changes conducive to recovery. Health greatly impacts recovery as mental health symptoms, physical health impairments, and adverse adulthood experiences have each been found in a number of studies to be negatively correlated with recovery (Green et al. 2013; Resnick et al. 2004; Stumbo et al. 2015).

The dimension of home identifies the role of stable housing in mental health recovery. By fulfilling the basic need for shelter, safe and affordable housing can become a cornerstone for personal growth. People with mental illness are then able to develop a future orientation through goal-setting and actualization (Nelson and MacLeod 2017). In contrast, homelessness and precarious housing perpetuate a survival mindset in which the ability to plan ahead is limited. This dimension has been minimally examined to date and the extent of its relationship with recovery is not fully understood. In a study of over 800 people with schizophrenia, number of moves in the past year was negatively correlated

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with hope (Resnick et al. 2004). Further, length of homelessness but not number of homeless episodes has been linked to poorer mental health recovery, suggesting that homelessness is an ongoing adversity that may undermine positive outcomes (Castellow et al. 2015).

Purpose refers to engagement in meaningful activities and having the means to participate in society. Involvement in work, school, family caregiving, hobbies and recreation, and other pursuits contribute to the achievement of fulfilling and satisfying lives, as well as offer opportunities to develop and expand social roles (Davidson and White 2007; Hendryx et al. 2009). Further, meaningful activities promote empowerment through greater community presence and voice. Studies have demonstrated that involvement in meaningful activities, including volunteering, school, and recreation, are linked to greater mental health recovery (Kaplan et al. 2012; Padgett et al. 2016a). As for paid employment, the evidence is mixed, with Kaplan et al. (2012) not finding a significant correlation with recovery, whereas Lloyd et al. (2010) found that individuals involved in paid employment perceived their mental health recovery to be greater than those who received income supports. Employment contributed to recovery for only a small number of formerly homeless adults with mental illness in the study by Padgett et al. (2016a), which may have been the result of high unemployment rates within the sample and a lack of opportunities to enter the workforce. There is scant evidence on the impacts of other meaningful activities, such as family caregiving, on recovery.

The fourth dimension of community, as initially proposed by SAMSHA (2012), emphasized the role of supportive relationships and social networks in recovery. Ellison et al. (2018) added community integration and connectedness as other aspects of the dimension. Social relationships can advance the recovery process as people with mental illness are able to access support in times of need. Connection to other people also offers opportunities for redefining self-identity from patienthood to personhood. The benefits of social support for mental health recovery are one of the most robust findings in studies of recovery among people with serious mental illness (e.g., Chang et al. 2013; Corrigan and Phelan 2004; Hendryx et al. 2009; Pernice-Duca and Onaga 2009). The components of community connectedness and integration may include people's presence and participation in activities in the community (i.e., physical integration), as well as their sense of belonging to a community (i.e., psychological integration; Aubry and Myner 1996). Physical involvement in the community can be beneficial for preventing or overcoming social isolation—a key barrier to recovery (Davidson et al. 2001). Community integration is also positively associated with neighbourhood tolerance of mental illness (Townley and Kloos 2011), which may enable people to live the lives they want with fewer experiences of stigma and discrimination. Among people with serious mental illness who lived in independent housing arrangements, participants who had a greater sense of belonging also perceived their level of recovery to be higher (Townley et al. 2009). Moreover, greater involvement in community and leisure activities has been linked to higher levels of recovery (Hendryx et al. 2009). Overall, although there is evidence to support the individual dimensions of SAMSHA's (2012) framework, the model has not yet been holistically examined. In addition, research has only minimally investigated the factors that affect mental health recovery among people with mental illness who are experiencing homelessness.

Poverty can hinder the recovery processes of people with mental illness by limiting their opportunities to engage in meaningful roles (Sylvestre et al. 2018). Despite its deleterious effects, research has not fully considered the challenges presented to achieving recovery in the context of having experienced homelessness and housing instability. Given that homelessness is associated with increased risk of victimization, social exclusion, and incarceration (Padgett et al. 2016b), these adversities may complicate the recovery process. Moreover, for people experiencing homelessness, housing stability may only be feasible with accompanying supports. For example, HF, which involves the provision of rent subsidies and support via assertive community treatment (ACT) or intensive case management (ICM), has been shown to be more effective in stably housing people experiencing chronic homelessness and mental illness than standard care (e.g., Aubry et al. 2016; Rog et al. 2014; Stergiopoulous et al. 2015). Because of this, support services are a necessary component of a mental health recovery framework for people who have experienced homelessness. Accordingly, this study examined an adapted version of SAMSHA's (2012) four-dimensional framework of mental health recovery that integrates elements applicable to the experience of homelessness.

Using 24-month longitudinal data from a multisite randomized controlled trial examining the effectiveness of HF relative to treatment as usual (TAU), this study explored the extent to which health, home and support, purpose, and community factors were predictive of subjective feelings of recovery among homeless people with mental illness. This study addressed two research questions. First, what are the strongest predictors of mental health recovery among homeless people with mental illness at baseline? Second, how does HF affect changes in mental health recovery at 24 months?

Methods

Study Design

The At Home/Chez Soi demonstration project was a multisite randomized controlled trial of HF conducted from 2009

to 2013 in five Canadian cities (Moncton, Montreal, Toronto, Vancouver, and Winnipeg). Participants were randomized to receive either HF or TAU. The HF intervention included access to scattered-site apartments with accompanying rent subsidies. Participants in the HF condition who were assessed to have high needs were provided with ACT based on presenting diagnoses and level of functioning, whereas ICM was available to those with moderate needs. All tenants had choice over the level of support that they received, including the option of only meeting in person for a short period with a support staff member once per week. The five sites each had a third arm intervention, which involved location-specific modifications to the housing and support model (for details, see Goering et al. 2011). Participants in the TAU condition were eligible to access any of the existing programs in their communities other than the HF services that were a part of the clinical trial. Research ethics board approval was obtained from the Centre for Addiction and Mental Health, as well as 11 local institutions at the five sites where the trial was conducted.

Participants

Recruitment for the trial occurred via community service organizations, including shelters and health clinics, as well as by self-referral. Eligibility criteria were: presence of a mental illness (as determined by the Mini-International Neuropsychiatric Interview, version 6.0 [Sheehan et al. 1998] or a recent written diagnosis); currently absolutely homeless (i.e., use of emergency shelters for one or more nights in the past month, or having no fixed address); and 18 years of age or older (19 + in Vancouver). Of the 2255 homeless adults with mental illness who were enrolled in the trial, 68 were excluded from analysis due to withdrawal from the study prior to 24 months. Data from 2187 participants were analyzed for this study.

Measures

A 22-item version of the recovery assessment Scale (RAS-22; Corrigan et al. 1999) was used to measure subjective ratings of recovery. The measure conceptualizes and assesses recovery across five domains: personal confidence and hope, willingness to ask for help, goal and success orientation, reliance on others, and freedom from illness symptoms. Using a five-point Scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), scores were computed for each subscale, as well as an overall rating of recovery. The measure was administered to participants at baseline and the 24-month follow-up. The original RAS has been found to have adequate test stability and adequate construct validity (Corrigan et al. 1999, 2004; Salzer and Brusilovskiy 2014). A 24-item version of the tool has also been validated for use with homeless populations (Girard et al. 2015). Internal consistency ratings of the RAS-22 and its subscales for this study ranged from .76 to .90 at baseline and .75–.91 at 24 months.

A modified 14-item version of the colorado symptom Index (CSI; Shern et al. 1994) was used to assess the presence and frequency of mental health symptoms experienced in the past month. The CSI has adequate test–retest reliability, content validity, and construct validity (Boothroyd and Chen 2008). Substance use in the past month was assessed using a five-item version of the global assessment of individual need—substance problem Scale (GAIN-SPS; Dennis et al. 2006). Questions ask about problems related to substance use, amount of time spent in substance-related activities (e.g., obtaining, using, or recovering from substances), and presence of withdrawal symptoms. Chronic medical conditions were assessed using the comorbid conditions list (Mental Health Commission of Canada (MHCC), 2010). A summed score of the number of comorbid conditions that persist for at least 6 months was computed. Adverse childhood experiences were examined using ten items that assess exposure to adversity before the age of 18 years, including emotional, physical, and sexual abuse; neglect; and household dysfunction (Felitti et al. 1998). A total score is computed by summing each dichotomous item (yes/no). The internal consistency of the Scale was .82 for this study.

The health, social, and justice service use inventory (HSJSU; MHCC, 2010) was used to assess use of case management services, assistance with housing and income, receipt of therapy, and use of drop-in centres and community meal programs. Items addressed dichotomous use of each service (yes/no) in the past month. Data were also gathered from five items assessing victimization in the past 6 months (experienced theft, physical assault, sexual assault, other crime). These items were also dichotomous but were summed to compute a total score of adverse adulthood experiences. The internal consistency of the victimization items was .67. The HSJSU previously underwent pre-testing and piloting to ensure that individuals with serious mental illness do not experience difficulties with the recall items (Goering et al. 2011).

Community integration was assessed using the community integration Scale (CIS; Goering et al. 2011). The CIS involves two Scales examining physical and psychological integration separately. Physical integration was assessed using seven items to examine participation in community activities within the past month. Each item was dichotomous with a total score being computed from 0 to 7. Four items were used to assess psychological integration. Using a five-point Scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), a total score was computed that ranged from 4 to 20. Higher scores on both CIS Scales reflect greater community integration. The CIS underwent

pre-testing and piloting with people with serious mental illness. The internal reliability of the physical integration Scale was .61 and the psychological integration Scale was .75.

The demographics, housing, vocational and service use history Questionnaire (MHCC, 2010) collected information on lifetime length of homelessness, involvement in work (paid or volunteer) and school, and provision of full or partial support to children under the age of 18 years. Additional information on participants' housing histories was collected from the residential time-line follow-back (Tsemberis et al. 2007). Housing stability was measured as the percentage of nights in the past 3 months that participants spent in stable residences, such as their own apartments or houses, family members' apartments or houses, single room occupancy hotels, boarding houses, group homes, or transitional housing programs with intended stays of at least 6 months.

Data Analysis

Hierarchical regressions were conducted using the full sample (i.e., participants from the HF and TAU conditions were analyzed together). The predicted variables in the regression analyses were ratings of recovery at baseline and 24 months. For the regression models predicting recovery at baseline, predictor variables were entered sequentially in four blocks: [1] adverse childhood experiences, chronic medical conditions, mental health symptoms, psychotic disorder diagnosis, substance use problems, and adverse adulthood experiences (health block); [2] lifetime length of homelessness, housing stability in past 3 months, receipt of case management services, receipt of assistance with housing or income, use of drop-in centres and community meal programs, and receipt of therapy (home and support block); [3] involvement in meaningful activity (paid work, volunteering, or school), and provision of full or partial support to a child under 18 years of age (purpose block); and [4] having a close confidante with whom to share personal information, psychological integration, and physical integration (community block). The four blocks were entered into the regression models in the order outlined by SAMSHA's (2012) working definition of recovery. Within each block, predictors were entered according to temporal precedence (i.e., any historical predictors were added prior to recent and current predictors).

For the regression model predicting recovery at 24 months, recovery ratings at baseline was added to the model as the first predictor to assess residual change in recovery scores. Randomization to intervention (HF plus ACT or ICM vs. TAU) was also added to the home and support block. All other variables remained the same. There were no violations to the regression model assumptions of collinearity, homoscedasticity, or independence of errors. Given the studied population, housing stability in the past 3 months was positively skewed; however, least-squares linear regression performs well with non-normally distributed samples of 500 or more participants (Lumley et al. 2002).

Multiple imputation was used to address missing data. Ten imputations, with 50 iterations each, were performed using a linear regression algorithm. To reduce analytic bias, an additional 23 variables were included as auxiliary predictors. Findings are presented using pooled estimates of the multiply imputed datasets. All statistical analyses were performed used SPSS 24.

Results

Of the 2187 participants, 1476 (67.5%) were male and the mean age was 40.82 (SD = 11.19) years. Approximately one-fifth of the sample (n = 472; 21.6%) identified as Indigenous Canadian. The mean rating of overall recovery at baseline was 78.64 (SE = 0.29). For contextual purposes, when the RAS-22 was scored as a mean as opposed to a sum ($M = 3.57$, SE = 0.01), level of recovery in this study was approximately one standard deviation lower than what has been found in other research with non-homeless samples of people with mental illness (for a review, see Salzer and Brusilovskiy 2014). Mean ratings of recovery for each RAS-22 subscale and other sample characteristics at baseline are presented in Table 1. Whereas participants had spent an average of 8.66% (SE = 0.57) of their nights in stable housing in the past 3 months at baseline, housing stability in the past 3 months increased to 63.03% (SE = 1.10) at 24 months.

The results of the hierarchical regression predicting overall recovery at baseline are presented in Table 2. The health, home and support, and community blocks of predictors significantly improved the model, though the effect size of the home and support block was small. Findings showed that participants who perceived their recovery to be greater were more likely to have fewer chronic medical conditions, have fewer mental health symptoms, have a diagnosis of a psychotic disorder, have less substance use problems in the past month, be homeless for less time in their lives, receive case management, have a close confidante with whom to share personal information, be more involved in community activities, and feel like they belong in their communities. Similar patterns of findings were observed for the five subscales of recovery, with the health and community blocks again being the strongest predictors of recovery (see Table 3). The variance explained by the four-dimensional framework was greatest for the subscale of personal confidence and hope, whereas it was lesser for willingness to ask for help, and goal and success orientation.

The health, home and support, purpose, and community predictors at baseline minimally affected residual changes in recovery at 24 months (see Table 4). None of the blocks of

Table 1 Sample characteristics at baseline (n = 2187)

Variable	M	SE	n	%
Recovery, overall (RAS-22)[a]	78.64	.29		
Personal confidence and hope[a]	24.75	.11		
Willingness to ask for help[a]	11.04	.05		
Goal and success orientation[a]	15.66	.06		
Reliance on others[a]	18.30	.08		
Freedom from illness symptoms[a]	8.90	.06		
Adverse childhood experiences[b]	4.72	.07		
Count of chronic medical conditions	4.70	.07		
Mental health symptoms (CSI)[c]	39.40	.26		
Psychotic disorder diagnosis			811	37.08
Substance use problems (GAIN-SPS)[d]	1.80	.04		
Adverse adulthood experiences[e]	1.37	.03		
Lifetime length of homelessness (years)	4.90	.13		
Housing stability in past 3 months[f]	8.66	.57		
Receives case management[g]			518.6	23.71
Receives help with housing/income[g]			992.5	45.38
Uses drop-in centres[g]			1499	68.54
Receives therapy[g]			584.3	26.72
Involved in meaningful activity			118.3	5.41
Provision of support to child			161	7.36
Have a close confidante			1105	50.53
Community integration (CIS), physical[h]	2.18	.04		
Community integration (CIS), psychological[i]	10.69	.08		

RAS-22 recovery assessment Scale-22, *CSI* colorado symptom inventory, *GAIN-SPS* global assessment of individual need-substance problem Scale, *CIS* community integration Scale

[a]Possible scores range from 22 to 110 (overall recovery), 7–35 (personal hope and recovery), 3–15 (willingness to ask for help), 4–20 (goal and success orientation), 5–25 (reliance on others), and 3–15 (freedom from illness symptoms), each with higher scores indicating greater recovery achievement

[b]Possible scores range from 0 to 10, with higher scores indicating more adverse childhood experiences

[c]Possible scores range from 14 to 70, with higher scores indicating more severe and frequent mental health symptoms

[d] Possible scores range from 0 to 5, with higher scores indicating more substance use problems

[e]Possible scores range from 0 to 5, with higher scores indicating more adverse adulthood experiences

[f]Possible scores range from 0 to 100, with higher scores indicating more nights in stable housing

[g]Service use in the past month

[h]Possible scores range from 0 to 7, with higher scores indicating more participation in community activities

[i]Possible scores range from 4 to 20, with higher scores indicating greater sense of belonging

the four-dimensional framework significantly added to the model. Of the individual predictors, fewer adverse childhood experiences, involvement in meaningful activity, and having a close confidante were each associated with greater perceived level of recovery. Receipt of HF services, which was added to the home and support block for this analysis, was also not a significant predictor of changes in level of recovery.

Discussion

The adapted four-dimensional framework of health, home and support, purpose, and community explained a large proportion of the variance in the hierarchal regression model predicting overall recovery among homeless people with mental illness. Similarly, the model predicting personal confidence and hope also had a large effect size, whereas, the four-dimensional framework had moderate effect sizes for the other recovery subscales. Of the four dimensions, health and community were the strongest predictors of mental health recovery, whereas the contributions of the home and support dimension were typically significant but small and the purpose predictors seldom reached the level of significance. Overall, the findings provide partial support for the effectiveness of the adapted four-dimensional framework for predicting mental health recovery among homeless people with mental illness.

Although this study is the first to examine predictors of mental health recovery using a sample of homeless people with mental illness, many of the study findings are consistent with past research using non-homeless samples. For example, less severity of mental health symptoms, fewer chronic medical conditions, greater involvement in community activities, and greater sense of belonging in the community have each been linked to greater mental health recovery (Green et al. 2013; Hendryx et al. 2009; Townley et al. 2009). Although this study used only a single, dichotomous item to measure social support, our findings are consistent with past research that demonstrates its importance to mental health recovery (e.g., Chang et al. 2013; Corrigan and Phelan 2004; Hendryx et al. 2009; Pernice-Duca and Onaga 2009). As for substance use problems, which were found to be negatively associated with overall recovery (as well as to the subscales of willingness to ask for help, and goal and success orientation), the findings suggest a stronger link to recovery than what has been found in past research (e.g., Resnick et al. 2004). Similar to Castellow et al. (2015), length of homelessness was found to be negatively associated with mental health recovery, suggesting that people experiencing chronic homelessness may be most at-risk of deteriorations in mental health recovery. Further, as involvement in meaningful activity, including work, was not correlated to recovery, the findings are consistent with Kaplan et al. (2012) and further obfuscate the empirical relationship between mental health recovery and engagement in

Table 2 Multivariate models predicting overall recovery at baseline

Predictor	Recovery, overall					
	B	SE	95% CI	p	R^2	ΔR^2
Block 1 (health)					.17	.17***
Adverse childhood experiences	< .01	.10	− .24, .15	ns		
Chronic medical conditions	− .31	.08	− .46, − .16	***		
Mental health symptoms	− .30	.02	− .35, − .26	***		
Psychotic disorder diagnosis	2.47	.51	1.46, 3.47	***		
Substance use problems	− .32	.14	− .59, − .05	*		
Adverse adulthood experiences	.13	.19	− .25, .51	ns		
Block 2 (home and support)					.18	.01*
Lifetime duration of homelessness	− .08	.04	− .17, 0	*		
Housing stability in past 3 months	< .01	.01	− .02, .02	ns		
Receives case management	1.57	.59	.42, 2.72	**		
Receives help with housing/income	− .01	.50	− .99, .98	ns		
Uses drop-in centres	.09	.55	− .99, 1.17	ns		
Receives therapy/counselling	− .50	.57	− 1.61, .62	ns		
Block 3 (purpose)					.18	< .01
Involved in meaningful activity	.78	1.08	− 1.33, 2.89	ns		
Provision of support to child	.02	.93	− 1.79, 1.84	ns		
Block 4 (community)					.31	.12***
Have a close confidante	4.33	.50	3.36, 5.31	***		
Community integration, physical	.93	.15	.64, 1.23	***		
Community integration, psychological	.91	.07	.78, 1.05	***		

Coefficient statistics are pooled estimates. For R^2 and ΔR^2 statistics, means were computed. Psychotic disorder diagnosis, support predictors (receives case management, receives help with housing/income, uses drop-in centres, receives therapy/counselling), have a close confidante: no = 0, yes = 1

*p ≤ .05; **p ≤ .01; ***p ≤ .001

Table 3 Model summary of multivariate models predicting recovery subscales at baseline

Block	Willingness to ask for help		Goal and success orientation		Reliance on others		Freedom from illness symptoms		Personal confidence and hope	
	R^2	ΔR^2	R^2	ΔR^2	R^2	ΔR^2	R^2	ΔR^2	R^2	ΔR^2
1 Health[a]	.07	.07***	.06	.06***	.05	.05***	.18	.18***	.19	.19***
2 Home and support[b]	.08	.01*	.06	< .01	.07	.02***	.18	< .01	.19	.01*
3 Purpose[c]	.08	< .01	.06	< .01	.07	< .01*	.18	< .01	.19	< .01
4 Community[d]	.13	.05***	.12	.06***	.23	.16***	.22	.04***	.27	.08***

Means were computed for R^2 and ΔR^2 statistics

*p ≤ .05; **p ≤ .01; ***p ≤ .001

[a]Predictors: adverse childhood experiences; chronic medical conditions; mental health symptoms; psychotic disorder diagnosis; substance use problems; adverse adulthood experiences

[b]Predictors: lifetime duration of homelessness; housing stability in past 3 months; receives case management; receives help with housing/income; uses drop-in centres; receives therapy

[c]Predictors: involved in meaningful activity; provision of support to child

[d]Predictors: have a close confidante; community integration, physical; community integration, psychological

meaningful activities. However, as all participants were homeless in the sample at baseline—an experience that can be characterized as being in survival mode—involvement in work, school, or volunteering may be secondary to securement of permanent housing. Meaningful activities may contribute more to recovery after people have the stability of housing. Overall, the consistency in findings in this study with past research would suggest that

Table 4 Multivariate model predicting recovery at 24 months using baseline predictors

Predictor	Recovery, overall					
	B	SE	95% CI	p	R^2	ΔR^2
Block 1					.17	.17***
Recovery at baseline	.37	.03	.31, .42	***		
Block 2 (health)					.18	< .01
Adverse childhood experiences	− .34	.11	− .56, − .12	**		
Chronic medical conditions	< .01	.11	− .21, .22	ns		
Mental health symptoms	.20	.60	− .98, 1.38	ns		
Psychotic disorder diagnosis	.02	.03	− .04, .08	ns		
Substance use problems	.07	.17	− .26, .41	ns		
Adverse adulthood experiences	− .14	.21	− .56, .29	ns		
Block 3 (home and support)					.19	< .01
Lifetime duration of homelessness	− .09	.05	− .18, 0	ns		
Housing stability in past 3 months	.01	.01	− .01, .03	ns		
Receives HF services	.86	.61	− 36, 2.07	ns		
Receives case management	.45	.71	− .95, 1.85	ns		
Receives help with housing/income	.24	.58	− .91, 1.38	ns		
Uses drop-in centres	1.26	.65	− .03, 2.55	ns		
Receives therapy/counselling	− .03	.66	− 1.34, 1.28	ns		
Block 4 (purpose)					.19	< .01
Involved in meaningful activity	2.42	1.23	.01, 4.84	*		
Provision of support to child	2.21	1.14	− .06, 4.47	ns		
Block 5 (community)					.19	< .01
Have a close confidante	1.15	.56	.04, 2.26	*		
Community integration, physical	.08	.19	− .29, .46	ns		
Community integration, psychological	.03	.08	− .14, .19	ns		

Coefficient statistics are pooled estimates. For R^2 and ΔR^2 statistics, means were computed. Psychotic disorder diagnosis, support predictors (receives HF services, receives case management, receives help with housing/income, uses drop-in centres, receives therapy/counselling), have a close confidante: no = 0, yes = 1

*p ≤ .05; **p ≤ .01; ***p ≤ .001

predictors of mental health recovery are largely similar between housed and homeless persons with mental illness.

The framework did not account for the residual changes in recovery at 24 months using baseline data. However, examining 24-month predictors may have yielded stronger findings. This was not feasible due to unavailable data related to the purpose dimension. Of note, fewer adverse childhood experiences and involvement in a meaningful activity were significantly associated with positive changes in recovery at 24 months. As the rate of housing stability in the sample was considerably higher at 24 months, the findings give rise to speculation about the temporality of predictors of mental health recovery. Future research should consider exploring how predictors of mental health recovery change over time as people transition from homelessness to housing, and vice versa. Moreover, as many housed people with mental illness live in poverty, it is important to recognize that financial stability may have a great effect on recovery after people exit homelessness. Receipt of HF services did not have any effect on changes in recovery scores. As participants had been homeless for almost an average of 5 years at baseline, those who were housed at 24 months may still be going through an adjustment phase that precedes action necessary to fostering and advancing mental health recovery. Moreover, mental illness, substance use problems, and homelessness may not be the only adversities from which people are recovering. Given that people with mental illness who have histories of homelessness report nearly nine adverse life events, on average (Padgett et al. 2012), traditional definitions and measures of mental health recovery may only capture a part of the recovery journeys of this population. Conceptualizations of recovery as the cumulative life adversities experienced by formerly homeless people with mental illness (Padgett et al. 2016b) may enhance research into the conditions that help this population to live satisfying and meaningful lives in the community.

The study findings have implications for the delivery of recovery-oriented services to people experiencing homelessness. As length of homelessness was negatively associated with mental health recovery, the primary objective of

programs and systems serving people experiencing homelessness should be to assist them to secure housing. If people with mental illness are not supported to exit homelessness, they may become more entrenched in street life and less likely to ask for help from the formal service system. Because of this, programs aimed at early identification of housing instability and rapid re-housing are expected to promote mental health recovery through the prevention of chronic homelessness. Support services can also facilitate the mental health recovery of people experiencing homelessness in other ways beyond finding housing. For example, interventions aimed at strengthening people's social networks and increasing their involvement in the community are expected to promote recovery. Further, as receipt of case management services was associated with greater recovery, connecting people who are experiencing homelessness to a primary worker may prevent social isolation, increase people's willingness to ask for help, facilitate access to services, and provide information and direction needed to exit homelessness and plan for the future. As many homeless people with mental illness have small social networks and difficulties with trust (Hawkins and Abrams 2007; Padgett et al. 2008b), case managers may also promote mental health recovery through the provision of a reliable and emotionally supportive relationship.

The negative effects of chronic medical conditions, mental health symptoms, and problematic substance use on recovery during homelessness also require intervention. Connection to accessible mental health and primary care services that can provide support throughout homelessness, as well as bridge any transition into housing, is expected to have a positive impact on recovery. Ensuring continuity of care is likely to add stability to people's support networks through the development of a supportive relationship and prevent disengagement from treatment services (Padgett et al. 2008a). As for substance use treatment, the rates of service use by homeless people with mental illness are considerably lower than the rates of problematic substance use (Herrman et al. 2004). Given this, implementation of harm reduction approaches that are rooted in individual choice and control over treatment may lead to greater service uptake and promote mental health recovery among homeless populations.

Limitations

There are several limitations to this study. First, the internal consistency coefficients of the Scales measuring physical integration in the community and adverse adulthood experiences were weak (Cronbach's $\alpha < .70$). Nevertheless, confidence in our findings on the relationship between physical integration and mental health recovery is strengthened by its consistency with past research (e.g., Hendryx et al. 2009). As for the role of recent adverse adulthood experiences in recovery, findings should be interpreted with caution and require further examination. Second, although the RAS-22 addresses many of the central elements of recovery (for review, see Ellison et al. 2018), it is unknown how the findings would generalize to other components of recovery, such as exercise of citizenship, inclusion, sense of self and control, and empowerment. Because of this, future research should consider applying the four-dimensional framework to other conceptualizations of mental health recovery. Third, available data limited a more comprehensive of examination of the dimension of purpose. Although this study was able to investigate the relationships between mental health recovery and involvement in meaningful roles (i.e., paid work, school, volunteering, and family caregiving), other responsibilities and activities characteristic of the dimension of purpose (e.g., hobbies and recreation, pet ownership) were not included and require future examination.

Conclusion

The study findings provided partial support for the effectiveness of the adapted four-dimensional framework in predicting mental health recovery among homeless people with mental illness. In particular, the health and community dimensions were the strongest predictors of perceived recovery, with moderate effect sizes. The home and support dimension added significantly to most components of recovery (reliance on others, willingness to ask for help, and personal confidence and hope), though the effect sizes were small. The purpose dimension added minimally to the regression models. Of the individual predictors, having fewer chronic medical conditions, having fewer mental health symptoms, having a diagnosis of a psychotic disorder, having a close confidante with whom to share personal information, being more involved in community activities, and feeling a greater sense of belonging in the community were most consistently associated with greater ratings of recovery. At 24 months, none of the health, home and support, purpose, and community dimensions significantly affected residual changes in recovery from baseline. Overall, the findings underscore the importance of assisting people experiencing homelessness to find housing as a means to facilitate mental health recovery. Moreover, providing case management services, such as those offered in HF, and interventions aimed at improving social support, managing mental and physical health symptoms, and increasing community involvement are expected to promote recovery among homeless people with mental illness.

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Compliance of Ethical Standards

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

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