One-Stop Shopping for Recovery: An Investigation of Participant Characteristics and Benefits Derived From U.S. Recovery Community Centers

John F. Kelly, Robert L. Stout, Leonard A. Jason, Nilofar Fallah-Sohy, Lauren A. Hoffman, and Bettina B. Hoeppner

Background: Recovery community centers (RCCs) are the "new kid on the block" in providing addiction recovery services, adding a third tier to the 2 existing tiers of formal treatment and mutual-help organizations (MHOs). RCCs are intended to be recovery hubs facilitating "one-stop shopping" in the accrual of recovery capital (e.g., recovery coaching; employment/educational linkages). Despite their growth, little is known about who uses RCCs, what they use, and how use relates to improvements in functioning and quality of life. Greater knowledge would inform the field about RCC's potential clinical and public health utility.

Methods: Online survey conducted with participants (N = 336) attending RCCs (k = 31) in the northeastern United States. Substance use history, services used, and derived benefits (e.g., quality of life) were assessed. Systematic regression modeling tested a priori theorized relationships among variables.

Results: RCC members (n = 336) were on average 41.1 ± 12.4 years of age, 50% female, predominantly White (78.6%), with high school or lower education (48.8%), and limited income (45.2% < $10,000 past-year household income). Most had either a primary opioid (32.7%) or alcohol (26.8%) problem. Just under half (48.5%) reported a lifetime psychiatric diagnosis. Participants had been attending RCCs for 2.6 ± 3.4 years, with many attending <1 year (35.4%). Most commonly used aspects were the socially oriented mutual-help/peer groups and volunteering, but technological assistance and employment assistance were also common. Conceptual model testing found RCCs associated with increased recovery capital, but not social support; both of these theorized proximal outcomes, however, were related to improvements in psychological distress, self-esteem, and quality of life.

Conclusions: RCCs are utilized by an array of individuals with few resources and primary opioid or alcohol histories. Whereas strong social supportive elements were common and highly rated, RCCs appear to play a more unique role not provided either by formal treatment or by MHOs in facilitating the acquisition of recovery capital and thereby enhancing functioning and quality of life.

Key Words: Recovery Community Centers, Recovery, Addiction, Support Services, Recovery Coaching, Addiction, Substance Use Disorder.

PROFESSIONAL TREATMENT SERVICES often play a vital role in addressing substance use disorders in the United States and around the world. Such clinical services can provide life-saving medically managed detoxification and stabilization as well as deliver medications and psychosocial interventions that can alleviate cravings and help prevent relapse. Extending the framework and benefits of these professional treatment efforts, peer-led mutual-help organizations (MHOs), such as Alcoholics Anonymous (AA), Narcotics Anonymous (NA), SMART Recovery, and many others are commonly used to provide additional long-term free recovery support over time in the communities in which people live (Bøg et al., 2017; Kelly, 2017; Kelly et al., 2017a). Adding to these resources in recent years has been a new dimension of recovery support services that are neither professional treatment nor MHOs. These new services (e.g., recovery community centers [RCCs], recovery residences, recovery coaching, recovery high schools, and collegiate recovery programs; Kelly et al., in press; White et al., 2012, 2012) combine voluntary, peer-led initiatives, with professional activities, and are intended to provide flexible community-based options to address the psychosocial barriers to sustained remission (White et al., 2012, 2012).

RCCs are one of the most common of these new additions to recovery support infrastructure and are growing rapidly (Cousins et al., 2012; Kelly et al., in press; Kelly et al., 2017b). RCCs are literally and metaphorically, "new kids on the block," as these novel entities are most often located on

From the Recovery Research Institute (JFK, NF-S, LAH, BBH), Massachusetts General Hospital and Harvard Medical School, Boston, Massachusetts; DePaul University (RLS), Chicago, Illinois; and Decision Sciences Institute (LAJ), Providence, Rhode Island.

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Reprint requests: John F. Kelly, PhD, Recovery Research Institute, Massachusetts General Hospital and Harvard Medical School, 151 Merrimac Street, 6th Floor, Boston, MA 02114; Tel.: 617-643-1980; Fax: 617-643-7667; E-mail: jkelly11@mgh.harvard.edu

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city blocks within the heart of communities and provide a variety of services including recovery coaching, relapse prevention skills building, employment and job training linkages, recreational activities, and a host of other support services intended for people in or seeking recovery (Kelly et al., in press). They appear to be operated most often by a combination of peer volunteers and addiction professionals (Cousins et al., 2012; Kelly et al., in press). Importantly, one of the principles of RCCs is that *there are many pathways to recovery*; RCCs are not allied with any specific recovery philosophy or model (e.g., 12-step; cognitive-behavioral; religious; and secular) and thus are all-inclusive and "agnostic" when it comes to recovery approaches (Valentine, 2011). This is a critically important aspect of these facilities in a field where partisan approaches can create unnecessary barriers to recovery for some (Kelly and White, 2012).

Conceptually, RCCs are founded on the principle that the achievement of sustained recovery from alcohol or other drug use disorders is not just a function of medical stabilization (e.g., detoxification) or addressing psychopathology, but also by providing and successfully mobilizing personal, social, environmental, and cultural resources that can be brought to bear on recovery. The total aggregate of these resources has been termed "recovery capital" (Cloud and Granfield, 2008). From a stress and coping theoretical perspective (Lazarus and Folkman, 1984), the greater the availability of, and access to, recovery capital, the greater the likelihood that individuals will be able to buffer stress associated with the adaptations needed to sustain stable remission (Kelly and Hoeppner, 2015). The accumulation of recovery capital that RCCs are intended to provide should therefore result in measurable enhancements in indices of quality of life, functioning, and well-being, as well as important reductions in psychological distress, and thereby supporting long-term remission (Kelly and Hoeppner, 2015).

In addition to enhancing members' recovery capital, RCCs should provide and increase recovery-specific social support to members through the lived experience of its existing members who can attract and engage people in or seeking recovery via the common bond of mutual suffering and demonstration of successful recovery pathways followed. Yet, despite their growth, RCCs have been subjected to very little systematic study (Armitage et al., 2010; Kelly et al., in press; Mericle et al., 2014). Some prior research examining RCCs across 1 U.S. region has detailed the physicality, locality, services offered and described staffing, operations, and budgets (Kelly et al., in press), but little is currently known regarding who uses RCCs, what types of services members use and how helpful they perceive such services to be, or whether RCC participation is related to increases in recovery capital and social support and whether these are, in turn, related to further enhancements in quality of life and functioning and other aspects of well-being. More knowledge in these areas will begin to inform national efforts by helping to estimate the potential public health utility of providing RCCs in U.S. communities.

To this end, in order to gather more systematic research on RCCs, the present investigation: (i) assessed the demographic, substance use, mental health, and recovery experience characteristics of active participants across almost 3 dozen RCCs in the northeastern United States; (ii) examined the types of available services used by RCC members across RCCs and described how helpful members found them; and (iii) investigated the relationship between the extent of RCC exposure and length of time in recovery and the associations among RCC exposure and measures of recovery capital and social support and how these constructs may be related to other indices of quality of life and functioning, and psychological and emotional well-being (see conceptual Fig. 1). It was hypothesized that exposure to RCCs (as measured by the number of years of RCC involvement, percent of days attending an RCC in the past 90 days, and length of a typical RCC visit) would be directly related to RCC members' levels of recovery capital and social support for recovery (above and beyond the effects explained by time in recovery and controlling for demographics) and that these proximal RCC outcomes would be associated with theorized downstream effects on lowering psychological distress and increasing self-esteem and quality of life.

MATERIALS AND METHODS

Participants

Participants were attendees at 31 RCCs located in the New England region of the United States as described elsewhere (Kelly et al., in press). To recruit (2/12/2016 to 10/30/2017), RCC directors and staff told RCC members about the study and posted flyers in their RCCs. In some cases, study staff visited RCCs to provide further information. Study staff also hosted monthly conference calls to assist RCC directors and staff with communication efforts regarding the study and facilitate study discussions among RCC directors. To be eligible for the study, RCC members needed to be 18+ years of age, currently seeking or in recovery from a drug or alcohol problem, and currently attending 1 of the 31 participating RCCs.

Procedure

Interested RCC members used an open REDCap (Harris et al., 2009) survey link to complete eligibility screening. If eligible, participants signed an electronic consent form and then proceeded to the survey. Participants received a $10 gift card for their completed survey, if they chose to provide their contact information (i.e., email and full name; $n = 36$ declined payment). Surveys were reviewed by study staff for completeness and validity. Of the 450 initially started surveys, 33 were found ineligible in the eligibility screening form, 38 chose not to provide consent, 2 signed consent but discontinued the survey, and 41 were judged to be invalid by study staff (e.g., participants attempting to take the survey twice discovered via same email address or other personal information). The remaining 336 comprise this sample. All study procedures were reviewed and approved by the Partners HealthCare Institutional Review Board.

Measures

Demographics. Participants were asked about their age, gender, sexual orientation, race, ethnicity, education, income, employment,

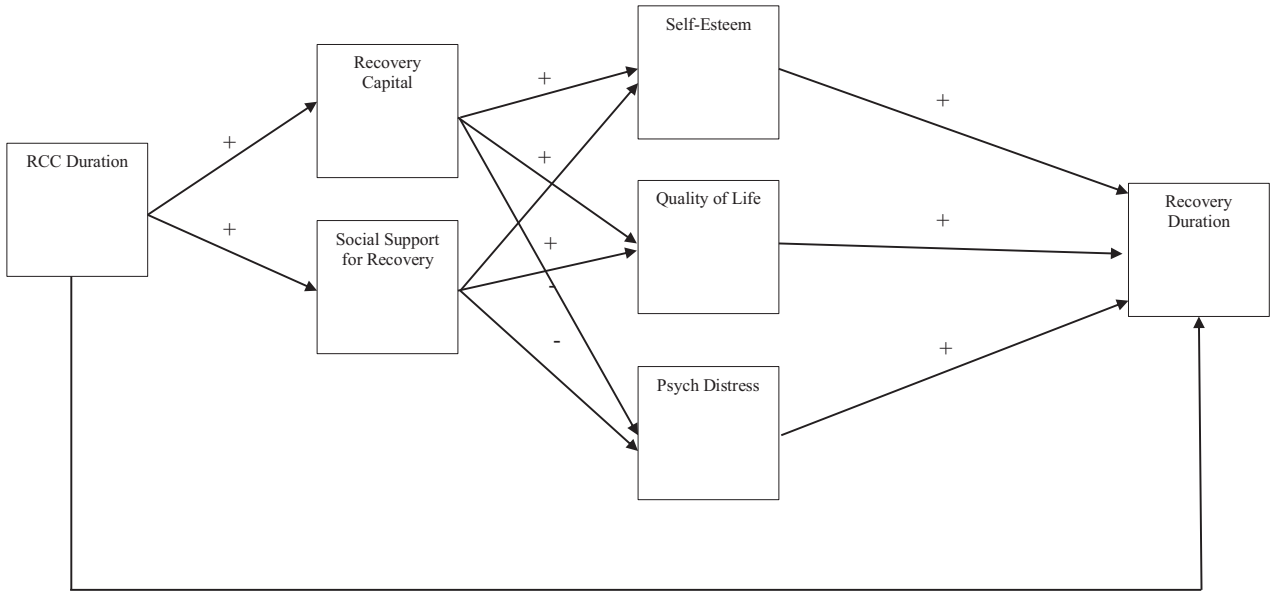

Fig. 1. Conceptual model of the theorized relationships among RCC duration and length of recovery with anticipated intermediate variables. Note: "+" = theorized positive association among linked variables; "−" = theorized negative association among linked variables.

and marital status. To assess participants' involvement in the legal system, an item was used from the TCU (Institute of Behavioral Research, 2007): "What is your current legal status?" where response options were "none," "on probation only," "on parole only," "on probation and parole," "awaiting charge, trial or sentence," "outstanding warrant," "case pending," or "other."

Recovery. Participants were asked "Would you describe yourself as being in recovery?" (yes/no). If yes, they were asked "For how long have you been in recovery from addiction?" (in years).

Substance Use. Participants were provided a list of substances (i.e., alcohol, marijuana, cocaine, heroin, unprescribed methadone, unprescribed buprenorphine, unprescribed other opioids, hallucinogens, synthetic marijuana, amphetamine, methamphetamine, benzodiazepines, barbiturates, inhalants, steroids, and tobacco) and their commonly used names, and were asked for each whether they had ever used it regularly (i.e., at least once per week) and/or were still using it currently. Of these, they then indicated "the primary substance that you used (i.e., what was your drug of choice)?" From these responses, we coded the number of substances they had used regularly (excluding tobacco), and if they had used tobacco ever and/or currently.

Mental Health. Participants were asked "Has a doctor, nurse, or counselor ever told you that you have a mental or psychological condition?" If yes, they were shown a list of 16 mental health conditions (excluding substance use disorders) and asked to select all that apply. From these responses, we coded endorsement of mood disorder (bipolar disorder I or II, dysthymic disorder, major depressive disorder), anxiety disorder (agoraphobia, generalized anxiety disorder, obsessive–compulsive disorder, panic disorder, posttraumatic stress disorder, social anxiety disorder, specific phobia), or other disorders (i.e., anorexia nervosa, bulimia nervosa, delusional disorder, personality disorder, schizoaffective disorder, and schizophrenia). Endorsement of multiple disorders (2+) was also coded. Then, participants were asked "Have you EVER been treated in an emergency room for mental health problems in your lifetime." If so, they were asked to indicate the number of times this occurred in their lifetime, since entering recovery, since attending their RCC, and during the past 90 days, from which we coded a binary indicator for each.

RCC Experience. Participants were asked about the referral source (see Table 1) for their specific RCC (using the piping function in REDCap), and the length of time since they started attending it (in years). To further describe their RCC exposure, they were also asked "On average, how many hours do you spend at the center per visit?" and "In the past 90 days (3 months), on how many days did you visit [your RCC]?"

RCC Services. Participants were shown a list of 23 services RCC provides, as generated by RCC directors from prior analyses (Kelly et al., in press). For each service, participants indicated if they used it at their RCC, and if so, how helpful it was, as rated on a 7-point Likert scale (anchored at 1 = "not helpful at all," 4 = "moderately helpful," and 7 = "extremely helpful").

RCC Appraisals. Using the same 7-point Likert scale, participants then rated the helpfulness of their RCC "for you in your recovery" and "in improving your personal well-being and quality of life," respectively. They then completed the "Sense of Community Scale (SCS)" (Jason et al., 2015), a 9-item scale assessing 3 distinct ecological domains involving the individual, microsystem, and macrosystem. To personalize, participants first chose the "word you use to describe the people involved in [your RCC]," where possible terms were guests, members, participants, peers, recoverees, friends, and visitors ("peers" was chosen most frequently, by $n = 98$, 29%). This term was then piped into the SCS item stems, and participants rated each item on a 6-point Likert scale (1 = "strongly disagree" to 6 = "strongly agree"). Example items are as follows: "I have friends in [my RCC]" for the "importance to self" subscale ($\alpha = 0.96$), "[Peers] can depend on each other at [my RCC]" for the "social relationships" subscale ($\alpha = 0.96$), and "I think [my RCC] is a good recovery community center" for the entity subscale ($\alpha = 0.89$).

Recovery Assets. Two scales were used to assess hypothesized assets to be gained through RCC participation. Recovery capital

Table 1. Characteristics of RCC Members (n = 336)

	Total	
	Mean/%	(SD/*n*)
Demographics		
Age (in mean, SD)	41.1	(12.4)
Gender		
Female	50.0	(168)
Male	47.3	(159)
Nonbinary	2.7	(9)
Sexual orientation		
Heterosexual	77.4	(260)
Bisexual	8.6	(29)
Gay/lesbian	6.5	(22)
Other	5.1	(17)
Race		
White	78.6	(264)
African American	15.2	(51)
Multiracial	3.0	(10)
American Indian	1.2	(4)
Other	0.6	(2)
Hispanic (% yes)	10.7	(36)
Education		
High school or less	48.8	(164)
Some college or other degrees	35.7	(120)
BA or higher	14.3	(48)
Income (i.e., total household past year)		
Less than $10,000	45.2	(152)
$10,000 to $49,999	42.9	(144)
$50,000 or more	7.7	(26)
Employment (past 90 days)		
Unemployed	46.1	(155)
Part-time (including irregular work)	28.9	(97)
Full-time (35 + h/wk)	19.9	(67)
Marital status		
In a relationship (married, living as married)	19.6	(66)
No longer together (divorced, widowed)	25.0	(84)
Never married nor living together	54.2	(182)
Legal involvement (% yes)	24.1	(81)
Recovery		
In recovery (% yes)	94.9	(319)
Length of time in recovery (in years)	4.2	(7.2)
Less than a year	31.3	(105)
1 to 5 years	42.6	(143)
5+ years	19.9	(67)
Substance use		
Primary substance used		
Heroin and other opioids	32.7	(110)
Alcohol	26.8	(90)
Cocaine	13.7	(46)
Marijuana	7.4	(25)
Other	5.4	(18)
Number of substances used regularly (1+/wk)		
1 substance	19.0	(64)
2 substances	20.5	(69)
3 + substances	52.1	(175)
Tobacco use		
Ever	63.7	(214)
Current	42.6	(143)
Mental health		
ED visit for mental health (% yes)		
Ever	39.3	(132)
Since entering recovery	4.2	(14)
Since attending RCC	3.3	(11)
Past 90 days	1.5	(5)
Lifetime diagnosis (% yes)	48.5	(163)
Multiple disorders	34.2	(115)
Mood disorder	37.2	(125)
Anxiety disorder	34.5	(116)
Other disorders	13.1	(44)
RCC experience		
Referral source		
Family and friends	44.0	(148)
SUD treatment (detox, inpatient, outpatient)	14.6	(49)
Housing and social services (e.g., sober living, shelter, including DSS)	13.7	(46)
RCC outreach (e.g., street outreach, Internet, pamphlets, community event, and ads)	11.6	(39)
Health care (PCP, ED)	5.4	(18)
Other (e.g., employer, 12-step, church, and academic)	8.9	(30)
Length of RCC attendance (in years)	2.6	(3.4)
Less than a year	35.4	(119)
1 to 5 years	49.1	(165)
5+ years	14.0	(47)
Percent days attended RCC in past 90 days (in mean, SD)	45.5	(32.1)
Length of typical RCC visit (in hours)	3.1	(2.7)
RCC appraisal		
RCC's helpfulness to recovery	6.2	(1.2)
RCC's helpfulness to QOL	6.1	(1.2)
RCC's sense of community (in mean, SD)		
Self (identity and importance to self)	5.3	(1.0)
Membership (social relationships)	5.2	(1.0)
Entity (a group's organization and purpose)	5.3	(1.0)
Recovery assets		
Recovery capital (BARC; 10 items, 1- to 6-point scale)	5.0	(0.9)
Social support for recovery (CEST-SS; 9 items, 1- to 6-point scale)	4.8	(1.0)
Quality of life (QOL) (in mean, SD)		
Quality of Life (EUROHIS-QOL; 8 items, 1- to 5-point scale)	3.8	(0.7)
Self-esteem (1 item, 1- to 10-point scale)	6.5	(2.3)
Psychological distress (Kessler-6, 6 items, 0- to 4-point scale)	2.0	(0.8)

was assessed using the Brief Assessment of Recovery Capital (BARC-10) scale (Vilsaint et al., 2017), a 10-item, self-report scale rated on a 6-point Likert scale (1 = "strongly agree," 6 = "strongly disagree"). Example items include the following: "I get lots of support from friends," "I have enough energy to complete the tasks I set myself," "My living space has helped to drive my recovery journey," and "I am happy dealing with a range of professional people" (α = 0.95). Social support for recovery was assessed using the 9-item social support subscale of the Texas Christian University "Client Evaluation of Self and Treatment" (CEST-SS; Institute of Behavioral Research, 2007), where we used the aforementioned 6-point Likert scale instead of a 5-point Likert scale, and used "I" instead of "you" (e.g., "I have good friends who do not use drugs," α = 0.91).

Quality of Life (QOL). Three scales were used to capture quality of life. The EUROHIS-QOL (Schmidt et al., 2006) is a widely used 8-item measure of quality of life, adapted from the World Health Organization measure on quality of life. Items are rated on a 5-point Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied), with larger values indicating greater QOL. A single-item measure, "I have high self-esteem," rated on a 10-point scale (1 = "Not very true of me," 10 = "Very true of me") assessed self-esteem. Psychological distress was assessed using the Kessler-6 (Furukawa et al., 2003), a 6-item scale where participants rate how often they experienced mental health difficulties (e.g., nervousness and depression) on a 5-point Likert scale ranging from 0 = "none of the time" to 4 = "all of the time" during the past 30 days.

Analytic Strategy

Scale scores were calculated by mean-scoring them, so as to reflect the response scale participants used, after accounting for reverse scoring (i.e., SCS). Descriptive statistics (means with standard deviations and percentages with sample sizes) were calculated to describe RCC members and their RCC service utilization.

To provide initial insight into the extent to which RCC use is associated with remission, recovery capital, and quality-of-life indices, we calculated Spearman's correlation coefficients and then used a systematic model-building approach to examine our 5 dependent variables of interest, as guided by our conceptual model (Fig. 1). Because all 5 dependent variables had substantial ceiling/floor effects, we dichotomized them and modeled the following probabilities: having a score of 5 ("agree") or higher on the BARC (59%) and CEST-SS (51%), having a score of less than 2 ("a little of the time") on the Kessler-6 (50%), having a score of 6 or higher on the single-item self-esteem scale (59%), and having a score of 4 ("good") or higher on the EUROHIS-QOL (47%). We fit this model using the GLIMMIX procedure in SAS, using a binomial distribution and logit link function, where we included RCC as a random effect to account for nesting of observations within centers. We modeled RCC as a random rather than a fixed effect, because the number of RCCs is large, and the sample size per RCC varied (Feaster et al, 2011). The primary predictors of interest were variables capturing RCC exposure (number of years attending the RCC, percent of days attending the RCC in the past 90 days, and length of typical RCC visit). We considered age and length of time in recovery to be time-related confounds in estimating the effect of RCC exposure on RCC outcomes. Thus, in order to examine the effect of RCC exposure on our hypothesized proximal outcomes (i.e., BARC and CEST-SS), we fit 3 successive models. The first model included only variables capturing RCC exposure, the second model added time confounds, and the third model added demographics. Of interest was the consistency of the effect of RCC exposure on RCC outcomes across these 3 models. To describe how much information each successive model step contributed, we calculated McFadden's pseudo-R-squared values for each model, which has been recommended as best capturing the percent of variance accounted for metric captured by r-squared values in linear models (Allison, 2014; Shtatland et al., 2002). We are also reporting Akaike information criterion values, which allow the comparison of models taking the number of predictors into account (smaller values are better).

We used a similar approach to examine the effect on theorized distal effects (quality of life, self-esteem, psychological distress), where we first only tested the impact of RCC exposure, then added variables capturing the hypothesized proximal effects (i.e., recovery capital and social support), then added time confounds, and then demographics.

To minimize the impact of missing demographic data (ranging from 0% on gender to 4% on income), we included "missing" as one of the categories we modeled. To address missing data on continuous variables (ranging from 1% for age to 6% for length of recovery, resulting in 9% of cases being affected by missing data), we used a multiple imputation approach. Namely, using PROC MI in SAS 4.3 we generated 50 imputed datasets, then analyzed these 50 imputed datasets using PROC GLIMMIX, and then combined results using PROC MIANALYZE.

RESULTS

Description of RCC Members

A total of 336 RCC members completed valid surveys (Table 1), with an average of 10.8 ± 6.2 RCC members per RCC (range: 1 to 24). RCC members were on average 41.1 ± 12.4 years of age, equally likely to be female or male, predominantly White (78.6%), with high school or lower education (48.8%), with very limited income (45.2% had less than $10,000 household income in the past year), many without employment (46.1%), and about a quarter reporting current involvement with the legal system (24.1%). RCCs served individuals both in long-term and in early-stage recovery, with participants reporting on average having been in recovery for 4.2 ± 7.2 years (median = 1). A significant minority of the participants did not indicate a primary substance (13.9%). Most commonly reported primary substances were opioids (32.7%) and alcohol (26.8%). The use of multiple substances was the norm (81.0%). Mental health comorbidities were frequent (48.5%), with lifetime diagnoses of mood (37.2%) and anxiety disorders (34.5%) reported most frequently, where PTSD was the most commonly reported diagnosis (24%; see Table 1).

Description of Recovery Community Center Experiences

Participants heard about the RCCs most commonly through family and friends (44.0%), with almost no referrals from criminal justice departments (<1%; see Table 1). On average, participants had been attending their RCC for 2.6 ± 3.4 years, with many having attended for less than 1 year (35.4%). Participants reported attending RCCs frequently, on average 45.5 ± 32.1 percent of the past 90 days (median = 33%). Once there, RCC members spent a substantial amount of time at their RCC, 3.1 ± 2.7 hours per visit on average (median = 2). Participants rated their RCC's helpfulness to recovery and QOL highly (6.2 and 6.1 on average on a 1- to 7-point scale) and felt that there was a strong positive sense of community on all 3 dimensions (5.3, 5.2, and 5.3 on average for self, membership, and entity, on a 1- to 6-point scale).

Recovery Community Center Services' Utilization and Perceived Helpfulness

Of the 23 RCC services (Table 2) identified by RCC directors,[1] the most commonly used services were "all recovery meetings" (64.8%; "all recovery meetings" are a type of open mutual-help meeting that welcomes anyone with any kind of addiction problem regardless of substance), other mutual-help groups (58.6%; e.g., AA, NA, and SMART Recovery), and peer-facilitated recovery support groups (54.2%). Very few participants used childcare (0.9%) and family support (8.0%) services or basic needs assistance (16.4%), but those who did use them valued them very highly (average helpfulness rating of 7.0, 6.4, and 6.4, respectively, on a 1- to 7-point scale). Other than childcare services, RCC services rated as most helpful were opportunities to volunteer/give back to the center (used by 44.3% of the sample, rated as 6.6 of 7 on helpfulness) and recovery advocacy outreach and opportunities (24.1%, 6.5).

Relationship Between Recovery Community Center Exposure and Theorized Proximal Effects on Recovery Capital and Social Support

RCC exposure variables were significantly correlated with several of our theorized RCC outcome variables, as were variables capturing time confounds (Table 3). Of note, as anticipated the number of years attending the RCC was strongly correlated with the numbers of years in recovery ($r = 0.48$).

Systematic model-building approaches (Table 4; also see Fig. 1 for conceptualization of theorized relationships) showed that the RCC exposure variables were significantly related to greater recovery capital. The effects of both length of RCC attendance and frequency of RCC visits remained significant and largely unchanged after adjusting for time confounds and demographics (e.g., for length of RCC attendance: OR = 1.18, 1.16, and 1.15 across the models, respectively). Neither adding time confounds nor adding demographic variables showed additional significant effects.

Effects of RCC variables on social support (CEST-SS) were not found (Table S1). Of note, there were demographic effects, where higher social support was related to being female (OR = 1.75 [1.06 to 2.87], $p = 0.03$), Black (OR = 2.09 [1.04 to 4.21], $p = 0.04$), having a higher education (some college: OR = 2.14 [1.26 to 3.63], $p = 0.005$; college or higher: OR = 2.29 [1.07 to 4.90], $p = 0.03$), and having a higher household income ($50,000 or more: OR = 3.12 [1.05 to 9.27], $p = 0.04$).

Table 2. RCC Services Used and Their Perceived Helpfulness

	Used service		Rated helpfulness	
RCC service	%	(*n*)	Mean	(SD)
All recovery meetings	64.9	(218)	6.1	(1.2)
Mutual-help groups	58.6	(197)	6.1	(1.3)
Peer-facilitated recovery support groups	54.2	(182)	6.1	(1.2)
Opportunity to volunteer/give back to the center	44.3	(149)	6.6	(0.8)
Recreational/social activities	40.8	(137)	6.2	(1.1)
Recovery coaching	37.8	(127)	6.3	(1.2)
Technology/Internet access	27.1	(91)	6.5	(0.9)
Employment assistance	26.5	(89)	5.9	(1.5)
Recovery advocacy outreach and opportunities	24.1	(81)	6.5	(0.9)
NARCAN training and/or distribution	21.1	(71)	6.4	(1.0)
Health, exercise, and nutrition programs	17.0	(57)	6.1	(1.1)
Basic needs assistance	16.4	(55)	6.4	(1.2)
Housing assistance	15.2	(51)	5.8	(1.4)
Medication-assisted treatment	14.9	(50)	5.3	(1.4)
Expressive arts	14.9	(50)	6.2	(1.1)
Education assistance	13.1	(44)	5.8	(1.4)
Mental health support	12.8	(43)	5.9	(1.4)
Family support services	8.0	(27)	6.4	(1.1)
Smoking cessation support	7.7	(26)	5.7	(1.7)
Legal assistance	7.4	(25)	5.6	(1.8)
Health insurance education	5.7	(19)	5.4	(1.5)
Financial services	3.9	(13)	5.2	(2.0)
Childcare services	0.9	(3)	7.0	(0.0)

Helpfulness rated on a 1- to 7-point scale, where 1 = "Not at All Helpful" and 7 = "Extremely Helpful"; only participants who indicated using a service were asked to rate it.

Relationships Among Recovery Community Center Exposure and Theorized Downstream Effects on Quality-of-Life Indices

The results of the systematic model-building approaches (Table 5; see Fig. 1 for conceptualization of theorized relationships), to estimate the impact on theorized downstream effects of RCC exposure, similarly highlighted the role of recovery capital rather than social support. In predicting psychological distress (Table 5)—as measured by scoring 2 ("a little of the time") or higher on the Kessler-6—there was a direct effect of length of RCC attendance on scoring low on distress (OR = 0.90 [0.83 to 0.97], $p = 0.007$). This effect diminished but remained significant (OR = 0.92 [0.85 to 0.998], $p = 0.04$) when hypothesized proximal gains of RCC exposure were added, where scoring high on recovery capital (BARC) was significantly related to lower psychological distress (OR = 0.36 [0.21 to 0.62], $p = 0.0003$). After adding time confounds and demographic variables, only the effect of recovery capital remained significant (OR decreased from 0.36 to 0.33 after adding demographic variables). McFadden R-squared values increased from 0.04, 0.07, 0.08, to 0.12, suggesting that variance in psychological distress was explained in roughly equal parts by RCC exposure ($r^2 = 0.04$), recovery capital (r^2 increase of 0.03), and demographics (r^2 increase of 0.05), but not time confounds (r^2 increase of 0.01). AIC values favored Model 2, which included only RCC exposure and near-future effects (i.e., recovery capital and social support), not demographics.

The overall take-away message looked different for self-esteem (Table S2). Here, there was no effect of RCC exposure on self-esteem, across any of the 4 models. Indeed, RCC exposure variables alone accounted for virtually none of the variance in scoring 6 or higher on the 1- to 10-point self-esteem scale ($r^2 = 0.004$). Both hypothesized proximal effects of RCC exposure, however, were related to self-esteem, with higher recovery capital (BARC) and social support (CEST-SS) scores related to higher self-esteem. These effects were magnified rather than diminished after controlling for time confounds and demographics and were larger for recovery capital (OR = 4.21, 4.29, and 5.27, respectively, across the models) than social support (OR = 2.19, 2.30, and 2.44). Length of time in recovery also emerged as a significant predictor of self-esteem (OR = 1.06 and 1.07, respectively), but the combined effect of the variables measuring proximal effects of RCC exposure explained substantially more variance in self-esteem (McFadden $R^2 = 0.14$ for Model 2, which just included RCC exposure and proximal effects, versus 0.15 after adding time confounds).

Results for quality of life (EUROHIS-QOL) were similar (Table S3). Like the findings regarding self-esteem, there was no direct effect of RCC exposure on QOL, across any of the 4 models, with a McFadden R-squared value of 0.002 for Model 1. Also, like the findings regarding self-esteem,

Table 3. Spearman's Correlations Between RCC Exposure and Potential Benefits

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
RCC appraisal															
1. RCC's helpfulness to recovery	1	**0.86**	**0.61**	**0.56**	**0.61**	0.05	**0.31**	**0.45**	**0.23**	0.00	**0.32**	**0.44**	0.05	**0.22**	**−0.15**
2. RCC's helpfulness to QOL	**0.86**	1	**0.60**	**0.59**	**0.58**	0.06	**0.31**	**0.44**	**0.26**	−0.02	**0.36**	**0.46**	**0.14**	**0.29**	**−0.16**
RCC's sense of community (SCS)															
3. Self	**0.61**	**0.60**	1	**0.82**	**0.83**	0.09	**0.26**	**0.33**	0.10	−0.03	**0.46**	**0.55**	**0.17**	**0.18**	**−0.18**
4. Membership	**0.56**	**0.59**	**0.82**	1	**0.77**	0.07	**0.19**	**0.25**	0.10	−0.01	**0.41**	**0.55**	**0.24**	**0.16**	**−0.20**
5. Entity	**0.61**	**0.58**	**0.83**	**0.77**	1	0.06	**0.24**	**0.29**	0.07	−0.06	**0.36**	**0.48**	0.11	**0.17**	**−0.17**
RCC exposure															
6. Length of RCC attendance	0.05	0.06	0.09	0.07	0.06	1	−0.03	0.00	**0.28**	**0.48**	0.01	**0.16**	**0.12**	**0.18**	**−0.12**
7. % days attended RCC (past 90 days)	**0.31**	**0.31**	**0.26**	**0.19**	**0.24**	−0.03	1	**0.44**	**0.16**	0.00	0.10	**0.19**	−0.04	0.09	**−0.13**
8. Length of typical RCC visit	**0.45**	**0.44**	**0.33**	**0.25**	**0.29**	0.00	**0.44**	1	**0.25**	0.09	**0.11**	**0.18**	−0.04	**0.16**	**−0.11**
Time confounds															
9. Age	**0.23**	**0.26**	0.10	0.10	0.07	**0.28**	**0.16**	**0.25**	1	**0.37**	0.06	**0.15**	−0.09	**0.12**	**−0.19**
10. Length of time in recovery	0.00	−0.02	−0.03	−0.01	−0.06	**0.48**	0.00	0.09	**0.37**	1	−0.02	0.09	0.10	**0.21**	**−0.13**
Hypothesized proximal effect of RCC exposure															
11. Recovery social support (CEST-SS)	**0.32**	**0.36**	**0.46**	**0.41**	**0.36**	0.01	0.10	**0.11**	0.06	−0.02	1	**0.53**	**0.33**	**0.35**	**−0.18**
12. Recovery capital (BARC)	**0.44**	**0.46**	**0.55**	**0.55**	**0.48**	**0.16**	**0.19**	**0.18**	**0.15**	0.09	**0.53**	1	**0.51**	**0.47**	**−0.35**
Hypothesized distal effects of RCC exposure															
13. Quality of Life (EUROHIS-QOL)	0.05	**0.14**	**0.17**	**0.24**	0.11	**0.12**	−0.04	−0.04	−0.09	0.10	**0.33**	**0.51**	1	**0.51**	**−0.47**
14. Self-esteem (single item)	**0.22**	**0.29**	**0.18**	**0.16**	**0.17**	**0.18**	0.09	**0.16**	**0.12**	**0.21**	**0.35**	**0.47**	**0.51**	1	**−0.38**
15. Psychological distress (Kessler-6)	**−0.15**	**−0.16**	**−0.18**	**−0.20**	**−0.17**	**−0.12**	**−0.13**	**−0.11**	**−0.19**	**−0.13**	**−0.18**	**−0.35**	**−0.47**	**−0.38**	1

If significant at $p < 0.05$, marked in bold.

hypothesized proximal effects of RCC exposure were significantly related to quality of life, though in this case only high recovery capital, but not social support, scores were related to scoring a 4 ("good") or higher on the quality-of-life scale. Similar to the effects regarding self-esteem, this effect (OR = 3.66 [2.09 to 6.42], $p < 0.001$) was magnified as time confounds (OR = 4.10 [2.28 to 7.37], $p < 0.001$) and demographic variables (OR = 4.16 [2.26 to 7.67], $p < 0.001$) were added to the model. Unlike results regarding self-esteem, age emerged as a statistically significant predictor of scoring 4 ("good") or higher on the EUROHIS-QOL, with increased age being associated with a lesser likelihood of scoring high on quality of life (OR = 0.96 [0.93 to 0.98], $p < 0.001$). Proximal effects explained more of the variance in quality of life than time confounds (increase in McFadden R-squared of 0.08 and 0.02, respectively).

DISCUSSION

The RCCs model is one of the largest and fastest growing of a new dimension of recovery support services in the United States. This study represents the first systematic attempt to investigate the characteristics of RCC members and benefits derived from participation. As such, the findings offer valuable, but preliminary, insights into who uses such centers, how they use them, what they use, and to what end. Results suggest centers are utilized by an array of mostly White, middle-aged, single, men and women, about half unemployed, and with low financial resources, affected mostly by histories of opioid and alcohol-related impairment and lifetime psychiatric comorbidity. A substantial proportion are legally involved, but very few cite the criminal justice system as a referral source. Members visit RCCs several times per week, on average, spending considerable time at each visit, and report making use of a variety of peer-support group and recreational offerings, as well as available computer and Internet technology, employment aid and linkages, and an array of legal and social services. In support of our theoretical model relating to the benefits of RCC exposure, greater use of RCCs appears to be associated with longer duration of recovery and higher recovery capital (but not social support), which in turn is associated with better quality of life and higher self-esteem and lower levels of psychological distress. As community-based recovery hubs, RCCs

Table 4. Effect of RCC Exposure on Recovery Capital (BARC)

	Model 1			Model 2			Model 3		
	AIC = 434.69			AIC = 437.58			AIC = 446.78		
	r^2 = 0.06			r^2 = 0.07			r^2 = 0.11		
Type of variable Variable	OR	95% CI	sig	OR	95% CI	sig	OR	95% CI	sig
RCC exposure									
Length of RCC attendance (in years)	1.18	(1.07, 1.29)	**	1.16	(1.04, 1.30)	**	1.15	(1.02, 1.29)	*
Percent days attended RCC past 90 days	1.01	(1.00, 1.02)	*	1.01	(1.00, 1.02)	*	1.01	(1.00, 1.02)	*
Length of typical RCC visit (in hours)	1.11	(1.00, 1.23)		1.10	(0.99, 1.22)		1.09	(0.98, 1.23)	
Time confounds									
Age				1.01	(0.99, 1.03)		1.01	(0.98, 1.03)	
Length of time in recovery (in years)				1.00	(0.95, 1.04)		0.99	(0.94, 1.04)	
Demographics									
Gender (female vs. male)[a]							1.55	(0.93, 2.59)	
Sexual orientation (any vs. heterosexual)							0.85	(0.46, 1.58)	
Race (Black vs. White)[a]							1.85	(0.87, 3.95)	
Ethnicity (Hispanic vs. not)							0.90	(0.41, 1.96)	
Education (ref = high school or less)									
Some college or other degrees							1.64	(0.95, 2.85)	
BA or higher							1.51	(0.69, 3.32)	
Income (ref = less than $10,000)									
$10,000 to $49,999							1.48	(0.89, 2.48)	
$50,000 or more							3.15	(1.00, 9.96)	

Modeling the probability of indicating 5 or higher on the BARC items (i.e., 59% of the sample, where 5 = agree, 6 = strongly agree); r^2 = McFadden r-sq.
[a]Other categories modeled, but not shown due to small sample sizes.

Table 5. Effect of RCC Exposure on Psychological Distress (Kessler-6)

	Model 1			Model 2			Model 3			Model 4		
	AIC = 455.36			AIC = 444.79			AIC = 444.85			AIC = 453.02		
	r^2 = 0.04			r^2 = 0.07			r^2 = 0.08			r^2 = 0.12		
Type of variable Variable	OR	95% CI	sig	OR	95% CI	sig	OR	95% CI	sig	OR	95% CI	sig
RCC exposure												
Length of RCC attendance (in years)	0.90	(0.83, 0.97)	**	0.92	(0.85, 1.00)	*	0.95	(0.86, 1.04)		0.94	(0.85, 1.04)	
Percent days attended RCC in past 90 days	0.99	(0.99, 1.00)		1.00	(0.99, 1.00)		1.00	(0.99, 1.00)		1.00	(0.99, 1.01)	
Length of typical RCC visit (in hours)	0.91	(0.83, 1.01)		0.93	(0.84, 1.02)		0.94	(0.85, 1.03)		0.92	(0.83, 1.03)	
Hypothesized near-future effects of RCC exposure												
Recovery capital				0.36	(0.21, 0.62)	**	0.36	(0.21, 0.63)	**	0.33	(0.18, 0.59)	**
Social support for recovery				1.42	(0.83, 2.42)		1.44	(0.84, 2.47)		1.23	(0.69, 2.18)	
Time confounds												
Age							0.98	(0.96, 1.00)		0.99	(0.96, 1.01)	
Length of time in recovery (in years)							1.00	(0.96, 1.04)		0.99	(0.94, 1.03)	
Demographics												
Gender (female vs. male)[a]										1.60	(0.96, 2.66)	
Sexual orientation (any vs. heterosexual)										1.64	(0.89, 3.02)	
Race (Black vs. White)[a]										0.83	(0.42, 1.65)	
Ethnicity (Hispanic vs. not)										1.08	(0.48, 2.43)	
Education (ref = high school or less)												
Some college or other degrees										1.47	(0.84, 2.57)	
BA or higher										0.86	(0.39, 1.88)	
Income (ref = less than $10,000)												
$10,000 to $49,999										0.75	(0.45, 1.25)	
$50,000 or more										2.40	(0.85, 6.80)	

Modeling the probability of having a score of 2+ ("a little of the time") on the Kessler-6 (50%); r^2 = McFadden R-Square.
[a]Other categories modeled, but not shown due to small sample sizes.

may provide a somewhat unique venue and set of services that help to build recovery capital and improve functioning and quality of life.

Of note, in terms of the characteristics of who is using RCCs, findings here suggest RCC participants typically are middle-aged and are comprised equally of men and women.

This suggests that compared to treatment and MHO populations, both of which are comprised of approximately one-third of women (Alcoholics Anonymous World Services, 2015; Center for Behavioral Health Statistics and Quality, 2018), women may be more likely to use RCCs than these other resources. In terms of sexual orientation, approximately 1 in 4 participants identified as something other than heterosexual. This is substantially higher than in the U.S. general population, where surveys estimate national prevalence to be approximately 4.5% (Newport, 2018) and is indicative of the noted overrepresentation of sexual minorities among those with substance-related disorders (McCabe et al., 2013; Medley et al., 2015). This particularly high representation of recovering LGBTQ persons among RCC members, however, may reflect the explicitly warm and accepting social climate of RCCs exemplified in their maxim, "many pathways [to recovery], all are celebrated," which may implicitly extend beyond substance use to help recovering LGBTQ persons feel less judged and more welcome at RCCs.

Also, RCC members appear, in general, to have low financial resources, to be unemployed or employed part-time (less than 20% were employed in full-time work), and less than half as likely as the general U.S. population to have a bachelor's degree (United States Census Bureau, 2017; 14.3% vs. 33.4%). For many entering recovery, finding a job and/or finishing or beginning fresh educational goals are important near-term objectives and many RCCs appear to explicitly concern themselves with facilitating these tasks. These also were rated high in helpfulness to recovery by RCC members.

In light of the current opioid crisis, it is encouraging to see RCCs being utilized particularly by those with primary opioid problem histories. The other major primary substance reported by RCC members was alcohol. Given the comparatively much smaller proportion of those in the population meeting criteria for opioid use disorder compared to alcohol use disorder in any given year (e.g., National Survey on Drug Use and Health; Substance Abuse and Mental Health Services Administration, 2019)—despite the current opioid crisis—this suggests that RCCs may play a particularly valuable role for those suffering from primary opioid problems who tend to be in need of more services (Hoffman et al., 2019), feel more stigmatized (Earnshaw et al., 2019), and have been shown to have lower recovery capital and quality of life compared with those with primary alcohol problems when beginning recovery (Kelly et al., 2018).

In terms of referral sources to RCCs, by far the largest was through family and friends. Only about 15% of participants reported being referred by a treatment program, and almost no one was referred from criminal justice settings. This is somewhat surprising and may reflect lack of knowledge of the existence or purpose of RCCs. Given the high relapse and recidivism rates following treatment or incarceration and the potential benefits observed here, it is plausible that increasing treatment and criminal justice system referrals to RCCs could enhance remission rates by helping individuals build recovery capital. This should be an endeavor of future research.

Noteworthy, also, was that a significant minority (31.3%) of RCC survey participants reported being in recovery for less than 1 year, with the largest proportion having 1 to 5 years (42.6%), and roughly 1 in 5 having more than 5 years. This suggests that RCCs may offer value not only to those in the initial stages of recovery—where one might expect—but also to those with more stable lengths of recovery, particularly those in the first 1 to 5 years where other studies have found there appears to be a much greater need for the acquisition of recovery capital and gaining improvements in indices of quality of life and psychological well-being (Hoffman et al., 2019; Kelly et al., 2018). It is of course possible that these estimates could be an artifact of the opportunistic sampling strategy used in this study (see Limitations section below for more details), whereby it is plausible that members in more stable recovery were more likely to fill out the online survey, and thus be overrepresented. While we cannot determine this directly, estimates here appear similar to those estimated by RCC directors reported previously (Kelly et al., in press).

The frequency of RCC attendance was high, and the length of typical visits was quite long. Some of this may be accounted for by peer-support group meeting attendance (which tend to last 60 to 90 minutes), but regardless, the high frequency of RCC exposure suggests RCCs are perceived as an attractive and safe venue, whether to attend peer-support group meetings, obtain other services, or otherwise to spend considerable time in the early months and years of recovery. This high participation rate is reflected in the high overall helpfulness ratings given by members for RCCs being helpful for both recovery and enhancing quality of life.

The types of services used by participants were wide-ranging, but most frequently were various types of peer-led recovery-focused mutual-aid meetings. The use of recovery coaches and recreational offerings were also common. All of these, individually, were rated as highly helpful to recovery. Of note also was that volunteering at the RCC was commonly reported and was rated the highest in terms of helpfulness to recovery (apart from "Childcare services" which was rated higher but only used by $n = 3$ participants). RCCs, thus, appear to provide a forum for a high degree of reciprocal social dynamic interplay with members both receiving and giving help. This social exchange appears to be well-liked and may be one of many inherent rewarding therapeutic milieu elements of RCCs. Another service often used and rated highly was technology/Internet services. This may reflect the low-income population who may not be able to afford their own computer and Internet access. Anecdotally, we have found that RCCs help provide assistance in constructing resumes and cover letters for job applications as well with printing and copying, and having access to technology to accomplish this can be invaluable for many. NARCAN overdose training and distribution was also relatively common and rated highly. Medication-assisted treatment

("MAT") was rarely provided directly at RCCs (less than 15% of centers), yet was rated generally quite high, but not as high as most other used services.

Finally, in terms of our theorized conceptual model, it was found that greater RCC exposure was associated with greater accrual of recovery capital, but not social support; yet, both recovery capital and greater social support were associated with theorized higher levels of quality of life, self-esteem, and lower psychological distress (Kelly and Hoeppner, 2015). The observed positive significant association between RCC exposure and greater recovery capital but no significant relationship between RCC exposure and increased social support suggests that one specific function of RCCs may be to provide access to the various aspects of recovery capital which cannot be accessed through MHO participation or formal treatment alone. Thus, as noted above, while RCCs do in fact appear to provide a venue for a great deal of recovery-specific social support (e.g., through a variety of group meetings/volunteering), which are rated as highly valuable by RCC members, it may be that the other services provided, such as technology/Internet (to construct resumes and cover letters), and employment, housing, and basic needs assistance, are elements that are more directly and uniquely acquired from RCC participation.

Limitations

Findings from the current study should be considered carefully in light of significant limitations inherent in the study design. This study captured 95% of existing RCCs in a given U.S. region (i.e., New England and NY State) in 2017, but generalizability of results to the larger population of RCCs in other U.S. regions and across the nation should be made cautiously. Also, this was a survey study where RCC members were notified of the opportunity to participate and certain members elected to participate. Thus, sampling was opportunistic and not purposeful. As a result, and because few formal records of RCC membership are kept, the generalizability of the findings from this convenience sample, to RCCs as a whole, is unknown. Such limitations are inherent in any cross-sectional study design but are important to keep in mind when generalizing from studies such as this. Important also is the fact that data are cross-sectional, and while allusions may be made to prospective associations (e.g., as depicted in our theorized model), future longitudinal research is needed to confirm whether relationships among variables detected herein still hold true when the same people are followed and assessed over time.

CONCLUSIONS

RCCs are growing across the United States as central recovery hubs intended to facilitate the building of recovery capital and provide strong, recovery-specific, social support. Findings here suggest RCCs may be of particular help to those more vulnerable individuals beginning recovery from substance use disorder who have few resources and low recovery capital. That said, they appear to offer value to many others in the early years of recovery stabilization and beyond. The nature and specificity of the recovery value conferred by these centers await confirmation through more rigorous controlled investigation, but the preliminary findings here suggest RCCs may provide a unique function in helping participants build recovery capital and thereby increase quality of life and self-esteem, and decrease psychological distress.

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CONFLICT OF INTEREST

The authors report no conflicts of interest.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Table S1. Effect of RCC exposure on social support.

Table S2. Effect of RCC exposure and hypothesized mechanisms on self-esteem.

Table S3. Effect of RCC exposure and hypothesized mechanisms on quality of life.