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Research Article

A Pilot Randomized Controlled Trial Evaluating Peer Recovery Coaches for Addiction Recovery among Indigenous Americans

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Abstract

Addiction is a common and devastating problem among many Indigenous American (IA) groups around the United States. Too few IA health care providers are available to deliver care in a way that leverages IA values and traditions to support addiction recovery. Peer Recovery Coaches (PRCs) are individuals who have lived experience of addiction and have received specialized training in helping others in recovery. IA PRCs hold significant potential in helping to fill the gap of culturally-specific support in addiction. In this feasibility trial, we recruited a total of 120 adult (≥19 years) IAs with a substance use disorder through Facebook advertisements. Ninety participants were randomized to the PRC (experimental) group which received support from PRC and 30 to the Attention-Control (AC) group which received support from research nurse. Both groups received weekly support for 12 weeks. Participants completed weekly surveys during the 12-week intervention and monthly surveys during a three-month follow-up phase. The two groups had similar quantities of alcohol consumed, days of alcohol use, and days of drug use except that the PRC group had fewer days of alcohol use in the first three weeks of the intervention phase (2.05 days v. 3.5 days, p=0.04). We found that "support and advocacy" was the most common intervention provided by the PRC. The PRC intervention was widely accepted and appreciated by individuals who completed the program with 79% of individuals giving positive feedback regarding the PRCs and the remaining 21% giving neutral feedback. This trial provides some insights upon which future trials can draw to further evaluate the potential of PRCs in this hard-to-reach population with a high level of need. Trials or programs that rely on national recruitment may be successful in reaching a sufficient number of individuals but they may lack the more intensive in-person capacity that will likely help with retention. Despite this limitation, the current pilot demonstrated that racially-concordant PRC services likely have a high degree of acceptability among IA populations. Future studies may draw on these findings by having trained IA coaches recruit and work with individuals in-person to assist with higher levels of retention.

Substance Use among Indigenous Americans

Indigenous Americans (IAs) often have the highest mortality rates from substances including alcohol, opioids, and multiple substances [1]. IAs die from alcohol-related causes at a rate that is almost five times greater than that of whites [2,3]. The 2021 National Survey on Drug Use and Health found that 36.1% of IAs used illicit drugs compared with 24.3% of African Americans, 22.5% of whites, 19.4% of Hispanics, and 11.1% of Asians [4]. IAs also had the highest rate of substance use disorders at 27.6% compared with 17.2% of African American, 17% of whites, 15.7% of Hispanics, and 8% of Asians [4]. Furthermore, IAs had the highest proportion in need of substance treatment at 28.7% compared with 16.4% of African Americans, 15.9% of whites, 15% of Hispanics, and 7.7% of Asians [4]. The high rates of alcohol and drug addiction among IAs are devastating communities across the country to the point that it threatens the very existence of once-thriving groups. Despite having some of the highest rates of addiction of any ethnic group, IA traditions and culture can foster resiliency [5]. These strengths are often unmatched in groups that have lost many of their traditional ways or which have substance use as a long-standing tradition [6]. Validating and building on the knowledge that can be protective for IA communities has become a valuable asset in suicide prevention [7], education [8], and substance use prevention [8-10]. Frequently, non-IA providers do not have the knowledge and ability to incorporate the traditions, cultural practices and values of IAs into their plan of care for addiction.9 Peer Recovery Coaches (PRCs) have a significant potential to fill this gap.

Role of Peer Recovery Coaches

Scholars have made explicit calls in the literature for action to address disparities among IA populations [11]. Of the many documented mental health disparities among IA communities, several programs have targeted substance use prevention [12,13]. Programs have shown the effectiveness of using unique culturally-grounded programming to address substance use for IA people [14]. The work thus far has largely targeted IA youth [15-18] and fewer projects have focused on adult IA populations. PRCs are individuals who have had problems with addiction themselves but who have established a period of sobriety (at least 12 months in this pilot). They receive specialized training in how to help individuals initiate and maintain the process of long-term recovery. Expected outcomes include fewer relapses, improved quality of life, increased resiliency, improved health, and higher levels of general wellbeing. PRCs encourage individuals to live self-directed lives and set goals to realize their full potential. Coaching services are person-centered to support the dignity, self-advocacy, and empowerment of the individual. The PRC-patient relationship differs from many other relationships in healthcare in that the lived experiences are both shared and discussed openly as a framework for mutual understanding.

PRCs can provide a wide variety of support services, depending on the unique needs of each patient. They may help an individual navigate and access formal and informal community resources. PRCs seek to build on the individual's strengths to empower them with self-help skills. They may also assist individuals in accessing treatment and joining self-help groups. PRCs can educate on issues such as healthy personal relationships, individual rights, and the importance of shared decision making. PRCs provide a positive role model by sharing experiences, skills, strengths, supports, and resources they have found helpful in their own recovery. One of the most critical elements of the relationship is that PRCs meet patients "where they are" with no prerequisites other than a desire to progress in recovery. PRCs may work with patients to develop and periodically revise individualized recovery plans.

The role and responsibilities of PRCs have not been defined consistently. However, PRCs have some similarities to Community Health Workers (CHW) but the two are differentiated by the important distinction that PRCs have similar lived experience to those they are serving [19]. PCR interventions can broadly be divided into: 1. support and advocacy, 2. role modeling, and 3. facilitate change. PRCs have critical lived experience that can help them relate to individuals in recovery in ways that no amount of training can provide. Lastly, PRC services are sometimes billable through Medicaid and other insurers so patients can benefit from added support at little or no cost to themselves or clinics with limited resources.

Interest in PRCs has grown in recent years despite the fact that the evidence for their efficacy is limited [20]. One systematic review concluded that PRCs used in addiction were associated with increased treatment adherence and reduced relapse rates [21]. However, another systematic review examining the use of PRCs in all areas of mental health found no significant difference in outcomes associated with the intervention [22]. It is difficult to draw larger conclusions from the results of studies for three primary reasons. First, studies have recruited participants in widely varying situations including people with specific health issues (e.g. HIV infection), mental illness, Veterans, people in prison, people involved in the criminal justice system at-large, people receiving opioid treatment, and others. Second, research has examined a wide variety of outcomes including reduced relapses, coaching/support engagement, improved mental or general health, engagement in legal process, rearrests, school enrollment, employment, housing, acute healthcare treatment, self-efficacy, motivation, and initiation/maintenance of addiction, psychiatric, or medical treatment. Third, the nature of PRC involvement has varied significantly, ranging from a single phone call to frequent meetings over six months. Few randomized controlled trials have been completed with more quasi-experimental, retrospective, and single-group analyses.

Conceptual Model

While exact mechanisms by which PRCs help individuals in the process of recovery have yet to be identified in research [21], theoretical models informed by PRC training programs have provided some initial insights. However, another challenge is that training programs can vary significantly across states and agencies. Research produced since this program started have found that PRCs often provide services of navigation and increasing motivation, stress management and developing coping skills, emotional support and case management, and education [23]. Based on the program provided to the PRCs trained for this trial, we asked the coaches to classify the services they provided in each interaction as supporting and advocating, role modeling, and facilitating change (see the first level in Figure 1). We next hypothesized that the PRC interventions may impact multiple intermediary factors we could measure throughout the study. These factors include cravings management [24-31], substance self-efficacy [10], and motivation [32,33]. Cravings have been found to play a role in relapse risk in alcohol, opiates, cannabis, methamphetamines, and cocaine addiction. In addition to its direct effects, self-efficacy has a moderating influence on cravings and an individual's response to them [24-31]. Individuals with low self-efficacy often have a diminished capacity to resist cravings and have more difficulty adapting to environmental stressors and substance cues [25,26]. Lack of motivation to quit has also been associated with in increased risk of relapse [33]. Additionally, individuals who are more motivated to stop using a substance are less responsive to relapse cues and cravings [27-31].

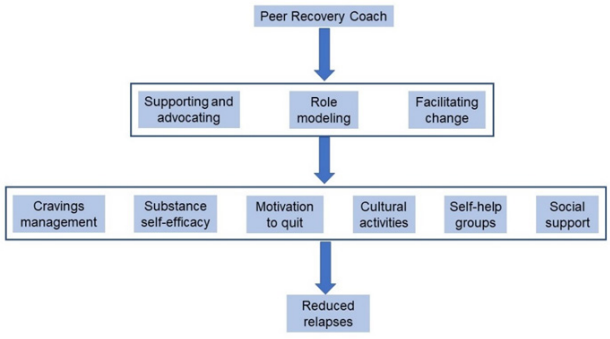

Figure 1: Conceptual model.

Based on the cultural background shared between the PRC and participant, we hypothesized that PRC interventions would increase participant engagement in cultural activities. Following the "culture as treatment" model, we anticipated that increased engagement in cultural activities would reduce the risk of relapse [34,35]. We also hypothesized that PRCs might help reduce the risk of relapse by encouraging or facilitating participants to attend self-help groups (e.g. Alcohols Anonymous) [36,37]. Previous research has identified social support as an important factor in addiction recovery [38,39]. The PRCs were trained to help participants identify and connect with social supports which we hypothesized would reduce the risk of relapse. The primary outcome in the conceptual model we developed for this study was relapse (see Figure 1). Numerous factors have been identified that have an impact on a person's risk for relapse. Relapses often occur in response to cravings with which the individual is unable to cope.

Literature Review

Very few PRC trials have been conducted among IAs so most conclusions must be drawn from studies conducted in the general population. Several trials have examined peer services in participants recruited in the community or primary care settings. In community-based trials, PRCs have been associated with greater support engagement [40], substance treatment initiation/maintenance [41], improved mental health [41], reduced hospitalization [42], reduced alcohol use [43] but not other drug use [43] or reduced arrests [43]. In primary care settings, PRC support has been associated with increased medical service engagement [44], school enrollment and employment [44], housing stability, and reduce relapses [44]. PRC services for people identified in emergency departments have been associated with increased substance treatment initiation/maintenance in some trials [45-47] but not others [48].

Due to high rates of recidivism, there has been special interest in peer services for people involved in corrections systems. Individuals receiving peer support in corrections have shown improved mental/physical health, increased self-efficacy/motivation, and reduced relapses [49]. Individuals engaged legal proceedings have shown better legal process engagement/reduced rearrests [50,51], improved housing stability [52], improved mental/physical health [52], and improved substance treatment initiation/maintenance and reduced relapses in some analyses [52] but not all [50].

Several trials have examined the impact of peer services for individuals recruited in healthcare settings. PRC services in addiction treatment centers have been associated with increased maintenance in substance treatment [53-55]. Some trials of individuals recruited in general hospital units have shown reduced hospitalization and emergency department use [56] but others have failed to support this conclusion [57,58] in addition to finding no impact on reduced relapses [58]. Among individuals recruited during hospitalization for mental health problems, one trial found reduce hospitalization, reduced alcohol relapses, and improved substance treatment initiation/maintenance but not improved mental health [59].

Additional trials have examined specific populations. Trials with veterans have shown increased engagement with support services, improved substance treatment initiation/maintenance, more engagement with medical and mental health treatment, and reduced relapses on drugs [36,60,61] but not alcohol [61]. Among IAs, an observational analysis found improved employment, housing stability, and reduced relapses among individuals completing the support program [62].

Attrition in trials is another significant challenge in interpreting the impact of PRC support. A number of trials and observational analyses have shown positive results in people who complete the designated program. However, the status of those who did not complete the program is often unknowable and would almost certainly reduce the effect size. One trial among IAs, for example, showed reduced substance use among individuals who completed a six-month program but had a 71% attrition rate [62]. An analysis of a large cohort in a treatment setting found that only 20% of individuals completed a 30-day program [63]. In another analysis of 1,208 patient encounters in an emergency department, PRCs were able to complete at least one follow up with only 23% of individuals [64]. In practice settings, adherence varies significantly and most often ranges between 33%40,65 and 66%.66 Some programs have shown much higher rates of adherence but these are most often in conjunction with much more intensive interventions such as methadone treatment which make them incomparable with PRC services alone [53,67].

Most research on PRC services has been conducted in the general population rather than among IAs so caution must be taken in applying general findings to this specific population. IAs struggling with addiction often share many qualities with non-IAs so it is likely that many conclusions from the general population would also apply to IA groups. However, one aspect of coaching that has yet to be examined is racial concordance between the coach and the individual. Patient-provider concordance has been shown significant in other aspects of healthcare [68,69]. Concordance may have an even greater impact in a coaching relationship where shared experiences are much more important than in provider-patient relationships [70]. Given the lack of information on IA PRC services, this study sought to lay the foundations for applying these support services to a sample of IAs seeking support to recovery from addiction.

Specific Aims

Aim 1

To evaluate the feasibility of implementing a PRC intervention compared to an Attention Control (AC) group of IAs recovering from alcohol/drug addiction on:

a) Enrollment
b) Attrition and
c) Acceptability

We hypothesize that an IA PRC intervention will have sufficient enrollment, attrition, and acceptability.

Aim 2

To compare AC and PRC group participants on the primary outcome of relapses and secondary outcomes of cravings, substance self-efficacy, quality of life, motivation, and sobriety activities. Relapse was measured by weekly self-reported alcohol/drug use surveys. Associated factors were measured through weekly surveys during the intervention phase and monthly surveys during the follow-up phase. We hypothesize that the PRC group will trend towards fewer relapses.

Aim 3

To measure and evaluate strategies used by the PRC to prevent relapse including:

a) Support and advocacy
b) Role modeling
c) Facilitating change and
d) Recovery plan

Materials & Methods

Design

We used a prospective, randomized, attention-controlled trial with 120 community-dwelling participants with a substance use disorder. The ninety participants randomized to the experimental group received a PRC while the remaining 30 in the attention control group received a research nurse. A three-to-one ratio favoring the experimental group was intended to provide more data about PRC strategies and feedback from participants than would have been possible with an equal allotment.

Pre-COVID Recruitment

Starting in November 2020, recruitment initially took place in collaboration with three IA agencies serving IAs in Nebraska including an urban health clinic, a tribal-based agency, and an independent rural organization. The original protocol stated that participants would be recruited from two urban areas, one reservation, and four smaller towns in Nebraska. Recruitment was significantly lower than expected based on conversations with the agencies. Two individuals completed consent forms and neither proceeded to participate in any study activities. However, weeks after enrollment was opened, COVID significantly reduced the activities of all three organizations. The lack of in-person contact at the agencies impaired their ability to present this opportunity to the people they serve.

Original inclusion criteria included living in one of the two urban areas, on the identified reservation, or in one of the four towns served by the agencies, meeting criteria for a substance use disorder with the most recent use being within the last 60 days, and self-identifying as IA. Individuals were excluded if they were in an inpatient or intensive outpatient program or if the PI determined they needed acute detoxification care.

Intra-COVID Recruitment

In early 2021, once CVOID levels in Nebraska reached the point that the university Institutional Review Board prohibited almost all in-person research, the research team decided to switch strategies. The trial moved to national recruitment to open the trial to a larger potential pool of individuals. All elements of the trial were switched to distance-only interactions (i.e. phone calls, video conferencing, and on-line surveys) to allow the study to proceed during COVID restrictions. We recruited individuals through advertisements on Facebook. The original inclusion criteria were retained with the exception that people living throughout the United States were now eligible. The original exclusion criteria were also applied with the additional restriction that individuals living on a reservation could not participate without tribal approval. We contacted three tribal councils of interested individuals but were unable to secure the approval of the tribal council.

Enrollment procedure

People who learned of the study through Facebook would either message study staff (most common), call, or e-mail for more information. The PI then arranged a phone call. During this meeting, the PI (a psychiatric nurse practitioner) asked the individual to describe their experience with substances to ensure they met criteria for a substance use disorder. He also screened for the other inclusion/exclusion criteria. Once any questions were answered and understanding was ensured, the PI gave the individual the chance to complete an informed consent (through mail initially and later through DocuSign once the IRB approved this process). The retention plan focused primarily on the weekly contact with the assigned support person and the weekly gift card sent for filling out each survey. It was hoped that more frequent contact over the 12-week intervention phase would help sustain response rates through the three-month follow-up period.

Sample size

With an expected prevalence (relapse rate) of 50% in the control group and 20% in the PRC group, a three-to-one allocation ratio favoring the PRC group, and an alpha of 0.05, we would need 72 participants in the PRC group and 24 in the control group to achieve 80% power to detect a difference of 30% in relapse rates between two groups using a two-sided Chi-square test. Based on a previous project completed with the Nebraska Urban Indian Health Coalition (NUIHC) in Omaha [71], we expected a dropout rate of up to 20% requiring a total initial sample size of 120. In this feasibility study, we recruited a total of 120 participants (90 in the PRC group and 30 in the AC). Due to the lack of information on PRCs among IAs, the unequal distribution was intended to provide more data that could be used to form greater insights into PRCs in this population. For example, had the attrition rate not been so high, we may have had some preliminary results reporting which PRC interventions were associated with greater progress in recovery (see Figure 2 for Consort diagram).

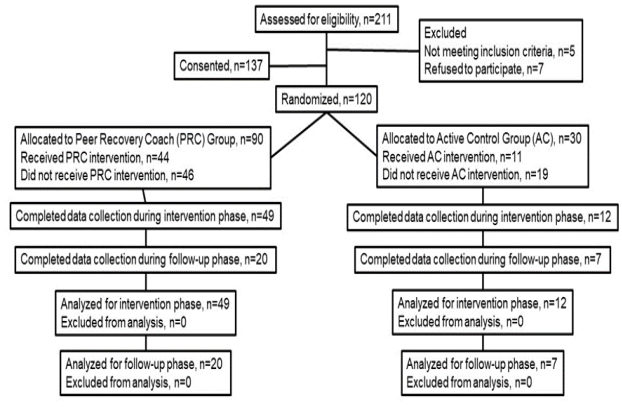

Figure 2: Consort diagram.

Intervention

Using a sequence of randomly generated numbers, 90 participants were assigned to the PRC group and 30 the AC group (see Figure 3). Participants in the PRC group were assigned a PRC who arranged a meeting over the phone or video conferencing once a week for 12 weeks. The PRC used the assessment skills they learned in the training to

identify the priority addiction needs and recovery goals of the participant. Consistent with PRC practice and in order to be the most responsive to the participants dynamic status, PRCs were then given the freedom to conduct ongoing informal assessments and alter plans as needed. PRCs could also use any combination of the interventions taught in the training based on the participant's responses and needs. The PRCs used strategies broadly identified as support and advocacy (connect to resources, coach on how to identify one's own needs and access resources, advocate for peer in treatment/community), role-modeling (share experiences, model recovery, demonstrate effective decision-making), facilitating change (motivation, highlighting strengths and resources, facilitate change through goal setting/education/skills building), and developing a recovery plan using templates available on various internet sites.

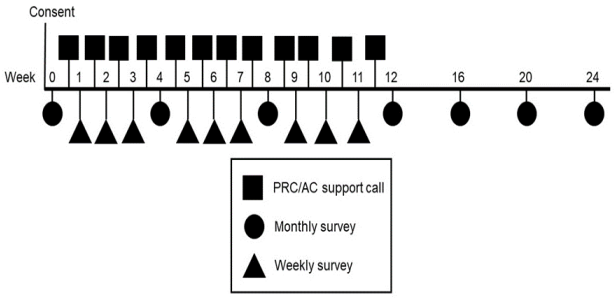

Figure 3: Study timeline.

Participants in the AC group were assigned to a nurse who also arranged a meeting over the phone or video conferencing once a week for 12 weeks. The nurse provided healthy lifestyle counseling focusing on nutrition and physical activity based on resources from the World Health Organization. He had received training in brief strategies including assessing readiness for change, motivational interviewing, assisting with setting goals, and tracking progress towards those goals. The research nurse was instructed to keep the discussion limited to nutrition and physical activity and specially to avoid addressing addiction or more general progress (e.g. employment) as these may be similar to the services provided by the PRCs.

Data collection

Participants completed on-line surveys on REDCap at baseline, weekly during the 12-week intervention, and monthly during the three-month follow-up period for a total of up to 16 surveys. PRCs completed a REDCap survey about their session after every meeting with a participant. The last follow-up data collection was completed in June, 2022. At baseline, we collected demographics and substance use history (each substance used, age of first use, problem substances, age at which each substance became a problem, number and type of treatments, number of quit attempts, and longest period of sobriety). During each survey we asked participants to detail the substances they used, the number of days of use, and the overall quantity since their last survey. Each weekly survey also included the Brief Craving Scale in addition to the number of minutes spent in sobriety activities (in cultural activities/practices, in self-help groups, or with family/friend supportive of their sobriety). The baseline and monthly surveys (administered during both the three-month intervention and the three-month follow-up) included the Circumstances, Motivation, and Readiness Scale and the Alcohol/Substance Abstinence Self-Efficacy Scale.

After each session between the assigned coach and participant, the coach filled out a REDCap survey in which they detailed the length of the session, whether the session took place over the phone or video conferencing, and which interventions the coach used. During the PRC training, coaches were educated on the various interventions they could provide as PRCs and how to document these interventions accurately [72]. After each coaching session with a participant, the coach filled out a REDCap survey where they were asked to detail which interventions they provided. The broad categories included support and advocacy, role modeling, facilitating change, and developing/revising a recovery plan. Coaches who selected one of the first three interventions were then prompted to give more detail. For "support and advocacy," they could specify connect to resources, coach on how to identify own needs and access resources and/or advocate for the participant in treatment/community. For "role modeling," they could select share experiences, model recovery, and/or demonstrate effective decision-making. For "facilitating change," they could specify motivation, highlight strengths and resources, and/or facilitate change through goal setting/education/skills building.

Data cleaning

The need for data cleaning was minimized through the use of REDCap features in online surveys. Most questions in the instruments were entered in multiple-choice format. Questions of asking for a number (e.g. number of drinks in the past week) used a sliding bar. Text responses (e.g. tribe, city/state of residence) were assessed manually and no unclear responses were identified. The type of work usually performed by the participant was also assessed manually and categorized according to the International Standard Classification of Occupations [73]. To account for sporadic addiction recovery progress that may not be accurately reflected in a single timepoint, means of measures were calculated in the first three weeks of the intervention, the final three weeks of the intervention, and the three months of follow-up data.

Statistical analysis

The characteristics of patients were compared between two groups using Student's t-tests or Welch's t-tests for continuous variables and Fisher's exact tests or Chi-square tests for categorical variables. Nonparametric Wilcoxon rank-sum tests were used to compare continuous outcomes measured from the survey between control and PRC groups due to skewed distribution or small sample size. Time to attrition was plotted using the method of Kaplan-Meier and compared between groups using a log-rank test. A value of $p < 0.05$ was considered to be statistically significant.

Aim 1: To evaluate the feasibility of implementing a PRC intervention compared to an AC group of IAs recovering from alcohol/drug addiction. Enrollment, attrition, and acceptability were analyzed using descriptive statistics. Qualitative analyses were performed on responses to open-ended questions.

Aim 2: To compare AC and PRC group participants on prevention of relapse in IAs recovering from alcohol/drug addiction. The primary baseline and outcome variables, number days of self-reported alcohol/drug use and the number of alcoholic drinks consumed in the past 30 days at baseline, the mean of the first three weeks of intervention phase, the mean of the last three weeks of the intervention phase, and the mean of all three months of the follow-up phase were compared between the PRC and AC groups using Wilcoxon Rank Sum tests. Survey questions included "On how many days in the past 30 days have you used drugs?," "On how many days in the past 30 days have you used alcohol?," and "How many alcoholic drinks have you had in the past 30 days?"

Aim 3: To analyze strategies the PRC reported using to prevent relapse collected in a survey including: a. support and advocacy, b. role modeling, c. facilitating change, and d. recovery plan development. PRC strategies were analyzed using descriptive statistics and qualitative analyses.

Results

Demographics

The only significant demographic differences between the groups were in the years of education and history of ever smoking (see Table 1). The overall sample had a mean age of 40 years and more females than males enrolled in both groups. The experimental group had a greater mean number of years of education than the control group (13.29 years v. 12.6 years, respectively, p=0.045). Individuals from Great Plains tribes represented approximately 50% of both groups followed by the southwest, other regions, and the southeast (see Figure 4). Most participants identified as multiracial with the majority also identifying as white. Most participants were enrolled in a tribe. Approximately half of participants reported being single and roughly 20% of each group as married. One third of participants reported currently being in counseling. Approximately 20% of each group reported typically engaging in work that would be classified as high skill (managers, professionals, technicians, and associate professionals), with approximately 40% reporting medium skill work and the remaining third reporting low skill work. A higher proportion of the control group reported ever smoking (90% v. 66.7%, p=0.013) but the difference in those who reported currently smoking was not significant.

Table 1: Demographics.

	PRC (n=90)	AC (n=30)	P-Value
	Number (SD/%)		
Age	41.08 (10.15)	40.53 (8.37)	0.791
Age groups			
19-33 years	24 (26.7%)	6 (20.0%)	0.532
34-40 years	21 (23.3%)	11 (36.7%)	
41-47 years	23 (25.6%	6 (20%)	
48 years and older	22 (24.4%)	7 (23.3%)	
Female	62 (68.9%)	19 (63.3%)	0.574
Education in years	13.29 (2.03)	12.6 (1.4)	0.045*
Education groups			
Less than HS	13 (14.4%)	4 (13.3%)	0.134
HS	22 (24.4%)	13 (43.3%)	
Some college	55 (61.1%)	13 (43.3%)	
Tribal Region			
Southwest	20 (22.2%)	10 (33.3%)	0.652
Great Plains	46 (51.1%)	14 (46.7%)	
Southeast	7 (7.8%)	2 (6.7%)	
Other	17 (18.9%)	4 (13.3%)	
Race in addition to Indigenous American			
White	74 (82.2%)	21 (70%)	0.153
African American	8 (8.9%)	3 (10%)	0.99
Other	3 (3.3%)	2 (6.7%)	0.598
Multiracial	75 (83.3%)	23 (76.7%)	0.414
Ethnicity in addition to Indigenous American			
Hispanic	2 (2.2%)	0 (0%)	0.99
Enrolled in Tribe	76 (85.4%)	27 (90%)	0.758
Marital status			
Single	44 (48.9%)	16 (53.3%)	0.613
Married	21 (23.3%)	6 (20%)	
Widowed	4 (4.4%)	1 (3.3%)	
Divorced	18 (20%)	4 (13.3%)	
Separated	3 (3.3%)	3 (10%)	
Current work			0.214
Full-time	24 (26.7%)	4 (13.3%)	
Part-time	12 (13.3%)	3 (10%)	
Occasional	4 (4.4%)	4 (13.3%)	
Unemployed	36 (40%)	16 (53.3%)	
Disabled	14 (15.6%)	3 (10%)	
Categorical Occupation[1]			
Skills level 3 and 4 (high)	18 (20%)	7 (23.3%)	0.764
Skills level 2 (medium)	34 (37.8%)	13 (43.3%)	
Skills level 1 (low)	34 (37.8%)	10 (33.3%)	
Other	4 (4.4%)	0 (0%)	
Currently in counseling	32 (35.6%)	9 (30%)	0.579
Currently in counseling for addiction	14 (15.6%)	7 (23.3%)	0.33
Ever smoked regularly	60 (66.7%)	27 (90%)	0.013*
Currently smokes	31 (34.4%)	12 (40%)	0.583

Source: *-Statistically significant at p<0.05
1-Categorical occupations:
High skill: managers, professionals, technicians and associate professionals
Medium skill: clerical, service, skilled trade, operator
Low skill: Elementary occupations.

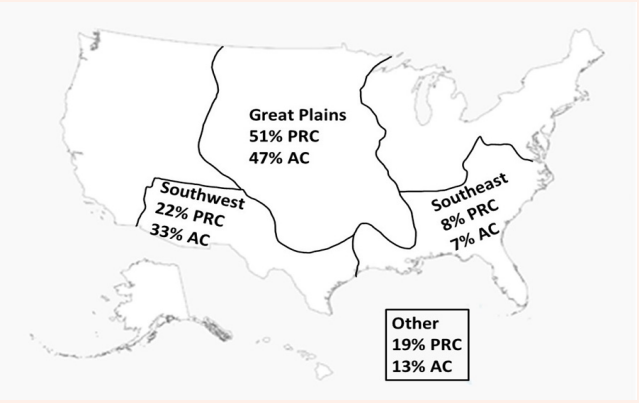

Figure 4: Tribal regions.

Aim 1: To evaluate the acceptability and feasibility of implementing a PRC intervention compared to an AC group of IAs recovering from alcohol/drug addiction. As is common in studies focusing on addiction, there was a significant amount of attrition during the trial (see Figure 5). It is likely that attrition increased significantly after week 12 especially in the PRC group as the weekly coaching ceased at that time. The log-rank test revealed that there is no difference in time to attrition between PRC and control groups (median time in weeks to attrition with 95% CI: 10.5 (4-24) for control, 16 (10-16) for PRC, p=0.85). There were no significant demographic differences between participants who were lost to follow up before week 12 and those who completed week 12 or beyond (see Table 2).

Table 2: Attrition characteristics.

	<12 weeks (n=59)	12 weeks or more (n=61)	P-value
Age Mean (SD)	40.46 (10.5)	41.41 (9)	0.59[1]
Age groups, n (%)			0.77[2]
19-33 years	16 (27.1%)	14 (23%)	
34-40 years	17 (28.8%)	15 (24.6%)	
41-47 years	12 (20.3%)	17 (27.9%)	
48-99 years	14 (23.7%)	15 (24.6%)	

Sex, n (%)			0.14[2]
Female	36 (61%)	45 (73.8%)	
Male/other	23 (39%)	16 (26.2%)	
Education groups, n (%)			0.26[2]
less than HS	10 (17%)	7 (11.5%)	
HS	20 (33.9%)	15 (24.6%)	
some college	29 (49.1%)	39 (63.9%)	

Source: [1]Equal variance two sample t-test p-value
[2]Chi-Square test p-value.

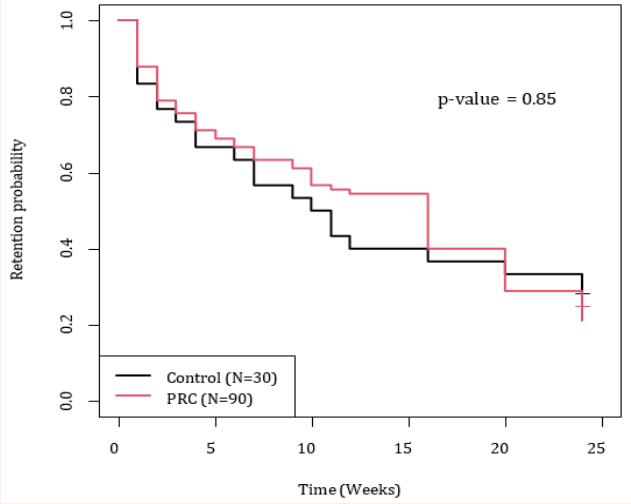

Figure 5: Study attrition by group.

The qualitative feedback from the participants who completed the final interview was largely positive regarding the PRCs. Fifteen of the nineteen (79%) codable responses on the support received from the PRCs were positive with the remaining four responses (21%) being neutral. All participants responded that working with their PRC posed little or no burned on them. Sixteen of the eighteen participants (89%) who provided codable responses on the value of having a PRC stated it was positive with the remaining two (11%) stating the value was neutral. When asked to describe the role of their PRC, the majority of participants cited positive aspects such as support, listening, guidance, advice, and insight. Twenty-two of the twenty-three participants (96%) stated they did not have to give up anything to work with their PRC with the last one (4%) noting they had to give up some family time. Fifteen of the nineteen (79%) participants stated that their PRCs were effective in providing support with "very" being the most common response. Conversely, four participants (21%) said their PRCs were minimally effective or not effective. Interestingly, one participant noted that the effectiveness depended on their own effort rather than the PRC. Most participants identified aspects such as conversation and providing perspective as the most helpful aspects of the PRC. Thirteen of nineteen participants (68%) reported they were very confident in the ability of their PRC to provide support while six others (31.6%) were somewhat less confident to neutral. Twenty participants had no concrete suggestions for PRC improvements while two suggested more contact.

Aim 2: To compare AC and PRC group participants on prevention of relapse in IAs recovering from alcohol/drug addiction. For baseline comparison and possible adjustment between groups, there were no significant differences in the median number of days of alcohol/drug use or quantity of alcohol consumed in the past 30 days on the intake surveys (see Table 3 and Table 4 for complete results). In the mean of the first three weekly surveys of the intervention phase, the PRC group reported fewer median days of drinking compared to the AC group (p=0.04). The median quantity of alcohol consumed and days of drug use over the first three weekly surveys of the intervention phase were not significantly different between the two groups. There were no significant differences between the two groups in median days of alcohol/drug use and alcohol quantity in the means of the last three weekly surveys of the intervention phase. Finally, there were no significant differences between the two groups in median days of alcohol/drug use and alcohol quantity in the means of the last three monthly surveys during the follow-up phase.

Table 3: Alcohol/drug use indicators.

Time point	Measure	P-value	Control N	Control Median (Range)	PRC N	PRC Median (Range)
Baseline	Alcohol quantity (30 days)	0.3	19	18 (0, 100)	72	10 (0, 100)
	Alcohol days (30 days)	0.29	19	5 (0, 30)	72	3 (0, 30)
	Drugs days (30 days)	0.29	19	3 (0, 30)	72	0 (0, 30)
First three weeks of intervention phase	Alcohol quantity (7 days)	0.39	10	13 (4.5, 38.33)	28	9.67 (0, 28.67)
	Alcohol days (7 days)	0.04*	11	4 (0, 7)	38	1.83 (0, 7)
	Drugs days (7 days)	0.45	11	2.5 (0, 6.67)	38	1 (0, 7)
Last three weeks of intervention phase	Alcohol quantity (7 days)	0.23	11	16 (4, 50)	21	10 (0, 38.67)
	Alcohol days (7 days)	0.1	11	3 (1.5, 7)	28	1.75 (0, 7)
	Drugs days (7 days)	0.8	11	2 (0, 7)	28	1 (0, 7)
Three months of follow-up phase	Alcohol quantity (30 days)	0.22	9	14.67 (2.5, 30)	23	10 (0, 30)
	Alcohol days (30 days)	0.32	9	12.33 (3, 22)	23	8.67 (0, 24.5)
	Drugs days (30 days)	0.35	9	12.67 (0, 30)	23	3 (0, 28.67)
Change from baseline to last three weeks of follow-up phase	Alcohol quantity change (30 days)	0.98	7	28.67 (-16.5, 70)	20	8.25 (-28.67, 68)
	Alcohol days change (30 days)	0.87	7	3 (-18.33, 18.5)	20	-0.25 (-21, 28)
	Drugs days change (30 days)	0.14	9	-6 (-30, 3)	22	-0.33 (-17.5, 23.5)
Change from first three weeks of intervention phase to last three week of follow-up phase	Alcohol quantity change (7 days)	0.59	8	7.58 (-12.5, 25)	13	4.67 (-12.33, 18.33)
	Alcohol days change (7 days)	0.77	8	0 (-2.17, 3)	21	0 (-3, 2.33)
	Drugs days change (7 days)	0.79	8	0 (-1.5, 3.17)	21	0 (-5.67, 3.5)

Table 4: Relapse rates.

Time Point	Control total N	Control relapse N(%)	PRC total N	PRC relapse N(%)	p-value
Baseline	19	16 (84.21%)	72	56 (77.78%)	0.75
First three weeks of intervention phase	11	11 (100%)	36	36 (100%)	--
Last three weeks of intervention phase	11	11 (100%)	27	27 (100%)	--
Three months of follow-up phase	9	9 (100%)	23	23 (100%)	--

Aim 3: To analyze strategies used by the PRC to prevent relapse including: a. support and advocacy, b. role modeling, c. facilitating change, and d. recovery plan development. The mean duration of PRC sessions was 30.2 minutes. Due to the COVID pandemic, all PRC/participant interactions occurred over the phone (84% of sessions) or video conferencing (16% of sessions).

PRCs were asked to detail what strategies they used in each session with participants. The broad options selected for this reporting included support and advocacy, role modeling, facilitating change, and recovery plan development. PRCs were then asked to select a more specific strategy. Options under "support and advocacy" included connecting with resources, identify own needs and access resources, facilitate change, and advocate for peer in treatment/community. Options under "role model" included share experience, model recovery, and demonstrate effective decision-making. Options under "facilitating change" included motivation, highlighting strengths and resources, and goal setting, education, and skills building. PRCs documented providing "support and advocacy" in over half (57.8%) of their sessions (see Table 5 for full results). PRCs could document multiple strategies for each session. There were no significant differences in the demographics of participants who received "support and advocacy" in half or more of their coaching sessions versus those who received this form of coaching in less than half of their sessions (see Table 6).

Table 5: PRC strategies.

Method of Contact	
Phone	100 (84%)
Video conferencing	19 (16%)
Strategies used by coach	
Support and advocacy	85 (57.8%)
Identify own needs and access resources	63 (42.9%)
Facilitate change	14 (9.5%)
Connect with resources	6 (4%)
Advocate for peer in treatment/community	2 (1.4%)
Role-model	35 (23.8%)
Share experience	18 (12.2%)
Model recovery	15 (10.2%)
Demonstrate effective decision-making	2 (1.4%)
Facilitating change	14 (9.5%)
Motivation	8 (5.4%)
Highlighting strengths and resources	3 (2%)
Goal setting, education, and skills building	3 (2%)
Recovery plan	13 (8.9%)

Table 6: PRC demographics by strategy.

	Support and Advocacy in Less than 50% of Sessions (n=10)	**Support and Advocacy in 50% or More of Sessions (n=32)**	
Age Mean (SD)	41.70 (9.02)	44.16 (9.84)	0.49[1]
Age groups, n (%)			0.80[2]
19-33 years	3 (30.00%)	5 (15.63%)	
34-40 years	2 (20.00%)	7 (21.88%)	
41-47 years	2 (20.00%)	7 (21.88%)	
48-99 years	3 (30.00%)	13 (40.63%)	
Sex, n (%)			0.41[2]
Female	6 (60.00%)	25 (78.13%)	
Male	4 (40.00%)	7 (21.88%)	
Education groups, n (%)			0.66[2]
Less than HS	2 (20.00%)	4 (12.50%)	
HS	1 (10.00%)	7 (21.88%)	
some college	7 (70.00%)	21 (65.63%)	

Source: [1]Equal variance two sample t-test p-value
[2]Fisher Exact p-value p-value.

Discussion

Admittedly, the conclusions drawn from this study must be tempered due to the high rate of attrition that has plagued many similar trials. Due to losing contact with those who did not continue in the study, we are unable to infer and analyze the causes of these withdraws. Another significant challenge is that this trial took place during the pandemic which prohibited the coaches from working in-person with participants as has been done in many previous trials. It seems likely that stronger connections and more effective working relationships could be developed when individuals can meet in-person at least once. The pandemic left many people feeling isolated and distance communication was an unsatisfactory substitute for many people. This barrier may have been even amplified among people struggling with a stigmatized condition, many of whom sometime engage in illegal activities.

The participants who completed the trial had a high degree of satisfaction with the assistance. Multiple participants expressed a desire for a longer period of support. We are unable to relate this finding to many previous trials as some have not specifically examined participant feedback. A previous trial developed a tool they called the Helpfulness of Peer Intervention which uses a 12-item assessment on a five-point Likert scale. The questions elicit the participant's perception of relevance and credibility of the intervention. The authors noted that the instrument had "face validity" but had not undergone any other validity or reliability testing. The analysis found that more than 80% of participants (n=35) "agreed" or "strongly agreed" with the statements of relevance and credibility [67].

The AC group reported a higher number of days of alcohol use in the first and last survey of the intervention phase compared with the PRC group. No change scores in the continuous outcomes of days of alcohol or drug use or the number of drinks consumed were significantly different between the two groups in either the intervention or follow-up phases. The PRC group had a greater proportion of participants who reported reduced days and quantity of alcohol use or sustained abstinence. Some other analyses were striking but not statistically significant. For example, 78.6% of the PRC group reported a decreased quantity of alcohol consumed (or continued abstinence) versus 21.4% of the AC group. Due to attrition by the end of the follow up period, it is unclear if this represents a difference that would become significant with a larger sample size or simply an aberration.

It is challenging to compare the strategies used by the PRCs in this trial to other trials for a number of reasons. First, the strategies selected for reporting in this trial were based on the material and skills covered in the PRC training before this trial started which likely differed from other programs. Second, other trials and programs have had different and often more specific goals (i.e. encouraging individuals to start on medications for opioid use disorders, starting contraception, [74] etc.). Third, most papers on PRCs do not report the specific strategies employed. Fourth, skilled PRCs conduct continuous assessments of the individual's status, needs, and responses to interventions. As a result, it is unlikely we could ever conclude that a certain PRC strategy is more effective than another. One research group developed a broader continuum of care model that includes peer recovery support services but it does not provide detail regarding specific peer strategies [75].

In this trial, almost 60% of sessions involved support and advocacy with assessing the need for and connecting to resources being the most common. It is unclear if this particular finding was affected by difficulties during the pandemic or simply reflects common needs of people struggling with addiction. Another notable finding was that the recovery plans were discussed in less than 10% of PRC sessions. This was somewhat surprising as recovery plans are common in many treatment centers as they provide the

individual with a personalized and tangible resource to consult in times of crisis. However, the majority of PRC meetings took place over the phone where working together on a document may have been difficult without computer access. It would be interesting to examine the utilization of this strategy during in-person PRC meetings.

Limitations

This study had a number of limitations. We had a relatively high attrition rate during the trial which likely resulted in a degree of attrition bias. High drop-out rates are common in both addiction treatment [63,64] and research [62]. The expected drop-out rate was likely compounded by our restriction to distance contact during the pandemic. It is unclear how the study would have progressed with local recruitment and in-person interactions originally planned before the pandemic. Some participants were homeless or did not have consistent phone service. It is challenging to compare the retention rate to other trials due to differences in focus, inclusion criteria, recruitment methods, and interventions. Retention rates in other PRC studies and programs often range from 33% [40,65] to 66% [66] with higher rates often associated with more intensive interventions such as methadone treatment [53,76]. Retention rates also vary by referral source with the lower rates associated with community-based recruitment [40] and higher rates associated with referral from sources such as schools and courts [66]. An individual's participation in a treatment program is often associated with external factors such as legal charges or custody decisions so would be expected to have higher retention rates than a research trial. The attrition rate in this trial was high but similar to other trials so likely does not imply a lack of effectiveness or participant dissatisfaction with the coaching.

The challenges of conducting PRC research are often significant and also vary by approach, making it difficult for researchers to apply what others have learned in a different setting. For example, Dir et al. [77] conducted an important analysis of challenges they encountered in study recruiting individuals after an overdose in an emergency department. Lack of community referral resources and patient's limited resources would apply in other settings but the other seven barriers they identified were specific to the emergency department.

Implications

Peer recovery coaching to support individuals recovering from addiction has grown significantly in recent years. It appears that PRC services have been widely applied despite the relative lack of evidence to support their effectiveness. Further research is needed to determine when and how PRCs can be most helpful. Available research often lacks control groups and has been heterogeneous in terms of population, setting, and type of support, making it difficult to synthesize studies for broader conclusions. The use of PRCs has become so widespread that it appears future research will need to examine outcomes within existing programs using available comparison groups. PRC services in this trial received positive feedback from the majority of participants. However, some participants commented that they would like the support to continue for a longer period of time. More coaching sessions would likely be needed to help many individuals make the progress needed to the point they could sustain their own recovery. The exact number of sessions will likely be difficult to determine as there is great diversity in the needs of individuals. Future research could examine coaching services over varying lengths of time and a varying number of sessions to determine an optimal number for the majority of individuals. Many IA populations have high morbidity and mortality rates associated with addiction. IA individuals are often unable to find culturally appropriate care that would likely be most effective for them. Despite the challenges in demonstrating their effectiveness, PRCs likely offer one of the most feasible methods to fill this critical gap.

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