



Reducing harm and promoting recovery through community-based mutual aid: Characterizing those who engage in a hybrid peer recovery community organization

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HIGHLIGHTS

- Community-based participatory research involving peers is viable and effective.
- Hybrid RCOs primarily engage populations often underserved by other systems.
- Participant characteristics are associated with primary substance used and engagement.

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ABSTRACT

Background: Peer-based support services are often used within harm reduction organizations, and more recently within recovery community organizations (RCO). Identifying the characteristics of individuals who engage with these novel RCOs is needed. Additionally, conducting collaborative research with communities of people who use drugs (PWUD) or are in recovery is an effective and rewarding approach that allows individuals to take ownership and play a critical role in the study.

Methods: This exploratory study employs a community-based participatory research (CBPR) framework in partnership with a peer-led hybrid recovery community organization, Rebel Recovery, in Florida. Peer staff participated in all phases of the study, helping to inform the study protocol, data collection, analysis, interpretation, and results write-up. A cross-sectional survey instrument was used to collect consumer intake data. Pearson Chi-square tests and multivariate binomial logistic regressions were used to examine relationships between consumer characteristics and service utilization.

Results: Consumers (n = 396) of Rebel Recovery peer support services had a mean age of 35.60 years (SD = 9.74). Many were experiencing homelessness (35.4%), unemployed (69.7%), high school graduates or GED holders (68.2%) and had a last year income of less than \$10,000 (58.3%). The majority were users of heroin primarily (70.7%), with intravenous use being the preferred route of administration (63.9%). Exploratory analysis found that gender, marital status, and involvement in the child welfare system were significantly related to primary substance of use. Past 30-day engagement in recovery meetings had several statistically significant predictors including primary substance of use, age, housing status, annual income level, past-30-day arrests, tobacco use, and alcohol harm perception. Process findings from the CBPR methods used reconfirm the value of including peers in research involving PWUD and individuals in recovery.

Conclusions: Results suggest that peer-based support services at a hybrid recovery community organization can successfully engage populations that are often underserved (i.e., experiencing homelessness, involved in drug court, intravenous users, etc.). Significant relationships identified in the exploratory analysis suggest that additional education concerning overdose and the potential benefits of recovery meetings may be useful for specific

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consumers. Additionally, several recommendations and benefits of engaging in community-based participatory research with peer-led organizations are made for future research.

1. Background

Substance use, misuse, and disorders (SUD) impact millions of Americans and communities every year (Abuse & Administration, 2017). The effects on individuals and communities are often related to fiscal (Horne, 2010), social (Gizewski et al., 2013), criminal justice (Belenko, Hiller, & Hamilton, 2013), or other social service (Whiteford et al., 2013) concerns. In addition to the ongoing effects of legal substances such as alcohol (Cortez-Pinto et al., 2010), marijuana (in some states) (Hall, 2017), and prescription opioids (Florence, Luo, Xu, & Zhou, 2016), the United States is also in a decades long illicit opioid and overdose crisis (Rudd, Seth, David, & Scholl, 2016). Many strategies have emerged in the last decade to address these issues, including SUD treatment capacity expansion, but while there have been suggestions for nearly 15 years to pursue system-wide integration of peer-based support services (PBSS; 10), there has only been nominal adoption and limited study into efficacy (Bassuk, Hanson, Greene, Richard, & Laudet, 2016; Hayashi, Wood, Wiebe, Qi, & Kerr, 2010; Kerr, Mitra, Kennedy, & McNeil, 2017; Reif et al., 2014).

1.1. Peer-based support services

Peer-based support services in the context of substance use exist across a continuum. This includes peer-based prevention (United Nations Office on Drug Use and Crime. *Peer to peer: using peer to peer strategies for drug abuse prevention*, 2002), harm reduction (Hay, Henderson, Maltby, & Canales, 2017; Hayashi et al., 2010; Marshall, Milloy, Wood, Montaner, & Kerr, 2011), and recovery support (Bassuk et al., 2016; Migdole et al., 2011; Reif et al., 2014; Veysey, Grasmere, & Andersen, 2010) services. Peers, or individuals with lived experience using substances or engaging in the recovery process, are often categorized as paraprofessionals when utilized in formal systems infrastructure (Migdole et al., 2011), but within harm reduction and recovery support services, can often be the leaders, administrators, and primary service delivery staff of an organization (Bassuk et al., 2016; Hay et al., 2017; Hayashi et al., 2010). The empirical evidence of peers in harm reduction and recovery support services is still largely unexplored, though preliminary evidence suggests positive benefits (Bassuk et al., 2016; Hay et al., 2017; Hayashi et al., 2010; Marshall, Dechman, Minichiello, Alcock, & Harris, 2015; Reif et al., 2014; Veysey et al., 2010).

Within harm reduction services, peer-based syringe exchange programs (SEP) (Hay et al., 2017; Hayashi et al., 2010) and overdose prevention sites (Bardwell, Kerr, Boyd, & McNeil, 2018) have been associated with positive effects. For example, a peer-based SEP in Vancouver increased the total service reach to include individuals not normally engaged by non-peer based, traditional SEP programs (Hayashi et al., 2010). Improved mental health outcomes (e.g. lower levels of depression and anxiety) and improved life satisfaction rates have also been associated with the use of peer-run SEPs (Hay et al., 2017). While positive effects are also associated with professionally managed harm reduction services (Des Jarlais, McKnight, Goldblatt, & Purchase, 2009; Marshall et al., 2011; Wodak & Cooney, 2005), preliminary evidence suggests that peer-based supports are not only viable but may produce better outcomes than those that are professionally managed, given the ability to engage individuals not typically engaged and improve mental health (Hay et al., 2017; Hayashi et al., 2010).

Within recovery support services, positive effects have also been associated with peer-led and delivered services. In a 2016 review, Bassuk and colleagues report that peer recovery support services have a

positive effect on individual recovery outcomes (Bassuk et al., 2016). Preliminary evidence suggests that the use of peers in the recovery process can lead to reductions in hospital readmissions, extend the length of sobriety, encourage post-discharge treatment plan adherence, increase housing stability, and improve mental health functioning (Bassuk et al., 2016). Peer recovery services are delivered in a variety of settings, including emergency departments (Migdole et al., 2011), collegiate recovery programs (Ashford, Brown, & Curtis, 2017), and recovery community organizations (RCO) (Veysey et al., 2010). As the only setting among these that is entirely peer-led, RCOs are uniquely positioned apart from emergency departments, which are situated in hospital systems, and collegiate recovery programs, which are situated in institutions of higher education.

RCOs are non-profit, non-governmental organizations, led by peers within the larger recovery community (i.e. peers in recovery from SUD or other behavioral health disorders); these peers not only lead the administrative operations of the organization, but also deliver services offered by the RCO (Valentine, White, & Taylor, 2007). While evidence of the effects of RCOs is currently unknown, evidence of peer-based recovery supports - which are the primary mechanism of these RCOs - is hopeful (Bassuk et al., 2016) and would suggest that RCOs will likely have similar positive effect for individuals given their use of peer recovery support services. However, additional evidence is needed to draw stronger conclusions. A recent study examined a novel type of RCO, the “hybrid recovery community organization”, which characterized the typology of participants engaging in an RCO that offered both peer-based recovery and harm reduction supports, available to both those in recovery and PWUD (Ashford, Curtis, & Brown, 2018). Though this research is emerging, hybrid RCOs may be a viable alternative to bridging two helpful models of service delivery – harm reduction and recovery support.

1.2. Community-based participatory research

Evidence in support of peer-based services for people who use drugs (PWUD) or are in recovery from SUD has been collected through community-based participatory research (CBPR) (Marshall et al., 2015). Utilizing CBPR with these communities often has additional ethical considerations (Souleymanov et al., 2016) and researchers are not always in a position to use CBPR best practices due to a lack of experience, willingness, or resources (Wallerstein & Duran, 2006). Engaging directly with these communities through CBPR, similar to methods employed in the mental health field (Simpson & House, 2002), may help to improve outcomes and should be looked to as a viable option for more researchers in the social and life sciences, and especially by those engaging in recovery and harm reduction research.

CBPR with communities of PWUD and are in recovery from SUD is guided by best methodological practices of CBPR (Horowitz, Robinson, & Seifer, 2009; Wallerstein & Duran, 2003), but also by guidance direct from the communities themselves. Perhaps the most distinct guidance has come from both the Australian Injecting & Illicit Drug Users League (AIVL), which released the “National statement on ethical issues for research involving injecting/illicit drug users” paper (National statement on ethical issues for research involving injecting/illicit drug users, 2003), and the “Nothing about us without us: Greater, meaningful involvement of people who use illegal drugs: A public health, ethical, and human rights imperative” released by the Canadian HIV/AIDS Legal Network (Canadian HIV/AIDS Legal Network, 2006). More recently, others have added to the discourse on the topic, suggesting guidelines for compensation and benefits (Barratt, Norman, & Fry, 2007) and

additional ethical considerations (Anderson & McNair, 2018). Taken as a whole from the guidance literature, CBPR with communities of PWUD or are in recovery from SUD should account for the following intentional steps: 1) include community members in all phases of the activities, including design, collection, analysis, and writing; 2) defer to the lived experience of community members as factual information rather than anecdotal insight, and 3) avoid tokenizing community members at all stages. It is with these practices in mind that this study proceeds.

The research team for this study is made up of people who have experience conducting CBPR with PWUD and are in recovery from SUD [RDA, BC], researchers with experience and expertise in recovery community organizations and peer-based support services [RDA, AB, JM, BC], and PWUD or are in recovery from SUD [JK, NM, GD, JM, AMB, RDA]. Our objectives for this study were to engage in a two-phase process: 1) to identify the goals of a peer-based hybrid RCO (Rebel Recovery) in relationship to evaluation of the organization's services and consumers of those services; and 2) to inform the growing body of research of CBPR involving PWUD, are in recovery from SUD, or provide peer-based support services. Following from the completion of objective 1, the primary aims of this evaluation that emerged were to: 1) characterize the population who use Rebel Recovery (demographic characteristics and service utilization), and 2) explore the relationships between consumer demographics and utilization to better inform the emerging research on hybrid RCOs. As this is the second known study of hybrid RCOs to date, the evaluation specific aims were chosen based on the need to further characterize and understand who is using hybrid RCO services and what associations may exist between consumers and service utilizations. As hybrid RCOs are a novel model, we did not define a priori hypotheses for this study.

In this paper we report the findings of both objectives, including the process of identifying the evaluation specific aims and overall lessons learned from engaging in CBPR with this peer-run organization, as well as the results relating to the primary aims of the evaluation: 1) characteristics of consumers and 2) the hypothesis generating exploratory analyses of the relationships between consumer characteristics and service utilization. The study protocol was reviewed by the Kennesaw State University Institutional Review Board and was found to be exempt.

2. Methods

2.1. Rebel recovery

Rebel Recovery (Rebel) is a non-profit hybrid recovery community organization based in Florida, United States. Founded in 2017, Rebel is completely peer-driven and is staffed and run by peers in recovery who have a history of using substances. Rebel has three primary initiatives and service delivery mechanisms, all of which are peer staffed. The first is the provision of peer-based recovery support services to people who are using substances and to those identifying as in recovery from a substance use disorder. These services include a) peer recovery support specialist coaching sessions, b) recovery case management, c) assistance with housing, employment, educational, and vocational goals, and d) connection to treatment services. The second is the delivery of harm reduction services to all individuals who request them. These services include a) naloxone distribution and training, b) overdose prevention education and safety tips, c) fentanyl testing strip, and d) sterile use kit distribution. The third and final service mechanism is engaging in community education and advocacy. Rebel is often involved in educating community stakeholders about overdose risks and engaged at the local and state level with policies, such as recovery residence regulation and patient brokering, that may have an effect on the consumers who use their services.

2.2. Community based participatory research design

In line with CBPR with communities of PWUD and in recovery from SUD, peer leadership and staff from Rebel were involved in all stages of this study. The research design began with initial contact with Rebel peer leadership to learn more about the organization's history, mission, vision, services offered to consumers, and the research questions that were most valuable to the peers of the organization. Following from this conversation, two primary research questions were established. Following the crafting of the research questions, the full research team (university and peers from Rebel) met several times over the first and second quarters (February – May) of 2018 to establish data collection and data analysis protocols. In an effort to retain fidelity to the Rebel service delivery model and to minimize disruption to the consumers receiving services, we decided that only minor modifications to the existing data collection procedures would be completed for this study. These modifications included assigning unique identifiers to all consumers requesting services from Rebel and the collection of an assessment of recovery capital, a self-report survey of individual recovery capital (ARC; (Groshkova, Best, & White, 2012)).

Data collection was completed by peer services staff at Rebel from September 2017 through October 2018, without any oversight or direct involvement from the university research team members so as not to disrupt ongoing service delivery; however, Rebel peer leadership and the full research team met at regular intervals to monitor progress and to maintain communication. All collection was done via an online survey platform that peer staff was comfortable using and requested to use for this study. All consumers engaged at Rebel in the study time period were provided informed consent at intake via peer staff. Which included statements that data collected would be used to inform programs, services, and evaluation. All consumers consented to data collection and no consumers were excluded from the study.

Following the data collection period, Rebel peer staff collated all new consumer intake data from the collection period, inserted the data into an excel spreadsheet, and uploaded it to the university research team members for initial analysis. All data was completely deidentified prior to submission to the university research team to protect consumer privacy. The university research team completed a secondary data cleaning and input all data into SPSS for analysis following the mutually agreed upon analysis plan, which included: 1) descriptive statistics for all new consumers completing an intake at Rebel in the data collection period, and 2) exploratory analysis using Pearson Chi-Square tests on demographic and characteristic variables and multivariate binary logistic regressions to examine correlates (including demographic variables and controls, recovery and substance use variables, and variables provided in Table 1) of past-30-day recovery meeting engagement among consumers. Initial results were then provided by the

Table 1
Variables used in data collection.

| |
|------------------------------------------|
| Date of engagement |
| Referral source |
| Mental health diagnosis |
| Veteran status |
| Drug court involvement |
| Pregnancy status |
| Child welfare system involvement |
| Drug court involvement |
| Criminal justice involvement |
| Arrests in past 30 days |
| Recovery meeting engagement past 30 days |
| Alcohol use harm perception |
| Tobacco use harm perception |
| Primary substance used |
| Secondary substance used |
| Substance use administration route |
| Substance use frequency |
| Readmission to RCO |

university research team to the peer research team for review, discussion, and interpretation. All result interpretations were agreed upon via consensus prior to being finalized for this paper.

2.3. Measures

Data collected for this study included the measures already in place by Rebel prior to the study, with the addition of two variables (a unique identifier and collection of an assessment of recovery capital) agreed upon by the full research team during study design. The data collected via the Rebel intake measures included: a) basic demographics such as gender, age, race, housing status, educational status, income, etc., and b) substance use, behavioral health, recovery, and criminal justice history. Specific variables collected apart from demographics are listed in Table 1. In the current study, recovery capital data is not reported, ARC scores are intended to be used in a subsequent study of longitudinal outcomes. The inclusion of this measure in the methods is presented to accurately describe the collaborative process with Rebel.

3. Results

3.1. Participants

Consumers (N = 396) had a mean age of 35.60 years (SD = 9.74), with the majority being male (58.1%), White/Caucasian (95.5%), single (78.0%), high school graduates or GED holders (68.2%), unemployed (69.7%), and having a household income level of \$0–10,000 (58.3%). Additionally, a large portion of consumers were current tobacco users (92.4%) and were from the Palm Beach County geographic area. A small portion of consumers (7.6%) had been previously enrolled in Rebel Recovery’s program and were reported as readmits (i.e., had previously engaged in services, stopped engaging, and then re-initiated engagement at a later date).

Many consumers were experiencing homelessness (35.4%) or living in a recovery residence (19.7%) and reported a co-occurring mental health disorder (30.3%). Less than a third of consumers were currently involved in the criminal justice system (24.0%) while still fewer were involved in the child welfare system (9.3%). Of note, the majority of consumers did not report any arrests in the past 30 days (72.5%), while 15.9% reported 1–2 arrests, 7.8% reported 3–4 arrests, and 3.8% reported 5 or more arrests in the past 30 days.

The majority of consumers reported that their primary substance of use was heroin (70.7%), followed by opioids (prescription and synthetic; 16.4%), and alcohol (5.6%). Consumer reported secondary substances of use included cocaine (25.0%), benzodiazepines (15.7%), and crack cocaine (15.7%). The primary substance administration route for consumers was injection (63.9%), followed by inhalation (15.2%), oral (13.9%), and combustion (smoking; 7.1%). A majority of consumers also reported daily use of their primary substance (71.0%).

Consumers also reported high levels of harm perception for both tobacco use (98.0%) and alcohol use (97.0%). Less than half of consumers (44.2%) had previously engaged in a recovery meeting in the last 30-days. Full participant characteristics are available in Tables 2, 3, and 4.

3.2. Exploratory relationships

Pearson Chi-Square test results found that consumer gender ($X^2(2, N = 396) = 12.493, p = .002$), marital status ($X^2(4, N = 396) = 20.937, p < .001$), and consumer child welfare system involvement ($X^2(2, N = 396) = 10.559, p = .005$) were all significantly related to primary substance of use. Further examination of the descriptive statistics suggested that: a) female consumers were more likely to use opioids than males, while male consumers were more likely to use heroin, b) consumers who were single were most likely to use heroin, while those consumers who were divorced/widowed/separated

were most likely to use opioids, and c) those consumers who were involved with the child welfare system were more likely to use opioids, while those not involved were more likely to use heroin.

Logistic regression results found that age, housing status, annual income level, past-30-day arrests, tobacco use, alcohol harm perception, and primary substance used were statistically significant predictors of consumer engagement in recovery meetings in the past 30-days in a model that explained 38% of the variance ($p < .001$; nagelkerke $r^2 = .38$; H&L $p = .22$). Results suggest that the following factors were associated with likelihood of past-30-day engagement with recovery meetings: older consumers (i.e., as age increased in years) have a lower likelihood (OR: 0.91–0.97); consumers living in a recovery residence had a greater likelihood (OR: 2.59–11.27); consumers with an annual income between \$30,000–\$39,000 had a lower likelihood (OR: 0.03–0.5); consumers with 5 or more arrests in the past 30-days had a greater likelihood (OR: 1.44–31.80); consumers that did not use tobacco had a lower likelihood (OR: 0.1–0.9); consumers that did not perceive alcohol as harmful had a lower likelihood (OR: 0.01–0.9); and that consumers who reported heroin (OR: 0.07–0.69) or other opioids (OR: 0.06–0.62) had a lower likelihood. Full results are available in Table 5.

Table 2
Consumer demographic characteristics.

| | (n = 396) | |
|-----------------------------------------|-----------|--------|
| | n | (%) |
| Age (years) | | |
| M = 35.60, SD = 9.74 | | |
| Gender | | |
| Male | 230 | (58.1) |
| Female | 166 | (41.9) |
| Race | | |
| White | 378 | (95.5) |
| Other | 18 | (4.5) |
| Ethnicity | | |
| Hispanic/Latino | 31 | (7.8) |
| Marital status | | |
| Single | 309 | (78.0) |
| Married/Domestic partnership | 19 | (4.8) |
| Divorced/Widowed/Separated | 68 | (17.2) |
| Educational status | | |
| Did not finish High School | 62 | (15.7) |
| High school grad/GED | 270 | (68.2) |
| Associates degree | 47 | (11.9) |
| Bachelors or Graduate degree | 17 | (4.3) |
| Employment status | | |
| Employed (Full-time) | 68 | (17.2) |
| Employed (Part-time) | 52 | (13.1) |
| Unemployed | 276 | (69.7) |
| Annual income level | | |
| \$0–10,000 | 231 | (58.3) |
| \$10,001–20,000 | 81 | (20.5) |
| \$20,001–30,000 | 38 | (9.6) |
| \$30,000 or more | 46 | (11.6) |
| Housing status | | |
| Homelessness | 140 | (35.4) |
| Recovery residence/Transitional housing | 78 | (19.7) |
| Stable housing | 178 | (44.9) |
| Pregnancy status | | |
| Pregnant | 8 | (2.0) |
| Co-occurring MH DX | | |
| Yes | 120 | (30.3) |
| Veteran status | | |
| Veteran | 9 | (2.3) |
| Tobacco use | | |
| Yes | 366 | (92.4) |
| Justice system involvement | | |
| Yes | 95 | (24.0) |
| Child welfare system involvement | | |
| Yes | 27 | (9.3) |

MH DX = Mental health diagnosis.

Table 3
Referral source; and substances used, administration route, and frequency.

| | (n = 396) | |
|----------------------------------------|-----------|--------|
| | n | (%) |
| Referral source | | |
| Rebel recovery pilot induction program | 199 | (50.3) |
| Community partner (Provider) | 57 | (14.4) |
| Community partner (Social Service) | 17 | (4.3) |
| Drug court | 16 | (4.0) |
| Walk-In | 11 | (2.8) |
| Current client | 7 | (1.8) |
| Other | 89 | (22.5) |
| Primary substance used | | |
| Heroin | 280 | (70.7) |
| Opioids (Rx and Synthetic) | 65 | (16.4) |
| Alcohol | 22 | (5.6) |
| Crack cocaine | 9 | (2.3) |
| Cocaine | 5 | (1.3) |
| Marijuana | 5 | (1.3) |
| Methamphetamines | 5 | (1.3) |
| Benzodiazepines | 4 | (1.0) |
| Ecstasy | 1 | (0.3) |
| Secondary substance used | | |
| Cocaine | 99 | (25.0) |
| Benzodiazepines | 62 | (15.7) |
| Crack cocaine | 62 | (15.7) |
| Opioids (Rx and Synthetic) | 61 | (15.4) |
| Marijuana | 39 | (9.8) |
| Alcohol | 34 | (8.6) |
| Heroin | 19 | (4.8) |
| Methamphetamines | 10 | (2.5) |
| None | 5 | (1.3) |
| Ecstasy | 4 | (1.0) |
| PHP | 1 | (0.3) |
| Substance administration route | | |
| Injection | 253 | (63.9) |
| Inhalation | 60 | (15.2) |
| Oral | 55 | (13.9) |
| Combustion | 28 | (7.1) |
| Substance use frequency | | |
| Daily | 281 | (71.0) |
| 3–6 times per week | 24 | (6.1) |
| 1–2 times per week | 14 | (3.5) |
| 1–3 times in past month | 29 | (7.3) |
| No past month use | 48 | (12.1) |

RX = Prescription.

Table 4
Client perceptions of harm and past 30-day activity.

| | (n = 396) | |
|-----------------------------------------------------|-----------|--------|
| | n | (%) |
| Perceive alcohol as harmful | | |
| Yes | 384 | (97.0) |
| Perceive tobacco as harmful | | |
| Yes | 388 | (98.0) |
| Arrests in past 30 days | | |
| 0 | 287 | (72.5) |
| 1–2 | 63 | (15.9) |
| 3–4 | 31 | (7.8) |
| 5 or more | 15 | (3.8) |
| Engaged in recovery meetings in past 30 days | | |
| Yes | 175 | (44.2) |
| Readmission to program | | |
| Yes | 30 | (7.6) |

4. Discussion

This study adds to the growing literature concerning peer-based supportive services in the harm reduction and SUD recovery fields broadly, and more specifically, is the second study of hybrid RCOs

Table 5
Logistic regression predictors of past-30-day engagement in recovery meetings.

| | Past-30-day engagement (ref = no) | |
|----------------------------------------------------------|-----------------------------------|-----------------|
| | OR | (95% CI) |
| Age | 0.943** | (0.913–0.975) |
| Gender | 0.869 | (0.485–1.56) |
| Race | 0.660 | (0.162–2.688) |
| Ethnicity | 1.071 | (0.461–2.758) |
| Marital status ^a | – | – |
| Education status ^a | – | – |
| Employment status ^a | – | – |
| Housing Status | – | – |
| Stable housing (ref) | – | – |
| Homelessness | 0.999 | (0.565–1.766) |
| Recovery residence | 5.37** | (2.558–11.274) |
| Annual income | – | – |
| 0–10,000 (ref) | – | – |
| 10,001–20,000 | 1.060 | (0.519–2.165) |
| 20,001–30,000 | 0.676 | (0.249–1.83) |
| 30,001–40,000 | 0.117* | (0.028–0.493) |
| 40,001–50,000 | 0.295 | (0.038–2.320) |
| 50,000 or more | 1.862 | (0.369–9.39) |
| MH DX (ref = no) | 1.020 | (0.576–1.808) |
| Veteran status (ref = no) | 1.344 | (0.280–6.455) |
| Pregnancy status (ref = no) | 0.620 | (0.104–3.685) |
| CWS involvement (ref = no) | 0.857 | (0.285–2.572) |
| Justice system involvement (ref = no) | 1.223 | (0.640–2.337) |
| Arrests past-30-days | – | – |
| 0 (ref) | – | – |
| 1–2 | 1.105 | (0.536–2.275) |
| 3–4 | 0.620 | (0.226–1.706) |
| 5 or more | 6.773* | (1.442–31.804) |
| Tobacco use (ref = yes) | 0.293* | (0.097–0.886) |
| Alcohol use perceived harmful (ref = yes) | 0.028* | (0.001–0.88) |
| Tobacco use perceived harmful (ref = yes) | 13.77 | (0.845–224.301) |
| Primary substance used | – | – |
| Other (ref) | – | – |
| Heroin | 0.211* | (0.065–0.687) |
| Other opioids | 0.197* | (0.063–0.616) |
| Primary substance used administration route ^a | – | – |
| Primary substance used frequency of use ^a | – | – |

OR = odds ratio, CI = confidence interval, ref. = reference category, MH DX = mental health diagnosis, CWS = children welfare system.

^a Categorical variables with more than two categories that were not significant overall or with a significant category do not have odds ratio statistics shown.

* $p < .05$.

** $p < .001$.

(Ashford et al., 2018). In line with our first aim, consumers engaging at Rebel tend to experience high rates of homelessness (35.4%), primarily use heroin and other opioids (87.1%) – most often through intravenous administration methods (63.9%) - have little to no fiscal resources (58.3% reported last year personal income between \$0 - \$10,000). Populations with these characteristics are often overlooked in traditional service pathways, due to a lack of insurance coverage or other access to care barriers (Deering et al., 2011; Hui et al., 2017). Similarly, a small percentage of consumers reported being pregnant (2.0%) or involved in the child welfare system (9.3), which are also often underserved or lack adequate treatment and recovery supports (Marcellus, MacKinnon, Benoit, Phillips, & Stengel, 2015; Van Scoyoc, Harrison, & Fisher, 2017). It would appear that the Rebel program has been successful in engaging – at least initially – these underserved groups.

Previous research has linked criminal activity with SUDs – both broadly (Craddock, Collins, & Timrots, 1994; Felson & Staff, 2010; Kopak & Hoffmann, 2014) and to specific substances (Helene, Buckman, Pardini, & Loeber, 2015). However, findings from the current study did not find rates of criminal justice involvement to be

significantly related to the type of substance used or the administration method. Overall, the population being served by Rebel had less than a 25% rate of current involvement in the criminal justice system and low rates of arrests in the previous 30-days from initial engagement; of which, only a small percentage (3.8%) of those had 5 or more arrests in that time period. Though only a small portion of consumers were involved in drug court (6.0%), these are promising engagement numbers. Consumers that are involved in drug courts often lack access to evidence-based treatment and recovery support services (Matusow et al., 2013); Rebel or other hybrid RCOs may provide a helpful setting to engage this population given its focus on peer services and no formal requirements for participation. It is unknown if the criminal justice system would be amenable to such a relationship, however, recent initiatives promoting harm reduction and criminal justice partnerships (e.g., Law Enforcement Assisted Diversion [LEAD]) (Clifasefi, Lonczak, & Collins, 2017) may provide a justification and framework for the partnership of hybrid RCOs and drug courts, however.

4.1. Exploratory relationships

In line with aim 2 of the current study, results from the exploratory analyses among consumer characteristics and service utilization found several statistically significant relationships worth further examination in future research. The association of opioid or heroin use with gender suggests that males tend to use heroin more than females, while females were more likely to use prescription or synthetic opioids than males. This finding is in line with a recent scoping review completed by Serdarevic and colleagues (Serdarevic, Striley, & Cottler, 2017), which found that women were more likely to report lifetime prescription opioid use than men. While every consumer should have easy access to naloxone and overdose prevention education, this finding suggests that access to these services may be even more critical for female consumers at Rebel due to the increased likelihood of synthetic opioid use (i.e. fentanyl). However, the growing trend of heroin diluted with fentanyl (Stogner, 2014) also places males at increased risk and all consumers using heroin or other opioids would benefit from increased access. Similarly, those consumers who were single, divorced, separated, widowed, involved in the child welfare system, or white (i.e. Caucasian) were more likely to use heroin or other opioids, as compared to married consumers, those not involved in the child welfare system, or other races. Increased access to naloxone and overdose prevention for these specific groups may be beneficial due to the increased risk of overdose given exposure and use of opioid substances.

Consumers who used heroin or other opioids, were older, had incomes between \$30–40,000, did not tobacco, and did not perceive alcohol use as harmful were also less likely to have engaged in recovery meetings in the past 30-days. Conversely, consumers currently living in a recovery residence or with 5 or more arrests in the past-30-days were more likely to have engaged in recovery meetings – potentially explained by the requirement of attendance by recovery residence programs and the criminal justice system. Given the documented benefits of engaging in some form of mutual-aid recovery meetings for individuals in and initiating recovery (Kelly, 2003; Zomore, Lui, Mericle, Hemberg, & Kaskutas, 2018), providing additional education to consumers with characteristics associated with lower likelihood of engagement on the importance of engaging with this resource may be beneficial.

4.2. Lessons learned for CBPR

Throughout the course of the project, we had several learning outcomes that we believe can help inform future CBPR researchers. First and foremost is including peers in all stages of the research process is indeed critical. In fact, in including peers in all phases of the project, many barriers were ameliorated. This includes items such as the correct vernacular when speaking to PWUD or those in early recovery that

receive supportive services (e.g. consumer as opposed to client), and having peers collect data as opposed to the university researchers. Additionally, a major tenant of peer-based services is the relative lack of power differential between consumer and service provider (White, 2009). When employing external evaluation of service delivery programs, especially those that are entirely peer-led and delivered, the use of only university evaluators may re-introduce this power differential in unintentional, and perhaps damaging, ways. The university researchers collecting data may be viewed as a type of service provider by consumers, and as such, the power differential that peer-based services seek to disrupt would be re-introduced. However, the use of peer service providers as researchers, as is done in the CBPR method, reduces the likelihood of power dynamic issues arising from the use of non-peer researchers.

It is also worth noting that as peers with lived experience, this power differential phenomenon may also be harmful to the peers conducting research, not only those who are receiving services. A comprehensive CBPR approach that includes peer researchers in all phases of the project is a way of further diminishing potentially harmful power dynamics arising from a power differential (i.e., peers do not have a say in all aspects of the study, only certain parts). We found that partnering with peers in study formulation, but importantly, actual data collection, analysis, and interpretation as well, helped to avoid problems arising from unequal power among the research team. In fact, we believe it is plausible that the quality of collected data was higher, as consumers may be more likely to be honest and open with peers, versus external researchers or clinical staff (LoSciuto, Aiken, Ausetts, & Brown, 1984).

The second critical learning outcome was the benefit of having a diverse research team, including the peer staff, that helped to interpret and inform the study results. Similar to the function of expert knowledge gained from lived experience that peers employ in service delivery (White, 2009), we find that the insight provided by peer researchers was not an epistemological tension, which often manifests in the discourse of clinical professionals wary of knowledge based in lived experience (Ashford & Brown, 2017). Rather, we view it is a valuable supplement to empirically-based positivism (Bryant, 1985). The combination of scientific and lived experience backgrounds allowed for a range of dialogues that ultimately helped to advance research design, the discussion and interpretation of the exploratory results, and suggestions for future research.

Finally, the act of including Rebel peers in this project allowed for real-time, practical changes to their programming. Rather than receiving a report of results after collection, evaluation, and write-up, the peer staff was able to review, interpret, and discuss findings in near real-time. In doing so, several programmatic changes were made in concert with the exploratory findings, including increasing the amount of overdose prevention education and referral to recovery meetings for certain participants. While these programmatic changes would likely have been made even if a CBPR method had not been employed, the speed at which they could be made due to the collaborative approach could perhaps mean the difference between life or death for some consumers (i.e. overdose prevention saves a life). We would also note that human and fiscal resources needed to complete the study were not meaningfully increased to engage in this CBPR project and the additional staff time that was needed we believe is offset by the advantages discussed here.

4.3. Limitations

The results of the current study should be interpreted in light of several limitations. First, as an exploratory study, the relationships identified as significantly related may in fact be confounded by some unknown variable. As the research team did not want to disrupt service delivery or place undue burden on consumers, there are important variables that would have helped elucidate findings that were not included. For example, the time engaged at Rebel, measures of substance

use harm, and justice involvement following initial engagement, are important data points that are unknown. Additionally, as data was collected at only one hybrid RCO, in one part of Florida, the results are not generalizable to the larger recovery and PWUD communities across the United States or the World. Limited information is available as to whether included consumers engaged in recovery support services, harm reduction services, or both. Though no analyses were conducted on the effects of such services, a break down utilization across all consumers would have provided a more nuanced understanding of utilization among specific consumer types.

4.4. Future directions

All recommendations for future research were developed in collaboration with the full research team including Rebel peer staff, but do not include the perspectives of consumers. Future research seeking to answer questions related to peer-based organizations for PWUD or are in recovery should strive to be completed in a collaborative fashion. While not all studies may be appropriate for a CBPR-method, such as those where the community is too diffuse to define by geography or those in which it is difficult to identify truly representative community members (Bryant, 1985), the potential to include peers in aspects of these projects can greatly inform the entire process, as previously discussed. As marginalized, often invisible, communities, the risk of further marginalization is present, and the loss of meaningful data and insights is something that all research teams should weigh appropriately.

Arising out of the current study, future research should focus on collecting data over a longer period of time, with regular follow-ups. We are currently doing this with Rebel, and hope to provide the results on 3, 6, 9, and 12-month follow-ups in the near future. If possible, additional data should be included in future studies on the effects of peer-based support organizations, not only related to functional outcomes (e.g. employment, housing, educational attainment, quality of life, recovery capital, etc.), but also on intrapersonal outcomes (self-esteem, self-efficacy, self-stigma, etc.). The use of measures that have been informed by individuals with lived experience, such as the Substance Use Recovery Evaluator (Neale et al., 2016), are recommended – especially in the context of hybrid RCOs, where abstinence is an outcome for some but not a prerequisite to be “in recovery”. This is in line with more recent definitions of recovery, also informed by individuals in recovery, that makes no mention of abstinence as a requirement (Ashford et al., 2019). Practical evaluation questions also need to be answered in future research, including the referral mechanisms and success of peer-based support organizations and the role they play in effecting levels of consumer engagement over time.

Finally, as peer-based support service research continues to increase, we believe it will be necessary to conduct a quasi-experimental study that compares outcomes for consumers engaged in services at peer-led organizations versus those consumers engaged in services at non-peer-led organizations. While a randomized control trial is perhaps the gold standard, it would be unethical to randomly assign PWUD or those who are in recovery to a setting they do not have full autonomy in choosing. This principle of self-guided care is critical to the recovery process and should be respected in future research.

5. Conclusion

Peer-based support services are likely to continue being used at increasing rates across the substance use, misuse, and disorder, as well as harm reduction and recovery fields. The potential benefits in both harm reduction and recovery spaces, especially by those that are peer-led and not just peer-staffed, will likely be welcome as many parts of the world deal with the economic, social, and mortality costs of opioid and other substance use. These organizations tend to show the ability to

engage successfully with both PWUD and individuals in recovery - populations that are often underserved and under supported. Hybrid RCOs are still novel models but are showing evidence of engaging populations that are often underserved by traditional systems and organizations. As research continues on these types of organizations and services, collaborative approaches - including the use of community-based participatory research - should be employed to ensure that peers are part of the process. Doing so helps to create informed, robust research studies that can help guide the future of the field.

Ethics approval and consent to participate

This study was reviewed and approved for completion following IRB review at Kennesaw State University.

Consent for publication

Not applicable.

Data availability statement

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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Authors' contribution

All authors contributed equally to the development of this manuscript.

Declaration of Competing Interest

The authors declare no conflicts of interest.

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