Published in final edited form as:

Addict Res Theory. 2015 ; 23(5): 404–412. doi:10.3109/16066359.2015.1021339.

Personal networks of women in residential and outpatient substance abuse treatment

HyunSoo Kim¹, Elizabeth Tracy², Suzanne Brown³, MinKyoung Jun⁴, Hyunyoung Park², Meeyoung Min², and Chris McCarty⁵

¹Department of Social Welfare, Dongguk University, Gyeongju-si, Republic of Korea

²The Jack, Joseph and Morton Mandel School of Applied Social Sciences, Case Western Reserve University, Cleveland, OH, USA

³School of Social Work, Wayne State University, Detroit, MI, USA

⁴Gyeonggido Family & Women's Research Institute, Gyeonggido, Suwon, Republic of Korea

⁵Survey Research Center, University of Florida, Gainesville, FL, USA

Abstract

This study compared compositional, social support, and structural characteristics of personal networks among women in residential (RT) and intensive outpatient (IOP) substance abuse treatment. The study sample included 377 women from inner-city substance use disorder treatment facilities. Respondents were asked about 25 personal network members known within the past 6 months, characteristics of each (relationship, substance use, types of support), and relationships between each network member. Differences between RT women and IOP women in personal network characteristics were identified using Chi-square and *t*-tests. Compared to IOP women, RT women had more substance users in their networks, more network members with whom they had used substances and fewer network members who provided social support. These findings suggest that women in residential treatment have specific network characteristics, not experienced by women in IOP, which may make them more vulnerable to relapse; they may therefore require interventions that target these specific network characteristics in order to reduce their vulnerability to relapse.

Keywords

Personal networks; substance abuse treatment; women and addiction

Introduction

Intensive outpatient treatment and community-based residential treatment programs are among the major options for individuals needing substance abuse treatment (Perkinson, 2012). Client placement criteria for determining the need for residential versus outpatient

services include acute intoxication and/or withdrawal complications, biomedical conditions and complications, emotional/behavioral/cognitive conditions and complications, treatment acceptance/resistance, relapse prevention, and recovery environment (American Society of Addiction Medicine, 2007). Approximately 30 percent of individuals in treatment for substance use disorders are women (Brady & Ashley, 2005). The clinical profiles of women who enter residential treatment (RT) differ from those who enter intensive outpatient treatment (IOP). Women entering long-term residential treatment programs tend to be younger, have lower levels of education and employment, have higher levels of involvement with the criminal justice system and have multiple previous treatment episodes as compared to women entering outpatient treatment (Wechsberg, Craddock, & Hubbard, 1998). In a veteran's sample of women in residential as compared with intensive outpatient, women in residential treatment tended to have more family problems, more closeness in relationships, greater severity of substance use disorders symptoms and were more likely to be married or widowed (Davis et al., 2002).

Upon treatment entry, women report child related concerns, psychosocial difficulties, physical/sexual abuse, health issues and mental health problems to a far greater degree than their male counterparts (Wechsberg et al., 1998). These complex problems present difficulties for women in accessing social support and developing supportive personal network relationships (Tracy & Martin, 2007), thereby compromising their recovery (Warren, Stein, & Grella, 2007; Wenzel, Tucker, Golinelli, Green, & Zhou, 2010). Although different clinical profiles have been identified between women in residential and outpatient substance abuse treatment, no previous studies have examined or identified differences in personal network characteristics between these two groups of women. The purpose of this study was to identify differences in personal network characteristics between women entering residential substance abuse treatment and those entering intensive outpatient treatment. A deeper understanding of these differences may add an important dimension to substance abuse treatment planning, and may be utilized to inform treatment interventions for women in residential and outpatient treatment settings.

Literature review

Social support, social networks, and stress buffering

Social support, as defined by Gottlieb (1983) and Barrera and Ainlay (1983) refers to supportive behaviours such as information, advice, tangible assistance, and emotional support or encouragement provided by members of an individual's personal social network or perceived by the individual to be available. The role of social support has been considered extensively from a stress buffering theoretical perspective (Gottlieb, 1983; Sarason & Sarason, 1985). From this perspective, social support, both received and perceived to be available, buffers individuals from the potentially negative physical, psychological, and social outcomes associated with stressful experiences (Cohen & Wills, 1985). In previous research on social support among individuals with substance dependence, social support has been found to improve substance abuse treatment retention and treatment outcomes such as reduced rates of relapse (Bond, Katskulis, & Weisner, 2003; Dodge & Proctocky, 2000; Joe, Broome, Rowan-Szal, & Simpson, 2002).

Wasserman and Faust (1994) defined social networks as a set of individuals and the ties among them. Social networks have been conceptualized across two dimensions, whole networks and personal networks (Marsden, 1990; McCallister & Fischer, 1983). Whole networks refer to the pattern of interactions within a socially or geographically bounded group of individuals such as a group of office workers, a village, or members of a social group. Personal networks refer to the social context of one focal individual and the interactions between that individual and each person within the network.

Personal networks may be assessed across multiple dimensions (McCarty, Killworth, & Rennell, 2007). These include compositional features such as characteristics of members of the networks (e.g. substance users), types and amount of social support (e.g. concrete, emotional) perceived to be available by the focal individual and interactions with network members (e.g. frequency of contact, reciprocity), and structural network characteristics which focus on the arrangement of network members around the focal individual. Structural characteristics include density (the proportion of ties between members that exist out of all possible ties that could exist) and centralization (the degree to which a network is organized around one or a few individuals in the network).

Personal networks and women with substance use disorders

Previous research has demonstrated the importance of personal networks in both treatment engagement and outcomes (Gregoire & Snively, 2001; Joe et al., 2002; Tucker, Wenzel, Golinelli, Zhou, & Green, 2011; Zywiak et al., 2009). This is especially true for women with addictions, as compared to men, since personal network relationships and interactions tend to have a greater influence on women's substance use and mental health (Skaff, Finney, & Moos, 1999). Quality of network relationships for women with addictions correlate with likelihood of relapse (Ellis, Bernichon, Yu, Roberts, & Herrell, 2004). Indeed, recovery-oriented personal networks and non-using personal network ties contribute to positive treatment outcomes and the maintenance of sobriety during recovery for both women and men (Gordon & Zrull, 1991; Lau-Barraco & Linden, 2014; Walton, Blow, Bingham, & Chermack, 2003; Weisner, Delucchi, Matzger, & Schmidt, 2003).

Often women in substance abuse treatment have difficulties developing and maintaining positive social networks that support the recovery process (Savage & Russell, 2005). In previous studies, researchers have characterized the networks of women in substance abuse treatment programs as small (El-Bassel, Chen, & Cooper, 1998; Manuel, McCrady, Epstein, Cook, & Tonigan, 2007), with a high proportion of substance users (Grella, 2008) unable or unwilling to provide social support during treatment and recovery (Laudet, Morgan, & White, 2006). Women as well as men are frequently introduced to substance use through partners, family members and close friends who can compromise the recovery process (Warren et al., 2007; Wenzel et al., 2010) or in the case of women, may contribute to increased physical and mental health problems (Dawson, Grant, Chou, & Stinson, 2007). Negative or conflictual relationships can trigger relapse during recovery; Rivaux, Sohn, Armour, and Bell (2008) noted that intimate partner relationship problems and demands were frequently described by women as triggers for relapse.

Previous researches on the personal networks of women with substance dependence have recruited respondents from either RT, IOP, or those no longer in formal treatment programmes. Studies examining women in residential treatment suggest that frequency of daily contact with others may be an important predictor of treatment outcome (Zywiak et al., 2009). Falkin and Strauss (2003) identified some complexity in the personal network relationships of women in RT, in that 23.7% of respondents' network members both provided support and enabled their drug use. Studies focused exclusively on women in IOP identified the negative influence of large numbers of substance using network members on continued use and/or relapse (Manuel et al., 2007; McDonald, Griffin, Kolodziej, Fitzmaurice, & Weiss, 2011). Additionally, higher network density and proximity of network members were found to increase the amount and type of social support provided to women in outpatient methadone treatment (El-Bassel et al., 1998).

Interactions with personal network members and the types of support exchanged within a network may vary between those entering RT and those entering IOP (Dobkin, De, Paraherakis, & Gill, 2002; Ellis et al., 2004). However, at this time, we are not aware of any studies that have compared the personal network characteristics of women in RT versus those in IOP. Understanding these differences may better inform criteria for substance abuse treatment placement. These findings may also assist treatment providers in identifying personal network vulnerabilities to relapse for women in residential versus outpatient treatment, and in developing personal network interventions specific to RT and IOP treatment modalities.

Aims of this study

The primary aim of this study was to examine the compositional, social support and structural differences in personal networks between women entering residential substance abuse treatment (RT) and those entering intensive outpatient substance abuse treatment (IOP). We examined three research questions. First, in what ways do the characteristics of personal network composition differ between women entering residential substance abuse treatment and those entering IOP? Composition referred to the characteristics of each network member such as gender, age, relationship to the participant, and substance use. Second, we asked, what are the differences in perceived social support reported by women entering RT compared with those entering IOP? Social support included emotional, informational, concrete, and support for recovery. The third research question was, in what ways does personal network structure differ between women entering RT and those entering IOP? Structure referred to the patterns of relationships between the members of each network such as density, closeness/distance, components, and isolates (McCarty, Molina, Aguilar, & Rota, 2007). We developed the following hypotheses based on these research questions: Women entering RT will have a greater number of substance using network members, less support across all domains, lower network density, and less closeness in relationships than women entering IOP.

Method

Participants and setting

The study sample included 377 adult women with a diagnosis of substance use dependence: 258 were in IOP and 119 were in non-medical community RT in Cleveland, Ohio. Protection of human subjects was approved by the Case Western Reserve University Institutional Review Board. In addition to confidentiality guaranteed by the informed consent document, a Certificate of Confidentiality from the National Institutes of Health protected participant information from subpoena by state or federal authorities.

Both treatment modalities were publically funded specialized programmes for women and served an inner city low income clientele with little or no insurance. Appropriateness for IOP vs. RT had been determined as part of the county level intake assessment process following the ASAM guidelines described earlier (2007). The Ohio Department of Alcohol and Drug Addiction Services specified that IOP consists of individual and group counselling provided for a minimum of 8 hours each week. Non-medical community residential treatment is defined as 24-hour services in a rehabilitation facility with structured activities for at least 30 hours weekly. Services in both the IOP and RT programs in this study were similar and included assessment, individual counselling, group counselling, crisis intervention and case management.

Sample recruitment/data collection

Women eligible for study participation were 18 years of age or older, met DSM-IV criteria for current substance dependence for at least one substance, including alcohol, and had been in treatment for at least one continuous week. One week post treatment intake was chosen to allow women to settle into their treatment program before being approached for participation in the study; this was also a strategy to maximize retention, as county administrative data showed that over half of women dropped out of treatment within the first week. Flyers distributed at the participating RT and IOP treatment sites were used to inform women about the study; those who expressed interest were contacted by a research interviewer. Data were collected between October 2009 and June 2011. Trained interviewers conducted the research interviews in private rooms at the corresponding treatment sites using a computerized assisted personal interview program (CAPI). Participants were given a \$35 gift card to a local store for each interview, plus travel reimbursement as needed (See Tracy et al., 2012 for more information on participant recruitment and data collection).

Measures

Socio-demographic measures—The Individual Assessment Profile (IAP) (Flynn, Craddock, Hubbard, Anderson, & Etheridge, 1997; Flynn et al., 1995) was used to gather demographic and background variables as follows: age, ethnic/racial identity, education level, marital status, income source, number of birth children, currently responsible for raising children (yes/no); living arrangements, type of residence, any lifetime experience of homelessness, and legal involvement including probation, parole or awaiting sentencing.

Clinical measures—Clinical characteristics were assessed at intake via the computerized Diagnostic Interview Schedule IV (CDIS) which is based upon DSM criteria (Helzer et al., 1985; Robins, Helzer, Croughan, & Ratcliff, 1981). Clinical characteristic variables in this study included: the total number of substances of dependence (alcohol and/or other drugs); presence (yes/no) of co-occurring mental disorders (i.e. generalized anxiety disorder, posttraumatic stress disorder, mania/hypomania and/or major depression/dysthymia); presence (yes/no) of chronic health conditions (being under doctor's care for any 2 or more conditions among heart disease, cancer, hepatitis, stroke, arthritis, asthma, diabetes, tuberculosis, bleeding ulcer, epilepsy, or other serious illness); and previous SUD treatment episode (yes/no). In addition, the Trauma Symptom Check-list 40 (TSC-40) (Briere, Elliott, Harris, & Cotman, 1995; Elliott & Briere, 1992; Zlotnick et al., 1996) assessed respondents' trauma symptoms related to childhood or adult traumatic experiences. Respondents rated how often they experienced each symptom over the prior two months using a 4-point scale ranging from 0 ("never") to 3 ("often"). The TSC-40 total scores range from 0 to 120, with higher scores indicating greater levels of trauma symptoms. The Cronbach's alpha of the TSC-40 scale for the present study was 0.93.

Personal network measures

This study utilized a common method for examining personal networks (McCarty, Molina, et al., 2007). Each individual study participant (focal individual) listed names of 25 personal network members and then answered detailed questions about each of these network members and their relationship with each network member. Each study participant (focal individual) was also asked a series of questions regarding the ties among their network members, such as the likelihood that each might interact with other network members (Tracy et al., 2012). Egonet, a software program used in previous personal network research (McCarty, 2002) was used to gather and evaluate network composition, support and structure.

Network composition—Respondents were initially asked to list 25 people they knew and with whom they had had any type of contact in the past six months, including "people who made them feel good, people who made them feel bad and others who played a part in their life". Respondents were then asked how they knew each person listed (e.g. "romantic/sexual partner or spouse," "family member/relative," "my child or child I am raising," "from work or school," "from religious group or organization," "treatment professional/staff," "peer from treatment program or AA/NA"). In addition, women were asked about each person's substance use (alcohol, drugs or both), and whether each person was someone with whom they "used substances (alcohol, drugs or both)".

Network support—Based on the initial list of 25 names, network support characteristics were measured as the number of people reported as "hardly ever," "sometimes," or "almost always" available for informational, concrete, emotional and sobriety support. In addition negativity in relationships was computed as the number of people rated "hardly ever," "sometimes," or "almost always" negative in their interactions. Respondents were also asked to rate the degree of closeness between themselves and each of the 25 persons listed ("not close," "somewhat close," "very close"). Each relationship was rated in terms of the

direction of help; reciprocity was operationalized as the number of relationships in which help giving was mutual.

Network structure—The final network questions in EgoNet asked for each unique pair of persons listed: “What is the likelihood that person1 and person 2 talk to each other independently of you”. Respondents rated each unique pair as “not at all likely,” “somewhat likely,” or “very likely” to interact. The structural variables included in this study were based on pairs very likely to interact and included: number of components (groups of at least three people connected directly or indirectly); number of isolates (persons in the network not connected to anyone else); a density measure (a score between 0 and 100 indicating the proportion of ties that exist relative to all possible ties); and two measures of centralization (a score from 0 to 100 computed within Egonet) indicating (1) degree centralization, extent to which a network is tightly organized around its most central point, typically one or a few persons connected to many other people and (2) betweenness centralization, extent to which persons in the network are positioned in the shortest path between other ties. EgoNet produces a network visualization which displays connections among the people and the structure of the network.

Data analysis

Initial data analyses calculated descriptive statistics for sociodemographic, clinical, and personal network variables, reviewing for normality of the distribution of the data. Chi-square analysis or Fisher’s Exact test on categorical variables and *t*-test on continuous variables were used to compare differences in socio-demographic and clinical characteristics and personal network variables (compositional, social support and structural) between two treatment modalities: RT ($n = 119$) and IOP ($n = 258$). Effect sizes, indicating practical significance of results, were calculated using Cohen’s *d* (Cohen, 1992) on social network variables; $d \approx 0.2$, 0.5 and 0.8 indicate small, moderate and large effect sizes, respectively.

Results

Socio-demographic characteristics

Table 1 compares socio-demographic characteristics between women served in the two treatment modalities. A comparison of women in RT versus IOP found the following statistically significant differences in demographic characteristics: women in RT were more likely to live in institutional settings, group homes or on the street prior to treatment whereas IOP women were more likely to have been in their own homes and to have lived with a spouse, partner or other family; women in RT had fewer biological children and were less likely to be responsible for raising children than women in IOP. The groups did not differ on other demographic variables examined.

Clinical characteristics and treatment history

Table 2 shows clinical characteristics between the two treatment modalities. Compared to women in IOP, women in RT were statistically significantly more likely to have cocaine and opiate dependence, to have multiple SUD, and to report more trauma symptoms than IOP women. Although Manic Episode was more prevalent among women in IOP, major

depressive episode was the most prevalent mental disorder for both groups. Approximately three-fourths were dually diagnosed. Of note is the fact that the groups did not differ on dual diagnosis status, previous treatment episodes or multiple chronic health conditions.

Personal networks

Network composition—Network composition differed significantly between the two treatment modalities in number of partners/spouse, children, AODA users, and persons with whom women “used with” (Table 3). The RT group had more partners and fewer children in their networks than those in the IOP group with a small to moderate effect sizes ($d = 0.24$ – 0.31). The RT group had on average three more AODA users and two more persons with whom they had used substances than those in the IOP group, representing moderate effect sizes ($d = 0.50$ – 0.60). No difference was found on the number of family members, professionals from treatment, and peers from treatment programs or AA/NA.

Network support—Women in RT reported on average 1–2 fewer persons in their networks who provided concrete, emotional, and sobriety support than those in IOP. There was a statistically significant difference in reciprocal relationships as well, with women in RT reporting on average 1.5 fewer persons with reciprocal relationships than those in the IOP group. Women in the RT group had fewer “very close” relationships than those in the IOP group. Cohen’s effect sizes in network support, ranging 0.22 on number of very close persons to 0.35 on number of reciprocal relationships, indicated small to moderate effect sizes. No differences were observed between the two treatment modalities in informational support, help offered to other persons, and negative (critical) relationships.

Network structure—There was a significant difference in betweenness centralization, while the effect size was small ($d = 0.29$). Women in RT groups, as compared with those in IOP, reported networks that were organized around one or a few persons who bridged the most ties. No other difference was found in network density, degree centralization, number of isolates, or number of components.

Discussion

Summary of findings

Socio-demographic—The present study compared socio-demographic, clinical and personal network characteristics among women in IOP versus RT settings. In terms of socio-demographic characteristics, a greater proportion of IOP women as compared with RT women lived with others just prior to treatment. Correspondingly, a greater proportion of RT women were living alone. When women in the RT group were asked about the compositional characteristics of personal networks, they reported a higher mean number of partners than women in the IOP group, indicating that RT women had both concurrent and ex-partners in their networks. However, in contrast to the findings of Wechsberg et al. (1998), who found differences in age, education level, criminal justice involvement and previous treatment episodes, this study found no statistically significant differences between RT and IOP along those dimensions. There could be several reasons for this including

differences in sample selection, different time periods for data collection, different drugs of abuse in the two samples or differences in insurance status or funding for treatment.

IOP women had given birth to a statistically significant greater number of children. Correspondingly, RT women also reported fewer children in their network than IOP women, which may increase their vulnerability to relapse. Previous research has identified that children may be a positive influence on recovery for women with addictions. Tracy & Martin (2007) found that women in residential and inpatient treatment reported that their children provided as much sobriety support as that provided by their adult network members. In particular, both children living with and in the care of the respondent as well as those children in foster or kinship care were viewed as providing specific types of positive social support. Falkin and Strauss (2003) found that one in five women in their study reported that their children had helped them to stop substance use. A meta synthesis of existing research on women with substance use disorders and parenting (Sword et al., 2009) reported that children often exert a motivating presence and a sense of security and comfort, along with a sense of urgency to work on recovery issues.

Clinical—In terms of clinical characteristics, diagnoses of cocaine and opiate dependence, higher number of trauma symptoms and use of multiple substances were statistically significantly higher among the women in RT as compared to IOP. This finding is similar to that of Davis et al. (2002). However, there were no differences in the number of women with dual disorders (co-occurring substance use and mental disorders) or in the number with chronic health conditions between the two treatment modalities. This is surprising in that one criteria for appropriateness for residential treatment is the seriousness of a number of combined factors (American Society of Addiction Medicine, 2007). In this sample, some factors that might indicate severity, such as dual diagnosis and chronic health conditions did not differ between the two treatment modality groups. There could be several other reasons for inconsistencies between findings from our study versus previous studies completed including differences in sample selection, different time periods for data collection, different drugs of abuse in the samples or differences in source of funding for treatment.

Personal networks—Our study contributes to the literature comparing RT and IOP women by documenting the vulnerabilities evident in personal networks. Consistent with the findings of Falkin and Strauss (2003), women in RT also reported a significantly greater number of persons in their networks who were substance users and a greater number of persons with whom they used substances within their networks. Thus, the hypothesis that women entering RT would report a greater number of substances using network members than those entering IOP was supported. This suggests that RT women are likely to negotiate their recovery in a tenuous support context, surrounded by a network of users and people with whom they had used substances, more challenging than that faced by IOP women. Number of substance users in a network has consistently been identified as a relapse risk for women in recovery (Bond et al., 2003; McDonald et al., 2011; Tracy, Min, Park, & Jun, 2013; Walton et al., 2003).

Study results were also in support of the hypothesis that women entering RT would report less social support across all domains and less closeness than those entering IOP. IOP

women reported a greater number of persons who provided concrete, emotional, and sobriety support as well as a greater number of reciprocal and very close relationships than RT women. No significant differences were observed between the two treatment modality groups in the amount of informational support or in the number of negative (critical) relationships. As noted earlier, previous research has confirmed that the absence of social support and particularly support for recovery poses a significant risk of relapse for women with addictions (Bond et al., 2003; Dodge & Potocky, 2000; Joe et al., 2002). These data suggest that this vulnerability may be especially salient for women in residential treatment.

In terms of network structure, the results indicated significant differences in only one centralization measure, betweenness centralization. However, none of the other structural measures (network density, degree centralization, number of isolates, or number of components) were significantly different between the two treatment modality groups, thus the hypothesis that RT women would have lower density was not supported. Women in RT, as compared with those in IOP, reported significantly higher betweenness centralization indicating that their networks at intake were organized around one or a few persons who bridged the most ties. This structural difference may indicate an over reliance on one or a few individuals within a network and may indicate vulnerability for women in residential treatment, particularly if the person in the bridging role continues to use substances, does not support sobriety and tends to block communication within the network. Conversely, greater dispersal of people within the network may be a vulnerability for women in IOP in that it may serve to enable secrecy as part of ongoing substance use. A less centralized network might not have an organizing person to keep components of the network connected to one another.

Implications for intervention

Findings suggest that women in residential treatment have less support for sobriety and fewer social resources at the time of treatment intake as compared with women entering outpatient treatment services. The most obvious difference between the two groups in this study with perhaps the greatest clinical impact is that women entered RT with more substance users in their networks and they had used substances with more people in their network as compared with those entering IOP treatment. This may make it harder for program staff to locate and engage non-using network members in treatment programming and education. Without interventions that modify these network characteristics, they may become vulnerabilities to relapse for women leaving RT.

Assessing personal networks relationships can be an important part of the treatment intake and case planning process for women entering substance abuse treatment. Findings from this study suggest that some key areas to assess include the number of people providing support in the network, the number of substance users and those persons used with in the network, closeness and reciprocity in relationships, and connections among network members. Network assessment early on could identify women who might be at higher risk of relapse, based on their personal network characteristics and better inform the decision to refer women to either residential or outpatient treatment modalities as well as to develop more realistic relapse prevention plans.

Understanding personal networks of women entering treatment can also help practitioners enhance the recovery process through tailoring network interventions appropriate to treatment modality. Different approaches to building and mobilizing personal networks in support of recovery may be needed depending on treatment modality and on the constellation of personal network vulnerabilities associated with women in each modality. For example, women in RT may need more intense assistance as compared to IOP women to disconnect with substance users in their networks and distance themselves from those with whom they had used substances prior to treatment. Many of the substance users in the network may be family members, making it even harder to disconnect from such relationships.

Overall, women in RT may need more assistance than women in IOP in developing non-using and supportive networks; in addition network members of women in RT as compared with IOP may need more training and guidance on how to provide social support to the woman in treatment. Since the RT women in this sample had a network structure characterized by betweenness centralization, it may be beneficial for treatment providers to identify those network members in a bridging role and engage them as allies in the treatment process. Those in a bridging role could serve a supportive role helping facilitate the flow of information to other components of the network. For example, bridging connections could be helpful in communicating with other network members and encouraging them to attend a family educational session. On the other hand, IOP women could be helped to identify network member who might serve a bridging role, to help with network communication and coordination.

Strengths, limitations and future research

Strengths of this study include its detailed and comprehensive approach to collecting personal network information which included compositional, social support and structural network characteristics. The sample participants were from an underserved population of low-income, primary African American women with dual disorders and chronic health conditions. While the diversity in the sample is one strength, findings from this study can only be generalized to similar low-income inner city women in publically-funded treatment services.

Because of the cross-sectional design of this analysis, we cannot determine whether the differences observed in personal network characteristics in the two treatment modalities persist over time following treatment. Future research should examine differences between women in RT and IOP in compositional, social support and structural network characteristics post treatment. An investigation of the relationships between post treatment network characteristics and other areas of post treatment functioning such as quality of life and relapse likelihood is also needed. A deeper and more contextualized understanding of women's personal networks in relation to treatment outcomes might identify vulnerabilities specific to women in residential or outpatient treatment and allow for more targeted personal network interventions specific to residential or intensive outpatient treatment modalities, e.g. network meetings to promote bridging connections for IOP women, strategies to minimize the influence of substance users for RT women. Additional qualitative research would be

helpful to understand the women's perceptions of their personal networks in relation to residential and outpatient treatment services.

Overall, findings from this study increase our understanding of personal networks of women entering residential and outpatient treatment. This study helps to identify the positive and reciprocal social contexts of women in treatment, which may play a vital role in substance use disorder assessment, treatment and recovery.

Acknowledgments

Declaration of interest

The project described was supported by Award Number R01DA022994 from the National Institute on Drug Abuse.

References

- American Society of Addictive Medicine (ASAM). ASAM PPC-2R patient placement criteria for the treatment of substance-related disorders. Chevy Chase, MD: Author; 2007.
- Barrera M Jr, Ainlay SL. The structure of social support: A conceptual and empirical analysis. *Journal of Community Psychology*. 1983; 11:133–143. [PubMed: 10299305]
- Bond J, Katskulis LA, Weisner C. The persistent influence of social networks and alcoholics anonymous on abstinence. *Journal of Studies on Alcoholism*. 2003; 64:579–588.
- Brady TM, Ashley OS. Women in substance abuse treatment: Results from the alcohol and drug services study (ADSS). 2005 DHHS Publication No. SMA 04-3968, Analytic Series A-26.
- Briere J, Elliott DM, Harris K, Cotman A. Trauma symptom inventory: Psychometrics and association with childhood and adult victimization in clinical samples. *J Interpers Violence*. 1995; 10:387–401.
- Cohen J. A power primer. *Psychological Bulletin*. 1992; 112:155–159. [PubMed: 19565683]
- Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. *Psychological Bulletin*. 1985; 98:310–357. [PubMed: 3901065]
- Davis TM, Carpenter KM, Malte CA, Carney M, Chambers S, Saxon AJ. Women in addictions treatment: Comparing VA and community samples. *Journal of Substance Abuse Treatment*. 2002; 23:41–48. [PubMed: 12127467]
- Dawson DA, Grant BF, Chou SP, Stinson FS. The impact of partner alcohol problems on women's physical and mental health. *Journal of Studies on Alcohol and Drugs*. 2007; 68:66–75. [PubMed: 17149519]
- Dobkin PL, De CM, Paraherakis A, Gill K. The role of functional social support in treatment retention and outcomes among outpatient adult substance abusers. *Addiction*. 2002; 97:347–356. [PubMed: 11964111]
- Dodge K, Protocky M. Female substance abuse: Characteristics and correlates in a sample of inpatient clients. *Journal of Substance Abuse Treatment*. 2000; 18:59–64. [PubMed: 10636608]
- El-Bassel N, Chen D, Cooper D. Social support and social network profiles among women on methadone. *Social Service Review*. 1998; 72:379–401.
- Elliott DM, Briere J. Sexual abuse trauma among professional women: Validating the trauma symptom checklist-40 (TSC-40). *Child Abuse & Neglect*. 1992; 16:391–398. [PubMed: 1617473]
- Ellis B, Bernichon T, Yu P, Roberts T, Herrell JM. Effect of social support on substance abuse relapse in a residential treatment setting for women. *Evaluation and Program Planning*. 2004; 27:213–221.
- Falkin GP, Strauss SM. Social supporters and drug use enablers: A dilemma for women in recovery. *Addictive Behaviors*. 2003; 28:141–155. [PubMed: 12507533]
- Flynn PM, Craddock SG, Hubbard RL, Anderson J, Etheridge RM. Methodological overview and research design for the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors*. 1997; 11:230–243.

- Flynn PM, Hubbard RL, Luckey JW, Forsyth BH, Smith TK, Phillips CD, Koman JJ. Individual assessment profile (IAP). Standardizing the assessment of substance abusers. *Journal of Substance Abuse Treatment*. 1995; 12:213–221. [PubMed: 7474029]
- Gordon AJ, Zrull M. Social networks and recovery: One year after inpatient treatment. *Journal of Substance Abuse Treatment*. 1991; 8:143–152. [PubMed: 1660079]
- Gottlieb, BH. Social support strategies. Beverly Hills, CA: Sage; 1983.
- Gregoire TK, Snively CA. The relationship of social support and economic self-sufficiency to substance abuse outcomes in a long-term recovery program for women. *Journal of Drug Education*. 2001; 31:221–237. [PubMed: 11696960]
- Grella CE. From generic to gender-responsive treatment: Changes in social policies, treatment services, and outcomes of women in substance abuse treatment. *Journal of Psychoactive Drugs*. 2008; 5:327–343. [PubMed: 19256044]
- Helzer JE, Robins LN, McEvoy LT, Spitznagel EL, Stoltzman RK, Farmer A, Brockington IF. A comparison of clinical and diagnostic interview schedule diagnoses. Physician reexamination of lay-interviewed cases in the general population. *Archives of General Psychiatry*. 1985; 42:657–666. [PubMed: 4015307]
- Joe GW, Broome KM, Rowan-Szal GA, Simpson DD. Measuring patient attributes and engagement in treatment. *Journal of Substance Abuse Treatment*. 2002; 22:183–196. [PubMed: 12072163]
- Lau-Barraco C, Linden AN. Drinking buddies: Who are they and when do they matter? *Addiction Research and Theory*. 2014; 22:57–67. [PubMed: 25429255]
- Laudet AB, Morgen K, White WL. The role of social supports, spirituality, religiousness, life meaning and affiliation with 12-step fellowships in quality of life satisfaction among individuals in recovery from alcohol and drug problems. *Alcoholism Treatment Quarterly*. 2006; 24:33–73. [PubMed: 16892161]
- Manuel JK, McCrady BS, Epstein EE, Cook S, Tonigan JS. The pretreatment social networks of women with alcohol dependence. *Journal of Studies on Alcohol and Drugs*. 2007; 68:871–878. [PubMed: 17960305]
- Marsden PV. Network data and management. *Annual Review of Sociology*. 1990; 16:435–463.
- McCallister, L.; Fischer, CS. A procedure for surveying personal networks. In: Burr, RS.; Minor, MJ., editors. *Applied network analysis: A methodological introduction*. Beverly Hills, CA: Sage; 1983.
- McCarty C. Measuring structure in personal networks. *Journal of Social Structure*. 2002; 3 Retrieved from <http://www.cmu.edu/joss/content/articles/volume3/McCarty.html>.
- McCarty C, Killworth PD, Rennell J. Impact of methods for reducing respondent burden on personal network structure measures. *Social Networks*. 2007; 29:300–315.
- McCarty C, Molina J, Aguilar C, Rota L. A comparison of social network mapping and personal network visualization. *Field Methods*. 2007; 19:145–162.
- McDonald LJ, Griffin ML, Kolodziej ME, Fitzmaurice GM, Weiss RD. The impact of drug use in social networks of patients with substance use and bipolar disorders. *American Journal on Addictions*. 2011; 20:100–105. [PubMed: 21314751]
- Perkinson, RR. *Chemical dependency counseling: A practical guide*. 4th ed.. Thousand Oaks, CA: Sage Publications; 2012.
- Robins LN, Helzer JE, Croughan J, Ratcliff KS. National Institute of Mental Health diagnostic interview schedule. Its history, characteristics, and validity. *Archives of General Psychiatry*. 1981; 38:381–389. [PubMed: 6260053]
- Rivaux SL, Sohn S, Armour MP, Bell H. Women's early recovery: Managing the dilemma of substance abuse and intimate partner relationships. *Journal of Drug Issues*. 2008; 38:957–979.
- Sarason, IG.; Sarason, BR., editors. *Social support: Theory, research, and applications*. The Hague, The Netherlands: Martinus Nijhof; 1985.
- Savage A, Russell LA. Tangled in a web of affiliation: Social support networks of dually diagnosed women who are trauma survivors. *Journal of Behavioral Health Services & Research*. 2005; 32:199–214. [PubMed: 15834268]
- Skaff MM, Finney JW, Moos RH. Gender differences in problem drinking and depression: Different "vulnerabilities?". *American Journal of Community Psychology*. 1999; 27:25–54. [PubMed: 10234802]

- Sword W, Jack S, Niccols A, Milligan K, Henderson J, Thabane L. Integrated programs for women with substance use issues and their children: A qualitative meta-synthesis of processes and outcomes. *Harm Reduction Journal*. 2009; 6:32–32. [PubMed: 19930575]
- Tracy EM, Kim H, Brown S, Min MO, Jun M, McCarty C. Substance abuse treatment stage and personal social networks among women in substance abuse treatment. *Journal of the Society for Social Work and Research*. 2012; 3:65–79. [PubMed: 22639705]
- Tracy EM, Martin TC. Children's roles in the social networks of women in substance abuse treatment. *Journal of Substance Abuse Treatment*. 2007; 32:81–88. [PubMed: 17175401]
- Tracy, EM.; Min, MO.; Park, H.; Jun, M. Personal networks and substance use at 12 month post treatment among dually diagnosed women; Paper presented at the 17th Annual Conference of the Society for Social Work and Research; January 19, 2013; San Diego, CA. 2013.
- Tucker JS, Wenzel SL, Golinelli D, Zhou A, Green HD Jr. Predictors of substance abuse treatment need and receipt among homeless women. *Journal of Substance Abuse Treatment*. 2011; 40:287–294. [PubMed: 21185682]
- Walton MA, Blow FC, Bingham CR, Chermack ST. Individual and social/environmental predictors of alcohol and drug use 2 years following substance abuse treatment. *Addictive Behaviors*. 2003; 28:627–642. [PubMed: 12726780]
- Warren JI, Stein JA, Grella CE. Role of social support and self-efficacy in treatment outcomes among clients with co-occurring disorders. *Drug and Alcohol Dependence*. 2007; 89:267–274. [PubMed: 17329040]
- Wasserman, S.; Faust, K. *Social network analysis: Methods and applications*. New York, NY: Cambridge University Press; 1994.
- Wechsberg WM, Craddock SG, Hubbard RL. How are women who enter substance abuse treatment different than men?: A gender comparison from the drug abuse treatment outcome study (DATOS). *Drugs*. 1998; 13:97–115.
- Weisner C, Delucchi K, Matzger H, Schmidt L. The role of community services and informal support on five-year drinking trajectories of alcohol dependent and problem drinkers. *Journal of Studies on Alcohol*. 2003; 64:862–873. [PubMed: 14743951]
- Wenzel SL, Tucker JS, Golinelli D, Green HD Jr, Zhou A. Personal network correlates of alcohol, cigarette, and marijuana use among homeless youth. *Drug and Alcohol Dependence*. 2010; 112:140–149. [PubMed: 20656423]
- Zlotnick C, Shea MT, Begin A, Pearlstein T, Simpson E, Costello E. The validation of the trauma symptom checklist-40 (TSC-40) in a sample of inpatients. *Child Abuse & Neglect*. 1996; 20:503–510. [PubMed: 8800525]
- Zywiak WH, Neighbors CJ, Martin RA, Johnson JE, Eaton CA, Rohsenow DJ. The important people drug and alcohol interview: Psychometric properties, predictive validity, and implications for treatment. *Journal of Substance Abuse Treatment*. 2009; 36:321–330. [PubMed: 18835677]

Table 1Socio-demographic characteristics by treatment modality ($N = 377$).

	<i>n</i> (%)		χ^2 or <i>t</i>	<i>p</i>
	Residential (<i>n</i> = 119)	Outpatient (<i>n</i> = 258)		
Race			0.67	0.413
Non black	51 (43.2)	99 (38.8)		
Black	67 (56.8)	158 (61.2)		
Education			2.77	0.250
Elementary Junior High	43 (36.4)	111 (43.2)		
GED/H.S.	53 (44.9)	112 (44.0)		
Vocational/Associate/Bachelor	22 (18.6)	33 (12.8)		
Marital status			1.36	0.507
Married	8 (6.8)	19 (7.4)		
Widowed/Separated/Divorced	37 (31.4)	66 (25.6)		
Never married	73 (61.9)	171 (67.1)		
Age <i>M</i> (<i>SD</i>)	36.55 (10.01)	36.43 (10.54)	0.11	0.914
# of Children <i>M</i> (<i>SD</i>)	2.25 (1.91)	3.02 (2.19)	3.25	0.001
Responsible for children (yes)	77 (64.7)	217 (84.4)	18.57	<0.001
Employment			0.27	0.873
On Jobs	13 (11.5)	24 (9.7)		
Welfare/Gov. assistance	81 (71.7)	180 (72.9)		
Other	19 (16.8)	43 (17.4)		
Housing			59.88	50.001
Own house	19 (16.2)	130 (50.6)		
Shared/Double-up/Temporary	53 (45.3)	102 (39.7)		
Institute/Group home/Street	45 (38.5)	25 (9.7)		
Living with			9.57	0.002
Alone	36 (30.3)	42 (16.3)		
Not alone	83 (69.7)	215 (83.7)		
Lifetime homeless (yes)	51 (42.9)	112 (43.6)	0.02	0.895
Lifetime legal Involvement (yes)	52 (43.7)	116 (45.1)	0.07	0.794

Table 2Clinical characteristics by treatment modality ($N = 377$).

	<i>n</i> (%)		χ^2 or <i>t</i>	<i>p</i>
	Residential (<i>n</i> = 119)	Outpatient (<i>n</i> = 258)		
Substance use disorder (SUD)				
Marijuana	44 (37.9)	105 (41.0)	0.32	0.574
Amphetamine	3 (2.6)	1 (0.4)	3.62	0.092 [†]
Sedatives	5 (4.3)	14 (5.5)	0.22	0.638
Cocaine	78 (67.2)	135 (52.7)	6.87	0.009
Opiates	35 (30.2)	51 (19.9)	4.72	0.030
Hallucinogens	0 (0.0)	9 (3.5)	4.18	0.062 [†]
Inhalants	0 (0.0)	1 (0.4)	0.45	>0.999 [†]
Phencyclidine	3 (2.6)	9 (3.5)	0.22	0.761 [†]
Alcohol	63 (54.3)	112 (43.8)	3.57	0.059
Multiple SUD (yes)	74 (63.8)	132 (51.8)	4.67	0.031
Mental health disorder				
Generalized anxiety	21 (17.6)	68 (26.5)	3.50	0.062
Posttraumatic	39 (32.8)	108 (42.0)	2.92	0.087
Major depressive episode	68 (57.1)	149 (58.0)	0.02	0.879
Dysthymia	5 (4.2)	7 (2.7)	0.57	0.531 [†]
Manic episode	27 (22.7)	91 (35.4)	6.11	0.013
Hypomanic episode	9 (7.6)	31 (12.1)	1.73	0.188
Dual diagnosis	89 (74.8)	186 (72.7)	0.19	0.664
Previous treatment	90 (75.6)	185 (72.3)	0.47	0.493
HIV test result (positive)	1 (0.9)	5 (2.0)	0.66	0.669 [†]
Multiple chronic health condition (2 or more)	26 (22.0)	65 (25.2)	0.44	0.507
Trauma symptom checklist, <i>M</i> (<i>SD</i>)	49.40 (20.94)	42.51 (21.29)	2.93	0.004

[†] Fisher's Exact Test.

Table 3

Network characteristics by treatment modality.

	Mean (SD)		<i>t</i>	<i>p</i>	Effect size (<i>d</i>)
	Residential (<i>n</i> = 119)	Outpatient (<i>n</i> = 258)			
Network composition*					
Partner	1.10 (1.00)	0.83 (0.77)	2.89	0.004	0.31
Family	9.87 (4.97)	9.90 (5.16)	−0.04	0.970	<0.01
Children	1.39 (1.51)	1.79 (1.82)	−2.11	0.035	0.24
Treatment	1.92 (3.09)	2.47 (3.53)	−1.53	0.126	0.17
Professional	1.06 (1.88)	1.32 (1.82)	−1.29	0.198	0.14
AODA users	10.42 (4.86)	7.55 (4.64)	5.50	<0.001	0.60
Use with	7.85 (4.92)	5.55 (4.27)	4.38	<0.001	0.50
Network support*					
Concrete	10.66 (6.61)	12.70 (6.59)	−2.79	0.005	0.31
Emotional	14.27 (5.31)	15.68 (5.87)	−2.24	0.026	0.25
Informational	14.20 (5.15)	15.32 (6.18)	−1.83	0.068	0.20
Sobriety	18.68 (4.89)	19.96 (4.98)	−2.34	0.020	0.26
Reciprocal	15.95 (4.73)	17.48 (4.20)	−3.03	0.003	0.34
Offering helping other	3.16 (2.83)	3.04 (2.65)	0.40	0.687	0.04
Negative	3.61 (4.27)	3.36 (4.33)	0.53	0.596	0.06
Very close	10.47 (5.18)	11.66 (5.50)	−1.98	0.048	0.22
Network structure					
Density	0.24 (0.21)	0.28 (0.27)	−1.59	0.112	0.17
Degree centralization	30.36 (16.07)	27.08 (16.35)	1.82	0.070	0.20
Between centralization	17.23 (16.63)	12.83 (13.96)	2.51	0.013	0.29
# of isolates	4.67 (5.06)	5.21 (5.66)	−0.88	0.381	0.10
# of components	1.55 (0.81)	1.50 (0.84)	0.64	0.525	0.07

* Indicates number of alters within a 25-alter personal network in each category.