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Social support network characteristics of incarcerated women with co-occurring major depressive and substance use disorders

Jessica E. Nargiso, Ph.D.,

Instructor, Department of Psychiatry, Harvard Medical School, Massachusetts General Hospital, Boston, MA USA 02114

Caroline C. Kuo, D.Phil,

Assistant Professor (Research), Center for Alcohol and Addiction Studies, School of Public Health, Brown University, Providence, RI, USA 02906. Honorary Lecturer, Department of Psychiatry and Mental Health, J-Block, Groote Schuur Hospital Observatory, Cape Town, South Africa

Caron Zlotnick, Ph.D., and

Professor, Department of Psychiatry and Human Behavior, Warren Alpert Medical School, Brown University, Providence, RI, USA 02906. Psychologist, Butler Hospital, Providence, RI, USA 02906

Jennifer E. Johnson, Ph.D.

Associate Professor (Research), Department of Psychiatry and Human Behavior, Warren Alpert Medical School, Brown University, Providence, RI, USA 02906

Abstract

The nature of social support available to incarcerated women is not well understood, particularly among women at high risk of negative outcomes, including women dually-diagnosed with Major Depressive Disorder and a Substance Use Disorder (MDD-SUD). Descriptive statistics and paired-tests were conducted on 60 incarcerated MDD-SUD women receiving in-prison substance use and depression treatments to characterize the women's social networks, including the strength of support, network characteristics, and types of support provided as well as to determine what aspects of social support may be amenable to change during incarceration and post-release. Study results showed that on average women perceived they had moderately supportive individuals in their lives, although more than a quarter of the sample could not identify any regular supporters in their network at baseline. During incarceration, women's social networks significantly increased in general supportiveness, and decreased in network size and percentage of substance users in their networks. Participants maintained positive social support gains post-release in most areas while also significantly increasing the size of their support network post-release. Findings suggest that there are aspects of incarcerated MDD-SUD women's social networks that are amenable to change during incarceration and post-release and provide insight into treatment targets for this vulnerable population.

Keywords

Social Support; Incarcerated Women; Dual Diagnosis; Depression; Substance Use Disorders; Treatment

Introduction

The United States has the highest rate of incarceration in the world (Mauer 2003). Incarcerated women are particularly vulnerable to poor mental health and to substance use problems (Baillargeon et al. 2009; Langan & Pelissier 2001; Lewis 2006). For example, prevalence of major depressive disorder (MDD) among incarcerated women is 11–14%, twice that of the general female population; 70% report lifetime substance use disorder (SUD), and 45–60% report SUD (Jordan 1996; Teplin 1996; Fazel & Danesh 2002; Binswanger et al. 2010). Among incarcerated women, co-occurrence of these disorders is especially common, with 32–38% of women in prison SUD treatment meeting lifetime criteria for MDD (Pelissier 2000; Zlotnick 2008).

Co-occurring MDD and SUD (MDD-SUD) puts women at risk for poor functioning in prison and poor re-adjustment to life in the community after release from prison. For example, individuals with co-occurring mental illness and SUDs are at substantially higher risk for multiple incarcerations compared to those with mental disorders alone or SUDs alone (Baillargeon et al. 2010). MDD increases the likelihood of relapse to substances and reduces the likelihood of successful substance use treatment (Brady, Krebs & Laird 2004; Hickert, Boyle & Tollefson 2009; Johnson et al. 2011b). Moreover, because many women are incarcerated for substance-related crimes (US Department of Justice 2000), return to substance use after release to the community can result in other negative outcomes including victimization, failure to find or keep legal employment, homelessness, risky sexual behavior, and reincarceration (Chandler 2009; Johnson 2012; Staton-Tindall, Roysse & Leukfeld 2007). A task force convened by the Depression and Bipolar Support Alliance concluded that co-occurring substance use and mental health disorders such as MDD-SUD “represent a legitimate public health crisis,” that is endemic to the criminal justice system and which “places an immense burden on individuals, families, and society” (O’Brien et al. 2004).

Social support is important to preventing SUD relapse and re-incarceration upon release from prison (Benda 2005; Liau et al. 2004; Parsons & Warner-Robbins 2002), especially for women (Chen 2009). Greater strength of social support has been associated with lower rates of depression among incarcerated individuals (Johnson et al. 2011a), long-term abstinence in community samples (Beattie & Longabaugh 1999; Dobkin et al. 2002; Havassy, Hall & Wasserman 1991; McMahon 2001; Witkiewitz & Marlatt 2004) and with lower daily substance use among women in the 6 months before incarceration (Harp, Oser & Leukefeld 2012). However, the social support networks of incarcerated women are often inadequate or actively criminogenic (Enos 2001; Fickenscher et al. 2001; Hickert, Boyle & Tollefson 2009). In addition, the more severe a female inmate’s substance use and criminal involvement have been, the smaller and less supportive her social support network becomes (Simpson, Knight & Dansereau 2004; Staton-Tindall, Roysse & Leukfeld 2007). Incarcerated

women face multiple life stressors during the high-risk time of community re-entry and inadequate social support may compromise dually diagnosed women's ability to effectively address these challenges.

Social support has been conceptualized as including three main components: strength of support, network characteristics, and the types of support offered. Strength of support reflects the perceived level of supportiveness provided by individuals in one's social support networks (Groh, Jason & Keys 2008). Important social network characteristics include the size of the network as well as the types of the people comprising the network, such as the percentage of substance users within the network (Zywiak, Longabaugh & Wirtz 2002). The types of support provided by one's social network can be tangible (e.g., exchange of physical items such as money, food, etc.) or intangible (e.g., through exchange of emotional support), or may be problem-specific, such as support for substance use treatment or attitudes of network members regarding a woman's continued use of alcohol or drugs (Groh et al. 2007; Groh, Jason & Keys 2008). Various kinds and sources of support may play different roles in an incarcerated woman's depression course, substance use recovery, and her re-entry efforts (Bui & Morash 2010; Harp, Oser & Leukefeld 2012; Johnson et al. 2011a; Staton-Tindall, Royse & Leukfeld 2007).

Unfortunately, the nature of social support available to women during incarceration and the changes in women's social networks during community re-entry are not well understood, especially among women at high risk for poor outcomes, such as those with MDD-SUD. A major emphasis of most prison-based substance use treatments is advising women to avoid associating with active substance users, framing this as a positive, healthy choice to make upon community re-entry. However, this advice fails to account for the environmental, economic and social context that have shaped these women's lives and the world that they return to after prison release. For example, women face significant structural and social barriers, such as poverty, discrimination, homelessness, histories of trauma and abuse, unemployment, limited education, limited treatment options, dependence on drug-using or abusive partner for shelter, economic support, or transportation to legally mandated treatment and other visits, and sometimes families and friendship networks in which there are no non-using members (Richie 2001; Kellett & Willging 2011; Johnson et al. in press; Johnson in press). These factors limit women's support network options after release (Kellett & Willging 2011). This study helps to inform the basic question of what is potentially changeable in the social networks of incarcerated women with MDD-SUD, and what is less so.

This paper describes the social support networks of incarcerated women with MDD-SUD who were participating in prison substance use treatment programs, in order to understand how these networks change over time, determine what social strengths and/or resources may be available to assist women transition to the community, and identify social network challenges that could be targeted in treatment. We describe levels, sources, and types of support available while women are incarcerated, and assess correlations among support variables to examine patterns in women's support networks. Second, we examine changes in support during women's last months in prison to determine which characteristics of women's networks may be mutable to change in the course of prison substance use

treatment and re-entry planning. Third, we identify interpersonal changes experienced by re-entering women that may be either important resources for or targets of treatment. These insights can provide a better understanding of what interpersonal strengths can be utilized as well as what social support resources may need to be strengthened in order to facilitate treatment or re-entry efforts.

Method

Participants

Participants for this secondary data analysis were 60 sentenced female state prisoners between 18 and 65 years of age incarcerated in minimum and medium security state prison facilities in the Northeastern United States who were participating in prison substance use treatment programs (day or residential prison treatment as usual; TAU). They were recruited to take part in one of two parent trials (an open pilot study or randomized clinical trial (RCT); Johnson & Zlotnick 2012) evaluating the effects of group depression interventions that were added to their existing substance use treatment for women prisoners nearing community release. Participants were eligible for these trials if they met the following criteria: (1) DSM-IV criteria for current primary (non substance-induced) major depressive disorder as determined by the Structured Clinical Interview (SCID-I) (First et al. 1996) after at least 4 weeks of incarceration and at least 2 weeks of prison SUD treatment; (2) DSM-IV criteria for substance (alcohol and/or drug) abuse or dependence in the month prior to incarceration; (3) a minimum score of 16 on the 17-item Hamilton Rating Scale for Depression (HRSD; Hamilton 1980, Keller 2003), indicating moderate to severe depression; and (4) 10–24 weeks away from release from prison. As has been done in other depression treatment outcome studies (O'Hara, Stuart, Gorman, & Wenzel 2000, Levin et al. 2013), the parent studies used a minimum HRSD score as an inclusion criterion to provide more range for Hamilton depression scores to decrease over time and to underscore the clinical significance of depressive symptoms. We recruited from a wide range of expected release dates (10–24 weeks away) given the unpredictability of actual release dates (Friedmann et al., 2008). Women were excluded if they: (1) met lifetime DSM-IV criteria for bipolar disorder or psychotic disorder; (2) were imminently suicidal; or (3) did not understand English well enough to provide informed consent.

Participants in both parent trials (Johnson & Zlotnick 2012) were enrolled in prison substance use day or residential treatment as usual (TAU), study-provided depression treatments, and many also received prison mental health TAU. Prison substance use TAU consisted of 18–30 hours per week of large-group psychoeducational classes and weekly individual counseling. This treatment was based on a relapse prevention model and encouraged women to stay away from drug users and heavy drinkers after community release. Prison mental health TAU included an antidepressant medication for 63.3% of the sample and another psychotropic medication for 45%; 43% received monthly prison mental health counseling. Study-provided depression treatments included an additional 3.75 hours of group intervention per week for 8 weeks in prison along with 6–15 hours of additional treatment spread over the 6–12 weeks after release. Depression interventions were either group interpersonal psychotherapy (IPT; which addresses interpersonal issues and works to

build social support) for 41 participants (68.3%) or group psychoeducation about co-occurring disorders (including how to access appropriate professional sources of support/help) for 19 women (31.7%). All participants in the open pilot study (n=19, 31.7%) received an adapted version of IPT in addition to the 18–30 hours of substance use TAU, other mental health TAU, as well as community follow-up TAU in the 6–12 weeks after release. Participants in the RCT were randomized to either an adapted version of IPT (n=22, 36.7%) or group psychoeducation (n=19, 31.7%) in addition to substance use and mental health TAU in prison and community follow-up TAU after release. After release, the prison referred all women in both parent studies for psychosocial substance use treatment (57% of the sample attended) and many for mental health counseling in the community (32% attended). Due to the small sample size the emphasis on removing substance users from women's networks in the 18–30 hours per week of prison TAU, and the range of other prison mental health TAU that women also received, this study does not explicitly test the effects of the experimental depression treatments on changes in social support or on substance use or depression outcomes at pre- or post-release.

Procedure

Recruitment and Consent Procedures—Participants were recruited through announcements made in prison substance use programs or housing units and through flyers. Women who indicated potential interest were approached privately for explanation of consent and study procedures. Study procedures were approved by Brown University's Institutional Review Board.

Assessments were at baseline (enrollment into the study in prison), pre-release (approximately 10 weeks later), and 3 months post-release. Of the 60 women providing study intake data, 59 completed pre-release assessments, and 54 completed the post-release assessment, which took place either in the community or at re-incarceration. This assessment was targeted for 3 months after release, but because women can be difficult to locate and interview after release from prison, these interviews took place as close to the 3 month mark as possible. Most interviews (89%) took place 2–4 months post-release. The remaining interviews took place 4–5 months (8%), 6 months (2%) and 8 months (2%) post-release.

Measures

Demographics—Demographic information, including race, ethnicity, income, marital status, and correctional history was collected through self-report.

Social Support Measures

Multidimensional Scale of Perceived Social Support (MSPSS): This 12-item scale measures overall strength of emotional support (e.g., “My family really tries to help me,” “I can count on my friends when things go wrong”) provided from three sources: family, friends, and “a special person” (Zimet et al. 1988; Zimet et al. 1990). Each item is rated on a 7 point Likert-type scale (1 “very strongly disagree” to 7 “very strongly agree”). In addition to providing a global score of social support (sum of all the 12 items, range from 12–84), this measure has 3 subscales to assess the social support provided by family, friends, and

“special” persons. The MSPSS has been used in various cultural settings (Bruwer et al. 2008). This measure assessed perceived social support at in-prison study intake (i.e., assessed current, not pre-prison, social support).

Important People and Activities Measure (IPA): (Zywiak, Longabaugh & Wirtz 2002) measures strength of general social support, network size and characteristics, and social support related to substance use and substance use treatment. The IPA has been widely used in alcohol research and was adapted to measure drug use outcomes; it has good reliability and validity (Zywiak, Longabaugh & Wirtz 2002). Participants list up to 12 people (e.g., family, friends, people at work), who have had a significant impact on their life in the past 3 months, regardless of whether they are liked or disliked. For each support person named, the participant completes 11 items, including their relationship to the participant, the amount of weekly contact, degree of general, treatment and substance use specific support, as well as each person’s alcohol and drug use status. Zywiak et al. (2002) validated indices created from the IPA that are used in this study (see Table 1). This measure assessed current network characteristics at the in-prison study intake. Women had phone and/or letter access to all potential network members while incarcerated.

Data Analysis Plan

First, we described strength of support, sources of support, network characteristics, and the type of support provided to women while incarcerated, using MSPSS scores and IPA indices from the baseline assessment. We also conducted Spearman correlations among baseline support variables to examine patterns in women’s support networks. Second, paired t-tests were used to examine changes in social support from baseline to pre-release, to assess which kinds of support changed during women’s last few months of prison substance use treatment and re-entry planning. Finally another set of paired t-tests was conducted with the social support measures from pre-release to the post-release follow-up assessment to examine changes in social support following the women’s return to the community.

Results

Baseline Sample Characteristics

As shown in Table 2, participants were predominantly Caucasian (81.7%) or African American/Black (16.7%); 18.3% identified as Hispanic. The average age was 35.5. At baseline, participants had severe depression and substance use disorders and high levels of psychiatric comorbidity. Women’s average Hamilton Rating Scale for Depression score was 26.2, and most reported more than 10 lifetime episodes of depression. Women’s primary substances of dependence were alcohol, cocaine, and opiates (Table 2) with a mean of 129 days of heavy drinking (4+ drinks) or drug use in the 180 days prior to incarceration. Most reported lifetime physical (85%) or sexual (70%) abuse, and many met DSM-IV criteria for borderline (33.3%) or antisocial (48.3%) personality disorders. The average length of the participants’ current sentence was 15.6 months (range: 3–60 months). The average number of arrests for the sample was 8.7 (range: 1–29). The most common offenses included drug or alcohol related charges (28%) and robbery/larceny (22%).

Aim 1: Characteristics of Social Support Levels, Networks, and Types at Baseline

Strength of Support—Women rated their network members as moderately supportive (MSPSS total score $M = 56.1$ on a 12–84 scale, $SD = 15.9$; IPA general support $M = 4.8$, $SD = 1.6$; the score is based on a 6 point scale from 1 “not at all supportive” to 6 “extremely supportive”; see Table 1). According to the MSPSS subscales (potential scores for MSPSS subscales range from 4 to 28), participants reported similar levels of social support from a “special person” ($M = 19.7$, $SD = 6.4$), family members ($M = 18.2$, $SD = 7.9$) and friends ($M = 17.9$, $SD = 6.0$). The IPA average general support scores of romantic partners ($M = 5.3$, $SD = 1.3$), family members ($M = 5.3$, $SD = 1.3$), and friends ($M = 5.3$, $SD = 1.1$) also demonstrated similar levels of support (Table 3).

Network Characteristics—At baseline, the women reported an Almost Daily Network size of approximately 2 people (range: 0 to 7 people). Almost daily network reflects the average number of people with whom participants have had regular contact (3–7 times a week) and who they consider to be important supports for them over the past 3 months. Notably, 28.3% were not able to identify a single supportive person with whom they had regular contact. Just under half of the women’s support networks (44%) were comprised of either drinkers and/or drug users, with women endorsing an average of 33% of their supporters being drinkers and 19% of their supporters being drug users. An average of 45% of family network members were current substance users (drinkers and/or drug users) while 45% of friends and 53% of romantic partners network members were identified as current substance users. Women reported a higher average alcohol network score (measure of contact with alcohol users in their network; see Table 1) compared to drug network score, indicating the women interacted more regularly with network members who were drinkers (including light, moderate, and heavy drinkers) than those who were drug users at the baseline assessment.

Types of Support Provided—Women reported that on average, the individuals in their network were highly supportive of the woman’s substance use treatment ($M = 5.6$, $SD = .77$ on the 1–6 IPA scale) at baseline. The women reported low acceptance of their drinking and/or drug use among their social support networks, with mean drinking and drug use support scores of 2.5 at baseline (scale ranged from 1 “left, or made you leave when you were drinking/using” to 5 “encouraged”). Family members, friends, and romantic partners were considered to be equally supportive of treatment.

Correlations of Social Support Indices at Baseline—Table 4 summarizes correlations among measures of social support. Higher overall MSPSS total score, a measure of overall strength of emotional support, was positively associated with IPA general support, the similar measure assessing average general supportiveness of network members. Both measures of strength of support were also significantly associated with more support for treatment within the women’s networks. A more supportive social network as measured by the MSPSS total score, as well as the “special person” and friend subscale scores, was associated with having a larger overall network size. The IPA measure of average general support was not correlated with network size. Other characteristics of the social support network, including the percentage of drinkers or drug users were also unrelated to the size of

the support network, although women with higher alcohol involvement scores had larger networks. Women who had a higher percentage of drug users in their networks reported less family support; while women who had a higher percentage of network substance users (drinkers and/or drug users) reported more friend support within their network. Additionally, networks composed of more drug users were also found to be more supportive of the women's drinking and drug use, whereas networks that provided more general support (as measured by the IPA) were less supportive of drinking or drug use.

Aim 2: Changes in Social Network from Baseline to Pre-release

Strength of Support—Women reported an increase in the MSPSS summary score, from an average of 57.1 at baseline to 61.2 ($t(54)=2.1$, $p=.04$) at pre-release. Similarly, the IPA measure of general support also increased (4.8 to 5.4; $t(57)=3.0$, $p=.004$) over this time period. There were no significant changes in the MSPSS subscales or the IPA average general support scores by relationship status (romantic partners, family members, friends).

Network Characteristics—The make-up of women's social networks changed as women neared prison release. They reported significant decreases in overall network size, as well as reductions in the percentage of drinkers and overall percentage of substance users (measure of percentage of drinkers and/or drug users) in their networks. Reductions in substance users in the network occurred across family members and friends; there was also a trend towards reducing the percentage of romantic partners in their network ($p=.05$). Contact with substance using network members was also reduced over this time, with significant reductions in the women's average alcohol and drug involvement scores from the baseline to pre-release.

Types of Support—There were no significant changes in overall support for substance use treatment or support for drinking or drug use as women neared release.

Aim 3: Changes in Social Network from Pre-release to Post release

Strength of Support—In the months following release from prison, participants reported consistent levels of support from significant others (romantic partners/"special person"), family members, and friends according to the MSPSS and the IPA.

Network Characteristics—Although average daily network size increased in the months following release (from 1.3 to 3.0), the percentage of drinkers and drug users in women's networks did not. Additionally, there was not a significant change in their average alcohol or drug involvement scores over this time period.

Type of Support Provided—Overall support for treatment among network members was steady in the months following release. However, relationship-specific support for treatment by romantic partners, family members and friends significantly decreased during this time period. There were no changes in support for drinking or drug use from pre-release to post-release.

Discussion

Baseline Characteristics of Social Support

Results highlight a number of strengths of the women's social support networks while incarcerated. Despite women's clinical reports of conflicts with important people in their lives, women on average perceived their networks to be at least moderately supportive at baseline. Greater strength of support was also positively correlated with greater support for substance use treatment among network members and negatively correlated with support for continued drinking. Results from the MSPSS also suggest that larger networks were associated with women perceiving greater supportiveness of their social network.

Examining characteristics of women's networks also revealed potential challenges. More than a quarter (28%) of women failed to identify a single supportive person whom they have regular contact at baseline (contact 3–7 times per week). While on average women perceived their networks to be at least moderately supportive, there was a subset of women with inadequate support networks during their incarceration. This is notable given that all participants were involved in in-prison treatment programs and were close to release, indicating that they did not consider the staff of these programs to have played the role of a “supportive person” in their lives. This could warrant further research into women's perceptions of in-custody treatment staff and what they feel constitutes a “supportive person” in the context of prison and re-entry.

Women's networks were also comprised of a high percentage of substance users. Nearly half (44%) of the networks members were identified as being either a drinker and/or drug user at baseline and although this percentage decreased leading up to release from prison, nearly a third of women's network members were identified as substance users at pre-release. A social network composed of a greater number of substance users represents a substantial risk for relapse for these women (Longabaugh et al. 2010; Zywiak, Longabaugh & Wirtz 2002).

Although both measures of the strength of social support found similar levels of support provided by significant others, family members, and friends, women who reported greater family support at baseline had fewer drug users in their networks. It is possible that family members may be less tolerant of drug users in the person's social network and may therefore play a greater role in encouraging women to remove drug users from their support network. Another possible explanation is that women with more substance users in their networks (possibly a proxy for more severe addiction) have less family support as family members have given up trying to help them. However, women who indicated more friend support had networks that were composed of more substance users. This finding highlights some of the strengths and weaknesses in these women's networks and demonstrate that all “support” may not be good support. More supportive friendships with other substance users may not be related to better SUD-MDD outcomes. On the other hand, more supportive relationships with family members might be more effective in helping the women avoid negative influences.

Changes in Social Network from Baseline to Pre-release

Women reported an overall increase in perceived strength of social support during their last few months of prison substance use and mental health treatment and reentry planning. We are not able to determine whether the treatment received in prison influenced social support; however, the significant increases in strength of social support suggests that these variables may be amenable to change during incarceration and therefore may be reasonable treatment targets. Although overall perceived supportiveness of network members increased, the size and substance involvement of women's networks decreased over the women's last few months of incarceration and prison treatment. Women significantly reduced the percentage of substance users in their networks during this time. Additionally, participants reported significant declines in the alcohol and drug network involvement scores, which capture the women's level of interaction with alcohol and drug users in their social networks. These findings may suggest that women made efforts to eliminate users from their networks and/or decrease their level of involvement with network members who were perceived as less supportive. Alternatively, it is possible that users in their network did not sustain contact with the women during their incarceration and therefore removed themselves from these women's networks. That the makeup of networks could change over the months leading up to prison release is promising given that having a greater percentage of abstinent individuals has predicted better treatment outcomes in community samples (Falkin & Strauss 2003; Zywiak, Longabaugh & Wirtz 2002). Over the last few months of incarceration, women's networks became smaller, but those people left in their networks were more likely to be supportive and less likely to be substance-involved.

These findings have implications for treatment development. For example, tenets from behavioral couples therapy (BCT; McCrady & Epstein 2008; O'Farrell & Fals-Stewart 2006) could be incorporated into in-prison treatment as the women near re-entry. This represent an opportunity to have women's network members (e.g., significant other, close family) learn how to best support recovery efforts upon release as well as facilitate the process of women regaining the supporters' trust. A recent review found that BCT was superior to individual therapy in terms of women's drinking outcomes and also resulted in better relationship functioning (O'Farrell & Clements, 2012).

Post-release Changes in Social Support

In the months following release from prison, women increased the number of supporters in their almost daily network from 1.3 to 2.4. In community samples, larger social networks predicted greater likelihood of abstinence following substance use treatment (Zywiak, Longabaugh & Wirtz 2002; Zywiak et al. 2009). The increase network size post-release may reflect a change in environment that enables more regular interactions with social supports compared to the prison environment. On average, the percent of drinkers and drug users in women's networks did not increase, suggesting that most of the increased network size following community re-entry did not represent a return of the substance using individuals to their support networks.

The overall MSPSS and IPA general support scores remained unchanged over the post-release time period, however, support for treatment from romantic partners, family

members, and friends decreased following release from prison. Since the majority of these women relapsed at least once during the months following release, a substance use relapse or “slip” may have reduced supporters’ belief that treatment could be helpful. Additionally, supporters may expect the women to be “cured” during incarceration and may be less supportive of women continuing in treatment post-release. As mentioned previously, incorporating other supporters into treatment prior to release, including providing psychoeducation regarding substance use disorders and depression can help the network members have a more realistic understanding of the challenges these women face, and proactively address some of the barriers to re-entry.

Limitations

The sample size was relatively small ($n = 60$) and we conducted many comparisons in order to capture multiple aspects of these women’s social networks. The majority of the participants were non-Hispanic White (72%); although this is consistent with the incarcerated female population in the states in which we recruited, findings may not generalize to other areas of the United States that have higher incarceration rates of minority groups. Also, due to the single-group design, this study describes changes that occurred in social support networks, but we are not able to examine why or how these changes occurred. Since 68% of the sample received 8 weeks of in-prison depression treatment that included a focus on building social support networks, it is possible that changes in social support characteristics may be an effect of IPT and future research can help clarify whether IPT offers additional benefits over TAU. Last, although the follow-up assessment periods were designed to be equivalent, there were varying lengths of post-release follow-up due to difficulties locating some of the women.

Conclusions/Clinical Implications

Despite these limitations, a major strength of the study is the detailed analysis of interpersonal networks in a high-risk, understudied population. The multiple types and measures of social support allow us to characterize the support networks of this unique sample of dually-diagnosed women followed longitudinally to provide a rich description of what that support looks like in the months leading up to release, as well as in the first few months post-release.

A large proportion of women in prison have a SUD and the majority receive advice to not associate with drug-involved individuals after release; however, it has previously been unclear the extent to which women are able to heed this advice given the economic and other contextual realities of their lives. Findings suggest that, on average, some aspects of social support networks can change while women are incarcerated and that some of these changes can be maintained after release. Both measures of general support increased during the months leading up to community re-entry. Moreover, the composition of women’s networks also changed over this time, with significant reductions in the percentage of substance users from their networks and women reduced the amount of contact with substance users in their networks. The size of the almost daily network also decreased during this time. These findings suggest that during incarceration, women were able to take positive steps to reduce contact with negative supporters while also improving the perceived

strength of their networks. Findings indicating average changes do not mean that all MDD-SUD women are able to change aspects of their social networks; however, on average, women leaving prison were able to make and maintain at least some short-term changes in their support networks.

In conclusion, although a subset of women did not have regular contact with any supportive people in their lives while incarcerated, on average the women reported improvement in the supportiveness of their networks over the final months of incarceration even though the size of their networks declined, suggesting that less supportive people were dropped from their networks during this time. The women also reported reductions in the substance users in their networks which may explain the decrease in network size over this time as the women may have chosen to remove using or unsupportive people from their networks. The women generally maintained these network changes in the months following release, with similar levels of overall support and no increases in substance users or contact with existing users in their networks, highlighting the possibility that network changes made in prison can be sustained after release. Findings suggest that aspects of social support (e.g., strength of support, size of network, percentage and level of contact with substance users) are malleable factors that may be amenable to change while women are incarcerated and post-release while the type of support provided (e.g., overall support and/or disapproval of substance use and support for treatment) did not shift substantially over the course of the study. Future research, including following women for a longer period of time after re-entry, would help inform what social support changes may be maintained as well as which structural interventions (e.g., housing, employment, medical insurance, transportation) may increase women's ability to sustain these positive changes (Johnson et al., in press). These findings also highlight the need for continued research to better understand how to building and maintaining healthy social supports can buffer against the multiple stressors (e.g., housing, job, caring for children, stigma) and improve outcomes for MDD-SUD women who are at high-risk for adverse substance use, mental health, and re-incarceration, following community reentry.

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Table 1

Description of IPA indices

Important People and Activities Measure (IPA)	Variable Description and Coding	Response Categories
<u>Index</u>		
<u>Strength of Support</u>		
General Support	Extent person is “generally supportive of you, by being sensitive to your personal needs, helping you think about things, and by giving you the moral support you need.” Average scores for all members in the network were computed.	1= Not at All Supportive to 6= Extremely supportive
<u>Network Characteristics</u>		
Size of Almost Daily Network	Number of people in network with whom they have had contact with 3 to 7 times a week	N/A
Percent Drinkers in Network	Network members identified as light, moderate, or heavy drinkers were coded as drinkers. Abstainers and recovering alcoholics were coded as non-drinkers. The total number of drinkers divided by the number of network members gives the total percentage for each individual.	N/A
Percent Drug users in Network	Network members identified as light, moderate, or heavy drug users were coded as drug users. The total number of drug users divided by the number of network members gives the total percentage for each individual.	N/A
Percent Substance Users in Network	Overall percentage of the woman’s social network that is comprised of members who were coded as drinkers and/or drug users. The percent of substance users in the networks was also calculated separately for members designated as romantic partners, family members, and friends.	N/A
Alcohol Involvement Score	This index estimates the drinking frequency of network members weighted by frequency of contact. This score is calculated by multiplying the frequency of alcohol use by network members (e.g., daily drinking, drinking 3–6 days/week) by the amount of contact (e.g., daily, 3–6 times a week, 1–2 times a week)	Frequency of drinking: 0=not in the past month to 7=daily; Frequency of contact: 1=once in past 6 months to 7=daily
Drug Involvement Score	This index estimates the drug use frequency of network members weighted by frequency of contact. This score is calculated by multiplying the frequency of drug use by network members (e.g., daily drinking, drinking 3–6 days/week) by the amount of contact (e.g., daily, 3–6 times a week, 1–2 times a week)	Frequency of drug use: 0=not in the past month to 7=daily; Frequency of contact: 1=once in past 6 months to 7=daily
<u>Type of Support Provided</u>		
Support for Treatment	Network members’ attitude towards the participant getting treatment. A mean score across network members was calculated. Three additional mean scores were created for network members coded as romantic partners, family members, and friends.	1= Strongly Opposes to 6=Strongly Supports
Support for Drinking ^a	The mean response to the participant’s drinking among all network members. Three additional scores were calculated for network members coded as romantic partners, family members, and friends.	1= Left, or Made You Leave When You’re Drinking to 5=Encouraged
Support for Drug Use ^a	The mean response to the participant’s drug use among all network members. Three additional scores were calculated for network members coded as romantic partners, family members, and friends.	1= Left, or Made You Leave When You’re Using Drugs to 5=Encouraged

Note. Zywiak et al. 2002 provides detailed description and scoring of IPA indices.

^aThese items were not answered if the individual had not used any alcohol or drugs in the past 3 months, therefore the n’s for these items are lower than other variables.

Table 2

Sample Characteristics

Demographics	Mean (SD) N=60
Age	35.47 (9.65)
Average number of weeks incarcerated	24.82 (31.40)
	N (%)
Race	
African-American/Black	10 (16.7%)
Non-Hispanic/White	49 (81.7%)
Other	1 (1.7%)
Ethnicity	
Non-Hispanic	49 (81.7%)
Hispanic	11 (18.3%)
Legal income [*]	
< \$10, 000	44 (73.4%)
\$10,000–\$20,000	7 (11.7%)
\$20,000–\$30,000	1 (1.7%)
\$30,000–\$40,000	2 (3.3%)
\$40,000+	6 (10.0%)
Marital Status	
Single (Never Married)	37(61.7%)
Married/Living with partner	6 (10.0%)
Divorced/Separated	16 (26.6%)
Widowed	1 (1.7%)
DSM-IV Diagnoses	
MDD Diagnosis Intake	60 (100%)
DSM-IV Alcohol Diagnosis ^{**}	
Abuse	2 (3.3%)
Dependence	35 (58.3%)
None	23(38.3%)
DSM-IV Drug Use Diagnosis ^{**}	
Cocaine Abuse	3 (5.0%)
Cocaine Dependence	30 (50.0%)
Heroin/Opioid Abuse	2 (3.3%)
Heroin/Opioid dependence	21 (35.0%)
Sedative-Hypnotic Abuse	1 (1.7%)
Sedative-Hypnotics Dependence	13 (21.7%)
Halluc/Other Dependence	4 (6.7%)
Cannabis dependence	11 (18.3%)
Cannabis abuse	1 (1.7%)

* In the year prior to incarceration

** In the month prior to incarceration

Table 3

Summary of Social Support Measures

Variable (n's listed for t-tests of baseline to pre-release and pre-release to post-release changes)	Baseline Mean (SD)	Pre-Release	Post-release
<u>MSPSS Social Support Variables</u>			
<i>Strength of Support</i>			
MSPSS Total Score (55, 50)	57.13(15.55)	61.18(14.30)*	62.86(18.38)
"Special Person" Support (58, 51)	19.75 (6.37)	21.36(5.48)	21.71(7.25)
Family Support (57, 50)	18.22 (7.87)	20.15(7.00)	20.06(7.99)
Friend Support (56, 51)	17.93 (6.03)	19.37(6.00)	20.46(6.02)
<u>IPA Social Support Variables</u>			
<i>Network Characteristics</i>			
Size Almost Daily Network (58, 48)	2.02 (1.83)	1.34 (1.78)*	2.98 (2.45)**
Percent drinkers in Network (55,46)	33.29 (34.08)	26.25 (30.70)**	21.80 (29.20)
Percent drug users in Network (55,46)	18.62 (29.43)	14.40 (29.07)	9.37 (23.99)
Percent overall substance users in Network (55, 46)	43.91 (35.40)	31.84 (35.14)**	26.50 (35.09)
% romantic partners (18, 10) ^a	52.89 (34.95)	39.61 (35.29)	44.00 (32.62)
% family members (45, 38)	45.36 (34.58)	31.13 (32.45)**	28.58 (35.10)
% friends (28, 21)	45.00 (31.89)	29.64 (31.45)*	32.33 (39.05)
Alcohol Involvement Score (52, 46)	6.57 (6.27)	3.95 (5.17)**	4.92 (9.41)
Drug Involvement Score (54,46)	5.60 (8.99)	2.91 (6.65)*	2.13 (8.00)
<i>Strength of Support</i>			
Overall General Support (58, 48)	4.79 (1.64)	5.45 (.86)**	5.52 (.87)
Romantic Partners (18, 10)	5.28 (1.32)	5.06 (1.51)	5.30 (1.57)
Family Members (45, 38)	5.27 (1.27)	5.47 (.99)	5.32 (1.09)
Friends (28, 21)	5.29 (1.15)	5.45 (.64)	5.62 (.59)
<i>Types of Support Provided</i>			
Overall Treatment Support (53, 45)	5.60 (.77)	5.79 (.41)	5.62 (.73)
Romantic Partners (18, 10)	5.67 (.84)	5.72 (.67)	5.20 (1.03)*
Family Members (44, 35)	5.79 (.51)	5.89 (.32)	5.66 (.59)*
Friends (27, 21)	5.85 (.32)	5.78 (.42)	5.43 (.75)*
Overall Support-Drinking (22, 13) ^b	2.50 (.80)	2.68 (.89)	2.85 (1.21)
Romantic Partners (6, 3)	2.83 (1.17)	3.00 (.89)	3.67 (.58)
Family Members (20, 12)	2.40 (.82)	2.50 (.83)	3.00 (1.13)
Friends (9, 5)	2.55 (.88)	2.55 (.73)	2.20 (1.30)
Overall Support - Drug Use (30, 18) ^b	2.50 (.90)	2.47 (.82)	2.56 (.92)
Romantic Partners (12, 4)	2.42 (.90)	2.42 (1.00)	3.50 (1.29)
Family Members (25, 15)	2.32 (.75)	2.16 (.62)	2.27 (.96)
Friends (15, 7)	2.60 (.83)	2.67 (.82)	2.57 (.53)

Note. Substance Users include drinkers, drug users or both. Significant results of paired tests between baseline and pre-release social support scores are presented in the pre-release column; significant results of paired t-tests between pre- and post-release are presented in the post-release column;

*
p<.05,

**
p<.01.

^aThe n's for these items are smaller, and vary by type of relationship, since not all women identified romantic partners, family members, or friends as part of their social networks on the IPA.

^bThese items were not answered if the participant had not used any alcohol or drugs in the past 3 months, therefore the n's for these items are lower than other variables

Table 4

Spearman Correlation of Baseline Social Support Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. MSPSS Total Score														
2. MSPSS: Special Person Support	.72**													
3. MSSS: Family Support	.80**	.38**												
4. MSPSS: Friend Support	.76**	.50**	.38**											
5. General Support	.35**	.20	.24	.26*										
6. Almost Daily Network Size	.32**	.34**	.14	.38**	-.04									
7. % Drinkers in Network	.12	.17	-.002	.22	-.15	.20								
8. % Drug Users in Network	.20	-.08	-.33**	.04	-.21	.11	.30*							
9. % Substance Users in Network	.02	.12	-.16	.27*	-.17	.18	.87**	.55**						
10. Alcohol Network Involvement	.10	.26	-.07	.28	-.31*	.45**	.84**	.23	.74**					
11. Drug Network Involvement	-.14	.06	-.19	.07	-.23	.22	.14	.95**	.44**	.30*				
12. Treatment Support	.27*	.11	.23	.14	.63**	-.13	-.19	-.17	-.21	-.33*	-.09			
13. Support for Drinking	-.15	.01	-.07	-.20	-.47**	.03	.26	.35*	.23	.19	.34	-.21		
14. Support for Drug Use	-.24	-.16	-.16	-.07	-.15	-.10	-.05	.45**	.14	.01	.47**	-.05	.56**	

 $p < .01$,*
 $p < .05$

Note. Higher scores for support for drinking and drug use indicate more support for use.