

A Social Network Profile and HIV Risk Among Men on Methadone: Do Social Networks Matter?

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ABSTRACT *The paper describes structural and HIV-related network characteristics and examines associations between these various social network domains and HIV risk behaviors among a sample of 356 men randomly selected from a methadone maintenance treatment program (MMTP) in New York City. Multiple logistic regression analyses suggest that (1) a higher level of perceived sexual risk among network members, referred to as “alters” in this study, was associated with an increased likelihood of the participant engaging in sexual risk behaviors; (2) participants who indicated that they exchanged encouragement with a higher number of network alters about using condoms were less likely to report engaging in unprotected sex; and (3) participants who indicated that they talked about HIV risks with a higher number of network alters were less likely to engage in unprotected sex in the past 6 months. Collectively, these findings support the notion that networks may influence the adoption of risk reduction strategies in this population. Implications of the findings for HIV prevention network interventions for men in MMTPs are discussed.*

KEYWORDS *HIV, Methadone, Social networks.*

INTRODUCTION

HIV seroprevalence rates among patients in methadone maintenance treatment programs (MMTPs) in East Coast urban areas range from 18% to 43%, with substantially higher rates reported for African-Americans and Latinos.¹⁻³ Although MMTP populations infected with HIV/AIDS steadily decreased and then leveled off during the past decade, the high rates of sexually transmitted infections (STIs) found in this group provide corroborating evidence of widespread unsafe sexual practices and raise continued concern about the increased risk of transmitting HIV.¹ Recent research suggests that men in MMTPs continue to engage in risky sexual behaviors, and condom use remains low.³

Accumulating research has highlighted the importance of the social context⁴⁻⁷ in understanding sexual HIV risk behaviors among drug users, which may in turn inform the design of effective prevention and intervention strategies to reduce HIV risks among individuals and their social networks. Although extensive research has been conducted on social networks among drug users, most has been limited by a narrow focus on social network domains, focusing on either structural or functional characteristics, risk networks or social networks, sexual behaviors of network

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members and participants, and either negative or positive influences on risk reduction behaviors. Little research has attempted to examine collectively the effect of structural characteristics of social networks and the positive and negative influence of network members' behaviors on sexual risk behaviors among men in MMTPs. A broader scope of research on these network domains may yield more nuanced data that may help guide future network interventions for this population.

The Relationship Between Network Structure and HIV

Sexual Risk Behaviors

Research indicates that structural characteristics of the network (e.g., size, density) have been found to be associated with sexual HIV risk behaviors. For example, higher density and larger network size have been found to be associated with sexual risk behaviors, such as having multiple sexual partners.^{5,8} Friedman et al.⁶ found that members of a large connected network were more likely to be infected with HIV than unlinked persons or members who had weak ties. This suggests that once HIV infection is introduced into a dense social network, transmission of the virus is likely to occur.⁶ Research has also consistently shown that having a larger proportion of high-risk members in the network is associated with sex and drug use behaviors.⁹⁻¹²

Social Network Influence

Sexual risk behaviors among individuals in a social network can be influenced by peer norms. The role of peers in influencing HIV risk behaviors is well supported in the literature.^{6,11,13} The social network may encourage or discourage HIV risk reduction. Attitudes and behaviors, including HIV risk behaviors, are confirmed and reinforced when they are shared with network members but are more likely to be changed if they differ.¹⁴ Social Learning Theory¹⁵ provides a conceptual explanation of how this link occurs. Substance abusing network members provide dysfunctional role models¹⁶ and reinforce maladaptive behaviors.¹⁷ According to Social Learning Theory, members who use drugs serve as "environmental cues" that may trigger craving and relapse to sexual risk behaviors.⁷ In a study among 70 MMTP patients, those with at least one drug user among their closest significant others were more likely to relapse and have poor treatment outcomes.¹⁸ The Theory of Planned Behavior¹⁹ has also been used to explain how social networks link sexual risk behaviors. It suggests that there are two types of peer social influences, proscriptive and descriptive. Proscriptive influence refers to when people do what individuals in their network tell them to do. Descriptive influence refers to what individuals in the social network actually do and what they think others should do.¹⁹ Both proscriptive and descriptive behaviors were found to be associated with HIV risk behaviors.^{20,21} They play an important role in the maintenance of social relationships and also constitute barriers to behavioral change.^{13,22} This underscores that social relationships may negatively or positively influence risk reduction behaviors. Research also suggests that networks constitute a mechanism for sexual behavior norms. Latkin et al.²³ found that having drug using members in a network was associated with a greater likelihood of engaging in sexual risk behaviors among drug users after adjusting for baseline drug use. In another study of 1,051 participants drawn from drug treatment programs, Latkin et al.¹³ found that self-reported condom use was strongly associated with positive norms about using condoms among network members. Furthermore, strong associations were found between self-reported condom use and perceptions of friends talking

about condoms, friends using condoms and encouraging others to use them. Moreover, studies have found that risk behaviors are more strongly associated with perceptions of peers' sexual risk behaviors than are peers' actual behaviors.^{13,24,25}

This paper addresses a gap in the current literature by considering the influence of social network characteristics on patterns of sexual risk behaviors among men in MMTPs. The paper focuses on several social network domains that may be related to patterns of risk behaviors or risk reduction among a random sample of 356 men in MMTPs. These social network characteristics include social network structure (e.g., density, size, gender of alter), perceived sexual HIV risk behaviors among network members (e.g., having sex with more than one partner, having sex with an HIV positive person or an injecting drug user), and social network influences related to HIV risk reduction (e.g., whether participants and network members encouraged each other to use condoms or talked to each other about HIV/AIDS risk reduction). Finally, the paper examines the associations between these various social network domains and sexual risk behaviors among men in MMTPs, controlling for potentially confounding socio-demographic and network characteristics.

METHODS

Sampling and Recruitment

The study was conducted between 1999 and 2004. From a total population of 2,067 men enrolled in seven MMTPs in New York City, we randomly selected 1,300; of these, 790 agreed to participate and completed a 15-minute screening interview. Of the 790 men screened, 356 met eligibility criteria and completed a 90-minute face-to-face, structured interview administered by experienced male interviewers. Eligibility criteria for the study were (1) being male aged 18 or over, (2) being enrolled in an MMTP for at least 3 months, and (3) during the past year, having had a sexual relationship with a woman whom the participant described as his girlfriend, spouse, regular sexual partner, or the mother of his children. Six cases were excluded because these participants were unable to follow the instructions for answering the network section questions. The institutional review boards of the participating MMTPs and Columbia University (the research institution) approved the protocol for this study. More details of recruitment are provided in another paper.²⁶

Measurement

Participant Sociodemographic Characteristics Participants provided self-reported sociodemographic data, including age, years of education, race/ethnicity, whether they experienced unemployment in the past 6 months, and criminal justice involvement (arrest and/or incarceration) in the past 6 months.

Participant Sexual HIV Risk Behaviors Sexual HIV risk was assessed with several items focusing on behaviors that occurred in the 6 months prior to the assessment time point, including whether the participant was sexually active, always used condoms during vaginal and anal sex with both regular and casual sex partners, had more than one sexual partner, engaged in sex trading (both buying and selling sex for drugs and/or money), and had sex with someone he knew or suspected was HIV positive and/or an injecting drug user (IDU).

Social Network Measures Information about a participant's social network was elicited using the Social Network and Support Questionnaire for Methadone Patients, which was adapted from the network section of the General Social Survey.²⁵ The participant was asked to report his frequent contacts in the past 6 months, including his wife, common-law wife, girlfriend, or any regular sexual partners, friends or associates, family members or relatives, neighbors and/or coworkers. Among these contacts, the participant was asked to choose a maximum of five people (referred to in this paper as "alters") with whom he had the most frequent contact in the past 30 days. The social network questions focused on the participant's reports of each alter's sociodemographic characteristics, HIV risk behaviors (including the joint activities of an alter and the participant) and support for risk reduction between each alter and the participant.

Network Structure Network structure measures included total size (defined as the total number of people whom the participant frequently "interacted with, did drugs with, had sex with, talked to or visited" in the past 6 months), network size of most frequent and recent contacts (defined as the total number of people whom the participant most frequently contacted in the past 30 days), density (operationalized as the sum of the closeness score among network members, including links among alters and links between participants and alters, divided by the total number of network links; the closeness scores were defined as 0 = "stranger" or "dislike each other," 0.5 = "acquaintance," 1 = "close"), number of immediate family alters (defined as a count of alters who participants identified as a parent, sibling or child but excluded spouse), and gender of alters.

Network Sexual HIV Risks Network HIV risk measures used in this study included the participant's reports on number of alters who were HIV positive, number of alters whom the participant knew or suspected ever had sex with someone HIV positive or an IDU, and number of alters who had another sex partner other than the participant in the past 6 months.

Network-Positive Influence Related to HIV Risks Network positive influences related to HIV risk measures included the number of alters who exchanged encouragement of condom use with the participant (or vice versa) in the past 6 months and number of alters who talked about HIV/AIDS risks with the participant (or vice versa) in the past 6 months.

Data Analysis

Descriptive statistics were calculated for participants and their social networks. Logistic regression was used to estimate the associations between network HIV characteristics and participants' sexual risk behaviors. First, we examined unadjusted odds ratios for the bivariate associations between each network characteristic and participants' HIV risks by regressing each participant's HIV risk behavior measure on each network structure. Then we analyzed each of the participant's HIV risks as outcome variables with network HIV risks and network-positive influences as independent variables. Each logistic regression model included one outcome variable and one network predicting variable, with covariance adjustment for network structure and participants' sociodemographic variables. The statistical analyses were performed using STATA.

TABLE 1. Sociodemographic characteristics, HIV risks and substance use of 350 participants

	Number	Percent
Sociodemographic characteristics		
Age	Mean = 43.6	SD = 8.5
Years of schooling	Mean = 11.6	SD = 2.3
African American	130	37.1%
Latino	158	45.1%
Unemployed in the past 6 months	164	46.9%
Arrested or incarcerated in the past 6 months	90	25.7%
HIV risks in the past 6 months		
HIV positive	49	14.0%
Had more than one sex partner	86	24.6%
Did not always use condoms	239	68.3%
Had sex with someone HIV positive or IDU	57	16.3%
Traded sex for money or drugs	33	9.4%
Had sex with men	4	1.1%

RESULTS

Background Characteristics of Participants

Table 1 describes the sociodemographic characteristics and HIV risk behaviors of the participants. The majority of the sample was Latino (45%) and African American (37%). Almost one half were unemployed, and 26% were incarcerated in the past 6 months.

As described in Table 1, 14% of participants were HIV positive. One-quarter had more than one sexual partner in the past 6 months, and two-thirds did not always use condoms during vaginal or anal sex with their sexual partner(s). About 16% reported having sex with someone who was HIV positive and/or an IDU in the past 6 months. Nine percent also reported trading sex for money or drugs in the past 6 months. Only 1% reported having sex with men in the past 6 months.

Network Structure, HIV Risks and Positive Influence

Table 2 presents structural characteristics of the networks. Total network size ranged from 1 to 300 people with an average of 11.3 people in the network. With respect to frequent and recent contacts in the past 30 days, participants reported an average of 3.9 alters. Network density, indicating the degree of closeness in the personal network, was 0.8 on average. Participants reported an average of 0.8 alters as their immediate family members (i.e., identified as a parent, sibling or child). Almost two-thirds of the participants (63%) did not name any immediate family member in their network, 26% named one or two immediate family members, and 11% reported three or more immediate family members in their network. Participants reported an average of 2.1 female alters and 1.9 male alters out of a maximum of five alters. With respect to network HIV risks, participants reported an average of 0.2 alters who were HIV positive, an average of 0.4 alters who ever had sex with an HIV infected person or an IDU and an average of 0.1 alters who had another sex partner in addition to the participant in the past 6 months. For network positive influence, participants reported exchanging encour-

TABLE 2. Means and ranges of network structure variables, reported by 350 participants

Network structure	Mean	SD	Min, Max
Size of most frequent and recent contacts	3.9	1.5	1, 5
Density	0.8	0.2	0.33, 1
Number of immediate family alters (excluding spouse)	0.8	1.2	0, 5
Number of alters who were female	2.1	1.3	0, 5
Number of alters who were male	1.9	1.5	0, 5
Number of alters who were HIV positive	0.2	0.6	0, 5
Number of alters who ever had sex with an HIV infected person or IDU	0.4	0.8	0, 5
Number of alters who had another sex partner in addition to participant in the past 6 months	0.1	0.4	0, 3
Number of alters who exchanged encouragement to use condoms with participant in the past 6 months	1.8	1.8	0, 5
Number of alters who talked about HIV/AIDS risks with participant in the past 6 months	2.6	1.8	0, 5

agement of condom use with an average of 1.8 alters and talking about HIV/AIDS risks with an average of 2.6 alters in the past 6 months.

Association Between the Network's Structure and the Participant's HIV Risk Behaviors

Table 3 shows the bivariate associations between a participant's network structural characteristics and his HIV risk measures. Larger network size was significantly associated with participants who reported having had more than one sexual partner in the past 6 months (odds ratio = 1.2). Lower network density was significantly associated with engaging in unprotected sex in the past 6 months among participants (odds ratio = 0.3), having more than one partner (odds ratio = 0.1) and

TABLE 3. Bivariate results of logistic regression of participant's HIV risks on network structure and characteristics: unadjusted odds ratio and *p* value

Dependent variable	Participant is HIV positive	Participant had unprotected sex across all partners in the past 6 months	Participant had more than one sexual partner in the past 6 months	Participant traded sex in the past 6 months	Participant had sex with an HIV infected person or IDU in the past 6 months
Independent variable					
Size of frequent and recent contacts	1.0 (0.90)	1.0 (0.79)	1.2 (0.04)	1.0 (0.85)	1.0 (0.89)
Density	1.6 (0.55)	0.3 (0.03)	0.1 (0.00)	0.1 (0.04)	1.2 (0.77)
Number of immediate family alters (excluding spouse)	1.1 (0.67)	0.8 (0.03)	0.8 (0.10)	0.7 (0.13)	1.1 (0.62)
Number of female alters	1.1 (0.59)	1.0 (0.88)	1.3 (0.00)	1.1 (0.45)	1.2 (0.11)

TABLE 4. Summary of logistic regression results of participant's HIV risks on network HIV risks and network positive influences related to HIV risks: odds ratio and *p* value

Independent variable	Dependent variable		Participant had unprotected sex across all partners in the past 6 months		Participant had more than one sexual partner in the past 6 months		Participant traded sex in the past 6 months		Participant had sex with an HIV infected person or IDU in the past 6 months	
	Participant is HIV positive		Participant is HIV positive		Participant is HIV positive		Participant is HIV positive		Participant is HIV positive	
	Unadj.	Adj.	Unadj.	Adj.	Unadj.	Adj.	Unadj.	Adj.	Unadj.	Adj.
Number of alters who were HIV positive	3.6 (0.00)	4.8 (0.00)	0.8 (0.29)	0.9 (0.56)	1.6 (0.02)	1.7 (0.01)	1.5 (0.06)	1.6 (0.04)	4.9 (0.00)	5.3 (0.00)
Number of alters who ever had sex with an HIV infected person or IDU	1.6 (0.00)	1.7 (0.00)	1.0 (0.84)	1.0 (0.95)	1.3 (0.06)	1.3 (0.14)	1.8 (0.00)	1.9 (0.00)	1.8 (0.00)	1.9 (0.00)
Number of alters who had another sex partner in addition to participant in the past 6 month	0.7 (0.46)	0.8 (0.71)	1.0 (0.86)	0.8 (0.37)	8.8 (0.00)	8.9 (0.00)	3.9 (0.00)	4.1 (0.00)	2.5 (0.00)	2.8 (0.00)
Number of alters who exchanged encouragement to use condoms with participant in the past 6 month	1.0 (0.82)	1.0 (0.81)	0.9 (0.03)	0.8 (0.01)	1.2 (0.02)	1.1 (0.10)	1.2 (0.07)	1.2 (0.11)	1.0 (0.95)	1.0 (0.69)
Number of alters who talked about HIV/AIDS risks with participant in the past 6 month	1.1 (0.27)	1.2 (0.22)	0.9 (0.09)	0.8 (0.04)	1.1 (0.08)	1.1 (0.37)	1.3 (0.01)	1.6 (0.01)	1.1 (0.27)	1.1 (0.46)

The adjusted model is adjusted by network characteristics (network size of most frequent and recent contacts, network density, number of immediate family alters, number of female alters) and participant's characteristics (age, ethnicity, education, unemployment, and incarceration).

exchanging sex for money or drugs in the past 6 months (odds ratio = 0.1). Having fewer immediate family members in the network was significantly associated with the participant engaging in unprotected sex in the past 6 months (odds ratio = 0.8). Having more females in the network was significantly associated with participants reporting more than one sexual partner in the past 6 months (odds ratio = 1.3).

Associations Between the Network's HIV Risks/Positive Influence and Participant's HIV Risks

Table 4 reports the logistic regression results (both unadjusted and adjusted) of participant HIV risks on four network HIV risks. After adjusting for network structure measures and participants' sociodemographic variables, a greater number of alters who were reported to be HIV positive was significantly associated with the participant being HIV positive (adjusted odds ratio = 4.8), having more than one sexual partner in the past 6 months (adjusted odds ratio = 1.7), trading sex (adjusted odds ratio = 1.6) and having had sex with an HIV positive person or an IDU (adjusted odds ratio = 5.3). A higher number of network members having ever had sex with an HIV positive person or IDU was associated with a greater likelihood of the participant reporting being HIV positive (adjusted odds ratio = 1.7), trading sex (adjusted odds ratio = 1.9), and having had sex with someone HIV positive or an IDU in the past 6 months (odds ratio = 1.9). A higher number of alters having another sexual partner in addition to the participant in the past 6 months was associated with the participant having sex with more than one sexual partner (adjusted odds ratio = 8.9), with trading sex for money or drugs (adjusted odds ratio = 4.1), and with having had sex with someone HIV positive or an IDU (adjusted odds ratio = 2.8) in the past 6 months.

Having fewer alters who exchanged encouragement with the participant to use condoms in the past 6 months was associated with the participant engaging in unprotected sex (adjusted odds ratio = 0.8). Having fewer alters who talked about HIV/AIDS risks in the past 6 months was associated with the participant engaging in unprotected sex (adjusted odds ratio = 0.8). However, having a greater number of alters who talked about HIV/AIDS risks was associated with participants trading sex for money or drugs (adjusted odds ratio = 1.6).

DISCUSSION

The study found multiple significant associations between an individual's HIV risk behavior and HIV risk and protective characteristics of his social network. These associations suggest multiple ways in which social networks might influence risk behaviors of members as well as facilitate positive peer norms regarding HIV/AIDS prevention. Joint risk activities between the participant and his network were apparent. Over one fifth of the alters had sex with the participant, and less than one quarter consistently used condoms during these encounters.

The findings indicate that a large number of the participants and their alters talked to each other about HIV/AIDS risks and encouraged each other to use condoms. These findings suggest that, on the whole, the social networks cultivated positive peer norms about condom use and raised awareness about HIV/AIDS. The widespread presence of these positive norms is somewhat at variance with other studies. For example, Smith, Lucas, and Latkin²⁷ found that HIV is an infrequent topic of conversation among drug users.

Different network structural characteristics were associated with HIV risk factors as found in other studies.^{5,8} A larger network was found to increase the likelihood that the participant had more than one sexual partner in the past 6 months. Higher connectedness among alters within a network (i.e., density) was found to decrease the likelihood of the following: engaging in unprotected sex among participants, having more than one sexual partner in the past 6 months and trading sex for money or drugs. These findings are inconsistent with previous

studies of drug users that have identified higher density in networks as a risk factor for engaging in sexual HIV transmission behaviors.^{5,8} The inconsistency may have occurred because this sample was drawn from MMTP patients with primary steady partners, and the type of name generator used may have been different. The association between a high density network and low sexual risk factors may further suggest the widespread presence of positive norms regarding condom use and HIV/AIDS prevention, as those who are in more connected networks have more opportunities to exchange information and advice related to HIV/AIDS risk reduction.

The findings of the adjusted logistic regression analyses suggest that higher levels of perceived sexual risk among alters were associated with an increased likelihood of the participant engaging in sexual risk behaviors. This supports the findings from other research on how sexual risk behaviors among individuals in a social network can be influenced by the norms.^{5,8} Networks with a higher number of alters who were perceived as having more than one sexual partner in addition to the participant were associated with an increased likelihood that the participant had more than one partner and engaged in sex trading. This finding suggests that perceived sexual risk of alters may influence sexual risk behaviors of the participant. Networks with a higher number of alters whom the participant reported as ever having had sex with an HIV positive person or an IDU was associated with an increased likelihood that the participant was HIV positive, traded sex, and had sex with someone who is HIV positive and/or an IDU. This finding similarly suggests that the high number of alters who are perceived as ever having had sex with a risky partner may increase the likelihood of an array of sexual risk factors among participants. Not surprisingly, the higher number of alters whom the participant reported as being HIV positive was associated with an increased likelihood that the participant was HIV positive, as well as had sex with an IDU and/or HIV positive partners. The findings suggest that HIV positive individuals tend to connect more with other HIV positive individuals for social support. The serological matching by positive HIV status may also occur as a risk reduction strategy to lower sexual and drug-related transmission to uninfected individuals. Alternatively, the finding linking the higher number of HIV positive alters to having had sex with an HIV positive partner may be explained by the direct effect of the HIV positive alter having sex with the participant.

The multivariate findings further suggest mixed associations between positive network influence factors and sexual risk outcomes among participants. Participants who indicated that they exchanged encouragement to use condoms with more alters in their network were less likely to report engaging in unprotected sex. Similarly, participants who indicated that they talked about HIV/AIDS risks with a larger number of alters in their network were less likely to engage in unprotected sex in the past 6 months. These findings suggest that peer norms for HIV risk reduction have a beneficial impact on reducing the participant's likelihood of engaging in unprotected sex. Conversely, a higher number of alters who talked with the participant about HIV/AIDS risks was associated with trading sex in the past 6 months. This negative association suggests that alters may be targeting their HIV risk reduction messages to participants who are at higher risk of sexual transmission by virtue of their having multiple sexual partners. It is not surprising that alters are less likely to encourage participants in long-term monogamous relationships to use condoms. Collectively, these findings support the notion that networks constitute a mechanism for HIV risk behavior norms or change.¹³

Limitations of the Study

The study has several limitations: (1) this study does not address causality; data used in this paper were collected at a single point in time; (2) data on the network were reported by the participants and not corroborated with the alters; and (3) the generalizability of study findings to other MMTP populations is somewhat limited due to the fact that more than a third of the random sample refused to participate or could not be located, and eligibility criteria excluded men without intimate partners. Despite these limitations, the findings have important HIV prevention implications.

Implication for HIV Prevention Interventions

During the past decade a number of drug abuse researchers have established that networks are critical determinants of HIV risks and have developed effective community-based HIV prevention intervention models to reduce these risks.^{23,28,29} This study's findings provide information on a profile of networks of men in MMTPs that is essential in the development of network and community level HIV interventions.

The study suggests that network members may directly influence a participant's sexual behavior by virtue of engaging in risky sexual behavior with participants, or they may have a broader social influence by serving as negative or positive role models with regard to engaging or not engaging in HIV risk behaviors or by socially interacting with participants to create positive peer norms around HIV risk reduction. Social networks of men in MMTPs can be used to facilitate discussions and encourage HIV risk reduction. HIV prevention approaches must consider the different aspects of social networks that may be harnessed in promoting risk reduction. Several studies found that using network members to promote discussion on condom use or family planning are effective mechanisms in promoting change in norms and sexual risk behaviors.³⁰⁻³² Network influence, for example, has been used successfully in a study in Tanzania that was designed to promote HIV prevention through a campaign designed to increase community-wide talk about HIV and family planning.³² In another study, Kelly et al.³³ used opinion leaders to teach individuals in the gay community to encourage condom use.

As suggested earlier, the study findings suggest that social networks can cultivate positive peer norms around HIV risk reduction and exert a positive influence on the protective behaviors of members. The findings also indicate that denser networks may lend themselves to a more efficient spread of HIV prevention messages among this population of men in MMTPs. The efficacy of network interventions may be enhanced by facilitating opportunities to increase positive interactions among network members around the need to protect themselves and their community from HIV/AIDS.

To date, only a limited number of effective network HIV prevention intervention models have been designed for men in MMTPs. Most HIV prevention interventions target the individuals without much emphasis on the social contexts, including the networks and their roles in encouraging healthy, safe behaviors and discouraging risk. Moreover, in MMTPs, most counseling, treatment modalities, and services are guided by individual approaches, and peer approaches are rarely employed. Network approaches in MMTPs would require a paradigm shift in the treatment, counseling, and services for men in drug programs. This paradigm shift would require training of drug treatment staff on network profiles of the drug-involved men, the roles and influences of networks on HIV norms, risk taking and

reduction, models of assessment that evaluate networks, and network-oriented treatment modalities. The findings of this research may inform researchers and clinicians on the profile of the networks and on the importance of considering the networks in HIV intervention prevention approaches for drug-involved men.

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