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# The social support and social network characteristics of smokers in methadone-maintenance treatment

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# Abstract

Previous studies have shown social support and social network variables to be important factors in smoking cessation treatment. Tobacco use is highly prevalent among individuals in methadone maintenance treatment (MMT). However, smoking cessation treatment outcomes in this vulnerable subpopulation have been poor and social support and social network variables may contribute. The current study examined the social support and social network characteristics of 151 MMT smokers involved in a randomized clinical trial of smoking cessation treatments. Participants were 50% women and 78% Caucasian. A high proportion (57%) of MMT smokers had spouses or partners who smoke and over two-thirds of households (68.5%) included at least one smoker. Our sample was characterized by relatively small social networks, but high levels of general social support and quitting support. The number of cigarettes per day was found to be positively associated with the number of smokers in the social network (r = .239, *p* < .05) and quitting self-efficacy was negatively associated with partner smoking (r = -.217, *p* < .001). Findings are discussed in the context of developing smoking cessation interventions that address the influential role of social support and social networks of smokers in MMT.

# Keywords

Social Support; Social Network; Smoking; Methadone-Maintenance

Approximately 80-90% of individuals involved in methadone maintenance treatment (MMT) are tobacco smokers as compared to 20% of the general population<sup>1, 2</sup>. Furthermore, Hser<sup>3</sup> has demonstrated that, after controlling for a wide array of health-risk behaviors, MMT smokers showed a death rate that was 4 times greater than non-smokers involved in MMT. Surveys on the attitudes of MMT patients have revealed that they are well aware of the health risks of smoking, are "very interested" in on-site quit programs and 80% express interest in using nicotine replacement products<sup>1, 2, 4</sup>. Nevertheless, smoking cessation treatment studies among MMT patients have shown relatively low abstinence rates<sup>5, 6</sup>. The challenge of achieving prolonged smoking cessation among the methadone-maintained suggests that novel strategies are needed in order to improve the outcomes of this understudied and difficult-to-treat population.

# **Theoretical Framework**

Social networks and support have been shown to be important factors related to smoking cessation and may be key components for developing novel treatment approaches for smokers in MMT. According to Akers'<sup>7</sup> social learning theory, substance use behaviors and values are maintained through social relationships that provide reinforcing experiences and observable behavior that is imitated. Wasserman and colleagues<sup>8</sup> have conceptualized social support and social network variables into two broad domains: 1) structural and 2) functional. The structural domain describes the quantitative aspects of support (e.g. size and characteristics of the social network) while the functional domain describes the availability of specific support functions (e.g., financial assistance, or encouragement). Within the context of substance abuse, the two broad domains are further delineated into general and abstinence-specific support. In the structural domain, abstinence-specific support refers to factors such as the proportion of substance users in the social network. Functional abstinence-specific support refers to abstinence-related support activities such as providing encouragement towards abstinence<sup>8</sup>.

# **Smoking and Social Support**

The positive impact of both structural and functional social factors on smoking cessation in the general population of smokers (non-MMT) has been summarized in two separate reviews<sup>9, 10</sup>. Most recently, Ennett and colleagues<sup>11</sup> found greater levels of friendship quality and social affiliation to be associated with higher rates of smoking cessation. Smoking cessation treatment studies that have included social support enhancing components have also resulted in more favorable cessation rates at follow-up<sup>12</sup>.

Social networks have also been the focus of longitudinal studies of tobacco use and risk. Chen and colleagues<sup>13</sup> found that being married to a non-smoker and having a lower number of non-smokers in one's social network predicted greater rates of cessation. Christakis and Fowler<sup>14</sup> demonstrated that quit attempts occurred within social clusters of the Framingham cohort. Christakis and Fowler<sup>14</sup> also demonstrated that a variety of network variables were predictive of cessation, including smoking cessation of a spouse, sibling, friend and coworker. While these findings highlight the critical role of social support and social networks in tobacco use and cessation, there is a lack of clarity about the underlying mechanisms that may influence the relationship between social support, network variables and tobacco use. Investigators have speculated that a higher prevalence of smokers in one's social network leads to greater levels of tobacco use and nicotine dependence through cigarette accessibility and through the influence of social norms<sup>9, 10</sup>. Similarly, a greater number of former smokers (and also individuals currently trying to quit) in one's social network is thought to impact one's desire to quit and self-efficacy about quitting through modeling and peer reinforcement<sup>9, 10</sup>. Despite the well-established relationship between tobacco cessation treatment outcomes and desire to quit and quitting self-efficacy<sup>15</sup>, the impact of social support on these two important predictor variables remains unexamined.

#### Social Support and MMT

A limited number of studies have examined the role of social support and social networks among individuals involved in MMT. Panchanadeswaran and colleagues<sup>16</sup> investigated the social support characteristics of women involved in MMT and found relatively low levels of perceived social support, small social networks, and high levels of intimate partner violence. Wasserman and colleagues<sup>8</sup> found greater levels of abstinence-specific support to be associated with decreased levels of comorbid cocaine use among individuals in opioid maintenance treatment (MMT or LAAM). However, abstinence specific social support and

general social support (both functional domains of support) did not significantly predict opioid abstinence.

The social network characteristics of MMT patients have also been shown to be important factors in opiate treatment success <sup>17-19</sup>. In Brewer's<sup>17</sup> metanalaysis of predictors of opioid treatment relapse, *association with substance abusing peers* was found to predict continued drug use during and after treatment. Goehl and colleagues<sup>18</sup> also found MMT patients with at least one drug user among their "significant others" to be more likely to relapse during 3 months of treatment. Lastly, Gogineni and colleagues<sup>19</sup> found greater rates of relapse among MMT patients who lived with a substance using partner and among those with a greater number of substance-using social relationships. However, there have been no studies that characterize the complex structural and functional domains of social support among *smokers* in MMT and how it specifically relates to tobacco use, quitting self-efficacy, and motivation to quit smoking.

# **Study Purpose**

The current study characterizes the structural and functional domains of social support in a sample of MMT smokers enrolled in a randomized smoking cessation clinical trial. We also explored the association between abstinence-specific social support domains and key smoking cessation treatment variables (i.e., level of desire/motivation to quit, quitting self-efficacy, cigarettes per day and level of nicotine dependence). Based on our theoretical framework, we hypothesize that social network and social support variables that are thought to promote abstinence (e.g., proportion of quitters and non-smokers in network, mean level of quitting support and general support, and spousal non-smoking) will be associated with decreased levels of tobacco dependence and tobacco use and greater self-efficacy and desire to quit. Conversely, we hypothesize that the social support and network variables theoretically predicted to be associated with smoking (proportion of smokers in network, decreased levels of general and abstinence support) will be associated with increased levels of tobacco dependence support) will be associated with increased levels of general and abstinence support) will be associated with increased levels of tobacco dependence support) will be associated with increased levels of tobacco dependence support) will be associated with increased levels of tobacco dependence support) will be associated with increased levels of tobacco dependence support) will be associated with increased levels of tobacco dependence support) will be associated with increased levels of tobacco dependence support) will be associated with increased levels of tobacco dependence support) will be associated with increased levels of tobacco dependence and use, and lower levels of self-efficacy and desire to quit.

# Method

The current study uses data from an ongoing three-group randomized clinical trial of varenicline (Chantix), varenicline placebo, and combination nicotine replacement therapy. Baseline data of 151 methadone-maintained cigarette smokers from five methadone treatment programs in Rhode Island were used in the current study. Inclusion criteria included: 1) 18 years of age or greater, 2) current, regular smoker (at least 10 cigarettes per day for the past 3 months), 3) speak English, 4) telephone availability, 5) methadone treatment for at least one month, 6) willingness to set a smoking quit date, and 7) availability during the next 12 months. Participants were excluded if they: 1) suffered from an unstable medical condition which would preclude the use of the study medications (e.g., unstable angina, psoriasis, etc), 2) were involved in other smoking cessation treatment or using smokeless tobacco, 3) were pregnant or nursing or 4) had a severe psychiatric condition or condition that would interfere with treatment (e.g., schizophrenia or other psychotic disorders, bipolar disorder, suicidal ideation).

#### Procedures

Study advertisements were posted at the five participating clinics to raise interest and awareness about the study. Participants were recruited directly by research staff in the methadone clinics during dosing hours. A total of 344 persons were screened between December 2008 and January of 2010, of those, 193 were ineligible for the study. The most common reasons for ineligibility included: schizophrenia or other psychiatric disorder

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(n=64), currently taking medications that would interact with NRT or varenicline (n=30), not enrolled in methadone treatment for more than 4 weeks (n=21), smoke less than 10 cigarettes per day (n=17), currently or recently involved in tobacco cessation treatment (n=14), hospitalized for a heart condition in the past 3 months (n=13). Informed consent was obtained from eligible participants in accordance with the study protocol approved by the Butler Hospital Institutional Review Board. Following the informed consent process, participants completed assessments that included measures of tobacco and substance use, social support, and other psychosocial indicators and were randomized to one of the three treatment groups.

#### Measures

A variety of social support domains were measured using a modified version of the Important People and Activities Instrument<sup>20</sup>. The IPA is designed to assess the relationship of social support and social network variables to smoking and abstinence. Specifically, the IPA asks participants to name up to 10 important people in their lives. For each named individual, participants provide general demographic information (relationship to the participant, gender, age, and ethnicity) and using a 6-point scale (ranging from extremely supportive to not at all) rate each named individual on their level of general supportiveness, quitting support (i.e., "How would/does this person feel about you quitting smoking?), and network member smoking status (i.e., *current smoker, former smoker, never a smoker*). Data from the IPA were used to derive the following variables: network size (a count of the number of individuals named); mean level of general network support from all social network members; mean level of quitting support from all social network members; partner smoking status (i.e., for participants with partners, whether partners are current smokers, quitters, or non-smokers); proportion of smokers in household, social network smoking status (proportion of smokers, non-smokers, and quitters in the social network).

Tobacco use (cigarettes per day) and tobacco dependence were evaluated using the Fagerstrom Test for Nicotine Dependence<sup>21</sup> (FTND). Desire to quit and quitting self-efficacy were measured with items from the *Thoughts About Abstinence* scale<sup>22</sup>. For these items, participants were asked to rate their current desire to quit and quitting efficacy (projected chances of success) on a 10-point scale with 1 representing the lowest degree of desire or efficacy.

#### **Analyses Plan**

Descriptive statistics were used to summarize participant demographics and to characterize the sample on key social support and social network variables. Product-moment correlational coefficients with tests of significance were conducted to determine the association between social support and social network variables and FTND score, cigarettes per day, desire to quit smoking, and quitting self-efficacy. For *Partner Smoking Status* (a dichotomous variable), point-biserial correlation coefficients were calculated with significance testing. All analyses were conducted using IBM SPSS Statistics 19.0.

# Results

# **Sample Characteristics**

Participant characteristics are summarized in Table 1. The mean age of study participants was 40.5 (SD = 9.08). Approximately 78.8% (n=119) were Caucasian, 2.6% (n=4) were African American, 12.6% (n=19) were Hispanic, and 6% (n=9) were of other racial or ethnic origins. Participants were 50.3% female (n=76), approximately 52% (n=78) of participants were single/never married, 17% (n=26) were married, 17% (n=27) were divorced or separated, 7.3% (n=11) were widowed and 6% (n=9) lived with a significant other. The

majority of participants were unemployed 76.8% (n=116). The mean level of education was 12.09 (SD=1.92) years and the mean number of days of opioid use (not including methadone) in the past month was .36 (SD=2.64). The mean FTND score was 5.8 (SD=1.95). The mean number of cigarettes per day was 20.38 (SD=8.73). Participants were found to have moderate to high self-efficacy scores on the IPA (scores range from 1-10) with a mean efficacy score of 7.83 (SD+1.99). Desire to quit on the IPA was also found to be relatively high with a mean score of 8.41 (SD=1.71).

#### Social Support

Social support and network variables are summarized in Table 2. Participants named a relatively low number of important people on the IPA, indicating a pattern of small social network sizes in this sample. The mean number of social support members was 2.59 (SD=1.38; range 1-9). The mean level of general support among network members was 5.26 (SD=.88; range 2-6) and corresponds to the IPA response range of "*very supportive (5)*" to "*extremely supportive (6)*". Similarly, the mean level of quitting support was found to be within that same range with a mean of 5.77 (SD=.471; range 3-6).

#### Smoking and Social Network Domains

Smoking related social support and network variables are also summarized in Table 2. Approximately 57% (n=87) of participants indicated that their partner or spouse were smokers. Over two-thirds of households (68.2%; SD=.467) included at least one smoker. The proportion (mean of sample) of *smokers* in the social network was 37.3% (SD=.349), *never smokers* was 37.2% (SD=.349), and *former smokers/quitters* 15.5% (SD=.262).

#### Associations

Product-moment correlational coefficients with tests of significance are summarized in Table 3. Participants' *Cigarettes per day* was positively associated with the proportion of smokers in the social network (r = .239, p < .05) and with level of general network support (r = .197, p < .05). Level of quitting self-efficacy was negatively associated with partner smoking (r = -.234, p < .001). Neither level of *desire to quit smoking* nor *level of nicotine dependence* (FTND) were found to be significantly associated with any of the social support and social network variables (i.e., network size, partner smoking status, % smokers in household, general support, quitting support, and smoking status of network).

# Discussion

Our findings characterize the social relationships of methadone-maintained smokers who have demonstrated an interest in quitting by entering a clinical trial. On average, participants in our study were found to have relatively small social networks of less than three individuals (mean = 2.59). This finding is consistent with the findings of Zywiak and colleagues'<sup>23</sup> study of general substance abusers (mean network size= 2.43) and Panchanadeswaran's<sup>16</sup> study of female MMT patients (mean network size= 2.7). Such small networks among MMT patients may be due to the negative personal and social consequences of substance use which often strain familial and social relationships.

Our findings contrast with Panchanadeswaran's<sup>16</sup> in that our participants were found to have high levels of both general social support and tobacco quitting support within their small networks. We considered the gender difference in samples as a possible explanation for the differences in findings. In the Panchanadeswaran and colleagues<sup>16</sup> study only females were enrolled. However, in our cohort significant gender differences (data not shown) in social network, support characteristics, and the associations between these variables and smoking related variables of interest, did not emerge. Further research is needed to fully elucidate

other potential moderators of social support among MMT patients that may have led to our contrasting findings including relationship status, age, and educational level.

Approximately 57% of participants reported having a spouse/partner who smokes. The smoking (or drug using) status of one's spouse or partner has been shown to be predictive of non-MMT smoking cessation outcomes<sup>13</sup> as well as MMT outcomes<sup>18, 19</sup>. We found a significant association between spouse smoking status and quitting self-efficacy. It is likely that participants recognize that having a spouse who smokes may contribute to a more difficult quitting process due to the greater availability of tobacco in the household, social pressure, and increased smoking cues, all of which may increase the likelihood of relapse. Therefore, when asked about the potential for success in quitting (self-efficacy), participants with spouses who smoke may account for these factors in their assessment of their likelihood of success. This finding poses a unique challenge to the development of smoking cessation interventions for smokers in MMT. Interventions that include social support members (including spouses) may offer advantages. Future MMT intervention effects may be enhanced by treating spousal (or partner) dyads and including specific behavioral skill components that address the unique barriers to quitting for individuals in a relationship with a smoker or someone attempting to quit. In Park and colleagues' meta-analysis<sup>24</sup> of nine smoking cessation interventions utilizing partner support, such interventions were found to be associated with improved cessation outcomes. The high levels of network support reported here suggests that many spouses, even if they smoke, support the study participant's current quit attempt.

Our correlational analyses revealed a significant association between the number of cigarettes smoked per day and the number of smokers in the social network (structural domain). This is a finding that has been replicated in a number of previous studies across diverse age groups and populations. Hence, clinicians commonly suggest that individuals should avoid regular contact with smokers when attempting to quit. Smoking cessation treatment intervention for smokers in MMT that offer specific behavioral skills related to how to remain abstinent when interacting other smokers have the potential to improve outcomes.

#### Limitations

The cross-sectional nature of the current study limits our ability to make conclusions regarding the stability of relationships over time. This also limits our ability to make conclusions about the temporal ordering of relationships; for example, we are unable to fully appreciate the potential impact of smoking cessation treatment on social relationships and tobacco related social support variables. This is particularly important considering that social networks are in constant flux and as Christakis and Fowler<sup>14</sup> showed, individuals often quit smoking in social clusters. Therefore, future studies that employ a longitudinal approach are needed to validate our findings, to explore how the MMT smoker's quit attempt may also impact the smoking status of their network, and to determine if network factors predict treatment outcome. A second limitation of our study relates to self-report bias regarding tobacco and other substance use. Participants often misrepresent their use due to social desirability or poor recall. Despite the potential for such self-report biases, studies have found a high concordance rate between self-report and biomarkers of use across a variety of substances<sup>25</sup>. Finally, our findings may not generalize to MMT smokers not seeking treatment for tobacco use, to light smokers (less than 10 cigarettes per day), or to opioid users not involved in MMT.

Despite these limitations, our study is the first to characterize the social support and social network characteristics of smokers in MMT and how these social variables relate to tobacco use, tobacco dependence, motivation to quit, and quitting self-efficacy. Individuals involved

in MMT are known to have very high rates of tobacco use and poor smoking cessation treatment outcomes. Findings from the current study may serve to inform the development of smoking cessation treatment interventions that harness or address the important role of social support and social networks.

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## Table 1

# **Background Characteristics**

Variables	<u>% (n)</u>		
Gender (Female)	50.3 (76)		
Marital Status			
Single/Never Married	51.7 (78)		
Married	17.2 (26)		
Separated/Divorced	17.9 (27)		
Living w/ Partner/Spouse	6 (9)		
Employment Status			
Full-time	14.6 (22)		
Part-time	8.6 (13)		
Unemployed	76.8 (116)		
Race/Ethnicity			
Caucasian (Non-Hispanic)	78.8 (119)		
African–American	2.6 (4)		
Hispanic/Latino	12.6 (19)		
Other Race/Ethnicity	6.0 (9)		

	<u>Mean (± SD)</u>	Median	Range
Age (years)	40.5 (9.08)	41.08	22.3 - 39
Education (Highest Grade Completed)	12.09 (1.92)	12	4 - 18
Cigarettes Per Day	20.38 (8.73)	20	10 - 44.8
FTND Nicotine Dependence	5.8 (1.95)	6	0 - 10
Desire to Quit	8.41 (1.71)	9	1 - 10
Quitting Efficacy	7.83 (1.99)	8	2 - 10
Days of Opioid Use (Non-Methadone) in Past 30 Days	.36 (2.64)	0	0-30

#### Table 2

# Social Support and Network Domains

Variable	Mean % (SD)
Structural Domains	
Network Size (# of Members)	2.59 (1.38)
Partner Smoking Status (smokers)	57 (1.41)
At Least One Smoker in Household	68.2 (.467)
Smokers in Overall Network	37.3 (.349)
Quitters in Overall Network	15.5 (.262)
Never Smokers in Network	37.2 (.349)
Functional Domains	
General Support	5.26 (.88)
Quitting Support	5.77 (.471)

#### Table 3

# Product Moment Correlations: Social Support and Smoking Variables

Variable	<u>FTND</u>	<u>Cigs. Per Day</u>	Desire to Ouit	Quitting <u>Efficacy</u>
Structural Domains				
Network Size (# of members)	031	048	042	.010
Partner Smoking Status <sup>a</sup>	.135	065	124	234 ***
% Smoker in Household	.158	.108	027	067
% Smokers in Network	.152	.239*	079	032
% Quitters in Network	158	046	079	008
% Never Smokers in Network	.084	072	.055	.089
Functional Domains				
General Support	.028	.086	.155	.055
Quitting Support	.093	.197*	.083	.144

<sup>a</sup>Point biserial correlation

.05 ° p

\*\* p < .01