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The Use of Peer Mentors to Enhance a Smoking Cessation Intervention for Persons with Serious Mental Illnesses

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Abstract

Objective—We evaluated a well-specified peer mentor program that enhanced a professionally-led smoking cessation group for persons with serious mental illnesses.

Methods—Participants were 8 peer mentors, persons with serious mental illnesses who had successfully quit smoking, and 30 program participants, persons with serious mental illnesses enrolled in a 6 month intervention. Peer mentors were trained and then helped to deliver a smoking cessation group and met with program participants individually. We assessed the mentors' skills after training, their fidelity to the model, and the program's feasibility and acceptability. We also measured the smoking outcomes of the program participants including change in exhaled carbon monoxide, a measure of recent smoking, and aspects of the peer mentor-program participant relationship.

Results—Peer mentors attained a mean score of 13.6/14 on role play assessments after training and delivered the intervention with fidelity as assessed by adherence and competence ratings (mean scores of 97% and 93%, respectively). The feasibility and acceptability of the intervention was demonstrated in that 28/30 participants met with their peer mentors regularly and only 1 participant and no peer mentor discontinued in the study. Both parties rated the interpersonal alliance highly, mean of 5.9/7. The program participants had a decline in carbon monoxide levels and number of cigarettes smoked per day (repeated measures ANOVA $F=6.04$, $p=.008$; $F=15.87$, $p<.001$, respectively). A total of 22/30 (73%) made a quit attempt but only 3 (10%) achieved sustained abstinence.

Conclusions and Implications for Practice—Our study adds to the growing literature about peer-delivered interventions.

Introduction

Despite widespread recognition about the harmful effects of smoking and dramatic decreases in cigarette smoking in the general population, the prevalence of smoking among persons with serious mental illnesses persists at epidemic levels (McClave, McKnight-Eily, Davis, & Dube, 2010). Recent data from psychiatric settings in central Maryland indicate that more than 60% of persons with schizophrenia and more than 40% of persons with bipolar disorder are cigarette smokers compared with fewer than 20% of persons in the general population (Dickerson, Stallings, Origoni, Vaughan, et al., 2013). Smoking represents an urgent problem in persons with serious mental illness because tobacco use is a primary cause of the excess premature mortality in this group (Dickerson, Stallings, Origoni, Schroeder, et al., 2013; Laursen, Munk-Olsen, & Vestergaard, 2012; Ringen, Engh, Birkenaes, Dieset, & Andreassen, 2014). Interventions using a combination of pharmacologic and counseling strategies have been developed to treat smoking in persons with serious mental illness; however, quit rates even among the best cessation programs and therapies are modest (Bennett, Wilson, Genderson, & Saperstein, 2013; Evins et al., 2014; Tsoi, Porwal, & Webster, 2013; Weiner et al., 2012).

The addition of a well-specified peer support component has the potential to improve cessation outcomes for several reasons. Peer support is well established in the treatment of other addictions and health conditions (Kaskutas, 2009; Webel, Okonsky, Trompeta, & Holzemer, 2010; Weeks et al., 2009). In addition, peer services have increasingly assumed an important role in mental health services for persons with serious mental illness (Chinman et al., 2014; Davidson, Chinman, Sells, & Rowe, 2006; Green, Janoff, Yarborough, & Paulson, 2013; Resnick, Armstrong, Sperrazza, Harkness, & Rosenheck, 2004; Salzer, Schwenk, & Brusilovskiy, 2010). Peer support may be particularly useful in smoking cessation because of the strong connection that has been demonstrated in the general population between quitting smoking and interpersonal associations with non-smokers (Christakis & Fowler, 2008). Persons with mental illnesses are often in environments where many of their peers smoke (Ziedonis et al., 2008). Therefore a peer support program in which persons with serious mental illnesses who have successfully quit smoking are mentors represents a logical addition to be added to smoking cessation interventions with this population.

Some smoking cessation initiatives for this population have been developed that involve peer support. The CHOICES (consumers helping others improve their condition by ending smoking) program aims to increase motivation for smoking cessation. The intervention is a single 20 minute one-to-one session delivered by peer counselors, “consumer tobacco advocates,” who provide feedback about the impact of expired carbon monoxide and the money spent on tobacco with the aim of motivating smokers to seek tobacco dependence treatment. The peer counselors received 30 hours of training. A pilot evaluation indicated that the program was well liked by consumers; however, motivation to quit smoking expressed immediately after the intervention was not maintained at a 1 month or 6 month

follow-up (Williams et al., 2011). A related approach is the "Tobacco Free for Recovery," a set of internet training materials intended to enable mental health peer counselors to help their peers with tobacco cessation (Center, 2008). Interventions have also been described in which peers assisted traditional staff in presenting a wellness program including a focus on tobacco use (Lee et al., 2011; Williams, Cain, Fredericks, & O'Shaughnessy, 2006). In another program, peers co-led a 10 session smoking cessation group offered at community mental health centers (Ashton, Miller, Bowden, & Bertossa, 2010). However, with the exception of the CHOICES program, limited information is provided in these reports about the specific training received by peers providing smoking cessation counseling, the outcomes of the training, or detailed descriptions about the specific peer-delivered services.

This project evaluated a well-specified peer mentor program added to a professionally-led behavioral group intervention for smoking cessation tailored for persons with serious mental illness. In the project, we evaluated the knowledge and skills of the peer mentors after being trained for their role; assessed the fidelity and feasibility of the smoking cessation intervention across three cohorts; and measured the smoking outcomes and their potential mediators (e.g., perceived social support the peer mentors) of the program participants.

Methods

Participants

A total of eight peer mentors delivered the peer mentor intervention. Mentor eligibility criteria were: 1) Former smoker – smoked ≥ 100 cigarettes in lifetime but none in the past one year, willingness to discuss the experience of quitting smoking and maintaining abstinence; 2) Receipt of services, past and/or current, for serious mental illness (diagnosis of schizophrenia/schizoaffective disorder, bipolar disorder or recurrent major depression per self report) and willingness to discuss this experience; 3) Age ≥ 18 years old; 4) Minimum of high school education and ≥12 months work or volunteer experience in the last 3 years; 5) Ability to engage in effective communication and reflective listening, ascertained via an application interview. Applicants were interviewed and assessed through a standard Human Resources process and hired as part-time employees of the principal investigator's hospital for the duration of the study. All resulting peer mentors had some experience providing human services but none had previously provided smoking cessation counseling.

A total of 30 persons were recruited from local psychiatric rehabilitation programs in 3 separate cohorts to participate in the smoking cessation intervention. Eligibility criteria for the program participants were: 1) Diagnosis of schizophrenia, schizoaffective disorder, bipolar disorder, or recurrent major depression from review of the medical record; 2) Worked ≤25% of past year; 3) Receipt of payment for mental disability (Supplemental Security Income, Social Security Disability Insurance, or Veterans Administration disability benefits); 4) Age 18–75 years old; 5) Current smoker, daily smoking for the majority of days in the past one month; 6) Absence of current alcohol or substance abuse diagnosis except for nicotine and caffeine from review of the record; 7) Readiness to change in the Contemplation or Preparation stage as assessed by the smoking Stages of Change short form (DiClemente et al., 1991).

Characteristics of the peer mentors and program participants at baseline are presented in Table 1.

The study was approved by the institutional review boards of Sheppard Pratt and the University of Maryland School of Medicine and all participants provided written consent after the study was explained.

Intervention

The professionally-led behavioral smoking cessation group was delivered in 24, one-hour meetings twice weekly over 3 months. The protocol was modified from a behavioral intervention originally developed for the treatment of co-occurring drug abuse in persons with serious mental illness (Bellack, Bennett, Gearon, Brown, & Yang, 2006) and further adapted for this study to include a structured role for the peer mentors in group and individual sessions, as described below. Elements of the smoking cessation intervention included: motivational enhancement, education about smoking, stop smoking strategies, education about smoking cessation medications, skills training, and goal setting. In each group, program participants also were tested on the carbon monoxide (CO) Breathalyzer ("Biochemical verification of tobacco use and cessation," 2002; Jarvis, Russell, & Saloojee, 1980) with feedback and monetary reinforcement ($1.50–$3.50) for CO testing of ≤ 8 parts per million (ppm); this level is consistent with smoking abstinence in the previous 6 hours. The group was led by a trained interventionist and also 2 peer mentors who participated on a rotating basis. Program participants received three dollars monetary reinforcement for each group attended. Nicotine replacement therapy (NRT) in the form of the patch, gum, or lozenge was made available to interested participants; instruction about its use was provided in brief sessions by the study nurse.

Peer mentor component: Based on social cognitive theory, the peer component aimed to provide modeling and encouragement in order to increase engagement in, and social support for, smoking cessation. Peer mentors worked with participants in the groups and individually. In the group meetings, the peer mentors had a structured role which included administering the CO Breathalyzer to each participant, providing personal narratives about their struggle with nicotine addiction as related to the group topic, recording each participant's goal; engaging participants in discussing the group topic and offering encouragement, and participating in role plays. Also, each peer mentor was assigned approximately 2 program participants to work with individually in each group cohort. The principal investigator and peer mentors met as a group to discuss the assignment of peer mentors to individual program participants with the intent of matching peers to participants based on who the peers felt they would relate to best.

During the three-month group phase, the peers met individually with their participants between group meetings in person and/or on the phone. These sessions were focused on reinforcing the content of the group meetings, helping participants to implement the goals they had set, and establishing rapport. It was expected that each peer mentor would meet with their participants approximately one to two hours per week. Meetings took place at or near the psychiatric rehabilitation program that participants attended or at locations in the

community selected by the peer mentor-program participant pair. Peers continued to work with their participants during an additional three-month period after the conclusion of the group. Activities in this phase include continued individual meetings with participants to reinforce the content of the smoking cessation curriculum and to further promote behaviors consistent with the goal of reducing and quitting smoking. Procedures for the peer mentors were outlined in a detailed manual that included templates for suggested responses to participants in different situations and who presented with attitudinal barriers to smoking cessation The peer mentors' contacts with participants, both in the smoking cessation group and in individual meetings, were discussed in a weekly 1.5 hour group supervision meeting with the principal investigator. The weekly supervision was used to reinforce and improve the peer mentors' skills, support them in their work and problem-solve challenges.

Peer mentor training: Prior to the above group and dyad roles, peer mentors were trained by the principal investigator in five, half-day interactive group sessions over a 3 week period for a total of 22 hours. Topics covered included: the peer mentor role; smoking and physical and mental health; cognitive behavioral strategies to reduce or quit smoking, communication skills; motivational interviewing including the 5 R's (Relevance, Risks, Rewards, Roadblocks, and Repetition)("A clinical practice guideline for treating tobacco use and dependence: 2008 update. A U.S. Public Health Service report," 2008); sharing personal experiences with successful quitting; smoking cessation group curriculum topics; and boundaries, confidentiality, safety, and dual relationships. Two sessions involved role play activities in which peer mentors practiced using basic counseling skills and responding to typical attitudes and challenges presented by smokers with serious mental illness who are considering quitting.

Measures

1. Feasibility and acceptability of the intervention

Assessment of peer mentor training: After the completion of the training, the peer mentors were individually assessed on their performance in simulated scenes with smokers presenting typical attitudinal barriers to smoking cessation. Peer mentors were rated on the presence or absence of 14 items including "Asks open ended questions," "Expresses empathy, " "Conveys realistic optimism about reducing and quitting smoking," 'Conveys understanding of difficulties of quitting smoking," "Offers own experience related to smoking or being a mental health consumer selectively," "Does not give direct advice," "Does not criticize the person for smoking." Each peer was rated by two members of the study team who were not involved in the training and ratings were made by consensus. Peer mentors were also assessed with a 20 item short-answer paper-and-pencil knowledge test based on didactic information about smoking cessation that had been taught in the training sessions.

Attendance and retention in the intervention: These were assessed for both program participants and peer mentors. Attendance logs were maintained for all group meetings.

Fidelity to the intervention: Group meetings were videotaped and reviewed by research staff not involved in delivering the intervention. The peer mentors were rated on Adherence

and Competence scales (Bellack et al., 2006). The Adherence scale contained 5 items that reflect the presence or absence of core features of the peer mentor's role in the group such as selectively providing a testimonial and describing his/her own struggles with nicotine addiction. The Competence scale contained 5 items that assess the presence or absence more process-oriented aspects of the peer mentor's role in the group such as offering encouragement around smoking cessation and collaborating with the group leader. Peer mentors were assessed in a total of 64 of 72 group meetings that were held.

Sessions held between peer mentors and participants: The duration and frequency of in-person and phone sessions were recorded on logs submitted weekly by the peer mentors that were discussed in weekly supervision meetings. Monthly meeting time totals for each peer mentor-program participant pair were calculated.

2. Peer mentor – program participant relationship—Several measures were administered to assess the relationship between each pair of peer mentors and program participants in the second and third cohorts after the intervention was standardized in the first cohort. At 3 months (the end of the group) and 6 months (the end of the peer mentor component), the quality of the alliance between each peer mentor – program participant pair was assessed with the bond factor of the Working Alliance Inventory (Busseri & Tyler, 2003) that was completed by both parties. The bond scale includes 4 items such as rating how much the person believes the other person in the pair likes him/her, trusts him/her, appreciates him/her as a person. Each item is rated on a 7 point Likert scale from "always" to "never."

At month 3, we also measured the program participant's rating of perceived encouragement from the peer mentor to attend and participate in the group. This scale consisted of the participant's response to 3 items inquiring about the extent to which the peer mentor: encouraged him/her to attend the regularly scheduled smoking cessation group meetings; encouraged him/her to speak about experiences and concerns related to smoking in the group meetings; and discussed the content of the group meetings. Each item was rated on a 7 point Likert scale from "strongly agree" to "strongly disagree."

We also assessed the perceived social support for smoking cessation received from the peer by the participant's completing a modified version of the Partner Interaction Questionnaire (PIQ)(Cohen & Lichtenstein, 1990) at 3 and 6 months. The PIQ is a 20 item scale in which persons rate the presence of behaviors performed by a partner in response to their efforts to quit smoking. There are 10 positive behaviors (e.g. compliments you on not smoking, helps you think of substitutes for smoking, tells you to stick with it, expresses confidence in your ability to quit or remain quit, participates in an activity with you that keeps you from smoking) and 10 negative behaviors (e.g. asks you to quit smoking, mentions being bothered by smoke, criticizes your smoking). The score is expressed as a ratio of the number of positive to negative behaviors endorsed. A score > 1 indicates that the program participant reported that his/her peer mentor demonstrated more positive than negative behaviors about his/her efforts to quit smoking and a negative score, the reverse. Items on this scale were modified to address the role of a peer mentor rather than a partner.

3. Smoking quantity and severity—Program participants were assessed at baseline, 3 months (the end of the group), and 6 months (the end of the peer mentor component and the intervention) by research staff who were not involved in delivering the intervention. Participants were assessed on the Breathalyzer ("Biochemical verification of tobacco use and cessation," 2002; Jarvis et al., 1980) which measures exhaled carbon monoxide, a biological indicator of smoking in the previous 6 hours; the cutoff used to determine the absence of recent smoking was ≤ 8 parts per million (ppm). Participants were also assessed with self-report measures including the Smoking History Questionnaire which included measures of current smoking and the Fagerstrom Test of Nicotine Dependence (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991). Participants' degree of motivation to quit smoking was calculated using the stage of change algorithm based on the transtheoretical model. (DiClemente et al., 1991). Scores were dichotomized between the Contemplation versus the Preparation, Action, or Maintenance stages.

Change in the Breathalyzer score was the primary smoking outcome measure. We also measured the number of participants who reported that they purposefully and voluntarily abstained from smoking for at least 24 hours in the course of the study; who reported that they successfully abstained purposefully and voluntarily for at least 7 days; and who abstained for at least 7 days and who remained quit at the final study visit with biological verification confirmed with measurement of urinary cotinine ("Biochemical verification of tobacco use and cessation," 2002) or the Breathalyzer test in the case of those using NRT ("Biochemical verification of tobacco use and cessation," 2002; Jarvis et al., 1980). Of note, participants who were abstinent from smoking because they were admitted to a smoke-free hospital setting were not counted as having made a quit attempt.

4. Smoking-related attitudes and activities—Attitudinal measures were collected for the second and third cohorts only. At baseline, 3 months (the end of the group), and 6 months (the end of the peer mentor component and the intervention), program participants' smoking-related attitudes were measured by the Smoking Cessation Processes of Change Scale, a 20 item questionnaire that measures the 10 core behavioral processes of change in the transtheoretical model (Prochaska, Velicer, DiClemente, & Fava, 1988). Respondents indicate the frequency with which they have used change strategies over the past month (on a 5-point scale from "never" to "repeatedly") such as "I stop to think that smoking is polluting the environment," "I do something else instead of smoking when I need to relax."

Participants were also assessed on the Smoking Decisional Balance Scale (Velicer, DiClemente, Prochaska, & Brandenburg, 1985), a 20 item measure that assesses attitudes towards smoking via endorsement of 10 perceived Pros or benefits and 10 Cons or costs of smoking on a 5-point Likert scale ranging from "not important at all" to "extremely important."

Participants also completed the Abstinence Self-efficacy Scale for Smoking measure (Velicer, Diclemente, Rossi, & Prochaska, 1990), a 20 item scale that assesses the degree to which persons feel confident in their ability to abstain from smoking, rated on a 5-point scale from "extremely confident" to "not at all confident", in specific situations such as "over coffee while talking and relaxing," "when I am extremely anxious and distressed."

Statistical analyses

Analyses of variance or Chi-squares were used to calculate changes over time in smoking-related variables. Repeated Measures ANOVA with a Greenhouse-Geisser correction was used to assess change across the 3 time points. T test pair-wise comparisons were used to compare the scores at the 3 month and 6 month time points with those at baseline. In calculating the mean CO Breathalyzer score and the change in the Breathalyzer scores, we excluded data from one individual who had respiratory disease and could not exhale sufficiently to generate a reliable CO score. Change in Stage of Change from baseline to 3 months and baseline to 9 months was assessed with the McNemars Chi-Square. We examined the association between the change in Breathalyzer score, the main outcome, and baseline characteristics of the program participants as well as variables related to the peer mentor- program participant relationship with Pearson correlations.

Results

1. Feasibility and acceptability of the intervention

Assessment of peer mentor training—The average score on the role play assessment after the training was 13.6 (s.d. 0.7) out of a possible score of 14. All 8 peer mentors achieved a score ≥ 85% of the possible total score. The average score on the short-answer knowledge test was 19.3 (s.d. 0.8) out of a possible 20. All 8 peer mentors achieved a score ≥ 90%.

Attendance and retention in the intervention—All 8 peer mentors worked with program participants for the full 6 month duration of at least one cohort, the expectation at time of enrollment and hire. A total of 4 peer mentors worked with program participants in 2 cohorts and 4 peer mentors did so with only one cohort. Most of the peer mentors attended supervision meetings focused on an additional cohort of participants with whom they were not working directly.

Attendance at the twice weekly group meetings across all 3 cohorts averaged 7 participants of 10 enrolled at each site (s.d. 0.7, range 5 to 10). The mean number of group sessions attended by program participants was 17.8 (s.d. 5.1) of the 24 at each site; 90% of participants attended at least 12 (50% of the) group sessions and 53% attended at least 18 (75% of the) group sessions. Of the 30 program participants who were enrolled in the intervention, 29 of 30 completed the data collection at 3 months and 6 months; 28 of 30 participants continued to meet with their peer mentors for the duration of the 6 month study.

Fidelity to the intervention—Of the 72 group meetings that were delivered, 64 had audio-visual recordings and peer mentors present. Each peer mentor had an average of 16 (s.d. 6.9) meetings rated. The average percent Adherence score for each peer mentor across group meetings was 97%. The average percent Competence score for each peer mentor across group meetings was 93%.

Peer mentor – program participant sessions—For each peer mentor- program participant pair, the mean number of in-person sessions per month, outside of the group

meetings, for the 6 months of the intervention was 3.9 (s.d. 2.3, range 0 to 12). The mean number of phone sessions per month, in addition to the in-person sessions, was 2.1 (s.d. 2.2, range 0 to 12). The mean duration of peer mentor- program participant interactions each month, outside of group sessions, was 219.6 minutes (s.d. 167.9, range 0 to 1065), or 3 hours and 39 minutes per month. These data were based on 172 months of peer mentor – program participant meetings over the 3 cohorts of the study.

2. Peer mentor – program participant relationship

The mean bond factor rating of the Working Alliance Inventory was consistently high for both parties at 3 months and 6 months (mean= 5.9 on 7 point Likert scale (s.d. 1.0, range 4–7). The mean perceived encouragement score rated by the program participants was also high (4.4, s.d. 0.7, range 3–5). Both of the means were positive for the modified version of the Partner Interaction Questionnaire at 3 months (mean 5.2., s.d.4.7) and 6 months (mean 4.6, s.d. 4.3), which suggested that the program participants viewed the peer mentors as demonstrating many more positive than negative behaviors in response to the participants' efforts to quit smoking.

3. Smoking quantity and severity

The Breathalyzer score showed a significant decline over the 3 data collection time points of the study ($F_{(1.6,42)} = 6.04$, p = .008). The mean Breathalyzer score declined from 21.8 (s.d. 11.9) ppm at baseline to 19.6 ppm (s.d. 12.6) at 3 months to 14.7 (s.d. 9.8) ppm at 6 months. The change from baseline to 6 months was significant ($t_{27} = 4.25$, p =< .001), however the decline at 3 months was not significant ($t_{26} = 1.18$, p = .248). The number of cigarettes smoked per day also showed a significant decrease over time ($F_{1.6, 46} = 15.87$, p<.001). The number of cigarettes smoked per day declined from a mean of 14.8 (8.2) at baseline to 10.2 (s.d. 8.6) at 3 months to 9.2 (s.d. 7.5) at 6 months. The decrease in number of cigarettes from baseline to 3 months ($t_{28} = 3.6$, p = .001) and to 6 months ($t_{28} = 6.39$, p =< .001) were both significant.

A total of 22/30 (73%) of program participants made a deliberate quit for at least 24 hours in the course of the study; 7/30 (23%) abstained voluntarily for at least 7 days; and 3 (10%) quit for at least 7 days and remained quit at the final study visit with biological verification; the mean duration of continuous abstinence of these 3 participants was 16 weeks (range 4 – 22 weeks).

4. Smoking-related attitudes and activities

At baseline, a total of 24/30 (80%) of the program participants were in the Contemplation stage of change, meaning an intention to quit within the next 6 months but not sooner. At 3 months this had declined to 15/29 (52%), and at 6 months was 18/29 (62%). Those who had moved out of Contemplation had moved to a higher stage (e.g., Preparation, Action, or Maintenance), signifying greater motivation to change. There was only a significant difference between baseline and month 3 (p=.035).

Measured in the second and third cohorts, the Smoking Cessation Processes of Change Scale and the Abstinence Self-Efficacy Scale for Smoking showed a significant change over the

course of the study with improved attitudes ($F_{2,36.2}$=5.40, p=.009; $F_{2,36.8}$=10.11, p=<.001, respectively). For the Smoking Cessation Processes of Change Scale, pair-wise comparisons were significant between baseline and scores at both month 3 and month 6 for the Smoking Cessation Processes of Change Scale. (p=.004; p=.018) and the Abstinence Self-Efficacy Scale for Smoking (p=<.001; p=.012). The Decisional Balance Scale did not show a significant change over time.

The change in Breathalyzer score, our primary measure of smoking outcome, was not significantly associated with the total duration of the peer mentor-program participant meetings, the bond factor ratings on the Working Alliance Inventory, or the participant's rating of peer mentor encouragement or support. The change in Breathalyzer score was significantly and inversely associated with the "Pros" score from the Decisional Balance Scale at baseline (r=−.67, p=.003). The change in Breathalyzer score was not significantly correlated with any other attitudinal measure, demographic variable, or baseline measure of smoking severity.

Discussion

In this study, peer mentors—i.e., persons with the lived experience of mental illness and who had previously successfully quit smoking—received training and then provided counseling and support to individuals with serious mental illnesses both during and after a group-based smoking cessation intervention. We assessed the peer mentors' response to training and found that they attained high scores on a test of factual knowledge as well as a test of counseling skills assessed in simulated role-play scenarios. We also demonstrated that the peer mentor intervention was delivered with fidelity to the model as assessed by ratings of adherence and competence during group meetings. The feasibility and acceptability of the intervention was supported by the high attendance of the program participants at group meetings compared to other smoking cessation counseling interventions for this population in the literature (Baker et al., 2006; Pachas et al., 2012; Williams et al., 2012; Williams et al., 2010) though the requirement of smoking cessation medication in other studies may have reduced participation. In addition, our study participants received small monetary reinforcement to attend group sessions and this incentive likely increased attendance. The peer mentor-program participant individual meetings occurred on a regular basis and at the frequency and duration as planned in the study protocol, even though participants did not receive any monetary reinforcement for these sessions. There was also high retention within the peer mentor group and also within each group of program participants over the course of the study. In addition, program participants rated the peer mentors as having provided encouragement and social support for smoking cessation. Both parties within each pair gave the relationship high ratings on the bond scale of the Working Alliance Inventory.

Our experience in providing this peer-enhanced intervention to persons with serious mental illnesses is consistent with numerous reports in the literature about the capacity of peers to provide services to other persons with serious mental illness (Chinman et al., 2014; Chinman et al., 2015; Hamilton, Chinman, Cohen, Oberman, & Young, 2015). In these other projects, as in our own, peers were accepted as service providers and were seen as adding value to a professionally-led intervention with this population. The feasibility of peer delivered

services for persons with serious mental illness has been previously demonstrated in supported employment (Kern et al., 2013), case management for homeless vets (Weissman, Covell, Kushner, Irwin, & Essock, 2005), case management to intensive case management (Chinman et al., 2015; Hamilton et al., 2015; Rivera, Sullivan, & Valenti, 2007) and to ACT team recipients (Sells, Davidson, Jewell, Falzer, & Rowe, 2006). There have also been previous reports of peers assisting traditional staff in promoting smoking cessation, typically as part of a broader wellness curriculum (Ashton et al., 2010; Lee et al., 2011; Williams et al., 2006).

In contrast to many of the peer-based interventions described in the literature, including those focused on support for smoking cessation, our peer intervention was highly specialized and structured. Procedures for the peer mentors were outlined in a detailed manual that included templates for suggested responses to participants in different situations and who presented with attitudinal barriers to smoking cessation. In addition, the criteria used to select our peer mentors were well-specified; this is often not the case in reports of peer interventions in the literature (Dixon et al., 2010). Our peer mentors were selected for their personal experience and characteristics which facilitated their learning and carrying out the peer mentor role. Our training program was focused on smoking cessation and related counseling skills and peers' responses to the training were carefully assessed. During the course of the intervention, weekly supervision was provided in which all of the peer mentors were present to discuss their cases and constructive feedback was given. The project was carried out with the support of an NIH grant; this degree of oversight and direction may be not feasible in clinical settings without such support. It is also of note that while we were able to recruit and hire the target number of well-qualified peer mentors, we did solicit referrals from a range of sources including psychiatric treatment settings, a self help program, and local colleges. Because relatively few persons with serious mental illness have quit smoking, there was not a large pool of eligible persons for the peer mentor role. It is anticipated that as smoking cessation becomes more widespread in mental health settings that the number of potential peer mentors for smoking cessation programs of this kind will grow substantially.

This was a pilot study and we did not directly compare services provided by trained persons with mental illness (peers) to that of providers who did not have this lived experience. In our study, "peer-ness" was twofold in that our peer mentors had not only the experience of serious mental illness but also the experience of cigarette smoking. As such, the former-smoker peer mentors were uniquely qualified to provide counseling support around smoking cessation. The importance of each aspect of "peer-ness" is an issue meriting further study. It is also of note that we did not make a direct comparison between the outcomes of our peer-enhanced intervention and the smoking cessation intervention provided without additional individual counseling and support. As such, it is not possible for us to separate the effects of the peer components of the intervention from the effects of the non-peer, professional part of intervention. This issue is not unique to our study as there are now a number of studies that have incorporated peers into an intervention for persons with serious mental illnesses that has a significant professional component (Cook et al., 2012; Druss et al., 2010; Goldberg et al., 2013; Jonikas et al., 2013; Pickett et al., 2012). While collaboration between peers and

professionals is desirable, it is then difficult to determine what are the specific contributions of the peers.

Despite the involvement of the peer mentors in addition to the provision of the structured behavioral group, the smoking outcomes of the intervention were modest. We did find significant reductions in CO readings and in the number of cigarettes smoked per day. In addition, close to three-quarters of participants made at least one 24 hour quit attempt though these were not biochemically verified. Attitudes related to smoking also improved with increased motivation for cessation and confidence to abstain from smoking expressed over the course of the study. However, few of the program participants achieved biochemically-verified sustained abstinence that would be regarded as full success. It is notable that our outcomes are consistent with other behaviorally-based smoking cessation interventions with this population (Tsoi et al., 2013). Our program participants were not required to use smoking cessation medication. While 23 of 30 participants used NRT on at least one occasion, only 4 used the patch and none received bupropion or varenicline as part of the study which are now evidence-based practices (Buchanan et al., 2010; Evins et al., 2014). In addition, the participants as a group had long histories of relatively heavy smoking. The intervention was further disadvantaged by the permissive smoking environments in which the program participants spent much of their time. Smoking remained normative at the programs that the participants attended despite our efforts to address the issue at these agencies, efforts which were only minimally successful during the time frame of the study and which were beyond the purview of our project.

It is also of note that we did not find any significant predictors of the Breathalyzer outcome among variables related to the peer mentor- program participant relationship. However, our sample size was small and there were likely other variables not accounted for in our analyses that led to the positive changes that were observed. We did find that a higher rating of the “Pros” of smoking at baseline was associated with less reduction in the Breathalyzer score, suggesting, not surprisingly, that positive attitudes about smoking represent a major impediment to reducing or quitting.

Given the support we found for the feasibility and acceptability of the peer enhanced intervention, an important next step will be to determine what benefits the peer component adds to a professionally-delivered intervention and in what ways peer mentors may contribute to improved smoking outcomes.

Conclusions

Our study adds to the growing literature about peer-delivered interventions. Quitting smoking in persons with serious mental illnesses represents a long journey through the process of change. Our data suggest that peer mentors support the change process and enhance the smoking modification attempts of smokers with serious mental illness. Further study in controlled trials is needed. The use of trained peer mentors to promote smoking cessation has the potential to fill an important gap in smoking cessation interventions for persons with serious mental illness.

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Table 1

Demographic and Clinical Characteristics of Study Sample at Baseline[1]

	Peer Mentors (n=8)	Program Participants (n=30)
Age, years	43 (12.5)	49 (9.7)
Gender, male	2 (25%)	19 (63%)
Race, Caucasian	7 (88%)	20 (67%)
Education, years	15.3 (1.8)	11.9 (1.6)
Diagnosis		
Schizophrenia/Schizoaffective disorder	1 (13%)	23 (77%)
Bipolar disorder	5 (63%)	4 (13%)
Major depression	2 (25%)	3 (10%)
Years smoked lifetime	17.8 (11.5)	34.6 (11.0)
Maximum number of cigarettes smoked per day, lifetime [2]	27.5 (9.3)	36.0 (16.2)
Fagerstrom Test of Nicotine Dependence [3]	N/A	4.8 (1.6)
Years quit, current	8.0 (10.1)	N/A

[1] Mean (standard deviation) or number (%)

[2] During period of heaviest smoking. One program participant was not able to provide a plausible response so based on n=29 program participants

[3] The Fagerstrom Test of Nicotine Dependence applies only to current smokers