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Treating Smoking in Adults with Co-Occurring Acute Psychiatric and Addictive Disorders

Smita Das, MD, PhD, MPH,

Clinical Assistant Professor (Affiliate), Psychiatry and Behavioral Sciences, Stanford University School of Medicine, Stanford, CA

Norval J. Hickman, PhD, MPH, and

Program Officer for the Social and Behavioral Sciences, Tobacco-Related Disease Research Program, University of California, Office of the President

Judith J. Prochaska, PhD, MPH

Associate Professor of Medicine, Stanford Prevention Research Center, Stanford University School of Medicine, Stanford, CA

Abstract

Objectives—Tobacco use is undertreated in individuals with psychiatric and substance use disorders (SUD), with concerns that quitting smoking may compromise recovery. We evaluated outcomes of a tobacco intervention among psychiatric patients with co-occurring SUD.

Methods—Data from two randomized tobacco treatment trials conducted in inpatient psychiatry were combined; analyses focused on the subsample with co-occurring SUD (n=216). Usual care provided brief advice to quit and nicotine replacement therapy (NRT) during the smoke-free hospitalization. The intervention, initiated during hospitalization and continued 6-months post-hospitalization, was tailored to readiness to quit smoking and added a computer-assisted intervention at baseline, 3, and 6-months; brief counseling; and 10-weeks of NRT post-hospitalization. Outcomes were 7-day point prevalence abstinence from 3- to 12-months and past 30-day reports of alcohol and illicit drug use.

Results—The sample was 34% women, 36% Caucasian, averaging 19 cigarettes/day pre-hospitalization; the groups were comparable at baseline. At 12 months, 22% of the intervention versus 11% of usual care participants were tobacco abstinent (RR=2.01, p=0.03). Past 30-day abstinence from alcohol/drugs did not differ by group (22%); however, successful quitters were less likely than continued smokers to report past 30-day cannabis (18% versus 42%) and alcohol (22% versus 58%) use (p<0.05), with no difference in other drug use.

Conclusions—Tobacco treatment in psychiatric patients with co-occurring SUD was effective and did not adversely impact recovery. Quitting smoking was associated with abstinence from

Correspondence: Judith J. Prochaska, PhD, MPH, jpro@stanford.edu, Associate Professor of Medicine, Stanford Prevention Research Center, Department of Medicine | Stanford University, Medical School Office Building, X316, 1265 Welch Road, Stanford, CA 94305-5411, T 650-724-3608, F 650-725-6247.

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alcohol and cannabis at follow-up. The findings support addressing tobacco in conjunction with alcohol and other drugs in psychiatric treatment.

Keywords

Tobacco; Mental Health; Smoking Cessation; Dual Diagnosis

BACKGROUND

For the clinician, a smoker with dual issues of mental illness and substance use disorders (SUD) presents a hefty treatment challenge. While the smoking prevalence in the general population has dropped to 18%, people with mental illness and SUD have two to four fold higher rates of smoking than the general population and are estimated to consume nearly half of cigarettes sold in the United States (Grant, Hasin, Chou, et al, 2004; Lasser, Boyd, Woolhandler, et al, 2000; US Department of Health and Human Services, 2014). In treatment settings, over half of patients smoke; methadone maintenance programs and inpatient psychiatry units generally have the highest rates, in the range of 75% to 95% (Diaz, James, Botts, et al, 2009; Kleber, Weiss, Anton, et al, 2007).

The morbidity and mortality ramifications are significant. Adults living with serious mental illness die on average 25 years earlier than other Americans, largely due to treatable medical conditions related to tobacco use such as heart disease, cancer, and cerebrovascular, respiratory, and lung diseases (Colton and Manderscheid, 2006; Parks, Svendsen, Singer, et al, 2006). Combined, 200,000 of the 520,000 premature deaths in the US annually are estimated to occur among those with mental illness or SUD (Schroeder and Morris, 2010). Smoking causes more deaths and disease than alcohol and all other drugs combined (US Department of Health and Human Services, 2014). This is true, even among individuals with heavy alcohol and drug use. Long-term drug abusers who smoke have four times the mortality risk of nonsmokers with drug abuse problems (Hser, McCarthy and Anglin, 1994). The negative consequences are not just additive, but multiplicative, in that the overall harms are greater than the sum of the parts (Bien and Burge, 1990). For example, in a study of oral, laryngeal, esophageal and liver cancer, alcohol and tobacco together had multiplicative effects on cancer progression (Pelucchi, Gallus, Garavello, et al, 2006).

The biopsychosocial consequences of smoking in those with mental illness or SUD go beyond the direct health effects. On an economic level, smoking can affect treatment and survival by using funds and effort to obtain cigarettes; in a study of smokers with schizophrenia, 27% of their median income was spent on cigarettes (Steinberg, Williams and Ziedonis, 2004). On a social level, smokers experience discrimination and stigma, which can add to stigma related to mental illness and/or SUD (Castaldelli-Maia, Ventriglio and Bhugra, 2016).

Primary psychiatric disorders also are adversely affected. In schizophrenia, smoking is associated with increased psychiatric symptoms, hospitalizations, and the need for higher medication doses (Ziedonis, Kosten, Glazer, et al, 1994). Tobacco withdrawal symptoms include anxiety and depression; in smoke-free treatment settings, the expression of anxiety and mood disorders in heavy smokers may appear amplified. When smokers hospitalized for

mental illness are not treated for nicotine withdrawal, rates of leaving against medical advice are increased two-fold (J. J. Prochaska, Gill and Hall, 2004). Further, independent association is well documented between cigarette smoking and suicide; smoking cessation may mitigate the risk (Li, Yang, Ge, et al, 2012).

Despite the increased mortality, morbidity, co-occurrence and biopsychosocial ramifications of cigarette smoking among those with mental illness and SUD, psychiatric and addiction treatment programs have traditionally overlooked tobacco as a treatment target with concern that efforts to quit smoking may threaten mental health recovery or sobriety. In a survey by the American Association of Medical Colleges of more than 3000 physicians, 47% of psychiatrists thought patients had more immediate problems to address and 22% reported that cessation heightens other symptoms; psychiatrists were the least likely to treat tobacco relative to other medical specialties (American Association of Medical Colleges, 2007). A review of 26 studies on smoking bans found that staff believe tobacco is important for self-medication and smoking bans in psychiatric units would worsen symptoms and increase behavioral problems, though research has demonstrated otherwise (Lawn and Pols, 2005). Currently, only 1 in 4 mental health treatment facilities in the U.S. offer services to quit smoking (NMHSS, November 25, 2014).

On the other hand, smokers with mental illness or SUD are just as motivated to quit smoking as the general population; among hospitalized smokers with mental illness, 65% were interested in quitting (J. J. Prochaska, Fletcher, Hall, et al, 2006). There is no evidence of worsening of clinical symptoms of unipolar depression, bipolar disorder, posttraumatic stress disorder, or schizophrenia with tobacco treatment (Hall and Prochaska, 2009). Furthermore, treatment of tobacco dependence is associated with a decreased likelihood of rehospitalization and, in a meta-analysis of 19 studies, with an increased likelihood of sobriety among smokers in treatment for addictive disorders; notably, only 3 of these studies were in inpatient addiction treatment settings and none were conducted with smokers with co-occurring mental illness (J. J. Prochaska, Delucchi and Hall, 2004).

Current Tobacco Clinical Practice Guidelines recommend providing evidence based tobacco cessation treatment to all smokers (Fiore and 2008 PHS Guideline Update Panel, Liaisons, and Staff, 2008). The American Psychiatric Association identifies psychiatric hospitalization as an ideal opportunity to treat tobacco dependence, yet treatment of tobacco in psychiatry is not regular practice (Kleber, et al, 2007). Outside of the data presented in this paper, only two randomized tobacco treatment trials have been published with adult psychiatric inpatients, both studies conducted in Australia (Stockings, Bowman, Baker, et al, 2014; Metse, Wiggers, Wye, et al, 2017). In large part, dual diagnosis of mental illness and SUD is viewed as complicated.

Herein, we report on smoking cessation and recovery outcomes analyzing data on smokers with mental illness and SUD treated for tobacco use in two randomized controlled trials (Hickman, Delucchi and Prochaska, 2015; J. J. Prochaska, Hall, Delucchi, et al, 2014). The tobacco cessation interventions were initiated in inpatient psychiatry, and we focus here on the subsample dually diagnosed with mental illness and SUD.

METHODS

Setting

Data from two randomized controlled trials testing smoking cessation interventions in patients hospitalized for psychiatric treatment were combined. The studies (n=224 recruited 2006–2008 and n=100 recruited 2009–2010) had common inclusion/exclusion criteria measures and procedures (Hickman, et al, 2015; J. J. Prochaska, et al, 2014). Psychiatric treatment was per protocol of the adult inpatient units.

Participants were recruited in-hospital from four 100% smoke-free locked acute psychiatry units at two hospitals in the San Francisco Bay Area (one academic and one public) and randomized to intervention or usual care. Intention to quit smoking was not required to participate as the intervention was informed by the Transtheoretical Model tailored to readiness to quit smoking.

Using medical records to identify positive smoking status, research staff worked with clinical staff to ask if a potential participant would like to hear about a smoking study; those interested were introduced to research staff who provided a greater description of the study and assessed eligibility for the trial. Inclusion criteria were: smoking at least five cigarettes daily prior to hospitalization, 18 years of age or older, and fluency in written and spoken English. Exclusion criteria were acute psychosis, hostility, or hypersomnolence that did not resolve sufficiently during hospitalization and contraindication for nicotine replacement therapy (NRT). Research staff fully reviewed the consent form with participants and assessed understanding of the purpose and potential risks and benefits of participation using a brief capacity to consent screening instrument (Hickman, Prochaska and Dunn, 2011).

Current analysis centered on participants with a SUD as defined by a positive drug abuse screening test (DAST) score ≥ 3 or positive alcohol use disorders identification test (AUDIT) score ≥ 8 at baseline (explanation of measures follows). See Figure 1 for participant selection.

Measures

Screening Measures—The AUDIT is a 10-item scale covering three conceptual domains: alcohol intake (items 1–3), dependence (items 4–6), and adverse consequences (items 7–10). It was developed by the World Health Organization and scores can range from 0–40 with a standard cut point of 8 (Reinert and Allen, 2007). The DAST is originally a 28-item face-valid self-report measure using yes/no questions to identify problematic substance use; there is a 10-item version of the test (Skinner, 1982). Studies in dual diagnosis populations reported that the AUDIT and DAST exhibited good psychometric properties, with internal consistency reliability coefficients in the mid-90s (Reinert and Allen, 2007; O’Hare, Sherrer, LaButti, et al, 2004; Boschloo, Vogelzangs, Smit, et al, 2010). A study in psychiatric patients in India of the AUDIT and DAST used cut points of 8 and 3 and demonstrated strong psychometric properties (Carey, Carey and Chandra, 2003). Similar findings were reported in a 2010 study with depressed and anxious men (Boschloo, et al, 2010). A 2004 study of the AUDIT administered on patients with serious mental illness

reported a sensitivity of 0.71 with specificity of 0.95 at the cut-point of 8 (O'Hare, et al, 2004; Boschloo, et al, 2010; Carey, et al, 2003).

Sample Descriptive Measures—Tobacco use measures were cigarettes per day (CPD); the Fagerström Test of Cigarette Dependence (FTCD range 0–10; < 5 indicating low, 5 moderate, and >5 high nicotine dependence), which includes time to first cigarette (Fagerstrom, 2012); and the Smoking Stage of Change scale, categorizing smokers at baseline into precontemplation (no intention to quit in the next 6 months), contemplation (intention to quit in the next 6 months), or preparation (intention to quit in the next 30 days with a past year 24 hour quit attempt) (J. O. Prochaska and DiClemente, 1983).

Outcomes of interest—Outcomes of interest were abstinence from tobacco, alcohol, and other drugs and change in psychiatric symptom ratings. Tobacco abstinence was self-reported at 3-, 6- and 12-months follow-up and validated with a breath sample tested for levels of carbon monoxide (CO) exposure over the past 24 hours as measured by a Bedfont Smokerlyzer, where a value of < 10 parts per million verified abstinence (Jarvis, Tunstall-Pedoe, Feyerabend, et al, 1987). If someone was lost to followup or not able to confirm nonsmoking status in person, collateral contacts obtained at baseline including friends, family, and health professionals were called to verify use in the last 7 days. Collateral reports were validated with CO confirmation in a study of smokers with SUD (Patten, Martin, Filter, et al, 2002). In addition to smoking status, we assessed any alcohol/illicit drug use for the past 30 days at each follow-up using the Addiction Severity Index (ASI; (McLellan, Alterman, Cacciola, et al, 1992). Lastly, the 24-item Behavior and Symptom Identification Scale (BASIS-24) was administered with scales for substance abuse, depression, self-harm, psychosis, emotional lability, and interpersonal relationships (Eisen, Normand, Belanger, et al, 2004). The substance abuse subscore looks at a participants' urge to drink or use of drugs as well as possible problems resulting from alcohol and/or drug use. We cannot report on the full BASIS-24 score since self-harm was not assessed by phone post-hospitalization.

Intervention

The overall aim of the two original studies was to test a Transtheoretical Model tailored, computer-assisted smoking cessation intervention with NRT post-hospitalization against enhanced usual care. Usual care included brief advice to quit, NRT on the unit, and a quit smoking pamphlet. The intervention group received usual care plus the Transtheoretical Model stage tailored computer delivered intervention with printed report, stage matched treatment manual and on unit individual cessation counseling. As part of standard care, participants in both conditions were offered NRT during their smoke-free hospitalization to manage nicotine withdrawal symptoms. In addition, participants randomized to intervention were offered a 10-week course of study-provided NRT patch, which they could elect to receive once ready to quit – available at the time of hospital discharge or anytime up to the 6-month follow-up assessment via mail or from the research offices. The 15–30 minute counseling for the intervention group provided motivational enhancement and stage-tailored strategies for managing temptations, considering the pros and cons of change (i.e., decisional balance), and encouraging use of stage-matched processes of change. The

intervention group at 3 and 6 months post-hospitalization repeated the computer intervention, which stored their previous entries providing *ipsative* feedback on how they changed over time, recommending next steps toward quitting smoking and maintaining abstinence. The intervention has been reported on previously (Hickman, et al, 2015; J. J. Prochaska, et al, 2014). Internal Review Board approval was obtained by the respective institutions.

Analysis

Baseline variables were summarized and compared for intervention and usual care groups. Pearson chi (χ) squared tests were used to compare gender, ethnicity, hospitalization status (voluntary versus not), insurance status, diagnosis, past 30-day alcohol/drug use, and smoking stage of change by treatment groups. Two sample t-tests were used to compare age, CPD, FTCD, AUDIT and DAST-10 scores.

To examine the primary outcome of interest, we compared smoking status between treatment groups at 12 months using Pearson χ^2 tests and by calculating relative risk. Further, we estimated and tested a logistic regression model using a generalized estimating equation (GEE) model (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) to examine abstinence versus smoking status at each follow up point (3, 6, and 12 months). Secondary outcomes of interest compared among treatment groups were change in the BASIS-24 substance abuse subscore and past 30 day drug or alcohol use at 12 months using t tests. Finally, we compared use of alcohol and other drugs between those who were smoking and those who were not smoking at 12 months using Pearson χ^2 tests. All analyses were two-sided and done at the $\alpha=0.05$ level.

RESULTS

Of the 324 original participants, 216 (67%) were determined to have a SUD based on our criteria; 111 were randomized to the usual care group and 105 to the intervention group (see Figure 1).

Baseline characteristics

At baseline, there were no major differences found between intervention and usual care groups on all demographic, psychiatric, and tobacco-related variables of interest (Table 1). The sample was 66% men and 36% non-Hispanic white with a mean age of 39 years (SD=13); 31% of the sample was hospitalized voluntarily. Insurance status was: 17% self-pay, 30% private insurance, 53% Medicare/Medi-Cal. Diagnoses were: 44% unipolar depression, 20% bipolar depression, 24% psychotic disorder, and 12% other. Smoking stage of change was: 33% Precontemplation, 47% Contemplation, and 20% Preparation. The mean number of cigarettes smoked per day prior to hospitalization was 19 (SD=12) and the mean FTCD score was 5.0 (SD=2.3), indicating moderate nicotine dependence; 43% were classified as highly dependent (FTCD > 5). Nearly all participants (94%) reported alcohol or illicit drug use in the 30 days prior to hospitalization. Participants randomized to the usual care and treatment groups differed only in past 30-day reported use of cocaine and

amphetamines, in both cases reported more frequently by participants randomized to the treatment than in the usual care group.

Primary and secondary outcomes

At 12 months, there was a significant difference in smoking status by treatment group: 22% of the treatment group was not smoking compared to 11% of the usual care group (Risk Ratio=2.01, 95% confidence interval [CI]=1.05–3.83) (Table 2). In a GEE model testing the effect over time, tobacco abstinence rates over 12 months differed significantly by treatment condition (Odds Ratio=2.30; 95% CI=1.08–4.90, $p<0.05$) (Figure 2).

Comparing treatment and usual care groups, there was no significant difference in reported past 30-day use of any drug (65% versus 68%), alcohol (57% versus 47%) or combined alcohol and drugs (81% versus 76%) at 12 months (Table 2). Further, by treatment condition, change in BASIS-24 scale scores did not differ by treatment group: substance abuse ($t=0.01$, $p=.99$), depression/functioning ($t=0.81$, $p=.42$), interpersonal relationships ($t=-0.59$, $p=0.55$), emotional lability ($t=0.78$, $p=0.44$), and psychosis ($t=0.58$, $p=0.56$).

At 12-months follow-up, examined by smoking status, those who quit smoking compared to continued smokers were less likely to report past 30-day alcohol (22% vs. 58%, $\chi^2=10.02$, $p=0.002$, Figure 3) and cannabis use (42% vs. 18%, $\chi^2=4.47$, $p=0.027$). There was no difference in reported past 30-day use of other drugs on the ASI by tobacco quit status at 12-months. Further, there was no significant difference in changes on the BASIS-24 scale scores when comparing those quit smoking to those who did not.

DISCUSSION

A tobacco cessation treatment initiated during inpatient psychiatric hospitalization among smokers with co-occurring mental illness and SUD was successful in doubling confirmed smoking abstinence rates at 12-months follow-up when compared with usual care. Further, there was no indication of harm to substance use recovery associated with the tobacco cessation treatment. Instead, irrespective of treatment group, those who quit smoking were found, at 12-months follow-up, to have half the rates of past 30-day alcohol and cannabis use, relative to those who continued smoking.

While the outcome differences in substance use are associative and not necessarily causative, recent models both at the addiction neurocircuitry level and cell/molecular biology levels suggest the presence of the Gateway Hypothesis and the Common Liability Model. First, the Gateway Hypothesis posits that use of nicotine and alcohol can increase the risk to use other drugs. Similarly the common liability model asserts that genetic, familial, and individual traits make one liable for multiple substances. It is thought that since different drugs are used together, they can in turn be treated together (Kandel and Kandel, 2015). The comorbidity of tobacco and other substance use, both socially and biologically, is impetus to treat both simultaneously so that there is additional benefit towards abstinence of each substance.

A smoke-free hospitalization provides a unique window of opportunity for addressing tobacco use in smokers with mental illness and SUD. Yet, the reality is that quitting smoking

is not the presenting acute issue. In our sample, only 1 in 5 participants at baseline expressed intention to quit smoking in the next 30 days. Rather than requiring motivation to quit, and effectively excluding 80% of hospitalized smokers, we utilized a treatment approach that was tailored to motivation or stage of change for quitting smoking. Our piloting of the intervention indicated acceptability and appreciation of the approach, which did not require action to participate, but rather provided support and encouragement over time out to 6-months post-hospitalization (J. J. Prochaska, Hall and Hall, 2009). Over time, quit rates rose to 22% at 12-months. The increase in quit rates over a year is a unique feature of a stage-based intervention. Stage-tailored interventions allow smokers not initially intending to quit to be supported through the process of quitting over time (J. O. Prochaska and DiClemente, 1983).

Hospital-based smoking cessation programs not directed at psychiatric patients have concluded that post-hospitalization contact is associated with better quit rates (Rigotti, Clair, Munafo, et al, 2012); the Joint Commission Tobacco Treatment Measures have been updated to include a measure for post discharge contact with a smoker within 1-month of hospital discharge (Fiore, Goplerud and Schroeder, 2012). Implementing the tobacco measure set for Joint Commission quality reporting could have major benefits for public health, through systematic identification, advice and follow up with hospitalized smokers. In the absence of a formal and extended intervention, even the most basic advice and a quitline referral is recommended (Fiore and 2008 PHS Guideline Update Panel, Liaisons, and Staff, 2008); in the current study, we observed a quit rate of 11% at 12-months in the enhanced usual care group, suggesting a low intensity intervention was helpful to many patients.

Recruitment and retention rates were high and a diagnostically and demographically diverse sample was enrolled, enhancing generalizability of the study findings. The study, however, was limited to one geographic region, the San Francisco Bay Area, where smoking rates are lower than the national average and there are more public restrictions on smoking. While the tobacco abstinence outcomes were bio-confirmed when possible, the substance use measures were self-reported. Non-nicotine substance use was not a target of the smoking cessation intervention, and there is no reason to expect differential bias in self-reporting by condition.

This manuscript pulls from two trials with common procedures to complete an analysis on a sub-sample of those with co-occurring SUD. We assume that with the common procedures, measures, and criteria that the data are similar. Despite the fact that the sample size increases from the combination of the data, there may be situations in which there are still too few responses. For example, while cannabis and alcohol use were fairly prevalent, there may not be enough power to detect differences in other drug use with smoking status.

A related limitation is that the trials were not designed to evaluate the specific question at hand. To our knowledge, this is the first study with randomized treatment groups to report on tobacco cessation outcomes among dually diagnosed smokers recruited from acute inpatient psychiatry settings. There are only two additional randomized controlled trial with adult psychiatric inpatients, both conducted in Australia (Stockings, et al, 2014; Metse, et al, 2017). Both found short term effects on abstinence that were not sustained, though reductions in smoking were reported; about 1 in 5 participants in the samples were identified

with substance-related disorders. There is limited data on treating tobacco use and dependence in those with acute mental illness, and especially in those who are dually diagnosed. Further research to inform best practices is warranted.

Another limitation is that while changes in substance use and general psychiatric symptoms were measured, mental health diagnoses were not reassessed at 12 months. The BASIS-24 scales are of interest as they are domains that clinicians may be concerned about decompensating with tobacco treatment, and the results support the literature that these mental health outcomes are not adversely affected by tobacco treatment.

The findings support recommendations to treat tobacco use in clients with co-occurring mental illness and SUD. Tobacco use disorders account for heavily increased mortality and morbidity among patients with mental illness, and outcomes are worse in those who have SUD. It is imperative, and consistent with clinical practice guidelines, to offer advice and help to all patients who smoke. Not providing tobacco treatment goes against quality standards of care. Future treatments may look to address alcohol, tobacco, and other drugs in one integrated intervention given the high rate of tobacco and SUD disorders among persons with mental illness. Combined treatment could lead to comprehensive care for a group at great risk of smoking related morbidity and mortality.

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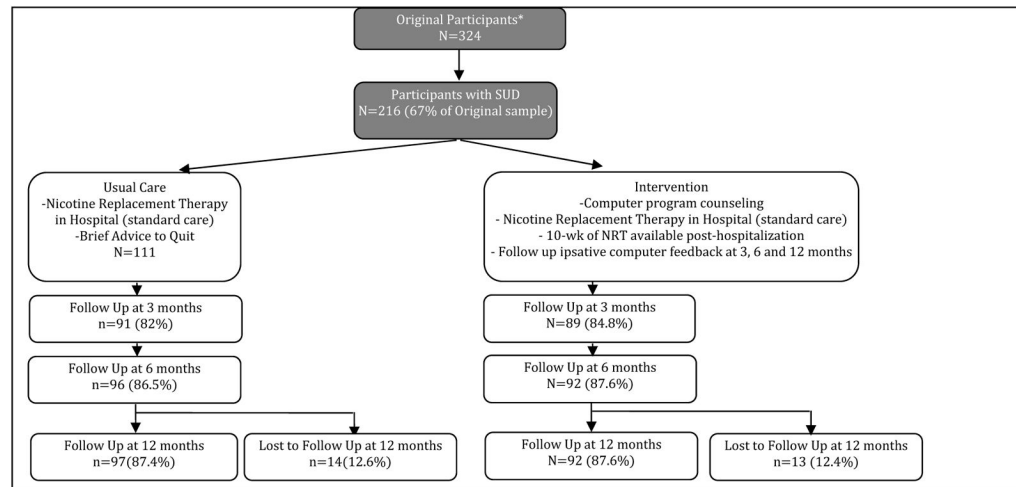


FIGURE 1.

Participant recruitment and randomization with smoking follow up rates

* Data combined from two randomized controlled trials testing smoking cessation interventions in patients hospitalized for psychiatric treatment (n=224 and n=100) which had common inclusion/exclusion criteria measures and procedures (Hickman, et al, 2015).

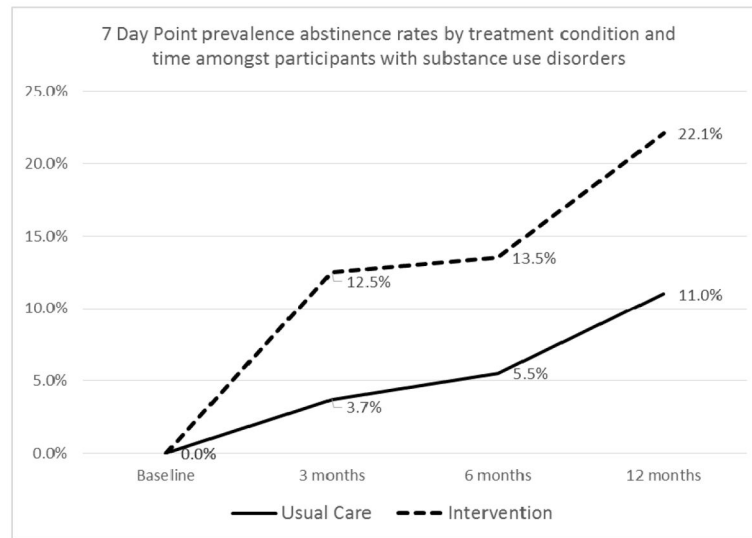


Figure 2.

7 Day Point prevalence abstinence rates by treatment condition and time among participants with substance use disorders

Tobacco abstinence rates over 12 months were significantly different by treatment condition (generalized estimating equation model: odds ratio = 2.30; 95% CI = [1.08, 4.90] $p < 0.05$).

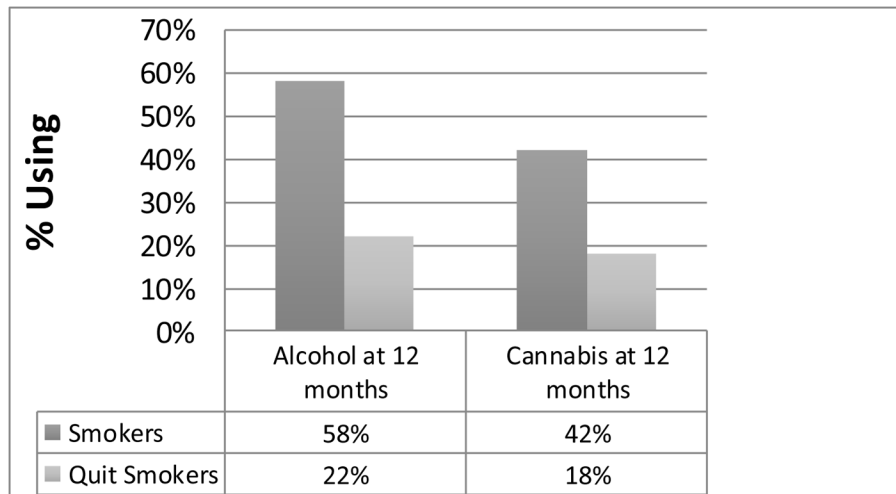


Figure 3.
Past 30-day Alcohol and Cannabis use at 12 months in those who quit smoking vs those who did not
Alcohol and cannabis abstinence rates at 12 months were significantly different by smoking cessation outcome ($\chi^2=10.02$, $p=0.002$ for alcohol, $\chi^2=4.47$, $p=0.027$ for cannabis).

Table 1

Baseline characteristics

	Usual Care N=111	Treatment N=105	All N=216
Male	69%	62%	66%
Ethnicity			
African American	14%	13%	13%
Asian	8%	6%	7%
Caucasian	62%	67%	64%
Hispanic	6%	7%	7%
Multiple or Other	10%	8%	9%
Stage of Change			
Precontemplation	35%	30%	33%
Contemplation	45%	50%	47%
Preparation	20%	20%	20%
Voluntary Hospitalization	26%	36%	31%
Pay Category			
Self-pay	19%	15%	17%
Private	25%	35%	30%
MediCare/Cal	56%	50%	53%
Diagnosis			
Unipolar depression	41%	47%	44%
Bipolar	25%	14%	20%
Psychosis	24%	24%	24%
Other	9%	15%	12%
Age in years: Mean (SD)	40 (14)	38 (12)	39 (13)
Cigarettes per day: Mean (SD)	19 (12)	18 (11)	19 (12)
FTCD Score: Mean (SD)	5.0 (2.4)	5.0 (2.2)	5.0 (2.3)
AUDIT: Mean (SD)	12.8 (10.0)	13.2 (10.5)	13.0 (10.3)
DAST-10: Mean (SD)	5.5 (3.0)	5.9 (3.3)	5.7 (3.2)
Any drug use in past 30 days	81%	84%	82%
Heroin	11%	13%	12%

	Usual Care N=111	Treatment N=105	All N=216
Methadone	11%	12%	11%
Cocaine* (p=0.05)	32%	45%	38%
Amphetamines* (p=0.02)	20%	34%	27%
Cannabis	44%	50%	47%
Hallucinogens	8%	6%	7%
Opiates	22%	22%	22%
Sedatives	30%	28%	29%
Pain Meds	32%	36%	34%
Barbituates	5%	3%	4%
Inhalants	3%	5%	4%
Any alcohol use in past 30 days	72%	73%	73%
Any drug or alcohol use in past 30 days	92%	96%	94%
BASIS-24 Summary score: Mean (SD)	2.15 (0.63)	2.19 (0.58)	2.18 (0.61)
Depression/Functioning	2.54 (0.92)	2.50 (0.90)	2.52 (0.91)
Interpersonal Relationships	2.15 (0.90)	2.20 (1.03)	2.17 (0.96)
Self-Harm	1.91 (1.29)	1.78 (1.43)	1.85 (1.36)
Emotional Lability	2.18 (1.09)	2.20 (1.12)	2.19 (1.10)
Psychosis	1.29 (1.14)	1.58 (1.31)	1.44 (1.23)
Substance Abuse	1.82 (1.11)	2.00 (1.16)	1.91 (1.13)

* Note: Other than past 30-day cocaine and amphetamine use (both greater in the treatment group), no significant differences (p<.05) at baseline between the usual care and the treatment group.

Table 2

12-month outcomes (Intervention versus Usual Care)

	Smoking Abstinence	RR [95%CI]	Drug Abstinence	RR [95%CI]	Alcohol Abstinence	RR [95%CI]	Drug and Alcohol Abstinence	RR [95%CI]
Intervention	22.1%	2.01	35.5%	0.95	42.9%	1.21	19.4%	1.07
Usual Care	11.0%	[1.05, 3.83]	32.4%	[0.75, 1.22]	52.7%	[0.88, 1.67]	24.3%	[0.89, 1.27]

RR = Risk Ratio, CI = Confidence Interval

There was a significant treatment effect for tobacco with no difference in alcohol or other drug use.