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Enforced Abstinence from Tobacco During In-Patient Dual-Diagnosis Treatment Improves Substance Abuse Treatment Outcomes in Smokers

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Background and Objectives: Although the prevalence of tobacco use in those in substance abuse treatment is known to be quite high, most treatment programs do not address tobacco. The purpose of this study was to determine substance abuse recovery rates a year after treatment in a fully integrated, 90-day inpatient, dual diagnosis treatment program where patients are required to quit tobacco use in addition to drug and alcohol use for the duration of their 3 month stay. Tobacco is treated in the same way as other drugs and alcohol.
Methods: One hundred fifty-four patients enrolled in a yearlong follow-up after treatment study consisting of monthly phone contact to assess recovery from substance abuse.
Results: One hundred forty (n=140) patients completed the year follow-up. At the time of entry into the program 120 (86%) were using tobacco daily. At the end of the year this decreased to 102 (73%). Patients who were using tobacco were more likely to relapse to other drugs or alcohol ($p = .01$). Patients who actively attempted to abstain from tobacco after treatment were significantly more likely to remain continuously abstinent throughout the year ($p = .03$).
Conclusions: This study demonstrates that tobacco use is correlated with relapse and addressing tobacco in treatment as seriously as and in the same fashion as other drugs, improves outcomes.
Scientific Significance: When provided with a tobacco free treatment environment for 90 days, patients with substance abuse and mental illness can and do make the decision to quit tobacco and stay quit, aiding their ability to remain sober. (Am J Addict 2014;XX:1–6)

INTRODUCTION

Patients with co-occurring addictive and mental health disorders have historically not done well in traditional substance abuse or mental health treatment programs and have benefited more from integrated dual-diagnosis treatment programs where both disorders are addressed at the same time.[1] Patients with substance abuse and mental illness have a very high incidence of co-occurring nicotine dependence. Up to 80% of individuals with schizophrenia, bipolar disorder, and alcohol or drug dependence use tobacco on a daily basis.[2] A review of the literature regarding smoking prevalence in addiction treatment indicates that although there has been a gradual decline in the use of tobacco by the general US adult population, from 40% in 1964 to 20.6% in 2009,[3] and more recently to 19% in 2011,[4] there has not been a similar trend in those with alcohol and drug use disorders. The lowest smoking prevalence found for any single year was 65%, in all of the reviewed studies.[3]

There is evidence that continued tobacco use may negatively influence recovery and trigger relapse to use of other drugs and alcohol.[5–10] In addition, there is mounting evidence that smoking cessation during substance abuse treatment does not impair outcomes of the presenting substance abuse problem and can actually enhance outcome success.[11–13] While controlling for multiple factors in a large, national, longitudinal study of drug abuse treatment, smoking cessation was associated with significantly greater abstinence from drug use after completion of drug abuse treatment.[14] A large naturalistic, observational study of the associations between change in smoking status and 12-month substance abuse treatment outcomes found that 13% of smokers quit smoking without a formal smoking cessation program.[15] Those who attempted to quit smoking had more days abstinent from drugs and alcohol than those who remained smokers or started/resumed smoking after treatment entry, even when controlling for length of stay in treatment. A 24-year follow-up study of 405 heroin-dependent criminal offenders admitted to court ordered treatment found that smokers were more likely to relapse to heroin use and excessive drinking.[16] In addition they found that tobacco use, even in a sample of long-term narcotics addicts, was strongly correlated with subsequent mortality.

Tobacco use is known to be a major cause of morbidity and mortality and has been shown to be a major cause of premature

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death in patients with substance abuse disorders who achieve sobriety but do not stop tobacco use.[17] In addition, there is evidence that simply decreasing the amount of tobacco used does not result in improvement of medical consequences[18] or psychiatric stability.[19] Substantial benefits result only from abstinence from tobacco.

A meta-analysis of 19 randomized controlled trials of smoking cessation interventions for those in substance abuse treatment or recovery found that the interventions provided during addiction treatment were associated with a 25% increased likelihood of long-term abstinence from alcohol and drugs.[20] While the findings indicated good initial success at stopping smoking, there was difficulty maintaining long-term smoking cessation. Such findings support the need to actively address nicotine as a drug of dependence in an integrated treatment program for co-occurring disorders and to develop strategies to help improve long-term smoking cessation in this population.

When people with substance abuse problems are not successful in maintaining sobriety during outpatient treatment, the most common recommendation is to utilize a more intensive level of care, such as residential or inpatient treatment.[21] Such programs have the unique ability to provide a safe and totally drug free environment where individuals can experience freedom from the drug driving its use and can begin to make better decisions about whether they want to quit or not. These programs are drug and alcohol free but very few inpatient or residential programs actually provide a tobacco free environment and require abstinence from tobacco during treatment.

Some system interventions have been initiated in the United States to address nicotine dependence in substance abuse treatment in order to treat it as seriously and in the same fashion as other drugs and alcohol. In 1999, New Jersey was the first state to implement a licensure standard for all residential addiction treatment programs to assess and treat tobacco dependence in the context of entirely tobacco-free facilities including outside grounds.[22] In 2008, New York implemented a policy requiring all state-supported programs to have smoke-free grounds, prohibiting staff from using tobacco during work, and providing education and tobacco cessation treatment for all patients.[23] While such initiatives reflect an increasing recognition of the need to address tobacco dependence in substance abuse treatment, the reality is that the provision of tobacco treatment is rare. Most substance abuse treatment programs do not address tobacco.[3,24,25]

The Circle Program at the Colorado Mental Health Institute at Pueblo is a fully integrated, dual diagnosis, 90-day inpatient treatment program for men and women, age 18–65, with co-occurring substance abuse and mental health problems. The program is Joint Commission accredited, operated by the Colorado Department of Human Services at one of the two State hospitals in Colorado, and funded by the State of Colorado. The program is mandated by the State to treat people who have failed everything else and most people have been in multiple previous inpatient treatment programs without success. Treatment in this program is voluntary, and the doors are not locked; although, 80% come to treatment through some sort of coercion, such as a condition of probation/parole/diversion for criminal behavior related to drug/alcohol use or via a civil commitment initiated by family members. The program is abstinence based and completely tobacco-free. The program is highly regarded by Judges and Probation officers throughout the state because of successful outcomes seen for many previously refractory patients and as a result there is a long waiting list. An outcome study was undertaken to determine substance abuse recovery rates at 1 year after treatment in the 90-day program.

Since the best outcomes for patients with both substance abuse and mental illness occur when treatment for both is fully integrated, we hypothesized that in addition, mandating tobacco abstinence for 3 months and integrating tobacco cessation into treatment for substance abuse and mental health would improve both substance abuse and tobacco cessation outcomes. All of the patients in this study had been unsuccessful in maintaining sobriety after previous treatment programs, often reporting relapsing soon after discharge. All the tobacco users reported continuing to smoke throughout those programs, even if encouraged to quit, simply because "they could". We hypothesized that after this treatment they would be more successful at maintaining sobriety because they would not be using tobacco throughout their stay and would be more likely to remain free from drugs, alcohol, and tobacco after discharge.

METHODS

The Program – Integration of Tobacco

Since January 2000, the program has been totally tobacco free and patients are not able to use tobacco products of any kind for the 90 days of treatment. If patients are using tobacco prior to admission (not coming from a jail setting where tobacco use is forbidden), they are offered nicotine replacement therapy in the form of a patch. The initial dose of this is tapered over the first 6 weeks of treatment, and the patients are expected to be nicotine free the last 6 weeks of treatment. Patients are also offered 5-point ear acupuncture NADA protocol (acudetox) 4–5 days per week and are encouraged to receive this regularly to help with tobacco and other drug cravings.[26,27] This is the only form of detox protocol provided in the program.

The topic of tobacco is fully integrated into all aspects of the program, whether it is a discussion of alcohol/drug/tobacco effects on the body, cravings, and triggers or it is a discussion of mental illness and medications. Patients participate in cue-exposure related to alcohol, drugs, and tobacco. The patients are given a great deal of education on tobacco and its effects on the brain and body and are queried monthly as to their plans on use of tobacco after discharge. Breath carbon monoxide testing is utilized, in addition to urine drug screens for nicotine, alcohol, and other drug detection and breathalyzers for alcohol detection. These are performed randomly, after every outing or pass and for probable cause.

Subjects

Between January 1, 2009 and December 31, 2011, 185 patients successfully completed the 90-day program. One hundred seventy-nine were eligible to enroll in the outcome study (six had to return to another secure environment making them ineligible). One hundred fifty-four patients (86%) enrolled (25 declined). They came from all over the State of Colorado, representing 28 different counties in the state. One hundred twenty-three (80%) of those who enrolled were admitted as a condition of probation for legal charges related to their substance use, 5 (3%) were under a civil commitment initiated by family members and 26 (17%) were voluntary – referred by their mental health center or private mental health clinician. On average, they had been in 2–3 previous inpatient treatment programs; with a range of up to 16 previous inpatient treatments and 1–2 previous intensive outpatient programs, with a range of up to 7 previous outpatient treatment programs.

Demographics included 52% male, 80% Caucasian, 15% Hispanic, 4% African-American, and 1% Asian. Average age was 35 +/– 10 years with a range of 19–65. Alcohol dependence was the primary substance dependence diagnosis (31%), followed by polysubstance dependence (30%), methamphetamine dependence (17%), cocaine dependence (12%), opiate dependence (8%), and cannabis dependence (2%). The primary psychiatric diagnosis was PTSD (31%), followed by depression (23%), bipolar disorder (16%), anxiety disorder (12%), substance induced mood/psychotic disorder (6%), schizophrenia/schizoaffective disorder (5%), ADHD (3%), and other (4%). Seventy-seven percent had an Axis II diagnosis with the predominant being borderline personality disorder (39%) and antisocial personality disorder (12%). Axis I and Axis II diagnoses were made by clinical assessment and continual re-evaluation during the patients' stay by the program psychiatrist, using DSM IV criteria.[28] Chronic hepatitis C was present in 22%.

Assessments

After patients were discharged from the 90-day inpatient stay, monthly contact was made for 12 months by phoning the patient, a family member, their mental health provider, their substance abuse counselor, and/or their probation/parole officer, if applicable, for information regarding their recovery efforts. Information was obtained using a standardized questionnaire. Responses provided data on patients use of drugs, alcohol and tobacco; employment; participation in school or training programs; participation in support groups; participation in individual or group therapy; maintaining contact with probation officer; frequency of tissue testing for drugs or alcohol; new legal charges; quality of physical health; quality of mental health; hospitalizations; compliance with prescribed medications; living situation; financial stability; and use of their support system. At each contact information was obtained regarding alcohol, drug and tobacco use in the past month and probation officers provided tissue testing results for verification.

The patients were provided with informed consent and signed releases of information for all persons to be contacted. The local Institutional Review Board of Parkview Hospital in Pueblo, Colorado approved this study.

Statistical Analysis

All statistical calculations were performed utilizing the StatView® program from the SAS Institute.[29] Statistical methods included chi-square analysis of contingency tables and Fisher's exact test for categorical variables and unpaired *t*-tests for continuous variables. The patients' status at the end of the year was compared to variables including gender, race, age, primary drug of abuse, primary psychiatric diagnosis, presence of an Axis II diagnosis, number of previous treatment programs and tobacco use. If patients relapsed to drugs or alcohol at all during the year this was compared with all these variables. In all analyses, p values $<.05$ were considered evidence of a statistical difference not attributable by chance.

RESULTS

Results for the One-Year Follow-up

Of the 154 patients who enrolled in the outcome study, 140 (91%) completed the one-year follow-up. Fourteen patients (9%) were lost to follow-up. Three of these could not be contacted, four were not on probation and were thus lost to follow-up after 2–3 months, seven were on probation but were lost to follow-up when they successfully completed their probation and were no longer followed by their probation officer. They were lost to follow up an average of 7 months post discharge and were verified by the probation officer to be maintaining sobriety at the time but were not included in the results due to not completing the 12-month follow up.

The status of the 140 patients at the end of the year showed the following results: 54% maintaining sobriety. Of these, 30% reported to be continuously abstinent from drugs and alcohol the entire year; 18% had a relapse to their drug of choice (>2 episodes of use or persistent use) but quit again and were maintaining sobriety; and 6% had one or more slips (1 or 2 isolated uses of alcohol or drugs considered not their drug of choice) and were maintaining sobriety at the end of the year. Sixteen percent were in relapse at the end of the year, 3% were back in an inpatient treatment program, 3% were deceased (three of the four had relapsed at the time of death) and 24% had re-offended and were incarcerated (Fig. 1). There was no significant difference between status at the end of follow-up and: gender; race; primary substance dependence diagnosis; primary psychiatric diagnosis; tobacco use on admission; presence of an Axis II diagnosis; or legal status. Age was a factor in that those who were incarcerated (32 ± 9 years) or relapsed (34 ± 9 years) were younger than those who were sober (35 ± 9 years) or those continuously abstinent (38 ± 12 years) and those who were deceased were older (46 ± 10 years). The difference in age between those who were incarcerated and those who were continuously sober was significant (t-Value $= 2.111$, $p = .04$).

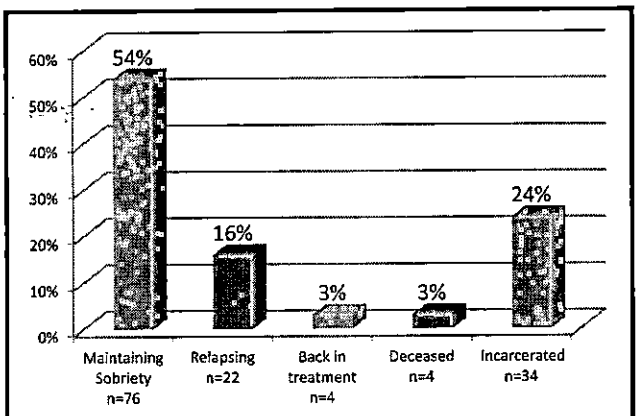

FIGURE 1. Status at the end of the year follow-up for 140 patients.

At the time of discharge, all 140 patients were maintaining sobriety and had not used any drugs or alcohol during their 90-day stay in the program. While 24 of the 140 individuals did attempt to use tobacco at some point during their treatment program, there was no correlation between this behavior and status at the end of the year. Tobacco use in treatment was considered a major rule violation. Some took the consequences of a level drop and increased reading and writing about tobacco very seriously and made the decision to stay away from tobacco after discharge with five of those caught using tobacco in treatment maintaining continuous abstinence from drugs, alcohol, and tobacco during the year after treatment. Tobacco use at time of follow-up did play a significant role in status. At the time of admission, 86% or 120 of 140 patients had been using tobacco on a daily basis. At the end of the follow-up period, 73% or 102 of 140 patients were using tobacco. The number of people refraining from using tobacco at the end of follow-up nearly doubled from 14% (20) to 27% (38). None of the 20 non-smokers on admission began smoking, as sometimes happens in treatment where smoking is accepted and 18 of the tobacco users were able to quit using tobacco. Those still using tobacco were much more likely to relapse to drugs/alcohol with 69% of tobacco users relapsing (>2 episodes of use or persistent use) and only 45% of non-tobacco users relapsing at some point throughout the year ($X^2 = 6.717$, $p = .01$). Patients who were using tobacco on admission but were willing to remain off tobacco after discharge were even more successful at staying sober than those not using tobacco at the time of admission. Sixty percent of non-tobacco users on admission relapsed versus 28% relapse in those who decided to stay quit from tobacco versus 69% relapse in those continuing to use tobacco ($X^2 = 10.893$, $p = .001$)(Fig. 2). The time to first relapse after discharge was significantly longer for those not using tobacco, 9 ± 5 months, than those using tobacco, 6 ± 5 months (t-value $= 2.699$, $p = .008$). There was a significant difference in tobacco use for those reporting to be continuously abstinent from drugs and alcohol throughout the entire year. Of the 20 non-tobacco users on admission, 7 (35%), reported to be continuously abstinent from drugs and alcohol compared with 23 of those 102 (23%) continuing to use tobacco and 12 of the 18 (67%) tobacco users who quit using tobacco ($X^2 = 10.168$, $p = .002$) (Fig. 3).

DISCUSSION

These outcomes are very good for a population that historically had a poorer overall prognosis and had been shown to be particularly resistant to previous community-based treatment. In addition, these outcomes are better than outcomes reported for patients with no assessed mental illness where such patients were found to have a relapse rate of 70–80% at 12 months after treatment.[30] An important finding in this study was that the primary drug of choice, the primary psychiatric diagnosis or even the presence of an Axis II diagnosis had no significant effect on substance abuse or tobacco use outcomes at one year after 3 months of inpatient treatment. However, ongoing tobacco use did significantly affect substance abuse outcomes. This is consistent with our previous observation that tobacco users are significantly more likely to relapse than non-tobacco users after substance abuse treatment.[9,10] Such information supports the need to assess tobacco use when looking at potential relapse factors for drugs and alcohol. Interestingly, an in depth review of the literature investigating relapse to alcohol and drug use by individuals diagnosed with co-occurring mental illness, did not address tobacco use at all.[31] This is most likely because the studies reviewed did not address tobacco use. Similarly, a prospective study investigating predictors for relapse 3 years after completing intensive outpatient treatment for alcoholism did not include tobacco.[32] Addressing tobacco as seriously and in the same fashion as alcohol and other drugs is a paradigm shift that will take time to be realized but these findings support the need for all treatment programs to actively pursue this shift.

Prior to enrolling in this program, these patients had failed to maintain sobriety after numerous previous programs, having been in an average of 2–3 previous inpatient treatment programs and 1–2 previous intensive outpatient programs or combination thereof without significant benefit. None of these patients had been in programs prior to this one where they were not allowed to use tobacco products during treatment, and tobacco was addressed in the same fashion as all other drugs. Not being able to use tobacco in this program did not impair their ability to complete the program and appears to have enhanced their ability to maintain sobriety, consistent with what has been reported in the literature.[11–13,15] In addition, no non-tobacco using patient on admission began using tobacco during or in the year after treatment as has been reported in previous studies of outpatient substance abuse treatment where patients were able to smoke.[13] These findings are strong support for the notion that ongoing tobacco use contributes to relapse to drugs and alcohol and that when provided with a tobacco free environment, even those with severe addictions and mental illness can and do make the decision to stop using tobacco.

Components of this program that most likely contribute to successful outcomes include the 90-days in a controlled environment with limited access to drugs, alcohol, and tobacco,

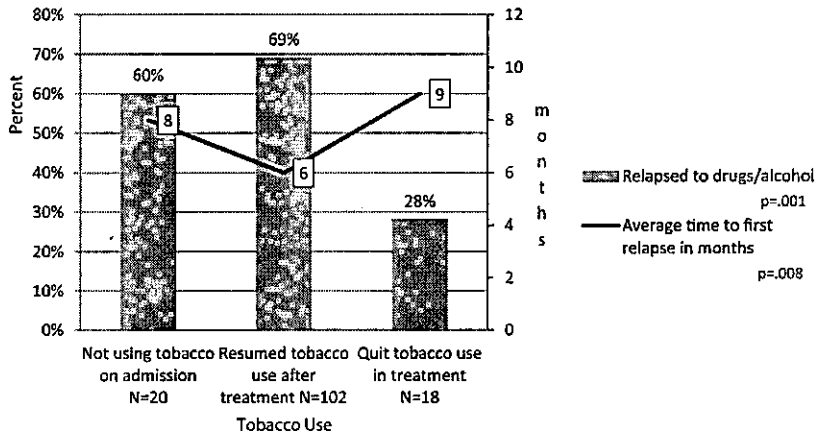

FIGURE 2. Quitting tobacco in treatment improves the ability to maintain sobriety 1 year after tobacco-free substance abuse treatment.

as well as the fully integrated treatment of substance abuse, mental illness, and tobacco cessation. Addiction is recognized as a disease of the learning and memory part of the brain in which drugs of abuse, including nicotine, negatively affect the learning and memory part of the brain. Since treatment is all about learning and remembering new skills, ongoing use of any addictive drug could make it difficult to learn new things. Durazzo et al.[33,34] have demonstrated that chronic smoking may modulate neurocognitive recovery in abstinent alcoholic patients. They found that at 1 month of abstinence[33] and again at 6–9 months of abstinence[34], non-smoking alcoholics were superior to smoking alcoholics on measures of auditory-verbal learning, auditory verbal memory, cognitive efficiency, executive skills, processing speed, and working memory.

A systematic review and meta-analysis of 26 studies that assessed mental health after smoking cessation found that smoking cessation is associated with reduced depression, anxiety, and stress and improved positive mood and quality of life compared with continuing to smoke.[35] These findings suggest that another possible explanation for the improved substance abuse outcomes seen in this study has to do with the possibility that the enforced abstinence from tobacco for 3 months, improved mental health symptoms as a result of no longer experiencing multiple episodes of negative affect induced by nicotine withdrawal. This along with the integrated education and treatment received in the program may have allowed the patients to feel better to the point they made a decision to try and refrain from tobacco use after discharge.

All of these patients, at the time of admission, reported recognizing the need for treatment for their alcohol and/or drug use. This was based on consequences, which included legal consequences, medical consequences, relationship consequences, and negative effects of these substances on their mental health. A few patients had begun to experience medical consequences from their tobacco use but the majority of patients had not and was therefore, not in agreement that they needed to quit tobacco use. It takes a great deal of education, advice, and encouragement to get such patients willing to look at the possibility that quitting tobacco use would be in their best interests. This is very difficult to do while the person is actively using tobacco, just as someone cannot be convinced to quit drinking while they are actively drinking. We have found that if the patient is willing to consider not using tobacco after 3 months of enforced abstinence and takes this seriously; when they relapse to tobacco, they are able to use this as a "red flag" indicating that they are not doing what they need to for their recovery, and they reassess what they are doing. As long as they focus on reducing tobacco use and quitting this, they seem to be better able to stay away from drugs and alcohol.

Strengths of this study include the assistance by probation officers who reported results of tissue testing including urine, breath, and hair to document use of drugs or alcohol during the year follow-up. Limitations of the study include the fact that none of these tests included nicotine, nicotine metabolites, or carbon monoxide testing so tobacco use was obtained by self-report and observation by others only. Another limitation was that 22% of the patients were not followed by a probation officer and therefore, did not have tissue-testing results. Slips, relapses, and tobacco use in these individuals was obtained by self-report and observation by others only.

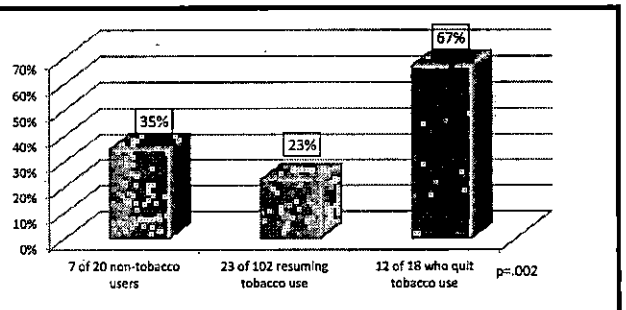

FIGURE 3. Those maintaining continuous abstinence from drugs/alcohol for 1 year after treatment by tobacco use after treatment $n = 42$.

CONCLUSIONS

This study demonstrates the benefits of residential and inpatient treatment programs providing tobacco free environments where patients can learn the benefits of quitting tobacco use and be more likely to do so, as well as preventing those who were not smoking from starting in treatment. It also demonstrates that successful tobacco treatment in smokers in substance abuse and dual diagnosis treatment makes them more likely to abstain from drugs/alcohol than those smokers who continue to smoke.

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Declaration of Interest

The author reports no conflicts of interest. The author alone is responsible for the content and writing of this paper.

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