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Smoking initiation among nonsmokers during and following treatment for alcohol use disorders

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Abstract

Few studies have examined nonsmokers who enter treatment for alcohol use disorders to see what happens to their smoking status over time. Such individuals may be vulnerable to initiating tobacco use during or after treatment. Thus, the present study examined changes in the smoking status of the 387 baseline nonsmokers in Project MATCH during and following their treatment for alcohol use or dependence.

Results showed that, of those who were nonsmokers at baseline, 15% initiated tobacco use during the 12-month followup period, most beginning during treatment. Smoking initiators' rates of tobacco consumption increased significantly between the 3- and 15-month followup assessments. These results suggest that smoking initiation during substance abuse treatment may be important to monitor and that efforts to help smoking initiators may be warranted.

Keywords

Tobacco; Alcohol; Treatment; Smoking initiation; Smoking cessation

1. Introduction

A majority of individuals with alcohol and drug use disorders are also dependent on nicotine, with rates of tobacco use as high as 60–95% (Batel, Pessione, Maitre, & Rueff, 1995; Burling & Ziff, 1988; Degenhardt & Hall, 2001; Fiore et al., 2000; SAMHSA, 2000, 2002; Sobell, Sobell, Brown, & Cleland, 1995; Toneatto, Sobell, & Sobell, 1995). Individuals with substance use disorders also tend to be heavy smokers, making them particularly vulnerable to tobacco-associated health problems (Collins & Marks, 1995; Marks, Hill, Pomerleau, Mudd, & Blow, 1997). Combined alcohol/drug and tobacco use are associated with greater morbidity and mortality risk than use of either substance alone (Blot, 1992; Elwood, Pearson, Skippen, & Jackson, 1984; Patten et al., 2001; USDHHS, 1982).

Smoking has traditionally been ignored as a serious problem meriting attention among those in treatment for alcohol and drug use disorders (McIlvain & Bobo, 1999). Without interventions specifically addressing tobacco use, smokers are likely to continue their heavy tobacco use during and after substance abuse treatment (Bobo, McIlvain, Lando, Walker, & Leed-Kelly, 1998; Myers & Brown, 1994). The danger of not addressing patients' tobacco use, however, is that smoking may be more likely to kill patients with substance use

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disorders in recovery than the alcohol and drug use that brought them into treatment in the first place(Hser, McCarthy, & Anglin, 1994; Hurt et al., 1996).

Patients who enter substance abuse treatment as non-smokers may be vulnerable to initiating tobacco use during or after treatment, although the research on this topic is limited. Some studies have reported that a greater proportion of nonsmoking substance abusers in community and substance abuse treatment settings were former, rather than never, smokers. Since ex-smokers are at risk for tobacco relapse, with a quick return to regular smoking, nonsmoking substance abusers may be vulnerable to initiating smoking partly on the basis of their status as former, likely heavy, smokers (Garvey, Bliss, Hitchcock, Heinold, & Rosner, 1992; Gilpin, Pierce, & Farkas, 1997; Shiffman et al., 1996). In a sample of outpatient alcohol abusers, Ellingstad, Sobel, Sobel, Cleland, and Agrawal (1997) found that 25% were ex-smokers, whereas 20% were never smokers. Similar findings have been reported in drug abusing samples (Clemmy, Brooner, Chutuape, Kidorf, & Stitzer, 1997; Frosch, Shoptaw, Nahorn, & Jarvik, 2000; McCarthy, Zhou, & Hser, 2001), although Richter, Gibson, Ahluwalia, and Schmelzle (2001) found equal proportions of never and former smokers (11%).

There may be other reasons why nonsmokers in substance abuse treatment may be at risk for smoking initiation. Some patients may replace their alcohol use with new behaviors, including substitute addictions (Davila, Sanchez-Craig, & Wilkinson, 2000). Mansky (1999) suggested that substitute addictions may develop as a mechanism for individuals in treatment to cope with dysphoric emotions that had otherwise been masked through substance abuse. Murphy and Hoffman (1993) reported that up to 25% of a sample of 80 alcoholics who had achieved at least one year of sobriety substituted new addictions, primarily desserts, cigarettes, and longer work hours, for their former alcohol use behaviors for up to 36 months post-abstinence. Conner, Stein, Longshore, and Stacy (1999) found that, over a 4-year period, decreased heroin use among addicts in treatment was associated with increase cigarette consumption, particularly among individuals who scored high on a measure of sensation seeking.

The few investigations that examined changes in smoking status among patients with substance use disorders generally found that most nonsmokers did not start smoking. Toneatto et al. (1995) found that only 2.6% of non-smokers at alcohol use treatment entry had initiated smoking at 1-year followup. In a community sample of polydrug users, McCarthy et al. (2001) reported that non-smokers had a 0.77 probability of retaining the same classification across any two consecutive assessments. Kohn, Tsoh, and Weisner (2003) found that, of the 39% of nonsmokers who entered treatment for alcohol and drug use disorders, only 12% had initiated or returned to smoking at 1-year followup.

Unlike the studies cited above, which collected followup assessments annually or biannually, Project MATCH assessed participants every 90 days. Moreover, whereas the other investigations had sample sizes ranging from 155 to 749 participants, Project MATCH included a far larger sample (N = 1,726). As the largest multi-site randomized clinical trial on alcoholism to date, Project MATCH offers an opportunity to examine the prevalence of smoking initiation and patterns of tobacco consumption during and following alcohol treatment.

We hypothesized the majority of nonsmokers would not initiate tobacco use during the study. We also predicted that smoking initiators would significantly increase their tobacco consumption over time.

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2. Materials and methods

Our study was based on Project MATCH, a prospective longitudinal investigation of the effects of three different behavioral interventions for alcohol abuse and dependence that were each delivered over the course of 12 weeks (USDHHS, 2001). Data were available for the first 15 months of the project (i.e., at baseline, during 3 months of treatment, and during 12 months of followup). Patients did not receive treatment for their tobacco use.

One thousand seven hundred and twenty-six patients with alcohol abuse and dependence disorders participated in the study. Participants were recruited as outpatients from community or outpatient centers, and from intensive inpatient or day-hospital treatment programs. Inclusion criteria included current (for outpatients) or 3-month prior (for inpatients or day-hospital patients) DSM-III-R (American Psychiatric Association, 1987) diagnosis of alcohol abuse or dependence. Exclusion criteria included current DSM-III-R diagnosis of dependence for sedative/hypnotic drugs, stimulants, cocaine, or opiates; intravenous drug use during the previous 6 months; current danger to self or others; symptoms of acute psychosis; and/or severe organic impairment. Participants provided informed consent and the procedures used were in accordance with the standards of the Committee on Human Experimentation with the Helsinki Declaration of 1975 (Project MATCH Research Group, 1993).

For the current investigation, only participants who had complete data for all variables were included, reducing the final sample size to 1,465. Nicotine and alcohol use measures were administered at baseline and 3-, 6-, 9-, 12-, and 15-month followup.

2.1. Measures

2.1.1. Nicotine use—Nicotine (cigarette) use was assessed at intake and all followups using the Form 90-I, developed specifically for Project MATCH (NIAAA, 1996). This instrument measured nicotine use during the "current period," corresponding to the previous 90 days, which varied somewhat depending on the exact date that patients came in for their followup assessments. Questions regarding nicotine (cigarette) use included: (a) ever tobacco use (yes/no); (b) number of lifetime weeks of use; and (c) number of days of use within the preceding 90 (NIAAA, 1996). In this study, "ever cigarette use" was defined according to whether patients had smoked even one cigarette, rather than the more typical definition of having ever smoked 100 cigarettes in a lifetime, because we did not have enough information for the latter definition. "Days of use in the current period," was used to determine whether a participant was a current smoker. Participants who reported that they smoked zero days in the current period were classified as nonsmokers, whereas participants who stated that they had smoked one or more days were defined as smokers.

2.1.2. Alcohol use—Alcohol use was assessed utilizing percent of days abstinent from alcohol use and drinks per drinking day at baseline, as measured using the Timeline Follow-Back (TLFB; Sobell & Sobell, 1992). The TLFB is a calendar-assisted daily drinking estimation method that provides a comprehensive assessment of a person's drinking over a designated period of time. It has demonstrated adequate psychometric properties in a variety of patient samples (Allen & Columbus, 1995). The TLFB tends to provide greater estimates of drinking frequency than quantity-frequency measures (Grant, Tonigan, & Miller, 1995; Lemmens, Tan, & Knibbe, 1992; Sobell, Sobell, Klajner, Pavan, & Basian, 1986; Sobell, Sobell, Leo, & Cancilla, 1988), although these differences do not appear to be clinically relevant (Allen & Columbus, 1995).

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2.2. Data analysis

Data analyses were conducted using SPSS version 10.0. Depending on the type of variables (continuous or discrete), analysis of variance (ANOVA) or chi-square analyses were performed to evaluate associations among independent variables and between dependent and independent variables.

3. Results

3.1. Sample baseline characteristics

Our final sample consisted of 1,465 participants for whom complete data at baseline and all followups was available. There were no significant differences between participants with complete followup data (N = 1,465) and participants without complete followup data (N = 261) in terms of gender, race, ethnicity, age, education, history of ever using tobacco, lifetime weeks of tobacco use, percent days abstinent from alcohol use at baseline, or drinks per drinking day at baseline.

Participants were an average age of 40.30 years and had completed 13.27 years of education (see Table 1). Seventyfive percent were male, and 80% were non-Hispanic Whites. Participants had a mean of 31 (SD = 30) percent days abstinent from alcohol use at baseline, consuming an average of 16.56 (SD = 10.55) drinks per drinking day. These consumption levels indicate that, on average, this group had serious drinking histories. Ninety-five percent of participants had smoked one or more cigarettes at some point in his or her lifetime. Seventy-four percent of the sample were current smokers who had smoked an average of 87.5 days in approximately the previous 90 days, with a mean daily consumption of 23.60 cigarettes (SD = 15.04).

3.2. Smokers vs. Nonsmokers on baseline characteristics

We compared smokers and nonsmokers on baseline demographic and clinical characteristics. Compared to non-smokers, smokers were significantly younger (39.08 vs. 43.72 years; $p < .001$), had completed fewer years of education (13.02 vs. 13.96 years; $p < .001$), and consumed more drinks per drinking day at baseline (17.66 vs. 13.50 drinks; $p < .001$). There were no significant differences between groups on gender, race/ethnicity, or percent days abstinent from alcohol use at baseline.

3.3. Smoking initiation during and after treatment

Cross-sectional analyses of the full sample at each followup assessment revealed that smoking rates remained relatively stable throughout the study: 73% at 3 months, 72% at 6 and 9 months, and 70% at 12 and 15 months. Of the 387 nonsmokers at baseline, 15% initiated smoking during the course of the investigation. Sixty-eight of the 387 (18%) were never smokers, of whom three (4%) began tobacco use.

3.4. Course of smoking consumption among during-treatment smoking initiators

The majority of initiators began smoking during the first 3 months of the study, the period in which the behavioral treatments were implemented. Of the 57 initiators, 50% started smoking at 3 months, 32% at 6 months, 9% at 9 months, 2% at 12 months, and 7% at 15 months.

Because 50% of initiators started smoking during treatment, we followed the course of their smoking patterns throughout followup to assess levels of cigarette consumption. Over the duration of the study, their average number of days of tobacco use significantly increased from 42.21 (SD = 48.86) days at 3 months to 54.75 (SD = 42.47) days at 15 months ($p < .$

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05). assessment. At the 15-month interview, 54% of initiators during treatment were still smoking.

There were no significant differences between smoking initiators and participants who retained their nonsmoking status during the study in terms of gender, race, ethnicity, years of education, percent days abstinent from alcoho l use at baseline, and drinks per drinking day at baseline. Compared to participants who retained their nonsmoking status however, smoking initiators were significantly younger (40.01 vs. 44.34 years; $p < .05$) and more likely to report a history of smoking (95% vs. 80%; $p < .05$).

In order to understand better smoking consumption rates among initiators, we divided the sample into three groups: (1) chronic smokers who smoked throughout the duration of the study ($N = 1,078$); (2) initiators who were former smokers ($N = 54$); and (3) initiators who had never previously smoked ($N = 3$). Because we did not have enough participants in Group 3, they were combined with Group 2, and we compared smoking consumption rates of Groups 1 and 2. Results indicated that chronic smokers showed significantly greater days of tobacco use at all followup assessments than initiators (all $p < .0001$) (see Table 2).

4. Discussion

The purpose of this research was to investigate smoking initiation among nonsmokers at baseline who were part of a 15-month study of the efficacy of three behavioral treatments for alcohol abuse and dependence. Both of our hypotheses were confirmed. The majority (85%) of baseline nonsmokers retained their nonsmoking status throughout the treatment and followup period. Among the 15% of initial nonsmokers who started smoking, more than half (54%) were still smoking twelve months after treatment and increased their days of tobacco use over the course of the investigation.

This study is one of the few longitudinal investigations that traced tobacco initiation and consumption, using relatively frequent followup assessments, in such a large sample of participants in treatment for alcohol use disorders. Our baseline smoking rates for the entire sample are consistent with those of other investigations (Burling & Ziff, 1988; SAMHSA, 2002; Sobell et al., 1995; Toneatto et al., 1995). Also like other studies, most nonsmokers in our investigation maintained their nonsmoking status over time (Kohn et al., 2003; McCarthy et al., 2001; Toneatto et al., 1995). Thus, our results help further validate prior research findings.

The majority of those who initiated tobacco use in our study did so in the first 3 months (i.e., during, rather than after, treatment). Moreover, their tobacco consumption increased significantly from 3- to 15-month followup. In contrast, chronic smokers who smoked throughout the duration of the study showed no significant change in consumption over time, although they demonstrated significantly greater days of use than initiators at all followups.

The finding that the majority of nonsmokers in the current study were ex-smokers suggests that their former tobacco use may have put them at risk for tobacco relapse, and possibly for heavy use (Garvey et al., 1992; Gilpin et al., 1997; Shiffman et al., 1996). Although initiators' tobacco consumption rates were still significantly lower than those of chronic smokers, our results raise the disturbing possibility that those individuals that begin smoking during treatment for alcohol use disorders may be headed towards chronic heavy use.

The clinical implications of these findings suggest that smoking prevention programs might be an important addition to substance abuse treatment to ensure that individuals vulnerable to start smoking do not leave treatment with a new addiction. The fact that the majority of

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smoking initiators were former smokers indicates that these individuals might be particularly vulnerable to heavy tobacco use and therefore be a special target of tobacco relapse prevention efforts.

Prior research has shown that quit rates are typically lower for individuals in treatment for substance use disorders than for the general population, ranging from 0 to 12% post alcohol treatment (Burling, Marshall, & Seidner, 1991; Burling, Burling, & Latini, 2001; Hughes, 1995; Hurt, Eberman, & Croghan, 1994; Joseph, Nichol, & Anderson, 1993), although higher rates have been reported (27%; Martin et al., 1997). These findings suggest that smoking cessation may be more difficult for such individuals and speaks to the importance of addressing tobacco use by initiators while they are still early in the development of nicotine dependence, when quit attempts might be more successful.

Our results suggest that early alcoholism treatment is a vulnerable time for at least a subset of patients to initiate tobacco use. The high tobacco use rates found in our and other studies suggest that smoking among patients in treatment for alcohol and drug use disorders may be considered a normative behavior. Thus, it is possible that smoking initiation and continued high rates of tobacco consumption may develop and be maintained as a means to fit in with smoking peers. Research on the reasons for smoking initiation and the influence of the social acceptability of tobacco use on smoking consumption patterns is warranted.

There are several limitations to this study that merit attention. We measured nonsmoking status at a categorical level of no cigarettes vs. one or more cigarettes. This is a conservative approach that we used because of our interest in examining smoking initiation. Future research might capture changes in smoking consumption patterns, particularly among chronic smokers, by using a continuous measure of tobacco use. In addition, our assessments relied only on self-report, without biochemical verification (other than a breathalyzer test for acute alcohol consumption) or collateral corroboration. Nonetheless, our research highlights a vulnerable period during recovery when a small but understudied population who might successfully be targeted for tobacco use prevention and treatment strategies.

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Table 1

Sample baseline characteristics (N = 1,465)

Variable	Frequency	Percent	Mean (*SD*)
Gender			
Male	1,097	74.9	
Race			
White	1,176	80%	
African-American	142	10%	
Hispanic-Mexican	51	3%	
Other Hispanic	69	5%	
American Indian	20	1%	
Asian-American	0	0%	
Other	7	1%	
Ethnicity			
Hispanic-Mexican	51	3%	
Hispanic-Puerto Rican	9	1%	
Other Hispanic	60	4%	
Age			40.30 (11.00)
Education			13.27 (2.09)
Ever tobacco use at baseline (yes)	1,397	95%	
Lifetime weeks of use			900.12 (657.60)
Percent of days abstinent from alcohol use at baseline			31% (30%)
Drinks per drinking day at baseline			16.56 (10.55)

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Table 2

Course of smoking consumption among treatment smoking initiators

	Baseline	3 months	6 months	9 months	12 months	15 months
[a]Initiators						
[b]Days of Tobacco Use (*M, SD*)	0.00 (0.00)	10.64 (14.21)	12.68 (11.27)	13.59 (11.84)	14.53 (10.52)	16.42* (10.80)
[c]Chronic Smokers						
Days of Tobacco Use (*M, SD*)	23.99# (14.64)	23.21# (12.85)	23.17# (12.95)	22.80# (12.64)	22.36# (13.23)	22.58# (12.68)

[a]Participants who were not smoking at baseline but started smoking during treatment (i.e., by Month 3; $N = 28$).

[b]Days of tobacco use within the past 90 days.

[c]Participants who were smoking at baseline and continued to smoke throughout the 15 months of the study ($N = 955$).

*Significantly greater days of tobacco use by Initiators at Month 15 compared to Month 3, $p < .05$.

#Significantly greater days of tobacco use by Chronic Smokers compared to Initiators, $p < .0001$.

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