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Regular Contribution

Nicotine dependence and treatment outcome among African American cocaine-dependent patients

Ashwin A. Patkar, Michael J. Vergare, Charles C. Thornton, Stephen P. Weinstein, Heather W. Murray, Frank T. Leone

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Despite a close association between tobacco and cocaine use, few studies have systematically examined whether smoking predicts an adverse outcome for cocaine-dependent patients. We investigated whether severity of nicotine dependence was related to treatment outcome for cocaine-dependent individuals. Standardized assessments of nicotine dependence (Fagerström Test for Nicotine Dependence; FTND), cocaine use, and personality were obtained for 105 African American cocaine-dependent outpatients. Outcome measures included negative urine drug screens, days in treatment, dropout, and number of treatment sessions attended. The sample was stratified into cocaine-positive and cocaine-negative groups based on admission urine drug screens, and relationships between nicotine dependence and outcome measures were examined in each group. In the cocaine-negative group, higher FTND scores were negatively correlated with number of negative urine drug screens during treatment even after controlling for other predictors, whereas FTND scores were not correlated to outcome in the cocaine-positive group. It seems that severity of tobacco use predicts poor outcome for cocaine-dependent patients who are cocaine free at the time of admission into outpatient treatment.

Introduction

Although adult tobacco use has declined in recent years, possibly related to increased public health efforts, no appreciable reduction has been seen in individuals with substance dependencies (Kalman, 1998; Mendez, Warner, & Courant, 1998). The prevalence rate of smoking among substance abusers is reported to be four to five times higher than among the general population (Hays, Farabee & Miller, 1998; Kozlowski, Skinner, Kent, & Pope, 1989), and the health hazards of continued tobacco use among recovering substance abusers, including premature death, have been well documented (Hurt et al., 1996; Miller & Gold, 1998). Despite substantial evidence of the medical consequences of smoking and the addictive properties of nicotine, most chemical dependency programs have failed to incorporate smoking cessation as a part of overall treatment of substance abusers (Bobo, 1989). Reluctance to do so often has stemmed from beliefs that substance abusers are not ready to stop smoking or that those who quit smoking may be more likely to relapse (Campbell, Wander, Stark, & Holbert, 1995; Knapp, Rosheim, Meister, & Kotte, 1993). Nevertheless, increasing evidence indicates that substance abusers have a significant interest in quitting smoking and that smoking cessation might improve abstinence from other drugs and alcohol (Clarke, Stein, McGarry, & Gogineni, 2001; Joseph, Nichol, & Anderson, 1993).

Most of the data supporting smoking cessation among substance abusers are derived from alcohol- or opiate-using populations (Clarke et al., 2001; Frosch, Shoptaw, Nahom, & Jarvik, 2000; Hurt et al., 1994) and from inpatient or methadone maintenance programs (Richter, Gibson, Ahluwalia, & Schmelzle, 2001; Stuyt, 1997). A review of several outcome studies for outpatient treatment of cocaine

Ashwin A. Patkar, M.D., Michael J. Vergare, M.D., Charles C. Thornton, Ph.D., Stephen P. Weinstein, Ph.D., and Heather W. Murray, B.A., Department of Psychiatry and Human Behavior; Frank T. Leone, M.D., Department of Medicine, Thomas Jefferson University, Philadelphia, PA.

Correspondence: Ashwin A. Patkar, M.D., Associate Professor of Psychiatry, Thomas Jefferson University, 833 Chestnut Street East, Suite 201E, Philadelphia, PA 19107, USA. Tel: +1 (215) 955-2542; fax: +1 (215) 503-2850; e-mail: ashwin.patkar@mail.tju.edu

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abusers indicated that, although alcohol and other illicit drug use have been examined frequently as possible predictors (Carroll, Power, Bryant, & Rounsaville, 1993; McLellan et al., 1994; Weinstein, Gottheil, & Sterling, 1997), the question of whether tobacco use predicts an adverse treatment outcome for cocaine-dependent patients has been addressed in few studies, with negative results (Roll, Higgins, Budney, Bickel, & Badger, 1996). Several suggestions have been made that this line of research might be worth exploring. First, high rates of tobacco smoking are observed in cocaine abusers. For example, 75%–80% of cocaine abusers in treatment have been reported to smoke tobacco (Gorelick, Simmons, Carriero, & Tashkin, 1997; Roll et al., 1996; Sees & Clark, 1993). Second, tobacco smoking often is found to precede the onset of crack cocaine smoking and to continue relatively unchanged once crack use is established, leading to theories that tobacco might be a gateway to illicit drug use including cocaine use (Lai, Lai, Page, & McCoy, 2000). Crack cocaine and tobacco smoking share several similarities, such as common forms and routes of administration; and they have similar effects on mesolimbic dopamine pathways that may mediate cue-induced craving (Pontieri, Tanda, Orzi, & DiChiara, 1996); therefore, tobacco smoking may be a possible trigger for crack use, and vice versa (Wiseman, 2000). Along these lines, researchers also have observed that cocaine use can increase tobacco smoking (Roll, Higgins, & Tidey, 1997). Finally, in a follow-up study of cocaine abusers that evaluated a different sample than the current study, we found that individuals who had used less tobacco at admission into the treatment program were more likely to remain abstinent from cocaine (Lundy, Patkar, Meier, & Weinstein, 2000). Hence, in the present study, we hypothesized that tobacco smoking will be associated with poor outcome for cocaine-dependent patients receiving outpatient treatment. Because an earlier study had found that level of nicotine dependence might influence the likelihood of quitting smoking (Breslau, Kilbey, & Andreski, 1991), and previous studies using smoking status as a predictor variable had reported negative results (Roll et al., 1996), we selected level of nicotine dependence as a predictor variable in a treatment-outcome study of cocaine abusers.

Consistent with the literature (Alterman et al., 1997), we had found that a cocaine-positive admission urine drug screen was a strong predictor of poor outcome for cocaine abusers in our outpatient program (Patkar et al., 2002). Expecting the admission urine drug screen to demonstrate a similar association with treatment outcome in the present study, we stratified our sample into cocaine-positive and cocaine-negative groups based on the results of admission urine drug screens and examined the relationship between smoking status and outcome measures in each group. This approach permitted us to test our hypothesis and also investigate the interaction between tobacco use and baseline urine drug screen in terms of predicting treatment outcome for cocaine-dependent patients. Because the findings could indicate the relative contributions of tobacco use and other clinical variables as predictors of outcome, the information might be of value in implementing smoking cessation strategies for the treatment of cocaine-dependent individuals.

Methods

Recruitment

The data were collected as part of a National Institute on Drug Abuse–supported study investigating serotonergic function in cocaine dependence. A total of 105 subjects were recruited from individuals admitted to a publicly funded, university-affiliated, intensive outpatient cocaine treatment program that serves a predominantly inner-city population in Philadelphia. Because about 92% of the patients in our treatment program were African American, the study sample was restricted to African-American subjects to represent our clinical population. After providing subjects with a description of the study, we obtained written informed consent using an Institutional Review Board-approved consent form. The Structured Clinical Interview for *DSM-IV* Axis I disorders (First, Spitzer, Gibbon, & Williams, 1997) was then administered to individuals who volunteered for the study. Individuals with a diagnosis of schizophrenia, major depression, bipolar disorder, or schizoaffective disorder; pregnant women; and patients receiving psychotropic medications were excluded. If patients used more than one substance, they were included only if their primary drug was cocaine. Primary drug of abuse was defined as the drug that produced the most self-reported problems for the patient. Urine drug screens were obtained for all subjects at baseline and subsequently every week using Accutests (Jant Pharmacal Corporation, Encino, CA). The Accutest Cocaine Drug Screen is a one-step immunoassay for the detection of the cocaine metabolite benzoylecgonine in urine at a cutoff of 300 ng/ml. Usually patients have to be cocaine free for 48–72 hr to produce a negative urine sample. Baseline was defined as the day of admission to the treatment program.

Assessment of nicotine dependence

At admission, all patients were assessed to determine whether they fulfilled *DSM-IV* (*Diagnostic and Statistical Manual of Mental Disorders*, 4th ed.) criteria for nicotine dependence (American Psychiatric Association, 1994). Subjects also completed the

Fagerström Test for Nicotine Dependence (FTND), a widely used and validated six-item questionnaire to assess severity of smoking that can be completed in 2 min (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). It is a revised version of the Fagerström Tolerance Questionnaire (Fagerström, 1978). The six questions on the FTND pertain to smoking within 30 min of waking up, difficulty in stopping smoking in places where it is forbidden, difficulty in giving up morning cigarettes, number of cigarettes smoked per day, smoking during early part of the day, and smoking despite being ill. The total scores on the FTND range from 0 to 10. Cigarette smoking was not an eligibility criterion for the study, and the sample included both nonsmokers and tobacco smokers.

Behavioral assessments

Medical history and physical examination were used to document subjects' medical health, and all subjects completed the following psychological tests: the Buss–Durkee Hostility Inventory (BDHI) (Buss & Durkee, 1957), Zuckerman's Sensation-Seeking Scale (SSS) (Zuckerman, 1993), the Beck Depression Inventory (BDI) (Beck & Steer, 1987), and the Addiction Severity Index (ASI) (McLellan et al., 1992). These instruments have been well validated in the literature.

The BDHI is a 75-item questionnaire that requires about 20 min to complete. It is composed of two main factors (motor aggression and hostility) and eight subscales. The motor aggression factor is composed of four subscales (direct, indirect, verbal, and irritability), and the hostility factor is composed of two subscales (resentment and suspiciousness); the remaining subscales measure guilt and negativism. The SSS is a widely used 40-item self-report questionnaire that provides a total sensation-seeking score as well as scores on four subscales assessing disinhibition, thrill and adventure seeking, experience seeking, and boredom susceptibility; it requires about 10–15 min to complete and provides measures of impulsivity and disinhibition. The BDI is a 21-item self-report questionnaire that assesses depressive symptomatology experienced during the past week; it requires about 10 min to complete. The ASI, a 40-min structured interview, assesses the severity and patterns of drug and alcohol use and impairment in employment, medical, legal, family/social, and psychiatric domains of functioning. For each problem area the ASI provides a subjective severity rating and a more objective composite score.

Treatment approach

Treatment for cocaine dependence was provided in a 12-week outpatient group therapy format with group sessions three times a week, each session lasting for 3 hr. In addition, patients participated in one 45-min individual therapy session per month over the 12-week period. Patients completing the 12-week intensive program entered an after-care program that consisted of one individual therapy session per week for up to 6 months. Thus, the maximum total duration of the program was 9 months. The treatment approach was problem oriented and focused on attaining well-defined objectives. Techniques appropriate to particular problem areas were drawn from different treatment models, including relapse-prevention strategies. Such a multimodal approach is fairly typical of many outpatient treatment programs in the United States. Our program does not incorporate smoking cessation as a part of overall treatment for cocaine dependence; however, data from the current study was expected to contribute toward plans to address tobacco use in our patient population.

Outcome measures

The following assessments were performed during treatment:

- Urine drug screens. Urine drug screens were obtained weekly for all patients in treatment. We recorded the number of screens negative for cocaine, excluding the baseline screen. A negative urine drug screen reflected both abstinence from cocaine and program attendance.
- Days in treatment. This assessment offered another estimate of treatment retention. It was recorded as the number of days from the first to the last visit.
- Number of treatment sessions. We calculated the total number of group and individual sessions the patient attended. This measure reflected participation in the treatment process.
- Early dropout. Early dropouts were defined as individuals who stopped attending the treatment program within 14 days of admission.

Although we expected outcome measures to be positively correlated with one another, they were selected because they were objective indicators and reflected different aspects of treatment outcome such as attrition, abstinence from cocaine, retention, and participation.

Statistical analyses

We compared the cocaine-positive ($n = 36$) and cocaine-negative ($n = 69$) subgroups on continuous variables using t tests (two-tailed) with corrections for unequal variances when appropriate, or analyses of variance (ANOVA). We used chi-square tests to analyze categorical variables. Within each group, we performed correlations between scores on FTND and outcome variables using Pearson product moment or

biserial correlations as appropriate. Finally, we used hierarchical regression analyses to predict outcome measures from combinations of independent variables.

Results

Subjects

A total of 105 African American cocaine-dependent subjects were studied: 96 (91.4%) smoked crack cocaine, and 9 (8.6%) used powdered cocaine via the intranasal or intravenous route. Baseline urine drug screens of 36 patients (34.3%) were positive for cocaine; 69 patients (65.7%) had cocaine-negative baseline screens. Of the subjects who were abstinent at admission, the average length of abstinence prior to admission was 15.4 days. A significant proportion of the cocaine-dependent subjects had additional current and lifetime substance abuse and dependence diagnoses. About 55% had abused or were dependent on alcohol, and nearly 35% were abusing or dependent on marijuana.

A total of 90 patients (85.7%) met *DSM-IV* criteria for nicotine dependence. Of the 15 subjects who did not meet criteria for nicotine dependence, four smoked intermittently, three were ex-smokers, and eight were nonsmokers. As expected, we found a strong positive association between *DSM-IV* diagnosis of nicotine dependence and FTND scores ($r = 0.89$, $p < .001$). We then divided the sample into high and low nicotine dependence groups based on a cutoff FTND score of 5, which corresponded to the mean FTND score for the total sample. The low nicotine dependence group included eight nonsmokers, three ex-smokers, and four intermittent smokers. Table 1 summarizes the clinical characteristics of the entire sample.

As expected, the high nicotine dependence subgroup smoked for longer duration and smoked more cigarettes per day, had a higher mean FTND score, and had higher ASI-medical composite scores compared with the low nicotine dependence subgroup. A comparison of clinical characteristics between the two groups showed that except for the duration of smoking ($t = 4.18$, $df = 103$, $p < .001$) and the ASI-medical subscale ($t = 2.08$, $df = 103$, $p < .05$), the two groups did not differ significantly on demographic variables, severity of drug use, or behavioral measures (scores on the BDHI, SSS, BDI, and ASI). Comparison of current and lifetime alcohol-, opioid-, and marijuana-related diagnoses between the two groups also showed no significant differences (all $\chi^2 < 1.86$, $df = 2$, $p > .05$ in each case).

Table 1. Clinical characteristics of the sample ($N = 105$)

Characteristic	Mean (SD)
Age	36.57 (6.39)
Male	72.1%
Education grade	11.58 (2.15)
Unemployed	79.3%
FTND score	5.02 (2.32)
Cigarettes per day	22.1 (6.21)
Duration of smoking (years)	21.3 (5.61)
Cocaine use	
Age at first use (year)	20.22 (4.02)
Quantity (rocks/day)	5.89 (1. 73)
Frequency (days/week)	6.03 (1.08)
Duration (year)	15.92 (4.14)
BDI	12.56 (8.21)
BDHI total	22.76 (4.99)
SSS total	17.42 (3.78)
ASI	
Drug	.25 (.24)
Alcohol	.25 (.31)
Employment	.86 (.28)
Family	.13 (.21)
Medical	.07 (.17)
Psychological	.17 (.18)

ASI, Addiction Severity Index; BDHI, Buss–Durkee Hostility Inventory; BDI, Beck Depression Inventory; FTND, Fagerström Test for Nicotine Dependence; SD, standard deviation; SSS, Zuckerman's Sensation-Seeking Scale.

Relationship between smoking and outcome measures

Collating the various in-treatment and end-of-treatment measures, we found that, on average, cocaine-dependent patients had stayed in treatment for (mean $\pm$ *SD*) 52.1 ± 47.4 days, attended 14.7 ± 14.9 group sessions and 4.3 ± 7.5 individual sessions, and provided 7.6 ± 6.6 negative urine screens. About 26% dropped out of treatment within 14 days of admission, and approximately 28% of the patients stayed longer than 90 days and participated in the after-care program.

We first examined the relationship between smoking and various measures of outcome among the entire sample. No significant correlations were observed between FTND scores and number of negative urine screens ($r = -0.12$), days in treatment ($r = 0.04$), number of treatment sessions attended ($r = 0.09$), or dropouts ($r = 0.05$). We then stratified the sample into cocaine-positive and cocaine-negative groups and examined the relationship of FTND scores with outcome measures separately in each group. The results are summarized in Table 2.

A significant relationship between outcome measures and FTND scores was observed among patients who tested cocaine-negative at baseline. Among this group, patients with higher FTND scores provided a lower number of clean urine screens and had a higher dropout rate. Though correlations of FTND scores with other outcome variables—days in treatment and number of treatment sessions attended—did not reach statistical significance, the results were in the expected direction. Interestingly, FTND scores failed to demonstrate a significant association with any outcome measures among patients with cocaine-positive baseline urine drug screens.

Table 2. Correlation between dependence (Fagerström Test for Nicotine Dependence scores) and outcome measures among cocaine-negative and cocaine-positive groups

Outcome measure	Cocaine-negative group ($n=69$)	Cocaine-positive group ($n=35$)
Negative urine drug screens	−0.34**	0.37
Days in treatment	−0.22	0.22
Dropouts	0.25*	−0.15
Treatment sessions	0.13	0.17

*$p<.05$, **$p<.01$.
Values represent correlation coefficient (r).

Because the relationship between FTND scores and outcome measures differed in the cocaine-positive and -negative subgroups, we examined whether the two groups differed in pretreatment characteristics and outcome. No significant differences between the cocaine-negative and cocaine-positive groups were observed for rate and severity of nicotine dependence, demographic variables, or severity of drug use. Also, the two groups did not differ significantly on measures of hostility (BDHI), sensation seeking (SSS), depression (BDI), or drug use (ASI). (all $\chi^2<1.66$, all $t<1.8$, $p>.05$ in each case). However, compared with the cocaine-negative group, the cocaine-positive group performed poorly across all outcome measures. Patients in the cocaine-positive group stayed fewer days in treatment ($t=4.02$, $df=104$, $p<.001$), provided fewer cocaine-negative (clean) urine samples ($t=3.66$, $df=104$, $p<.001$), attended fewer group and individual sessions ($t=3.01$, $df=104$, $p<.01$), and had a higher dropout rate ($t=3.64$, $df=104$, $p<.01$).

Nicotine dependence as a predictor of outcome among cocaine-negative patients

Hierarchical regressions were used to determine whether level of nicotine dependence was associated with outcome measures after covarying educational level, severity of drug use (ASI-drug scores), and behavioral measures (sensation-seeking scores) for cocaine-negative patients. These three variables have been associated with poor treatment outcome for cocaine-dependent patients. Step 1 entered educational level, Step 2 added ASI-drug and sensation-seeking total scores, and Step 3 examined whether FTND scores added any significant variance. The results are summarized in Table 3.

The results indicated that educational level and ASI-drug and sensation-seeking scores were not significantly associated with the outcome measure of abstinence (number of negative urine screens) but did predict treatment dropout. For this measure, FTND score was the only variable that was significant; it added 11% variance to the model in predicting abstinence. For the other outcome variables (days in treatment, treatment sessions, and dropouts), FTND scores did not contribute to any significant increase in variance.

Table 3. Regression analysis for predictors of outcome among cocaine-negative patients ($n=69$)

Outcome variable	β	R^2	F
Days in treatment[a]			
Step 1. Education level	.25	.07*	2.93
Step 2. ASI-drug & sensation-seeking total	−.27	.18*	
Step 3. FTND	−.16	.22	
Negative urine drug screens[b]			
Step 1. Education level	.19	.05	2.57
Step 2. ASI-drug & sensation-seeking total	−.10	.09	
Step 3. FTND	−.36	.20**	
Dropouts[c]			
Step 1. Education level	−.25	.09*	3.90
Step 2. ASI-drug & sensation-seeking total	.31	.25*	
Step 3. FTND	.17	.28	
Treatment sessions[d]			
Step 1. Education level	.31	.10*	2.41
Step 2. ASI-drug & sensation-seeking total	−.21	.19	
Step 3. FTND	−.01	.19	

*$p<.05$, **$p<.01$.
ASI, Addiction Severity Index; FTND, Fagerström Test for Nicotine Dependence.
[a]$F(3, 66)=2.93$, $p<.05$.
[b]$F(3, 66)=2.57$, $p<.05$.
[c]$F(3, 66)=3.90$, $p<.01$.
[d]$F(3, 66)=2.41$, $p<.05$.

Discussion

A significant finding in the present study is that level of nicotine dependence at admission predicts an outcome measure for cocaine-dependent patients who are cocaine free at the time of admission into outpatient treatment. Among this group of patients, severity of nicotine dependence at admission was positively associated with cocaine use during treatment after controlling for several clinically significant variables. Moreover, among a variety of clinically significant variables, nicotine dependence was found to be the strongest contributor toward predicting abstinence from cocaine. Nicotine dependence did not predict any outcome measures for patients who tested positive for cocaine at the time of admission.

Among patients who provided cocaine-negative urine samples at entry into treatment, the mean duration of abstinence from cocaine was about 15 days. In this group, the level of nicotine dependence was significantly associated with a recurrence of cocaine use. This finding suggests that long-term, concomitant dependence on tobacco and crack cocaine may act or interact in some manner such that if cocaine use is stopped but dependent use of tobacco persists, the individual may be at increased risk for relapse. One

possibility is that individuals who are dependent on both crack and tobacco may have clinical or behavioral characteristics that may place them at increased risk for relapse compared with those who are not dependent on tobacco. Although few of the nondependent smokers in our groups were ex-smokers, it is possible that cocaine-dependent patients who are not dependent on tobacco may have skills for resisting relapse of cocaine use based on their abilities, characteristics, or experiences in resisting dependence on tobacco. Because we did not directly compare persistent smokers with nonsmokers, it is not possible to comment on the possible role of continued tobacco smoking as a conditioned stimulus for crack smoking by activation of mesolimbic dopamine pathways. Such biobehavioral models have been proposed to explain relapse, and studies of comparisons between continued smokers, ex-smokers, and nonsmokers in the substance-abusing group may begin to address some of these questions (Ehrman, Robbins, Childress, & O'Brien, 1992; Jaffe, Cascella, Komor, & Sherer, 1989; Shiffman, Read, & Jarvik, 1985). In contrast to our findings, Roll et al. (1997) failed to observe significant differences in cocaine abstinence or treatment retention among tobacco smokers and nonsmokers. The discrepant findings could be related to the fact that our study examined nicotine dependence as a predictor variable and stratified the sample based on the admission urine drug screen status, whereas Roll and colleagues dichotomized their sample based on smoking status and did not examine the effect of admission urine screen. In addition, differences in sample size and characteristics could have contributed to the contrasting results.

No significant relationships were observed between nicotine dependence and outcome measures among patients who tested positive for cocaine at admission. Because the cocaine-positive and cocaine-negative groups did not differ across several pretreatment variables, it is unlikely that the differential effects of smoking in the two groups were due to differences in smoking patterns, severity of drug use, or psychopathology. Instead it seems that the failure to abstain from cocaine before entering treatment may reflect a lack of treatment readiness of such patients, which may adversely influence their outcome (Joe, Simpson, & Broome, 1998). Notably, nearly 50% of patients in this group dropped out within the first 2 weeks of treatment, and very few remained abstinent during treatment. The data also indicated that the positive correlation between FTND scores and number of negative urine screens among the cocaine-positive subgroup was of similar magnitude to the negative correlation between the same variables in the cocaine-negative group, although this correlation was not statistically significant. It is possible that the smaller sample size of cocaine-positive patients, and consequently insufficient power, could explain the lack of statistical significance. If this is the case, it raises the intriguing possibility that among patients who are actively using cocaine at the beginning of treatment, higher dependence on nicotine may be associated with reduced cocaine use during treatment. This question seems worth exploring in future studies. It does seem that compared with patients who are cocaine-free, those who actively use cocaine at admission constitute a distinct group with different predictor variables, possibly related to motivational attributes and demonstrating more unfavorable outcomes.

Additional findings from the study deserve comment. The 86% prevalence of nicotine dependence in our sample attests to the widespread clustering of tobacco and cocaine use and is consistent with published data (Henningfield, 1990; Wiseman & McMillan, 1998). Also similar to other reports (Gorelick et al., 1997), we did not find a significant relationship between smoking and severity of cocaine use. Contrasting findings, however, have been reported (Roll et al., 1996), and a systematic examination of this relationship on larger samples using well-defined criteria for nicotine dependence seems timely. Our findings in a proportion of cocaine-dependent outpatients were consistent with findings from an inpatient sample of substance abusers that reported a significantly better 12-month outcome for non-tobacco users compared with tobacco users (Stuyt, 1997).

The strengths of the present study include well-defined criteria to diagnose cocaine and nicotine dependence and the use of objective measures of outcome. Another strength is that the research was conducted with patients from an ongoing publicly funded treatment program; therefore, the results may be representative of other public sector outpatient programs. However, interpretations of our findings are subject to certain methodological limitations. Because our study was carried out in an outpatient setting and included individuals only of African American background, the findings need to be replicated by extending the study to different treatment settings and including different ethnic groups. This is particularly relevant because a large proportion of African Americans have been reported to be light smokers (Okuyemi, Ahluwalia, Richter, Mayo, & Resnicow, 2001). Another limitation is that a significant number of cocaine-dependent patients abused other substances, although these variables were statistically controlled during data analyses. Also, the sample included both nonsmokers and smokers; therefore, individuals with FTND scores of zero were likely to represent a mix of nonsmokers as well as occasional and light smokers. We did not assess smoking status during treatment, and smoking cessation was not a part of treatment; hence, the influence of these variables on treatment outcome could not be examined. Moreover, tobacco use

accounted for only about 11% of the variance in predicting negative urine screens. Finally, not all outcome measures showed a significant relationship with smoking. This result suggests the preliminary nature of our findings and emphasizes the need for similar studies to confirm our results.

In a multifactorial disorder such as cocaine dependence, a combination of several variables likely are needed to fully predict the course and outcome of the disorder. Our study indicates that tobacco use may be an important variable in predicting poor treatment outcome for cocaine-dependent patients who abstain from cocaine at the time of admission. Such patients are more likely to engage and participate in treatment (Erickson, Stevens, McKnight, & Figueredo, 1995), and targeting smoking cessation toward this group may be more beneficial for the patients and more rewarding for program staff. Further research along these lines may help to determine the type of smoking cessation interventions that might be most effective in outpatient substance abuse treatment programs (Hughes, 1993). Such data are likely to facilitate the incorporation of smoking cessation into the mainstream of addiction and medical treatment as suggested by the American Society of Addiction Medicine (1997) and the Agency for Health Care Policy and Research (1996).

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