Published in final edited form as:
Am J Addict. 2007 ; 16(6): 468–474. doi:10.1080/10550490701641173.

Combining Cognitive Behavioral Therapy with Contingency Management for Smoking Cessation in Adolescent Smokers: A Preliminary Comparison of Two Different CBT Formats

Dana A. Cavallo, Ph[1], **Judith L. Cooney, PhD**[2], **Amy M. Duhig, PhD**[1], **Anne E. Smith, PhD**[1], **Thomas B. Liss, MS**[1], **Amanda K. McFetridge, BA**[1], **Theresa Babuscio, MA**[1], **Charla Nich, MS**[1], **Kathleen M. Carroll, PhD**[1], **Bruce J. Rounsaville, MD**[1], and **Suchitra Krishnan-Sarin, PhD**[1]

[1]Department of Psychiatry, Yale University School of Medicine, New Haven, Connecticut

[2]The University of Connecticut School of Medicine, VA Connecticut Healthcare System, Farmington, Connecticut

Abstract

This pilot study evaluated the optimal format of cognitive behavioral therapy (CBT) to combine with contingency management (CM) in a four-week, high school-based smoking cessation program. Thirty-four adolescent smokers received a standard weekly version of CBT or a frequent brief behavioral intervention. Results indicate a trend toward a higher seven-day point prevalence end-of-treatment abstinence rate and percent days abstinent during treatment in the CBT condition. In addition, significantly more participants in the CBT group completed treatment. These preliminary results suggest that when combined with CM, the standard weekly format of CBT is more acceptable to adolescent smokers.

INTRODUCTION

Approximately 22% of adolescents in the United States report smoking cigarettes,[1] and more than half of these indicate having tried to quit in the past year.[2] Evaluations of smoking cessation interventions for adolescents indicate an average quit rate of 12% at 3–12 months follow-up, which is only slightly better than the 7% quit rate for control groups.[3] The few empirically supported smoking cessation strategies that exist for adolescent smokers are limited by low participation and success rates[4] due to a majority of adolescent smokers being ambivalent about quitting and unmotivated to engage in treatment,[5] as well as methodological issues preventing definitive conclusions.[6]

Contingency management (CM) interventions provide tangible reinforcers contingent on achieving certain performance or target behaviors, such as drug abstinence. These strategies have been demonstrated to be effective at motivating and maintaining abstinence and increasing retention in programs targeting substance use in adults[7] and may also be suitable for adolescent smoking cessation.[8,9] Two recent preliminary trials with treatment-seeking adolescent smokers suggest that CM techniques significantly increase abstinence rates.[10,11]

Address correspondence to Dr. Krishnan-Sarin, Department of Psychiatry, Yale University School of Medicine, S-208, Connecticut Mental Health Center, 34 Park Street, New Haven, CT 06519. suchitra.krishnan-sarin@yale.edu..

Our group is developing a school-based intervention that provides CM for abstinence using an escalating magnitude scale with a reset contingency[12,13] in combination with a behavioral smoking cessation intervention based on cognitive behavioral principles. Unlike CM, which is designed to reduce substance use immediately and rapidly, the skills learned in CBT take time to be incorporated into daily behavior and may be associated with better coping skills acquisition and continued improvement even after treatment has ended.[14,15] A meta-analysis of existing adolescent smoking cessation trials[16] concluded that cognitive-behavioral approaches were the most promising interventions for youth smoking cessation. A broad range of issues can be addressed, such as future health consequences, physical appearance, and athletic performance, all of which have been shown to motivate a quit attempt.[17] CBT can also address potential factors in smoking relapse, such as stress management, concerns about weight gain, and peer smoking and attitudes toward smoking, serving to augment maintenance of smoking abstinence in adolescents.[18–22] Furthermore, CBT can be helpful in building deficient skills in young smokers,[5,18] including developing alternative behavioral responses, lifestyle changes, and problem-solving skills as part of smoking cessation treatment.

Focus groups conducted by Balch[23] indicate that adolescents value short sessions and avoidance of lectures in smoking cessation programs. These findings suggest that both the format and delivery of behavioral smoking cessation interventions for adolescents need to be addressed to increase effectiveness. A potential weakness of standard CBT is that it is typically delivered in weekly sessions of up to an hour long. Thus, standard CBT may be difficult to fit into the schedule of an adolescent, especially in a school-based setting (such as in our program), and may be further limited by adolescents' attention and concentration spans. An inherent advantage of CM interventions may arise from more frequent contact with the adolescent smoker, providing a window for a brief counseling intervention to accompany the assessment of abstinence.

In accordance with the Stage Model of behavioral therapies research,[24] the current pilot study was designed to compare two different formats of CBT delivered in the context of a CM-based smoking cessation treatment program conducted in high schools. In this pilot trial, adolescents were randomly assigned to receive one of two different formats of CBT: a weekly version of longer duration (CBT) or a more frequent brief behavioral intervention (FBBI) that took advantage of the frequent opportunities provided by the CM assessments to provide short sessions thrice weekly. All adolescents received monetary incentives contingent on abstinence. The primary goal of this pilot study was to determine which format of CBT (standard CBT versus FBBI), when combined with CM, would result in better abstinence rates and would be better accepted by the adolescent smokers.

METHODS

Participants

Participants were high-school aged adolescent smokers in New Haven County who were interested in quitting smoking. The study protocol was approved by the Yale School of Medicine Human Investigation Committee and by the local school boards and high schools. Parents were informed about the study through brochures and were asked to notify the schools if they did not want their child to participate in such a program; active consent from parents was not required.

Following a phone screen to determine eligibility, the initial appointment was conducted at our clinic or at the local school where assent from participants aged 14–17 years of age was obtained: adolescents who were 18 years old signed separate consent forms. Individuals were included if they reported smoking at least ten cigarettes per day for the past six months

and had quantitative urine cotinine levels of 350 ng/ml or higher (Graham Massey Analytical Labs, Shelton, Connecticut, USA).

The DISC Predictive Scale (DPS),[25] select modules of the Diagnostic Interview Schedule for Children (DISC),[26] and an evaluation by a clinical psychologist were used to assess current DSM-IV Axis I disorders. Individuals were excluded if they had a current diagnosis of Generalized Anxiety Disorder (GAD), Major Depressive Disorder (MDD), or a current substance dependence disorder (other than nicotine dependence); any significant current medical condition (eg, neurological, cardiovascular, endocrine); or were a current suicidal/homicidal risk. Although a formal diagnosis of ADHD was conducted, it was not an exclusion criterion. Participants were also excluded for regular use of any psychotropic medications (including anxiolytics and antidepressants) unless medication use was stabilized for at least three months and was being monitored by a physician.

Procedures

The smoking cessation program consisted of a four-week treatment phase during which all participants received CM to reinforce abstinence from smoking. All participants also received a 45-minute "preparation to quit" session 2–7 days prior to their scheduled quit date that offered specific cognitive and behavioral strategies to motivate and initiate cigarette abstinence, including setting the quit date and information about the risks of continued smoking and the benefits of quitting. They were also assisted in developing a plan to increase social support and create a nonsmoking environment for ease of transition. At the end of this session, adolescents were randomly assigned to receive one of two behavioral treatments: Cognitive Behavioral Therapy (CBT) or Frequent Brief Behavioral Intervention (FBBI). A follow-up interview was conducted two months following the quit date to evaluate smoking behavior since the end of treatment.

During the treatment period, all weekday appointments were conducted in the school during classroom breaks, and weekend appointments were conducted at public locations where biochemical measurements could be obtained.

Interventions

Both formats of treatment were individually administered and developed using empirically validated clinical practice guidelines and based upon our previous adolescent smoking cessation manuals.[27] Both the CBT and FBBI interventions were identical in content and total time of treatment, but differed in the frequency and duration of sessions. Overall, the program sought to teach self-control strategies, identify high-risk situations, and review coping skills to deal with these situations. The intervention consisted of the following skills modules: communication training, problem solving, peer refusal, negative mood management, social support, work- and school-related skills, and relapse prevention.

Subjects in the CBT condition received weekly behavioral counseling sessions of approximately 45 minutes in duration for the four weeks of the treatment phase. Subjects in the FBBI condition received behavioral counseling three times weekly for the four weeks of the treatment phase;each session was approximately 10–15 minutes in duration. This format, which was adapted from a manual developed by Cooney[28] for use with adult smokers, delivers coping skills training in frequent short sessions and capitalizes on the daily contact required for the purposes of reinforcement of abstinence. The sessions were matched in content and total time to the weekly CBT sessions. Thus, a key feature of FBBI is that it retains the essential components of coping skills therapy but provides the therapy in a very brief but frequent format.

Counselors and Training

Four counselors provided the CBT and/or the FBBI sessions and were trained by a licensed doctoral level clinical psychologist with extensive experience in CBT and smoking cessation (JLC). Two of the counselors had bachelor's degrees in psychology with two years' experience in smoking cessation counseling, and the other two had doctoral degrees in clinical psychology. All counselors attended a formal half-day training on the manual-guided CBT treatment and viewed CBT training videotapes. They also participated in weekly group supervision to discuss cases with an expert supervisor and maintain adherence to manual guidelines throughout the study. All counselors provided both formats of therapy, and the bachelor versus doctoral level counselors were balanced across both formats.

Contingency Management (CM)

CM appointments to monitor and reinforce abstinence were conducted by research assistants. Abstinence was assessed using CO levels (<7 ppm, Vitalograph Breath CO; Bedfont, Massachusetts, USA) and semiquantitative urine cotinine dipstick readings (NicAlert Immunoassay Test Strips; ITS; Jant Pharmacal Corporation, Enrico, California, USA). The semiquantitative urine cotinine dipstick test has seven levels: 0 = 0–10 ng/ml, 1 = 10–30 ng/ml, 2 = 30–100 ng/ml, 3 = 100–200 ng/ml, 4 = 200–500 ng/ml, 5 = 500–1000, 6 = >1,000 ng/ml; abstinence was defined as levels that were less than those on the earlier day in the first week and <100 ng/ml (level 3) during the subsequent weeks. Subjects had to meet the cutoff levels for both CO and ITS to be reinforced. Verification of abstinence began on the adolescent's quit day.

Participants were reinforced for abstinence on an escalating magnitude schedule of reinforcement with a reset contingency.[12,13] Subjects were paid two dollars for the first appointment, when they were abstinent, and then progressively increasing amounts for each subsequent appointment, when their CO and ITS levels were negative. If the subject's CO or ITS levels were positive, then they were not paid, and the payment for the next appointment was reset back to the initial dollar amount.

Participants in both treatment groups could earn up to a total of $273.50 in CM payments for confirmed abstinence. Participants also received $20 vouchers for the time spend in completing research assessments at each of the research appointments (a total of $160) as well as a bonus payment of $41.75 for attending all appointments as scheduled.

Treatment Outcomes

Primary outcomes were end of treatment abstinence rates, retention rates, and treatment satisfaction ratings. End of treatment abstinence rates were assessed using self-reports confirmed by weekly quantitative urine cotinine levels (<50 ng/ml) and percent days abstinent during the treatment period using daily semi-quantitative cotinine (ITS < 3); these analyses excluded the first four days of treatment, when urine cotinine levels were still decreasing for most participants. Treatment satisfaction was assessed at the end of the four week treatment phase with two questions: "Overall, how satisfied are you with the treatment you received?" and "How satisfied are you with the amount of treatment you received?" Participants rated satisfaction on a five-point Likert scale from "very satisfied" to "very dissatisfied."

The secondary outcome for the study was continuous abstinence rates at the two-month follow-up appointment, determined using self-reports confirmed by quantitative urine cotinine levels.

Data Analysis

Chi-square and ANOVA analyses were used to evaluate baseline differences in participant characteristics between intervention conditions. The sample that initiated treatment (n = 31) was compared on abstinence rates at end of treatment, end of treatment seven-day point prevalence, and follow-up using chi-square analyses. Percent days abstinent during treatment (excluding days 1–4) were compared using an independent samples *t*-test. For all analyses, participants who dropped out or missed multiple appointments were counted as treatment failures and were considered to be smoking. Treatment satisfaction ratings were evaluated by treatment condition (CBT versus FBBI) using chi-square analyses. Treatment retention was evaluated using survival analysis using all randomized participants (n = 34) and Pearson correlations were used to compare time in treatment with smoking outcome.

RESULTS

Participant Characteristics

A total of 113 individuals were screened for participation in the study. Of these, 55 were eligible for the study. Of the 55 participants who were eligible, a total of 34 participants attended their preparation to quit session and were randomized to treatment condition (17 to CBT and 17 to FBBI), and 31 made it to quit day. As indicated in Table 1, the two groups were equivalent on baseline demographic characteristics, with the exception of baseline quantitative cotinine, which was significantly higher in the FBBI group compared to the CBT group.

Abstinence Rates

The overall end of treatment abstinence rate was 58% for the participants who initiated treatment (n = 31), and the seven-day point prevalence abstinence rate in treatment week 4 was 55%. The percent days abstinent during treatment (excluding days 1–4) was 46.9%, and the follow-up continuous self-reported abstinence rate was 20%. There were no significant differences between abstinence rates by treatment condition, although there was a trend for those in the CBT condition to have higher end-of-treatment seven-day point prevalence abstinence rates than those in the FBBI condition (see Table 2).

Retention During Treatment and Follow-Up Period

A total of 11 participants dropped out of the study. Two dropped out after the preparation to quit session and did not make it to quit day. Seven dropped out during the first week of treatment (3 CBT and 4 FBBI), 3 dropped out on day 11 (all FBBI), and 1 dropped out on day 15 (FBBI). Of the 31 participants who initiated treatment, fifteen completed the follow-up (8 CBT and 7 FBBI).

The overall rate of treatment completion was 62%, with 86% of participants in the CBT condition and 53% of participants in the FBBI condition completing treatment, $X^2(N = 31) = 3.77$, $p = .05$. Survival analysis on time to drop out in the full sample (n = 34) revealed that the median number of days that participants were in treatment was 28 for both groups (Wilcoxon (1) = 2.42, $p = .12$). Among the group of treatment initiators, the median remained 28 (Wilcoxon (1) = 3.31, $p = .07$). Similarly, the number of minutes that participants were in treatment was higher for those in the CBT group ($M = 134.2$, $SD = 85.0$) compared to the FBBI group ($M = 110.1$, $SD = 69.9$), although this difference was not statistically significant, $F(1, 32) = .81$, $p = .37$. Yet, again, among the treatment initiators, the FBBI group had 110.1 minutes of treatment ($SD = 69.9$) and the CBT group had 162.9 minutes of treatment ($SD = 62.0$) minutes, $F(1, 29) = 4.84$, $p = .04$. The total number of minutes in treatment was significantly correlated with the percent days of reported cigarette use during active engagement in treatment ($r = -.72$, $p = .00$).

Evaluation of Treatment

There were no significant differences between the treatment conditions on overall satisfaction with treatment, $X^2(2, N = 28) = 1.76$, $p = .416$, and on satisfaction with amount of treatment, $X^2(3, N = 28) = 2.09$, $p = .554$ (see Table 3).

DISCUSSION

This study presents a comparison of two formats of CBT, designed to provide the same quantity of treatment on two different schedules, in combination with contingency management in the treatment of adolescent smokers in a high school setting. Overall, the results of this preliminary study do not support the superiority of one behavioral platform over another. We found no statistically significant differences between the two interventions on end of treatment or follow-up abstinence rates or percent of days abstinent during treatment. It is important to note that because the purpose of this pilot study was to determine which of these two formats of CBT would be optimal for use with contingency management procedures, we did not examine the independent effect of these CBT formats in the absence of contingency management procedures.

The results do highlight an interesting difference between the treatment formats. The less frequent CBT schedule was more likely to retain clients, which ultimately increased both the “dose” of treatment and the point prevalence abstinence rates at treatment completion. Hence, it is possible that the trend for higher abstinence rates at end of treatment in the CBT condition was related to the increased time spent on the psychosocial intervention. Further examination of the retention rates indicated that those who dropped out of treatment did so during the first two weeks of the treatment period and were mostly in the FBBI group. Although not indicated on the treatment satisfaction ratings (perhaps due to lack of sensitivity or frequency of the treatment satisfaction questions), it is possible that the adolescents were less pleased with the FBBI format. In the future, ongoing and more frequent assessment of treatment satisfaction with the behavioral intervention may be needed to further address this issue.

While our intervention is a promising means of initiating abstinence in adolescent smokers, there is a need to find improved methods to help sustain abstinence: of those adolescents who returned for the follow-up session, 20% were able to maintain abstinence with no booster session or additional intervention since the end of treatment. While higher than the average rate of 12%,[6] this follow-up rate of abstinence is still low and indicates that most of the adolescents who initiated abstinence returned to smoking after the end of the program. Furthermore, in general, caution should be exercised in considering follow-up rates of abstinence, even though self-reports were confirmed biochemically using quantitative cotinine levels (as per recommendation of the Society for Research on Nicotine and Tobacco subcommittee[29]). Due to its 20-hour half life, cotinine cannot adequately describe or confirm smoking during the entire follow-up period. More frequent assessment of ongoing abstinence post-treatment is required to more fully understand sustained abstinence. As stated earlier, the skills learned by CBT take time to be incorporated into daily behavior and seem to continue and escalate even after treatment has ended.[14,15] Ongoing work by our group is examining ways to enhance both short- and long-term quit rates by extending the duration of the CM + CBT program beyond four weeks. It is possible that follow-up abstinence rates could be improved be extending our CBT program, as many studies utilizing CBT for adolescent smokers include at least eight sessions of treatment.[16]

A significant limitation of this study is the small sample size, which may have limited the power of statistical analyses to detect differences between the two CBT formats. Effect size estimates (Cohen’s d) ranged from .3 to .6 for all treatment outcomes, indicating only a

small to medium effect size. However, given the trend for greater abstinence rates and retention to be associated with the longer, less frequent CBT sessions, it is possible that even with a larger sample size, the results would favor the use of the weekly CBT condition rather than the more frequent FBBI condition.

In summary, the results of this study suggest that when using a combination of CM and CBT techniques in a high school-based smoking cessation program, there is no specific benefit of providing CBT in a more frequent, shorter format. Interestingly, regardless of CBT format, we found an overall end of treatment abstinence rate of 58% with this smoking intervention, similar to the results of our earlier pilot trial using the CM + CBT intervention.[10] Further investigation into the optimal duration of the treatment period and the enhancement of quit rates beyond the treatment period is needed to refine this novel school-based smoking cessation treatment for adolescent smokers.

Acknowledgments

This research was supported by Center Grant P50 DA09421 (Dr. Krishnan-Sarin), and grants K05-DA000457 and K05-DA00089 (Drs. Carroll and Rounsaville) from the National Institute on Drug Abuse, Bethesda, Md.; and by the VISN 1 U.S. Veterans Administration Mental Illness Research, Education and Clinical Center, West Haven, Conn.

REFERENCES

1. Grunbaum JA, Kann L, Kinchen S, et al. Youth risk behavior surveillance—United States, 2003. MMWR Surveill Summ. 2004; 53:1–96. [PubMed: 15152182]
2. MMWR. Youth tobacco surveillance—United States, 2000. MMWR Morb Mortal Wkly Rep. 2001; 50:1–84. [PubMed: 11215787]
3. Sussman S. Effects of sixty six adolescent tobacco use cessation trials and seventeen prospective studies of self-initiated quitting. Tobacco Induced Diseases. 2002; 1:35–81. [PubMed: 19570247]
4. Backinger CL, McDonald P, Ossip-Klein DJ, et al. Improving the future of youth smoking cessation. Am J Health Behav. 2003; 27(Suppl. 2):S170–S184. [PubMed: 14521244]
5. Sussman S, Dent CW, Nezami E, Stacy AW, Burton D, Flay BR. Reasons for quitting and smoking temptation among adolescent smokers: gender differences. Subst Use Misuse. 1998; 33:2703–2720. [PubMed: 9869439]
6. Sussman S, Lichtman K, Ritt A, Pallonen UE. Effects of thirty-four adolescent tobacco use cessation and prevention trials on regular users of tobacco products. Subst Use Misuse. 1999; 34:1469–1503. [PubMed: 10468104]
7. Petry NM. Contingency management treatments. Br J Psychiatry. 2006; 189:97–98. [PubMed: 16880476]
8. Corby EA, Roll LM, Ledgerwood DM, Schuster CR. Contingency management interventions for treating the substance abuse of adolescents. Exp Clin Psychopharmacol. 2000; 8:371–376. [PubMed: 10975628]
9. Weissman W, Glasgow R, Biglan A, Lichtenstein E. Developmental and preliminary evaluation of a cessation program for adolescent smokers. Psychol Addict Behav. 1987; 1:84–91.
10. Krishnan-Sarin S, Duhig A, McKee S, et al. Contingency management for smoking cessation in adolescent smokers. Exp Clin Psychopharmacol. 2006; 14:306–310. [PubMed: 16893273]
11. Roll JM, Chudzynski JE, Richardson G. Potential sources of reinforcement and punishment in a drug-free treatment clinic: Client and staff perceptions. Am J Drug Alcohol Abuse. 2005; 31:21–33. [PubMed: 15768569]
12. Higgins ST, Delaney DD, Budney AJ, et al. A behavioral approach to achieving initial cocaine abstinence. Am J Psychiatry. 1991; 148:1218–1224. [PubMed: 1883001]
13. Roll JM, Higgins ST, Badger GJ. An experimental comparison of three different schedules of reinforcement of drug abstinence using cigarette smoking as an exemplar. J Appl Behav Anal. 1996; 29:495–504. [PubMed: 8995832]

14. Carroll KM, Kadden RM, Donovan DM, Zweben A, Rounsaville BJ. Implementing treatment and protecting the validity of the independent variable in treatment matching studies. J Stud Alcohol. 1994; 12:149–155.
15. Carroll KM, Nich C, Sifry R, et al. A general system for evaluating therapist adherence and competence in psychotherapy research in the addictions. Drug Alcohol Depend. 2000; 57:225–238. [PubMed: 10661673]
16. McDonald P, Colwell B, Backinger CL, Husten C, Maule CO. Better practices for youth tobacco cessation: evidence of review panel. Am J Health Behav. 2003; 27(Suppl. 2):S144–S158. [PubMed: 14521242]
17. Riedel BW, Robinson LA, Klesges RC, McLain-Allen B. What motivates adolescent smokers to make a quit attempt? Drug Alcohol Depend. 2002; 68:167–174. [PubMed: 12234646]
18. Balch GI, Tworek C, Barker DC, Sasso B, Mermelstein R, Giovino GA. Opportunities for youth smoking cessation: findings from a national focus group study. Nicotine Tob Res. 2004; 6:9–17. [PubMed: 14982683]
19. Ennett ST, Bauman KE. The contribution of influence and selection to adolescent peer group homogeneity: the case of adolescent cigarette smoking. J Pers Soc Psychol. 1994; 67:653–663. [PubMed: 7965611]
20. Robinson LA, Klesges RC, Zbikowski SM. Gender and ethnic differences in young adolescents' sources of cigarettes. Tob Control. 1998; 7:353–359. [PubMed: 10093167]
21. Rowe DC, Chassin L, Presson CC, Edwards DA, Sherman SJ. An "epidemic" model of adolescent cigarette smoking. Journal of Applied Social Psychology. 1992; 26:261–285.
22. Urberg KA, Degirmencioglu SM, Pilgrim C. Close friend and group influence on adolescent cigarette smoking and alcohol use. Dev Psychol. 1997; 33:834–844. [PubMed: 9300216]
23. Balch GI. Exploring perceptions of smoking cessation among high school smokers: Input and feedback from focus groups. Prev Med. 1998; 27:A55–A63. [PubMed: 9808818]
24. Rounsaville BJ. A stage model of behavioral therapies research: getting started and moving on from stage 1. Clinical Psychology: Science and Practice. 2001; 8:133–142.
25. Lucas CP, Zhang H, Fisher P, et al. The DISC Predictive Scales (DPS): efficiently screening for diagnoses. J Am Acad Child Adolesc Psychiatry. 2001; 40:443–449. [PubMed: 11314570]
26. Shaffer D, Fisher P, Lucas CP, Dulcan M, Schwab-Stone M. NIMH Diagnostic Interview Scale for Children, Version IV (NIMH DISC-IV): Description, differences from previous version, and reliability of some common diagnoses. J Am Acad Child Adolesc Psychiatry. 2000; 39:28–38. [PubMed: 10638065]
27. Duhig, AM.; Cavallo, DA.; McKee, SA., et al. Cognitive behavioral therapy for adolescent smoking cessation. Yale University; 2003. Unpublished manual
28. Cooney, JL. Frequent brief behavioral intervention (FBBI) for adult smokers. 2000. Unpublished manual
29. Mermelstein R, Colby SM, Patten C, et al. Methodological issues in measuring treatment outcome in adolescent smoking cessation studies. Nicotine Tob Res. 2002; 4:395–403. [PubMed: 12521399]

TABLE 1

Baseline demographic characteristics (n = 34)

Variable (percent or mean [SD])	CBT	FBBI	X^2 or F
Female	41.2	52.9	.49
Ethnicity			3.04
Caucasian	82.4	76.5	
African American	0	5.9	
Hispanic	17.6	11.8	
Native American	0	5.9	
Age	16.7 (.92)	16.7 (1.1)	.03
Baseline urine cotinine (ng=ml)	885.1 (478.7)	1361.9 (740.2)	4.54 *
Number of cigarettes smoked per day	13.8 (3.9)	17.8 (9.5)	2.28
mFTQ	2.8 (.74)	3.1 (1.1)	.86
Years smoked daily	2.6 (1.0)	3.0 (2.2)	.41
Number of quit attempts of >24 hours	1.3 (1.2)	1.3 (1.3)	.00
Days of alcohol use, past 28	1.7 (2.9)	1.7 (4.8)	.00
Number of drinks, past 28	.6 (1.3)	.3 (.6)	.75
Days of marijuana use, past 28	2.6 (5.2)	4.7 (9.0)	.63
Number of joints smoked, past 28	.1 (.1)	.2 (.5)	1.59
BDI score	8.1 (6.5)	8.6 (6.5)	.05
ADHD diagnosis, past month (DISC)	11.8	11.8	1.00
Contemplation Ladder (0–10)	8.2 (1.3)	8.3 (1.4)	.04

* $p < .05$. MFTQ = Modified Fagerström Tolerance Questionaire.

TABLE 2

Abstinence rates by treatment condition (n = 31)

	CBT (%)	FBBI (%)	X^2 or t	p
EOT abstinence rate *	71.4	47.1	1.87	.171
EOT seven-day point prevalence abstinence rate †	71.4	41.2	2.84	.092
Days abstinent (day 5–28) ‡	57.1	38.5	− 1.63	.114
Two-month follow-up abstinence ratey †	12.5	28.6	.603	.438

Abbreviation: EOT = end of treatment.

* Confirmed by quantitative urine cotinine <50 ng/ml.

† Self-report confirmed by quantitative cotinine <50 ng/ml.

‡ Confirmed by semi-quantitative cotinine <100 ng/ml (level 3 on the ITS).

TABLE 3

Treatment satisfaction ratings (n = 28)

	CBT (%)	FBBI (%)	X^2
"Overall, how satisfied are you with the treatment you received?"			1.76
Very satisfied	76.9	53.3	
Moderately satisfied	15.4	26.7	
Neither satisfied nor dissatisfied	7.7	20	
Moderately dissatisfied	0	0	
Very dissatisfied	0	0	
"How satisfied are you with the amount of treatment you received?"			2.09
Very satisfied	76.9	53.3	
Moderately satisfied	15.4	26.7	
Neither satisfied nor dissatisfied	7.7	13.3	
Moderately dissatisfied	0	0	
Very dissatisfied	0	6.7	