Motivational Enhancement Therapy for High-Risk Adolescent Smokers

Amy Helstrom[a], **Kent Hutchison**[b], and **Angela Bryan**[b]

a*VA Boston Healthcare System*

b*University of Colorado, Boulder*

Abstract

The majority of regular adult smokers begin smoking in adolescence and there is a clear need for youth-targeted smoking cessation interventions. The present randomized, controlled trial tested the effectiveness of Motivational Enhancement Therapy (MET) to reduce smoking among 81 adjudicated adolescents. Participants received either MET or an education control. Smoking abstinence, quantity, and frequency were assessed at one- and six-months post treatment. Results suggest that although between-groups differences on outcome measures were not significant at follow-up, smoking behavior decreased in both groups with approximately 10% achieving 1-month smoking abstinence at 6-month follow-up. Further, participant response to MET varied by level of alcohol use and impulsivity such that participants with lower levels of alcohol use and impulsivity had significantly greater response to MET. In contrast, participants who endorsed higher rates of alcohol use and impulsivity responded better to the control than the MET condition. Results suggest that MET may be an effective intervention for some adolescent smokers but may be contraindicated for adolescents who have concomitant problems with alcohol use or impulsivity.

Keywords

adolescent; smoking cessation; motivational enhancement therapy; juvenile offender

1. Introduction

Relatively few studies have specifically tested the efficacy of smoking cessation interventions with adolescent populations and these studies are often been hindered by high attrition and low recruitment rates (McCormick et al., 1999). Further, high-risk adolescent smokers (e.g., those subject to delinquency) may present particular challenges to smoking cessation efforts as they may smoke at a higher rate and have greater nicotine withdrawal severity than adolescents in the general population (Peters et al., 2005; Strong et al., 2004). Despite this, evidence suggests that high-risk youth often want to quit smoking but are unable to do so (Dozois, Farrow, & Miser, 1995).

Although a relatively small body of research, several key controlled studies of smoking cessation interventions among adolescents have suggested that motivational enhancement therapy (MET; Miller & Rollnick, 1991) may be a promising intervention for adolescent

smokers (e.g., Tevyaw & Monti, 2004). To date, MET as a smoking cessation intervention with juvenile offenders specifically has not been tested. The objectives of the present study were to test the effectiveness of MET in a sample of delinquent adolescent smokers and to examine how comorbid problems (alcohol use) and intrapersonal factors (impulsivity) moderated treatment outcome.

2. Method

Eighty one adjudicated adolescent smokers were randomly assigned to receive either one session of MET or tobacco education control. Assessment was conducted at baseline and at 1- and 6-months post treatment.

2.1. Participants and Intervention

Participants had been arrested or given notice to appear in court for a variety of offenses and were given the option for a diversionary program (see Table 1 for demographic data). MET sessions began with individualized feedback about participants' smoking based on information from the baseline assessment. Following, participants' likes/ dislikes, beliefs, and pattern of tobacco use were discussed and participants were assisted in identifying goals for behavior change and addressing their ambivalence about their smoking. For participants ready to make changes, cessation strategies were provided, goals were defined, and a behavior change plan was collaboratively developed. The control condition included an information session based on a pamphlet about tobacco use by the American Cancer Society.

2.2. Measures

As part of a larger study, participants completed a number of subjective and biological measures (i.e., salivary cotinine) including alcohol use (White & Labouvie, 1989) impulsive behavior (ImpSS; Zuckerman et al., 1993) (at baseline only), and The Time Line Follow Back interview (TLFB; Sobell & Sobell, 1992), to assess smoking frequency and days abstinent at each time point.

3.0. Results

As shown in Table 1, participants were mostly daily smokers who began smoking at a young age. Thirty-three percent of participants reported that they had no plans to quit smoking while 16% reported wanting to quit in the immediate future. At pre-treatment, the two treatment groups were not different on any variable except for gender, with males reporting smoking more cigarettes in the past month than females (see Table 2). In addition, t-tests of a post treatment checklist suggested that participants in the MET condition received a significantly different intervention than individuals in the control condition.

Abstinence rates by treatment are presented in Table 3. Binary logistic regression on point (1-week) and prolonged (1-month) smoking abstinence at 1-month and 6-month follow-up revealed no significant treatment effects. Results from attrition analyses suggested that non-completers did not differ significantly from completers on any variables measured. However, significantly more participants in the MET condition attended the 6-month follow-up than participants in the control condition.

Two additional models were estimated: one testing treatment effects on days abstinent and one testing treatment effects on number of cigarettes smoked. Intervention effects on these outcomes were tested with a series of 2 (MET versus Control) × 3 (baseline, 1-month follow-up, 6-month follow-up) mixed model analyses of variance (ANOVAs). There was no significant treatment × time interaction in either model. However, in both cases there was a

significant main effect of time (F (1, 120) = 12.37, p>.001, η^2_p=.17, for days abstinent and F (1, 112) = 10.93, p<.001, η^2_p=.15, for number of cigarettes smoked per day). In the case of cigarettes per day, there were initial reductions in smoking from baseline to the 1-month follow-up (p<.001), and these reductions were maintained though did not improve at six months (p=. 28; M_{base}=10.69, M_{1mo}=7.15, M_{6mo}=8.21). For number of days abstinent, there were improvements from baseline to one month (p<.05), and further improvements from one month to six months (p<.05; M_{base}=1.48, M_{1mo}=3.81, M_{6mo}=6.81).

In the third set of analyses, moderator variables of alcohol use, impulsive sensation seeking (ImpSS), and gender were examined with frequency of smoking and number of days abstinent as outcomes. There was a significant time × treatment × alcohol use interaction, F (2, 114) =3.02, p=.05, η^2_p =.05, on quantity smoked. As can be seen in Figure 1, participants with lower levels of alcohol use reported a slight decrease in smoking from pretest to follow-up in the MET condition, with almost no sustained change in the control condition. For participants with higher levels of alcohol use, it appeared that responses were again slightly better in the *control* condition as compared to the MET condition.

The effect of treatment on change in average number of cigarettes per day was moderated by ImpSS. The time × treatment condition × ImpSS interaction was significant, F (2, 116) =3.15, p<.05, η^2_p =.05. For lower IMPSS individuals, the MET condition was slightly more effective than the control condition. For higher ImpSS individuals, however, the control condition was more successful than the MET (see Figure 2). There were no significant moderating effects of gender, and there was no moderation of treatment effects on the days abstinent variable.

4.0. Discussion

The present study examined the effect of a motivational enhancement intervention on juvenile offenders' smoking abstinence and smoking reduction. Results suggested that overall, MET did not perform better than an education control. The brief MET was better than standard educational material with respect to decreasing smoking behavior, but only for a subset of adolescents. Adolescents who consumed less alcohol and were less impulsive responded relatively well to MET in terms of self-reported decreases in smoking rates. However, for adolescents who endorsed higher rates of alcohol, or who were higher in impulsivity, MET generally performed relatively worse than the control treatment. In fact, this subset of adolescents responded better to the control condition--reading information verbatim from a pamphlet. These results are consistent with some recent work indicating that MET approaches may be less effective with adolescents, particularly those with comorbid psychiatric problems (e.g., Brown et al., 2003).

The present study was limited by problems common to treatment outcome studies with adolescents, such as low recruitment. Due to the need to provide parental consent for participation, adolescents who were smokers but whose smoking was not known to the family did not volunteer. Additionally, the study was limited by the restriction to a single session of MET and by the use of a single interventionist. Additionally, while the MET intervention did not lead to greater abstinence rates overall than control, statistically more participants in the MET condition were retained in treatment at 6-month follow-up. Given the results of the current study, further research with a larger sample is needed to better understand how MET may be helpful for high-risk adolescent smokers.

References

Brown RA, Ramsey SE, Strong DR, Myers, et al. Effects of motivational interviewing on smoking cessation in adolescents with psychiatric disorders. Tobacco Control 2003;12:3–10. [PubMed: 12612347]

Dozois DN, Farrow JA, Miser A. Smoking patterns and cessation motivations during adolescence. International Journal of Addiction 1995;30:1485–1498.

McCormick LK, Crawford M, Anderson RH, Gittelsohn J, Kingsley B, Upson D. Recruiting adolescents into qualitative tobacco research studies: Experiences and lessons learned. Journal of School Health 1999;69:95–99. [PubMed: 10332644]

Miller, WR.; Rollnick, S. Motivational interviewing: Preparing people to change addictive behavior. Guilford Press; New York: 1991.

Peters RJ, Kelder SH, Prokhorov AV, Yacoubian GS, Markham CM, Essien EJ. Cigarette smoking as an alternative to screened drugs: Why juvenile probationers smoke more. Addiction Research & Theory 2005;13:35–42.

Sobell, LC.; Sobell, MB. Time-line follow-back: A technique for assessing self reported alcohol consumption. In: Litten, RZ.; Allen, JP., editors. Measuring alcohol consumption. Humana Press; Totowa, NJ: 1992. p. 73-98.

Strong DR, Kahler CW, Ramsey SE, Abrantes A, Brown RA. Nicotine withdrawal among adolescents with acute psychopathology: An item response analysis. Nicotine & Tobacco Research 2004;6:547–557. [PubMed: 15203788]

Tevyaw TO'L, Monti PM. Motivational enhancement and other brief interventions for adolescent substance abuse: Foundations, applications, and evaluations. Addiction 2004;99:63–75. [PubMed: 15488106]

White HR, Labouvie EW. Toward the assessment of adolescent problem drinking. Journal of Studies on Alcohol 1989;50:30–37. [PubMed: 2927120]

Zuckerman M, Kuhlman M, Joiremann J, Teta P. A comparison of three structural models for personality: The big three, the big five, and the alternative five. Journal of Personality and Social Psychology 1993;65:757–768.
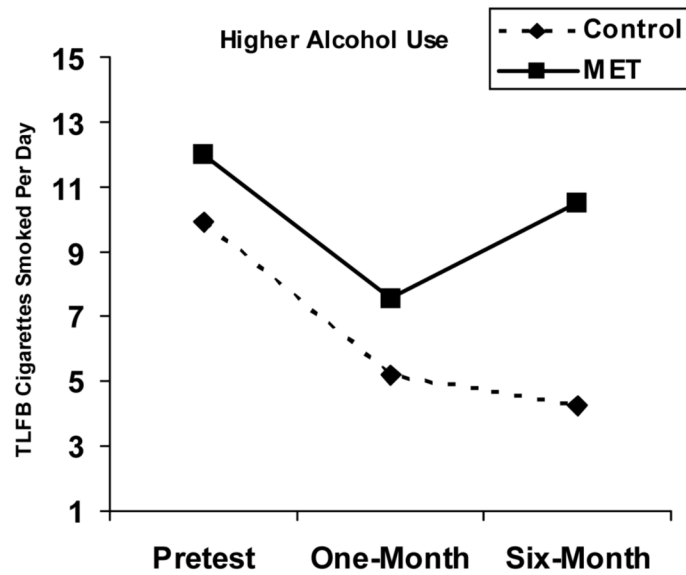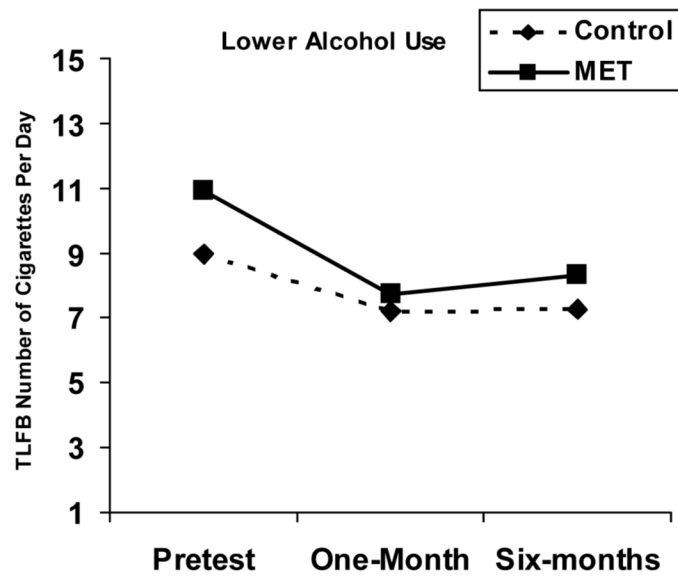
Figure 1.
Changes in self-reported smoking as assessed by the TLFB in the control versus the MET condition for those with lower (top panel) versus higher (bottom panel) quantity and frequency of alcohol use.
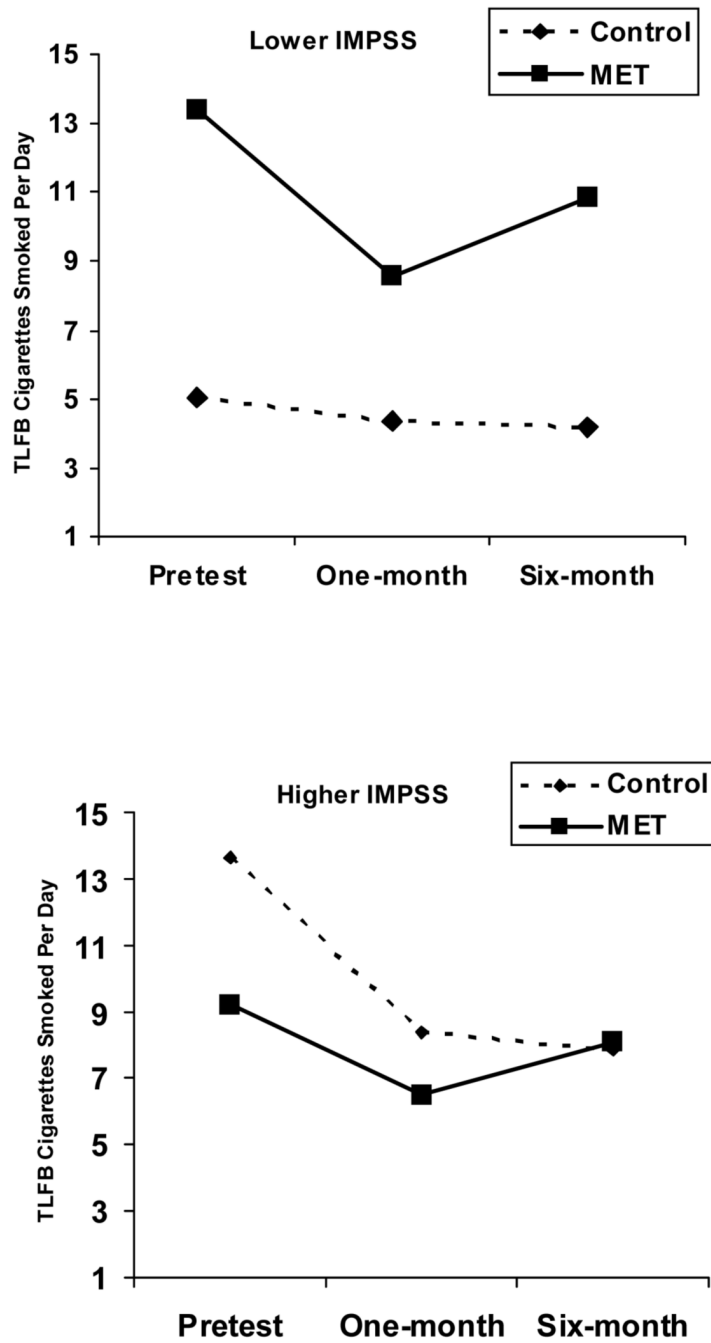
Figure 2.
Changes in self-reported smoking as assessed by the TLFB in the control versus the MET condition for those with lower (top panel) versus higher (bottom panel) impulsivity.

Table 1

Pretest Differences in MET versus Control Participants[1]

Variable[2]	MET ($\underline{n}$ = 45)	Control ($\underline{n}$ = 36)	Test for Difference
Gender (% male)	N=26	N=21	$\chi^2(1) < 1$, *ns*
	58%	58%	
Age	15.98	15.97	*t* (79) = 0.02, *ns*
	(1.30)	(1.36)	
Race (% Caucasian)	84.44%	72.22%	$\chi^2(1) = 1.80$, *ns*
Age when first smoked cigarette	11.93	11.97	*t* (77) = −0.07, *ns*
	2.83	2.30	
Average Number of Cigarettes Smoked Past Month	11.73	8.96	*t* (74) = 1.33, *ns*
	(8.18)	(8.66)	
Salivary Cotinine	167.06	236.19	*t* (74) = 0.08, *ns*
	(144.63)	(195.95)	
Alcohol Use Frequency[3]	.09	−.11	*t* (78) = -1.09, *ns*
	(.71)	(.76)	
ImpSS	11.02	11.03	*t* (72) = −0.01, *ns*
	(3.46)	(3.64)	

[1] Additional data collected at baseline and follow-up (e.g., nicotine dependence, carbon monoxide) are available from the first author.

[2] Standard deviations appear in parentheses below the means of continuous variables.

[3] Scale is the mean of three standardized variables (*z*-scores) reflecting quantity and frequency of alcohol use and frequency of getting drunk.

Table 2

Pre- and Post-Test Dependent Variable Means

Variable[1] and Treatment Condition	Baseline	1-Month Follow-up	6-Month Follow-up
TLFB (average cigarettes per day)			
MET	11.22 (8.46)	8.24 (5.76)	9.11 (7.84)
Education	9.56 (9.43)	6.05 (6.26)	6.55 (6.97)
Salivary Cotinine			
MET	225.28 (198.74)	203.20 (183.63)	183.31 (142.78)
Education	194.70 (167.65)	164.64 (158.42)	152.02 (169.13)

[1]Standard deviations appear in parentheses adjacent to the means of the variables.

Table 3

Smoking Point Abstinence at Follow-Up by Treatment Condition

Variable	1-Month Follow-Up		6-Month Follow-Up	
	MET (n=38)	Education (n=29)	MET (n=42)	Education (n=27)
28-Day Abstinence (self-report)[1]	1 (2.6%)	1 (3.4%)	4 (9.5%)	3 (11.1%)
7-Day Abstinence (self-report)	2 (5.2%)	4 (13.8%)	5 (11.9%)	3 (11.1%)
Salivary Cotinine[2]	4 (10.5%)	2 (6.8%)	4 (9.5%)	2 (7.4%)

[1] Includes one participant abstinent at both 1-month and 6-month follow-up

[2] Abstinence defined as salivary cotinine ≤ 15 ng/mL