

The Role of Marijuana Use in Brief Motivational Intervention With Young Adult Drinkers Treated in an Emergency Department*

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ABSTRACT. Objective: The aim of this research was to study marijuana use, associated risks, and response to brief motivational intervention among young adult drinkers treated in an emergency department. **Method:** Study participants ($N = 215$; ages 18-24) were in a randomized controlled trial for alcohol use that compared motivational interviewing with personalized feedback (MI) with personalized feedback only. Past-month marijuana users were compared with nonusers on demographics, readiness, self-efficacy, and behavioral risk variables. Marijuana use was examined as a potential moderator of alcohol outcomes. Whether marijuana use alone or combined marijuana and alcohol use would be reduced as a result of brief intervention for alcohol was examined at 6 and 12 months. **Results:** Current marijuana users were younger, were

more likely to be white, and reported more alcohol use, other illicit drug use, and more alcohol-related consequences than nonmarijuana users. Marijuana use at baseline did not moderate response to brief alcohol treatment. Marijuana use declined from baseline to 6 months for both treatment groups, but only MI participants continued to reduce their use of marijuana from 6- to 12-month follow-up. Reductions in number of days of use of marijuana with alcohol appeared to be primarily a function of decreased alcohol use. **Conclusions:** Young adult drinkers reporting current marijuana use are at generally higher risk but responded to brief alcohol treatment by reducing alcohol and marijuana use. (*J. Stud. Alcohol Drugs* 70: 409-413, 2009)

RATES OF MARIJUANA AND ALCOHOL USE are highest among older adolescents and young adults (Substance Abuse and Mental Health Services Administration, 2007b), and the emergency department (ED) is a medical setting where young adults are often seen when experiencing substance-related events such as illness or injury. Marijuana use occurs in approximately one third of drug-related ED admissions with rates of marijuana-related events highest among 18- to 24-year-olds (Substance Abuse and Mental Health Services Administration, 2007a). High rates of marijuana use are found in general samples of ED patients (Rockett et al., 2006; Soderstrom et al., 1988) and in adult ED patients treated for alcohol problems (Woolard et al., 2003); and greater injury-related risk has been shown among patients using both alcohol and marijuana (Soderstrom et al., 1988; Woolard et al., 2003).

Medical settings provide an opportunity for screening (Chung et al., 2003) and early intervention with non-treatment-seeking alcohol and marijuana users (Degutis, 2003). ED studies of brief motivational interventions (BMIs) for alcohol have demonstrated positive outcomes with older adolescent and young adult samples (Monti et al., 1999, 2007). Although studies have effectively targeted multiple risk behaviors for injury among adolescents in the ED (Johnston et al., 2002), we found no published studies that targeted multiple substances with older adolescents or young adults in ED settings. However, BMI has reduced both alcohol and marijuana use among adult ED patients more than standard services (Woolard et al., 2008). A few studies have targeted multiple substances with college students, and a recent study examined adolescent substance use in a general medical setting. D'Amico and colleagues (2008) found greater reduction of marijuana use in a BMI compared with usual services among at-risk adolescents recruited in a primary care clinic. BMI and written personalized feedback were effective in reducing alcohol, nicotine, and marijuana use with mandated college students (White et al., 2006, 2007), and non-help-seeking college students decreased alcohol, nicotine, and marijuana use more after BMI than education-as-usual comparisons (McCambridge and Strang, 2004).

The studies reviewed targeted substances other than alcohol, but it is possible that subjects will decrease drug use

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even if it is not a focus of the intervention. A recent meta-analysis did not find secondary effects of alcohol-focused motivational interviewing (MI) with personalized feedback on nicotine across seven clinical trials (McCambridge and Jenkins, 2008). A study of an alcohol-focused decisional balance exercise with male college students found an effect on alcohol use and not on sexual risk behavior, although sexual risk behavior was a focus of assessment (LaBrie et al., 2006). None of these studies examined possible effects on marijuana use. Given high rates of concurrent alcohol and marijuana use, and the lifestyle changes that often accompany reductions in alcohol use, effects of an alcohol intervention on marijuana use should be considered. Alcohol and marijuana users may also present with multiple risk behaviors; however, little is known about how these factors affect response to alcohol treatment. In the present sample, patients with high alcohol-problem severity and no alcohol-related event precipitating their ED visit changed their alcohol use more in the 12 months after receiving a BMI compared with those who received a feedback report only (Barnett et al., submitted for publication). These young adults needed MI to facilitate changes in their alcohol use, whereas those who experienced an alcohol-related event changed in both treatment conditions. Concurrent marijuana use may be an additional behavioral risk factor, and whether it affects patients' response to alcohol treatment, independent of alcohol-problem severity, should be examined.

This study was conducted with data from a prospective randomized trial of MI with personalized feedback on alcohol use compared with personalized feedback only (FO; Monti et al., 2007). Our objectives were the following: (1) to compare young adult drinkers with and without marijuana use on demographics, readiness, self-efficacy, and behavioral risk factors (i.e., drug use and consequences); (2) to examine whether reported marijuana use would moderate response to MI; and (3) to test whether marijuana users would reduce marijuana use overall or when combined with alcohol use as a result of a brief alcohol intervention. It was expected that young adult ED patients using both alcohol and marijuana would be at generally higher risk and would have worse alcohol-use outcomes than nonmarijuana users; in addition, we expected that this would be independent of alcohol-problem severity. Finally, it was unknown whether the effects of alcohol-focused MI or FO would generalize to marijuana use.

Method

Participants ages 18 to 24 ($N = 215$) were recruited from a large northeastern hospital and were eligible if they met one of the following criteria: (1) blood alcohol concentration greater than .01 g% or self-reported alcohol use in the 6 hours before the event precipitating their ED visit or (2) a score of 8 or higher on the Alcohol Use Disorders Identifica-

tion Test (AUDIT; Saunders et al., 1993). Participants who did not speak English, had a self-inflicted injury, or were in police custody were not eligible.

Procedures

All procedures were approved by the university and hospital institutional review boards, and participants gave written informed consent. Participants completed baseline questionnaires (30-45 minutes) and were randomly assigned to receive either MI or FO, each with telephone booster contact. Treatment providers (nine bachelor's- or master's-level therapists) received 30 hours of training and ongoing weekly supervision. The single MI session (30-45 minutes) involved establishing rapport, assessing motivation for change, enhancing motivation for change with feedback on alcohol use, and change plan (upon patient agreement). The FO condition involved an introduction to the report and an opportunity to ask questions (<5 minutes of counselor contact). Telephone booster sessions were conducted at 1 and 3 months. In the MI condition, booster sessions (20-30 minutes) included a review of progress toward change goals (where appropriate), and an assessment of alcohol use and related problems. The FO booster sessions (5-15 minutes) involved alcohol assessment only. An updated feedback report was generated and mailed to participants in both conditions at 3-month follow-up. Further detail on study procedure can be found in Monti et al. (2007).

Measures

Demographic variables were age, gender, ethnicity/race, and college status (dichotomous). The Readiness Ruler (Miller and Rollnick, 2002) measures readiness to change alcohol use by asking, "How ready are you to make a change in your drinking?" with options ranging from 1 = "not ready" to 10 = "trying." The Brief Situational Confidence Questionnaire (Breslin et al., 2000) measures self-efficacy to resist heavy drinking across seven high-risk situations, uses a scale of 0 to 100%, and was the mean rating used for analyses.

The Timeline Followback (TLFB; Sobell and Sobell, 1996) assessed alcohol use in the 30 days before the ED visit and before 6- and 12-month follow-up. Number of drinking days, average number of drinks per week, and number of heavy drinking days (five or more drinks for men, four or more for women) were calculated. A drug-use frequency questionnaire assessed number of days of marijuana, cocaine, methamphetamine, LSD (lysergic acid diethylamide), PCP (phencyclidine), inhalant, opiate, and other prescription drug use (alone and in combination with alcohol). Marijuana use was examined as a dichotomous and as a continuous past-30-day reported use variable. All other illicit drugs (positively skewed) were summed and dichotomized into past-30-day use or nonuse. The AUDIT (Saunders et al., 1993) was used

to assess overall alcohol-problem severity. Alcohol-related consequences were measured with the Rutgers Alcohol Problem Index (White and Labouvie, 1989), a 23-item measure that uses a 4-point Likert rating of “none,” “1 to 2 times,” “3 to 5 times,” and “greater than 5 times”; the sum was used.

Data analysis

Bivariate *t* test or chi-square analyses were used to compare participants with and without reported past-30-day marijuana use on demographic, readiness, self-efficacy, and behavioral risk variables. Moderation was tested using repeated measures analysis of variance (ANOVA) with dichotomous baseline marijuana use and treatment condition as factors and baseline AUDIT score as a covariate for each of the three alcohol outcomes from baseline to 12-month follow-up. Repeated measures ANOVA was also used to examine potential changes in marijuana use and combined marijuana and alcohol use from baseline to 12-month follow-up and was followed by post hoc tests of Time \times Treatment effects within each 6-month timeframe. If significant treatment effects were shown for number of days of use of marijuana combined with alcohol, analyses were rerun with follow-up number of days of alcohol use as a covariate. For each outcome, within-group effect sizes (Cohen's *d*) were calculated to provide descriptive measures of use reduction by treatment condition.

Results

Demographic characteristics are shown in Table 1. Reasons for participant ED treatment were assault/fight (23.3%),

motor vehicle accident (20.9%), other injury (20.9%), substance use (17.7%), fall (10.7%), and illness (6.5%). The mean (SD) blood alcohol concentration was .081 g% (.083 g%). Of the participants, 54.9% reported marijuana use in the past 30 days. Among marijuana users, the mean number of days of use in the past month was 13 (11.6), and 70% reported marijuana use on 20 or more days. Group comparisons by past-30-day marijuana use (Table 1) found that past-month marijuana users were older; were more likely to be white; and scored significantly higher on alcohol use, other illicit drug use, and alcohol-related consequences but were not any more or less ready to change or confident that they could resist alcohol compared with nonusers.

For moderation analyses, there were nonsignificant Marijuana Group (use/nonuse) \times Treatment interactions at 6-through 12-month follow-ups for number of days of alcohol use ($F = 0.92$, 2/160 df, NS), average number of drinks per week ($F = 1.49$, 2/160 df, NS), and number of heavy drinking days ($F = 1.58$, 2/160 df, NS), indicating that past-30-day marijuana use at baseline did not moderate the effects of MI.

Table 2 shows descriptive data and subject time-level contrasts for marijuana use only and combined marijuana and alcohol use for participants who had used marijuana at baseline ($n = 118$). Participants reported significantly fewer days of marijuana use over time ($F = 6.76$, 2/93 df, $p < .005$), and Table 2 shows that this was accounted for by differences from baseline to 6-month follow-up. The Time \times Treatment effect was marginally significant ($F = 3.07$, 2/93 df, $p = .051$), and Table 2 shows that this was accounted for by differences from 6 to 12 months. Therefore, participants in both MI and FO reduced marijuana use from baseline to

TABLE 1. Demographic, readiness and self-efficacy, and behavioral risks among marijuana using and nonusing young adult drinkers

Variable	Marijuana users ($n = 118$) % or mean (SD)	Nonusers ($n = 97$) % or mean (SD)	Total % or mean (SD)	<i>t</i>	χ^2
Demographic characteristics					
Age	20.3 (1.7)	20.9 (2.0)	20.6 (1.9)	2.51, 213 df*	
Gender, male	57.3%	42.7%	66.5%		1.04, 1/213 df
Ethnicity/race					10.15, 1/213 df†
White	62.3%	37.7%	70.2%		
Hispanic	36.4%	63.6%	10.2%		
Black	38.5%	61.5%	12.1%		
Other	37.5%	62.5%	7.4%		
College status, in college	58.2%	41.8%	36.7%		0.59, 1/213 df
Readiness and self-efficacy					
Readiness to change alcohol	5.4 (2.7)	5.9 (2.8)	5.6 (2.7)	1.01, 146 df	
Confidence to resist heavy drinking	68.4 (19.6)	74.6 (18.6)	70.9 (19.4)	1.79, 126 df§	
Behavioral risks					
No. of drinking days	8.9 (6.5)	5.9 (5.3)	7.5 (6.2)	-3.71, 213 df†	
No. drinks per week	16.2 (13.8)	7.6 (8.1)	12.8 (12.4)	-4.33, 213 df†	
No. heavy drinking days	6.0 (5.8)	2.9 (3.2)	4.6 (5.0)	-4.89, 213 df†	
Any illicit drugs used, past-30-day use	75.8%	24.2%	15.3%		6.86, 1/213 df*
AUDIT score	12.3 (6.4)	9.6 (6.1)	11.1 (6.4)	-3.15, 213 df†	
RAPI score	20.1 (17.1)	13.8 (12.1)	17.3 (15.3)	-3.12, 213 df†	

Notes: AUDIT = Alcohol Use Disorders Identification Test; RAPI = Rutgers Alcohol Problem Index.

§ $p < .10$; * $p < .05$; † $p < .01$; ‡ $p < .001$.

TABLE 2. Repeated measures of marijuana use at 6- and 12-month follow-up among participants with any marijuana use at baseline

Measure	MI (<i>n</i> = 55) Mean (SD)	FO (<i>n</i> = 41) Mean (SD)	Post hoc tests within 6-month timeframe			Effect size
			df	<i>F</i> (time)	<i>F</i> (Time × Tx)	
No. days used marijuana past 30 days						
Baseline	15.83 (11.60)	11.78 (11.37)				
6-month follow-up	12.24 (11.75)	8.71 (10.88)	1/94	8.46**	0.05	.31 (MI) .28 (FO)
12-month follow-up	9.37 (10.97)	9.91 (11.59)	1/94	0.80	4.72*	.57 (MI) .16 (FO)
	MI (<i>n</i> = 25) Mean (SD)	FO (<i>n</i> = 33) Mean (SD)				
No. days used marijuana with alcohol past 30 days						
Baseline	6.48 (6.58)	4.15 (4.77)				
6-month follow-up, with 6-month alcohol use controlled	2.92 (3.40)	6.36 (6.98)	1/56	0.65	11.92‡	.54 (MI)
12-month follow-up	3.13 (4.23)	4.29 (5.82)	1/56	12.43†	2.07	-.46 (FO)
			1/56	0.19	0.67	.51 (MI) -.03 (FO)

Notes: Sample size for analyses are participants for which follow-up data were available (attrition 19% at 12 months with no significant differences by treatment condition; Monti et al., 2007). MI = motivational interviewing with personalized feedback; FO = personalized feedback only; Tx = treatment.

* $p < .05$; † $p < .01$; ** $p < .005$; ‡ $p < .001$.

6 months, but only those in MI continued to reduce their use from 6- to 12-month follow-up.

For number of days of combined marijuana and alcohol use, the time effect was not significant ($F = 1.09$, 2/55 df, NS), but the Time × Treatment effect was significant ($F = 7.56$, 2/55 df, $p < .005$) and was accounted for by differences from baseline to 6 months (Table 2). The MI group reduced marijuana and alcohol use at 6 months, but, in follow-up analyses with 6-month number of days drank covaried, the 6-month outcome was no longer significant. This indicates that the greater reduction in number of days used marijuana with alcohol in MI compared with FO was primarily a function of a greater reduction of alcohol use in the MI group.

An additional set of analyses were conducted with participants who had not used marijuana at baseline to identify whether there were group differences in marijuana use at follow-up. Of the participants not using marijuana at baseline ($n = 97$), 12.7% used marijuana in the past month at 6-month follow-up, and 20.6% used marijuana in the past month at 12-month follow-up. Among these nonusers at baseline, there were no treatment group differences in marijuana-use status at 6 months ($\chi^2 = .05$, 1 df, NS; $n = 71$) and at 12 months ($\chi^2 = 2.10$, 1 df, NS; $n = 71$). Therefore, although people in the MI group made greater changes in alcohol use compared with those in the FO group (Monti et al., 2007), it appears that they did not replace their use of alcohol with marijuana.

Discussion

In this study, we report findings on marijuana-use prevalence, associated characteristics and risks, and brief treatment

response among young adults with recent alcohol problems treated in an ED setting. Among these young adult drinkers, 55% reported past-30-day marijuana use, which is more than three times the rate found for 18- to 24-year-olds in population-based studies (Substance Abuse and Mental Health Services Administration, 2007b). In addition, approximately one third of marijuana users in this study reported using on 20 or more days in the past month. Participants reporting current marijuana use were younger and more likely to be white but did not differ by gender or college status. Marijuana users scored higher than nonusers on all measures of alcohol use and alcohol-related problems and were more likely to use other illicit drugs, which may result in greater risk for re-injury. However, current marijuana users did not differ from nonusers on baseline readiness to change alcohol use or self-efficacy to resist heavy drinking. In addition, marijuana use did not moderate participant response to MI. These results suggest that concurrent marijuana use does not indicate that BMIs for alcohol will be less effective despite an increased level of involvement with alcohol and other drugs.

Although the findings should be considered preliminary, there may be some protective benefit of alcohol-focused MI compared with FO in relation to marijuana use. Despite higher substance use and associated consequences, marijuana use declined in both conditions at 6 months and continued to decline from 6 to 12 months among those who received MI. Findings on marijuana use in combination with alcohol showed a Time × Treatment effect with decreased use among those in the MI group at 6 months. This latter finding appears to be a function of overall changes in number of days used alcohol, which was greater in MI compared with FO (Monti et al., 2007). Thus, by decreasing alcohol use,

marijuana use also declined, and longer term generalization of alcohol-treatment effects to marijuana appeared to occur only in the more substantial MI intervention.

Limitations and future directions

The parent study did not include a no-treatment control group, and therefore we cannot conclude that the intervention conditions caused the decline in marijuana use. Participants may have underreported use of substances to research staff, and biological corroboration of self-report was not collected. It is also unknown whether greater therapeutic contact within the MI group could have led to differential underreporting of marijuana use. The sample in this study consisted of young adults in an ED; results may not generalize to other age groups or other community settings. Results should be confirmed in prospective analyses that examine the role of marijuana use in young adult problem drinking and alcohol-related change behavior.

Research demonstrating high prevalence of alcohol- and marijuana-related ED admissions highlights the need to conduct screening and brief intervention for substance use (Degutis, 2003), particularly with higher risk young adults. Progress has been made regarding multiple-target BMIs (Johnston et al., 2002; Woolard et al., 2008), and future intervention development should include investigating whether treating alcohol and marijuana use concurrently would result in enhanced treatment effectiveness in this population. It is also critical to investigate how these two substances interact in the behavior change process, as well as to understand the mechanisms through which substance use declines.

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