Brief Intervention for Harm Reduction With Alcohol-Positive Older Adolescents in a Hospital Emergency Department

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This study evaluated the use of a brief motivational interview (MI) to reduce alcohol-related conse-
quences and use among adolescents treated in an emergency room (ER) following an alcohol-related
event. Patients aged 18 to 19 years ($N = 94$) were randomly assigned to receive either MI or standard
care (SC). Assessment and intervention were conducted in the ER during or after the patient's treatment.
Follow-up assessments showed that patients who received the MI had a significantly lower incidence of
drinking and driving, traffic violations, alcohol-related injuries, and alcohol-related problems than
patients who received SC. Both conditions showed reduced alcohol consumption. The harm-reduction
focus of the MI was evident in that MI reduced negative outcomes related to drinking, beyond what was
produced by the precipitating event plus SC alone.

Adolescent drinking has been associated with injuries, motor vehicle crashes, and assaults (Maio, Portnoy, Blow, & Hill, 1994). Although there has been increased focus recently on smoking and other drug use among youths (Monti, 1997), alcohol-related inju- ries and crashes are the leading cause of death for young adults (Institute of Medicine, 1990). Indeed, 18- to 24-year-olds have the highest rates of alcohol consumption and represent the largest percentage of problem drinkers (U.S. Department of Health and Human Services, 1997).

In contrast to adult treatment (e.g., Monti, Abrams, Kadden, & Cooney, 1989), little empirical effort has been directed toward adolescents. Furthermore, although school-based prevention pro- grams have had some success, they tend not to address cessation/ reduction or motivational issues related to use and abuse and cannot target dropouts.

One approach that has addressed the first two of these concerns has focused on the reduction of harm associated with heavy drinking in college (Baer, Kivlahan, & Marlatt, 1992). This pro- gram was implemented with members of the entering freshman class, initially assessed as high school seniors. Using a motiva- tional intervention approach that provides normative comparisons and personalized feedback, the intervention produced impressive results, both in the short term, where there was a decrease in alcohol-related problems and a modest reduction in use, and more recently at the 2-year follow-up (Marlatt et al., 1998). Although encouraging, this approach does not address older adolescents who are not attending school. Given the increased risk for alcohol- and drug-related negative consequences associated with dropout (Cook & Moore, 1993) and with this age group, it seems important to develop a program in a nonschool environment.

Health care settings provide an opportunity to reach teens who are in need of intervention. Studies have demonstrated the efficacy of brief interventions for adult problem drinkers in clinics or medical settings (see Wilk, Jensen, & Havighurst, 1997, for a review). Brief alcohol intervention in a medical setting may cap-

italize on a "teachable moment." Indeed, adolescents treated for an alcohol-related emergency may be especially receptive to an intervention because of the recency of the event and the patient's emotional state. These factors may assist a provider in eliciting ambivalence about alcohol use, given that the negative consequences of that use are so salient.

A motivational interview (MI) approach is particularly well suited for use in an emergency room (ER) in that it is brief and combines personal feedback regarding drinking patterns and effects with an empathic style (Miller & Rollnick, 1991). Further, it has proven effective in reducing problem drinking among adults (Miller, 1995). This study examined the efficacy of a brief MI for reducing harm associated with drinking among alcohol-positive adolescents in an ER. A randomized two-group design compared outcomes of patients receiving MI with those receiving standard care (SC).

Method

Participants

Eligibility criteria included a positive blood alcohol concentration (BAC) or a report of drinking alcohol prior to the event that precipitated treatment. Patients were identified by research or hospital staff. Patients who were suicidal, who were in police custody, who were non-English speaking, who had failed a mental status exam, or who had suffered serious traumatic injury were excluded. The study was introduced to 184 eligible patients, but 43 were discharged from the ER prior to recruitment. Of the remaining 141 patients, 94 (67%) agreed to participate. Compared with participants, nonparticipants were slightly older (M = 18.6 years, SD = 0.50 years), $t(183)$ = 2.60, p < .05, but did not differ by gender (68% male), $\chi^2(1, N = 184)$ = 0.32, or by average BAC (M = 176 mg/dl, SD = 84 mg/dl), $t(152)$ = 1.25. Sample characteristics and baseline drinking variables are provided in Table 1.

Procedure

Research interventionists conducted all aspects of the baseline contact. All procedures were approved by both the university and hospital institutional review boards. Assessments and interventions were typically conducted in private areas, and family members were not present. Patients unable to complete baseline participation during their medical visit were rescheduled. There was no group difference in the percentage of patients who were scheduled to return (29%), $\chi^2(1, N = 94)$ = 0.00, or in hours elapsed between the time of admission and the time of the intervention (M = 35.8, Mdn = 5.0, SD = 61.3). After assessment, patients were

Table 1
Demographic and Baseline Information

Variable	Motivational interview (n = 52)			Standard care (n = 42)			Total (N = 94)			Statistic
	M	SD	%	M	SD	%	M	SD	%	
Age (years)	18.4	0.5		18.3	0.5		18.4	0.5		$t(92)$ = 0.94
Gender										$\chi^2(1)$ = 0.12
Male			65			62			64	
Female			35			38			36	
Ethnicity										$\chi^2(3)$ = 3.77
White			79			81			80	
African American			10			17			13	
Asian/East Indian			8			2			5	
Hispanic			4						2	
No. of years in school	11.5	1.3		11.6	1.1		11.5	1.2		$t(92)$ = 0.54
School status										$\chi^2(3)$ = 4.09
College			46			48			47	
Dropped out/expelled			31			17			25	
High school graduate/GED			14			14			14	
High school			10			21			15	
Reason for ED visit										$\chi^2(4)$ = 3.93
MVA			29			24			27	
Assault			8			21			14	
Fall			8			5			6	
Other injury			10			7			9	
Intoxication only			46			43			45	
Blood alcohol level (mg/dl)	168	75		149	59		159	69		$t(84)$ = 1.28
No. of days drinking/month	7.8	8.0		8.2	7.6		8.0	7.8		$t(92)$ = 0.25
No. of drinks/episode	5.7	2.0		5.0	1.7		5.4	1.9		$t(92)$ = 1.73
ADI total score	19.5	10.9		21.4	10.3		20.4	10.6		$t(92)$ = −0.87
Stage of change										$\chi^2(5)$ = 3.24
Acquisition			15			12			14	
Precontemplation			39			31			35	
Contemplation			2			2			2	
Preparation			44			50			47	
Action						2			1	
Maintenance						2			1	

Note. All between-groups comparisons were not significant. GED = general equivalency diploma; ED = emergency department; MVA = motor vehicle accident; ADI = Adolescent Drinking Index.

randomized to either MI (35–40 min) or SC (approximately 5 min). Completers were paid $20. Patients were reinterviewed at 3 and 6 months.

Measures

Three types of measures were given: (a) measures of alcohol-related problems, (b) measures of alcohol use, and (c) a potential mediator and a potential moderator of outcome. Most measures were administered at baseline and at both follow-ups. The Adolescent Drinking Index (ADI) was administered only at baseline, and the alcohol treatment and alcohol problem questions were asked only at follow-up. Behavior was measured over the past year at baseline and over the past 3 months at follow-ups.

Drinking and driving was measured by five items from the Young Adult Drinking and Driving Questionnaire (Donovan, 1993), which asks how often (i.e., number of times) respondents drove after various amounts of drinking. The measure is reliable and valid (Donovan, 1993); internal consistency in our sample was $\alpha = .89$.

Moving violations during the follow-up period were obtained from Department of Motor Vehicle (DMV) records for licensed drivers.

The Adolescent Injury Checklist (AIC) is a 14-item true–false self-report measure of recent injuries, adapted to measure alcohol involvement, with good internal consistency ($\alpha = .68$) (Jelalian et al., 1997) and validity (Jelalian, Spirito, Rasile, & Nobile, 1999).

Alcohol-related problems were assessed by five items from the Health Behavior Questionnaire (Jessor, Donovan, & Costa, 1989) that measured frequency of trouble with parents, school, friends, dates, or the police because of drinking on 5-point Likert scales ranging from 0 (never) to 4 (five or more times). Construct validity is good (Donovan, 1996; Donovan, Jessor, & Costa, in press); internal consistency in our sample was $\alpha = .63$.

The Adolescent Drinking Questionnaire (ADQ) consists of four items from the Adolescent Health Behavior Questionnaire (Jessor et al., 1989) that assess drinking quantity and frequency of drinking, high-volume drinking, and drunkenness on 8-point scales. The alcohol use total outcome score is derived by summing the item scores. An average of the 3- and 6-month total scores was used for outcome analyses. Construct validity is well established (Donovan, 1996; Donovan et al., in press); internal consistency in our sample was $\alpha = .85$.

The ADI (Harrell & Wirtz, 1989) is a 24-item measure of the severity of alcohol involvement with two subscales: Rebellious and Self-Medicating Drinking. Items are scored on scales ranging from 0 (not like me at all) to 2 (like me a lot) or from 0 (never) to 4 (four or more times). The ADI total scale and subscales have good internal consistency (αs >.80) and construct validity (Harrell & Wirtz, 1989). This baseline measure was used to describe the sample and for personalized feedback.

At the 6-month follow-up, patients were asked to report on the frequency of any additional alcohol treatment they had received (with six questions). This measure was evaluated as a mediator of intervention effects.

The Stage of Change Algorithm (Migneault, Pallonen, & Velicer, 1997) has eight true–false items about current drinking and intentions to change. Respondents are categorized into precontemplation, contemplation, preparation, action, and maintenance stages of acquisition or cessation of immoderate drinking (three or more drinks at a time). Migneault et al. validated the stages against the pros and cons of drinking. This measure was used as a moderator of response to the intervention.

SC Condition

SC was designed to be consistent with general practice for treating alcohol-involved teens in an urgent care setting, included a handout on avoiding drinking and driving and a list of local treatment agencies.

MI Condition

Interventionists' therapeutic style and protocol were based on the principles of MI (Miller & Rollnick, 1991), with a focus on empathy, not arguing, developing discrepancy, self-efficacy, and personal choice. The MI has five sections: (a) introduction and review of event circumstances, (b) exploration of motivation (pros and cons), (c) personalized and computerized assessment feedback, (d) imagining the future, and (e) establishing goals.

MI patients were provided with the same set of handouts given to SC patients. They were also given an information sheet about the effects of alcohol on driving and their personalized feedback sheet.

Manipulation Check, Training, and Supervision and Follow-Up Assessment

Interventionists were 12 bachelor's- to master's-level staff members with 1 to 2 years of experience. All of the interventionists completed extensive MI training. Weekly group supervision was provided. Two mechanisms were implemented to ensure adherence to MI principles in general and to the session protocol in particular. First, both interventionists and patients independently completed a 14-item rating scale that assessed the degree to which important aspects of MI and the intervention protocol had been administered. Items that reflected the core features of MI were rapport, empathy, and self-efficacy enhancement. They were scored on a scale ranging from 1 (strongly disagree) to 4 (strongly agree). Patients' ratings were high, with a mean of 3.9 (SD = 0.21) for rapport, 3.7 (SD = 0.45) for empathy, and 3.7 (SD = 0.47) for self-efficacy enhancement. The interventionists and patients rated the delivery of essential elements of the protocol and their perceptions of the utility of each element on scales ranging from 0 (topic not discussed) to 3 (very useful). Essential elements were presented to patients 88% of the time according to patients and 89% of the time according to interventionists.

To provide an objective measure of intervention fidelity, every 3 months we videotaped interventionists conducting an MI with naive research staff. Methods used by Project MATCH (Carroll et al., 1998) were adapted, including generating items that reflected the specific ingredients of the MI. An observer rating manual was developed that provided guidelines for rating each item. Following ratings, corrective feedback was provided to interventionists.

Follow-up interviews were conducted at 3 months by telephone and at 6 months in person by research assistants who were unaware of treatment condition. Patients were paid $10 at 3 months and $15 at 6 months.

Results

Of the original 94 patients, 87 (93%) completed the 3-month interview and 84 (89%) completed the 6-month interview, with no differential follow-up rates between groups or by gender. Non-White participants were less likely than White participants to complete the phone interview, $\chi^2(1, N = 94) = 6.40, p < .05$, but not the in-person interview. Compared with those who completed follow-up, participants who did not were more likely to have been school dropouts at baseline, $\chi^2(1, N = 94) = 3.90, p < .05$, and reported less severe drinking at baseline, including lower frequency of episodic heavy drinking (≥ 5 drinks), $t(48) = 5.00, p < .001$, and fewer days drinking, $t(18) = 2.11, p < .05$.

An "intent-to-treat" approach was used, such that all participants who had been randomized to treatment condition were eligible for follow-up, regardless of whether or not they received the intervention in its entirety.

Harm-Reduction Effects

To test whether MI resulted in hypothesized reduction in harm associated with alcohol use, we examined effects on alcohol-

related injuries, social problems, drinking and driving, and traffic violations at follow-up. Because these experiences occur at relatively low base rates, we added data from the 3- and 6-month follow-ups (each covering the prior 3-month follow-up period). We analyzed group differences using between-groups analysis of covariance (ANCOVA) or logistic regression, depending on the dependent variable. When available, corresponding baseline measures were covaried.

Drinking and driving. About one fourth (26%) of the drivers in this sample reported no drinking-and-driving behavior following treatment. A logistic regression comparing groups on whether or not they had engaged in drinking-and-driving at follow-up, entering the baseline value as a covariate, was significant, $\chi^2(1, N = 73) = 5.82, p < .05$. Logistic regression results are shown in Table 2. Those in SC were nearly four times more likely to report any drinking and driving (85%) compared with those in MI (62%).

Moving violations. DMV data were obtained for 62 licensed drivers (31 per group). A chi-square analysis showed that those teens who received MI were significantly less likely to have a moving violation (3%) in the 6 months following treatment compared with those in SC (23%), $\chi^2(1, N = 62) = 5.17, p < .05.$[1]

Alcohol-related injuries. We used logistic regression analysis to test whether MI resulted in fewer reports of alcohol-related injuries at the 6-month follow-up. The log-transformed number of alcohol-related injuries (from the AIC) over a 1-year baseline period served as a covariate. Rates of injury were found to differ significantly by group, $\chi^2(1, N = 82) = 7.72, p < .01$ (see Table 2). Those who had received MI were significantly less likely (21%) to report having sustained an alcohol-related injury than those who had received SC (50%).

Alcohol-related problems. Patients reported that drinking caused problems with dates (33%), with friends (30%), with police (20%), with parent(s) (20%), and at school (12%). Using an ANCOVA, we compared MI and SC groups on the number of alcohol-related problems during follow-up, covarying frequency of heavy drinking at baseline. MI patients reported significantly fewer alcohol-related problems ($M = 0.88$, adjusted $M = 0.89$, $SD = 1.18$) in the 6 months following treatment compared with SC patients ($M = 1.45$, adjusted $M = 1.44$, $SD = 1.43$), $F(1, 78) = 4.10, p < .05$, $\eta^2 = .05$, indicating an almost-medium effect size of 0.23.

Alcohol Use Outcomes

Alcohol consumption data are presented in Table 1. Using a 2 × 2 (Group × Time) repeated measures analysis of variance, we

tested whether drinking (ADQ total scores) decreased significantly from baseline to follow-up and whether change in drinking differed by treatment group. A time effect, $F(1, 79) = 24.55, p < .001$, showed significant reductions in ADQ total scores, with no group difference or interaction.

Potential Mediator of Outcome

Although the modest sample size precluded formal mediational analyses, a potential mediator variable, which might account for the harm-reduction effects of MI, was analyzed. A chi-square analysis indicated that the groups did not differ on whether they had received additional treatment related to their alcohol use, $\chi^2(1, N = 83) = 0.29$, with 23% of those in MI, compared with 18% of those in SC, reporting additional treatment.

Potential Moderators of Outcome

We examined whether gender or stage of change may have influenced response to the MI. Two sets of exploratory analyses added gender and stage of change in turn as independent variables to the above outcome analyses. No significant interactions with treatment condition were found on measures of drinking and driving, alcohol-related injuries, alcohol-related problems, or drinking outcome.

Discussion

Alcohol-positive adolescents who were recruited from a busy urban hospital ER were successfully assessed, received MI, and were retained for follow-up. Findings clearly demonstrate the intervention's acceptability and feasibility. Consistent with harm-reduction conceptualizations, adolescents who received MI were significantly less likely to report having driven after drinking than those who received SC. Also, MI patients were significantly less likely than SC patients to report having had alcohol involved in an injury or to have had alcohol-related problems. Furthermore, according to DMV records, MI patients were significantly less likely to have a moving violation in the 6 months posttreatment compared with SC patients. The clinical significance of these effects is of interest; 6 months after their ER visit, the MI group showed a 32% reduction in drinking and driving and had half the occurrence of alcohol-related injuries of the SC group. Thus, this brief intervention had an important effect on clinically significant sequelae of drinking.[2]

Table 2

Logistic Regression Analyses of Drinking and Driving and Alcohol-Related Injury as a Function of Intervention Group

Variable	B	Wald test	OR	95% CI
Drinking and driving (0 = no, 1 = yes)	1.37	5.17*	3.92	1.21–12.72
Alcohol-related injury (0 = no, 1 = yes)	1.37	7.21**	3.94	1.45–10.74

Note. The predictor variable of group was coded 0 = motivational interview, 1 = standard care. OR = odds ratio; CI = confidence interval. *$p < .05$. **$p < .01$.

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[1] In an attempt to provide convergent evidence, we compared the number of moving violations according to the DMV records with the number reported by participants. The percentage of agreement between DMV records and self-reports was identical for the two groups, with 26 of 31 participants (84%) in agreement about whether a moving violation had occurred during the follow-up period. The characteristics of the disagreements were also identical; 4 participants in each group reported having a violation when the DMV had no such record, and only 1 participant in each group denied having a violation when one had been recorded by the DMV.

[2] Because of the nature of our data (dichotomous outcomes or without baseline levels), we were unable to conduct formal analyses to evaluate the clinical significance of our findings (as suggested by Jacobson, Follette, & Revenstorf, 1984, and by Kendall, Flannery-Schroeder, & Ford, 1999). The clinical significance of such interventions should be addressed in future work.

All patients significantly reduced their drinking during follow-up, particularly during the first 3 months, regardless of intervention. It is plausible that the experience of having an alcohol-related emergency precipitating treatment in the ER can account for this significant reduction. It is also important to note that our control condition was somewhat more than typical "standard care" in that patients received assessment and handouts. Reactivity to assessment may account for the lack of group differences in alcohol use. Furthermore, the MI did not emphasize a reduction in drinking per se but instead focused on its harmful consequences.

The utility of our MI appears to be its efficacy in producing harm-reduction effects rather than reduced alcohol use. It is interesting to compare the present results with those of Marlatt et al. (1998), who found smaller effects for alcohol use than for alcohol-related problems. The results are also consistent with some brief intervention studies with adults in primary care settings in that there were reductions in alcohol consumption in both groups, but harm-reduction effects were seen only with the intervention (e.g., Chick, Lloyd, & Crombie, 1985). It may be that a more intense intervention—perhaps one that includes booster sessions—would result in differential drinking.

The discrepancy between the drinking results and those pertaining to reduction in harm is of theoretical as well as practical interest. It raises the question "How does MI work?" Indeed, it is curious that although both groups in the present study decreased their drinking overall, and appeared to be drinking at equal rates at follow-up, only MI patients showed a reduction in harm. Given the lack of differences found for additional treatment seeking, the mechanism of MI's effect needs further delineation. The MI's focus on reducing the harmful and risky effects of drinking appeared to have a significant impact, possibly by changing the settings in which drinking occurred or by reducing risky behaviors (such as driving) after drinking.

Our findings are encouraging for intervening with alcohol-positive older adolescents in an ER and are consistent with demonstrations of the efficacy of brief interventions for adult problem drinkers in medical settings (Wilk et al., 1997). Given the prevalence of alcohol-positive adolescents in such settings (Barnett et al., 1998), the results are particularly important. Nevertheless, one needs to be cautious about generalizing. Although MI is a promising approach for ER settings and other settings where there is the potential to channel a teachable moment into behavior change, older adolescents and young adults who are problem drinkers or alcoholics may not respond as well. Given our inclusion criterion (i.e., medical treatment for an alcohol event), we inevitably included patients who had relatively low levels of alcohol consumption and some who did not meet the ADI cutoff for alcohol abuse. Indeed, our study does not address the issue of whether an MI would be effective for a more impaired population.

Conclusions are also limited by our relatively high refusal rate. In this regard, it is important to note that our method of proactive recruitment was very different from that of most treatment studies in that patients were not necessarily motivated for treatment. In addition, patients could not be approached about participating until they were able to pass a mental status exam. However, by the time their mental status cleared, many were ready to be discharged and their desire to leave after having been in the ER for several hours

impacted enrollment. These limitations notwithstanding, given the feasibility, broad transportability, and ability of our intervention to target drinking teens who might not be reached by more traditional school-based prevention or treatment programs, the potential for a clinically meaningful application of a brief MI with adolescents is promising.

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