Published in final edited form as:

Ann Emerg Med. 2008 June ; 51(6): 742–750.e2. doi:10.1016/j.annemergmed.2007.11.028.

Brief Intervention for Hazardous and Harmful Drinkers in the Emergency Department

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Abstract

Study Objective—To determine efficacy of emergency practitioner performed brief intervention for hazardous/harmful drinkers in reducing alcohol consumption and negative consequences in an Emergency Department (ED) setting.

Methods—A randomized clinical trial (Project ED Health) was conducted in an urban ED from 5/2002 to 11/2003 for hazardous/harmful drinkers. Patients ≥ 18 who screened above National Institute for Alcohol Abuse and Alcoholism guidelines for “low risk” drinking or presented with an injury in the setting of alcohol ingestion were eligible. The mean number of drinks per week and binge drinking episodes over the past 30 days were collected at 6 and 12-months; negative consequences and use of treatment services at 12-months. A Brief Negotiation Interview (BNI) performed by emergency practitioners was compared to scripted discharge instructions (DI).

Results—A total of 494 hazardous/harmful drinkers were studied. The two groups were similar with respect to baseline characteristics. In the BNI group the mean number of drinks per week at 12 months was 3.8 less than the 13.6 reported at baseline. The DI group decreased 2.6 from 12.4 at baseline. Likewise, binge drinking episodes per month decreased by 2.0 from a baseline of 6.0 in the BNI group and 1.5 from 5.4 in the DI group. For each outcome the time effect was significant and the treatment effect was not. Conclusion: Among ED patients with hazardous/harmful drinking, we did not detect a difference in efficacy between emergency practitioner-performed BNI and DI. Further studies to test the efficacy of brief intervention in the ED are needed.

INTRODUCTION

Alcohol problems are common in emergency department (ED) patients. In 2001, 7.6 million of the 110 million ED visits in the United States were attributable to alcohol.¹ Alcohol has

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Presented: Society for Academic Emergency Medicine (SAEM) Annual Meeting, May 2005, New York, New York; and Research Society on Alcoholism (RSA) Annual Meeting, June 2005, Santa Barbara, CA.

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been shown to be a risk factor for injury, and is involved in 40% of fatal motor vehicle crashes, 60% of fatal falls, 60% of suicides/homicides, and over 60% of fire deaths in adults;^{2,3} as well as a wide range of illnesses including hypertension and gastrointestinal problems precipitating an ED visit.⁴ For population subgroups like the young and uninsured, the ED is often the primary access point to health care, and the ED visit may be the only opportunity for screening, intervention and referral for alcohol problems. Unfortunately, alcohol screening and intervention is not widespread, so that many patients with alcohol problems are not identified and treated.⁵

The spectrum of alcohol problems ranges from hazardous use to physical dependence. Hazardous or “at-risk” drinking is defined as drinking above the National Institute on Alcohol Abuse and Alcoholism (NIAAA) low risk guidelines; ≤ 14 drinks per week and ≤ 4 drinks per occasion for men, and ≤ 7 drinks per week and ≤ 3 drinks per occasion for women and all over the age of 65.⁶ Individuals who exceed these guidelines are at risk for future medical, social or legal consequences. Harmful drinkers are those who present with negative consequence related to alcohol. Prior research conducted in primary care settings, has demonstrated that hazardous and harmful drinkers may benefit from a one-time, brief intervention targeted at reducing alcohol use and/or its harmful effects.^{7,8,9}

Brief interventions are counseling sessions ranging from 10–45 minutes typically performed by non-addiction specialists.¹⁰ Evidence suggests brief interventions are effective in primary care⁷ and in-patient trauma settings.¹¹ Gentilello, et al¹¹, demonstrated that brief interventions provided to patients admitted to a trauma center were effective in significantly reducing alcohol consumption and decreasing repeat injury hospitalizations in patients who received interventions from a psychologist during their hospitalization after injury.

To date, few randomized controlled studies of brief interventions in the ED setting have been published.^{12,13,14,15} All have concentrated on patients presenting with injuries, either older adolescents¹² or adults^{13, 14, 15} rather than general medical illnesses. In three studies, research staff performed the intervention.^{12, 13, 15} and in one, the intervention was computer-generated.¹⁴ The results varied. One noted a significant decrease in alcohol consumption in the intervention group,¹⁴ two reported a similar decrease in alcohol consumption in the intervention and control groups but demonstrated significant reductions in negative consequences after the initial brief intervention session¹² or a booster session¹³ in the intervention group, and one detected no difference in consumption between the intervention and control groups.¹⁵

The ED visit may present an opportunity for screening and brief intervention for hazardous and harmful drinking, yet unlike research in primary care settings, prior research on ED patients has not investigated the “real life” scenarios of alcohol screening irrespective of presenting complaint, combined with brief interventions performed by emergency practitioners in an ED setting. This study assessed the efficacy of an emergency practitioner-performed intervention of less than 10 minutes in reducing alcohol consumption and negative consequences over a 6 and 12-month time period.

METHODS

Study Design and Setting

We conducted a randomized, controlled clinical trial, comparing a brief (5–10 minutes), motivational intervention called the Brief Negotiation Interview (BNI)¹⁶ with scripted discharge instructions (DI) for hazardous and harmful drinkers, entitled Project ED Health. Participants were enrolled between May 6, 2002 and November 12, 2003 after presenting to the emergency department (ED) of Yale-New Haven Hospital, a tertiary care urban hospital,

with 70,000 annual adult ED visits. The study was approved by the Human Investigation Committee at Yale University School of Medicine. (**Clinical Trial Registration Number: NCT00443183, registered March 2007 @ <http://www.clinicaltrials.gov>**)

Selection of Participants

All patients, whether or not their primary complaint was related to alcohol, were evaluated for the study. Patients ≥ 18 years who reported alcohol consumption exceeding the NIAAA's low-risk limits (Hazardous drinkers) or whose index ED visit was related to an injury associated with alcohol use (Harmful drinkers) were eligible. Acute alcohol ingestion was defined as a serum or breathalyzer test blood alcohol concentration of $> 0.02\text{mg}\%$. Patients were excluded if they were: non-English speaking; likely to be alcohol dependent, defined as having an AUDIT¹⁷ score > 19 , or drug dependent as determined by self-reported daily use; currently enrolled in a substance abuse treatment program; seeking treatment for an acute psychiatric complaint or hospitalized for a psychiatric problem in the past year; critically ill, injured or cognitively impaired

Patients were recruited during 5 rotating 8 hour shifts per week which occurred between 6am and midnight; 7 days per week). The NIAAA quantity and frequency questions used to identify hazardous drinkers:⁶ 1) "In a typical week how many days do you drink?" 2) "How many drinks do you have per drinking day?" and 3) "What is the maximum number of drinks you have had on one occasion (24-hour period) during the past month?" were embedded in an 18-item health screen administered by trained researchers. The screen included questions related to smoking, exercise and seatbelt use in order to mask alcohol as the central focus, thereby minimizing demand characteristics that have been shown previously to confound results.⁷

Treatment Assignment and Conditions

Patients were randomly assigned using 100 block randomization to ensure near equal numbers between two treatment conditions: Brief Negotiation Interview (BNI) or scripted Discharge Instructions (DI). Research associates were provided with sealed, opaque envelopes for each of the 500 randomized study identification numbers. The identification number appeared on the outside, and the assigned treatment condition was specified inside the envelope. Both the BNI and DI were performed by trained emergency practitioners including attending physicians, 3rd & 4th year emergency medicine residents and physician associates. A two-hour structured training program, including skills-based training and feedback (role-play and rehearsal), was used. Training was followed by a proficiency test. Details on training procedures have been reported previously.¹⁶

Brief Negotiation Interview (BNI)—The BNI is a manual-guided intervention¹⁶ using techniques based on motivational interviewing, brief advice,⁷ behavioral contracting¹⁸ and designed to be delivered in less than 10 minutes. The four primary steps are: 1) Raise the subject of alcohol; 2) Provide feedback by reviewing the patient's screening data, make a connection between alcohol and the visit/illness or injury if possible, review NIAAA guidelines for low-risk drinking; 3) Enhance motivation using motivational interviewing techniques; and 4) Negotiate and advise by summarizing the patient's reasons for change and negotiating a drinking goal. Patients are then asked to complete and sign a drinking agreement.

Discharge Instructions: Patients assigned to the DI condition received scripted discharge instructions read by the emergency practitioner, designed to be less than 1 minute in length. (See web-based Table ?) This included a statement recommending the patient decrease

alcohol intake and if appropriate use seatbelts, exercise regularly and stop smoking. A handout was provided with more information related to all identified health risks.

Assessments

Baseline assessment included: (1) Alcohol consumption for the past 30 days as measured by the Time-line Follow-Back method,¹⁹ a calendar-based assessment where patients are asked to recall their drinking behavior over the past 30 days by looking at a calendar, recording the number of drinks consumed daily starting with the previous day and working back, using holidays or special occasions as memory triggers. Reliability and validity of this instrument has been well documented;²⁰ (2) Questions concerning drinking related consequences such as driving after drinking, injury sustained while drinking and legal problems such as arrests; (3) Readiness to change drinking behavior was assessed using the Contemplation Ladder,²¹ a very brief measure of motivation or readiness to change allowing patients to indicate their motivation to change their drinking from 1–10, where 1 is least motivated and 10 is most motivated; (4) the Short Form Health Survey (SF-12)²² was used to assess health status in two domains, physical and mental, including summary measures and overall general health perceptions; and (5) the Treatment Services Review²³ documenting both inpatient and outpatient use of services.

Patients were contacted by telephone for follow-up interviews at 6 and 12-months. Interviews were conducted by research associates, blinded to subject treatment assignment. Patients received travel checks as compensation after completing each assessment in the following amounts: \$20 at intake visit from a research associate, and by mail in the amounts of \$40 and \$50 at 6 and 12 months respectively.

Treatment Integrity

To assess treatment integrity, all BNI and DI sessions were audiotaped. Tapes were rated, using an adherence scale of critical emergency practitioner actions, by independent, trained raters, blinded to study hypotheses and treatment assignment. A Brief Negotiation Interview Adherence and Competence Scale (BNIACS) was developed. Three raters were trained for reliability during a 4-hour training session. Raters were then assigned tapes to review with the understanding that the recordings could be of either BNI or DI interventions, and instructed to complete an adherence form (BNIACS) for each.

Based on an initial sample of 25 audio-taped sessions, the 18 items of the final scale had good mean agreement (83.5%). Results from the remaining audio-taped interventions (N=367) demonstrated that emergency practitioners correctly administered nearly all of the BNI and DI techniques with an overall mean BNI adherence score of 8.9/13. Ratings confirmed the presence of specific counseling strategies in BNI and the absence of these strategies in DI as well as the length of sessions; 5–10 minutes (BNI) vs. ≤ 1 minute (DI). BNI sessions contained significantly more counseling strategies than DI sessions (mean 8.9 vs 0.5, respectively), as expected. BNI sessions were significantly longer than DI sessions, (mean 6.7 vs. 1.4 minutes, respectively). These findings suggest that the emergency practitioners performed competently and adhered to the specific components of both BNI and DI.

Outcome Measures

Primary outcome measures were: (1) number of standard drinks per week, (2) number of binge episodes (>4 drinks for women, and >5 drinks for men) in the past 30 days, and (3) percentage of participants in each treatment condition who exceeded NIAAA low-risk drinking limits in the past month. Secondary outcomes measures were: (1) potential and actual negative consequences related to drinking, (2) patterns of primary medical care and

alcohol-related treatment services utilization, as measured by the Treatment Services Review and (3) readiness to change drinking patterns.

Primary Data Analysis

Sample Size—Based on published data⁷ we anticipated a moderate effect size of 0.33 in differences favoring BNI compared to DI in the number of standard drinks per week. The sample size of 500 subjects provided a statistical power of greater than 0.80 and a 2-sided Type I error of 0.05 to detect a similar or larger effect size difference between the 2 conditions.

We estimated observing a 20% difference in the use of primary care and/or supportive services for follow-up of alcohol problems between the groups. The proposed sample of 500 patients allowed sufficient power (0.95–0.99) to detect such effects assuming a type I error of 0.05.

Statistical Analyses—We used the Mixed Models procedure (SAS, release 9.0) to compare the effects of treatment assignment (BNI vs. DI), the effects of time (baseline, 6-months and 12-months), and the interactions of these two factors on the primary and secondary outcome measures (the mean number of drinks per week, and the number of bingeing episodes). The Mixed Models procedure is designed for unbalanced repeated measures with missing data, allowing for intra-subject serial correlation and unequal variance and covariance structure across time. It provides tests of the overall between-subject effects, repeated measures (time) effects, tests of fixed and random effects, and also allows analysis of reduced models that can provide detailed tests of specific pattern of results. The secondary outcome measures were analyzed using non parametric tests, comparing changes between the 2 groups from baseline to 12-months only.

We also conducted exploratory linear and logistic regression analyses to investigate the potential impact of baseline patient characteristics and treatment assignment on drinking over NIAAA limits and reduction of drinking from baseline: gender, baseline, AUDIT score, treatment arm, drinks per week, age, education level, marital status, ethnicity, race, insurance status, smoking status, level of motivation and presence of injury at ED visit.

RESULTS

Baseline Demographic and Health Status Characteristics

The baseline demographic and health status characteristics of the subjects enrolled in this study appear in Table 1. The two groups were similar with respect to baseline characteristics. Additionally, the occurrence of an injury at ED presentation, alcohol use and problems as measured by AUDIT score, smoking status or readiness to change did not differ significantly between the groups.

Enrollment, Intervention Allocation and Analysis

A flow diagram is provided in Figure 1. A total of 250 patients were randomized to both BNI and DI groups, and 247 were subsequently analyzed in each group. Three patients in the BNI group did not receive the intervention due to developing critical illness but were all included in an intention to treat analysis. Follow-up rates were high and comparable in both groups; 95% at 6-months and 92% at 12-months. High follow-up rates were obtained by efforts previously reported.²⁴ Multiple alternate contact information was obtained from patients at the intake visit. Appointments were made for a follow up at the time of the index visit or with each subsequent phone call that were convenient for the patient. Reminder

letters were sent prior to the call, and the research associates called at all times of the day, 7 days a week.

Primary Outcomes: Alcohol Use—Alcohol use was assessed using two common measures of alcohol consumption: average number of drinks per week and number of binge episodes in the past month (Table 2). In the BNI group the mean number of drinks per week at 12 months was 3.8 less than the 13.6 reported at baseline. The DI group decreased 2.6 from 12.4 at baseline. Likewise, binge drinking episodes per month decreased by 2.0 from a baseline of 6.0 in the BNI group and 1.5 from 5.4 in the DI group. For each outcome the time effect was significant and the treatment effect was not.

Alcohol use was assessed in the context of the NIAAA guidelines concerning alcohol consumption and health. As expected, at baseline the proportion of subjects who met criteria for hazardous drinking was 99.2% in the BNI group and 98.0% in the DI group. The few patients who did not meet the criteria for hazardous drinking were enrolled due to their presenting complaint of an injury associated with concurrent alcohol use (harmful drinking). The percent who continued to meet criteria for hazardous drinking decreased during treatment in both groups (to 62.0% and 65.4% respectively), demonstrating improvement over time within groups ($p<0.001$). However there was no difference detected between the two treatment groups ($p=0.6$).

Exploratory regression analyses for all patients revealed that none of the investigated variables were associated with decreases in drinking over NIAAA limits. However, consuming more drinks per week, younger age and being married were associated with significant reductions in drinking from baseline in both treatment groups (Table 3 *web-based*).

Secondary Outcomes—All variables were tested using count, nonparametric data at baseline and at 12 months.

Negative consequences: Six potential drinking-related negative consequences were measured (Table 4). Of the three consequences related to alcohol use and driving (driving after drinking, arrest for driving while under the influence, and being involved in a car crash while intoxicated) only one, driving after drinking, demonstrated a decrease over time. There was no change between treatment groups for these three measures.

Similarly, there was a decrease in occurrence of injuries while drinking over time from baseline to 12-months. There were no differences related to injury occurrence, days of missed work, and legal problems between the groups.

Health Services Utilization: A review of treatment services utilization was performed for both inpatient and outpatient health services (Table 5). Rates of all inpatient service (e.g., hospitalization) utilization for study subjects were low overall and did not differ significantly between the groups. We did note a small increase in substance abuse and mental health service use in both groups.

There was a 10% increase in overall outpatient services utilization in both groups. Of note, all patients received a referral for follow-up care at the time of discharge. Overall greater than 68% of individuals had at least one outpatient visit in the twelve months following ED enrollment visit. However, the rate of utilization of these outpatient treatment services did not differ by treatment group. Patients in both treatment arms had very few emergency department or substance abuse and mental health outpatient visits in the following 12-

months and there was no significant difference between the groups in the utilization of these services.

Readiness to Change: Readiness to change was assessed at baseline, 6 months and 12 months for both groups. Overall the readiness score did increase over time for both treatment groups, but there was no treatment effect.

LIMITATIONS

There are a number of limitations to our study. First we relied on self-report of alcohol consumption as the primary outcome measure. In an effort to decrease potential bias, researchers instructed patients to answer accurately, that there were no right or wrong answers and that all information was confidential. In addition, questions regarding alcohol were embedded within other health screening questions at intake and telephone follow up assessments. Self-report by telephone using time-line follow-back methods after an initial face-to-face interview has been demonstrated in the literature to be reliable.^{25, 26,27}

There are many methodological challenges in performing ED based interventions that may have contributed to the lack of impact of brief intervention on reduction in alcohol consumption in these studies.²⁸ First, all studies had lengthy assessments that in one form or another contained some elements of the intervention and so called “assessment reactivity” may have acted as a de facto intervention. Daeppen¹⁵ attempted to control for this by including a non assessment group, but also reported no differences between the control and intervention group. In the current study the DI group also received very brief advice, (less than 1 minute), which may be more than is generally provided in usual care. Therefore, it is conceivable that either assessment reactivity or very brief advice may have served as a form of attenuated treatment and decreased our ability to detect a difference between the two treatments.

Another example of how research context may have weakened or obscured intervention effect is highlighted in a recent article published by Saitz, et al.²⁹ This study randomized in-patient medical patients with the entire spectrum of unhealthy drinking behaviors to a 30-minute brief intervention or a control (usual care) group. Brief intervention had no effect on daily drinking consumption or any other secondary outcomes; however both groups decreased their alcohol consumption.

In addition, because we excluded patients with a high likelihood of alcohol dependence, we enrolled many patients with relatively low levels of alcohol consumption. In fact 62% and 66% respectively of the DI and BNI groups had AUDIT scores below the usual cut-off of eight. Consequently with lower levels at baseline, it was more difficult to demonstrate a significant level of improvement. This fact may have attributed to the negative findings in Daeppen's study, as the mean number of drinks and AUDIT scores were low. One of the major strengths of the study, the high retention rate of 92% at 12-months, may also have introduced negative effects relating to social desirability bias. It is possible that patients came to identify with the program and reported behaviors that they thought would please the interviewer. To minimize this possibility, however, the researchers performing follow-up assessments were blinded to patient study arm assignment and were not the same who initially enrolled the patient.

DISCUSSION

Emergency practitioners performed a brief intervention for hazardous and harmful drinkers during the constraints of an ED visit. This study is unique in that it reports the feasibility of using existing clinical staff as opposed to research or ancillary counseling staff to perform

an alcohol intervention; and to include all eligible patients regardless of presenting complaint of injury or illness. However, the significant decrease in alcohol consumption at 6-month that persisted at the 12-month follow up was almost identical for both the control and the intervention groups. No difference between groups was found when controlling for severity of drinking, presence of injury, level of motivation, age or sex. The observed effects translate into an average decrease of alcohol consumption per week of 3.8 drinks or 28% from baseline to 12 months in the BNI group, and of 2.6 drinks or 21% for the DI group over the same time period. Additionally there was a decrease of 2.0 or 33% binge episodes in the BNI group from baseline to 12-months and a 1.5 or 28% decrease in the DI group. While no statistical difference between the groups was found, these reductions in number of drinks per week and number of binge episodes in the past month are clinically relevant. Whether this is the result of a regression to the mean phenomenon or some other factor that we can not identify at this time is unknown.

Although there is evidence that brief intervention is effective in other settings such as primary care and in-patient trauma centers, the current study's negative findings for the primary outcome of alcohol consumption is similar to other ED studies previously published.^{12,13,15} Longabaugh¹³ studied injured adults treated and released in the ED who met inclusion criteria for hazardous or harmful drinking by scoring > 8 on the AUDIT or having a positive alcohol level at the time of the injury. At 1-year patients assigned to standard care, brief intervention alone, or brief intervention with a booster all reduced their drinking. However, patients who received the brief intervention with booster reduced their alcohol-related negative consequences and presence of alcohol-related injuries. Monti and colleagues¹² studied a brief motivational interview in 18–19 year olds treated in an ED following an alcohol-related event. At 6-months both motivational interview and control groups decreased their alcohol consumption, but the motivational interview group had a significantly lower incidence of drinking and driving, traffic violations, alcohol-related injuries and alcohol-related problems. In a separate study, Fleming reported a significantly greater reduction in drinking in the intervention group compared to controls in a primary care setting, but also noted a 20% reduction in alcohol use in the control groups.⁷

Monti and Longabaugh^{12, 13} both reported a decrease in negative consequences. In this study we found a similar decrease in alcohol related injuries in both groups. However, in all studies the actual numbers of negative consequences at baseline and follow-up are low making interpretation difficult. Larger numbers would necessitate multi-centered trials.

Two recently published trials studying the efficacy of interventions among injured, at-risk drinkers in the ED^{30,14} provide additional support for the efficacy of brief intervention in the ED. Blow and colleagues³⁰ studied 4 interventions with and without tailored messages and advice for reducing alcohol consumption and consequences in 575 injured patients. Each groups significantly decreased alcohol consumption from baseline to 12-month follow-up with those in the first group significantly decreasing their weekly alcohol consumption by 48.5% ($p<.0001$). In this study there was no control group for comparison.

Neumann¹⁴ used a computer-generated brief intervention for at-risk drinkers who presented with minor injury to a German ED. The intervention group had a significant decrease in alcohol intake at 6-months compared with a control group (35.7% decrease compared with 20.5% decrease in controls) ($p=0.006$). This significant decrease persisted at 12-months.

In the current study, participants had a relatively high rate of utilization of health care services. In the 6-months following the ED intake visit, participants had an average of 3 primary care visits. We found that 84 percent of participants had at least one outpatient visit, and 56 percent had at least one primary care visit in the 6-months following their ED intake

visit, suggesting an opportunity for primary care follow-up. Perhaps a booster at the time of a primary care visit may have enhanced a reduction in drinking and similar to Longabaugh¹³ substantially decreased negative consequences.

Finally, we were not able to detect a difference in drinking outcomes between the brief intervention and discharge instruction groups. While brief intervention may be a promising approach towards intervening with unhealthy drinkers in the ED, the evidence is mixed, and there are many more questions that need to be addressed. What is the minimal “dose” of the intervention that may be successful in changing alcohol consumption? For which patients might such an intervention be beneficial? For example, must there be a clear connection with one's drinking and the ED visit for change to occur. In Gentilello's study¹¹ which revealed a positive result, an injury severe enough to necessitate an admission may have served as a motivator itself. Studies with positive findings tended to enroll patients with higher drinking amounts at baseline.^{11,14} The use of the NIAAA guidelines as the enrollment criteria may represent too low of a drinking level to permit a detection of change. Perhaps interventions targeted for specific age groups and conditions may be more successful. How, by whom or by what methods i.e., face-to-face, telephone, computer-assisted or via website, should these interventions be delivered? In addition, how should assessments be obtained, by person-to-person telephone conversations or more sophisticated methods such as interactive voice response³¹ or web-based entry? Finally, screening and brief intervention for alcohol problems is being widely adapted in clinical practice in emergency departments. While we applaud these efforts, and support the need for interventions for alcohol problems, we recommend that the components of the interventions that lead to success be identified in order to allow for adoption of evidence-based practices and policies.

Acknowledgments

Funding Support: National Institute on Alcohol Abuse and Alcoholism grant R01 AA12417-01A1 (GD), National Institute on Drug Abuse grant K23 DA15144 (MVP), and Robert Wood Johnson Generalist Physician Faculty Scholar Award (DAF)

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FIGURE 1.
Flow Diagram

TABLE 1

Characteristics of Subject Population

	Treatment (BNI) (n= 247) # (%)	Control (DI) (n=247) # (%)
Gender		
Male	167 (68%)	169 (68%)
Female	80 (32%)	78 (32%)
Age mean (SD)		
Male	33.8 (15.2)	36.0 (15.6)
Female	34.5 (16.4)	35.1 (17.4)
Marital Status		
Single	172 (70%)	153 (62%)
Widowed, divorced, separated	19 (8%)	27 (11%)
Married or living as married	56 (22%)	67 (27%)
Education		
High school or less	106 (43%)	128 (52%)
Some college	98 (40%)	80 (32%)
College degree or more	43 (17%)	39 (16%)
Race/ethnicity		
White	168 (68%)	162 (66%)
Black	51 (21%)	50 (20%)
Hispanic	23 (9%)	30 (12%)
Other	5 (2%)	5 (2%)
Insurance Coverage [total]	[201] (81%)	[190] (77%)
Private (HMO/Private)	157 (78%)	139 (73%)
Medicare/Medicaid	28 (14%)	29 (15%)
Other	16 (8%)	22 (12%)
Primary Physician	155 (63%)	148 (60%)
Usual Source of Care		
Clinic	69 (28%)	70 (28%)
Emergency Dept or No Place	64 (26%)	73 (30%)
Private doctor	114 (46%)	104 (42%)
General Health Status		
Excellent-Good	220 (89%)	216 (87%)
Injured at ED presentation	113 (46%)	108 (44%)
AUDIT < 8	154 (62%)	163 (66%)
Smoking status		

	Treatment (BNI) (n= 247) # (%)	Control (DI) (n=247) # (%)
Smokes >10 cigarettes per day	85 (34%)	95 (38%)
Smokes <10 cigarettes per day	40 (16%)	40 (16%)
Motivational Level mean (SD)	3.1 (3.3)	3.5 (3.3)

TABLE 2

Outcomes: Alcohol Consumption

	BASELINE Mean (SD) 95% CI	6 MONTH* Mean (SD) 95% CI	12 MONTH** Mean (SD) 95% CI	Time Effect	Treatment Effect
Average # Drinks Per Week					
Treatment (BNI)	13.6 (11.6) 12.1–15.0	9.4 (14.9) 7.5–11.4	9.8 (14.3) 8.0–11.7	p<0.001	p=0.4
Control (DI)	12.4 (8.7) 11.4–13.5	9.1 (11.8) 7.6–10.6	9.8 (10.9) 8.4–11.2		
# Binge Episodes In Past Month					
Treatment (BNI)	6.0 (6.8) 5.1–6.9	3.4 (6.0) 2.7–4.2	4.0 (6.7) 3.1–4.9	p<0.001	p=0.7
Control (DI)	5.4 (5.4) 4.7–6.1	3.6 (6.2) 2.8–4.4	3.9 (6.2) 3.1–4.7		
Proportion Over NIAAA Guidelines (Weekly And Binge Combined)					
Treatment (BNI)	245/247 (99.2%)	151/233 (64.8%)	142/229 (62.0%)	p<0.001	p=0.6
Control (DI)	242/247 (98.0%)	154/236 (65.3%)	149/228 (65.4%)		

Statistical test used for table was Mixed Model Procedure

* 95% Follow-up rate;

** 92% follow-up rate

TABLE 3

Predictors of outcome at 12 months using linear regression model with reduction in drinking from baseline (the difference between the number of drinks at baseline and at 12 months) as the dependent variable:

	Regression Coefficient	95% CI
Average # of Drinks	0.693	0.513 – 0.874
Age	–0.211	–0.351 – –0.071
Marital Status	–1.506	–2.584 – –0.427
Audit Score	–0.335	–0.873 – 0.204
Smoker	–2.055	–5.658 – 1.547
Ethnicity	2.482	–2.108 – 7.072
Race	1.024	–0.983 – 3.030
Motivation to Change	0.266	–0.264 – 0.797
Insured	–1.325	–5.162 – 2.512
Injury Visit	–1.029	–4.531 – 2.472
Education	0.508	–2.025 – 3.041
Sex	0.396	–3.331 – 4.122

TABLE 4

Negative Consequences

	BASELINE n (%)	12 MONTH n (%)	Time Effect	Treatment Effect
Driven After Drinking $\geq$ 1 Time				
Treatment (BNI)	84/247 (34.0%)	47/229 (21.0%)	0.001	0.9
Control (DI)	84/247 (34.0%)	46/227 (20.3%)		
Arrested Or Pulled Over For Driving Under the Influence				
Treatment (BNI)	2/247 (0.8%)	3/229 (1.3%)	0.7	1.0
Control (DI)	1/247 (0.4%)	2/227 (0.9%)		
Car Crash While Intoxicated				
Treatment (BNI)	2/247 (0.8%)	0/229 (0 %)	1.0	0.5
Control (DI)	1/247 (0.4%)	1/227 (0.4%)		
Injured While Drinking $\geq$ 1 Time				
Treatment (BNI)	18/247 (7.3%)	7/229 (3.1%)	0.037	0.4
Control (DI)	12/247 (4.9%)	9/227 (4.0%)		
Contact With Legal System				
Treatment (BNI)	20/247 (8.1%)	35/229 (15.4%)	0.1	0.5
Control (DI)	32/247 (13.0%)	30/227 (13.2%)		
Missed 1 Work Day (Past 30 Days)*				
* n = # pts reporting employment				
Treatment (BNI)	103/208 (49.5%)	81/184 (44.0%)	0.5	0.9
Control (DI)	88/201 (43.8%)	79/179 (44.1%)		

All variables were tested using count, nonparametric data at baseline and at 12 months.

TABLE 5

Treatment Services Review and Readiness to Change

TREATMENT SERVICES REVIEW*				
	BASELINE n (%)	12 MONTH n (%)	Time Effect	Treatment Effect
INPATIENT (ALL)				
Treatment (BNI)	19/247 (7.7%)	13/229 (5.7%)	0.6	0.7
Control (DI)	19/247(7.7%)	15/227 (6.6%)		
Inpatient Substance Abuse and Mental Health				
Treatment (BNI)	0/247 (0%)	2/229 (0.9%)	0.046 (increase)	1.0
Control (DI)	0/247 (0%)	2/227 (0.9%)		
OUTPATIENT (ALL)				
Treatment (BNI)	146/247 (59.1%)	158/229(69.6%)	0.001 (increase)	0.7
Control (DI)	143/247 (57.9%)	154/227(67.8%)		
Primary Care Provider Visit				
Treatment (BNI)	119/247 (48.2%)	137/229(60.4%)	0.013 (increase)	0.5
Control (DI)	127/247(51.4%)	144/227(63.4%)		
Emergency Department Visit				
Treatment (BNI)	39/247 (15.8%)	26/229 (11.5%)	0.07	0.3
Control (DI)	24/247 (9.7%)	19/227 (8.4%)		
Substance Abuse and Mental Health Visit				
Treatment (BNI)	0/247 (0%)	2/229 (0.9%)	0.3	0.6
Control (DI)	2/247 (0.8 %)	3/227 (1.3%)		

READINESS TO CHANGE (based on Contemplation Ladder)					
	BASELINE Mean (SD)	6 MONTH Mean (SD)	12 MONTH Mean (SD)	Time Effect	Treatment Effect
Treatment (BNI)	3.11 (3.26)	5.19 (3.86)	4.83 (3.78)	0.01	0.6
Control (DI)	3.53 (3.29)	4.42 (3.76)	4.88 (3.77)		

* All variables were tested using count, nonparametric data at baseline and at 12 months.