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ORIGINAL RESEARCH

Geriatrics

Use of a Brief Negotiation Interview in the emergency department to reduce high-risk alcohol use among older adults: A randomized trial

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1. J. Griffeth, Y. Fatade, T. Platts-Mills, M. Weaver, K. Biese, G. D'Onofrio, J. Busby-Whitehead, C. Shenvi, "Comparing High-Risk and Low-Risk Drinking in Older Adults" presented by J. Griffeth at the American Geriatrics Society annual Meeting, May 2017, San Antonio, TX, USA.
2. C.L. Shenvi, T. Platts-Mills, Y. Fatade, M. Weaver, K. Biese, J. Busby-Whitehead, G. D'Onofrio, "A Comparison of Older Adults With Low-Risk and High-Risk Alcohol Use in the Emergency Department," Grants for Early Medical/Surgical Specialists (GEMSSTAR) U13 Conference, September 2016, Washington, DC, USA.
3. C.L. Shenvi, T. Platts-Mills, Y. Fatade, M. Weaver, K. Biese, J. Busby-Whitehead, G.

Abstract

Objective: To determine whether a Brief Negotiation Interview (BNI) performed in the emergency department (ED) can reduce future rates of alcohol use among older adults who are high-risk drinkers.

Methods: Adults aged 65 years and older in a single academic ED were screened for high-risk alcohol use based on the National Institute for Alcohol Abuse and Alcoholism definition of >7 drinks per week or >3 drinks per occasion. Eligible individuals who were high-risk drinkers who passed a cognitive impairment screener and who consented to enrollment were randomly assigned to receive the BNI versus usual care. Outcomes were assessed at 3, 6, and 12 months. The primary outcome was the rate of high-risk alcohol use at 6 months.

Results: Of 2250 ED patients who were screened, 183 (8%) met the criteria for high-risk alcohol use. Of those, 98 (53%) patients met full criteria and consented to participation. Of the participants, 67% were men and 83% were non-Hispanic White. There was no significant difference in the primary outcome of high-risk alcohol use at 6 months between the BNI at 59.1% (95% confidence interval [CI], 45.5%–76.8%) and the control at 49.1% (95% CI, 36.9%–65.2%). However, there was a significant time-effect reduction in alcohol consumption and rates of high-risk alcohol use for both groups.

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4. Y. Fatade, T. Platts-Mills, M. Weaver, K. Biese, J. Busby-Whitehead, G. D'Onofrio, C.L. Shenvi, "A Comparison of Older Adults With Low-Risk and High-Risk Alcohol Use in the Emergency Department," presented by Y. Fatade, American Geriatrics Society Annual Meeting, May 2016, Long Beach, CA, USA.

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Conclusion: Among older adults who met the criteria for high-risk alcohol use, the BNI in the ED did not result in a reduction in high-risk alcohol use at 6 months, although both groups showed significant reductions after their ED visit. Further work is needed to determine the optimal setting and time to use the BNI to impact high-risk alcohol use in this population.

KEYWORDS
alcohol abuse, Brief Negotiation Interview, geriatric emergency medicine, substance use

1 | INTRODUCTION

1.1 | Background

Alcohol abuse and misuse are important, preventable causes of morbidity and mortality. The best ways to intervene and reduce high-risk alcohol use in older adults (aged ≥65 years) have not yet been established. Prior studies of a Brief Negotiation Interview (BNI) performed with high-risk alcohol users in the emergency department (ED) have had mixed results, although some have successfully shown reductions in future alcohol consumption and improved health outcomes.[1–4] However, no prior work has focused specifically on the older adult population, and results from the general adult population may not be generalizable to older patients.

ED visits represent an opportunity to identify and intervene in potentially harmful alcohol use, especially for older adults. The ED is an important site of care for older adults, who make upwards of 23 million visits annually.[5,6] EDs are an important point of healthcare contact, particularly for individuals with limited access to primary healthcare, low socioeconomic status, or limited means of transportation who may not have regular primary care visits where their alcohol use could be identified.[7,8] Older adults will make up a growing percentage of ED patients in the coming decades. They are often systematically excluded or underrepresented in clinical trials[9] because of their greater medical and pharmacological complexity as well as the added need of screening for the cognitive capability to allow consent and enrollment. It is important to understand how interventions function in this population.

1.2 | Importance

Alcohol is the fourth leading cause of preventable death in the United States.[1] Excess alcohol use also contributes to liver disease, cancer, and ischemic heart disease as well as accidental injury and death, accounting for 31% of motor vehicle collision (MVC) fatalities.[1,10]

Alcohol use poses a significant risk to older adults. Lower blood volume leads to higher alcohol concentration per given intake, putting older drinkers at high risk for additional impairment and injury.[11,12] Older adults tend to have more chronic conditions and are at higher risk for falls, both of which are exacerbated by alcohol use. An additional risk comes from combining alcohol with medications, and 90% of older adults take at least 1 prescription medication, many of which interact negatively with alcohol.[13] For all these reasons, identifying and preventing high-risk alcohol use is an important healthcare initiative in this population.

Receiving a BNI in the ED can potentially improve future outcomes. Results have been mixed, but a 2017 systematic review found moderate evidence for a small reduction in alcohol use, a decrease in negative consequences (eg, injury), and a lower number of future ED visits among children and adults reporting excessive alcohol use who received a BNI in the ED.[1–4] Results may not be generalizable to the older adult population, however, because the definitions for high-risk use and the appropriate cutoffs for positive alcohol screening tools are different for older adults.[14,15] In addition, the consequences and physiologic risks of alcohol use are different in this population, making the Cut Down, Annoyed, Guilty, Eye-Opener (CAGE) assessment and

Alcohol Use Disorders Identification Test (AUDIT) potentially less reliable. Furthermore, older patients may respond differently to the process of the BNI in the ED, so we cannot generalize to this population from the adolescent and younger adult studies.

1.3 | Goals of this investigation

The National Institute for Alcohol Abuse and Alcoholism (NIAAA) guidelines define high-risk alcohol use as >7 drinks per week or 3 drinks per occasion for both men and women aged ≥65 years.[15]

We conducted a randomized trial to determine the efficacy of a 1-time, ED-based BNI on rates of high-risk alcohol use, quantity of alcohol consumed, and on health outcomes at 6 and 12 months among high-risk drinkers aged ≥65 years.

The goal of this investigation was to assess the effectiveness of a BNI to reduce future rates of high-risk alcohol use. If effective, the BNI could provide a relatively cheap, easily implementable method to reduce the negative health consequences of high-risk alcohol use and could be used in many EDs.

The Bottom Line

When used in the emergency department (ED), the Brief Negotiation Interview (BNI) may help to reduce future alcohol use. Given their chronic medical conditions and risk of falls, measures to reduce alcohol use in older persons are particularly important. In this randomized trial of 98 older ED patients, BNI did not impact 6-month high-risk alcohol use compared with standard care (59% vs 49%; $P = 0.35$). Additional study is needed to identify effective alcohol use reduction strategies for older adults.

2 | METHODS

2.1 | Study design and setting

This was a randomized, controlled trial comparing the effectiveness of a BNI versus usual care on rates of high-risk alcohol use. The study was approved by the institutional review board of the University of North Carolina at Chapel Hill and was registered with ClinicalTrials.gov (NCT02236494). Additional low-risk drinkers were enrolled, as reported on the registration, in a parallel study to compare the characteristics of high-risk and low-risk drinkers.[16]

The study was conducted at a single, academic, level 1 trauma center in the southeast United States that serves a socioeconomically diverse population with 70,000 visits annually, of which 16% are patients aged >64 years.

2.2 | Selection of participants

Patients were eligible if they were aged >64 years and English speaking. They were excluded if they were under a psychiatric hold, would be receiving end-of-life care, resided in a skilled nursing facility, were cognitively impaired or a prisoner, or were currently in treatment for a substance use disorder, which would confound the assessment. Patients were excluded if they were too ill to participate, such as if they were intubated or unable to easily answer questions for other medical reasons as deemed by their emergency physician. All eligible patients had to pass 6-item cognitive screener with a score of >3 to demonstrate capacity to consent and continue in the enrollment.[17] Research assistants (RAs) monitored the ED census for eligible patients from 7 AM to 10 PM on weekdays. Enrollment occurred between October 2013 and June 2015, and follow-up phone calls occurred through June 2016.

Eligible patients were screened for high-risk alcohol consumption using a 2-question screening tool described previously[16] based on the NIAAA guidelines for high-risk alcohol use. The 2 questions used to assess high-risk drinking were the following: (1) During the last 3 months, on average, how many drinks containing alcohol have you had per week? (2) During the last 3 months, have you ever had 4 or more drinks on 1 occasion (during the course of ≤4 hours)? High-risk drinking is defined as ≥1 binge-drinking episodes in the past 3 months or an average of ≥8 drinks per week. These 2 screening questions can rapidly and accurately identify high-risk alcohol use in the ED.[16] Patients were randomized in a 1:1 allocation using randomly permuted blocks with randomly selected block sizes of 8 or 12. Sequential group assignment papers were placed in sealed, numbered envelopes. Envelopes were opened, and participants were assigned to either the BNI or usual care at the time of enrollment. The treating physicians were blinded to the randomization arm.

After consent was obtained, a trained RA conducted a structured interview using the timeline follow-back (TLFB) method to characterize drinking in the past 7 days and binge episodes in the past 28 days.[18] The TLFB is a commonly used method to assess alcohol consumption. Beginning with the previous day, the patient works backward and reports their alcohol consumption each day for the prior week. Then, using a calendar as a reference to remind the patient of special occasions, such as holidays or social events, the patient reviews and reports any dates with binge drinking episodes of >3 drinks per occasion.[19] The following 2 commonly used alcohol screening tools were also administered: the AUDIT[20] and CAGE[21] assessment. In addition to standard sociodemographic characteristics, we also assessed the number of falls, MVCs, episodes of driving after drinking, and the number of outpatient, ED, and inpatient healthcare encounters in the 6 months before the interview. Patients' ability to perform activities of daily living (ADLs) was assessed using the Katz Index of Independence in ADLs,[22] and depression was assessed using the Patient Health Questionnaire-2 (PHQ-2).[23] The initial interview also asked about patients' social support, past or current alcohol rehabilitation treatment, drug and substance use, mobility, and chronic pain.

2.3 | Interventions

Patients in the intervention arm received the BNI. The BNI is a well-described 3-step, structured interview that (1) asks the patient to explore the connection between alcohol use and their ED visit, (2) reviews the patient's current alcohol use compared with NIAAA guidelines, (3) gauges readiness for change by identifying motivations for cutting back, and (4) asks the patient to develop and agree on a goal related to drinking.[24] The patient identifies his or her readiness to change on a scale of 1–10, and the individual performing the BNI asks the patient to identify why their readiness is not a lower number than they indicated to help the patient identify his or her motivations for cutting back. The BNI was performed by trained RAs, which is standard research practice in the field.

Patients randomly assigned to the control arm received the usual care, which generally consisted of education and discharge instructions from their treating physician related to their chief complaint or diagnosis, but no specific alcohol interventions. If patients expressed a desire to cut down on drinking or had a history of complicated withdrawal, the ED physician was notified and provided the appropriate care as needed.

RAs were trained in recruitment, enrollment, consent, cognitive screening of older adults, and performance of the BNI. Training in the BNI included training modules, videos, role-play exercises, and completion of 2 90-minute live practice sessions in which the RAs practiced the BNI to ensure mastery of the interview and BNI process.

2.4 | Measurements

Alcohol consumption was assessed at enrollment and at 3, 6, and 12 months after enrollment. Follow-up interviews after the initial enrollment were conducted over the telephone by trained RAs. The rates of high-risk alcohol use based on NIAAA guidelines were determined at each time point. At the 6-month and 12-month interviews, assessments were repeated, including measures of (1) general physical and mental health; (2) self-reported healthcare use, including hospitalizations, primary care, and specialist visits; (3) negative consequences related to alcohol, including falls and MVC; and (4) drinking behavior and readiness to change drinking behavior.

2.5 | Outcomes

The primary outcome was the rate of high-risk alcohol use at 6 months, as the primary goal was the reduction of rates of high-risk alcohol use and to compare values to prior ED-based studies.[4] Secondary outcomes included changes in weekly alcohol consumption, number of monthly binge episodes, AUDIT and CAGE scores, risk-taking behavior (driving after drinking), alcohol-related injury or trauma, healthcare use and encounters, and measures of general health including mobility, depression, and chronic pain. This study was powered at the 0.8 level with an α of 0.05 to detect an absolute difference in the proportion of patients meeting criteria for high-risk alcohol use of 20% between the 2 groups with enrollment of 98 participants. We estimated that there would be a reduction in the rates of high-risk alcohol use of 5% in the control group and 25% in the intervention group.

2.6 | Analysis

Descriptive statistics were used to summarize the characteristics of the BNI and control populations. Standardized differences were computed to identify an imbalance (>0.10) in the baseline characteristics between the BNI and control groups.[25,26] For the primary outcome at 6 months, the average drinks in the last week from the screening questionnaire and 7-day TLFB method were summarized by treatment group. In addition, the difference in the number of drinks and a *t* test assuming unequal variances in each group were computed to investigate if there was statistical difference in alcohol consumption between groups. The proportion of high-risk drinkers and difference in proportions were also summarized at 6 months as well as a χ^2 test to test for a difference between treatment groups.

Repeated-measures analysis of covariance modeling treatment, time, and their interaction to compute point estimates for continuous secondary outcomes. The mean (95% confidence interval [CI]), *P* value for the treatment effect, and *P* value for the time effect are reported for each outcome measure. The first step in the repeated-measures analysis was to determine the type of covariance structure of the repeated measurements. We computed fit statistics for models with several covariance structures (ie, compound symmetric, autoregressive [1], unstructured) and selected the model with the smallest Akaike information criteria (AIC) value for the final analysis. The KENWARDROGER option was used to compute the model denominator degrees of freedom. The unstructured model had the lowest AIC of the tested models for alcohol consumption and AUDIT score. Different covariance models were used for the remaining secondary outcomes: CAGE (heterogeneous compound symmetric), PHQ-2 (heterogeneous autoregressive), pain score (compound symmetric), and Katz score (TOEPH).

For the secondary outcomes with categorical measurements, alcohol consumption (proportion of high-risk drinkers) and healthcare measures (proportion with healthcare encounter, reporting a fall, etc), generalized estimating equations modeling treatment, time, and their interaction were used to compute estimates of the proportion of patients at each time point by treatment groups. The proportion (95% CI), *P* value for the treatment effect, and *P* value for the time effect are reported for each secondary measure. If no patients had a positive response at any time point for either treatment group, only the raw proportion of positive responses is reported. Covariance structure was determined similarly to the previous method using the Quasi information criteria (QIC) value to determine the structure for the final analysis. The unstructured model had the lowest QIC of the tested models for healthcare visits to the ED, urgent care, and specialty clinic as well as episodes of driving after drinking. The compound symmetric covariance model was used for proportion of high-risk drinkers, primary care physician (PCP) visits, and withdrawal symptom outcomes, and the autoregressive model was used for hospitalization and falls outcomes. All analyses were completed using SAS 9.4 (SAS Institute).

TABLE 1 Characteristics of control and BNI groups

Characteristics	Control, n = 52; n (%)	BNI, n = 46; n (%)	Standardized difference
Sex			
Male	34 (65.4)	32 (69.6)	0.09
Female	18 (34.6)	14 (30.4)	0.09
Marital status			
Single, never married	<5	<5	0.14
Married or living with partner	31 (59.6)	27 (58.7)	0.02
Divorced or separated	9 (17.3)	10 (21.7)	0.11
Widow/widower or partner died	8 (15.4)	6 (13.0)	0.07
Other	<5	<5	
Education			
Grades 8–11	5 (9.6)	<5	0.03
Completed high school	<5	6 (13.0)	0.18
Vocational, technical, or business school	<5	<5	0.14
Some college or junior college	11 (21.2)	8 (17.4)	0.10
Graduated from college (bachelor's degree)	15 (28.8)	14 (30.4)	0.03
Completed graduate school (master's degree)	8 (15.4)	5 (10.9)	0.13
Completed doctoral or professional school	5 (9.6)	7 (15.2)	0.17
Race			
White, non-Hispanic	43 (82.7)	38 (82.6)	0.00
Black or African American	9 (17.3)	8 (17.4)	0.00
Insurance coverage			
Private	32 (61.5)	28 (60.9)	0.01
Medicare	50 (96.2)	45 (97.8)	0.10
Medicaid	7 (13.5)	5 (10.9)	0.08
Other	6 (11.5)	6 (13.0)	0.05
Smoking status in last 6 months			
Never	38 (73.1)	36 (78.3)	0.12
Weekly or less than weekly	5 (9.6)	2 (4.3)	0.18
Daily or almost daily	9 (17.3)	8 (17.4)	0.00
Experienced minor withdrawal symptoms in the past	8 (15.4)	5 (10.9)	0.134
Experienced major withdrawal symptoms in the past	4 (7.7)	1 (2.2)	0.257

Note: Standardized difference is shown. A difference of plus or minus 0.1 is considered significant.[25,26]
Abbreviation: BNI, Brief Negotiation Interview.

3 | RESULTS

3.1 | Characteristics of study participants

During the enrollment period, 2250 ED patients aged ≥65 years were screened for high-risk alcohol use based on NIAAA guidelines.[16] A total of 183 (8%) met the criteria for high-risk alcohol use. All high-risk patients were screened using the further eligibility criteria, and 98 (53%) were enrolled. Of those who did not enroll, 13 failed the 6-item screener for cognitive impairment. The remainder declined to participate in the study for various reasons, including feeling too sick (17), concern it would take too much time (13), disinclination to take part in a study about alcohol (7), feeling too anxious (6), or other reasons (29).

The enrolled sample was 67% men and 83% non-Hispanic White with a mean age of 73 years (age range, 65–94 years). The intervention and control arms did not vary greatly in demographics or in baseline characteristics (Table 1). The control group reported consuming a higher number of drinks in the prior week using the TLFB method (19.9 vs 14.6) and more withdrawal symptoms than did the BNI group. Both groups had comparable AUDIT, CAGE, PHQ-2, and Katz ADL scores (Table 1).

TABLE 2 Alcohol consumption and rates of high-risk alcohol use at baseline and 3, 6, and 12 months among the control and intervention groups

Measure	Baseline, n = 98; mean (95% CI)		3 months, n = 90; mean (95% CI)		6 months, n = 88; mean (95% CI)		12 months, n = 84; mean (95% CI)		BNI effect	Time effect
	Control	BNI	Control	BNI	Control	BNI	Control	BNI		
Patient estimate using 2-question screener										
Mean drinks per week	20.5 (14.7–26.2)	17.4 (11.3–23.5)	7.2 (4.7–9.7)	9.7 (7.0–12.4)	8.4 (5.6–11.2)	12.4 (9.3–15.5)	7.4 (5.2–9.7)	9.0 (6.4–11.6)	0.49	<0.01
Mean binge episodes/mo			0.6 (−0.9 to 2.0)	2.1 (0.6–3.7)	0.6 (−1.1 to 2.3)	3.3 (1.4–5.3)	0.7 (−0.8 to 2.2)	2.0 (0.3–3.7)	0.06	0.33
High-risk drinkers, %	100	100	45.1 (33.1–61.3)	56.1 (42.8–73.5)	54.1 (41.9–69.9)	57.3 (43.8–74.9)	36.0 (24.8–52.4)	51.5 (38.0–70.0)	0.25	0.04
TLFB method										
Drinks in the past 7 days	19.9 (14.1–25.8)	14.6 (8.4–20.8)	7.0 (4.4–9.5)	9.5 (6.7–12.4)	8.4 (5.0–11.8)	12.2 (8.4–15.9)	7.6 (4.8–10.4)	10.7 (7.5–13.8)	0.59	<0.01
Days of binge episodes in past 28 days	5.8 (3.1–8.6)	6.0 (3.1–8.8)	0.7 (−0.4 to 1.8)	1.1 (−0.1 to 2.4)	0.6 (−0.7 to 1.9)	2.5 (1.0–3.9)	0.7 (−0.6 to 2.0)	1.8 (0.3–3.2)	0.33	<0.01
High-risk drinkers, %	80.8	87.0 (77.7–97.3)	39.1 (27.6–55.3)	59.0 (45.7–76.3)	49.1 (36.9–65.2)	59.1 (45.5–76.8)	39.1 (27.5–55.5)	53.4 (39.4–72.3)	0.06	<0.01

Note: Ranges represent 95% CIs for the least squares mean at each time point. The *P* values for the treatment and time effects are shown. The *P* values for difference by TLFB in drinks in the past week at 6 months was 0.181, and the *P* values for difference in percentage who were high-risk drinkers (the primary outcome) was 0.35.

Abbreviations: BNI, Brief Negotiation Interview; CI, confidence interval; TLFB, timeline follow-back.

3.2 | Primary outcome: high-risk alcohol use at 6 months

The primary outcome was the rate of high-risk alcohol use at 6 months. Using either the TLFB method or the patient's estimate of weekly consumption, there was no statistically significant difference in rates of high-risk alcohol use between the treatment and control groups (Table 2) at 3, 6, or 12 months after enrollment. Rates of high-risk alcohol use had declined at 6 months to 57.3% in the intervention group and to 54.1% in the control group ($p = 0.579$) as measured using the 2-question screener, and to 59.1% and 49.1% respectively measured using the TLFB method ($p = 0.350$). There was a statistically significant time effect in the reduction in alcohol use in both groups (Figure 1).

3.3 | Secondary outcomes

General measures of health, including mobility, depression, and pain, healthcare use, and negative consequences, were similar at baseline for the treatment and control groups, and there was no significant difference between the intervention and control groups at 6 months.

Mobility and pain scores changed minimally in both groups, whereas PHQ-2 scores decreased in both groups at 6 months. The percentage of patients who had been hospitalized increased at 6 months for both groups before decreasing at 12 months, although there were wide confidence intervals in both groups (BNI: 39.1 [95% CI, 27.3–56.1]; control: 44.2 [95% CI, 32.6–60.0]). Use of other healthcare services including ED, urgent care, primary care, and specialist visits decreased across both groups at 6 months (Table 3).

3.4 | Time effects

There was a statistically significant time effect seen in both groups. The average drinks per week and the rate of high-risk alcohol use decreased in both the intervention and control groups from the initial enrollment to 6 months (Figure 1). In the BNI group, the average number of drinks per week decreased from 17.4 to 12.4 at 6 months. For the control group, the mean number of drinks per week decreased more, from 20.4 to 8.4 drinks. Alcohol misuse, as measured by AUDIT and CAGE scores, decreased for both groups at 6 months (Figure 2). Rates of driving after having ≥2 drinks fell from 27% to 6.3% at 12 months in the intervention group and 25% to 13.5% in the control group (Table 3).

4 | LIMITATIONS

This study was conducted at a single academic ED in the southeast United States. Cultural and regional factors as well as access to community resources (eg, Alcoholics Anonymous meetings) may influence the impact of the BNI. The number of individuals enrolled also limits its power to detect smaller effects of the intervention on alcohol use

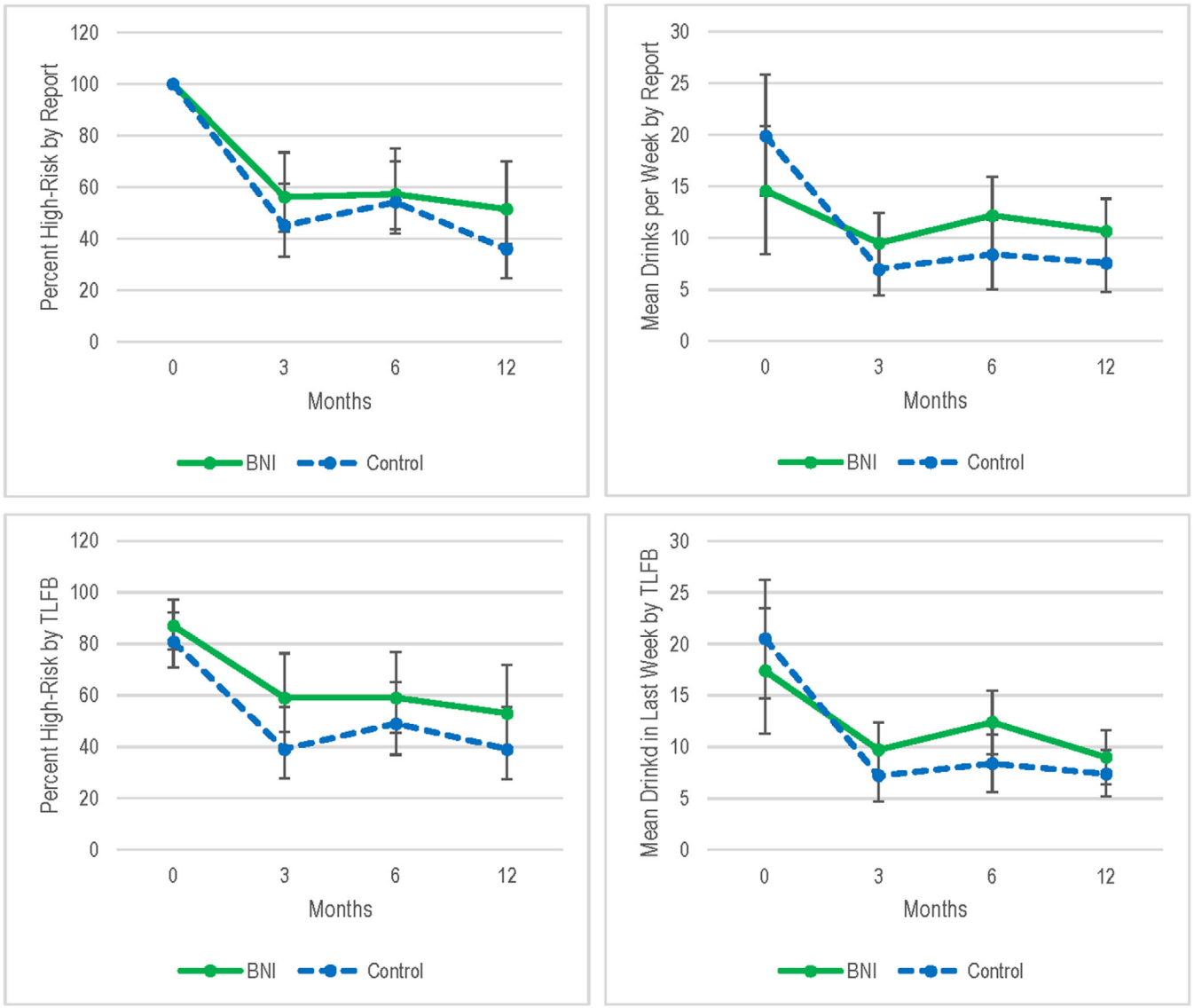

FIGURE 1 Rates of high-risk alcohol use at 0, 3, 6, and 12 months by self-estimate (2-question screener) and TLFB method to estimate alcohol consumption. Mean drinks per week by self-estimate and last 7-day consumption by TLFB method. BNI, Brief Negotiation Interview; TLFB, timeline follow-back

patterns. In addition, because this study required disclosure of alcohol use, patients who opted to participate may have been more motivated to change drinking behavior than other older adults engaging in hazardous drinking. Higher baseline motivation to change in both groups could mean that these patients were likely to decrease drinking behavior regardless of the intervention or follow-up.

The observed time effect in this study may reflect regression to the mean or an effect of the enrollment and interview process itself, as the effect of enrollment and discussion of alcohol use itself may have motivated the control group to reduce their consumption.

In this study, RAs administered the BNI, which is common practice. However, administration by a physician or nurse may have a stronger effect on patient behavior. It is also possible that the BNI may have a greater effect if used when a patient is in the ED for an alcohol-related illness or injury. Although we did assess whether the ED visit was directly or indirectly alcohol related, the number of enrollees was not large enough to gather statistically significant data related to this variable.

5 | DISCUSSION

This study found that the BNI performed in the ED among patients aged ≥65 years who were high-risk alcohol users did not lead to lower rates of high-risk alcohol use at 6 months. Both the intervention and control groups reported >25% lower weekly alcohol consumption and had lower rates of high-risk use. However, it was the time effect, not the treatment effect, that was significant. These results were not expected, as our methods were very similar to prior studies that did show a greater reduction in alcohol use with the BNI compared with in the

TABLE 3 Secondary outcomes measured among the treatment (BNI) and control groups at baseline and 6 and 12 months

Measure	Baseline, n = 98; mean (95% CI)		6 months, n = 88; mean (95% CI)		12 months, n = 84; mean (95% CI)		BNI effect	Time effect
	Control	BNI	Control	BNI	Control	BNI		
AUDIT score	8.9 (6.9–11.0)	9.2 (7.1–11.4)	4.8 (3.2–6.3)	6.9 (5.2–8.7)	4.3 (3.1–5.5)	6.5 (5.1–7.8)	0.13	<0.01
CAGE score	1.1 (0.8–1.4)	1.3 (0.9–1.6)	0.5 (0.2–0.8)	0.6 (0.3–0.9)	0.5 (0.3–0.8)	0.6 (0.4–0.9)	0.36	<0.01
PHQ-2 score	1.1 (0.6–1.7)	1.6 (1.0–2.2)	0.6 (0.2–1.0)	0.9 (0.5–1.4)	0.7 (0.3–1.1)	0.7 (0.2–1.2)	0.35	<0.01
Pain score	4.7 (3.6–5.8)	5.3 (4.4–6.3)	4.7 (3.5–5.8)	4.7 (3.7–5.8)	4.7 (3.6–5.7)	4.8 (3.7–5.8)	0.61	0.74
Katz score	0.1 (0.0–0.2)	0.1 (0.0–0.3)	0.1 (−0.1 to 0.2)	0.2 (−0.0 to 0.3)	0.3 (0.1–0.5)	0.2 (−0.1 to 0.4)	0.92	0.21
Hospitalized in prior 6 months, %	23.1 (14.0–37.9)	19.6 (10.9–35.2)	44.2 (32.6–60.0)	39.1 (27.3–56.1)	13.5 (6.8–26.8)	21.7 (12.6–37.6)	0.8	<0.01
ED visit in prior 6 months, %	All by default	All by default	21.2 (12.5–35.8)	23.9 (14.3–40.0)	11.5 (5.4–24.5)	21.7 (12.6–37.6)	0.26	0.2
UC visit in prior 6 months, %	17.3 (9.6–31.4)	23.9 (14.3–40.0)	11.5 (5.4–24.5)	10.9 (4.8–24.9)	7.7 (3.0–19.7)	8.7 (3.4–22.2)	0.75	<0.01
PCP visit in prior 6 months, %	76.9 (66.3–89.3)	76.1 (64.7–89.5)	67.3 (55.7–81.3)	76.1 (64.7–89.5)	67.3 (55.7–81.3)	60.9 (48.3–76.7)	0.97	0.14
Specialist visit in prior 6 months, %	69.2 (57.8–83.0)	63.0 (50.5–78.7)	51.9 (40.0–67.4)	60.9 (48.3–76.7)	59.6 (47.7–74.6)	56.5 (43.9–72.8)	0.97	0.23
Falls in prior 6 months, %	46.2 (34.4–61.9)	47.8 (35.4–64.7)	28.8 (18.8–44.2)	28.3 (17.8–44.8)	17.3 (9.6–31.4)	19.6 (10.9–35.2)	0.85	<0.01
Reporting driving after ≥2 drinks in prior 6 months, %	25.0 (15.6–40.0)	23.9 (14.3–40.0)	15.4 (8.1–29.1)	15.2 (7.7–30.1)	13.5 (6.8–26.8)	6.5 (2.2–19.5)	0.5	<0.01
MVCs in prior 6 months, %	3.8	0	3.8	2.2	5.8	0		

Note: Ranges represent 95% CIs for the least squares mean at each time point. The *P* values for the treatment and time effects are shown.
Abbreviations: AUDIT, Alcohol Use Disorders Identification Test; BNI, Brief Negotiation Interview; CAGE, Cut Down, Annoyed, Guilty, Eye-Opener; CI, confidence interval; ED, emergency medicine; MVC, motor vehicle collision; PCP, primary care physician; PHQ-2, Patient Health Questionnaire-2; UC, urgent care.

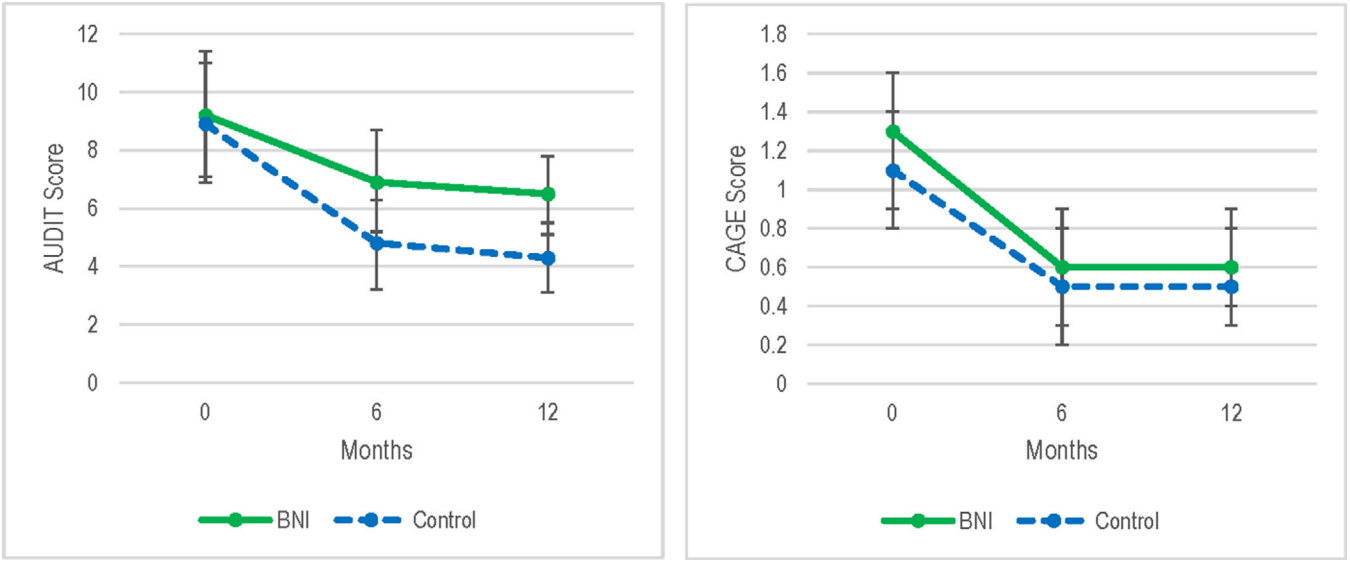

FIGURE 2 AUDIT and CAGE scores at 0, 6, and 12 months in the BNI and control groups. AUDIT, Alcohol Use Disorders Identification Test; BNI, Brief Negotiation Interview; CAGE, Cut Down, Annoyed, Guilty, Eye-Opener

general population.[4] Prior work that formed the basis for this study found a reduction in quantity of drinks per week in control and intervention groups (from 19.8 to 12.7 with the BNI compared with 20.9 to 14.2 for the control at 6 months). Although both groups had reduced their alcohol consumption, there was a statistically significant difference between the groups ($P = 0.045$ for the treatment effect and $P < 0.001$ for the time effect).

There are several possible reasons why this study did not demonstrate an effect of the BNI compared with the control. One explanation is that older adults may not respond as robustly to the BNI as younger

individuals. It is possible that other interventions would be more effective in this age group, such as discussions with a physician, longitudinal therapy, or medications. In addition, this study was powered to find an absolute difference of 20% in the rate of high-risk drinking, so would be underpowered to find a smaller effect.

There are also number of challenges inherent in the research of alcohol and substance use disorders that could confound results and that could be more pronounced in the older adult population, including stigma, avoidance bias, recall bias, and social acceptability bias.[27]

It is also possible that the interview and enrollment itself served as a more significant inducement to reduce consumption in this age group. The questioning about alcohol use itself may lead to reductions in consumption that overshadow the effect of the BNI.[1] Other studies have found no contribution of the assessment effect in an ED-based study of injured patients undergoing a 10–15 minute alcohol assessment.[28] However, the control group assessment in this study was of a different population and lasted 30–40 minutes. Other prior studies have also shown a reduction in alcohol consumption after an ED visit not attributable to any targeted ED-based intervention.[3,28,29]

In this study, the follow-up interviews also included assessments of drinking behavior, legal side effects, and readiness to change. These interviews in and of themselves may have motivated participants in both groups to renew their efforts to cut back. Future work could further assess the role that questioning about alcohol in a control group can affect the drinking habits of older adult patients. Intervention studies may be clearer if the control group receives fewer questions related to alcohol. Finally, studies that include collaboration with a patient's PCP or referral to a substance use program could prove more effective in this population.

The reduction in alcohol use over time seen here could also represent a reversion to the mean. Prior studies have found that, particularly when the threshold for entry into a study increases, that regression to the mean can account for some of the time-related decrease in future consumption.[30] In this study, the threshold for enrollment was low, but the average number of drinks consumed was high and comparable with levels for younger adults enrolled in other similar ED-based studies.[4]

In summary, among older ED patients who are high-risk alcohol users, a single BNI during an ED visit did not produce a statistically significant treatment effect, but both groups reduced their consumption up to a year after their index visit. Of note, this study preceded the COVID-19 pandemic, and alcohol consumption has escalated significantly since the pandemic onset.[31] Future work should study other interventions that may be more effective in serving this patient population, enroll a larger sample size, or reduce the assessment effect by minimizing the control group's alcohol-related questioning.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Christina L. Shenvi, Timothy F. Platts-Mills, Kevin J. Biese, and Gail D'Onofrio conceived of the study, designed the trial, and obtained funding. Montika Bush performed statistical analyses. Yushan Wang, Rishab Revankar, and Jacline Phillips performed data collection. Aileen Aylward assisted with data analysis and manuscript preparation. Christina L. Shenvi led the study, supervised data acquisition and analysis, and led manuscript development. All authors contributed to manuscript preparation. Christina L. Shenvi takes responsibility for the article as a whole.

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