Gender, violence and brief interventions for alcohol in the emergency department

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Abstract

Background—The impact of gender and violence on brief interventions (BIs) for alcohol use in the emergency department (ED) has not been studied. Our objective was to examine the effectiveness of alcohol BIs in an ED population stratified by gender and violence.

Methods—This was a secondary analysis of datasets pooled from three ED-based randomized controlled studies of alcohol BIs. AUDIT-C was the primary outcome measure; secondary outcomes were binge drinking and achievement of NIAAA safe drinking levels. We conducted univariate comparisons and developed generalized linear models (GLM) for the primary outcome and generalized estimating equation (GEE) models for secondary outcomes to examine the intervention effect on the whole study group, gender-stratified subgroups, and gender- and violence-stratified subgroups.

Results—Of 1219 participants enrolled, 30% were female; 31% of women and 42% of men reported violence involvement at baseline. In univariate analysis, no differences in outcomes were found between intervention and control groups for any subgroup. However, in multivariable models, men demonstrated an intervention effect for likelihood of safe drinking limits. Stratifying further by violence, only men *without* violence involvement demonstrated a positive intervention effect for safe drinking limits. There was no evidence of an intervention effect on women.

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Conclusions—Analyzing the overall effect of ED-based BI may mask its ability to improve alcohol-related outcomes in a subset of the population. Alternatively, interventions may need to be significantly improved in subsets of the ED population, e.g., in women and in men with involvement in violence.

Keywords

Alcohol-related disorders; Gender; Violence; Emergency medicine

1. Introduction

Alcohol misuse is exceedingly common in the emergency department (ED) population (Cherpitel, 1999). However, it is rare for patients to receive appropriate substance abuse treatments (Gerstein et al., 1994; Rockett et al., 2005) or primary care follow-up after being seen in the ED (Magnusson et al., 1993), making the visit itself an advantageous moment to implement interventions to reduce drinking (Green et al., 1993). Emergency medicine clinicians and researchers have long recognized the potential of performing opportunistic interventions for reducing alcohol use on injured patients during their ED visit, when the negative consequences of alcohol are often apparent and create a potential "teachable moment" that may result in behavior change (Madden and Cole, 1995; Longabaugh et al., 2001; Vaca and Winn, 2007; Cunningham et al., 2009a). The modest effects of brief interventions on alcohol use to date, however, have stimulated discussion about unmeasured or unaddressed factors that might be influencing the impact of such interventions (Bernstein and Bernstein, 2008; Havard et al., 2008; Nilsen et al., 2008; Field et al., 2010).

Gender may play a role in variable responsiveness to alcohol interventions. Substantial literature supports a broad range of differences in alcohol use between men and women (Brady and Randall, 1999; Nolen-Hoeksema, 2004). Gender-specific patterns have been observed for initiation of alcohol use (Chermack et al., 2000), amount and frequency of daily and weekly drinking, perceptions of acceptable drinking (DeVisser and McDonnell, 2012), consequences of drinking (Labrie et al., 2011; Nolen-Hoeksema, 2004), motivations to modulate or stop drinking (Carey and DeMartini, 2010), and response to treatments (Chang, 2002; Reinhardt et al., 2008; Sanchez-Craig et al., 1989).

Further, there are significant gender differences in the relationship between alcohol misuse and other high-risk behaviors; a good example of this is involvement in violence, whether as aggressor, victim, or both. Among men, alcohol use has been primarily examined for its association with *perpetration* of several typologies of violence, including violence in pursuit of profit-based goals, violence in pursuit of social dominance goals, and violence as a response to perceived threat (McMurran et al., 2010). Males have demonstrated an association between alcohol use and subsequent, temporally related injury from fights or assault (Borges et al., 1998), suggesting that alcohol use may be a disinhibiting factor for the occurrence of violence in men.

Among women, however, alcohol misuse has predominantly demonstrated a close relationship with the experience of partner violence (Miller et al., 2000; Stuart et al., 2004; Peters et al., 2012). Female patients with alcohol misuse report higher odds of violent

victimization (Chavira et al., 2011). Female trauma patients with alcohol misuse report a much higher prevalence of severe partner violence than non-drinking trauma patients (60% vs. 13%) (Weinsheimer et al., 2005). In alcohol treatment services for women, histories of prior partner violence are so common (ranging from 42% to 90%; Chermack et al., 2009; Najavits et al., 2004; Schneider et al., 2009) that the Substance Abuse and Mental Health Services Administration (SAMHSA) has recommended integrated intervention approaches that address violence and alcohol use together (Markoff et al., 2005). In women, it is likely that this relationship is bidirectional, with violence leading to increased alcohol use, and alcohol use a predisposing factor for the occurrence of violence. There is little in the literature focused on non-partner violence among women, although it is important to note that in ED populations, women, as well as men, report a high prevalence of involvement in non-partner violence (Cunningham et al., 2009b), that both men and women report victimization and perpetration (Houry et al., 2008; Walton et al., 2009; Lipsky and Caetano, 2011), and that substance abuse is associated with partner violence for both men and women (Walton et al., 2009).

To date, there has been no investigation into how gender and involvement in violence may impact the effectiveness of ED-based brief interventions (BI) that address alcohol and other substance use. The objective of this secondary analysis study, therefore, was to examine how gender and involvement in violence (defined as intentional injury, whether through partner or non-partner violence) impact the effect of BI, using data from three previous studies of high-risk alcohol users in the ED. Our hypothesis was that BI would have varying effectiveness among the four subpopulations of patients: men with and without involvement in violence and women with and without involvement of violence.

2. Methods

2.1. Study design and population

This was a secondary data analysis of pooled data from three randomized, controlled studies of alcohol brief interventions. The primary site for these studies was an urban, high-volume, academic ED in a Level I trauma center in a northeastern city. Two of the studies (DIAL and Reduce) additionally recruited a small proportion of patients from two affiliated suburban EDs.

2.2. Studies

The Rhode Island Early Intervention Study (REIS; Longabaugh et al., 2001), conducted from January 1996 to September 1998, recruited English- or Spanish-speaking, non-hospitalized injured hazardous or harmful adult drinkers. "Hazardous or harmful" drinking was defined as (1) blood alcohol concentration (BAC) positive in the ED; (2) reporting alcohol within 6 h prior to the injury precipitating the ED visit; or (3) a score of eight or greater on the Alcohol Use Disorders Identification Test (AUDIT). Patients randomized to the intervention arm received 1–2 in-person brief intervention sessions. REIS enrolled 539 patients. Follow-up assessments were performed primarily in-person, but when this could not be arranged, participants completed a telephone interview or written assessments mailed to their home address. Follow-up rate at 12 months was 83%.

The Decreasing Injuries from Alcohol (DIAL) study (Mello et al., 2008, 2012) was conducted from November 2003 to June 2006. English-speaking non-critically injured adult patients with risky alcohol use were randomized to control or treatment consisting of a brief intervention and second "booster" session two weeks later, both conducted by telephone after the initial ED visit. Risky alcohol use was defined by National Institute on Alcohol Abuse and Alcoholism (NIAAA) quantity/frequency guidelines: more than 14 drinks/week or 5 or more drinks/occasion, for men, and more than 7 drinks/week or 4 or more drinks/occasion for women. DIAL recruited patients not only from the main urban site (89%) but also a small proportion of patients (11%) from two smaller affiliated community hospitals. DIAL enrolled 279 participants. Follow-up assessments were performed by telephone with twelvemonth follow up rate of 89%.

Project Reduce (Woolard et al., 2009) was conducted from November 2003 through September 2006. Inclusion criteria were any alcohol use in the past month and any marijuana use in the past 12 months. English-speaking adult patients with conjoint alcohol and use were randomized to no intervention or two in-person brief intervention sessions, the first in the ED during the initial visit and a second "booster" session two weeks later. Project Reduce recruited 515 participants. As with REIS, follow-up assessments were performed primarily in-person, but when this could not be arranged, by telephone or writing. Follow up rate was 83% at 12 months.

To summarize, key differences between studies included: a ten-year span between the start of REIS and the conclusion of Project Reduce; slightly different inclusion and exclusion criteria for each study, study-to-study differences in timing, mode, and duration of intervention delivery, and differences in how follow-up assessments were obtained.

All three studies enrolled adult patients   18 years of age and recruited patients from a representative sample of day, evening, night and weekend hours. All delivered brief interventions that were based on the principles of motivational interviewing, which uses empathic, reflective, and respectful techniques, rather than confrontational approaches. The brief interventions emphasized patient autonomy, aiming to mobilize patients' own resources and motivations to lead to changes needed to reduce alcohol use and alcohol-related risky behaviors. The control condition in all studies consisted of the ED standard of care, meaning no routine screening or counseling was provided. In all three studies, all participants received the assigned condition. A licensed clinical psychologist with experience in BI monitored intervention fidelity through weekly supervision sessions with counselors delivering the intervention. The studies performed assessments at baseline, 3 and 12 months, and included past 3-month AUDIT or AUDIT-C as a measure of risky alcohol use. Research staff who performed follow up assessments were blinded to study assignment. None of the studies randomized the populations to treatment or control based on either gender or violence.

2.3. Measures

As the AUDIT-C measure was common to all three studies across all three time points, we used it as our primary outcome measure for this analysis. AUDIT-C is based on the full AUDIT, a 10-item self-report measure used to identify hazardous or harmful drinkers (Bohn

et al., 1995). The full AUDIT contains questions on the amount and frequency of drinking, alcohol dependence, and problems caused by alcohol. Questions are scored using a five-point Likert scale. The AUDIT has been shown to reliably distinguish participants with harmful or hazardous alcohol use from non-hazardous drinkers (Bush et al., 1998; Bradley et al., 2007). The AUDIT-C consists of the first three questions of the AUDIT, which ask about frequency of drinking, quantity consumed at a typical occasion, and frequency of heavy episodic drinking. The AUDIT-C is scored on a scale of 0–12. In men, a score of four or more is considered positive for hazardous drinking; in women, a score of three or more is positive. Generally, the higher the score, the more likely it is that the patient's drinking is affecting his/her health and safety. The AUDIT-C has performed favorably compared to the full AUDIT in screening for risky drinking (Bush et al., 1998) and is considered useful to determine eligibility for brief interventions. To provide uniformity to the combined study populations, we included only patients who met criteria for risky alcohol use based on AUDIT-C (3 for women or 4 for men).

As secondary analyses, we also examined the outcome of binge drinking, defined as any positive answer to the third AUDIT-C question, "How often do you have six or more drinks on one occasion?" and, to ensure clinical relevance of any detected reductions in alcohol use, created a dichotomous variable representing a reduction to NIAAA "safe" drinking levels (based on AUDIT-C scores; a score of <4 for males and <3 for females) at 12-month follow up.

Violence involvement in this study was defined using a combined variable that consisted of external causes of injury codes (e-codes) consistent with assault (E960-E969, "Homicide and injury purposely inflicted by other persons") or selected items on the Injury Behavior Checklist (IBC; Starfield, 1991) that correspond to interpersonal violence. The IBC, which was also common to all three studies, has questions on 17 categories of injuries occurring in the 12 months preceding but not including the ED visit that resulted in study recruitment. The three items corresponding to interpersonal violence ask if the participant was injured in the past 12 months in any of the following ways: "Injured by being in a physical fight with someone?", "Injured by being sexually assaulted?" and "Injured by being physically attacked?". Of note, the IBC does not specify the relationship (partner or non-partner) between individuals involved in these violent events; nor does it clarify if the subject was the aggressor or the victim. To be considered positive for violence, study participants needed to have either an e-code documenting the occurrence of assault or a positive answer to any of the three violence-related IBC questions.

2.4. Data analysis

We calculated descriptive statistics (means, proportions) and made univariate comparisons (chi-square, *t*-tests) of men and women in control and BI groups in the study dataset. We then developed generalized linear models (GLM) for the primary outcome, which was a continuous variable, and generalized estimating equation models (GEE) for the binary secondary outcomes, to examine: (1) the overall intervention effect (time × group assignment interaction) on the whole study population; (2) the intervention effect in a gender-stratified population and (3) the intervention effect in gender- and violence-stratified

populations. All models adjusted for study assignment to account for the variability in patient sampling and interventions. Analyses used an intention-to-treat approach and included those lost to follow up. Analyses were performed using Stata 9.0 (StataCorp LP, College Station, TX).

3. Results

There were a total of 1385 participants enrolled across the three studies; 30% were female. Thirty-one percent of women and 42% of men reported involvement in violence at baseline. For all three studies, participants who completed the 12-month follow-up survey did not significantly differ on baseline AUDIT-C scores or measures of involvement in violence compared to those lost to follow up. Characteristics of the study population, by gender and group assignment, are shown in Table 1. Among men, the intervention group had greater involvement in violence ($p = 0.002$). In the overall study sample, there were no main effects of the intervention on alcohol consumption by any measure (AUDIT-C, binge drinking, or safe alcohol levels). When stratifying the population by gender alone, again, no main effects were noted in any of the drinking measures between groups. When stratifying further by gender and violence (Table 2a), there were no main effects between women with and without violence in drinking levels or change in drinking from baseline to 12 months, and the proportion of participants reaching safe drinking levels was not significantly different among gender- and violence-stratified groups. A greater proportion of men in the intervention group compared to controls (27.0% vs. 19.9%) reported safe drinking levels at 12 months (Table 2a), compared to controls; further, among men without involvement violence, a greater proportion of men in the intervention group (29.2% vs.20.2%) reported safe drinking levels at 12 months compared to controls (Tables 2b and 2c). While these differences were not statistically significant in univariate analysis, they were in the GLM and GEE models (Table 3): there was a positive intervention effect for safe drinking among men in the gender-stratified analysis and among men without involvement in violence in the gender-and violence-stratified analysis. Women, regardless of involvement in violence, did not demonstrate an intervention effect for any measure of alcohol consumption. Of note, smaller sample sizes within the female subgroups resulted in wide confidence intervals for these analyses.

4. Discussion

The vast number of ED visits each year (Pitts et al., 2008) and the high prevalence of hazardous alcohol use in the ED population (Cherpitel, 1999) offers the opportunity to access and intervene in a large number of individuals who may misuse alcohol. Those with involvement in violence are more likely to present to the ED with a positive blood alcohol level, to report drinking prior to the event, to report heavy drinking more often, and to report more alcohol-related problems than patients with injuries not related to alcohol (Cherpitel, 1994). Further, involvement in violence and patterns of drinking in relation to violence appear to differ between genders (Kellermann and Mercy, 1992; Walton et al., 2007; Wells et al., 2007). Thus, a better understanding of how gender and violence impact ED-based alcohol treatments would be relevant to the optimal care of these patients. However, to our

knowledge, the presence or absence of violence in the lives of patients has not been studied for its influence on the effect of a BI on gender-specific patient outcomes.

In this secondary analysis, we did not find main effects of BI on alcohol consumption measures for the overall population. Stratifying the study population by gender alone, we found a positive BI effect in one outcome measure (achieving safe drinking levels) in men only; there was no observed intervention benefit for women. Earlier studies examining gender differences in the efficacy of brief interventions have supported a difference between genders, but the results are conflicting, with some supporting benefit for men and not women (Kaner et al., 2007) and others demonstrating greater benefit for women compared to men (Reinhardt et al., 2008; Sanchez-Craig et al., 1989). Some studies have suggested that women are more responsive to assessment-only, or control conditions (WHO Brief Intervention Study Group, 1996; Aalto et al., 2000); this gender difference in assessment reactivity could similarly be blunting the effects of BIs on women in our study, or, other, unexamined variables may play a role in the lack of intervention effect observed.

Further stratifying the population by violence, we found that a positive intervention effect occurred for safe drinking levels in one subgroup: men without involvement in violence. The potential impact is not negligible; among men without involvement in violence, 9.2% more reached safe drinking levels after an intervention compared to controls, an effect that was not found in men with involvement in violence, or in women. This could correspond to a significant missed opportunity in the other subgroups of ED patients in which the BI did not achieve the same results, considering estimates that place risky alcohol use as high as 40% of adult males and 28% of adult females in the ED (Nordqvist et al., 2004).

Could violence be a determining factor in the differential success previously noted in various populations of men and women? In theory, violence may hamper the success of BI through different mechanisms depending on gender. For example, for some men, involvement in violence following alcohol use may not necessarily be a strong motivator of change; in fact, alcohol use may be viewed positively among those with underlying dispositional aggression or aggression-related alcohol expectancies (Chermack and Taylor, 1995; Giancola et al., 2005; Zhang et al., 2002). In contrast, women who are victims of partner abuse who misuse alcohol may have poor self-efficacy, be socially isolated, and may drink in response to negative (and unaddressed) psychological sequelae of violence (Peters et al., 2012; Sullivan et al., 2012), all factors that hypothetically could blunt the response to brief interventions. These explanations, derived from existing literature investigating the relationships between gender, violence and substance use, are biased by an assumption that men are the aggressors and women the victims and that women are only involved in partner violence; assumptions that contrast with epidemiologic evidence demonstrating that both genders are involved in, and experience negative consequences of, various types of violence (Houry et al., 2008; Cunningham et al., 2009b). There is some evidence that non-partner violence is more likely to be associated with binge drinking and alcohol consequences in men, and partner violence is more likely to be associated with binge drinking and alcohol consequences in women (Walton et al., 2007); there is also evidence that an aggressor role in non-partner violence, or in both non-partner and partner violence, is associated with more severe substance use problems (Chermack et al., 2009). However, additional studies on BIs

for alcohol use are needed to investigate the complex interplay between gender, type of violence involvement, alcohol use, and response to treatments. Our study findings do suggest that violence alone will not explain modest or absent effects of BI among women.

We note that no effect was found on other measures of alcohol consumption (binge drinking or AUDIT-C scores) for men uninvolved in violence. Of the three studies included in this analysis, Project Reduce found a reduction in 12-month binge drinking days and days of conjoint alcohol and marijuana use in the BI group (Woolard et al.). However, other measures of alcohol use in Project Reduce were not different between BI and control groups, and prior published findings from the other studies included in this analysis failed to find a reduction in alcohol measures (Longabaugh et al., 2001; Woolard et al., 2009; Mello et al., 2012). Earlier studies have also demonstrated lack of main effects of BI but improvements in related outcomes such as drinking and driving or alcohol-related consequences (Havard et al., 2008). It may be that interventions currently under study in the emergency department provide messages for specific types of drinking behaviors that are more effective in subsets of the population. For example, it may be that men in general are resistant to treatments addressing binge drinking, a strongly socially reinforced behavior (DeVisser and McDonnell, 2012), but men not influenced by the violence-related expectancies are more receptive to limits for weekly or daily alcohol use. Metrics of drinking behavior would allow this inconsistency: for example, a man may reduce his overall drinking to less than 14 standard units of alcohol a week, meeting NIAAA safe drinking limits by the total AUDIT-C score, but may still binge once a week, which would only influence the last component of the AUDIT-C.

This study has a number of limitations. The study dataset consists of a pooled population from three separate studies, each of which had slightly different inclusion/exclusion criteria. Contributing to the heterogeneity of the population is the recruitment over time, with a ten-year span between the start of REIS and the conclusion of Project Reduce. While all provided brief interventions, these too had some study-to-study differences in timing, mode, and duration of intervention delivery. The studies did, however, have uniformity in the investigator team and the key aspects of the study protocols, including the training of research staff involved in delivering the BIs and in monitoring the clinical fidelity of the BIs.

None of the studies randomized based on gender or violence. In addition, our violence measures did not allow us to discriminate between victims and aggressors (or those who are both) or to know the relationship between the parties involved in violence (i.e., we did not know whether violence was from an intimate partner or a non-partner). Combining these heterogenous groups may have diminished the magnitude of our found effect of violence on alcohol outcome or have prevented the true effect from being detected. Our violence measures also did not specifically screen for partner violence; future studies should include validated screening for partner violence among its assessments to better evaluate the impact of this type of violence on men or women's ability to successfully engage in a BI. Finally, small sample sizes, particularly for groups stratified by both gender and violence, may have prevented us from detecting differences between subgroups that do exist. The wide confidence intervals in the female subgroup, and especially the women subdivided further

by violence, reflect this limitation. Prospective data that are adequately powered for questions around gender and violence are needed to confirm the results of this study.

Our study suggests that the effects of brief interventions for alcohol use among patients in the ED may vary based on gender and violence, with benefit shown only for non-violent males. These findings suggest that analyzing the intervention effect in the group as a whole may mask its ability to improve outcomes in a subset of the population. Alternatively, it may be that BIs currently under study are inadequate to meet the needs of subsets of our ED population, such as women and men involved in violence. Prospective studies randomized by gender and violence are required to further investigate this hypothesis, and to examine the effectiveness of BIs that incorporate consideration of these factors on alcohol outcomes.

Acknowledgments

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Table 1

Characteristics of study population.

	Female (n = 354)				Male (n = 865)			
	Control (n = 161)	Intervention (n = 193)	Test statistic, p value		Control (n = 387)	Intervention (n = 478)	Test statistic, p value
Age (mean years (SD))	29.2 (10.03)	27.8 (9.83)	$t = 1.09, 0.28$		29.3 (9.54)	28.2 (8.96)	$t = 1.32, 0.19$
Race (n (%))			$\chi^2 = 2.01, 0.37$				$\chi^2 = 3.99, 0.14$
Black	31 (20.5)	32 (17.6)			64 (17.3)	60 (13.0)	
White	113 (74.8)	135 (74.2)			270 (73.2)	346 (74.9)	
Other	7 (4.6)	15 (8.2)			35 (9.5)	56 (12.1)	
Ethnicity (n (%)) Hispanic	22 (14.3)	25 (13.3)	$\chi^2 = 0.07, 0.79$		59 (16.2)	57 (12.4)	$\chi^2 = 2.40, 0.12$
Education (n (%)) completed high school	126 (78.3)	160 (82.9)	$\chi^2 = 1.22, 0.27$		295 (76.2)	332 (69.5)	$\chi^2 = 4.92, 0.03$
Baseline involvement in violence (n (%))	43 (26.7)	68 (35.2)	$\chi^2 = 2.96, 0.09$		145 (37.5)	220 (46.0)	$\chi^2 = 6.42, 0.01$
Baseline AUDIT-C (mean score (SD))	5.93 (2.36)	5.70 (2.29)	$t = 0.89, 0.37$		7.42 (2.24)	7.55 (2.33)	$t = -0.85, 0.40$

Table 2a

Change in alcohol consumption for: (A) whole study sample and (B) gender-stratified sample.

(A)	Whole sample (*n* = 1219)	
	Control (*n* = 548)	Intervention (*n* = 671)
AUDIT-C from baseline (mean, 95% CI)	−1.60 (−1.88, −1.32)	−1.89 (−2.14, −1.62)
Percentage binge drinking, baseline (%, 95% CI)	91.6 (89.3, 93.9)	89.9 (87.6, 92.2)
Percentage binge drinking, 12-month (%, 95% CI)	82.5 (76.6, 85.3)	79.5 (76.3, 82.7)
Percentage reaching safe drinking levels (%, 95%CI)	21.5 (18.1, 25.0)	25.9 (22.5, 29.3)

(B)	Female (*n* = 354)		Male (*n* = 865)	
	Control (*n* = 161)	Intervention (*n* = 193)	Control (*n* = 387)	Intervention (*n* = 478)
AUDIT-C from baseline (mean, 95% CI)	−1.57 (−2.04, −1.10)	−1.20 (−1.57, −0.83)	−1.61 (−1.96, −1.27)	−2.15 (−2.49, −1.82)
Percentage binge drinking, baseline (%, 95% CI)	81.4 (75.3, 87.4)	75.1 (69.0, 81.3)	95.9 (93.9, 97.9)	95.8 (94.0, 97.6)
Percentage binge drinking, 12-month (%, 95% CI)	68.0 (60.3, 75.7)	66.1 (52.9, 71.0)	88.6 (85.2, 91.9)	84.8 (81.5, 88.2)
Percentage reaching safe drinking levels (%, 95%CI)	25.5 (18.7, 32.3)	23.3 (17.3, 29.3)	19.9 (15.9, 23.9)	27.0 (23.0, 31.0)

Table 2b

Change in alcohol consumption for gender- and violence-stratified sample: females.

	Female (*n* = 354)			
	Violence− (*n* = 243)		Violence+ (*n* = 111)	
	Control (*n* = 118)	Intervention (*n* = 125)	Control (*n* = 43)	Intervention (*n* = 68)
AUDIT-C from baseline (mean, 95% CI)	−1.33 (−1.86, −0.81)	−0.90 (−1.29, −0.52)	−2.23 (−3.27, −1.19)	−1.72 (−2.48, −0.96)
Percentage binge drinking, baseline (%, 95% CI)	80.5 (73.3, 87.8)	72.8 (64.9, 80.7)	83.7 (72.2, 95.2)	79.4 (69.6, 89.3)
Percentage binge drinking, 12-month (%, 95% CI)	64.4 (60.6, 78.3)	61.9 (52.9, 71.0)	64.1 (48.3, 79.9)	73.4 (62.3, 84.6)
Percentage reaching safe drinking levels (%, 95%CI)	21.2 (13.7, 28.7)	26.5 (15.7, 37.2)	37.2 (22.2, 52.3)	26.5 (15.7, 37.2)

Table 2c

Change in alcohol consumption for gender- and violence-stratified sample: males.

| | Male (*n* = 865) | | | |
| | Violence− (*n* = 500) | | Violence+ (*n* = 365) | |
	Control (*n* = 242)	Intervention (*n* = 258)	Control (*n* = 145)	Intervention (*n* = 220)
AUDIT-C from baseline (mean, 95% CI)	−1.64 (−2.05, −1.24)	−2.27 (−2.72, −1.82)	−1.57 (−2.18, −0.95)	−2.01 (−2.52, −1.51)
Percentage binge drinking, baseline (%, 95% CI)	96.7 (94.4, 99.0)	94.6 (91.8, 97.4)	94.5 (90.7, 98.2)	97.3 (95.1, 99.4)
Percentage binge drinking, 12-month (%, 95% CI)	86.8 (82.2, 91.4)	80.0 (74.8, 85.2)	91.3 (86.5, 96.1)	90.3 (86.3, 94.4)
Percentage reaching safe drinking levels (%, 95%CI)	20.2 (15.1, 25.3)	29.4 (23.9, 35.1)	19.3 (12.8, 25.8)	24.9 (18.4, 29.8)

Table 3

GLM/GEE models for effect of brief intervention on: (A) whole study sample; (B) gender-stratified sample; and (C) gender- and violence-stratified sample.[a]

(A)	Whole sample (*n* = 1219) Standardized estimates (*β*) (*p* value)
AUDIT-C score	
Group	−0.03 (0.91)
Time	−0.81 (<0.001)
Group × time	−0.17 (0.24)
Binge drinking	
Group	−0.02 (0.50)
Time	−0.05 (<0.001)
Group × time	−0.005 (0.67)
Safe drinking limits @ 12 months	
Group	−0.02 (0.58)
Time	0.11 (<0.001)
Group × time	0.02 (0.09)

(B)	Female (*n* = 354)	Male (*n* = 865)
	Standardized estimates (*β*) (*p* value)	
AUDIT-C score		
Group	−0.51 (0.25)	0.18 (0.64)
Time	−0.81 (<0.001)	−0.80 (<0.001)
Group × time	0.20 (0.33)	−0.31 (0.08)
Binge drinking		
Group	−0.08 (0.25)	0.007 (0.83)
Time	−0.07 (0.01)	−0.04 (<0.001)
Group × time	0.20 (0.39)	−0.02 (0.19)
Safe drinking limits @ 12 months		
Group	0.04 (0.48)	−0.04 (0.28)
Time	0.13 (<0.001)	0.10 (<0.001)
Group × time	−0.01 (0.58)	**0.04 (0.02)**

(C)	Violence− (*n* = 243)	Violence+ (*n* = 111)	Violence− (*n* = 500)	Violence+ (*n* = 365)
	Standardized estimates (*β*) (*p* value)			
AUDIT-C score				
Group	−0.59 (0.23)	−0.60 (0.52)	0.32 (0.43)	−0.10 (0.89)
Time	−0.71 (<0.001)	−1.08 (0.001)	−0.80 (<0.001)	−0.81 (0.001)
Group × time	0.25 (0.30)	0.23 (0.60)	−0.35 (0.07)	−0.26 (0.43)
Binge drinking				
Group	−0.07 (0.40)	−0.10 (0.39)	−0.003 (0.93)	0.03 (0.45)
Time	−0.06 (0.012)	−0.10 (0.01)	−0.05 (<0.001)	−0.02 (0.29)
Group × time	0.002 (0.94)	0.07 (0.15)	−0.02 (0.27)	−0.02 (0.30)

(C)	Violence− ($n = 243$)	Violence+ ($n = 111$)	Violence− ($n = 500$)	Violence+ ($n = 365$)
	Standardized estimates (β) (p value)			
Safe drinking limits @ 12 months				
Group	0.01 (0.80)	0.10 (0.33)	−0.05 (0.25)	−0.02 (0.68)
Time	0.11 (<0.001)	0.19 (<0.001)	0.10 (<0.001)	0.10 (<0.001)
Group × time	0.002 (0.95)	−0.06 (0.18)	**0.05 (0.02)**	0.02 (0.29)

[a]Model adjusts for study assignment.