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The Healthy Moms Study: The efficacy of brief alcohol intervention in postpartum women

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Abstract

Background: The prevention and treatment of alcohol use disorders among women of reproductive age have been well described. However, there is limited information on women specifically during the postpartum period. This period in a woman's life is a time of transition and provides an ideal opportunity for primary care providers to intervene.

Purpose: The goal of this report is to present the results of a brief alcohol intervention conducted in 34 obstetrical practices in women seeking routine postpartum care.

Methods: A randomized clinical trial was conducted from 2002-2005 in a diverse sample of women located in 15 Wisconsin counties. This report presents 6 month follow-up data.

Results: 8,706 women were screened for high-risk alcohol use during routine postpartum care with 997 (12%) of these women testing positive for at-risk drinking. 235 women met inclusion criteria and were randomized to either "usual care" or "brief intervention". The four session intervention was delivered by outpatient obstetrical nurses and research staff. The mean age of the women in the sample was 28, 19.3% were from minority groups, 60.8% were married, 53.2% reported current tobacco use and 17.9% had used marijuana in the previous 30 days. At the 6 month follow-up appointment, there were significant reductions in mean number of total drinks in the previous 28 days ($p<.013$), number of drinking days ($p<.024$) and heavy drinking days ($p<.019$). In addition to a statistical difference between groups, there was a 19% difference in the mean number of drinks and number of drinking days, and a 36% difference in the number of heavy drinking days in favor of the intervention group.

Conclusion: The findings of the Healthy Moms Trial support the implementation of brief alcohol intervention during the postpartum period.

Keywords

alcohol brief intervention trials; post partum women; fetal alcohol spectrum disorder

Introduction

Alcohol consumption by women during the postpartum period is important. Frequent, heavy maternal drinking is associated with poorer family functioning, poorer intellectual stimulation and increased interpersonal violence (Fried et al., 1985; Walsh et al., 2003; Berger LM, 2005). Substance abuse by a parent is associated with double the risk of childhood physical and sexual abuse (Jester et al., 2000). This association was stronger in cases of exclusive maternal substance abuse compared to exclusive paternal substance abuse (Miller et al., 1992). There is also an increased likelihood of childhood behavior problems occurring among children whose mothers had co-occurring mental health, substance use, and domestic violence conditions (Whitaker et al., 2006). This association persisted even after controlling for prenatal exposure and paternal mental health and substance use. Furthermore, the likelihood of fetal alcohol syndrome increases with subsequent pregnancies (May et al., 2004), making the identification of mothers with risky drinking a critical step toward prevention of fetal alcohol spectrum disorders.

One method for the prevention of the negative health consequences of alcohol use in women of childbearing age is to identify the population at risk and provide a brief counseling intervention. Brief interventions (BI) are time limited, brief counseling sessions, focused on motivating high risk and problem drinkers to reduce their alcohol use to low-risk levels. Meta-analyses of brief alcohol intervention have found significant reductions in alcohol use, alcohol related harm and costs in women and men of all ages (Whitlock et al., 2004, Bertholet et al., 2005, Wilk et al., 1997). One of the trials focused on women of childbearing age (ages 18-40) and found persistent reductions in alcohol use and alcohol related harm over a 48 month period (Manwell et al., 2000). Two recent BI trials conducted in pregnant women reported significant reductions in alcohol use (Chang et al., 2005; O'Connor and Whaley, 2007). The study conducted by Whaley also demonstrated higher birth weights and lower fetal mortality rates in the BI group. Another BI trial "Project Choices" focused on the prevention of alcohol-exposed pregnancy and found a significant reduction in alcohol use in women prior to conception (Floyd et al., 2007). This latter trial is the largest BI trial to date (n= 830) focused on women of childbearing age.

This paper reports the results from the Healthy Moms Trial. This RCT was designed to test the efficacy of brief intervention among postpartum women. This is the first large alcohol trial focused on postpartum women in the offices of community-based obstetricians.

Methods

Physician/clinic site recruitment

Obstetricians were recruited in 2001 through local community hospitals, managed care organizations and personal contacts. Physicians who participated in the trial met the following criteria: 1) trained in obstetrics and gynecology; 2) practice medicine at least 50% time; 3) amenable to having a research team identify and work with their patients; and 4) willingness to have their office staff complete research protocols. The 34 obstetrical practice clinics who participated in the trial belonged to 18 different health care systems. The majority of subjects were recruited from clinics located in South Central and South Eastern Wisconsin. Other major areas included Stevens Point, Marshfield, Appleton and Oshkosh, as well as a number of small communities in the northern Wisconsin. The large number of practices was needed to obtain sufficient sample size and to increase the external validity of the findings.

Study Population

All postpartum patients 18 years or older were asked to complete a health screening survey (HSS) by reception personnel as they arrived for regularly scheduled appointments for postpartum care. The screening questionnaire was completed on postpartum day 45 (sd=14.1). The response rate varied by clinic and ranged from 85%-95%. All patients who screened positive for high-risk drinking were contacted by one of six researchers. Subjects were invited to participate in a face-to-face interview to determine their eligibility for the trial. High-risk drinking on the HSS was defined as: a) 3 or more drinking days/week or 5 or more drinks/day or 7 or more drinks per week prior to pregnancy; or b) alcohol use once the subject knew she was pregnant; or c) 7 or more drinks/week or 3 or more drinking days/week or 4 or more drinks on 2 or more days in the last 28 days; or d) 2 or more 'yes' responses on T-ACE questions during the postpartum period.

Inclusion/exclusion Criteria

The primary inclusion criteria for the trial were age 18 years or older, seeing their obstetrician or advanced practice nurse for a postpartum visit and 20 or more standard drinks in the previous 28 days or 4 or more drinks on 4 or more occasions in the last 28 days or 20 or more drinking days in the last 28 days. We set the inclusion criteria for our trial below the National Institute of Alcohol Abuse and Alcoholism recommended limit of 30 drinks per month for two reasons. First, postpartum drinking women may be more vulnerable to alcohol related harm such as depression, nutrition/breastfeeding issues, partner violence and co-morbid tobacco use than other women. Second, we wanted to see if brief intervention could reduce alcohol use in this population. Patients were paid a total of \$150 if they completed the required procedures. The research protocol was reviewed and approved by the University of Wisconsin Human Health Sciences Human Subjects Committee and 11 additional human subject committees specific to the different health care systems.

Intervention protocol

The intervention was based on protocols developed for Project TrEAT (Fleming et al., 1997). The TrEAT intervention workbook was modified for the Healthy Moms trial, after consultation with obstetricians, obstetrical nurses and experts in the field. Two 15-minute visits with a clinic nurse or obstetrician were scheduled one month apart for a brief intervention and a reinforcement session. Ninety percent of the interventions were conducted by clinic nurses. Each patient received a follow-up phone call from the interventionist two weeks after each face-to-face meeting. There were a total of 4 contacts to the participants spread over an 8 week period. The brief intervention protocol was contained in a workbook that included scripted messages with feedback regarding current health behaviors, a review of the prevalence of problem drinking, a list of the adverse effects of alcohol focused on women and pregnancy, a worksheet on drinking cues, a drinking agreement in the form of a prescription, and drinking diary cards. The workbook was based on the principals of motivational interviewing and cognitive behavioral therapy.

The interventionist went through the work book with each patient during the two face-to-face visits. The patient took the workbook home between visits and filled out a number of home work assignments focused on high-risk drinking situations and drinking cue's (i.e. things they liked and didn't like about drinking). The patient was also asked to fill out drinking diary cards between visits to more accurately assess their current drinking level. The follow-up phone calls reinforced the drinking limits set at each visit, challenges they faced in cutting down on drinking and offering continued support.

Outcome variables

The primary outcome variables of interest were changes in: a) mean number of standard drinks in the previous 28 days; b) mean number of drinking days in the previous 28 days; and c) mean number of heavy drinking days (four or more drinks) in the previous 28 days. The variables were selected *a priori* based on the findings of previous trials (Bertholet et al, 2005). We elected not to utilize health status changes, accidents, injuries, alcohol related legal events and health care utilization as primary outcomes due to the infrequent occurrence of these events in young women.

Research procedures

Postpartum women returning for routine postpartum appointments between the spring of 2002 and fall of 2004 were asked to complete the Health Screening Survey (HSS) (Fleming et al., 1991). The HSS was designed as a general lifestyle questionnaire in order to increase patient acceptance of the research procedures and to minimize the intervention effect of the alcohol questions. The HSS contained four sets of parallel questions on exercise, smoking, nutrition and alcohol use. The HSS was modified for the Healthy Moms trial to include questions on alcohol use during pre-pregnancy, pregnancy and postpartum periods. Subjects who screened positive for high-risk drinking during one of three time periods were invited to participate in a research interview.

The face-to-face 30-minute research interview took place in each patient's obstetrician's clinic and was conducted by one of six trained researchers. This assessment interview included a Time Line Follow Back procedure to assess alcohol use in the previous 28 days (Sobell et al., 1988), six questions on exercise, two questions on current tobacco use, current partner alcohol use, current drug use (SAMHSA, 1999), family history of alcohol problems, current breastfeeding status, previous counseling regarding alcohol use, the Edinburgh Postpartum Depression Scale (Cox et al., 1987) and interpersonal partner violence (McFarlane et al., 1992).

Subjects assigned to the control group received a health booklet on general health issues and were followed up at six months. They were not given any specific counseling. They were instructed to address any health concerns in their "usual manner". Patients in the experimental group were given the same booklet and scheduled to see an obstetrical nurse or researcher for the brief intervention protocol.

Role playing and general skills training techniques were used to train interventionists to administer the intervention protocol. These educational programs were conducted at each of the 34 clinics. The interventionists also received additional training in booster sessions shortly after the initial intervention session. Interventionists completed a form following each intervention visit to document that the patient had received the protocol and agreed to reduce her alcohol use. Follow-up procedures included a telephone interview at six months by one of the researchers not assigned to the subject's clinic.

Participant flow and follow-up

A total of 8,706 subjects from 34 clinics in 15 counties in Wisconsin completed the HSS. Of those, 1,209 (14%) screened positive for high-risk drinking and consented to further contact. A total of 969 agreed to participate in the next phase of the study and completed the Researcher Lifestyle Interview. Of these, 235 (24%) subjects met all inclusion criteria and were randomized into the experimental group (n=122), or control group (n=113). Most of the subjects who did not meet inclusion criteria at the baseline interview were ineligible because their alcohol use in the previous 28 days was below the selected cut-off limit. The

Time Line Follow Back procedure was used in the Baseline Interview to assess daily alcohol use in the previous 28 days and provided more accurate information than the HSS.

Twenty-three subjects randomized to the experimental group failed to keep their appointments with the nurse or researcher interventionist and did not receive the intervention; which left 99 subjects participating in the intervention protocol. The 23 subjects not included were scheduled at least three times by the researchers. Primary reasons given by these patients for not following through with the scheduled intervention included lack of time, family illness, transportation problems and inability to take time off from work. This group was not statistically different at baseline from the persons who completed the intervention on age, gender or alcohol use. All persons initially randomized to the intervention group (n=122) remained in this group for the analysis. Of the 235 subjects enrolled in the trial, 207 (87%) completed the 6-month follow-up procedures. Of the 28 subjects who did not complete the 6-month follow-up interview, 5 were in the control group and 23 in the intervention group.

Analysis

Statistical analyses of the data were conducted to investigate changes in alcohol use and other variables among study participants. For categorical variables *chi*-square tests were used to determine significant differences between the treatment and control groups; for continuous variables, *t*-tests were applied. Three separate regression models were utilized to test for experimental treatment effect (pre-intervention alcohol use minus post-intervention) on total number of standard drinks, number of drinking days, and number of heavy drinking days, after controlling for potential confounders such as age, race, education, tobacco use status, depression scores, currently breastfeeding, partner alcohol use, and baseline drinking levels.

An intention-to-treat analysis was performed on all patients randomized into the trial. We used two methods to deal with missing 6-month follow-up data. First we calculated the differences between groups by imputing the subject's 6-month alcohol use from the baseline. Two factors make this the most conservative method to use: all brief intervention trials have documented large reductions in alcohol use in the no-treatment groups, and intervention groups have a higher loss to follow up. The second method to calculate 6-month change in alcohol use involved using the average reduction in drinking by group. Both methods yielded similar findings with statistical differences between groups. We elected to report the findings utilizing the second method.

Assignment

The unit of randomization was the individual patient. Randomization of subjects to the experimental and control groups was carried out separately in each physician's practice using a computer-generated allocation method. Each physician had both control and experimental patients in his/her practice. The goal of the trial was to have 2-4 experimental subjects assigned to each interventionist.

Masking (Blinding)

Randomized trials try to blind the research subject, the person carrying out the intervention and the researchers who collect the outcome data for the trial. While behavioral interventions do not have a "blinded placebo tablet" it is possible to partially blind all three groups to which patients are in the active arm(s) of a trial. We used modified blinding or masking procedures to minimize the biases inherent in behavioral trials.

Research subjects consented to participate in a study that included a number of health behaviors including alcohol, smoking, exercise, depression and partner violence at the time of the face-to-face baseline interview, before randomization. They were told they would either be randomly assigned to receive a general health booklet or be scheduled to see a physician for a health intervention. Subjects were told the intervention included information on a number of health behaviors including alcohol. The second method in the trial was to imbed alcohol specific follow-up questions in the context of other health issues such as smoking, exercise, nutrition, depression and other health factors important to women in the post partum period. All research procedures, including the follow-up interviews, asked parallel questions on a number of behaviors besides alcohol.

Providers were only told which women were assigned to receive the intervention. Providers were not told which post partum women were randomly assigned to the control group or the “usual care” group. To avoid interviewer bias at the 6 month follow-up interviews, researchers were rotated for the telephone interviews. These blinding procedures were based on Project TrEAT, which reported that most patients assigned to the control group assumed the trial was about a number of behaviors, not just alcohol. In addition very few control subjects in Project TrEAT, received any alcohol counseling from their physician during the first year following randomization (Fleming et al, 1997). These findings suggest it is possible to partially blind subjects and physicians using the procedures outlined above and to minimize changes in the control group.

Results

Sample characteristics

Selected characteristics of the women in the sample are presented in Table 1. The median age was 28 with the majority between the ages of 26-30. The population was mostly Caucasian with 19% coming from under-represented minority groups (6.8% African American, 7.2% Native American and 2.5% Hispanic). Sixty-three percent had attended college, 82% were married or living with a partner and 47.2% were on maternity leave. Tobacco and marijuana use was higher than expected with more than 50% of the new mothers reporting smoking cigarettes, and nearly 1 out of 5 using marijuana. As expected, the frequency of depression was high with 38.7% scoring more than 10 points on the Edinburgh Postpartum Depression Scale. There were no significant statistical differences between groups suggesting randomization was successful in distributing the potential confounding variables listed in Table 1.

Table 2 presents the primary outcomes of the trial. We elected to use three primary alcohol use variables as the primary outcomes, including total number of drinks, number of drinking days, and number of heavy drinking days (4 or more drinks in a day), in the previous 28 days. A timeline follow back interview was used to collect this data at baseline and 6 months post randomization. As one can see there were reductions in alcohol use between baseline (pre- randomization) and at 6 month for both groups for all three alcohol use outcomes. In addition there were also statistically significant differences between groups in favor of the intervention group. The clinical difference was 19% for total drinks, 21% number of drinking days between groups, and 36% difference in the number of heavy drinking days. Other outcomes of interest including accidents, injuries, driving while intoxicated, health care utilization were not reported in this paper due to the limited number of events for these outcomes during the 6 month follow-up period.

Table 3 presents a regression model to control for potential confounders. As noted there is a statistically significant difference in alcohol use in favor of the experimental group for total number of drinks, number of drinking days, and number of heavy drinking days after

controlling for baseline alcohol use, age, education, smoking status, depression, breastfeeding and partner alcohol use.

Discussion

This study provides new evidence that brief intervention can reduce alcohol use in post partum women. The statistically significant difference in alcohol use at the 6 month follow-up period suggests a positive treatment effect. As the study was conducted in a diverse sample of practices located in rural, urban and small communities, the findings may be generalizable to other outpatient obstetrical settings. The clinical difference is important and suggests providers can expect a 19% reduction in daily alcohol use, 21% reduction in number of drinking days, and 36% reduction in heavy drinking days among their postpartum patients if they follow the brief intervention protocol tested in the Healthy Moms trial. The findings of this BI trial complement recent studies completed during the pre-pregnancy period (Floyd et al., 2007) and during pregnancy (Chang et al., 2005; O'Connor et al. 2007).

The findings of this trial have important public health implications. Despite numerous public awareness campaigns and the inclusion of warning labels on alcoholic beverages, fetal alcohol spectrum disorders continue to be a significant cause of disability. FASD is the leading known cause of preventable mental retardation/developmental disabilities in the Western World (Floyd et al., 2007). The disabilities associated with FASD persist throughout a person's lifetime, and are associated with significant costs to families and society (Stratton et al., 1996). While the prenatal period is clearly an important time to intervene, by the time a woman realizes that she is pregnant, irreversible damage to the fetus may have already occurred (Floyd et al., 1999). Preventing alcohol exposure with the next pregnancy may provide the best chance we have to prevent FASD (May et al., 2004).

The routine postpartum obstetrical visit is an excellent setting for such an intervention. Other settings for intervention may include the offices of pediatricians, family physicians, public health nurses, or clinics associated with the Women, Infants, and Children Program (Tough et al., 2006). These represent settings where a mother might accompany her children to appointments. We urge medical providers to adopt alcohol screening as a routine part of care, as many have done for the assessment of postpartum depression and parental smoking practices.

A strong link has been established between interpersonal violence, tobacco use, illicit drug use, depression, and high-risk drinking among women (Flynn et al., 2003; Certain et al, 2007; Gilchrist et al., 1996; Little et al., 1990). Each of these behaviors is associated with significant health problems for women as well their children and families. While there is limited information on the combined treatment of high-risk drinking and other behaviors, behavioral change is a complex process that often requires multiple lifestyle changes at the same time. The results of this trial suggest health care providers can make a difference. Providers can change alcohol use among new mothers.

Health care systems, payors, policy makers, and society need to acknowledge the potential implications of BI research. We have an effective treatment (BI) that can prevent FASD and other adverse effects related to high-risk drinking among women of childbearing age. We have an evidence-based strategy that can reduce the loss of human potential due to irreversibly damaged nervous systems, as occurs in FASD. It is important to offer alcohol screening and BI to all women of childbearing age. This includes women coming in to see their obstetrician for routine postpartum care.

The strengths of the trial include a diverse sample of postpartum women, recruitment of non treatment seeking research subjects, state of the art research procedures, location of the

study in 34 primary care offices, and high follow-up rates. Intention-to-treat procedures were used in the analysis. The recruitment rates were similar to many medication and behavioral trials with 24% (235/1209) of non treatment seeking high-risk drinkers randomized into the trial. One of the strengths of the trial was to screen all patients, not just those seeking alcohol treatment. While the high-risk drinking subjects, who did not meet all of our inclusion criteria, may have responded differently to the BI intervention protocol, our sample does represent a large group of women who did reduce their alcohol use. The effect size one could achieve by intervening with 100% of high-risk post partum women remains unclear. Additional research is needed.

Limitations of the trial include relatively small sample size, short follow-up period, absence of changes in alcohol-related harm outcomes, differential loss to follow-up between groups and reliance on patient self report as the primary outcome. We assume this differential loss to follow-up is related to the research burden of the group assigned to the intervention group (4 provider contacts), resistance to talk further about their drinking, shame about their drinking, reluctance to talk to us by their partners alcohol use or presence of interpersonal partner violence.

Another potential limitation of the study is delivery of the brief intervention protocol by clinic nurses. 90% of the interventions were conducted by clinic nurses. With the increasing use of other providers, such as clinic nurses to deliver routine care, the post partum visit was usually performed by clinic nurses, rather than obstetricians. While there is ample evidence that physicians can successfully deliver brief intervention protocols our study was not able to answer the question whether BI can be effectively delivered by obstetricians.

Summary

Preventing alcohol-exposed pregnancies and the adverse health effects of alcohol on women is an important public health issue. The findings of this trial support the widespread implementation of alcohol screening and brief intervention during the postpartum period. Inclusion of alcohol screening questions within postpartum electronic medical record templates would facilitate the inclusion of routine screening similar to what has occurred with the addition of routine alcohol screening questions on prenatal forms. Screening all new mothers each year (4 million in 2006), during their postpartum visit or well child care visit, is likely to identify an estimated 480,000 high-risk drinkers in the US alone (Jagodzinski and Fleming, 2007). All of these women, their children, their families and society could potentially benefit, if health care providers spent a few minutes talking to them about their alcohol use.

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Table 1

Comparison of Treatment and Control Subjects in Healthy Moms Study

	Control (N=113)		Treatment (N=122)		Total (N=235)	
	N	%	N	%	N	%
<u>Age</u>						
18-21	17	15.0	19	15.6	36	15.3
22-25	20	17.7	22	18.0	42	17.9
26-30	32	28.3	40	32.8	72	30.6
31-35	28	24.8	22	18.0	50	21.3
36-40	15	13.3	15	12.3	30	12.8
41 or more	1	0.9	4	3.3	5	2.1
						(p=.658)
<u>Race</u>						
Caucasian	90	79.6	102	83.6	192	81.7
African American	10	8.8	6	4.9	16	6.8
Native American	9	8.0	8	6.6	17	7.2
Asian	1	0.9	1	0.8	2	0.9
Hispanic	2	1.8	4	3.3	6	2.5
Other	1	0.9	1	0.8	2	0.9
						(p=.600)
<u>Education</u>						
Less than HS	9	8.0	21	17.2	30	12.8
HS graduate	33	29.2	23	18.9	56	23.8
Some college	35	31.0	39	32.0	74	31.5
College degree	35	31.0	39	32.0	74	31.5
						(p=.086)
<u>Marital status</u>						
Married	64	56.6	79	64.8	143	60.8
With partner/not married	28	24.8	23	18.9	51	21.7
Separated	1	0.9	2	1.6	3	1.3
Divorced	1	0.9	0	0.0	1	0.4
Widowed	1	0.9	1	0.8	2	0.9
Never married	18	15.9	17	13.9	35	14.9
						(p=.626)

	<u>Control (N=113)</u>		<u>Treatment (N=122)</u>		<u>Total (N=235)</u>	
	N	%	N	%	N	%
<u>Employment</u>						
Working full-time	14	12.4	15	12.3	29	12.3
Working part-time	9	8.0	8	6.6	17	7.2
On maternity leave	58	51.3	53	43.4	111	47.2
Seeking employment	9	8.0	21	17.2	30	12.8
Not in labor force	21	18.6	20	16.4	41	17.5 (p=.288)
<u>Currently breastfeeding</u>	30	26.6	35	28.7	65	27.7 (p=.685)
<u>Tobacco use, last 30 days</u>	60	53.1	65	53.3	125	53.2 (p=.924)
<u>Marijuana use, last 30 days</u>	19	16.8	23	18.9	42	17.9 (p=.684)
<u>Cocaine use, last 30 days</u>	3	2.7	3	2.4	6	2.5 (p=.924)
<u>Depression (Edinburgh ≥10)</u>	43	38.1	48	39.3	91	38.7 (p=.800)

Table 2

Changes in Alcohol Use between the control and intervention group

	Control	Treatment	
Significance	N=113	n=122	
	mean (SD)	mean (SD)	
Total number of standard drinks in the previous 28 days			
Baseline pre-randomization	32.2 (16.2)	34.0 (22.8)	(p=0.491)
6 months post-randomization	27.1 (22.1)	19.8 (19.2)	* (p=0.013)
Pre-post drinking change in each group	27%	46%	** 19%
Number of Drinking Days, past 28 days			
Baseline pre-randomization	10.4 (7.2)	10.3 (6.8)	(p= 0.903)
6 month post randomization	9.2 (22.1)	6.9 (6.3)	* (p=0.024)
Pre post drinking change	12%	33%	** 21%
Number of Heavy Drinking Days, past 28 days (four or more drinks)			
Baseline pre-randomization	3.1 (3.3)	3.5 (3.8)	(p=0.389)
6 month follow up	2.6 (3.1)	1.7 (2.2)	* (p=.019)
Pre post drinking change	16%	51%	** 36%

* The p value listed is the unadjusted statistical difference between groups

** The clinical significance is the difference in alcohol use between the groups at the 6 month follow-up. This difference represents the amount of change in alcohol use providers can expect following brief intervention.

Table 3

Regression model for reduction (pre minus post) in alcohol use (n=235)

Characteristic	Outcome Variable		
	Standard Drinks	Drinking Days	Heavy Drinking Days
	β (Std. Error)	β (Std. Error)	β (Std. Error)
Experimental treatment group	6.90 ** (2.98)	1.94 *** (0.70)	1.08 ** (0.47)
Baseline drinking			
<28 drinks, past 28 days	4.44 (3.19)	0.95 (0.75)	0.48 (0.51)
28-55 drinks, past 28 days	33.88 *** (5.56)	6.06 *** (1.31)	3.38 *** (0.88)
56 or more drinks, past 28 days (reference)	0.00	0.00	0.00
Age			
18-21	9.18 (6.19)	0.19 (1.46)	1.24 (0.98)
22-25	3.86 (5.70)	0.07 (1.34)	0.26 (0.90)
26-30	3.33 (4.89)	0.01 (1.15)	0.22 (0.78)
31-35	2.76 (5.04)	-0.38 (1.19)	0.44 (0.80)
36 or older (reference group)	0.00	0.00	0.00
Race			
African American	5.85 (6.46)	2.40 (1.52)	2.35 (1.02)
Native American	5.40 (6.29)	-1.06 (1.48)	0.61 (1.00)
Other	3.39 (7.13)	-0.11 (1.68)	0.55 (1.13)
Caucasian (reference group)	0.00	0.00	0.00
Used tobacco last 30 days	-3.01 (3.73)	-0.53 (0.88)	-0.53 (0.59)
Education			
Less than high school (reference group)	0.00	0.00	0.00
High school graduate	-4.12 (5.34)	0.35 (1.26)	-0.08 (0.85)
Some college or college degree	0.67 (5.31)	1.06 (1.25)	0.37 (0.84)
Depression (Edinburgh $\geq$ 10)	-1.20 (3.24)	-0.19 (0.76)	-0.21 (0.51)
Currently breastfeeding	-2.59 (1.84)	-0.17 (0.43)	-0.51 * (0.29)
Partner alcohol use	-2.98 (3.31)	-0.88 (0.78)	-0.65 (0.53)

*
p<.10**
p<.05***
p<.01