Published in final edited form as:

J Subst Abuse Treat. 2013 ; 45(5): 389–394. doi:10.1016/j.jsat.2013.06.006.

A Randomized Trial Comparing Telephone vs. In-person Brief Intervention to Reduce the Risk of an Alcohol-Exposed Pregnancy

Georgiana Wilton, D. Paul Moberg, Kit R. Van Stelle, Lyric L. Dold, Kristi Obmascher, and Janae Goodrich

University of Wisconsin School of Medicine and Public Health

Abstract

Brief, effective interventions are needed to reduce the risk of an alcohol-exposed pregnancy in women who drink and do not use effective contraception. The Healthy Choices study compared telephone and in-person administration of a brief intervention. In addition to indicators of alcohol use and effective contraception, compliance with the intervention was examined. Women between the ages of 18 and 44 who were drinking above recommended levels and not using effective contraception were randomly assigned to either a telephone (n=68) or in-person (n=63) brief (2 session) intervention. Overall, participants showed small but significant reductions in alcohol use and larger increases in effective use of contraception. Risk of alcohol-exposed pregnancy was thus significantly reduced, largely due to improved contraception with minor reductions in alcohol use. There was no significant difference in success of the intervention between the two conditions (telephone vs. in-person). These findings suggest telephone-based brief intervention may be equally successful and cost-effective in reducing the risk of an alcohol-exposed pregnancy and thus fetal alcohol syndrome.

Keywords

brief intervention; alcohol; pregnancy; fetal alcohol syndrome

1. Introduction

The adverse effects of alcohol consumption during pregnancy have been widely reported, and represent a leading preventable cause of cognitive deficits in the United States, including fetal alcohol syndrome (Bertrand, 2009). Even moderate alcohol use by pregnant women has been associated with adverse effects, including low birth weight, growth retardation, pre-term delivery, and an increased risk of spontaneous abortion (Kesmodel, Wisberg, Olsen, Henriksen, & Secher, 2002; Kodituwakku, 2007) and represents a major public health concern (Chen, 2012).

Approximately half of pregnancies in the United States are unintended (Finer & Zolna, 2011) and half of unintended pregnancies occur among women who use contraception (Finer & Henshaw, 2006). Women who experience an unplanned pregnancy are at increased risk for adverse maternal behaviors and health outcomes in their child (Finer & Zolna, 2011). While many women stop drinking when they find out they are pregnant, an estimated

130,000 pregnancies are exposed to high levels of alcohol in the United States each year (Lupton, Burd, & Harwood, 2004). Pregnant women who report any alcohol use, frequent drinking and/or binge drinking tend to be ages 35–44, employed and not married (Centers for Disease Control and Prevention, 2011). However, younger women who use both alcohol and tobacco are less likely to stop during pregnancy (Ebrahim, Merrill, & Floyd, 2000). It is, therefore, prudent to target all women of childbearing age for education, screening, and intervention to reduce the incidence of alcohol exposure in pregnancy and the risk of fetal alcohol syndrome (FAS) and other adverse neurocognitive deficits.

Due to the risks associated with alcohol exposure during pregnancy, effective accessible interventions are needed. One evidence-based option is brief alcohol intervention. Brief alcohol interventions are time-limited counseling strategies that focus on reducing alcohol use and associated health risks in non-dependent drinkers (Erllich, 2010; Moyer, Finney, Swearingen, & Vergun, 2002). These interventions typically include techniques associated with both motivational interviewing (Miller & Rollnick, 2002) and cognitive behavioral therapies.

The efficacy of brief interventions have been documented for over 30 years in settings ranging from emergency departments and primary care to community settings (Bertholet, Daepfen, Wietlisbach, Fleming, & Burnand, 2005; Moyer et al., 2002). In-person brief interventions have been successful in reducing the risk of an alcohol-exposed pregnancy (AEP) by reducing alcohol use or increasing use of effective contraception (Ceperich & Ingersoll, 2011; Floyd et al., 2007; Ingersoll et al., 2012). A positive relationship has been seen between the use of a scripted intervention protocol and positive health-related decisions among postpartum women (Fleming, Lund, Wilton, Landry, & Scheets 2008) and a reduction in postpartum depressive symptomatology (Wilton, Moberg, & Fleming, 2009). Finally, contraceptive counseling combined with role play was associated with increased condom use (Orr, Langefeld, Katz, & Caine, 1996).

As our use of technology in health care increases, so has the evidence supporting the use of technology-based brief interventions targeting health behaviors. A single-session computer-based intervention in combination with mail follow-up was successful in decreasing illicit drug use in postpartum women (Ondersma, Svikis, & Schuster, 2007). Weekly text messages and responses reduced heavy drinking days in young adults (Suffoletto, Callaway, Kristan, Kraemer, & Clark, 2012). Finally, a web-based alcohol assessment and intervention resulted in reducing risky drinking regardless of inclusion of personalized feedback (Delrahim-Howlett, Chambers, Clapp, Xu, Duke, Moyer, & Van Sickle, 2011). Specific to reducing the risk of an AEP, a mail intervention with telephone follow-up decreased reported alcohol use and increased contraception use in American Indian women (Hanson, Miller, Winberg, & Elliott, 2013).

The current study, Healthy Choices, was a randomized clinical trial designed to assess overall effectiveness of a brief intervention and to compare the efficacy of intervention modality for reducing the risk of an alcohol-exposed pregnancy. Women were randomized to receive the intervention via the telephone or in-person and followed for 6 months.

2. Methods

2.1 Sample and Recruitment

Recruitment took place in clinical settings (public health and family practice clinics); college campuses (University of Wisconsin-Madison, Madison Area Technical College); and a community event (Dane County Women's Expo). The intervention was offered to consenting women who screened positive for drinking at risky levels (>7 drinks/week or >3 in any 1 day) and who were not using effective contraception. The study protocol was approved by the University of Wisconsin's Health Sciences Institutional Review Board. All participants provided signed informed consent.

Participants were 131 women ages 18 to 44 who were recruited to participate in the study via a multi-stage screening process. Women completed a brief prescreen and indicated whether they agreed to be contacted by study staff pending eligibility determination. The prescreen included 9 questions, two with multiple sub-questions. Women whose responses indicated that they were risky drinkers and were sexually active were contacted and consented prior to completing an in-depth Baseline Assessment Interview (BAI).

The BAI was conducted by telephone by trained research staff and consisted of 101 questions that included demographics; general health and health care utilization; attitudes about eating, alcohol, tobacco and exercise; mood issues; partner violence and partner use; sexual activity and contraception use; and social support. Inclusion criteria for the intervention included (a) consumption of >7 drinks in any one week or >3 drinks on any day during the past 90 days; (b) sexually active (specifically vaginal intercourse with a male partner) and not using effective contraception over the past 90 days; (c) not pregnant. If a participant was eligible, she was invited to enroll in the intervention component of the project. Upon agreement, the interventionist would immediately open the next envelope in the pile that contained a computer-generated randomization card indicating 'in-person' or 'telephone'.

2.2 Assessments and Intervention

The Healthy Choices intervention was adapted from the protocols developed for the Healthy Mom's Study (Fleming et al., 2008; Wilton et al., 2009) and CDC's Project CHOICES (Floyd et al., 2007). The intervention workbook was modified for this trial after consultation with family physicians and experts in the field, including the 2 interventionists who conducted each session. The intervention consisted of 2 counseling sessions that utilized the techniques of motivational interviewing (MI) and cognitive therapy to focus on alcohol consumption and contraception usage. Personalized feedback was used to motivate women to reduce their alcohol consumption and/or increase their use of effective contraception (or use their current method of contraception more effectively). The counselors followed the workbook that included information about health risks, temptations for alcohol use, goal setting, and plan development. The components of the brief intervention are shown in Table 1.

Two practitioners conducted all interventions—a licensed professional counselor and rehabilitation psychologist. They were experienced in counseling and providing brief

intervention and participated in over 30 hours of MI training prior to beginning the study. They met regularly as a team to review cases and consult to assure consistency.

The telephone and in-person interventions were administered in a similar standardized manner. Women assigned to the telephone intervention were instructed to complete it in a private setting and not while driving. Following randomization, the counselor completed the personalized feedback portions of the workbook in preparation for session 1. Upon completion of session 1, the workbook was given to the participant along with activities to complete prior to session 2. Telephone participants were mailed the intervention workbook following the completion of session 1.

Following the intervention phase of the study, research staff (including the 2 interventionists and 3 trained research specialists) contacted the women by telephone at 3, 6, and 12 months to assess change in indicators assessed in the BAI. Women were compensated \$25 per contact for a maximum of \$150.

This paper reports on data from the six-month follow-up. The 6-month point was selected because this interval's 90 day look-back would not overlap with the interventions which typically occurred in months 1 and 2, and a concerted effort to minimize follow-up attrition was implemented for 6-month follow-up. A higher completion rate was attained at 6-months than at 3-months and 12-months.

Figure 1 shows the study flow and breakdown of participants. A woman who initially screened positive and consented to further contact was determined to be eligible based on 2 indicators in the baseline interview: drinking at risky levels as defined by the National Institute on Alcohol Abuse and Alcoholism (>7 drinks in any 1 week period, or >3 drinks on any one occasion) *and* determined by the interviewer to be at risk of becoming pregnant (not using contraception during intercourse, or not using contraception effectively based on cue cards containing the appropriate usage of contraception methods). If eligible and consenting, the participant was invited into the intervention portion of the study and randomized into the intervention conditions, "telephone" or "in-person."

From the 3,051 prescreens collected, 1,195 (39%) were eligible to complete the baseline. Of the eligible women, 296 (24%) did not provide contact information and could not be contacted for baseline interview. There were no significant differences in demographics between the eligible participants that provided contact information and the eligible participants that did not provide contact information.

Of the 899 women who were eligible for the BAI, 434 (48%) completed the baseline, with 132 remaining eligible for participation in the study by reporting both risky drinking and ineffective contraception use. Only 1 of the 132 eligible women refused to participate in the intervention.

2.3 Instruments

A timeline followback (TLFB) methodology (Sobell & Sobell, 2000) was used to document the alcohol consumption and sexual intercourse of participating women. Using a calendar,

90-day retrospective estimates of both alcohol consumption and sexual intercourse were obtained. The data collected represented the number of ‘standard drinks’ (0.6 oz absolute alcohol, documented with assistance from research interviewers to convert various types and serving sizes of alcoholic beverages) and instances of sexual activity (defined as acts of ‘vaginal intercourse with a man’). This TLFB methodology was employed by Louise Floyd et al. (2007) in her study of “Preventing Alcohol Exposed Pregnancies” and is widely used to appraise alcohol use and other health-related behaviors (Hetteima, Hosseinbor, & Ingersoll, 2012; Weinhardt, Carey, Maistro, Carey, Cohen, & Wickramasinghe, 1998). Contraception effectiveness was ascertained by identifying all methods of birth control used by a woman over the past 90 days. Cue cards developed by the CDC were used to review effective usage and assist the woman in determining if she used the method correctly and effectively. The interviewers coded each participant as effectively or ineffectively using contraception based on their responses to this series of questions.

Several additional standardized and validated tools were included in the baseline interview. Items related to drug use were adapted from the “National Household Survey on Drug Abuse” (<http://www.icpsr.umich.edu/icpsrweb/SAMHDA/series/00064>). The short form of the Beck Depression Inventory was included in the interview to assess symptoms of depression (Beck & Steer, 1993). Levels of partner and family violence were assessed using questions adapted from a survey measuring abuse during pregnancy (McFarlane, Parker, Soeken, & Bullock, 1992). The items related to attitudes toward eating were included from “The Eating Attitudes Test” (Garner, Olmsted, Bohr, & Garfinkel, 1982) to assess eating disordered thinking.

The follow-up interview was identical to the BAI with the exception of 5 demographic questions that were eliminated (race, age, birth date, income level, the lifetime number of cigarettes smoked, and substance abuse history) as they do not tend to show change over our follow-up interval.

2.4 Data Analysis

Analysis used basic descriptive statistics (chi-square, difference of means tests, confidence intervals for proportions) to establish equivalence of groups at baseline, to assess overall outcomes and to compare groups at follow-up. Overall results were estimated using only the cases who had completed a follow-up interview, as well as a conservative “intent to treat” analysis in which all cases were included with the assumption that if follow-up data were missing the individual had continued risky behaviors.

With the goal of controlling for potentially confounding predictors of outcome, investigation of the factors predicting pregnancy risk, risky drinking, and risk of alcohol-exposed pregnancy began with computation of bivariate correlation coefficients to assess relationships among the measures. A wide range of measures were considered including demographics, employment, drug use, depression score, and social support scale score. Years of education and prescreen recruitment site were related ($F=9.79$, $df=6$, $p<.001$), suggesting that educational level varied by site. These measures are also significantly related to the white/non-white race measure. Variables correlating significantly with our outcome measures were incorporated in the final models.

Logistic regression was then utilized to more precisely estimate the effect of intervention modality controlling for these measures. Due to the high correlations among race, education, and recruitment site, site was not included in the models. The final models included as control variables white/non-white, age at baseline interview, years of education, any illegal drug use in the past year, and intervention modality to predict past 90 day pregnancy risk, risky drinking, and risk of alcohol-exposed pregnancy at six-month follow-up.

3. Results

Recruitment efforts (see Figure 1) resulted in 3,051 prescreen surveys collected, 434 baseline interviews conducted, and 132 women randomized into the two intervention conditions (either telephone administration or in-person administration). One participant refused the intervention. Of the 131 women who agreed to participate in the intervention, 68 were randomized into the telephone condition and 63 were randomized into the in-person condition. A total of 89 six-month follow-up interviews (68% retention to follow-up) were conducted and available for inclusion in the outcomes analyses.

Selected characteristics of women in the study are presented in Table 2. The average age was 26 with 13% married. Nearly 75% had some post high-school education and 7% reported not completing high school. More than 76% were employed with 56% reporting an income less than \$20,000 per year. The sample was primarily White (63%) with 20% Black and 5% Hispanic.

3.1 Baseline results

Demographic and behavioral measures were examined to assess baseline differences among women randomized to each of the intervention conditions (see Table 2). The only significant difference between women assigned to receive the intervention via telephone or in person was related to race. The in-person group had a higher percent of Black women and the telephone condition had a higher percent with race in the “Other” category (primarily Native American). There does not appear to be a systematic bias as to whether the person received the intervention by telephone or in person by: recruitment site, income (+ \$20,000), marital status, age and education. Participants who are Black and unemployed were significantly more likely to be randomized to the in-person condition than were women of other racial identity that were also unemployed.

3.2 Program Engagement and Follow-up Attrition

Eighteen women (14%) who had agreed to participate and had been randomized did not complete any of the brief intervention sessions. Seventeen (13%) completed only one session, and 96 (73%) completed both intervention sessions. Compliance with the intervention did not differ between the telephone and in-person modalities (Chi-square= 2.74, 2 df, $p = .25$).

Women who reported any of the following were less likely to complete the 6-month follow-up: a current mood disorder, a biological father or mother who had an alcohol abuse problem, or reported physical abuse in the past 12 months. No other predictors of attrition were found.

3.3 Six-month follow-up

The primary research questions sought to (1) assess whether there was an overall reduction in the risk of an alcohol-exposed pregnancy, and (2) to compare the efficacy of the brief intervention between the intervention groups.

Overall (see totals column in Table 3), participants with 6 month follow-ups ($n=89$) showed significant reductions in risky alcohol use (from 100% to 84%; binomial $CI_{95}=.750-.902$), and increases in effective use of contraception (from none to 64%; binomial $CI_{95}=.536-.732$) thus reducing their risk of an alcohol-exposed pregnancy (from 100% to 29%; binomial $CI_{95}=.206-.391$).

Results from the more conservative “intent to treat” analysis are also included in Table 3. In these analyses, missing follow-up data (which is most common among those cases with zero or one intervention session) is assumed to reflect negative outcomes. Even with this conservative assumption, the results show an overall significant reduction of risk from baseline where 100% of the participants were at risk. Risk of pregnancy was reduced to 56% (binomial $CI_{95}=.479-.647$), risky drinking from 100% to 89% (binomial $CI_{95}=.823-.935$) and overall risk of alcohol exposed pregnancy from 100% to 52% (binomial $CI_{95}=.434-.603$).

Table 3 also shows the unadjusted primary outcomes of the study by group at the six-month follow-up. Based on chi-square analysis, there were no significant differences in success of the intervention between the two conditions (telephone vs. in-person). For the primary outcome--risk of alcohol exposed pregnancy, the continued risk was 25% in the in-person condition and 33% in the telephone condition, an insignificant difference (Chi-square = 0.747, 1 df, $p=.387$). For the intent to treat analysis, the continued risk was 48% in the in-person condition and 56% in the telephone condition, also an insignificant difference (Chi-square = 0.894, 1 df, $p=.344$).

A final analysis used logistic regression to provide an adjusted assessment of the impact of the telephone vs. in-person intervention on the three outcomes. Table 4 shows that after controlling for potential confounding measures, the intervention modality was not a significant predictor of any outcomes. Significant odds ratios are of interest substantively. Older women were less likely to reduce their pregnancy risk and hence their overall risk of alcohol-exposed pregnancy relative to younger women. White women were significantly more likely to reduce their risk of pregnancy, but not their risky drinking or overall risk of an alcohol-exposed pregnancy, relative to non-white women. Finally, women who used illicit drugs tended to remain risky drinkers (at $p < .10$), relative to non-drug users. These models were repeated (not shown) for the “intent to treat” analysis with similar results, although the drug use measure had to be eliminated as that was collected at the (missing) six month follow-up.

4. Discussion

The effectiveness of brief interventions in reducing risky drinking behavior and drinking-related harm in women has been well documented (Fleming et al., 2008; Floyd et al., 2007).

Consistently significant findings limit the value of untreated control groups for studying comparative effectiveness. It is now arguably of no utility to withhold treatment in such clinical trials. With over 30 years of brief intervention research documenting success, the focus should expand to determine which specific modalities of intervention are most effective and most likely to be implemented in clinical and community settings.

Telephone intervention has been used effectively to increase healthy behaviors such as promoting fruit and vegetable consumption both for cancer prevention (Campbell et al., 2009) and for weight reduction (Kim et al., 2009); and exercise and related self-care for diabetes management (Sacco, Malone, Morrison, Friedman, & Wells, 2009). It has also been shown to be effective in reducing harmful behaviors such as high risk alcohol use (Mello, Longabaugh, Baird, Nirenberg, & Woolard, 2008) and tobacco use (Pbert, 2009).

This randomized trial was designed to test the difference in efficacy of a brief intervention intended to reduce the risk of an alcohol-exposed pregnancy, comparing women who received the counseling sessions in-person and those who received the same intervention via the telephone. Both modalities have a high volume of success reported in the literature. The *Healthy Choices* intervention significantly reduced the risk of an alcohol-exposed pregnancy in women ages 18–44 who were both drinking above recommended levels and were not using effective contraception (or using a specific contraception method ineffectively). This study demonstrated the effectiveness of both methods of delivery with no significant difference between modality.

Screening and brief intervention is advocated by many medical and allied health professions—yet it is not routinely implemented as a standard of care. In busy medical environments that are demanding of a clinician's time, it becomes increasingly important to find a valid, non-invasive mechanism to provide intervention to reduce harmful behaviors and increase protective behaviors (Mello et al., 2008). When assessing cost-effectiveness, telephone-based intervention counseling ranks high and certainly should be considered. With no significant difference in effectiveness in reducing the risk of an alcohol-exposed pregnancy (and individually decreasing risky drinking and/or increasing effective contraception use), telephone-based counseling is generally less expensive to both the patient/client (reduced travel costs, reduced time loss from work and other activities), and the clinician (reduced burden of no-shows, reduced use of office space and scheduling). There was no difference in rate of participant compliance with telephone and in-person modalities, suggesting that either approach is acceptable to patients/clients. Equal effectiveness is maintained for those clinicians and patients who prefer a face-to-face interaction.

Several limitations must be discussed with respect to this study. Self-report data may include inaccuracies when projected over a 90-day period. Further, funding did not allow us to adhere to a design where the intervention sessions and follow-up interview were conducted by the same individual. While the intervention sessions for a particular participant were completed by the same counselor, follow-up interviews were scheduled based on availability of our research team. This could allow for a more independent assessment than a clinician collecting her own follow-up data with potential inherent bias, but it is possible that different results would be reported to a counselor with whom the participant had established rapport.

Since the follow-up data were collected by the clinicians and their staff, the assessors were generally not blind to condition. The relatively small sample size limits our statistical power and hence our ability to detect small effects which may nonetheless be important on a population basis. Finally, the attrition rate may also limit the representativeness of the sample.

The prevention of alcohol-exposed pregnancies is a critical public health issue. With estimates of approximately 130,000 pregnancies each year being exposed to high levels of alcohol and the associated risk for fetal alcohol syndrome (Lupton et al., 2004), these interventions need not be limited to medical and allied health environments. Educational and community settings can provide access to populations at-risk who may not have medical insurance or routinely access medical care. Screening and brief intervention services in multiple environments can be provided efficiently using telephone as well as in-person modalities.

Acknowledgments

The authors acknowledge funding support from the Centers for Disease Control and Prevention (CDC) cooperative agreement # U84/CCU524082. The project also benefited from assistance obtained from the Clinical and Translational Science Award (CTSA) program through the National Center for Advancing Translational Sciences (NCATS) grant 9U54TR000021.

References

- Beck, AT.; Steer, RA. Beck Depression Inventory Manual. San Antonio: Psychological Corporation; 1993.
- Bertholet N, Daeppen J-B, Wietlisback V, Fleming M, Burnand B. Reduction of alcohol consumption by brief alcohol intervention in primary care. *Archives of Internal Medicine*, 2005; 165:986–995. [PubMed: 15883236]
- Campbell MK, Carr C, DeVellis B, Switzer B, Biddle A, Amamoo MA, Sandler R. A randomized trial of tailoring and motivational interviewing to promoted fruit and vegetable consumption for cancer prevention and control. *Annals of Behavioral Medicine*, 2009
- Centers for Disease Control and Prevention. Alcohol use and binge drinking among women of childbearing age—United States, 2006–2010. *Morbidity and Mortality Weekly Report*, 2011; 61(No. 28)
- Ceperich SD, Ingersoll KS. Motivational interviewing + feedback intervention to reduce alcohol-exposed pregnancy risk among college binge drinkers: Determinants and patterns of response. *Journal of Behavioral Medicine*, 2011; 34:381–395. [PubMed: 21318412]
- Chen J. Maternal alcohol use during pregnancy, birth weight and early behavioral outcomes. *Alcohol and Alcoholism*, 2012; 47:649–656. [PubMed: 22893227]
- Delrahim-Howlett K, Chambers CD, Clapp JD, Xu R, Duke K, Moyer RJ, Van Sickle D. Web-based assessment and brief intervention for alcohol use in women of childbearing potential: A report of the primary findings. *Alcoholism: Clinical and Experimental Research*, 2011; 35:1331–1338.
- Ebrahim SH, Merritt RK, Floyd RL. Smoking and women's health: opportunities to reduce the burden of smoking during pregnancy. *Canadian Medical Association Journal*, 2000; 163(3):288–289. [PubMed: 10951728]
- Finer LB, Henshaw SK. Disparities in rates of unintended pregnancy in the United States, 1994 and 2001. *Perspectives on Sexual and Reproductive Health*, 2006; 38:90–96. [PubMed: 16772190]
- Finer LB, Zolna MR. Unintended pregnancy in the United States: Incidence and disparities, 2006. *Contraception*, 2011; 84:478–485. [PubMed: 22018121]

- Fleming MF, Lund MR, Wilton G, Landry M, Scheets D. The Healthy Moms Study: The efficacy of brief alcohol intervention in postpartum women. *Alcoholism Clinical and Experimental Research*. 2008; 32:1600–1606.
- Floyd RL, Sobell M, Velasquez MM, Ingersoll K, Nettleman M, Sobell L, Nagaraja J. Preventing alcohol-exposed pregnancies: A randomized controlled trial. *American Journal of Preventive Medicine*. 2007; 32:1–10. [PubMed: 17218187]
- Garner DM, Olmsted MP, Bohr Y, Garfinkel PE. The eating attitudes test: Psychometric features and clinical correlates. *Psychological Medicine*. 1982; 12:871–878. [PubMed: 6961471]
- Hanson JD, Miller AL, Winberg A, Elliott AJ. Prevention of alcohol-exposed pregnancies among nonpregnant American Indian women. *American Journal of Public Health*. 2013; 27(Suppl.):S66–S73.
- Hettema JE, Hosseinbor S, Ingersoll KS. Feasibility and reliability of Interactive Voice response Assessment of HIV Medication Adherence: Research and clinical implications. *HIV Clinical Trials*. 2012; 13:271–277. [PubMed: 23134627]
- Ingersoll KS, Ceperich SD, Nettleman, Hettema J, Farrell-Carnahan L, Penberthy JK. Preconceptional motivational interviewing interventions to reduce alcohol-exposed pregnancy risk. 2012 <http://dx.doi.org/10.1016/j.jsat2012.10.001>.
- Kesmodel U, Wisborg K, Olsen SF, Henriksen TB, Secher NJ. Moderate alcohol intake in pregnancy and the risk of spontaneous abortion. *Alcohol and Alcoholism*. 2002; 37(1):87–92. [PubMed: 11825863]
- Kim Y, Pike J, Adams H, Cross D, Doyle C, Foreyt J. Telephone intervention promoting weight-related health behaviors. *Preventive Medicine*. 2009
- Kodituwakku PW. Defining the behavioral phenotype in children with fetal alcohol spectrum disorders: A review. *Neuroscience and Biobehavioral Reviews*. 2007; 31:192–201. [PubMed: 16930704]
- Lupton C, Burd L, Harwood R. Cost of fetal alcohol spectrum disorders. *American Journal of Medical Genetics Part C*. 2004; 127C:42–50.
- McFarlane J, Parker B, Soeken K, Bullock L. Assessing for abuse during pregnancy. *Journal of the American Medical Association*. 1992; 267:3176–3178. [PubMed: 1593739]
- Mello MJ, Longabaugh R, Baird J, Nirenberg T, Woolard R. DIAL: A telephone brief intervention for high-risk alcohol use with injured emergency department patients. *Annals of Emergency Medicine*. 2008; 51:755–764. [PubMed: 18436341]
- Miller, WR.; Rollnick, S. *Motivational interviewing: Preparing people to change*. 2nd ed.. New York: Guilford Press; 2002.
- Moyer A, Finney JW, Swearingen CE, Vergun P. Brief interventions for alcohol problems: A meta-analytic review of controlled investigations in treatment-seeking and non-treatment seeking populations. *Addiction*. 2002; 97:279–292. [PubMed: 11964101]
- Ondersma SJ, Svikis DS, Schuster CR. Computer-based brief intervention: A randomized trial with postpartum women. *American Journal of Preventive Medicine*. 2007; 32:231–238. [PubMed: 17236741]
- Orr DP, Langefeld CD, Katz BP, Caine VA. Behavioral intervention to increase condom use among high-risk female adolescents. *The Journal of Pediatrics*. 1996; 128:288–295. [PubMed: 8636834]
- Pbert L. Enhancing the effect of telephone quitline counseling through proactive callback counseling. *CHEST Online*. 2009; 136:1199–1200.
- Sacco WP, Malone JI, Morrison AD, Friedman A, Wells K. Effect of a brief, regular telephone intervention by paraprofessionals for type 2 diabetes. *Journal of Behavioral Medicine*. 2009; 32:349–359. [PubMed: 19365719]
- Sobell, LC.; Sobell, MB. *Handbook of Psychiatric Measures*. Washington, DC: American Psychiatric Association; 2000. Alcohol Timeline Followback (TFLB). In American Psychiatric Association; p. 477–479.(Ed.)
- Suffoletto G, Callaway C, Kristan J, Kraemer K, Clark DB. Text-messagebased drinking assessments and brief interventions for young adults discharged from the emergency department. *Alcoholism: Clinical and Experimental Research*. 2012; 36:552–560.

- Weinhardt LS, Carey MP, Maistro SA, Carey KB, Cohen MM, Wickramasinghe SM. Reliability of the Timeline Followback Sexual Behavior Interview. *Annals of Behavioral Medicine*. 1009; 20:25–30. [PubMed: 9755348]
- Wilton G, Moberg DP, Fleming M. The effect of brief alcohol intervention on postpartum depression. *The American Journal of Maternal Child Nursing*. 2009; 34:297–302.
- Xaverius PK, Tenkku LE, Salas J. Differences between women at higher and lower risk for an unintended pregnancy. *Women's Health Issues*. 2009; 19:306–312. [PubMed: 19733800]

Figure 1.
Study Flow and Breakdown of Participants

*Not eligible because alcohol consumption was not at risk levels (>7 per week or >3 on 1 day) or was effectively contracepting.

Table 1Components of the *Healthy Choices* Brief Intervention

Session 1:

- Rapport building
- Alcohol discussion
 - Baseline Assessment Interview Review
 - Discussion about reported alcohol consumption
 - Decisional balance on drinking pros and cons
 - Health risks associated with alcohol consumption
 - Comparison of drinking to peers
 - Costs associated with drinking
 - Discussion of motivation to change drinking behavior
- Contraception
 - Motivation to use contraception
 - Decisional balance on pregnancy pros and cons
 - Decisional balance on contraception method
 - Discussion of motivation to change contraceptive behavior

Session 2:

- Check-in
- Personal Goals
 - Health
 - Work/School
 - Family/Friends
 - Self-image
 - Sex/Reproduction
 - Finances
 - Legal
 - Safety
 - Religious/Spiritual
 - Social
- Goal Setting
 - Alcohol use
 - Contraception

Table 2

Baseline Sociodemographic and Behavioral Characteristics at Randomization

	In-Person (N=63)	Telephone (N=68)
Average Age at Baseline Interview	25 Years	26 Years
Race: *		
White	65%	62%
Black	26	15
Hispanic	6	4
Other	3	19
Marital Status:		
Married	10%	16%
Education:		
Grades 7–11	8%	6%
Grade 12, High School, or GED	19	22
Some College	57	46
College Graduate	11	16
Grades 17–18 (post-college)	5	10
Income:		
Under \$20,000	56%	56%
Over \$20,000	44%	44%
Employment Status Categories		
Employed (Employed for Wages, Self-employed)	22%	29%
Employed and a student (Employed for Wages + Student)	52	48
Student (Student, Student + Homemaker)	5	15
Unemployed and/or seeking work outside the home	19	4
Homemaker (Homemaker)	0	2
Disabled/Other (Disabled, Other)	2	2
Alcohol Use Past 90 Days (Timeline Followback Calendar):		
Percent Drank in Past 90 Days	100%	100%
Average Total Days Drank in Past 90 Days	26	28
Average Total Number of Drinks in Past 90 Days	110	139
Percent Any Binge in Past 90 Days	97	97
Average Total Number of Binges in Past 90 Days	14	13
Number of Drinks per Week in Past 90 Days	8	10
Any History of Treatment for Alcohol-Related Problems	11%	12%
Blood Relatives With Alcohol or Other Drug Problem:		
Father	36%	41%
Mother	18	22
Brother(s)	32	17

	In-Person (N=63)	Telephone (N=68)
Drug Use in Past 12 Months:		
Any Illegal Drug Use in Past 12 Months	71%	65%
Prescription Drug Misuse in Past 12 Months	29%	28%
Current Smoker	37%	46%

* difference is significant @ p .05

Table 3

Risk of Alcohol-Exposed Pregnancy (AEP) at Six-Month Follow-Up Interview By Intervention Group

	In-Person	Telephone	Total [*]
Past 90 Day Outcomes:			
-Risk of Pregnancy for 89 Cases with Follow-up:	30%	42%	36%
-Risk of Pregnancy for all 131 Cases (ITT^{**}):	51%	62%	56%
-Risky Drinking (any binge or drinking more than 7 drinks per week) 89 Cases with Follow-up:	86%	82%	84%
-Risky Drinking for all 131 Cases (ITT^{**})	88%	90%	89%
-Risk of Alcohol Exposed Pregnancy (binge or drinking more than 7 drinks per week AND at risk of pregnancy) 89 Cases with Follow-up:	25%	33%	29%
-Risk of Alcohol Exposed Pregnancy for all 131 Cases (ITT^{**})	48%	56%	52%

* All participants (100%) were both at risk of pregnancy and risky drinking at baseline. These overall results (Total Column) reflect significant reduction in risk from the 100% baseline rates at $p < .05$ for all variables. Results for In-Person compared to Telephone intervention did not differ significantly on any outcome.

** ITT=Intent to treat analysis includes all 131 participants randomized to condition and assumes those lost to follow-up continue to be at risk.

Table 4

Results of Logistic Regression Predicting Six-Month Pregnancy Risk, Risky Drinking, and Risk of Alcohol-Exposed Pregnancy (N=89 cases with Follow-up Data)

	At Risk Of Pregnancy At Six-Month Follow-up			Risky Drinking At Six-Month Follow-up			Risk of Alcohol-Exposed Pregnancy At Six-Month Follow-up		
	Odds Ratio	CI ₉₅	Sig	Odds Ratio	CI ₉₅	Sig	Odds Ratio	CI ₉₅	Sig
Age at baseline interview	1.19	1.0, 1.2	.002	.984	.90, 1.1	.704	1.09	1.0, 1.2	.016
Years of education	1.58	.84, 2.9	.152	1.20	.57, 2.5	.635	1.50	.81, 2.8	.195
Race (white relative to non-white)	0.22	.07, .75	.015	3.06	.77, 12.2	.113	.374	.11, 1.2	.104
Any Illegal Drug Use in Past Year at Time of Six-Month Follow-up (yes/no)	1.44	.46, 4.5	.532	3.18	.86, 11.7	.083	1.34	.44, 4.1	.609
Intervention Group (in-person/ telephone)	.658	.24, 1.8	.423	1.56	.44, 5.5	.492	.803	.29, 2.2	.676