Published in final edited form as:

Subst Abus. 2015 ; 36(1): 13–20. doi:10.1080/08897077.2013.857631.

Acceptability of a Computerized Brief Intervention for Alcohol among Abstinent but at-Risk Pregnant Women

Sarah A. Pollick¹, Jessica R. Beatty, PhD¹, Robert J. Sokol, MD¹, Ronald C. Strickler, MD², Grace Chang, MD, MPH^{3,4}, Dace S. Svikis, PhD⁵, Golfo K. Tzilos, PhD⁶, and Steven J. Ondersma, PhD¹

¹Wayne State University

²Henry Ford Health System

³Harvard Medical School

⁴VA Boston Healthcare System

⁵Virginia Commonwealth University

⁶Brown University

Abstract

Background—Limitations in time and training have hindered widespread implementation of alcohol-based interventions in prenatal clinics. Also, despite the possibility of under-reporting or relapse, many at risk women report that they quit drinking after pregnancy confirmation so that interventions focusing on current drinking may seem unnecessary. The Computerized Brief Intervention for Alcohol Use in Pregnancy (C-BIAP) was designed to (a) be implemented via a handheld device in prenatal clinics, and (b) use a modified brief intervention strategy with women who screen at-risk but report no current drinking.

Methods—We administered the C-BIAP to 18 T-ACE (Tolerance, Annoyance, Cut Down, and Eye Opener) positive, pregnant African-American women who provided quantitative and qualitative feedback.

Results—The C-BIAP received high ratings of acceptability; qualitative feedback was also positive overall and suggested good acceptance of abstinence themes.

Conclusions—Technology may be a feasible and acceptable method for brief intervention delivery with pregnant women who do not report current drinking.

Keywords

alcohol/alcoholism; intervention programs; pregnancy; research; mixed methods; technology

Corresponding Author: Correspondence can be sent to Steven J. Ondersma, 71 E. Ferry Ave., Detroit, MI 48202; 313-577-6680, s.ondersma@wayne.edu.

Author Contributions:

S.A. Pollick contributed through data analysis, interpretation of results, writing and revision. J.R. Beatty contributed through research conception & design, collection of data, analysis, interpretation of results, writing, and revision. R.J. Sokol, R.C. Strickler, G. Chang, D.S. Svikis, and G.K. Tzilos contributed through research conception and design, interpretation of results, and revision. S.J. Ondersma contributed through research conception and design, analysis, interpretation of results, writing, and revision.

INTRODUCTION

Alcohol use during pregnancy can lead to a range of long-term adverse neonatal effects, including mental retardation and impaired neurocognitive, social, and behavioral functioning.¹ Despite widespread knowledge of the dangers of alcohol use during pregnancy, drinking in pregnancy often goes unaddressed. The consequent need for proactive screening, together with the promising efficacy of brief interventions for alcohol use,² has led to recommendations that screening, brief intervention, and referral for treatment (SBIRT) be a standard element of prenatal care.³

However, implementation of SBIRT approaches has been challenging. First, considerable time, financial, and logistic obstacles are involved with integrating screening and brief intervention programs into ongoing medical practice.^{4,5} For example, one estimate suggests that conducting all recommended prevention-related activities with all patients would take a primary care physician 4.4 hours each day.⁶ This issue is exacerbated by the fact that such services are rarely reimbursed by third-party payers. Second, many medical professionals express discomfort with the screening and intervention process and report doubts about its effectiveness—even when voluntarily participating in a formal demonstration program.⁴ This discomfort and skepticism may in part explain findings of very low levels of physician adherence to recommended brief intervention guidelines, even after training.^{7,8} In addition, a recent Center for Disease Control (CDC) survey of prenatal care providers finds that little improvement has been made in implementing SBIRT practices, and that most providers are unaware of the American Congress of Obstetricians and Gynecologists (ACOG) or National Institute on Alcohol Abuse and Alcoholism (NIAAA) toolkits.⁹ Third, training in brief approaches such as Motivational Interviewing is expensive, time-consuming in order to train individuals to acceptable competency levels, and may have modest or transient effects when suitable competencies are not achieved.^{10–12}

Technology offers a potential solution to obstacles regarding implementation. For example, computer-delivered brief interventions are acknowledged for their low cost, replication potential within the community, and more consistent delivery across patients.¹³ They also offer increased privacy and ease of use, as the program can work independently of the medical staff without the need for extensive training. In addition, computer-delivered interventions can relatively easily be tailored to individual patient characteristics. Alternate brief intervention approaches can thus be used to selectively target pregnant women based on a range of key individual characteristics.

One such key characteristic is level of drinking, both before and after pregnancy. Traditional brief interventions are designed around a discussion of current drinking and the advantages of/strategies needed to reduce alcohol use. During pregnancy, however, many women—including those whose pre-pregnancy drinking suggests substantial risk—will report having quit alcohol use,¹⁴ and will express little or no expectation of difficulty in maintaining that abstinence during pregnancy. This necessitates a modified brief intervention in order to potentially (a) reduce the risk of relapse later in pregnancy; and/or (b) reduce drinking among women who are actually drinking, but reported abstinence in order to avoid being

stigmatized. A computer-delivered brief intervention can easily incorporate this and other modifications that can facilitate tailoring to each individual. Computer-delivered approaches can incorporate multiple paths/approaches more easily than can person-delivered approaches, where the existence of multiple versions would necessitate training in each of them.

Prior research regarding a computer-delivered brief intervention for alcohol use during pregnancy has shown that such approaches can receive high quantitative ratings from participants on respectfulness, ease of use, and helpfulness.¹⁵ More specifically, concerns regarding the difficulty of using and understanding the technology were not found to be valid. With minimal instructions on how to use the computers before hand, previous research has shown high overall ratings on ease of use by participants.^{15,16} However, in the Tzilos et al., 2011 study, data were from quantitative ratings and lacked specific details regarding participants' reactions to the software. Therefore, more information is needed about how to best improve the brief intervention, rather than levels of acceptability for the technology. This report also did not focus specifically on the subset of participants who report having quit since becoming pregnant. This is an important distinction, since current recommendations for pregnant women suggest brief intervention delivery for all women scoring positive on the T-ACE (Tolerance, Annoyance, Cut Down, and Eye Opener), a global indicator of risk that does not require admission of current drinking. Brief interventions designed to target this unique group—as well as formative data to aid in their development—are thus greatly needed.

Thus, the aim of this study was to evaluate the level of acceptability of a computer-delivered brief intervention targeting alcohol use during pregnancy, using qualitative feedback from representative participants, and focusing on women who indicate they have already quit drinking. If this computer-delivered intervention appears acceptable and helpful to this group of pregnant women, it will support further research efforts examining the efficacy of this intervention to reduce alcohol use and/or prevent relapse among women who report having quit drinking.

METHODS

Participants

Participants were 18 pregnant women attending an initial/intake appointment with a nurse at a single prenatal care clinic in Detroit, MI. To participate, women had to be at least 18 years old, report having quit all alcohol use since becoming pregnant, and score positive (using a cut score of 2 or more) on the T-ACE alcohol risk screener,¹⁷ which has no necessary relationship to current drinking. Exclusion criteria included inability to communicate in English and frank cognitive impairment.

Intervention

The software used in the present study is highly interactive and individualized. The participant is guided through the Computerized Brief Intervention for Alcohol Use in Pregnancy (C-BIAP) by a three-dimensional animated narrator in order to facilitate a sense

of synchronous interactivity. The narrator is able to speak, move, provide empathic reflections, and display appropriate emotional responses. The program includes aural as well as visual presentation of all content and all answers are recorded by simply tapping responses from a list or by touching a visual analogue scale. The narrator reads aloud any written material on the screen including response options (participants just have to click on the word or phrase to hear it read aloud).

The C-BIAP was adapted from brief intervention^{18–20} and Motivational Interviewing (MI) techniques.²¹ The intervention begins with a brief introduction, followed by a video where a doctor discusses reasons to abstain from alcohol when pregnant and a mother briefly describes how she resisted the urge to drink with her pregnancy. Next participants are asked about their current use of alcohol. Participants who endorse active drinking receive content that is consistent with traditional brief intervention approaches, and which includes normed feedback (normed for age, pregnancy status, and gender), decisional balance exercises, and an optional change plan with a menu of change options and referral to local treatment options. However, the focus of the present analysis is on an alternate branch designed for participants who are T-ACE positive but report having already quit drinking completely since becoming pregnant (see Figure 1). In this branch, the software commends the participant's choice to abstain from alcohol use, elicits reasons and advantages for that choice, and helps the participant to develop a personalized plan for preventing relapse. Thus, this branch is unique in that it does not presume current alcohol use but nevertheless is designed to be acceptable and potentially efficacious with at-risk women who have quit (for example, via reinforcing change behavior and preventing relapse), as well as with at-risk women who have not quit, but choose to indicate having done so (for example, via indirectly providing information regarding norms and eliciting reasons why change is/might be helpful).

Measures

All study data, other than the qualitative interview, were collected using two Tablet PCs used for the screening portion and the intervention. No computerized assessment other than the brief screening to determine eligibility was conducted.

Software Acceptability—Acceptability of the computer-delivered intervention was assessed using participant responses to 9 self-report satisfaction questions. These items, relating to ease of use, respectfulness, helpfulness, and likeability were rated using a 1–5 Likert scale, with 1=Not at all and 5=Very Much, after completion of the intervention. The question, “How much did some parts of the computer bother you?” was reverse coded, with 1=Very Much and 5=Not at all. These acceptability questions were mirrored after those developed and used successfully in previous research of the software.¹⁶ Additionally, one yes-no question asked all participants “are you more likely to be successful with this goal [of quitting alcohol] because of your participation here?” Ratings were gathered from 17 of the 18 participants due to a technical malfunction of the program resulting in missing responses for all 10 questions from one participant.

Alcohol Use T-ACE—The T-ACE (Tolerance, Annoyance, Cut Down, and Eye Opener) is a commonly used screening tool for problem alcohol use in pregnant women.¹⁷ The T-ACE consists of four items evaluating tolerance, concern expressed by others, feelings of needing to cut down, and use of alcohol in the morning. The values of each answer for the four questions are summed to determine a final score. With a score range of 0–5, a total score of 2 or greater indicates potential risk drinking and is considered a positive screen.

Additional items measuring alcohol use—At-risk drinking was also assessed using a brief series of quantity-frequency questions taken from the NIAAA Task Force on Recommended Alcohol Questions (2003). These questions were modified to ask participants the frequency of binge drinking in the 12 months before becoming pregnant.

Feedback Interview—A 14 item open ended interview was developed to better understand participants' thoughts about the program. Development of the guide was conducted by expert opinion (the majority of the co-authors were included in this group) and consensus on what information would be helpful in making modifications to the intervention.

Procedure

Women were first told about the study by a clinic nurse after the initial pregnancy intake appointment was complete. Interested women were introduced to a female research assistant who evaluated the eligibility criteria. To determine the alcohol eligibility criterion (T-ACE), potential participants were presented with a 10.1 inch touch screen tablet running the Android operating system and using the open-source OpenDataKit application (<http://opendatakit.org>). This tablet presented an informed consent information sheet on screen and verbally (via head phones for privacy) that was approved by both the university and hospital Institutional Review Boards [IRBs]. Those who indicated willingness to participate went on to complete a 28-item screening, focusing primarily on alcohol use before pregnancy, using the same tablet. The research assistant offered the next portion of the study to any participant who was T-ACE positive.

Interested and eligible participants reviewed a second IRB-approved research information sheet (a hard copy in this case) describing the study. Those who provided consent to participate spent approximately 1 hour reviewing the intervention materials (approximately 20 minutes) and completing a semi-structured feedback interview (approximately 30 minutes). Both research information sheets contained the eight elements of a typical informed consent, but did not require a signature in order to maintain anonymity, a step that protects participants and yields greater disclosure.^{22,23} All study activities were conducted in a private office within the prenatal clinic. The C-BIAP was presented on a Tablet PC with headphones for privacy purposes.

With the exception of two places during the intervention (feedback was sought regarding specific slides); the research assistant conducted the interview after completion of the intervention. The brief interview was designed to elicit the participant's overall impression of the software, evaluations of its helpfulness, likes/dislikes, and suggested changes. This semi-structured interview was designed to promote open-ended responses from participants;

unclear or short responses were probed to elicit more information. The research assistant received training in conducting semi-structured interviews from a PhD level clinical psychologist and was supervised in vivo for several interviews to determine competency with interview administration. All responses were transcribed during the interview for later analysis. A total of fourteen questions were asked of all participants. Participants received a \$30 Target gift card for participation in the study. After completion of the interview, all participants were provided with a referral guide for relevant services in the area. Procedures were in place for active referral to clinic staff and local treatment centers, but none of the participants met criteria or expressed interest in this level of service. All procedures and questions asked of the participants were reviewed and approved by both the university and hospital IRB boards prior to any recruitment.

Data Analysis

For the qualitative data, we conducted manual coding of participants' oral responses, which were hand-written or typed by the research assistant performing the interview. Responses were grouped by similar themes derived from the data from two coders. The coding and classification of the responses to the corresponding themes were performed and validated independently by two members of the investigative team (SAP and JRB). If any disagreements occurred it was discussed until a consensus was reached. Means, standard deviations, and counts for demographic data and software acceptability were analyzed via SPSS version 20.

RESULTS

Participant Characteristics

All of the 18 participants were African American. Twelve (67%) participants were between the ages of 18 and 25, and an additional 4 (22%) were between the ages of 26 and 29. Twelve (67%) reported completing at least one year of college. These characteristics reflect the population served in this urban Detroit clinic. In addition to scoring positive on the T-ACE, 11 (61%) participants also reported binge drinking (defined as 4 or more standard drinks in a two-hour period) at least monthly in the twelve months before becoming pregnant. Three participants (17%) reported any cigarette use in the past week. The mean gestational age at the time of the interview was 10.8 weeks (sd = 4.3; range = 6 to 21 weeks).

Quantitative Feedback

Quantitative data revealed high ratings in terms of software approval. All participants gave ease of use, respectfulness, interest in working with the program again, and excited about changing alcohol use during pregnancy a positive rating (selected 4 or 5 on the 5 point scale). The item "How interesting was it?" received the lowest number of positive ratings; see Table 1 for frequencies of positive ratings. Eleven (69%) indicated "yes" when asked if they were more likely to be successful with their goal of quitting alcohol use because of their participation.

Qualitative Feedback

Manual coding of interview responses revealed five main themes: Lack of Personal Relevance, Overall Acceptability, Helpfulness/Influence, Specific Complaints, and Specific Suggestions. A summary of these themes is provided in Table 2 and a list of the interview questions can be found in Table 3.

Lack of Personal Relevance—Consistent with their self-report of having already quit drinking, some participants indicated that the software was not particularly relevant to them or their situation. In response to “How has using it changed your thoughts on drinking?” 5 women (28%) indicated that the program did not have a large impact on their views about alcohol use. Most women in this subgroup (3 women, or 60%) claimed they already knew the information presented in the intervention and knew that they should not be drinking while pregnant.

Overall acceptability—The software also appeared to succeed in being broadly acceptable, even among those who felt it was not relevant. Overall, 15 members of the sample (83%) said that they were not bothered by any of the questions or parts of the program. When asked “At any point did any part of the program seem too preachy?” seventeen of the women (94%) said it was not too preachy.

Participants also expressed overall satisfaction with the program’s length, pace, and animated narrator. For example, 14 (78%) and 16 (89%) participants felt the program was suitable at its current duration and pace respectively. Similarly, most participants (15, or 83%) found the pace and tone of the narrator’s voice to be acceptable and easy to understand. Also of interest, 7 (39%) participants said they would prefer working with narrator/computer over a real person and three (17%) participants said they had no preference.

Influence/Helpfulness—Fifteen women (83%) had positive feedback about the helpfulness of the software, finding it simple as well as easy to use and understand. Many women also reported that the intervention had influenced them with regard to drinking during pregnancy. For example, 8 women (44%) stated that the intervention helped reassure them of their decision to stop drinking. For example, one participant indicated that:

It really boosts my confidence in my decision. It is easier not to drink so that you don’t risk your baby’s life. It’s a helpful program. You have another life that you are responsible for now. (Participant #4)

Two women (11%) stated that they were not currently using alcohol during their pregnancy, but lacked concrete information as to why drinking during pregnancy can be harmful. The software appeared to be helpful in providing these participants with basic information regarding alcohol and pregnancy or resolving any misconceptions or doubts. For example, one woman stated:

Well, it confirms my idea that I should not drink at all. I heard in the past that when you reach your third trimester, it’s okay to have a drink of wine, but the video confirmed that it’s not okay. (Participant #18)

Seven women (39%) indicated that the program did change their thoughts on drinking by either shedding light on their own alcohol use, even post-pregnancy, or by serving as motivation to stop drinking while pregnant. One participant indicated that:

It has actually changed my thoughts a lot. Makes me not want to drink even after my pregnancy, not even at birthday parties. Not only for a healthier child, but also a healthier you. (Participant #13)

Researchers also asked more direct questions about specific slides, such as the introduction to the intervention and a slide depicting graphically the rates of alcohol use during pregnancy (using a chart of 100 women), including the number who continue to binge drink during pregnancy. Similar to the overall ratings, women found the information on the slides easy to understand and interesting. The slides were found to be helpful in the composition of the intervention, and displayed an appropriate amount of information on each screenshot.

Participants were also asked which component of the program was most useful to them. The most frequent responses were the videos (22%) and graphs/charts (39%) embedded within the slides. A select few (17%) did not narrow down a specific element by stating everything in the intervention was useful.

Specific Complaints—Despite the overall positive reaction by participants, a number of specific complaints emerged. For example, one participant was uncomfortable with the use of repetition of related information from different sources:

[The narrator] was talking, the MD spoke, the pregnant girl spoke, it was almost like you are beating me over the head with it. I think it was effective, but I think you had four different avenues saying the same thing. (Participant #18)

Despite the overall positive response regarding length and pace (noted above), nine participants (50%) expressed concerns about the narrator speaking too slowly or the internet connection making the program drag. Four participants (22%) commented negatively on the robotic nature of the narrator's voice.

Specific Suggestions—Participants offered a number of specific suggestions to improve the intervention. For example, some felt that it should be longer and provide more information:

The length of the program was kinda too short, because it did not contain information that it should have hit, like the seriousness of the situation. Also, more on people who actually kicked their habit and more details about how they kicked the habit would help. For example, the help groups and telephone numbers to call. (Participant #4)

Additionally, two women asked for the inclusion of information on smoking marijuana and cigarettes as part of the alcohol intervention.

DISCUSSION

Computer delivered brief interventions for alcohol use during pregnancy must take a number of unique factors into account. They must be exceedingly clear and straightforward, easy to use, and free from any language that might imply judgment or condescension. They should also take advantage of their relative anonymity and reassure the user regarding who can and cannot access their answers. General factors to consider with regard to brief interventions for alcohol use in pregnancy include the need to address the potential dangers of alcohol for the pregnancy as well as to the participant herself, and the need to recognize the existence of significant counter-incentives to full disclosure of drinking. This evaluation suggests that the C-BIAP was perceived as appropriate and helpful, despite its use with women who reported already having quit drinking during pregnancy. This is an important point of departure from prior brief intervention research, in which the provider-patient discussion centers around cessation of an ongoing behavior rather than on maintenance of a recent change. These results are also noteworthy because of the additional focus of the intervention on subtly providing information intended to be helpful for active drinkers who report having quit in order to protect themselves from perceived or potential consequences of disclosure. These findings suggest that it is appropriate to conduct further research examining the efficacy of this unique intervention approach.

Elements of the current software that appeared to work well included the videos, the use of graphics with explanation from the narrator, and the non-judgmental provision of information. The positive comments regarding the latter element is particularly noteworthy given that the software was targeted at women who indicated they had already made a change—meaning that these participants could easily have become annoyed at the potential or perceived redundancy of the material. Framing the information as “reasons why your decision to quit will help you and your baby,” or “one thing you probably already know, but just in case,” may have contributed to this overall acceptability. The overall use of a gain-framed approach (that is, focusing on the benefits of quitting, rather than a loss-framed approach emphasizing the costs of continuing to drink) may also have helped with overall acceptability, which is consistent with the literature on promoting health behaviors.²⁴ Finally, the extent to which participants reported learning something new from the software is of interest, and suggests that specific information (e.g., advantages of quitting) was perceived as fresh by women who clearly already had a sense that alcohol could be damaging when used during pregnancy.

These findings are consistent with other examinations of acceptability in the literature on computerized brief interventions. High levels of ease of use, comfort using the computer, respectfulness and usefulness have been found in computerized brief interventions surrounding alcohol use in patients of hospital emergency rooms.^{25,26} The current study expands existing literature to examine use of a similar, but different access point (during prenatal care appointments) to expand the potential reach and accessibility of brief interventions.

Despite these successes, a number of challenges clearly remain. For example, having all material read aloud by the narrator insured that participants did not need to actively indicate

that they are having trouble understanding written text, and was appreciated by most participants. Nevertheless, a significant minority of participants found that this practice negatively affected the pace of the intervention. This creates a “literacy dilemma” that may be best solved by taking expected characteristics of the population into account (e.g., a sample that is likely to be highly literate may have an opt-in approach, whereas a lower literacy sample may implement aural presentation of content for all users). Further, although we sought and achieved a non-judgmental and non-argumentative tone, several participants clearly recommended a more assertive approach. Future research should examine the extent to which providing more strongly worded, loss-framed messages might be more acceptable when used with participants who specifically opt for this approach.

A number of limitations should be highlighted. First, the reactions of this small sample of African-American women recruited from a Midwestern urban hospital system may not represent the reactions of other pregnant women, particularly those from different regions or with different demographic characteristics. Second, although the individual interviews used for this study allowed us to carefully elicit each participant’s unique perceptions, a focus group approach would have yielded additional information in terms of respondent reactions to the intervention.

The preliminary success of this intervention, in terms of acceptability with at-risk women who report having already stopped drinking, is encouraging. Should later trials support the efficacy of this approach, it could greatly expand the proportion of at-risk pregnant women who can be presented with a brief intervention. If successful, this direction could also apply to interventions for other substances during pregnancy, as well as to a wide range of additional health-related behaviors that are sometimes under-reported.

Acknowledgments

This research was conducted with support from the National Institute on Alcohol Abuse and Alcoholism (grant AA 20056). NIH had no role in the conduct of the study, data analysis, or preparation of the manuscript.

References

1. Sokol RJ, Delaney-Black V, Nordstrom B. Fetal alcohol spectrum disorder. *Jama*. Dec 10; 2003 290(22):2996–2999. [PubMed: 14665662]
2. O’Connor MJ, Whaley SE. Brief intervention for alcohol use by pregnant women. *American Journal of Public Health*. Feb; 2007 97(2):252–258. [PubMed: 17194863]
3. Barry, K.; Caetano, R.; Chang, G., et al. Reducing alcohol-exposed pregnancies: A report of the National Task Force on Fetal Alcohol Syndrome and Fetal Alcohol Effect. Atlanta, GA: 2009.
4. Beich A, Gannik D, Malterud K. Screening and brief intervention for excessive alcohol use: qualitative interview study of the experiences of general practitioners. *Bmj*. Oct 19.2002 325(7369): 870. [PubMed: 12386040]
5. Aalto M, Pekuri P, Seppa K. Obstacles to carrying out brief intervention for heavy drinkers in primary health care: a focus group study. *Drug Alcohol Rev*. Jun; 2003 22(2):169–173. [PubMed: 12850903]
6. Yarnall KS, Pollak KI, Ostbye T, Krause KM, Michener JL. Primary care: is there enough time for prevention? *Am J Public Health*. Apr; 2003 93(4):635–641. [PubMed: 12660210]
7. DePue JD, Goldstein MG, Schilling A, et al. Dissemination of the AHCPR clinical practice guideline in community health centres. *Tob Control*. Dec; 2002 11(4):329–335. [PubMed: 12432158]

8. Aalto M, Pekuri P, Seppa K. Primary health care professionals' activity in intervening in patients' alcohol drinking during a 3-year brief intervention implementation project. *Drug Alcohol Depend.* Jan 24; 2003 69(1):9–14. [PubMed: 12536061]
9. Anderson BL, Dang EP, Floyd RL, Sokol R, Mahoney J, Schulkin J. Knowledge, opinions, and practice patterns of obstetrician-gynecologists regarding their patients' use of alcohol. *Journal of addiction medicine.* Jun; 2010 4(2):114–121. [PubMed: 21769028]
10. Miller WR, Mount KA. A small study of training in motivational interviewing: Does one workshop change clinician and client behavior? *Behavioural & Cognitive Psychotherapy.* Oct; 2001 29(4): 457–471.
11. Baer JS, Rosengren DB, Dunn CW, Wells EA, Ogle RL, Hartzler B. An evaluation of workshop training in motivational interviewing for addiction and mental health clinicians. *Drug and Alcohol Dependence.* 2004; 73:99–106. [PubMed: 14687964]
12. Schoener EP, Madeja CL, Henderson MJ, Ondersma SJ, Janisse JJ. Effects of motivational interviewing training on mental health therapist behavior. *Drug Alcohol Depend.* May 20; 2006 82(3):269–275. [PubMed: 16289396]
13. Moore BA, Fazzino T, Garnet B, Cutter CJ, Barry DT. Computer-based interventions for drug use disorders: a systematic review. *J Subst Abuse Treat.* Apr; 2011 40(3):215–223. [PubMed: 21185683]
14. Office of Applied Studies. Substance Use among Women During Pregnancy and Following Childbirth. The NSDUH Report. 2009. <http://www.oas.samhsa.gov/2k3/pregnancy/pregnancy.htm>
15. Tzilos GK, Sokol RJ, Ondersma SJ. A randomized phase I trial of a brief computer-delivered intervention for alcohol use during pregnancy. *J Womens Health (Larchmt).* Oct; 2011 20(10): 1517–1524. [PubMed: 21823917]
16. Ondersma SJ, Chase SK, Svikis DS, Schuster CR. Computer-based brief motivational intervention for perinatal drug use. *J Subst Abuse Treat.* Jun; 2005 28(4):305–312. [PubMed: 15925264]
17. Sokol RJ, Martier SS, Ager JW. The T-ACE questions: practical prenatal detection of risk-drinking. *Am J Obstet Gynecol.* Apr; 1989 160(4):863–868. discussion 868–870. [PubMed: 2712118]
18. Russell MA, Stapleton JA, Jackson PH, Hajek P, Belcher M. District programme to reduce smoking: effect of clinic supported brief intervention by general practitioners. *Br Med J (Clin Res Ed).* Nov 14; 1987 295(6608):1240–1244.
19. Higgins-Biddle JC, Babor TF, Mullahy J, Daniels J, McRee B. Alcohol screening and brief intervention: where research meets practice. *Connecticut medicine.* Sep; 1997 61(9):565–575. [PubMed: 9334512]
20. Babor TF, McRee BG, Kassebaum PA, Grimaldi PL, Ahmed K, Bray J. Screening, Brief Intervention, and Referral to Treatment (SBIRT): toward a public health approach to the management of substance abuse. *Subst Abus.* 2007; 28(3):7–30. [PubMed: 18077300]
21. Miller, WR.; Rollnick, S. *Motivational Interviewing: Preparing People for Change.* 2. New York: Guilford; 2002.
22. Chase SK, Beatty JR, Ondersma SJ. A randomized trial of the effects of anonymity and quasi anonymity on disclosure of child maltreatment-related outcomes among postpartum women. *Child Maltreat.* Feb; 2011 16(1):33–40. [PubMed: 21131632]
23. Durant LE, Carey MP, Schroder KE. Effects of anonymity, gender, and erotophilia on the quality of data obtained from self-reports of socially sensitive behaviors. *J Behav Med.* Oct; 2002 25(5): 438–467. [PubMed: 12442560]
24. Rothman AJ, Bartels RD, Wlaschin J, Salovey P. The strategic use of gain- and loss-framed messages to promote healthy behavior: How theory can inform practice. *J Commun.* 2006; 56:S202–S220.
25. Murphy MK, Bijur PE, Rosenbloom D, Bernstein SL, Gallagher EJ. Feasibility of a computer-assisted alcohol SBIRT program in an urban emergency department: patient and research staff perspectives. *Addict Sci Clin Pract.* 2013; 8(1):2. [PubMed: 23324597]
26. Vaca F, Winn D, Anderson C, Kim D, Arcila M. Feasibility of emergency department bilingual computerized alcohol screening, brief intervention, and referral to treatment. *Subst Abus.* Oct; 2010 31(4):264–269. [PubMed: 21038180]

Figure 1. Structure and Content of the Computerized Brief Intervention for Alcohol in Pregnancy (C-BIAP)

*These branches are not discussed in the present paper, which focuses only on participants who reported having already quit drinking.

Table 1

Quantitative Ratings of Software Acceptability

Question	# giving a positive rating	% giving a positive rating
Likeability	16	94.1
Ease of use	17	100.0
How interesting	11	64.7
Respectful	17	100.0
Bothered by parts of program ^a	16	94.1
Helpfulness	16	94.1
Interest in working with program again	17	100.0
Excited about changing alcohol use during pregnancy	17	100.0
Think other moms would be helped by program	15	88.2

Note. These items were scored on a 1–5 Likert scale, with 1=Not at all and 5=Very Much. n = 17. Positive rating = score of 4 or 5.

^aThis item was reverse scored.

Table 2

Qualitative Feedback Themes

Theme	Summary
Lack of direct relevance	<ul style="list-style-type: none"> • The intervention did not change my mind-I had already quit before using the program • I already knew I should not be drinking during pregnancy
Overall acceptability	<ul style="list-style-type: none"> • Nothing about the program bothered me • The program was not too preachy • The length and pace were good • [The narrator] was easy to understand, and the voice was OK • Specific elements, such as graphs, charts, and videos, were useful
Influence/helpfulness	<ul style="list-style-type: none"> • The intervention helped me to think about my alcohol use • I didn't know that even smaller amounts of alcohol might be harmful • The program helped motivate me to continue to stay away from alcohol while I'm pregnant • The information that they provided as far as graphs were useful. There were a lot of things that I didn't know like there were more women who didn't drink while pregnant • The video was useful – doctor gave more information
Specific complaints	<ul style="list-style-type: none"> • The program took too long, especially to refresh pages • The personal change plan section wasn't helpful or interesting • [The narrator] didn't drag, I just read faster than what he was talking. [The narrator] is a helpful resource, but if you have reading comprehension skills, he might be annoying.
Specific suggestions	<ul style="list-style-type: none"> • Be more aggressive—show pictures of affected babies, say you can't drink • Add information about tobacco and marijuana use • The length of the program could have been longer. Could have added more pictures, and charts, and graphs explaining how dangerous it is to drink while pregnant

Table 3

Interview Questions

Number	Interview Question
1	(at specific slide) Please stop for a minute, I'd like to ask you something now. Did this information surprise you? Did you understand all of it? What do you think about the amount of information (too much, not enough, good amount)?
2	(at a specific slide) Please stop again for a minute. Were you able to understand this? Should this have more details?
3	What did you think about using the program?
4	What did you think about the introductions – where [narrator] tells you what you are going to be doing next with him? Were they helpful, boring? Was it too much information, not enough, etc.?
5	How was [narrator's] voice? Are you able to understand what he is saying? Were there any parts where it was harder to understand him? (maybe he spoke too quickly, gave too much information at once)?
6	Did any of the questions or parts of the program bother you?
7	What was useful to you in the program?
8	How has using it changed your thoughts on your drinking?
9	Did you make a personal plan for how to change your alcohol use? If no, why not? If yes, what did you think? How helpful was that section of the program? What could have been added to make it more useful for you?
10	Would you have preferred to work with [narrator] or a real person (such as your doctor or counselor)?
11	What did you think about the length of the program? Was it too long, just right, or too short?
12	What did you think about the pace of the program? Were there parts that dragged on or you felt went too fast? If so, what was [narrator] talking with you about when it happened? What ideas do you have about making it better?
13	Were you bored at any point during the program? Why or why not? What would have made it more interesting for you?
14	At any point did any part of the program seem too preachy?