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“I need to hear from women who have ‘been there’”: Developing a woman-focused intervention for drug use and partner violence in the emergency department

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Abstract

Objective—Addressing violence and linking women to community services in parallel with drug change goals is critical for women with coexisting intimate partner violence (IPV) and substance use disorders (SUD). Our objective was to develop a Web-based intervention to address violence and drug use among women patients in the ED.

Methods—The intervention was developed in a five-step process: 1) Initial intervention development based on selected theoretical frameworks; 2) In-depth interviews with the target population; 3) Intervention adaptation, with iterative feedback from further interviews; 4) Beta testing and review by an advisory committee of domestic violence advocates; 5) Acceptability and feasibility testing in a small open trial.

Results—Themes supported the selection of MI and empowerment models but also guided major adaptations to the intervention, including the introduction of videos and a more robust booster phone call. Participants in the open trial reported high scores for satisfaction, usability, and consistency with essential elements of motivational interviewing.

Conclusions—This qualitative work with our target population of women in the ED with SUD experiencing IPV underscored the importance of connection to peers and empathetic human contact. We developed an acceptable and feasible intervention distinct from prior ED-based brief interventions for substance-using populations.

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Keywords

Intimate partner violence; Domestic violence; Intervention development; Substance use disorders; Women; Emergency department; Emergency medicine

Introduction

The link between intimate partner violence (IPV) and drug use in women is well established. Drug use at baseline is a risk factor for the occurrence of partner violence, and the experience of violence predicts subsequent substance use (Gilbert, El-Bassel, Chang, Wu, & Roy, 2012; Golinelli, Longshore, & Wenzel, 2009; Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997; Testa, Livingston, & Leonard, 2003). In addition, each problem serves as a potential barrier to intervening in the other. Women abused by their partners may be subject to controlling behaviors that prevent them from accessing treatment programs, may have few independent financial resources to be able to pay for treatment, and may fear retribution or escalation of violence if they try to make a positive change autonomously, particularly if substance use is an established activity in the abusive relationship. Trauma from the abuse itself may also be an impetus for drug use (Najavits, Sonn, Walsh, & Weiss, 2004), and substance use disorders may prevent women from being eligible for housing in domestic violence shelters and may impact responses of law enforcement to incidents involving assault by an intimate partner (Stewart & Maddren, 1997).

The emergency department (ED) population has a high prevalence of coexisting IPV and substance use, making the visit a unique opportunity to identify these problems and provide brief interventions and referrals to treatment. The ED visit has been described as a “teachable moment” in which behavior change may be more likely to occur, particularly if linked to a negative health consequence (S. L. Bernstein & D’Onofrio, 2009). Interventions for drug and alcohol use disorders have been conducted in the ED for more than 30 years, but rarely address inseparable conditions such as partner abuse. In the outpatient setting, women have been identified as having specific barriers to accessing and completing substance use treatment programs, and demonstrate improved participation and outcomes when offered gender-specific substance use treatment programming (Greenfield & Grella, 2009; Grella, Scott, & Foss, 2005; Grella, Scott, Foss, & Dennis, 2008; Grella, 2008). Addressing violence and linking women to IPV services in parallel with drug change goals is critical, as counseling and safety planning may help women cope with past or ongoing violence, optimize safety, and, in the long term, avoid further abusive relationships.

To compound the complexity of the problem, involvement with violence frequently entails more than victimization, as women may be perpetrators as well as victims of violence. In CDC’s 2010 National Intimate Partner and Sexual Violence Survey (NISVS), one in four men reported lifetime physical abuse, stalking or rape by an intimate partner (Black et al., 2011). IPV may take the form of intimate terrorism – “the attempt to dominate one’s partner and to exert general control over the relationship” – or situational couple violence, which is not connected to a general pattern of control (Frye, Manganello, Campbell, Walton-Moss, & Wilt, 2006; Hines & Douglas, 2010; Johnson, 2008). Situational couple violence, often

bidirectional, is usually less injurious or severe, whereas intimate terrorism is more injurious, more frequent, and more frequently perpetrated by men against women. Overall, women continue to be the primary targets of violence and to experience at high rates the health sequelae and utilization of healthcare as a direct result of IPV. Therefore, much of the healthcare response to IPV, as well as community resources for survivors, tend to be directed towards women who are victims of IPV. However, female victims who are also perpetrators may not fit the passive, traditional “victim” role. Violence involvement, therefore, may have a complexity that an individual provider may not have the understanding, training, or preparation to address; further, women may feel reluctant to admit victimization face-to-face if they are also involved in aggression.

The idea of addressing such complex and chronic problems in an integrated manner within the constraints of a single healthcare visit may seem implausible. Indeed, there are many barriers to providing such brief interventions in the ED, including the high acuity, volume, and provider workload, lack of physical space to ensure privacy, lack of provider training in counseling skills, low provider confidence for addressing IPV or substance use, and limited resources and staffing to support such a program (McGrath et al., 1997).

However, many identified barriers can be overcome with the use of technology (Cohen & Stussman, 2005; Hester & Miller, 2006; KV Rhodes et al., 2006; Turner et al., 1998). Computer or Web-based programs provide a sense of anonymity and privacy, which may actually increase reporting of unhealthy behaviors and IPV (Karin V Rhodes, Lauderdale, He, Howes, & Levinson, 2002; Turner et al., 1998). They require little direct clinician involvement. They can be adapted to be culturally and linguistically specific and audio capabilities allow interventions to engage low-literacy individuals. They can deliver assessments and, based on the results, provide immediate, individualized feedback and recommendations for change. They minimize the bias that can arise in interpersonal relationships between the provider and patient. An intervention, if proven effective, can be widely disseminated while maintaining treatment fidelity across clinical sites. Adult women have reported increasing comfort with the use of technology, including the Internet and email, for obtaining health information.⁵⁷ Most ED patients use computers (91%) and access the Internet (71%) and the vast majority feel comfortable receiving technology-based health information (Ranney et al., 2012).

Technology, therefore, may provide an alternate means of delivery of screening and brief interventions for women with IPV and substance use disorders. Our preliminary work demonstrated that drug using women in the ED reporting IPV would be receptive to Web-delivered screening and advice (Choo, Ranney, et al., 2014). However, there have been no established ED-based interventions integrating these topics, and little information about the content, format, and language specific to this population.

The purposes of this study were to use patient-centered, mixed-methods intervention development techniques to develop and refine a computer-based intervention for drug-using women reporting IPV in the ED, called “B-SAFER” (**B**rief Intervention for **S**ubstance Use and **P**artner **A**buse for **F**emales in the **E**mergency **R**oom). We did this through a process of five sequential steps: 1) Initial intervention content and format development based on

selected theoretical frameworks; 2) In-depth interviews with the target population, with identification of key themes and ideas to inform intervention development; 3) Adaptation of the intervention, with iterative feedback from further interviews; 4) Beta testing and review by a advisory committee of community domestic violence advocates; and finally, 5) Acceptability and feasibility testing in a small open trial (N=10). By combining multiple stages of qualitative data with quantitative post-intervention evaluations, our intervention development process provides critical information about acceptability, feasibility and important structural and content elements of a computerized intervention for this high-risk population.

Step 1: Initial Intervention Development

Theoretical Background and Format

Motivational interviewing (MI) (Miller & Rollnick, 2002), which is based in the Transtheoretical Model (TTM) and used as the basis for most evidence-based brief interventions for alcohol and drug use in the ED (E Bernstein, Bernstein, & Levenson, 1997; D'Onofrio et al., 2012; Mello, Longabaugh, Baird, Nirenberg, & Woolard, 2008), served as the theoretical framework for intervention development. Because this intervention focused on women who are victims of abuse and thus are often socially isolated, subject to controlling and coercive behaviors, and lack autonomy and resources to make positive changes, we felt it critical to incorporate elements of the Empowerment Model, a departure from prior brief behavioral interventions used in the ED (Kulkarni, Bell, & Rhodes, 2012; Perez, Johnson, & Wright, 2012). Empowerment is a theoretical framework that identifies key factors that may influence women's vulnerability to IPV including: 1) perceptions of personal strengths; 2) outside resources and social supports; 3) beliefs about relationships and gender roles; 4) positive aspects of the relationship (Dutton, 1992). Increasing empowerment has been demonstrated to reduce IPV (Kiely, El-Mohandes, El-Khorazaty, Blake, & Gantz, 2010; Tiwari et al., 2005). Using this framework, effective empowerment-based interventions seek to bolster protective factors against abuse, including strengthening women's knowledge about the relationship between their drug use and relationships and safety behaviors, increasing social supports, and including series of short, positive statements towards the end of the program that emphasized participants' strength and self-worth.

In terms of format, design goals were to maximize feasibility in the ED setting. We considered the range of program duration of other brief computerized interventions (Maio et al., 2005; Walton et al., 2010), the length of total ED visit times (typically many hours), and the frequency of interruptions during clinical care, e.g., for tests or interactions with nurses or physicians. Ultimately, we aimed for a total program time of around 30 minutes. Prior studies have used booster sessions to enhance the impact of the necessarily brief ED intervention; thus, we planned a short, 10 to 20 minute follow-up booster conversation within two weeks of the index visit. Taking all theoretical and practical considerations into account, we developed an initial outline of the intervention, which was reviewed by substance use and partner abuse content experts.

Delivery System

We licensed the Computer Intervention Authoring Software (CIAS) by Interva, Inc., to build the intervention. CIAS was created for use in designing behavioral health interventions. It has pre-existing templates for the assessments and the actual intervention that can be populated with any specific content, including words, photos and videos. The software uses animated avatars to build rapport, convey sympathy and read program content aloud, making it accessible even to low literacy patients.

Step 2: In-Depth Interviews with Women with IPV and SUD

The basic conceptualized intervention was developed further using in-depth, face-to-face interviews with a convenience sample of adult women presenting to the ED and reporting IPV and substance use.

Methods

Setting and Population—Participants were recruited from the adult ED of Rhode Island Hospital (RIH), the major teaching affiliate of the Warren Alpert Medical School of Brown University, a level I trauma center with more than 100,000 annual adult visits by an ethnically and racially diverse patient population. English speaking adult women ($n = 18$) presenting to the ED were approached at random during selected shifts and invited to complete a “Women’s Health Survey,” self-administered on an iPad (Apple, Inc.). Those who reported experiencing both drug use (by the brief NIDA-modified Alcohol, Smoking and Substance Involvement Screening Test, NM-ASSIST)(“National Institute on Drug Abuse. NM-ASSIST V3.0: Screening for Tobacco, Alcohol and Other Drug Use,” 2009) and IPV in the past three months (by the Women’s Abuse Screening Tool, WAST)(Brown, Lent, Brett, Sas, & Pederson, 1996) were eligible and recruited into the study. We excluded those who were critically ill (triaged to the critical care area of the ED), had suicidal ideation or psychosis, were combative or in police custody, or were treated in a supervised setting for alcohol or drug dependence. Eligible patients were invited to participate in a 60- to 90-minute face-to-face qualitative interview conducted within two weeks after their initial ED visit.

Research assistants were trained on safety measures to protect patient confidentiality and avoid disclosure of sensitive information. Visitors were asked to leave the patient’s room for the duration of the screening survey and consent process. Participants were asked for the safest method of contact, including telephone, email, text message, and no contact at all and were given the option to select a code word to be used by research staff when contacting them. Participants were advised not to take home any paper materials, such as brochures and consent forms, if they had concerns about their safety at home and were instead given the opportunity to read all study materials in the ED and return them to study staff before leaving. Research assistants did not discuss any aspect of the study with anyone other than the participant herself and reaffirmed the safest contact method at each encounter with the participant. The Institutional Review Board (IRB) of the participating hospital approved all study procedures.

Measures—A semi-structured interview guide designed to identify primary content and desired language, approaches, and types of media for the intervention was developed (Appendix A). The guide was designed to elicit participants' past experience and perceptions of IPV and drug screening and intervention in the ED, to identify motivators of change and empowering experiences specific to this population, and to provide specific feedback on planned content. We iteratively revised the interview guide as needed to explore prominent themes; for example, we added questions specifically about the process and motivators of change. We also revised the interview guide to support the creation and evaluation of new elements (such as intervention videos, described in Step 3, below).

Data Analysis—Interview discussions were captured on digital audio recording software, transcribed verbatim, and entered into qualitative data management software (NVivo). Each interview transcript was reviewed at least once before analysis began. Subsequent reviews of the text identified themes. Initial codes were based on the framework of major topical headings in the interview guide. The coding structure was refined iteratively by coding initial transcripts, identifying additional codes through group discussion, and modifying and refining existing codes. Research team members reevaluated coding categories routinely to ensure that each coder had the same understanding of the codes and to identify any needed revisions of the coding scheme. The final coding classification scheme was applied to each transcript by two independent coders. Any coding discrepancies or ambiguities were resolved through discussion. An integrated set of codes, consisting of all mutually agreed-upon codes, was entered into the NVIVO database with the final version of each transcript. After coding all transcripts in this manner, an initial thematic framework was developed by summarizing codes by major themes and subthemes. The study team, composed of experts in IPV and substance use interventions and qualitative research methods, met collaboratively to decide on a final thematic framework and to select illustrative quotes, representing the full range of responses relevant to each theme.

Results

749 women were screened via the web-based women's health screening survey; 92 of these were eligible to participate based on both drug use and IPV criteria. Twenty-three women completed interviews; at this point, iterative review of transcripts suggested saturation of content. Mean age of participants was 32 years, 22% were Black, 9% Hispanic or Latino, 83% had at least a high school education, and 48% had children. Cannabis was the most common drug used, with twenty (87%) participants reporting past-3 month use; 17 (74%) reported polysubstance use. In terms of IPV occurrence, ten (43%) reported physical abuse, 16 (70%) reported emotional abuse, and eight (35%) reported sexual abuse over the previous three months.

Themes—Major themes, with illustrative quotes, are summarized in Table 1.

Theme 1: Participants wanted the intervention to connect them to real people, especially peers experiencing drug use and/or IPV: Participants were positive about the use of a Web program to help them divulge drug use and partner abuse, but viewed this as entrée into a more personal, human connection, hoping that the computer would ultimately

link them to in-person assistance. Women also expressed the desire to be connected to peers. Although health information regarding drug use from a physician was trusted and viewed as likely to be accurate, participants requested access to women who had been through similar experiences (who have “been there”), whether drug use or partner violence, or both, stating that advice from that person was more legitimate, valued, and helpful. Additionally, interviews invariably revealed women’s desire to hear narratives of positive change, saying it would be “nice to see...a woman who does win the struggle [with drugs or partner violence]” (S15, 37 yo, White).

Theme 2: Women’s stories of making a positive change identified common motivating factors: In discussing their personal stories of IPV and drug use, many of our participants identified the values that provided them with the impetus for change, and many had similar values. These motivating factors included, in particular, children – including the desire for future children – other close relationships, spirituality or religion, the desire to improve their life circumstances, and concern for their physical and mental health.

Theme 3: Participants affirmed the need for change goals to be bolstered by a meaningful support system: Women felt they could not “go it alone,” but needed people who would support them in their change goals and help overcome their feelings of isolation. In particular, they identified the need to distance themselves from their drug-using social milieu and find positive influences and environments.

Theme 4: Self-image and low confidence were cited as key factors in initiating and continuing abusive relationships and drug use and in being capable of making a change: Many participants identified poor self-image as a key reason for initiating drug use and getting into abusive relationships and initiating drug use. Correspondingly, many described a strong or growing sense of self-worth as a key factor in feeling that they could make changes in their relationships, drug use, and other major life domains.

Theme 5: Readiness is the key element to changing drug use: A recurrent theme in the interviews was the sentiment that any intervention content – no matter how relevant or compelling – would be ineffective against drug use for the participant who was not ready to change. Many women were able to identify “sentinel moments” that they identify with making them ready to change behaviors, and many of these moments related to core values identified in Theme 2.

Step 3: BSAFER Adaptations Based on Step 2 Findings

The importance of social supports to achieve behavior change (**Theme 3**) led us to include a section in the intervention asking participants to identify a trusted social support, whether formal (physician, pastor, counselor) or informal (family member or friend). They were encouraged to share their change goals with this person so that they could receive support achieving the goal.

The need to discuss problems with a “real human” (**Theme 1**) placed emphasis on the booster call, which had been planned as a brief review of substance use goals and a reminder

of referrals. Because of the needs communicated by the study participants, the research team created a more in-depth follow up booster that approximated the length of the original intervention (30-40 minutes) with an interventionist trained in conducting MI-based counseling. The booster included review of priority values and goals, discussion of challenges to change and to accessing referral resources, problem solving around these challenges, encouragement around progress made, and additional referral information as needed. Due to challenges meeting participants in person (see below, Step 3), this was designed as a telephone booster.

Some of the identified themes validated the planned intervention theoretical framework in a general sense (**Themes 4 and 5**). Many of the participants made some reference to the fact that readiness was critical to making change in drug use. In general, participants felt that brief advice or discussion about negative consequences of drug use within participants' lives would motivate change only if the participant was ready for change, consistent with the framework of MI/TTM. The need to bolster self image and self worth in order to effect change in drug use and/or seeking independence from violent relationships was also a common theme throughout the interviews, underscoring the critical role for women of an empowerment component to the program.

Within the planned framework, however, the interviews provided guidance for specific language or content. For example, short empowerment messages were developed from statements within the interviews themselves ("It has helped a lot with my relationships to know that I am worthy, that I deserve respect... Not to be hit. Not to be...treated wrong," S6 [26 yo, Black], turned into the empowerment statement "I am worthy of respect"). Motivators for behavior change were adapted into core values, as mentioned above, which allowed us to more easily reproduce, within the limits of the Web interface and the software program used, the process of developing discrepancy and stimulating the patient to consider the pros and cons of substance use against values that motivate them ("decisional balance").

The need to connect with other women experiencing drug problems and / or partner violence (**Theme 1**) was prominent within the first few interviews. Therefore, the study team decided to build in videos with personal stories of women who had experienced drug use and partner abuse. This required a modification of the study protocol so as interviews continued, participants were asked for permission to use their recorded voices in the intervention being built (**Step 3**).

Participant stories of facing challenges related to drug use and IPV and of having success in making positive changes were turned into a series of short videos. The videos used stock photos of women and scenes, with audio of participants' voices or, in one case, the participant's words read aloud by a research assistant. An introductory video established the connection between these "real women" and the participant by describing drug use and partner abuse.

Eight videos aligned with specific core values that were created from the motivating factors women identified in their personal narratives, both from Step 2 (Theme 2): Children ("to take good care of your children"); Spirituality "to live by a higher power"); Healing ("to

move on from past events”); Health (“to have good physical and mental health”); Love (“to give and receive love”); Relationships (“to have good relationships with friends and family”); Self-Image (“to feel good about yourself”); Wealth and Prosperity (“to have plenty of money”). Participants were invited to view any video(s) that related to them. A conclusion video emphasized empowerment messages and the positive aspects of making drug use changes. A sample video is available at <http://tinyurl.com/BSAFER>.

As there was little precedent for using videos embedded within brief ED interventions, and as some of the videos had content that was potentially emotional or disturbing, we piloted the videos as we developed them, incorporating video clips into ongoing in-depth interviews as described above (n=8). The interview guide was adapted to include questions about the videos, including how the videos made women feel, whether any content made them uncomfortable, what they liked best and least, and their perceptions of the women depicted in the videos, including whether the women were relatable and trustworthy. Overall, women responded positively to the videos, stating they were enjoyable to watch, realistic, and depicted women and situations that they related to.

“I definitely think she was absolutely relatable in what she said because I mean, I mean, I definitely felt like I was a good mom and a bad mom at the same time. You know, exactly what she said.” S18 (32 yo)

“That’s me, you know.” S20 (59 yo) [after watching a video]

Step 4: Beta Testing and Review

Finally, a full version of the intervention, including videos, was created. To refine our intervention further, we conducted our second stage of evaluation with beta testing and community experts in IPV.

Methods

This preliminary version was beta tested by five volunteer research assistants, who went through the program for consistency with the intervention content outline and functionality. The program was then assessed by domestic violence volunteers from our state’s central domestic advocacy organization during a single, 2.5-hour focus group using a semi-structured guide to obtain feedback on the acceptability, feasibility, and relevance of proposed intervention elements.

Results

Detailed notes from this focus group were reviewed and summarized into three key recommendations:

- *Avoid judgmental language.* For example, initial language that asked women if they would set goals and state their readiness and confidence to “make their relationships safer” was thought to suggest that women may be at fault for the violence in their relationships. Further, the community advisors felt that the change goal around IPV should be directed more specifically toward the proximal goal of seeking help from domestic

violence agencies, rather than changing the relationships itself. Therefore, the suggestion was made that we change this language about IPV goals, readiness and confidence to “seek help from domestic violence agencies and receive support for their safety.”

- Use direct, explicit language warning women about the possibility that violence may increase when they try to implement positive change in their drug use. While we had encouraged women to follow up with domestic violence agencies to be safer, we had not explained clearly that drug use change itself may increase danger. Here, expert review helped to clarify the need to address multiple social harms, and how they interact with one another, in these complex situations.
- Maintain “tough” language or messages related to severe drug use. Content that described some of the more extreme or serious consequences of drug use (direct harm to children from having drugs around the home, or indirect harm such as loss of children to foster care as a result of drug use) were considered highly relevant and accurate and important to retain in the program.

Adaptations—Based on the community group’s suggestions, we modified the language about drug use and about potential dangers associated with change. The content outline of the final intervention is included in Appendix B.

Step 5: Open Trial

Study Design

Participants were identified and recruited from the ED visit (Figure 1) to participate in a small open trial (10 participants) in order to preliminarily test the acceptability and feasibility of the final version of the intervention. Study setting, population, means of identification of eligible patients, and safety measures were the same as that described in Step I, above. Eligible patients who provided informed consent for participation were enrolled in the study and were asked to provide demographic information and baseline assessments. Participants were then given headphones, a tablet computer, and a brief tutorial on navigating through the program. Immediately following the intervention, participants were asked to complete a brief post survey that included measurements of acceptability and usability of the program. The post survey also included questions that assessed how well the program was consistent with MI principles and processes, including providing feedback, empathy, collaboration, and a sense of regard and respect; helping the participant develop discrepancy and change goals; emphasizing personal values; evoking feelings and emotions; guiding the participant to a eureka moment; and rolling with resistance.

All participants were given a brochure with general health resources, which including contact information for domestic violence agencies and substance use treatment services. We also asked participants to provide three locators, or individuals who might be able to help us find the participants if we were not able to reach them through their primary phone number.

The Institutional Review Board (IRB) of the participating hospital approved all study procedures.

Data Analysis

Because this was an open trial of feasibility only, and not an efficacy trial, we examined only descriptive data, calculating counts, means and proportions.

Results

A total of 10 participants (71% of those eligible) were enrolled in the open trial. The mean age was 26 years (range 18 to 43); 4 (40%) were Black or African American; 2 (20%) were Hispanic or Latino; 8 (80%) had received at least a high school education; 6 (60%) were single, never married, and 5 (50%) had children. Three (30%) participants used more than one drug; the most common drug of abuse was marijuana (9 participants). Seven (70%) participants reported emotional abuse, three participants (30%) reported physical abuse and three participants (30%) reported severe combined forms of abuse. For their “priority value,” five participants selected Children and one participant each selected Love, Relationships, Self-Image and Wealth and Prosperity.

All completed the full BSAFER program during their ED visit and participated in the post-program satisfaction survey. Results are shown in Tables 2-3, below. Overall, scores on satisfaction, consistency with MI, and technical usability were high. Five participants (50%) completed the two-week booster, and scores on satisfaction and consistency were similarly high.

Based on call log notes, the primary obstacle to booster follow up was telephone access: many participants’ original phone numbers were disconnected by the two-week follow up. Overall, locators were only marginally helpful in tracking down hard-to-reach participants; many of these numbers were also disconnected at follow up, or locators were not able to reach the participant. For safety reasons, we did not accept partners/husbands as locators, which limited the ability of some women to provide multiple locators. Work or school obligations also seemed to limit women’s ability to follow up; many of our participants seemed to work long hours with little flexibility or free time during their work day.

Discussion

We developed an MI- and Empowerment-based Web intervention for women presenting to the ED who reported a recent history of IPV and drug use. Although many screening, brief intervention, and referral to treatment studies have been completed in the ED, this novel intervention acknowledges the complex interplay between IPV and drug use for women with substance use disorders. Because programs for targeted, at-risk populations have little precedent in the acute care setting (Choo, Beauchamp, et al., 2014), in-depth interviews with participants were a critical component of selecting the content and format of the intervention and, working within the planned theoretical framework, strengthening the aspects of the intervention that the women themselves prioritized.

The qualitative work led us to numerous adaptations to study content during the initial intervention development phase. First, we humanized the intervention to a degree initially not planned, a good reminder that technology ultimately should be a link to social support and that a positive network of peers is a critical component to women with drug use disorders and IPV who present to the ED and may be socially isolated and without access to other health providers. Similarly, Walton et al., in an RCT of a computer-based intervention for adolescents with alcohol use and violence involvement (Cunningham et al., 2012), studied the efficacy of three study conditions: a control, a computer-based intervention, and a therapist intervention that was computer assisted. The investigators found that only the computer-assisted, therapist intervention led to improvements in peer aggression-related outcomes, while the computer-only arm did not. More recently, a systematic review of technology-based alcohol interventions demonstrated modest short-term reductions in alcohol consumption, but little long-term benefit (Dedert et al., 2015). We do not know if the videos in BSAFER were an adequate replacement for a human presence; however, women found them relatable and acceptable, and the scores on consistency with MI principles suggest that the overall experience of the Web-based program was personal and empathetic.

Referral to community resources after discharge has long been a key component of ED-based initiatives for substance use disorders (E Bernstein et al., 1997). However, the extant literature supports the effectiveness of gender-specific substance treatment programs (Brady & Randall, 1999; Greenfield et al., 2007; Grella, 2008), and the referral needs of drug-using women presenting to the ED has not been explored. Themes in both the first and second stage of intervention development emphasized that technology's ultimate goal should be linking women specifically to social supports, particularly a positive network of peers. Our data suggests that women with IPV and substance use disorders who present to the ED may be socially isolated, and without access to peers or regular health providers. By providing women with strong linkages to resources as a primary goal, we may have improved the acceptability and feasibility of the intervention.

The MI-based booster session, too, was designed to provide a human component to the intervention and to provide an opportunity not only to remind patients of their goals and enhance motivation, but to fulfill the women's desire to feel listened to, discuss frustrations and barriers, have an opportunity to ask questions and receive additional, individualized referrals, and to receive further encouragement for progress made in achieving their goals. Boosters have previously been used in the ED to augment the effect of bedside interventions that are necessarily brief, given the ED setting and single point of contact (Edward Bernstein et al., 2009; Bogenschutz et al., 2014; D'Onofrio et al., 2012; Linakis et al., 2013; Mello et al., 2005). However, our interviews suggested that for our target population, the boosters were critical to the technology-based intervention, providing a human component, convey empathy, and participant-specific resources.

Additionally, the qualitative data allowed us to identify the specific content to be prioritized for this population. Although the final intervention remained consistent with the planned theoretical framework, the development process allowed us to improve the concordance between women's own priorities and their perceptions of the intervention. For example, we

increased women's ability to choose "priority values" based on themes identified in the first two stages of the intervention development.

Usability is a critical issue for technology-based interventions, particularly for populations with low-health literacy. However, our open trial confirmed data from earlier exploratory work, (Choo, Ranney, et al., 2014) which suggested that our target population was, in general, technologically savvy and confident both with using devices to report and receive information about sensitive health issues and with the security and privacy provided by Web-based programs. Both the U.S. public in general (Fox & Duggan, 2013; Perrin & Duggan, 2015; Smith, 2013), and the ED population in particular (Ranney et al., 2012), report high rates of cell phone ownership, internet use, and comfort accessing health information online. Our data were consistent with the increasing technological savvy of Americans, suggesting that the medium of intervention delivery we chose was not likely to be a barrier for the average ED patient. This may not be true for all patients; while our study population did represent racial and ethnic diversity and a heterogeneous drug use profile, selection bias may have led to a sample of patients who were particularly comfortable with the Web-based format of the intervention. Future work will be needed to explore the intervention's ability to reach a wide range of individuals, including non-English speaking patients, low literacy patients, and those who are not habitual technology users.

Attrition from study activities after departure from the ED was a significant problem, one that we anticipated given the complex psychosocial circumstances of women with coexisting drug use and partner violence. In future studies, additional methods to improve follow up at the boosters and follow up assessments – many recommended by Donovan et. al (Donovan et al., 2014) in a recent paper on post-ED intervention boosters – may include allowing a generous window for follow up, emphasizing a "warm handoff" from the RA, providing participants with sufficient financial compensation for boosters, and providing the interventionist with close supervision and regular debriefings.

Limitations

Our study recruited participants from a single ED. Although the high-volume, urban, and diverse nature of the setting likely contributed to its generalizability, our findings may be less applicable in other regions of the country, in rural or suburban settings, or in settings where the racial or ethnic composition or drug use patterns of the ED population differs.

Even with the advantage of technology, the BSAFER program does not allow extensive individualization, particularly given the limited amount of time and the complexity of the overlapping issues of violence and drug use. For example, violence in the intervention chiefly addressed the experience of victimization; whereas, as discussed above, many victims may also be involved in perpetration of violence. Although focused on IPV and drug use, women who present to the ED are also at high risk of other comorbidities, including mental health problems (D Houry et al., 2008; Debra Houry, Kemball, Click, & Kaslow, 2007) and sexually transmitted infections (Meyer, Springer, & Altice, 2011), topics which were not incorporated into this intervention. Future work may examine intervention approaches that either provide greater depth to the issues of drug use and violence or expand the breadth of the coexisting conditions that a single program is capable of addressing.

Conclusion

Overall, our small open trial demonstrated the acceptability and feasibility of completing the Web-based intervention during an ED visit. Satisfaction with the intervention in the ED and with the booster was high, and we were able to maintain the essential aspects of MI therapy even after translating it into a computerized format. Although our participants had a variety of educational backgrounds, completion rates and usability scores indicated little difficulty with the technical aspects of the program, boding well for the possibility of broad disseminability of the program. Future work will need to examine efficacy of the program and adapt materials for cultural specificity.

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Appendix A: Initial Interview Guide for Intervention Development

Introduction

- I. Opening Questions: Current computer use and barriers to use (5 minutes)
 Tell me how you currently use computers. This can include a laptop or desktop computer; a tablet computer, like an iPad; or a mobile device, like your cell phone, that you use to get on the internet.
Probes:
 - If ANY→ How often do you use a computer? What kinds of things do you use it for? Have you ever used it to access health information? What kinds?
 - If NONE→ What are the reasons you do not use a computer? What would make you more likely to use a computer?
- II. Core Topic: How the participant achieves behavior change (15 minutes)
 We really want our intervention to be a success, so I'd like to step back and ask you a general question about being successful at something. Think of a time when you set a goal and were successful in reaching it. Tell me about it. (15 minutes)
Probes:
 - What motivated you to make this change? Was there one thing or moment that made you ready to "go for" this goal? What was the first step you took? How did that go? How did that lead to further change?
- III. Core Topic: Supporting change for drug or alcohol use (15 minutes)

The intervention we are building is, in part, about changing drug or alcohol use. We know these are HARD things to change, so we want your advice about how we can best help women make these changes.

- A.** Question: What would you say are the values most important to you? How did/does drug/alcohol use affect these values? How did/would cutting back on drug/alcohol use affect your values?

If needed: How did/does drug/alcohol use affect your quality of life? How did/would quitting/cutting back affect your quality of life?

- B.** Question: When you spoke about your success in [xyz], earlier, you mentioned that [xyz] was helpful. How might [xyz] help someone trying to change their drug or alcohol use?

IV. Core Topic: Supporting change for partner abuse (15 minutes)

The intervention we are building is also about making some changes in women's romantic relationships. We know these are HARD things to change, so we want your advice about how we can best help women make these changes.

- A.** Question: What would you say are the values most important to you? How did/does abuse in your relationship use affect these values? How did/would having safe relationships affect your values?

If needed: How did/does relationship abuse affect your quality of life? How did/would having safe relationships affect your quality of life?

- B.** Question: When you spoke about your success in [xyz], earlier, you mentioned that [xyz] was helpful. How might [xyz] help someone trying to make changes in their relationships?

V. Core Topic: Relationship between relationships and drug/alcohol use.

- A.** Question: Have you noticed any ways in which your drug/alcohol use affects your intimate relationships?

If needed: Describe a situation in which your drug/alcohol use affected your relationship.

- B.** Question: Are there any ways in which stress in your intimate relationships affect how you use alcohol or drugs?

If needed: Describe a situation in which your relationship stress affected your drug/alcohol use.

- VI.** Core Topic: Responses to videos
- A.** How did this video make you feel?
 - B.** Did anything make you feel uncomfortable?
 - C.** What did you like best? Least?
 - D.** What did you think of the women portrayed in the video?
Were they like you? Why or why not? Did you trust what they had to say? Why or why not?

Appendix B: BSAFER INTERVENTION OUTLINE

- A.** Introducing Women's Stories
Meet women who have been there too [Link to BSAFER Intro Video]
- B.** Your Priority Value
Children (To take good care of my children)
Healing (To move on from past events)
Health (To have good physical and mental health)
Love (To give and receive love)
Relationships (To have good relationships with friends and family)
Self-image (To feel good about myself)
Spirituality (To live by a higher power)
Wealth and Prosperity (To have plenty of money)
- C.** **Being Healthier and Safer**
 - 1) Your drug use
 - 2) How using drugs has affected you & your relationships
 - 3) Let's talk money [populates from **Cost Estimate – Drug Use**]
 - 4) Women's stories [Links to Videos: Children, Healing, Health, Love, Your Relationships, Self-Image, Spirituality, Wealth and Prosperity]
 - 5) Drugs and your priority value
Think of your current drug use and how it relates to your priority value of [**your priority value**].
- D.** **Are You Ready to Change Your Drug Use?**
 - 1) Readiness Ruler: Drug use change
 - 2) Confidence Ruler: Drug use change

- E. Moving Forward: Changing Your Drug Use** [only viewed if participant ranks readiness as 1-4]
- 1) Ready to make a change?
Free-text answer where they can explain why they feel ready to make a change.
 - 2) Drug use change goal
Choose a goal to change drug use from a set list of goals.
 - 3) Review: your priority value and goals
How is the drug use change goal you chose in line with your priority value?
- F. IPV & Changing Drug Use**
- You should know...
- Earlier, you have told us that you are experiencing some negative things because of abuse in your relationship. [SIP Violence content]
- You should know (continued)...
- “When you try to make change, you make encounter resistance from your partner. Your partner may become more abusive or controlling when they realize you are trying to make a positive change in your life. This does not mean that you can’t change – you can! But it is very important to have support in making the change. There are people who can help you make a plan to staying safe as you achieve your change goals. Advocates are available to help you.
- 1) Who in your life can support you best?
Asks participant to choose a social support from a list of possible supports or enter in free text.
 - 2) Choosing healthier activities
Asks participant to choose from a menu of alternate behaviors.
- G. How You Feel About Getting Help with Your Relationship**
- 1) Readiness Ruler: Seeking help for IPV
 - 2) Confidence Ruler: Seeking help for IPV
- H. We Did It! ... and So Can You!**
- Empowerment Video “Women’s stories: overcoming obstacles”
- The women you heard from today faced some challenges, but found the strength to change. I’d like to send you home with a message that will give you strength and inspiration to accomplish the goals you set today.
[Participants choose from a list of empowerment messages]

I. Summary and Referrals

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Figure 1.
BSAFER Open Trial Recruitment

Table 1

Major Themes Identified in In-Depth Interviews with Women in the ED with Drug Use and IPV Histories

Themes	Illustrative Quotes
Theme 1: Participants wanted any intervention to connect them to real people, particularly peers.	<p>"I feel like a computer could, you know, ask them those questions and help <i>lead</i> them to a person" S8 (18 yo, Asian)</p> <p>"You could do some on the computer but you should also have something in person, too... if you're meeting with people that have been through the same thing, then it'll make you feel more comfortable. I think they both will help." S6 (26 yo, Black)</p> <p>"...Have women that have gone through what they're asking help for, either the drugs or the abuse. Because if you have a person that's never been there, has never been through it, that's not gonna mean nothin'. It's just talk. But if you've – a woman's been through it and they're talk' to somebody that's going through it, they'll know. Because they'll be like, wow, that happened to me so she really knows what she's talk' about. Because believe it or not, we know if you've been there or not. We know. You know, just by what you say and how you say it. We know." S12 (47 yo, Black)</p> <p>"...having more women that have actually been that have actually suffered the consequences of their drug use, like their testimonies maybe, you know, would be something that you know maybe would help other women. I think to hear them say it – maybe just like, like a compilation of all of that...I think that would be good for other girls to see that, 'this happened to me'... 'this happened to me.'" S18 (32 yo, White)</p> <p>"Havin' someone, for me, who's smoked marijuana so I can, you know, relate to them and be like, this is why I do it, this is how I feel, and they can be like, 'well yeah, that's how I felt too,' and then they could tell you, 'but, this is what happened.'" S4 (23 yo, AI/AN.)</p> <p><i>Interviewer: "What are the things that you would look for in the program that would make you think, 'Wow, this is really helpful'?"</i></p> <p>S11 (30 yo, White): It could just be having a live chat with somebody... like somebody that's been there and gone through it... You don't have to know the person."</p> <p>"Show something that is bad and show the good end of it. Because people's thinking, when they are in that situation, all they are thinking is this can't get any better, all it can do is get worse. So they wanna see it can get better, they wanna know if they can live that good life." S4 (23 yo, AI/AN)</p>
Theme 2: Women's stories of making a positive change identified common motivating factors.	<p>Children and Family</p> <p>"Well, obviously I don't want my children making the same mistakes I have made in the past... I wouldn't want her to see me in a spot where I'm annihilated or drunk or any of those things." S18 (32 yo, White)</p> <p>"My kids helped me through [quitting drug use] a lot. They always used to tell me, 'Ma, we love you. We want to see you grow old so we can get you a rocking chair.'" S5 (50 yo, Black/AIAN)</p> <p>"My reaching point was my daughter's not gonna live in this kind of relationship. She's not gonna see this. That's when I said, 'Okay, enough is enough.'" S10 (21 yo, Hispanic)</p> <p>Moving Past Prior Trauma</p> <p>"I had to...try cancel out a lot of bad memories that I had in my past. And not live on that hurt that I had had in the past and make it a part of my life" S6 (26 yo, Black)</p> <p>Other Relationships</p> <p>"[My friend] is very affected by it and I'm really</p>

Themes	Illustrative Quotes
	<p>close with him and I wouldn't want him to get upset with me or anything." S9 (20 yo, White)</p> <p>Spirituality/Religion</p> <p>"It's like your mind is clearer when you're trying to walk with God... And it's almost like he's telling you, 'Oh, you know that's not good for you. So just turn the other way and walk that way.'" S6 (26 yo, Black)</p> <p>Physical Health</p> <p>"I was tired of waking up in the morning sick, withdrawals, the vomiting...I want at least one child. In order to do that, I have to keep my body healthy." S7 (38 yo, Black)</p>
Theme 3: Participants affirmed the need for change goals to be bolstered by a meaningful support system.	<p>"I think every woman really needs to have a support system... that's absolutely very vital for women to have... a good support system." (32 yo, White)</p> <p>"I think a support network is always an essential... if you're just, you know, doing it by yourself, you can't do anything by yourself. You need other people there." S15 (37 yo, White)</p>
Theme 4: Self-image and confidence were cited as key factors in initiating and continuing drug use and abusive relationships and in being capable of making a change.	<p>[Asked by interviewer about the causes of her problems with drugs, alcohol and relationships]</p> <p>"Lack of self-belief, self-confidence. Really like, I would just think of myself as like worthless and stuff." S8 (18 yo, Asian)</p> <p>"I'm not gonna go out of my way to get [drugs] because, like, I don't want people to be like, 'This girl's picking up again this week for more'... I care about my reputation and, like, ...I realize my self-worth." S9 (20 yo, White)</p> <p>"I mentioned drug abuse... I've been sober for a couple of weeks... I wanted to stop. Like, I don't want to be this girl that's – I don't think it's cute at all." S10 (20 yo, White)</p> <p>"Once you gain that self confidence... there's power within yourself. You feel like you can make those changes. That's what really makes you believe you can make those changes." S8 (18 yo, Asian)</p>
Theme 5: Readiness is the necessary to changing drug use.	<p>"You have to be ready on your own"</p> <p>"I saw myself caught up in a lot of things. I saw myself just making so little money, I couldn't even afford a lot of things like baby diapers. It was hard and I hate asking people for things... my daughter would ask me for something and I couldn't afford it and that – I'm like, I need to do something. That was the reach point that I'm like, I have to do it. It can't be tomorrow, it has to be today. So that's when I was ready." S10 (20 yo, White)</p>

Table 2

Participant ratings of consistency of Web-based program with motivational interviewing principles/processes

In my most recent conversation.../My most recent conversation.../Because of my most recent conversation...	Agree/Strongly Agree* n(%)
I felt understood	10 (100%)
We worked well together	9 (90%)
Encouraged me to express my thoughts and feelings	10 (100%)
I felt like my thoughts and feelings were paid attention to	10 (100%)
I felt respected	10 (100%)
Helped me realize the difference between what my life is like now and what I would like my life to be like	9 (90%)
I feel more able to change my drug use	80 (80%)
Hearing about possible consequences of my choices helped me consider changing my drug use	10 (100%)
Helped me think of ways to change my drug use	10 (100%)
I have developed some new understanding of how drug use affects my life	10 (100%)
Gave me a reason to change my drug use	6 (60%)
When the counselor and I felt differently about my drug use I felt judged or looked down upon	1 (10%)

Table 3

Participant satisfaction ratings for the Web-based program (CSQ-8)

Question	Positive answers* n(%)
How would you rate the quality of service you have received? (Good or Excellent)	10 (100%)
Did you get the kind of service you wanted? (Yes, generally or Yes, definitely)	8 (90%)
To what extent has our program met your needs? (Almost all of my needs have been met or Most of my needs have been met)	10 (100%)
If a friend were in need of similar help, would you recommend our program to him or her? (Yes, definitely or Yes, I think so)	10 (100%)
How satisfied are you with the amount of help you have received? (Very satisfied or Mostly satisfied)	9 (90%)
Have the services you received helped you to deal more effectively with your problems? (Yes, they helped a great deal or Yes, they helped)	10 (100%)
In an overall, general sense, how satisfied are you with the service you have received? (Very satisfied or Mostly satisfied)	10 (100%)
If you were to seek help again, would you come back to our program? (Yes, definitely or Yes, I think so)	10 (100%)

* On a 4-point Likert scale (answer options are slightly different for each question, but each has two negative answer options and two positive answer options, indicated in the first column)