

Reducing Alcohol Misuse and Promoting Treatment Initiation among Veterans through Brief Online Intervention: Study Protocol for a Randomized Controlled Trial

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Abstract

Background: Young adult veterans who served after the September 11th attacks on the United States in 2001 (i.e., post-9/11) are at heightened risk for experiencing behavioral health distress and disorders, including hazardous drinking, PTSD, and depression. These veterans often face significant barriers to behavioral health treatment, and reaching them through brief mobile phone-based interventions could help reduce drinking and promote treatment engagement.

Objective: Following a successful pilot study, this randomized controlled trial (RCT) aims to further test the efficacy of a brief (i.e., single session) mobile phone-delivered personalized normative feedback (PNF) intervention enhanced with content to promote treatment engagement.

Methods: We will conduct an RCT with 800 post-9/11 young adult veterans (aged 18 to 40) with potentially hazardous drinking and who have not recently received treatment for any behavioral health problems. Participants will be randomly assigned to the personalized intervention or a control condition with resources for seeking care. The PNF module in the intervention focuses on correction of misperceived norms of peer alcohol use and utilizes empirically informed approaches to increase motivation to address alcohol use and co-occurring behavioral health problems.

Results: Drinking, alcohol-related consequences, and treatment-seeking behaviors will be assessed at baseline and 3-, 6-, 9-, and 12-months post-intervention. Sex, barriers to care, PTSD, depression, and severity of alcohol use disorder symptoms will be explored as potential moderators of outcomes.

Conclusions: This RCT will evaluate the efficacy of a novel intervention for non-treatment-seeking veterans who struggle with hazardous drinking and possible co-occurring behavioral health problems. This intervention has the potential to improve veteran health outcomes and overcome significant barriers to treatment. Clinical Trial: ClinicalTrials.gov Identifier NCT04244461

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Reducing Alcohol Misuse and Promoting Treatment Initiation among Veterans through Brief Online Intervention: Study Protocol for a Randomized Controlled Trial

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Abstract

Background: Young adult veterans who served after the September 11th attacks on the United States in 2001 (i.e., post-9/11) are at heightened risk for experiencing behavioral health distress and disorders, including hazardous drinking, PTSD, and depression. These veterans often face significant barriers to behavioral health treatment, and reaching them through brief mobile phone-based interventions may help reduce drinking and promote treatment engagement.

Objectives: Following a successful pilot study, this randomized controlled trial (RCT) aims to further test the efficacy of a brief (i.e., single session) mobile phone-delivered personalized normative feedback (PNF) intervention enhanced with content to promote treatment engagement.

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Results. Past 30-day drinking, alcohol-related consequences, and treatment-seeking behaviors will be assessed at baseline and 3-, 6-, 9-, and 12-months post-intervention. Sex, barriers to care, PTSD, depression, and severity of alcohol use disorder symptoms will be explored as potential moderators of outcomes. We expect recruitment to be completed within 6 months, with data collection taking 12 months for each enrolled participant. Analyses will begin within three months of the final data collection point (i.e., 12 months follow-up).

Conclusions: This RCT will evaluate the efficacy of a novel intervention for non-treatment-seeking veterans who struggle with hazardous drinking and possible co-occurring behavioral health problems. This intervention has the potential to improve veteran health outcomes and overcome significant barriers to treatment.

Trial registration: ClinicalTrials.gov Identifier NCT04244461

Keywords: military, mental health, substance use, mobile, PTSD, drinking



1. Introduction

Americans who served in the U.S. military during or after September 11, 2001 and have since discharged (post-9/11 veterans) experience concerning rates of mental health disorders, with estimated prevalence of depression and posttraumatic stress disorder (PTSD) ranging from 10% to 30%, respectively [1-5], and often co-occurring [6]. Alcohol use disorder (AUD) is the most common substance use disorder among veterans [7-10] and it, too, often co-occurs among veterans with depression or PTSD [11-14]. Approximately 1 in 10 post-9/11 veterans who are seeking any care within the Veterans Health Administration meet criteria for an AUD [15], and studies show that upwards of 40% of these veterans drink alcohol at levels that place them at risk for negative alcohol-related consequences (i.e., hazardous drinking) [10, 16-19]. Younger veterans under age 40 drink more heavily than older veterans [10, 15] and may be at heightened risk for developing an AUD later in life, making early intervention and prevention efforts for younger adult veterans essential.

Despite the availability of evidence-based behavioral health care (i.e., care for mental health and/or substance use disorders) through Veterans Affairs (VA) and in private care settings [20-23], not all veterans with behavioral health needs utilize these services. Estimates suggest that over 50% of post-9/11 veterans meet screening criteria for a mental health disorder (including AUD), but less than half receive care [24-30]. Those that do often receive inadequate care to address their needs, such as seeing a mental health provider only once or twice for an intake without follow-up or not completing a doctor's full planned prescription for psychotropic medications [31-33]. Veterans who engage in heavy drinking and have a co-occurring PTSD and depression diagnosis have particularly difficult barriers to seeking care [34]. It is important to target heavy alcohol use early after discharge and in young adulthood so both alcohol use and co-occurring mental health problems do not become chronic or more difficult to treat.

Veterans may not receive needed care for a variety of reasons. Barriers to care include perceived stigma from others (e.g., belief that colleagues, family, and friends would respect them

less), fear of repercussions or career harm (e.g., concerns that their career would not progress if they seek treatment), beliefs that their drinking behavior is normative among other veterans and not in need of changing, lack of awareness of treatment options, concerns about high costs, limited access due to residency in rural areas, and beliefs that they can handle their problems on their own or that available treatments are not effective [28, 30, 35-40]. Women and racial/ethnic minority veterans may have additional barriers related to childcare responsibilities, apprehension about using VA facilities, discomfort and mistrust of providers, and discrimination within healthcare systems [41].

Internet- and mobile-phone based approaches to treatment represent a potentially important avenue through which to help veterans overcome barriers to accessing care they may not otherwise pursue. Existing outreach efforts target veterans already seeking services at the VA (e.g., care for physical injuries) through public media campaigns and announcements in primary care clinics. However, these efforts do little for the largely neglected population of veterans who have not received care from the VA or for those who may prefer to seek care elsewhere but are either unaware of or disinterested in their options [34, 42]. In addition, stand-alone online alcohol interventions for veterans are lengthy and characterized by high attrition [43-47].

In an effort to reach veterans outside of VA settings, we designed and pilot tested a single-session intervention [48] for a cohort of young adult veterans (i.e., aged 18 to 34) who were recruited on social media websites. In the intervention, which targeted veteran drinkers who were not necessarily seeking treatment for alcohol-related concerns, veteran participants were shown normative data of their gender-specific veteran peers [49, 50] to correct their overestimations of peer veteran drinking behavior and to provide a comparative reference for their own drinking behavior (that is, to demonstrate that their veteran peers likely drink less than an individual may think other veterans drink, and/or less than they, in fact, do). In this pilot randomized controlled trial (RCT) (ClinicalTrials.gov NCT02187887), we found small but significant intervention effects favoring the intervention one-month post intervention on all pre-specified drinking outcomes: past 30-day drinks

per week ($d = 0.47$), average number of drinks per occasion ($d = 0.17$), binge drinking days (defined at 5 drinks in a row for males and 4 drinks in a row for females; $d = 0.18$), and alcohol-related consequences ($d = 0.17$) compared to control [51].

As concluded in a recent review of brief online interventions for young adult alcohol misuse [52], from a public health perspective, being able to reach a large number of individuals and provide them with interventions that lead to even modest effects is beneficial at a societal level. Such modest effects from a single session program may be important as an individual begins to evaluate one's personal alcohol use and considers making a change, which may include seeking out formal assessment and more intensive treatment. The personalized normative feedback (PNF) approach offers a reference point for an individual's personal drinking habits compared to peers and, similar to a check-up model [43, 53], allows one to consider making a change to their drinking. Though PNF interventions are efficacious, these effects are often small and short-lived [54]. Thus, there is room for PNF interventions to expand beyond short-term effects on drinking and be used as a vehicle to connect those who have never received an intervention before with more intensive services. For veterans engaging in heavier problem drinking, sustained changes in drinking may be better obtained through in-person individual or group interventions, as opposed to a one-time brief intervention. For veterans that use alcohol to cope with or manage PTSD or depression symptoms, more intensive co-occurring disorder treatment may be indicated, whereby they can learn more adaptive techniques to cope with negative affect. In our pilot study, we found that almost twice as many PNF condition participants as control participants reported increases in motivation and likelihood to seek AUD treatment simply after viewing the PNF [55], alluding to the promise of the approach in targeting treatment initiation among the group of veterans who have not engaged in care or have had substantial barriers or challenges doing so. . If the brief intervention prompted veterans to think more about making a change to their drinking, it may be a tool to reach those who may not have otherwise considered change and to connect them with services.

The Present Study

To build upon the pilot trial, we designed the current study to test the longer-term effects (i.e., 12-month outcomes) of a brief PNF intervention on drinking and treatment (i.e., motivation and preparation for; actual initiation) outcomes. For this larger study, we expand upon the original pilot intervention content, which primarily focused on correcting misperceived norms of veteran peer alcohol use, to include empirically informed approaches to increase motivation to address one's alcohol use and co-occurring behavioral mental health problems (e.g., depression, anxiety, PTSD) in more formal care settings (i.e., those beyond a one-time brief intervention, such as care with a provider at a VA). In doing so, we will evaluate intervention effects on readiness to initiate behavioral health care, preparatory behaviors towards seeking that care, and any actual care initiation in the post-intervention period. To evaluate the impact of the intervention on these outcomes, we intend to enroll and randomize 800 participants into either the PNF intervention (N = 400) or a resources-only control condition focused on providing information related to care services (N = 400). In the protocol that follows, we describe our recruitment methods and target sample; list our measures for outcomes and moderators of intervention effects; discuss the intervention content in detail; and lay out the proposed analytic plan to examine the efficacy of the brief online intervention on alcohol use and treatment initiation outcomes.

2. Methods

2.1. Trial design overview

This RCT (ClinicalTrials.gov NCT04244461) was designed to test the efficacy of a single session brief mobile phone-based intervention with young adult veterans. The intervention will be a mix of narrated video, audio, text, and graphics that contain personalized content emphasizing the veteran's values, their goals for treatment initiation, and resources to help them connect with behavioral health care. Veteran participants aged 18 to 40 will complete a baseline survey, be randomized to the intervention or a control condition, and then complete four follow-up surveys at

3-, 6-, 9-, and 12-months post-baseline. At each follow-up period, all participants will be emailed a list of resources to help connect them to behavioral health services, as well as a link to the intervention website after each follow-up assessment. The intervention is named Project BRAVE (Building Resilience and Agency through Veteran Engagement), with an accompanying logo, to help veterans recognize the study during recruitment and reminder correspondence.

2.2 Specific aims and hypotheses

For the first aim, we intend to conduct an RCT of the BRAVE online intervention by randomly assigning veterans with potentially hazardous drinking patterns, but who have not received recent treatment for drinking or any other behavioral health problem, to receive either the BRAVE intervention or a resources-only control condition. We hypothesize that BRAVE participants will drink less (fewer days per week, fewer drinks per occasion, fewer binge drinking days), experience fewer negative alcohol-related consequences, and report more treatment readiness, preparatory behaviors, and initiation behaviors at 3-, 6-, 9-, and 12-months post-intervention, relative to control participants. For the second aim, we will determine for which subgroups the intervention works best. We hypothesize BRAVE participants who report more baseline barriers to care (e.g., perceived public stigma beliefs that others would view them negatively for seeking care, not having time due to work or family responsibilities), baseline high levels of PTSD or depression symptoms, and higher baseline problematic alcohol use, will benefit most from the intervention in terms of drinking reductions and treatment initiation outcomes. Sex (male, female) will be examined as an exploratory moderator, which expands on veteran work that traditionally examines male veterans only, which is important considering unique female-specific factors that affect treatment engagement [41].

2.3 Participant recruitment and eligibility

The BRAVE intervention is designed for mobile phones with Internet capabilities and is targeted towards young adult veterans. Though the intervention is designed for use on mobile phones, it can be accessed through computers and tablets. Given the focus on a younger veteran

cohort, eligibility criteria include: (1) United States veteran who has been discharged or separated from the Air Force, Army, Navy, Marine Corps, or Coast Guard (participants could have also been in the reserves or guard units, but not on active duty), (2) between the ages of 18 and 40, (3) a score on the 10-item Alcohol Use Disorders Identification Test (AUDIT [56]), of 4 or greater (men) or 3 or greater (women), which represents cutoff scores to identify those who may benefit from interventions to reduce alcohol misuse, (4) no upcoming appointments at the VA or elsewhere to receive treatment for a behavioral health concern (such as depression, PTSD, or alcohol use concerns), and (5) no appointments in the past six months for behavioral health treatment at a VA or elsewhere. The purpose of these latter two criteria is to reach participants outside of traditional care settings (i.e., those who may need care but who are not receiving it) and to measure the effect of the intervention on treatment initiation. Participants also need access to the Internet via a computer, tablet, or phone; a working email address; and the ability to read and understand English. Based on these criteria, we will recruit 800 participants who will be randomly assigned to the BRAVE intervention (N = 400) or a resources-only control condition (N = 400) that presents resources for care seeking (e.g., location of local VA, links for connecting with local veteran service organizations) without any personalized content.

2.4 Procedures

Participants will be recruited online with the aid of a recruitment platform, BuildClinical, which uses machine-learning and data mining procedures to target online ads to recruit the sample population from a variety of general online and social media sources (e.g., Instagram, Facebook, Google, health websites). BuildClinical uses targeted ad imagery and text to ensure we meet the recruitment needs of the study, including aiming for 10-15% women veterans to match the growing number of post-9/11 women veterans. The pilot intervention study successfully enrolled 18% women veterans [51]. Participants will click on ads displayed online and be directed to a website with a description of the study. If interested, they can fill out an online screening form to assess for

eligibility and answer questions to help determine that they are not falsifying responses to gain access to the offered incentives. We have developed procedures to identify and exclude non-veterans from enrollment, which includes asking about first-hand knowledge through questions that must be consistent across responses (e.g., branch, rank, pay grade, and job in the military must all make sense when considered together) and ensuring responses are identical when asked variations of the same question at different times throughout the survey. Once participants pass through the initial validation checks, we will call each potential participant to verify the information they provided (e.g., ensuring phone responses match survey responses to items such as branch and rank). If the individual's responses are deemed credible and they remain interested in participation, the individual will be enrolled as a participant following a discussion of the study procedures and consent document. Once enrolled, participants will fill out a baseline survey and then be randomized to one of two conditions: the BRAVE intervention or a resources-only control condition.

2.5 BRAVE intervention condition

The intervention was designed to build upon the piloted personalized normative feedback (PNF) intervention with veterans from our prior work [51]. Similar to other young adult groups, veterans misperceive the drinking behavior of their peers and these misperceptions associate with their own drinking behavior [50]. PNF is one of the most frequently used efficacious drinking interventions for young adults [54] and we have shown promise of the stand-alone approach for young veterans [51]. In the PNF, individuals are presented with normative data that challenges their beliefs that similar peers drink as heavily as the individual perceives they do. Using graphics and descriptions of norms theory (e.g., we pay attention to patterns outside the norm and come to believe those deviations are more normative than they are), individuals can see that their perceptions about others may be incorrect and that they may be drinking more than their peers. In BRAVE, participants are presented with PNF approximately midway through the larger, multicomponent intervention. First, participants are asked about their own drinking behavior and the behavior of their peers in the

past 30 days. Participants indicate how many drinks they consumed on a typical drinking day and how many drinks they think other male and other female veterans drank on a typical drinking day. They then indicate how many days in the past 30 days they drank 4 (for females) or 5 (for males) drinks on an occasion (i.e., binge drinking) and how many days they think male and female veterans drank these amounts. PNF is then displayed for both male and female drinking norms to all participants so veterans can see that heavy drinking is not the norm among both sexes (see example in Figure 2). Norms for drinking were derived from our prior work with 1,230 veterans [57].

We expanded the PNF intervention to include content designed to encourage veterans that were not currently seeking care for alcohol or mental health concerns to more strongly consider and actually seek care. The intervention includes a mix of videos, audio, text, graphics, and interactive components. There are two veteran peers as narrators (one male, one female) that walk veterans through a 20-to 30-minute personalized intervention. Veteran peers were selected for the program given prior work showing the importance of peers in helping change attitudes and behaviors in health interventions [58], particularly among veterans with mental health and substance use concerns [59, 60].

BRAVE begins with the clarification of personal values, with the selection of values and related content that highlights the ways in which veterans live according to those values. Veterans are given a set of 16 values and asked to select which resonate with them. Examples of values presented include Honor (“To adhere to what is right with great respect”), Self-control (“To be disciplined in my own actions”), Courage (“To be brave and strong in the face of fear, threat, or difficulty”), and Empathy (“To try and understand the perspective of others and what they are feeling”). They are also given the option to indicate their own values not included in the sample list. This component is based on the interactive ‘values card sort’ exercise originally created as a tool in Motivational Interviewing [61], and used heavily in Acceptance and Commitment Therapy [62]. The purpose of using these intervention components is to help veterans identify and reflect on what is most meaningful and

important to them in their life; this may include seeking care for any mental health concerns they may have. Clarifying values will then help a veteran move forward on important committed actions, defined as action in the direction of what someone cares about even in the presence of obstacles (e.g., address problematic alcohol use, seek care) [63]. Values clarification is followed by content to help veterans overcome identified barriers to care, such as challenging unhelpful beliefs about treatment (e.g., “I can handle my problems on my own,” “Providers will force me to take medication,” “My symptoms are not severe enough to deserve care”) by providing information about what to expect when seeking care, with practical resources for where to seek help. Four main topic areas are presented to veterans, where they can click to learn more about each area: “What is mental health treatment like?,” “What is the format of mental health treatment?,” “How much of a commitment is mental health treatment?,” and “Where can I get mental health treatment?” PNF is reviewed for alcohol use as described above, followed by normative feedback that helps to challenge the perceived public stigma that many veterans have about seeking care [64]. For example, the narrators describe studies that show that other veterans would not see someone as weak for seeking care; in fact, they would encourage those who need help to get the help they need. Preliminary work shows the promise of showing individuals information that corrects their misperceptions about perceived public stigma (e.g., informing them that most people think that having a mental health problem is nothing to be embarrassed about [65]). Within the intervention, veterans are prompted to identify their personal values; these values are repeatedly referred to throughout the content of the intervention, including when veterans make goals for themselves about seeking care or making a positive change in their lives (e.g., the intervention prompts them to mindfully consider what changes they can make to live more in accordance with their values [66]). Veterans are asked about some reasons for seeking behavioral health care that resonate with them, such as “my family life may improve,” “I may gain personal insight and awareness,” and “I may feel more motivated to do the things I want to do.” These reasons for seeking care are presented alongside their values and veterans

are asked to consider if seeking care would help them live more in line with their values. Informed by Cognitive Behavioral Therapy [67] and Motivational Interviewing [53, 68] theory and practice, content is presented in a non-judgmental way, with veterans able to make their own choices about making a change to their drinking or pursuit of behavioral health care.

In the penultimate section of the program, veterans are asked to make immediate, short-term, and long-term goals, with encouragement from the narrators to work towards those goals in the next few months [69]. Veterans type in their goals related to any area of their life where they want to make a change (e.g., “I want to drink less,” “I want to address my anxiety and reduce stress,” “I want to improve my relationship with my kids”) and are asked to make sure these goals align with their values. Prompts for immediate (i.e., something small and simple that they can easily accomplish within the next 24 hours), short-term (i.e., things they can do in the service of their values-based goal within the next few days and weeks), and long-term (i.e., actions that will move them closer to their values-based goal over the next few months and years) goals are provided.

The intervention concludes with a summary of the content reviewed as well as personalized resources, including where to get help (e.g., the location of nearest care centers based on participant’s ZIP Code, crisis assistance) and information about local peer support groups and veterans service organizations. In the RCT, participants will receive a login for the intervention and can return to it any time during the study. At each follow-up survey, they will be sent the link to the intervention with their login information and encouraged to review the content again.

2.6 Control condition

Participants assigned to the control condition will receive a link to an interactive website with resources similar to those provided at the end of the BRAVE intervention. On the site, veterans are able to find care centers, peer support groups, and veterans service organizations by clicking through the organized content. Participants will be asked to explore the content on the website for about 20 to 30 minutes, to match the length of the BRAVE intervention. They can return to the website at any

time. After each follow-up survey, the control participants will be sent the link to these resources again to have it easily accessible.

2.7 Measures

Measures will be collected at screening, baseline, and all follow-up time points through confidential online surveys. After completing the screening survey and becoming enrolled, participants will receive a \$20 gift card for each survey they complete (total of \$100 for all surveys).

2.7.1 *Demographics and background*

Participants will fill out several demographic items that will be used to describe the sample. These include age, sex at birth, gender, race, ethnicity, income level, military branch, military rank and pay grade at discharge, number and location of deployments, education level, marital status, and number of children. Participants will also complete a measure of combat exposure to assess for presence and severity of combat experiences while in the military [28].

2.7.2. *Primary outcomes*

Primary outcomes are drinking behavior (past 30-day frequency, quantity, and number of binge drinking days), negative alcohol-related consequences, and treatment initiation. Three past 30-day drinking outcomes will be assessed through single item self-reports: drinking days, average drinks per occasion, and binge drinking days. Alcohol-related consequences in the past 30 days will be assessed with the Short Inventory of Problems (SIP-R; [70]), which is modified from the Drinker Inventory of Consequences (DrInC; [71]). The treatment outcome will be measured as treatment initiation in the time period after the intervention (i.e., post-baseline). Treatment initiation is assessed with an item asking participants to indicate if they have seen a provider at a VA or non-VA care setting for therapy, counseling, support groups, hospitalization, or medications for any concerns related to alcohol or substance use (e.g., if they sought help to drink less, or attended groups to stay abstinent from cannabis or other drugs) or mental health concerns (e.g., to help with stress, anxiety, depression, nightmares) in the past six months (at baseline) and past three months (follow-ups).

Providers are defined for participants as a mental health or behavioral health provider (e.g., psychiatrist, psychologist, social worker, mental/behavioral health nurse, or other provider), a general medical provider (e.g., primary care doctor, physician assistant, nurse practitioner), or an addiction specialist (e.g., addiction counselor). Care is specified as either in-person or via telehealth.

2.7.3. Secondary outcomes.

The decision to seek care and then actual receipt of care can be a lengthy process. Given that participants may not receive any care during the 12 months of follow-up, we will also assess their readiness to receive care in the future and if they made preparations to receive that care. Preparatory behaviors will be specified as six behaviors participants would definitely do, probably do, probably not do, or definitely not do in the next 30 days to prepare for treatment (i.e., looking at options online; discussing with a partner, family member, or friend the options available; talking with a partner, family member, or friend about their experiences with treatment; contacting a provider to learn more about the options; contacting the insurance provider to see what options are available; contacting a provider to make an appointment). Two readiness rulers will also assess participants' readiness to seek care in the next 30 days in order to reduce their drinking and to address any mental health concerns they have from 0 (not ready at all) to 10 (absolutely ready).

2.7.4 Moderators

To examine the characteristics of participants for whom the intervention is most efficacious, we will include measures at baseline of perceived barriers to treatment, PTSD symptoms, depression symptoms, and AUD severity. Perceived barriers are assessed with the 15-item RAND Barriers to Mental Health Care item bank [72]. Items are rated on a scale from 1 (not at all) to 5 (very much) and reflect barriers of perceived stigma (e.g., seeking care would be viewed as a sign of personal failure, others would lose respect for the person, other veterans would see them as weak), fears about confidentiality (e.g., people might find out about it), beliefs that treatment does not work, and difficulties finding time for treatment due to other responsibilities (e.g., because of work or family).

These items can be summed to receive a baseline severity of barriers score. PTSD symptoms will be assessed with the 20-item PTSD Checklist (PCL-5), a widely used measure for military and veteran populations with adequate reliability and validity for young adult military samples [73]. Depression symptoms will be assessed with the Patient Health Questionnaire 8-item (PHQ-8), a reliable and valid measure of depression used in research and practice for military and veterans [74-76]. Severity of AUD will be assessed with the AUDIT [56], a 10-item alcohol screen that identifies individuals who had probable AUD in the past year. The PCL-5, PHQ-8, and AUDIT can each be summed to create baseline symptom severity scores for each.

2.8 Analytic Plan

Prior to main aims analyses, we will assess for multivariate normality. The maximum likelihood estimator will be used if data are approximately normal and robust maximum likelihood will be used if the data are not multivariate normal. Missing data will be assumed to be missing at random and handled using direct maximum likelihood techniques. We will assess for differences in baseline demographics and military characteristics between the intervention (BRAVE) and control conditions. Any characteristic significantly different between groups will be controlled for in analyses.

To assess the effects of the intervention on continuous primary outcomes (drinking days, average drinks per occasion, binge drinking days, negative alcohol-related consequences, treatment initiation) and secondary outcomes (preparatory behaviors, readiness to seek care ruler for alcohol, readiness to seek care ruler for mental health), a taxonomy of latent growth models will be estimated [77]. The primary outcome timepoint for this trial will be the baseline to first follow-up (i.e., 3-month post-baseline); however, we are interested in past 30-day changes from baseline to each of the three additional follow-up timepoints (i.e., baseline to 6-, 9-, and 12-months post-baseline). To assess between-group differences in the intercept and growth factors, we will regress each on a dummy variable representing the intervention (BRAVE = 1) and control (control = 0)

groups. For any count variables, negative binomial or Poisson distributions will be explored for better model fit. To understand change in treatment initiation (binary outcome) we will utilize latent growth models with categorical outcomes as well as estimate simple logistic regression at each time point. To understand practical significance, we will calculate standardized mean differences (Cohen's d) at all four follow-up timepoints for both between group and within group.

We will test for significant effect moderation by the following variables: barriers to care, PTSD, depression, and severity of AUD symptoms. To explore moderation, we will use simple linear regression models for primary outcomes at each time point. We will include an interaction term between each potential moderator and the intervention indicator (BRAVE vs. control). Significant interactions between intervention group and these moderators will be plotted with appropriate values and interpreted. Simple slopes will be calculated for all significant interactions. Given our prior work and the large sample size, we expect to have adequate numbers of participants in each cell for moderation analyses and will use established cutoff scores on the PCL-5 (score 33 or higher vs. under 33), PHQ-8 (scores 10 or higher vs. under 10), and the AUDIT (scores 8 or higher vs. under 8). We hypothesize that those with greater barriers, PTSD, depression, and severity of AUD symptoms will benefit most from the intervention. Sex (male/female) will be included as an exploratory moderator.

2.8.1 Power analysis.

Given this study design (and standard $p < .05$, two-tailed testing), we will have 80% power to detect small treatment effects between the groups; specifically, effects of $d = 0.22$ at 3- and 6-month follow-ups and $d = 0.23$ at 9- and 12-month follow ups. For reference, our observed intervention effect sizes at 1-month post-intervention in the pilot study were $d = 0.17$ for average drinks, $d = 0.18$ for binge days per month, and $d = 0.19$ for consequences [51]. We have similarly found small effect sizes over two years of follow-up in other large scale PNF studies [78-80]. We expect effect sizes to be small, though slightly larger than those in our prior work given we include a sample screening positive for hazardous alcohol use that could benefit from treatment, whereas prior work targeted

general college students and young veterans drinking at less severe levels. As noted, given that this intervention targets those who may never have received care otherwise, small effects seen in brief interventions such as this are potentially clinically significant.

Our prior work evaluating treatment seeking behaviors has found rates of preparatory and actual treatment seeking by service members to increase by double following brief phone-based feedback [81]. Other work has similarly found rates of substance use treatment initiation to increase to upwards of 50% following in-person feedback-based approaches [82]; thus, we hypothesize that upwards of 50% of participants who receive the enhanced PNF will report actual treatment initiation at some point during the 12 month follow-up period. We will examine preparatory behaviors (i.e., steps along the way to actual initiation) and motivation to seek care.

2.9 Ethics Approval

The Internal Review Board at the University of Southern California approved all procedures for this study.

3. Results

Data on primary and secondary outcomes will be collected as specified in the Methods section. We expect recruitment to be completed within 6 months, with data collection taking 12 months for each enrolled participant. Analyses will be conducted as specified in the Analytic Plan section above and begin within three months of the final data collection point (i.e., 12 months follow-up).

4. Discussion

The brief intervention we designed is intended to reach younger veterans who may have never otherwise considered seeking care for alcohol misuse or co-occurring mental health problems. BRAVE was designed to expand upon our prior pilot intervention study [48] that showed a PNF intervention yielded small intervention effects one-month post-intervention [51]. Given the ability of

the Internet recruitment method to access this difficult-to-reach population, combined with the intervention's ability to prevent alcohol misuse and consequences among a population with high rates of co-occurring mental health symptoms, we included values clarification, goal setting, and content to address barriers to care to expand on the theoretical and empirical basis of PNF interventions, including theories of normative influence [83, 84] and aspects of Motivational interviewing [68], to encourage veterans to consider making changes to their drinking behaviors early, either by reducing on their own or seeking formal treatment, before their alcohol use transitions to a more problematic AUD.

Should BRAVE demonstrate efficacy in reducing drinking and/or improving treatment engagement among veteran participants, there is the potential to reach large numbers of veterans given the ubiquity of mobile technology [86] and the potentially low cost and burden of accessing mobile health interventions [87]. There may be challenges associated with disseminating such an intervention more broadly, given that the target population involves veterans not engaged in treatment who therefore are not in contact with those who would traditionally recommend such an intervention (i.e., care systems and providers).

Moderation analyses of the present study could allow for the further tailoring of our treatment approach and for better targeting specific subgroups of veterans. That is, should our analyses reveal that veterans with specific clinical or demographic characteristics are more likely to evidence reductions in drinking and/or treatment seeking behaviors, this could justify targeted dissemination of PNF interventions like ours to such veterans. On the other hand, should a subgroup of veterans be less responsive to BRAVE, researchers could consider further adapting such interventions to better target relevant symptom processes or demographic groups. Hypothetically, such an intervention could be tailored to better meet the needs of female or male veterans or could include modules specific to PTSD or depression symptomology.

4. Limitations and Considerations

As the sample will involve relatively younger post-9/11 U.S. veterans, it is unclear whether results will generalize to broader veteran samples and, in particular, veterans who are less comfortable with technology may have challenges engaging with an intervention such as BRAVE. Additionally, should the intervention demonstrate efficacy for reducing drinking and/or treatment related outcomes, it will not be possible to disentangle whether it was the intervention as a whole or specific aspects of the intervention which were efficacious. Further dismantling studies of BRAVE may be necessary.

5. Conclusions

The BRAVE intervention has much potential to provide intervention to a traditionally difficult to reach population. It leverages mobile technology and combines several intervention strategies to fit the needs of the specific clinical presentation and needs of the population. While we anticipate BRAVE to be efficacious, reaching veterans outside of research studies will be an essential next step for our team and for intervention developers more broadly. Dissemination and implementation of evidence-based mobile and Internet-based interventions is a key component of continuing to improve behavioral health care access for veterans and other groups in need.

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Author Contributions

ERP is the lead author and drafted a first version of this manuscript. ERP conceptualized the study and obtained funding along with JPD, JFH, KB, and CN. KDB is the project manager for this study and assisted with drafting sections of this manuscript, as well as provided formatting for the journal. JPD, JFH, KB, CN, KDB, IMS, REF, DDT, and SS contributed equally when providing edits to the first draft of the manuscript. All authors approved this final version of the manuscript.

Conflicts of Interest

None declared.

Data Availability

Data are available by request from the first author (ERP). A data use agreement will be available.

Abbreviations

AUD: Alcohol use disorder

AUDIT: Alcohol Use Disorders Identification Test

(Project) BRAVE: Building Resilience and Agency through Veteran Engagement

DrInC: Drinker Inventory of Consequences

PCL: PTSD Checklist

PHQ: Patient Health Questionnaire

PNF: Personalized normative feedback

PTSD: Posttraumatic stress disorder

RCT: Randomized controlled trial

SIP-R: Short Inventory of Problems Revised

VA: Veterans Affairs

References

1. Gradus, J. L., Epidemiology of PTSD. Washington, DC: National Center for PTSD, Department of Veterans Affairs. 2014. <https://www.ptsd.va.gov/professional/treat/essentials/epidemiology.asp>. Accessed October 2023.
2. Dursa, E. K., et al., Prevalence of a positive screen for PTSD among OEF/OIF and OEF/OIF-era veterans in a large population-based cohort. *J Trauma Stress*. 2014; **27**(5): 542-9. PMID: 25267288
3. Fulton, J. J., et al., The prevalence of posttraumatic stress disorder in Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) Veterans: a meta-analysis. *J Anxiety Disord*. 2015; **31**: 98-107. PMID: 25768399
4. Lapierre, C. B., Schwegler, A.F., & LaBauve, B .J. Posttraumatic stress and depression symptoms in soldiers returning from combat operations in Iraq and Afghanistan. *J Trauma Stress*. 2007; **20**(6): 933-943. PMID: 18157882
5. Boakye, E. A., et al. Self-reported lifetime depression and current mental distress among veterans across service eras. *Mil Med*. 2017; **182**(3-4): e1691-e1696. PMID: 28290944
6. Knowles, K. A., et al. Comorbid mood and anxiety disorders and severity of posttraumatic stress disorder symptoms in treatment-seeking veterans. *Psychol Trauma*. 2019; **11**(4): 451-458. PMID: 29963890
7. Ecker, A. H., et al. Cannabis use disorder among veterans: Comorbidity and mental health treatment utilization. *J Subst Abuse Treat*. 2020; **109**: 46-49. PMID: 31856950
8. Bonn-Miller, M. O., Harris, A. H., & Trafton, J.A. Prevalence of cannabis use disorder diagnoses among veterans in 2002, 2008, and 2009. *Psychol Serv*. 2012; **9**(4): 404-16. PMID: 22564034
9. Seal, K. H., et al. Substance use disorders in Iraq and Afghanistan veterans in VA healthcare,

- 2001–2010: Implications for screening, diagnosis and treatment. *Drug and Alcohol Depend.* 2011; **116**(1): 93-101. PMID: 21277712
10. Hoggatt, K. J., et al. Prevalence of substance misuse among US veterans in the general population. *Am J Addict.* 2017; **26**(4): 357-365. PMID: 28370701
 11. Bryan, J. L., et al., Cannabis use disorder and post-traumatic stress disorder: The prevalence of comorbidity in veterans of recent conflicts. *Journal of Substance Abuse Treatment.* 2021; **122**: 108254. PMID: 33509412
 12. Pedersen, E. R., et al. Improving substance use care: Addressing barriers to expanding integrated treatment options for post-9/11 veterans. Santa Monica, CA: RAND Corporation. 2020. https://www.rand.org/pubs/research_reports/RR4354.html. Accessed October 2023.
 13. Dworkin, E. R., et al. Co-occurring post-traumatic stress disorder and alcohol use disorder in U.S. military and veteran populations. *Alcohol Res.* 2018; **39**(2): 161-169. PMID: 31198655
 14. Yoon, G., Petrakis, I. L., & Rosenheck, R. A. Correlates of major depressive disorder with and without comorbid alcohol use disorder nationally in the veterans health administration. *Am J Addict.* 2015; **24**(5): 419-26. PMID: 25950244
 15. Seal, K. H., et al. Substance use disorders in Iraq and Afghanistan veterans in VA healthcare, 2001-2010: Implications for screening, diagnosis and treatment. *Drug and Alcohol Depend.* 2011; **116**: 93-101. PMID: 21277712
 16. Calhoun, P. S., et al. Hazardous alcohol use and receipt of risk-reduction counseling among U.S. veterans of the wars in Iraq and Afghanistan. *J Clin Psychiatry.* 2008; **69**(11): 1686-93. PMID: 19012816
 17. Erbes, C., et al. Post-traumatic stress disorder and service utilization in a sample of service members from Iraq and Afghanistan. *Mil Med.* 2007; **172**(4): p. 359-63. doi: 10.7205/MILMED.172.4.359
 18. Hawkins, E. J., et al. Recognition and management of alcohol misuse in OEF/OIF and other

- veterans in the VA: a cross-sectional study. *Drug and Alcohol Depend.* 2010; **109**(1-3): 147-53. PMID: 20167440
19. McDevitt-Murphy, M. E., et al. PTSD symptoms, hazardous drinking, and health functioning among U.S.OEF and OIF veterans presenting to primary care. *J Trauma Stress.* 2010; **23**(1): 108-11. PMID: 20104586
 20. Watkins, K. E., et al. Care for veterans with mental and substance use disorders : good performance, but room to improve on many measures. *Health Affairs (Project Hope).* 2011; **30**(11): 2194-2203. PMID: 22012967
 21. Watkins, K. E., et al. Veterans Health Administration mental health program evaluation : Capstone report. 2011. http://www.rand.org/pubs/technical_reports/TR956.html Accessed October 2023.
 22. Congressional Budget Office, Quality Initiatives Undertaken by the Veterans Health Administration, Publication No. 3234. Congressional Budget Office: Washington, DC. 2009. <https://www.cbo.gov/sites/default/files/111th-congress-2009-2010/reports/08-13-vha.pdf>. Accessed October 2023.
 23. Tanielian, T., Farmer, C. M., Burns, R. M., Duffy, E. L., & Setodji, C. M. Are Private Health Care Providers Ready to Treat Veterans? Evidence from New York State. Santa Monica, CA: RAND Corporation. 2018. https://www.rand.org/pubs/research_briefs/RB10006.html. Accessed October 2023.
 24. Tanielian, T., & Jaycox, L. Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery. Santa Monica, CA: RAND Corporation. 2008. <https://www.rand.org/pubs/monographs/MG720.html> Accessed November 2023.
 25. National Academies of Sciences, Engineering, and Medicine. Department of Veterans Affairs Mental Health Services: Need, usage, and access and barriers to care. Evaluation of the

- Department of Veterans Affairs Mental Health Services. National Academies Press.: Washington, DC; 2018. <https://www.ncbi.nlm.nih.gov/books/NBK499497/>. Accessed October 2023.
26. Bagalman, E.. Mental Disorders Among OEF/OIF Veterans Using VA Health Care: Facts and Figures. Congressional Research Service: Washington, DC; 2013. https://deploymentpsych.org/sites/default/files/mc_resources/Mental%20Disorders%20Among%20OEF-OIF%20Veterans%20Using%20VA%20Healthcare.pdf Accessed October 2023.
27. Veterans Health Administration, Department of Veterans Affairs. Analysis of VA Health Care Utilization among Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), and Operation New Dawn (OND) Veterans - Revised. Epidemiology Program, Post-Deployment Health Group, Office of Public Health Washington, DC; 2013.
28. Schell, T. L. and Marshall, G. N. Survey of individuals previously deployed for OEF/OIF. In: Tanielian, T. & Jaycox, L.H, editors. Invisible wounds of war: Psychological and cognitive Injuries, their consequences, and services to assist recovery. Santa Monica, CA: RAND MG-720; 2008. ISBN: 9780833045294
29. Gorman, L. A., et al. National Guard families after combat: mental health, use of mental health services, and perceived treatment barriers. *Psychiatr Serv.* 2011; **62**(1): 28-34. PMID: 21209296
30. Pietrzak, R. H., et al. Perceived stigma and barriers to mental health care utilization among OEF-OIF veterans. *Psychiatr Serv.* 2009; **60**(8): 1118-1122. PMID: 19648201
31. Hebenstreit, C. L., et al. Minimally adequate mental health care and latent classes of PTSD symptoms in female Iraq and Afghanistan veterans. *Psychiatry Res.* 2015; **230**(1): 90-95. PMID: 26330305
32. Pedersen, E. R., Marshall, G. N., & Kurz, J. Behavioral health treatment receipt among a

- community sample of young adult veterans. *J Behav Health Serv Res.* 2017; **44**(4): 536-550. PMID: 2761246
33. Tran, L. D., Grant, D., & Aydin, M. California veterans receive inadequate treatment to address their mental health needs. *Am J Med Res (N Y).* 2016; **3**(2): 126-140. PMID: 27570802
34. Ouimette, P., et al. Perceived barriers to care among veterans health administration patients with posttraumatic stress disorder. *Psychol Serv.* 2011; **8**(3): 212-223. doi: 10.1037/a0024360
35. Hoge, C.W., et al. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *N Engl J Med.* 2004.; **351**(1): 13-22. PMID: 15229303
36. Garcia, H. A., et al. A survey of perceived barriers and attitudes toward mental health care among OEF/OIF veterans at VA outpatient mental health clinics. *Mil Med.* 2014; **179**(3): 273-8. PMID: 24594461
37. DeViva, J. C., et al. Correlates of VA mental health treatment utilization among OEF/OIF/OND veterans: Resilience, stigma, social support, personality, and beliefs about treatment. *Psychol Trauma.* 2016; **8**(3): 310-318. PMID: 26237497
38. Fox, A. B., Meyer, E. C., & Vogt, D. Attitudes about the VA health-care setting, mental illness, and mental health treatment and their relationship with VA mental health service use among female and male OEF/OIF veterans. *Psychol Serv.* 2015; **12**(1): 49-58. PMID: 25365245
39. Hoge, C. W., et al. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *N Engl J Med.* 2004; **351**(1): 13-22. PMID: 15229303
40. Vogt, D. Mental health-related beliefs as a barrier to service use for military personnel and veterans: a review. *Psychiatr Serv.* 2011; **62**(2): 135-42. PMID: 21285091
41. Fitzke, R. E., et al. Barriers and facilitators to behavioral healthcare for women veterans: a mixed-methods analysis of the current landscape. *J Behav Health Serv Res.* 2024; **51**(2): 164-

184. PMID: 37798569
42. Department of Veterans Affairs, Veterans Health Administration, Office of the Assistant Deputy Under Secretary for Health for Policy and Planning 2011 Survey of Veteran Enrollees' Health and Reliance Upon VA: With Selected Comparison to the 1999 - 2010 Surveys. Washington, DC: Department of Veterans Affairs. 2012. Accessed October 2023.
43. Hester, R. K., Squires, D. D., & Delaney, H. D. The Drinker's Check-up: 12-month outcomes of a controlled clinical trial of a stand-alone software program for problem drinkers. *J Subst Abuse Treat.* 2005; **28**(2): 159-69. PMID: 15780546
44. Pemberton, M. R., et al. Evaluation of two web-based alcohol interventions in the U.S. military. *J Stud Alcohol Drugs.* 2011; **72**(3): 480-9. PMID: 21513685
45. Williams, J., et al. Mediating mechanisms of a military Web-based alcohol intervention. *Drug Alcohol Depend.* 2009; **100**(3): 248-57. PMID: 19081206
46. Brief, D. J., et al. Web-based intervention for returning veterans with symptoms of posttraumatic stress disorder and risky alcohol use. *J Contemp Psychother.* 2011; **41**(4): 237-246. PMID: 25378713
47. Brief, D. J., et al. Web intervention for OEF/OIF veterans with problem drinking and PTSD symptoms: a randomized clinical trial. *J Consult Clin Psychol.* 2013; **81**(5): 890-900. PMID: 23875821
48. Pedersen, E. R., Marshall, G. N., & Schell, T. L. Study protocol for a web-based personalized normative feedback alcohol intervention for young adult veterans. *Addict Sci Clin Pract.* 2016; **11**(1): 1-15. PMID: 27036408
49. Pedersen, E. R., et al. Using facebook to recruit young adult veterans: online mental health research. *JMIR Res Protoc.* 2015; **4**(2): e63. PMID: 26033209
50. Pedersen, E. R., et al. Young adult veteran perceptions of peers' drinking behavior and attitudes. *Psychol Addict Behav.* 2016; **30**: 39-51. PMID: 26415056

51. Pedersen, E. R., et al. A randomized controlled trial for a web-based personalized normative feedback alcohol intervention for young adult veterans. *J Consult Clin Psychol*. 2017; **85**: 459-470. PMID: 28287799
52. Dedert, E., et al. Evidence Report: E-Interventions for Alcohol Misuse, in VA ESP Project #09-009. Washington (DC): Department of Veterans Affairs (US). 2014. <https://www.ncbi.nlm.nih.gov/books/NBK293699/> Accessed November 2023.
53. Miller, W. R. & Sovereign, R. G. The Check-up: A model for early intervention in addictive behaviors. In: T. Løberg, et al., editors. *Addictive behaviors: Prevention and early intervention*. Lisse, Netherlands: Swets & Zeitlinger Publishers; 1989: 219-231. ISBN: 9026509340
54. Saxton, J., et al. The efficacy of Personalized Normative Feedback interventions across addictions: A systematic review and meta-analysis. *PLoS One*. 2021; **16**(4): e0248262. PMID: 33793583
55. Pedersen, E. R., et al. A pilot randomized controlled trial for a web-based personalized normative feedback alcohol intervention for young adult veterans. *Alcoholism: Clinical and Experimental Research*, 2016. **40**(6): p. 2016 supplemental issue.
56. Saunders, J. B., et al. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption--II. *Addiction*. 1993; **88**(6): 791-804. PMID: 8329970
57. Pedersen, E. R., et al. Mental health symptoms among American veterans during the COVID-19 Pandemic. *Psychiatry Res*. 2021; **306**: 114292. PMID: 34814069
58. Ramchand, R., et al. A systematic review of peer-supported interventions for health promotion and disease prevention. *Prev Med*. 2017; **101**: 156-170. PMID: 28601621
59. Mercier, J. M., et al. Peer support activities for veterans, serving members, and their families: Results of a scoping review. *Int J Environ Res Public Health*. 2023; **20**(4): 3628. PMID:

36834328

60. Romaniuk, M., Evans, J., & Kidd, C. Evaluation of the online, peer delivered 'Post War: Survive to Thrive Program' for veterans with symptoms of posttraumatic stress disorder. *J Mil Vet Health*. 2019; **27**(2): 55-65.
61. Miller, W. R., C'de Baca, J., Matthews, D. B., & Wilbourne, P.L. Personal values card sort. Available at <http://casaa.unm.edu>. 2001. Accessed October 2023.
62. Hayes, S.C., Strosahl, K. D., & Wilson, K. G. Acceptance and commitment therapy: The process and practice of mindful change. New York, NY: Guilford Press; 2011. ISBN: 9781609189624
63. Hayes, S.C., et al. Acceptance and commitment therapy and contextual behavioral science: examining the progress of a distinctive model of behavioral and cognitive therapy. *Behav Ther*. 2013; **44**(2): 180-98. PMID: 23611068
64. Kulesza, M., et al. Help seeking stigma and mental health treatment seeking among young adult veterans. *Mil Behav Health*. 2015; **3**: 230-239. PMID: 26664795
65. Oh, H., Pickering, T. A., Schiffman, J., LaBrie, J. W., Soffer-Dudek, N., & Pedersen, E. R. Web-based Personalized Normative Feedback to decrease stigma and increase intentions to seek help. *Stigma and Health* (forthcoming). 2024.
66. Harris, R. ACT made simple: An easy-to-read primer on acceptance and commitment therapy. Oakland, CA: New Harbinger Publications; 2019. ISBN: 9781684033010
67. Beck, J.S. Cognitive behavior therapy: Basics and beyond. New York, NY: Guilford Publications; 2020. ISBN: 9781462544196
68. Miller, W. R. & Rollnick, S. Motivational Interviewing: Helping People Change (Applications of Motivational Interviewing Series). 3rd Edition. New York, NY: Guilford Press; 2012. ISBN: 9781609182274
69. Doran, G. T. There's a SMART way to write managements's goals and objectives.

- Management Review; 1981. **70**(11): 35-36. Accessed October 2023.
70. Kiluk, B. D., et al. The Short Inventory of Problems - revised (SIP-R): psychometric properties within a large, diverse sample of substance use disorder treatment seekers. *Psychol Addict Behav.* 2013; **27**(1): 307-314. PMID: 22642856
71. Miller, W. R., The Drinker Inventory of Consequences (DrInC): An instrument for assessing adverse consequences of alcohol abuse: Test manual (No. 95). Rockville, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Alcohol Abuse and Alcoholism; 1995. <https://www.niaaa.nih.gov/sites/default/files/match04.pdf> Accessed October 2023.
72. Acosta, J. D., et al. Measuring Barriers to Mental Health Care in the Military: The RAND Barriers and Facilitators to Care Item Banks. Santa Monica, CA: RAND Corporation; 2018. https://www.rand.org/pubs/research_reports/RR1762.html. Accessed October 2023.
73. Bovin, M. J., et al. Psychometric properties of the PTSD Checklist for DSM-5 (PCL-5) in veterans. *Psychol Assess.* 2016; **28**(11): 1379–1391. PMID: 26653052
74. Kroenke, K., et al. The PHQ-8 as a measure of current depression in the general population. *J Affect Disord.* 2009; **114**(1-3): 163-173. PMID: 18752852
75. Britton, P. C., Ouimette, P., and Bossarte, R. M. The effect of depression on the association between military service and life satisfaction. *Qual Life Res.* 2012; **21**(10): 1857-1862. PMID: [22286221](https://pubmed.ncbi.nlm.nih.gov/22286221/)
76. Wells, T. S., et al. A comparison of the PRIME-MD PHQ-9 and PHQ-8 in a large military prospective study, the Millennium Cohort Study. *J Affect Disord.* 2013; **148**(1): 77-83. PMID: 23246365
77. Grimm, K. J., Ram, N., & Estabrook, R. Growth Modeling: Structural Equation and Multilevel Modeling Approaches. New York, NY: Guilford Publications; 2016. ISBN: 9781462526062

78. Osilla, K. C., et al. Effects of a web-based intervention in reducing drinking among concerned partners of military service members and veterans. *Couple Family Psychol.* 2022; **11**(1): 4-14. PMID: 36448033
79. Pedersen, E. R., et al. A mobile-based pregame drinking prevention intervention for college students: A pilot randomized controlled trial. *Psychol Addict Behav.* 2023; **37**(7): 841-852. PMID: 37053413
80. Pedersen, E. R., et al. Brief online interventions targeting risk and protective factors for increased and problematic alcohol use among American college students studying abroad. *Psychol Addict Behav.* 2017; **31**: 220-230. PMID: 28080092
81. Walker, D. D., et al. Attracting substance abusing soldiers to voluntarily take stock of their use: Preliminary outcomes from The Warrior Check-Up MET intervention, in *Addiction Health Services Research Conference*. Marina del Rey, CA; 2015.
82. Carroll, K. M., et al. Motivational Interviewing to Enhance Treatment Initiation in Substance Abusers: An Effectiveness Study. *Am J Addict.* 2001; **10**(4): 335-339. PMID: 11783748
83. Latané, B. The psychology of social impact. *Am Psychol.* 1981; **36**(4): 343-356. doi: 10.1037/0003-066X.36.4.343
84. Berkowitz, A. D. & Perkins, H.W. Problem drinking among college students: a review of recent research. *J Am Coll Health.* 1986; **35**(1): p. 21-8. PMID: 3771936
86. Bush, N. E. & Wheeler, W. M. Personal technology use by US military service members and veterans: an update. *Telemed J E Health.* 2015; **21**(4): 245-258. PMID: 25615027
87. Gentili, A., et al. The cost-effectiveness of digital health interventions: A systematic review of the literature. *Front Public Health.* 2022; **10**: 787135. PMID: 36033812

Figure 1. RCT Flow.

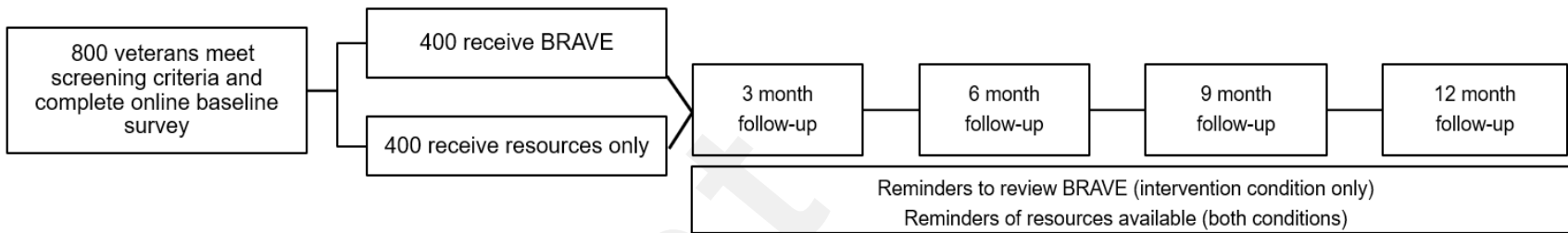
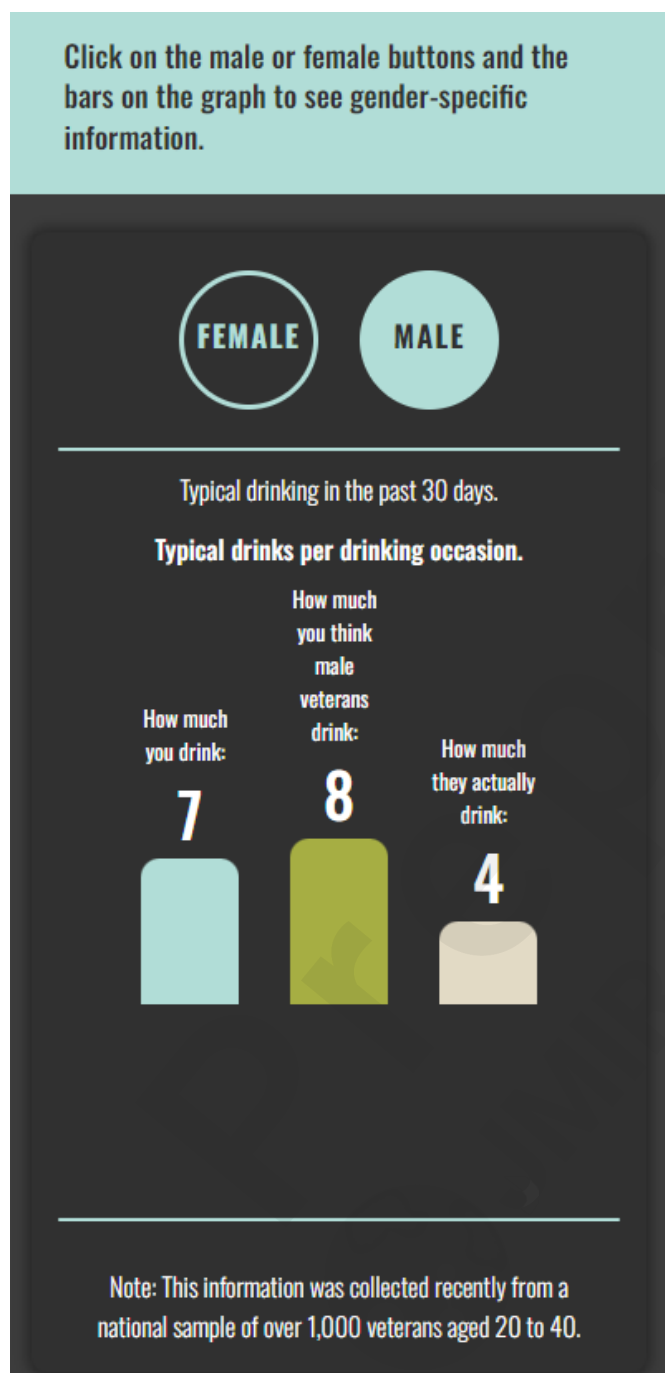
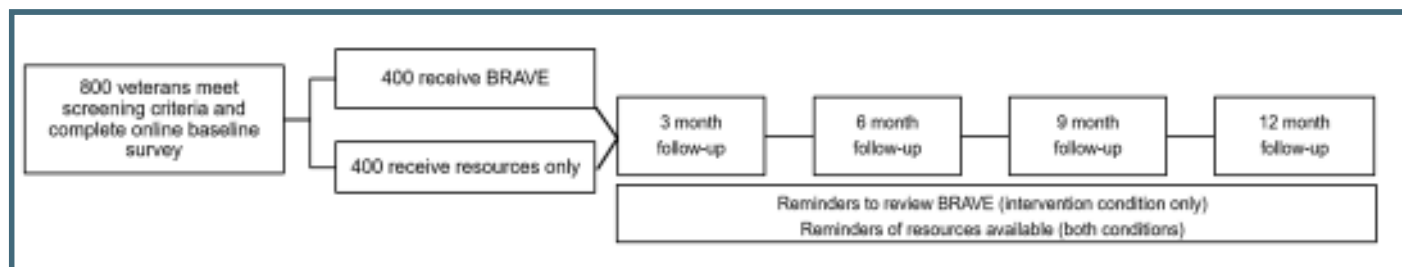


Figure 2. Sample of Drinking PNF

Supplementary Files

Figures

Flow of proposed RCT.



Sample of Drinking PNF.



Multimedia Appendixes

Peer-reviewed research proposal funded by NIAAA.

URL: <http://asset.jmir.pub/assets/3c9a839d9ac95097795ce76c11cec082.pdf>

