


Building a Tobacco Cessation Telehealth Care Management Program for Veterans With Posttraumatic Stress Disorder

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Abstract

BACKGROUND: Veterans with posttraumatic stress disorder (PTSD) have high rates of smoking. Motivational interviewing (MI) enhances readiness for change. **OBJECTIVE:** To test the feasibility and fidelity of home telehealth care management strategy to improve quit rates. **DESIGN:** A telehealth device delivered a cessation curriculum while a nurse supported veterans through weekly MI telephone calls. Treatment fidelity was evaluated. Outcomes measures included changes in smoking behaviors, stage of change, dose effect, and participant satisfaction with intervention. **RESULTS:** There was a correlation ($r = -.677$; $p = .03$) at the end of treatment between readiness to change and number of cigarettes smoked per day. As 11 participants progressed along stages of change, they smoked fewer cigarettes per day. Two (20%) quit smoking. The nurse adhered to MI principles. Participants were highly satisfied and 100% felt curriculum delivered new information and respected choices. **CONCLUSIONS:** It was feasible to deliver the home telehealth care management intervention with high treatment fidelity. Participants were motivated to change smoking behaviors.

Keywords

tobacco cessation, behavioral, telehealth

The Department of Veterans Affairs (VA) currently uses a home telehealth system called the Health Buddy[®] (Bosch Healthcare, Palo Alto, CA) to help veterans manage a broad range of chronic illnesses. We integrated a tobacco cessation curriculum into the posttraumatic stress disorder (PTSD) health management program, which is delivered through the Health Buddy, to help veterans with PTSD quit smoking.

Introduction

Smoking and PTSD are on the rise among military personnel, resulting in a larger number of patients who have PTSD and who smoke. Both represent enormous challenges to the VA health care system. Many veterans began using tobacco while in the military, and after a 20-year decline in smoking rates, the Department of Defense reported tobacco use is on the rise among military personnel (Bray et al., 2003). Smoking rates among veterans seen in the VA health care system are higher than smoking rates in the U.S. population (VA Public Health Strategic Health Care Group, 2007). A recent RAND study (Tanielian & Jaycox, 2008) reported approximately

26% of military personnel returning from Iraq and Afghanistan are estimated to have mental health problems, of which PTSD is the most common.

Patients with PTSD have smoking rates of 45% to 66%, and while 50% of all Americans who once smoked have quit, only 23% of smokers with PTSD have stopped smoking (McFall et al., 2007). These patients have biological and psychosocial factors that increase their tendency to smoke and complicate clinical symptoms during

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withdrawal (Morris, Waxmonsky, May, Giese, & Martin, 2009). A recent systemic review by Fu et al., (2007) of PTSD and smoking suggests a bidirectional causal relationship. Although PTSD symptoms may contribute to smoking and interfere with cessation attempts (Fu et al., 2007), smoking can increase PTSD symptoms such as hyperarousal and avoidance (Beckham et al., 1997; Karney, Ramchand, Osilla, Caldarone, & Burns, 2008; Thorndike, Wernicke, Pearlman, & Haaga, 2006). At the same time, nicotine can enhance concentration and learning, temporarily reduce anxiety, and create a positive effect on mood or feelings of enjoyment making it more difficult to quit (Morris et al., 2009).

Veterans with PTSD face barriers to accessing cessation services and often fail to benefit from current cessation treatment. The current model of care is relatively ineffective for a chronic, relapsing condition like tobacco dependence, especially for veterans with PTSD. Tobacco cessation often requires intensive interventions requiring more comprehensive treatments occurring over longer periods of time (Fiore et al., 2008; Hapke et al., 2005). Currently, tobacco cessation treatment is not well integrated in mental health care and tends to be brief and episodic in nature. Primary care providers have limited training in tobacco cessation and have limited time to continually monitor a patient's smoking status, respond to relapses, or pursue drop-outs (Fiore et al., 2008).

Our strategy to improve cessation rates in this challenging population was built on the principles of behavior change (Hall & Rossi, 2008) and motivational interviewing (Hettema & Hendricks, 2010). Applying these principles (Hettema, Steele, & Miller, 2005) to patients with PTSD is optimal because the intervention delivers evidence-based nursing care management and tobacco cessation through a proven telehealth technology in a client-centered, supportive, and nonconfrontational manner. Nurses have successfully managed chronic diseases using home telehealth by focusing on increasing self-management, positive behaviors, and knowledge (Cherry, Colliflower, & Tsiperfal, 2000; Rich et al., 1995). Nurses have broad-based knowledge; intense, often prolonged contact with patients; and a collaborative professional style (Rienzo, 1993). A nurse can also promote continuity of care by actively reaching out to high-risk patients to improve adherence to prevention and treatment regimens (Abrams et al., 2007). Furthermore, care management using telehealth has improved access to care and reduced costs for patients with multiple chronic diseases (Cherry, Moffatt, Rodriguez, & Dryden, 2002; Dang, Ma, Nedd, Aguilar, & Roos, 2006; Guendelman, Meade, Benson, Chen, & Samuels, 2002; Kobb, Hoffman, Lodge, & Kline, 2003; Meyer, Kobb, & Ryan, 2002; Ryan, Kobb, & Hilsen, 2003; Schofield et al., 2005; Vaccaro, Cherry, Harper, & O'Connell, 2001).

Our objective was to determine the feasibility of a telehealth care management program and assess the fidelity of the intervention using a tobacco cessation curriculum based on the stages of change and motivational interviewing to help veterans with PTSD stop smoking. It was hypothesized that an integrated telehealth care management program along with motivational interviewing would increase 24-hour quit attempts and show forward movement in the process of change. This pilot study incorporated the concept of integrated tobacco cessation care for veterans with PTSD and addressed critical gaps in tobacco cessation treatment by (a) providing remote telemonitoring by a nurse to deliver prolonged, high-intensity motivational counseling and (b) supporting and influencing patient self-care behaviors through chronic care management. Since veterans with PTSD smoke at high rates, have lower quit rates, and are already using the telehealth care management program to manage their PTSD symptoms, they were an ideal choice for testing this new model of care for tobacco cessation.

Background

Home Telehealth Care

Home telehealth is a chronic disease management tool that can help veterans stay connected to their health care providers. At the time of the pilot study, participants used the Health Buddy in their home through a conventional telephone line or ethernet cable. Questions and text messages display on the device to assess patients' symptoms, behaviors, and knowledge related to their PTSD. The health management program allows the care coordinators to respond to gradual changes in the patients' status, not acute or urgent care needs. Prior experience with this type of program demonstrated that patients used it appropriately (Cherry et al., 2002). The home telehealth appliance measures 12 in. × 8 in. × 4 in. and consists of an LCD screen and four large buttons. Once a patient completes a session, the device automatically transmits the information during the night to a secure data center and questions for the next day are downloaded into the appliance. A care coordinator is the point of contact for a patient using a home telehealth device. Data are accessed by logging onto a secure VA intranet site to review the patients' responses on a daily basis, during the regular work week.

PTSD Home Telehealth Care

The usual PTSD health management program remained intact during the pilot study. This program engages patients in all aspects of care by helping them monitor health behaviors, learn about symptoms, and adhere to medication schedules while at home. The home

telehealth care coordinators provide clinical support, care coordination, and education to help patients maintain optimal health. All responses to the PTSD curriculum are color-coded and flagged according to predetermined criteria (high, medium, or low risk) to facilitate rapid interpretation so that coordinators can determine if a patient is experiencing problems. When deterioration in clinical status is detected, the care coordinators contact the patient to verify the accuracy of the responses to questions and acquire additional information as needed. The coordinators either provide counseling to the patient or follow up with the primary or mental health provider for further recommendations. During the pilot program, the care coordinators alerted our research nurse of any issues or concerns, such as emergency visits or hospitalizations.

Transtheoretical Model and Motivational Interviewing

Meeting the complex needs of patients with chronic illnesses or impairments is the single greatest challenge facing medical practices today (Wagner, 1998). In many cases, “usual care” does not meet the needs of these patients and they tend to fall through the cracks of the health care delivery system. The transtheoretical model of changing behavior developed by Prochaska and DiClemente groups people according to their “readiness to change” and is widely accepted as an effective tool for lifestyle change interventions (Velicer, Prochaska, Fava, Norman, & Redding, 1998). Tailoring the therapy relationship and treatment intervention to the patient’s stage of change has been shown to improve outcomes (Prochaska & Norcross, 2001). Stage-based interventions have been effective in helping people change their smoking behaviors (Riemsma et al., 2003).

Motivational interviewing is a behavioral counseling approach that helps people recognize their problems and move through the stages of change. It has been shown to be effective in helping patients abstain from negative behaviors by helping resolve ambivalence about behavior and increase internal motivation (Miller & Rollnick, 1991; Parker, Pederson, & Bergmark, 2007; Resnicow et al., 2002). Motivational interviewing facilitates openness to change, which helps clients build commitment and, when ready, reach a decision to change (DiClemente, 2003). All smokers trying to quit can benefit substantially from counseling because it can address obstacles to quitting that medication cannot, thereby increasing the likelihood of success (Perkins, Conklin, & Levine, 2008). Furthermore, recent reviews of the literature (Heckman, Egleston, & Hofmann, 2010; Lai, Cahill, Qin, & Tang, 2010) showed an increase in smoking cessation when motivational interviewing was used in comparison with brief counseling or usual care. This was especially true when motivational interviewing was conducted in multiple sessions for more

than 20 minutes per session. Motivational interviewing has also been shown to support the stages of change model and has the greatest effect on those who are not ready to change (Butler et al., 1999).

Our pilot combined principles of the transtheoretical model and motivational interviewing. The transtheoretical model provided the overarching framework, whereas motivational interviewing was used to assess readiness to change and help veterans with PTSD increase their motivation to make a change to their smoking behaviors by targeting the intervention to meet their needs for each stage of change. The research nurse used motivational interviewing techniques to help the patient increase his or her willingness to change and target the most appropriate intervention based on the patient’s stage of readiness to change.

Method

Study Design

The study was a nonexperimental, single group, unblinded intervention trial approved by the Colorado Multiple Institutional Review Board and the VA Eastern Colorado Health Care System Research and Development Committee. We conducted this 1-year pilot study to test the feasibility and assess the fidelity of our tobacco cessation treatment intervention. The research team developed a tobacco cessation curriculum based on the stages of change and motivational interviewing and incorporated the new curriculum into the existing PTSD health management program, adding weekly telephone motivational interviewing counseling. During the pilot study, we partnered with the Care Coordination/Home Telehealth department to provide PTSD care coordination services to study participants. The care coordinators were experienced nurses or social workers and monitored each participant’s PTSD symptoms. The research nurse trained in tobacco cessation and motivational interviewing interfaced with the participants as it related to the research intervention. When participants were ready to make a change to their smoking, the research nurse helped facilitate access to all first-line medications since studies have shown that pharmacological treatment combined with behavioral treatment results in some of the highest long-term abstinence rates (Fiore et al., 2008; National Institute on Drug Abuse, 2006).

Study Sample

Based on the pilot study budget and recruitment timeline, our goal was to enroll 10 to 15 patients with a Diagnostic and Statistical Manual of Mental Disorders IV criteria (*DSM-IV*) diagnosis code of 309.81 (PTSD) who smoked a minimum of 10 cigarettes per day at the

time of enrollment, regardless of their willingness to quit. No patients were included unless they were able to provide informed consent. Participants were informed that the goal was to develop a new way to help veterans with PTSD increase their motivation to stop smoking and that they could participate even if they were not ready to make a change to their smoking. We excluded patients if they used smokeless tobacco, pipes, or cigars instead of cigarettes at the time of enrollment. This was consistent with previous research studying motivational interviewing for smoking cessation (DiClemente et al., 1991; Fiore et al., 2008; Lai et al., 2010) and the rate of smokeless tobacco use among men aged 45 to 64 years is very low (3.3%) in Colorado (Centers for Disease Control and Prevention, 2013). Exclusion criteria also included imminent risk of suicide or violence and inability to connect to the Health Buddy in their home. We recruited veterans by posting educational fliers throughout the health care system and attending PTSD support groups, tobacco cessation classes, and staff meetings to inform potential subjects as well as primary care and mental health providers about the pilot study.

Intervention

The telehealth care management tobacco cessation intervention had two components. We integrated the tobacco cessation curriculum with the PTSD Health Buddy program and added motivational interviewing telephone counseling to help veterans with PTSD quit smoking.

Tobacco Cessation Curriculum. Members of the research team developed a 90-session tobacco cessation curriculum grounded in the principles of stage of change and motivational interviewing that was added to the PTSD Health Buddy program. The tobacco cessation curriculum was created from motivational interviewing material written for primary care practitioners (Rollnick, Miller, & Butler, 2008). Each daily session of the written curriculum interjected stage-based information or questions about readiness to quit smoking, process of change, and a commitment to take action. Depending on participant responses, follow-up questions and/or information was generated using branching-chain logic. When the tobacco cessation curriculum was integrated into the PTSD health management program, it formed the enhanced PTSD program. As a result, participants received daily information about tobacco cessation and PTSD. The enhanced home telehealth program enabled veterans to manage their PTSD, realize their motivations to change smoking behaviors, make a commitment, and take action to quit smoking. A typical enhanced PTSD health management session lasted 1 to 3 minutes, with questions such as, "On a scale of 1-10 (with 1 being not confident and 10 being

very confident) how confident are you that you are capable of quitting?" or "Are you trying to cut down to gain better control of your life?" Examples of questions in the PTSD module are the following: "On a scale from 1 to 10, how angry have you felt over the past week?" or "Are your medicines improving your quality of life?" Patients respond using the buttons on the appliance. Both the care coordinators and the research nurse followed the participants throughout the pilot study.

Motivational Interviewing Counseling. The research nurse interacted with participants during weekly counseling calls based on stage of change and responses to the home telehealth tobacco cessation curriculum questions. The research nurse engaged the participant using motivational interviewing techniques, such as (a) practicing empathy, (b) providing choice, (c) clarifying goals, (d) giving advice as requested, (e) removing barriers, (f) decreasing tobacco desirability, (g) providing feedback, and (h) actively helping (Miller & Rollnick, 2002; Rollnick et al., 2008). For example, in the precontemplation stage, the participant is not considering a change. Using empathy, the nurse validated the patient's lack of readiness, encouraged reevaluation, and explained the risks in a nonjudgmental way using the "elicit-provide-elicit" approach to patient education. The goal of this stage was to move the precontemplator from "No" to "I'll think about it" (University of California Los Angeles Center for Human Nutrition, 2007). For participants in later stages of change, the research nurse collaborated with the participant to build a commitment to change and move into action based on the participant's plan. In addition, the nurse care manager offered support for participant's health behavior changes and provided care coordination as needed.

Treatment Fidelity. Bellg et al. (2004) define treatment fidelity as "methodological strategies used to monitor and enhance the reliability and validity of behavioral interventions." (p. 443). The National Institute of Health Behavior Change Consortium workgroup developed best practice guidelines (Bellg et al., 2004; Resnick et al., 2005), and we applied these five guidelines to determine if our intervention remained true to the theoretical framework and was delivered as intended (Bellg et al., 2004; Breitenstein et al., 2010; Resnick et al., 2005). We evaluated the treatment fidelity to assess the internal and external validity of our behavioral intervention (Resnick et al., 2005).

Study design, nurse training, and delivery were assessed to ensure that the tobacco cessation curriculum and motivational interviewing counseling were aligned with the transtheoretical model and the principles of motivational interviewing. Receipt and enactment of the

intervention by the participants were measured by changes in their behaviors, such as number of self-reported 24-hour quit attempts, forward movement in the stage of change process, and the average number of days the participants took to complete the 90-session tobacco cessation curriculum.

Data Analytical Plan

Data Collection

Our main goal of data collection was to gather information to evaluate the feasibility and assess the treatment fidelity of all components of the intervention. A web-based patient management tool delivered and received information from veterans about PTSD and smoking cessation. Baseline data were collected when the participant began using the home telemonitoring appliance. Demographic characteristics of the study population were collected at time of enrollment and at baseline. We also collected nicotine dependence information at baseline using the Fagerström Test of Nicotine Dependence (Fagerström & Schneider, 1989), which has been shown to predict withdrawal symptoms and difficulty in quitting. The expired carbon monoxide level using a Micro + Smokerlyzer[®] (Bedfont Scientific Limited, Kent, England) was measured at the time of enrollment and at the end of the pilot study to confirm tobacco cessation.

We used the following surveys in our pilot study to ensure that participants' symptoms were not exacerbated by the tobacco cessation intervention. When feasible, questionnaires were integrated into the enhanced PTSD health management program.

- Geriatric Depression Scale (Bass, Attix, Phillips-Bute, & Monk, 2008; Ferraro & Chelminski, 1996) to assess depression during the intervention period.
- PTSD Military or Civilian Checklist (Weathers, Huska, & Keane, 1991) to assess PTSD symptoms at baseline and at the end of the intervention period.
- VA Suicide Risk Assessment Guide (American Psychiatric Association, 2004; Rudd, 2008) to screen for suicide risk. This is included in the PTSD Health Buddy program along with assessments for other comorbid conditions such as drug and alcohol abuse, anxiety, anger, and depression.
- McGill Short Form Pain Questionnaire (MPQ-SF; Melzack, 1975) to assess present pain intensity at baseline and at the end of the intervention period.
- VR 12 (Kazis et al., 2006; Ware, 1996; SF 12 for veteran population) to assess veteran quality of life at baseline and at the end of the intervention period.

Satisfaction with both the tobacco cessation curriculum and weekly motivational interviewing counseling calls with the research nurse was measured to determine a participant's perception of being a recipient of the intervention and the degree of response burden. Rollnick (1992) recommended measuring patient satisfaction as a key outcome of motivational interviewing consultation. Two patient satisfaction surveys were created using the book *Motivational Interviewing in Health Care: Helping Patients Change Behavior* as a guide (Rollnick et al., 2008). Both instruments were subjected to expert review to ensure content validity. Additionally, the satisfaction with nurse motivational interviewing counseling survey demonstrated high internal consistency reliability (Cronbach's $\alpha = .925$).

Statistical Analysis

Descriptive statistics including mean and standard deviations, median, ranges, and frequency distributions were used to detail baseline characteristics of participants and study outcomes. Dichotomous variables were summarized with proportions. Measures for evaluating the feasibility and treatment fidelity of delivering tobacco cessation care through the enhanced PTSD Health Buddy program included the following:

- Integration of the tobacco cessation curriculum into the existing PTSD Health Buddy program
- Participant response burden related to the implementation of study instruments (understandability and time required to answer questions)
- Evaluation of the motivational interviewing intervention using treatment fidelity guidelines from the NIH Behavior Change Consortium
- Behavior change outcomes—Proportion of subjects who self-report 24-hour quit attempts (zero cigarettes/24-hour) and show forward movement in the stages of change and the number of days to complete the enhanced PTSD Health Buddy program (the goal was 90 sessions in 90 days)
- Satisfaction with the two components of the telehealth care management and tobacco cessation intervention

Results

Patient Characteristics

Eleven veterans were enrolled in the pilot study. Seven participants completed the pilot study. One participant voluntarily dropped out and three participants were no longer able to use the home telehealth appliance (two participants lost connectivity in their homes and one participant was incarcerated). Study population

Table 1. Baseline Characteristics ($N = 11$).

Characteristics	<i>n</i>
Gender	
Male	8 (72.7%)
Female	3 (27.3%)
Ethnicity/race	
Black/African American	4 (36.3%)
White Non-Hispanic	5 (45.5%)
White Hispanic	2 (18.2%)
Mean age	54 years; range = 26-65 years
Employment status	
Unemployed	10 (90.9%)
Employed	1 (9.1%)
Started smoking regularly	
Before or at high school	6 (54.5%)
Before service	1 (0.09%)
During service	4 (36.4%)
After discharged from service	0
Addiction level (Fagerström Test for Nicotine Dependence) score ^a	Mean = 5.7 ($SD = 2.4$); range = 2-10
Quit smoking in past for at least for 7 days?	Yes—9 or 81.8%

a. Fagerström Test of Nicotine Dependence scoring guidelines: 0-3 = low; 4-6 = medium; 7-10 = high.

characteristics (Table 1) show there was a diverse cross section of veterans in our pilot study. There were 27.3% women, a wide age range, and veterans from different theaters of war, including Iraq and Afghanistan. At baseline, participants rated themselves as moderately addicted to nicotine (mean 5.7) with a range from 2 to 10. All participants were current smokers and 82% had past quit attempts lasting at least 7 days.

Feasibility

A panel of experts reviewed the final enhanced PTSD Health Buddy program including the tobacco cessation curriculum and a stage-based motivational interviewing counseling manual used by the research nurse as a guide when interacting with participants. Our panel of experts included mental health providers whose areas of expertise were PTSD and motivational interviewing, tobacco cessation educators/counselors, and the PTSD care coordinators. Once approved, implementation protocols were developed in collaboration with the PTSD care coordinators and joint meetings were held throughout the pilot study to discuss patient-related issues as well as process issues to identify problems/solutions early.

All research surveys were incorporated into the enhanced PTSD Health Buddy program except for the PTSD Military or Civilian Checklist and the McGill Short Form Pain Questionnaire, which were completed manually by participant. Response burden was evaluated through the

satisfaction with the tobacco cessation curriculum survey. Participants did not feel it was a burden to respond to the enhanced program (PTSD, research surveys, and tobacco cessation curriculum). PTSD symptoms were monitored closely throughout the pilot study using the PTSD Military or Civilian Checklist to ensure that participants' symptoms did not worsen with the tobacco cessation intervention. Participants' assessments did not worsen over the course of the pilot study (baseline $M = 57$, $SD = 18.3$, range = 22-81, compared to at the end of the study assessment period, $M = 53$, $SD = 14.9$, range = 25-75).

Treatment Fidelity

Table 2 illustrates how we measured each treatment fidelity guideline and reports the corresponding feasibility/fidelity results. Based on our study design, participants were asked to use the home telehealth device daily and to be available for their weekly scheduled motivational interviewing counseling call with the research nurse. Consistent with the motivational interviewing principles, participants made choices about how and when to participate (dose) and not all participants chose to answer the enhanced health management questions each day or to be available for their counseling call. On average, participants required 111 days to complete the full 90-session curriculum. The nurse scheduled motivational interviewing counseling calls with each participant once a week for 12 weeks. If the participant was unavailable at the scheduled appointment time, the nurse attempted to call the participant once more in the course of the week. Consequently, the nurse initiated 220 calls and completed 140 motivational interviewing counseling calls (63.6% of attempted calls). The average number of completed calls was 12.7 ($SD = 5.3$) per participant, and the average length of these completed motivational interviewing calls was 21.0 minutes ($SD = 3.1$).

The nurse used the treatment fidelity checklist each week to document the motivational interviewing calls with participants. Of the 140 completed treatment fidelity checklists, motivational interviewing consistent behaviors were counted by another member of the research team. The research nurse assessed what participants wanted to talk about during the call (96%), set the agenda for the next counseling session (80%), elicited from participants their own motivation for making a health behavior change (69%), noted commitment talk/taking steps toward change (57%), and noted change talk or participants' desire for change (52%).

To determine behavior change, receipt and enactment measures of treatment fidelity were evaluated based on the participants' responses to the enhanced PTSD health management program questions about their attitudes and behaviors. Results of key motivational interviewing

Table 2. Treatment Fidelity Guidelines With corresponding Strategy and Evaluation Components.

Component	Definition	Feasibility/treatment fidelity strategy	Feasibility/treatment fidelity evaluation
<ul style="list-style-type: none"> Design 	<ul style="list-style-type: none"> Intended to ensure that study can adequately test hypotheses in relation to underlying theory (transtheoretical model of change and motivational interviewing) and clinical processes 	<ol style="list-style-type: none"> Utilize specified theoretical concepts and ensure interventions are congruent throughout the process Create a 90-session tobacco cessation curriculum based on theoretical concepts Integrate cessation curriculum into the health management program forming the Enhanced PTSD Health Buddy program Design a Motivational Interviewing Counseling Manual to guide study nurse through stage-based/weekly motivational counseling calls Design motivational interviewing tools to use in clinical process Address possible setbacks in implementation 	<ul style="list-style-type: none"> Intervention used Rollnick, Miller, and Butler's "Motivational Interviewing in Health Care" Smoking Cessation curriculum and Motivational Interviewing Manual grounded in theory Validated by motivational interviewing experts Cessation curriculum assessed stage of change, patient behavior, and satisfaction Cessation curriculum was successfully added to Health Buddy program. Motivational interviewing counseling guided by specific stage of change Revised cessation curriculum and motivational interviewing counseling protocols No adverse clinical events noted. Care coordinators alerted research nurse of any clinical issues or concerns such as emergency visits, or hospitalizations Addressed possible problems related to implementation early. Research nurse and care coordinators met regularly to discuss recruitment, implementation and ease of integrating PTSD care management and tobacco cessation activities
<ul style="list-style-type: none"> Training 	<ul style="list-style-type: none"> Assessing and improving the training of the interventionist (research nurse) to ensure that she is satisfactorily trained to deliver the intervention to participants 	<ol style="list-style-type: none"> Read "Motivational Interviewing in Health Care" Attend a 2-day motivational interviewing educational workshop Develop training manual with training materials and resources in the literature Provide ongoing support to prevent "drift" 	<ul style="list-style-type: none"> Study nurse had 16 hours of motivational interviewing training Motivational Interviewing Counseling Manual included training materials and resources Study nurse received weekly coaching by provider experienced in motivational interviewing
<ul style="list-style-type: none"> Delivery 	<ul style="list-style-type: none"> Monitors the delivery of the intervention to ensure that it is delivered as intended 	<ol style="list-style-type: none"> Assess patient satisfaction and response burden of the tobacco cessation curriculum Assess patient satisfaction with motivational interviewing counseling concerning delivery of the interventions 	<ul style="list-style-type: none"> Manual reduced variability and increased quality during weekly counseling but did not ensure same dose was given to all participants Veterans dosed themselves by making choices Average number of motivational interviewing calls was 12.7 and length of motivational interviewing call was 21 minutes

(continued)

Table 2. (continued)

Component	Definition	Feasibility/treatment fidelity strategy	Feasibility/treatment fidelity evaluation
<ul style="list-style-type: none"> Receipt 	<ul style="list-style-type: none"> Ensures the intervention was received and understood by the participant 	<ol style="list-style-type: none"> Assess patient satisfaction with tobacco cessation content and motivational interviewing counseling Assess stage of change, as well as readiness, confidence and importance to change behavior within tobacco cessation curriculum Assess response burden through patient satisfaction with tobacco cessation content survey 	<ul style="list-style-type: none"> Satisfaction surveys derived from Rollnick, Miller, and Butler's book Surveys measured satisfaction of motivational interviewing cessation curriculum and motivational interviewing counseling Specific questions assessed the participants cognitions 100% thought the tobacco cessation curriculum was valuable Only 11.1% experienced frustration on most days 88.9% were willing to recommend to others 100% thought tobacco cessation and PTSD worked well together
<ul style="list-style-type: none"> Enactment 	<ul style="list-style-type: none"> Monitors the extent the participant performs the behavioral skill and uses cognitive strategies in real life 	<ol style="list-style-type: none"> Assess 24-hour quit attempts every 7 days in the tobacco cessation curriculum Assess progression along the stage of change continuum every 28 days in the tobacco cessation curriculum Assess quit smoking rates 	<ul style="list-style-type: none"> Mean number of 24-hour quit attempts was 10.3 (range: 0-47) Mean number of 7-day quit attempts was 1 (range 0-6) Forward movement along stage of change continuum Baseline Cigarettes/Day—45.5% reported smoking <10 and 54.6% reported smoking between 10 and 20 Time Last Cigarettes/Day—20% reported smoking none, 30% reported smoking <10, and 50% reported smoking between 10 and 20 Significant correlation found between Time Last Stage of Change and Time Last Cigarettes/Day ($r = -.677$; $p = .03$)

Note. PTSD = posttraumatic stress disorder.

tobacco cessation intervention questions (Table 3) showed that participants wanted to quit smoking, planned to make changes to their smoking, and thought they were ready. However, participants were only moderately confident in their ability to follow through and only 28.6% were willing to pick a specific date to make a change. The nurse collaborated with participants to set discussion topics and tailored the motivational interviewing calls based on their answers to the tobacco cessation curriculum questions. At baseline, 45.5% of the 11 participants

reported smoking <10 cigarettes/day, and 54.6% reported smoking 10 to 20 cigarettes/day. At the final assessment, 20% were not smoking, 30% reported smoking <10 cigarettes/day, and 50% reported smoking between 10 and 20 cigarettes/day. The mean number of 24-hour quit attempts was 10.3 (range = 0-47) and the mean number of 7-day quit attempts was 1 (range = 0-6).

Baseline measurement of stage of change showed that one participant (9%) was in precontemplation, four participants (36%) were in contemplation, and six

Table 3. Key Tobacco Cessation Intervention Questions and Answers.

Tobacco cessation questions	Number of responses	Results
Want to quit smoking? (10-point Likert ruler)	9	Mean 8.3 (SD 2.9)
How important is it to quit smoking? (10-point Likert ruler)	9	Mean 6.7 (SD 3.6)
How confident are you? (10-point Likert ruler)	9	Mean 5.2 (SD 3.4)
How ready are you to quit smoking? (10-point Likert ruler)	8	Mean-7.8 (SD 2.8)
Goal Setting: Are you planning to make changes to your smoking?	7	Yes—86%
Goal Setting: Are you planning to use cold turkey, nicotine fading, or nicotine replacement therapy (NRT)?	6	I cold turkey I nicotine fading 4 NRT 2 Yes
Have you picked a specific date to make a change in smoking?	7	3 No, I haven't picked a date 2 No, I'm not going to pick a date

participants (55%) were in preparation. At the final assessment, no participant was in precontemplation, three participants (30%) were in contemplation, five participants (50%) were in preparation, and two participants (20%) were in action. At the end of the study, the expired carbon monoxide levels for the two participants who quit smoking were 7 ppm and 8 ppm, indicating that they had in fact quit smoking (Benowitz et al., 2002). At the end of treatment, a significant relationship ($r = -.677$; $p = .03$) was found between stage of change and number of cigarettes/day smoked; as participants progressed forward along the stage of change continuum, they smoked fewer cigarettes/day. No adverse clinical events occurred during the pilot study.

Satisfaction With Tobacco Cessation Curriculum and Motivational Interviewing Counseling

Participants reported high satisfaction with the home telehealth tobacco cessation curriculum and motivational interviewing telephone calls (Table 4). All participants thought the tobacco cessation curriculum was valuable, that it gave them new information, and that it helped them to see how they might be able to quit smoking. All participants thought the cessation curriculum and the PTSD program worked well together, almost all thought the curriculum had the right number of questions each day, and only one participant experienced frustration on most days. A majority of participants were willing to recommend the enhanced program to others with PTSD and who smoked.

Participants were satisfied with the weekly motivational interviewing telephone sessions (mean = 88.1) and stated they were comfortable talking to the nurse and that the nurse and participant talked in a calm manner. Based on participants' reports of the telephone counseling interaction, the nurse asked permission of participants before providing information about tobacco cessation medications, participants learned to take better care of themselves, and their freedom to smoke or not smoke was respected by the nurse. Participants also felt that they were given an opportunity to explore their motivation to quit.

Conclusions

Our approach to tobacco cessation improves on prior efforts because it reflects the chronic nature of tobacco dependence, emphasizes the importance of integrated care, provides counseling over time, and employs a home telehealth system currently in use in VA medical facilities. This study found that the telehealth care management and tobacco cessation strategy was feasible and was delivered with high treatment fidelity. It was possible to integrate tobacco cessation messages into the existing PTSD health management program and to incorporate motivational interviewing telephone counseling into usual care to help participants consider changing their smoking behaviors. The participants engaged in all components of the study and had a high level of satisfaction. The correlation between last assessment of cigarettes smoked and stage of change is suggestive that this intervention will help

Table 4. Key Results of Health Buddy Curriculum and Motivational Interviewing Counseling Satisfaction Surveys ($N = 9$).

Questions	Results
Satisfaction with Health Buddy Tobacco Cessation Curriculum	
On a scale of 1-10, I rate my readiness to consider making changes to my smoking.	Mean 7.25 (SD 0.7)
How valuable did you think your Health Buddy smoking program was? 3 = very valuable, 2 = somewhat, 3 = a little	Very valuable 66.7%
	Somewhat valuable 33.3%
How many days did you experience frustration as you worked through your smoking content? 4 = most, 3 = many, 2 = some, 1 = few	Most 11.1%
How willing will you be to recommend smoking questions to others with PTSD? 4 = very willing, 3 = somewhat, 2 = somewhat unwilling, 1 = unwilling	Very willing 66.7%
	Somewhat willing 22.2%
Health Buddy gave me new information, but respected my choice to smoke or not smoke.	Yes 100%
Health Buddy questions helped me feel I might have the desire to quit.	Yes 100%
Health Buddy helped me see how I might be able to quit.	Yes 100%
Health Buddy helped me see my needs or reasons to quit.	Yes 100%
Health Buddy helped me consider a commitment to changing something about my smoking.	Yes 100%
Health Buddy helped me take one step to change my smoking.	Yes 100%
Health Buddy led me to see myself as a former smoker, smoker who smokes fewer cigarettes, or a smoker who makes no changes.	Former smoker 77.8%
	Smoker who smokes fewer cigarettes 22.2%
Health Buddy prompted me to talk with the study nurse.	Yes 100%
Satisfaction with Nurse Motivational Interviewing Counseling ^a	
The nurse and I are able to talk in a calm manner.	Mean 4.6 (SD 1.0) (range 2-5)
I feel comfortable talking with the nurse.	Mean 4.7 (SD 0.7) (range 3-5)
I learned about taking better care of my health and reducing the risks of smoking.	Mean 4.4 (SD 0.5) (range 4-5)
I feel two ways about my smoking. I have talked with my nurse about what I like and dislike about my smoking.	Mean 4.2 (SD 0.7) (range 3-5)
The nurse asked me what I knew about medications that help one quit smoking.	Mean 4.4 (SD 0.5) (range 4-5)
The nurse invited me to imagine myself as a former smoker.	Mean 4.2 (SD 1.0) (range 2-5)
My freedom to smoke was respected whether I smoked or chose to quit.	Mean 4.6 (SD 0.7) (range 3-5)
I know the reasons I want to change when or if I cut down on my smoking.	Mean 4.6 (SD 0.5) (range 4-5)
When and if I choose to do something different with my smoking, the nurse would support my change and help me plan.	Mean 4.6 (SD 0.5) (range 4-5)
The nurse seemed to think she knew what was best for me.	Mean 2.7 (SD 1.6) (range 1-5)

Note. PTSD = posttraumatic stress disorder.

a. 5 = always, 4 = often, 3 = sometimes, 2 = rarely, 1 = never.

veterans with PTSD quit smoking and provides evidence that feasibility and fidelity were achieved.

A strength of this pilot study is that we assessed treatment fidelity in addition to determining the feasibility of the intervention. Few studies report treatment fidelity

measures when using a behavioral intervention (Perepletchikova, Treat, & Kazdin, 2007). The research team felt it was important to assess treatment fidelity because this was the first time the principles of motivational interviewing were used in a VA home telehealth

management program. Furthermore, we wanted to confirm adherence to the intervention by the research nurse and receipt by the patients. We were able to demonstrate the motivational interviewing intervention was delivered as intended.

Competence in delivering motivational interviewing is a component of treatment fidelity (Breitenstein et al., 2010), and for the research nurse, becoming skillful and competent in motivational interviewing was a challenge. Health care practitioners tend to rely on traditional patient education methods to communicate with patients about making lifestyle changes such as tobacco cessation. Although patient education has been shown to be less effective than psychological counseling in helping patients change unhealthy behaviors, it is a style that most practitioners are familiar with and it fits the medical model (Cook, Emiliozzi, & McCabe, 2007). The research nurse gained confidence and learned to make the shift from "I'm the expert" to "the patient is the expert" in knowing their own motivation for making a health behavior change and how best to accomplish it.

Other lessons related to feasibility and treatment fidelity were learned over the course of the pilot study. We made small changes to the tobacco cessation curriculum based on feedback from participants to make questions more easily understood and less cumbersome. To maximize participants' daily use of the home telehealth program and availability for scheduled motivational interviewing counseling calls, we engaged participants in a discussion during the enrollment process to help them identify and choose how they would change their daily routine to include these activities. These processes will be implemented in a future study to maintain treatment adherence. As in the current study, the nurses in our future work will complete a self-assessment tool after each motivational interviewing counseling call. In addition, a motivational interviewing coach will conduct random audits of motivational interviewing counseling sessions to improve the quality of these sessions.

The main limitation of this pilot study was the lack of a control group and the small sample size. Although we were unable to estimate the effect size of our intervention during this pilot study, results laid the groundwork for a larger randomized control trial currently funded to test the effectiveness of this intervention. We did not account for the use of pharmacological treatment in our pilot study analyses. This will be considered in the currently funded randomized control trial.

Our telehealth care management and tobacco cessation intervention may be applicable to smokers with other chronic diseases such as those with congestive heart failure, diabetes, chronic obstructive pulmonary disease

(COPD), or other mental illnesses. This pilot study showed that a multifaceted tobacco cessation strategy can be successfully integrated into a home telehealth monitoring program. With minimal revisions to the cessation curriculum, we are currently testing this intervention with veterans who smoke and have COPD. It is also well suited for smokers living in rural areas.

Clearly, as long as smoking prevalence remains high for veterans with PTSD and other mental illnesses, new evidence-based cessation techniques and translational delivery strategies will be needed. New skills will also be needed for practitioners as they continue to help patients change health behaviors in real-life settings. This pilot study provided an opportunity to use evidence-based patient counseling methods to improve tobacco cessation for veterans with PTSD.

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Catherine Battaglia substantially contributed to the intellectual content of this article through conception and design, acquisition of data, analysis and interpretation of data, as well as drafting the manuscript. Susan Benson contributed through conception and design of treatment fidelity of motivational interviewing intervention, analysis and interpretation of data, and critical revisions of manuscript for important intellectual content. Paul Cook contributed through conception and design of treatment fidelity of motivational interviewing, statistical analysis and interpretation of data, and critical revisions of manuscript for important intellectual content. Allan Prochazka contributed through conception and design, analysis and interpretation of data, critical revisions of manuscript for important intellectual content, and supervision.

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