



Comparative effectiveness of an Internet-based smoking cessation intervention versus clinic-based specialty care for veterans



Patrick S. Calhoun, Ph.D. ^{a,b,c,d,*}, Santanu Datta, Ph.D. ^{d,e}, Maren Olsen, Ph.D. ^{a,d,h}, Valerie A. Smith, Dr.PH. ^{a,d,e}, Scott D. Moore, M.D., Ph.D. ^{a,b,c}, Lauren P. Hair, M.S. ^{a,b,d}, Eric A. Dedert, Ph.D. ^{a,b,c}, Angela Kirby, M.S. ^{a,b,c}, Michelle Dennis, B.A. ^{a,b}, Jean C. Beckham, Ph.D. ^{a,b,c}, Lori A. Bastian, M.D., M.P.H. ^{f,g}

^a Durham Veterans Affairs Medical Center, Durham, NC, 27705, USA

^b Department of Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, NC, 27705, USA

^c Veterans Affairs Mid-Atlantic Region Mental Illness Research, Education, and Clinical Center, Durham, NC, 27705, USA

^d Veterans Affairs Center for Health Services Research in Primary Care, Durham, NC, 27705, USA

^e Department of General Internal Medicine, Duke University Medical Center, Durham, NC, 27705, USA

^f Department of Medicine, University of Connecticut Medical Center, Farmington, CT, 06030, USA

^g VA Connecticut Healthcare System, West Haven Campus, West Haven, CT, 06516, USA

^h Department of Biostatistics and Bioinformatics, Duke University Medical Center, Durham, NC, 27705, USA

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ABSTRACT

Introduction: The primary objective of this project was to examine the effectiveness of an Internet-based smoking cessation intervention combined with a tele-health medication clinic for nicotine replacement therapy (NRT) compared to referral to clinic-based smoking cessation care.

Methods: A total of 413 patients were proactively recruited from the Durham VA Medical Center and followed for 12 months. Patients were randomized to receive either a referral to VA specialty smoking cessation care (control) or to the Internet intervention and tele-health medication clinic. Primary outcomes included (1) intervention reach, (2) self-reported 7-day point prevalence abstinence rates at 3 months and 12 months, and 3) relative cost-effectiveness.

Results: Reach of the Internet intervention and use of smoking cessation aids were significantly greater compared to the control. At 3 months-post randomization, however, there were no significant differences in quit rates: 17% (95% CI: 12%–23%) in the Internet-based intervention compared to 12% (95% CI: 8%–17%) in the control arm. Similarly, there were no differences in quit rates at 12 months (13% vs. 16%). While costs associated with the Internet arm were higher due to increased penetration and intensity of NRT use, there were no statistically significant differences in the relative cost effectiveness (e.g., life years gained, quality adjusted life years) between the two arms. **Conclusions:** Current results suggest that using an electronic medical record to identify smokers and proactively offering smoking cessation services that are consistent with US Public Health Guidelines can significantly reduce smoking in veterans. Novel interventions that increase the reach of intensive treatment are needed to maximize quit rates in this population.

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1. Introduction

An estimated 44.5 million adults smoke cigarettes, resulting in death or disability for half (Mokdad, Marks, Stroup, & Gerberding, 2004). More deaths are caused each year by tobacco use than by all deaths from AIDS, illegal drugs, alcohol use, motor vehicle accidents, suicides, and murders combined (Centers for Disease Control and Prevention, 2002). Coupled with this enormous health toll is the significant economic burden of tobacco use, with more than \$96 billion per year in medical expenditures

alone (Centers for Disease Control and Prevention, 2008). While great strides have been made to reduce smoking in military populations, smoking rates in active duty military populations remain as high as 32% (Barlas, Higgins, Pflieger, & Diecker, 2013; Bray et al., 2005). Unfortunately, smoking in the military is associated with a lifelong pattern of increased cigarette consumption (Feigelman, 1994; McKinney, McIntire, Carmody, & Joseph, 1997). As many as 50% of veterans returning from service in Iraq and Afghanistan (i.e., Operation Enduring Freedom, Operation Iraqi Freedom, Operation New Dawn; OEF/OIF) using Veterans Health Administration (VA) healthcare have a lifetime history of smoking and 24% currently smoke (Acheson, Straits-Troster, Calhoun, Beckham, & Hamlett-Berry, 2011). Rates are higher among veterans and the general public with mental health problems such as posttraumatic stress disorder (PTSD) (Kirby et al., 2008).

* Corresponding author at: Durham Veterans Affairs Medical Center, 508 Fulton St. (VISN 6 MIRECC), Durham, NC, 27705, USA. Tel.: +1 919 286 0411x7970.

E-mail addresses: Patrick.calhoun2@va.gov, Patrick.calhoun@duke.edu (P.S. Calhoun).

Specialty clinic-based tobacco cessation programs have been shown to be efficacious in reducing smoking (Fiore, 2000; Shipley, Steffen, & Riley, 1999) but such programs are infrequently attended (Sherman, Yano, Lanto, Simon, & Rubenstein, 2005; Thompson et al., 1988; Yano et al., 2008). This limits the impact on prevalence, disease impact, and economic costs of smoking (Sherman et al., 2006). Attendance to specialty-based smoking cessation clinics is as low as 6%–14% (Sherman et al., 2005; Thompson et al., 1988; Yano et al., 2008). While the VA removed co-pays for smoking cessation care visits in 2005, other barriers (e.g., travel, scheduling conflicts) continue to limit access.

There is significant disagreement in the tobacco control field with regard to how smoking cessation care should be structured (Sherman et al., 2006). Many experts emphasize treatment in specialty clinics, as intensive programs have been shown to be most efficacious (Fiore et al., 2000). Others have highlighted the need of adopting a public health approach to smoking cessation (Sherman & Farmer, 2004). From a public health perspective, impact has been defined as Reach (i.e., number of people who access/receive an intervention) X Efficacy (effect size of an intervention) (Abrams et al., 1996). Current approaches reflect a tradeoff between low reach/high efficacy (e.g., clinic-based care) and high reach/low efficacy (e.g., physician advice).

Internet interventions could be used to improve reach of smoking cessation interventions by avoiding barriers that limit participation in specialty care. Smoking cessation treatment may be particularly well suited to delivery via the Internet through on-line chat groups, contacts with experts, and individually-tailored information and feedback regarding behavioral skills. Treatment can be provided in “real time” and at the convenience of the user for as long as he/she needs it, which may help prevent relapse (Bock et al., 2004). The anonymity of online interactions can facilitate social support (Kramish et al., 2001). On the other hand, Internet interventions are generally less intensive than in person interventions, which could result in lower efficacy.

Although there are relatively few studies that have evaluated Internet-based cessation interventions, initial evidence examining Web-based interventions have documented cessation rates ranging from 13%–15% (Graham, Cobb, Raymond, Sill, & Young, 2007). Internet interventions might be particularly effective for younger veterans who are more likely to have home-based Internet access (Schneiderman, Lincoln, Curbow, & Kang, 2004). No studies have examined the effectiveness of Internet based smoking cessation interventions in a veteran population. The purpose of the current study was to compare the impact (i.e., intervention reach and efficacy) and cost-effectiveness of an Internet-based smoking cessation intervention paired with a tele-medicine clinic for nicotine replacement therapy (NRT) to an assisted referral to specialty smoking cessation clinic-based care for veteran smokers.

2. Method

2.1. Participants

Patients (N = 413) were recruited from the Durham VA Medical Center and followed for at least 12 months. Eligible patients included current smokers (any tobacco use in the past month including cigarettes and cigars) who a) were enrolled at the VA for primary care and b) were willing to make a quit attempt in the next 30 days. Exclusion criteria included an active diagnosis of psychosis in the medical record, no regular access to a telephone, refusal to provide informed consent, and severely impaired hearing or speech that would make him/her unable to respond to telephone interviews. A CONSORT diagram for the trial is shown in Fig. 1.

2.2. Procedures

Veterans with tobacco use were identified from electronic medical records (EMR) based on the presence of an ICD-9 code for nicotine

dependence or identification of current smoking status based on results of required annual screening. Veterans were sent an introductory letter that described the study and encouraged smoking cessation and included a toll-free opt out number. Those that did not decline were called and asked if they were currently smoking cigarettes and willing to quit smoking in the next 30 days. Participating veterans completed a baseline survey that included demographic data, smoking characteristics, and screens for PTSD, depression, and alcohol misuse. Participants were compensated \$25 each for completion of baseline and two follow-up surveys, and received up to \$50 for return of saliva samples. Participants enrolled in the study were randomized to receive either an Internet-based intervention combined with a tele-health medication clinic or a referral to standard specialty-clinic based treatment (control). Participants were randomized to treatment arm using blocked randomization (in blocks of 4), stratified by gender and presence of psychiatric symptoms (i.e., PTSD/depression/alcohol abuse vs. none) was used. Study staff members were blinded to the block size.

2.3. Intervention description

2.3.1. Specialty clinic based smoking cessation (control)

Patients randomized to receive referral to specialty care had a consult placed to the VA specialty-based clinic on their behalf. The clinic subsequently sent a pre-appointment letter and scheduled visits. The clinic provides group and telephone counseling provided by doctoral-level psychologists based on the QuitSmart™ Program (Cooper, Dundon, Hoffman, & Stoeber, 2006; Shipley, 1998), with medication management provided by a psychiatrist. NRT and medications were provided as per usual, i.e., veterans attending specialty care met with a psychiatrist at the end of the first clinic session and were offered their choice of NRT and other smoking cessation medications (e.g., Bupropion SR). These smoking cessation aids (NRT, medications) were provided during the clinic visit with renewals sent via mail.

2.3.2. Internet intervention

Patients randomized to the Internet-based intervention were provided a free, lifetime membership to the full, enhanced version of QuitNet® (www.QuitNet.com). The Website provides 24/7 access to tailored, online tobacco cessation support that is personalized based on each user's readiness to quit. The enhanced site offers direct access to online smoking cessation counselors, access to interactive features that offer assistance in selecting a quit date and choosing medications, unlimited access to social support features (e.g., forums, buddies, chat rooms), and access to pro-active email support. Veterans randomized to the Internet intervention were encouraged (but not required) to register on-line via a QuitNet® home page branded for the current study.

For patients randomized to the Internet intervention, at the end of the baseline assessment call, a study staff member discussed types and side effects of each type of NRT available. Interested participants received a tailored dose of NRT and delivery type based on number of cigarettes smoked per day using an established protocol (e.g., Bastian et al., 2012). This could include an 8-week course of nicotine patches and up to two rescue methods (e.g., nicotine lozenge, gum). The study physician wrote NRT prescriptions, and NRT was provided by the Durham VAMC pharmacy. Patients who reported contraindications at baseline (i.e., high blood pressure not controlled by medication) had to obtain VA physician authorization prior to receiving NRT. Participants were instructed to call the study physician with questions or concerns related to NRT.

2.4. Measures

Demographic information was collected at the baseline survey. Nicotine dependence was assessed with the 6-item Fagerström Test for Nicotine Dependence (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). Depressive symptoms were measured using the 10-item version

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