Web-Based Intervention for Transitioning Smokers From Inpatient to Outpatient Care

An RCT

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Introduction: Smoking-cessation follow-up care after hospitalization is known to be effective. Cost-effective and disseminable interventions adoptable by hospitals are needed.

Design: RCT.

Setting/participants: Fourteen hundred eighty-eight current smokers recruited during a tertiary care hospital stay were randomly assigned to Usual Care (UC) or Usual Care plus Web-Based Intervention (WI). Data were collected in 2011–2013 and analyzed in 2014–2015.

Intervention: UC provided brief bedside advice to quit, a quit plan template, and quitline contact information. WI included access to a website with asynchronous e-message communication with a tobacco counselor, use of interactive self-assessments, helpful cessation information, and access to additional web resources, as well as automated e-mail messages tailored for health concern and readiness to quit.

Main outcome measures: Self-reported 30-day abstinence at 6 months was the primary outcome; a subset was verified by saliva cotinine.

Results: Six-month follow-up was completed by 83% of participants. No difference was found between study arms for self-reported abstinence rates in intent-to-treat (25.4% WI vs 26.8% UC) and complete case (31.3% WI vs 31.4% UC) analyses. Reduced smoking was reported by 45.5% (WI, n=276) and 47% (UC, n=296) of non-abstinent responders (p=0.59). Using a 10-ng/mL cotinine cut off, abstinence was verified in 52.1% of WI and 62.5% of UC (p=0.11). Significant covariates associated with abstinence at 6 months were being male, not smoking during hospitalization, being very confident in quitting, planning to quit/stay quit, smoking fewer days in the past 30 days, fewer years of smoking, and having cerebrovascular or connective tissue rheumatic disease as primary hospital diagnosis.

Conclusions: Lack of difference between treatment arms suggests a strong effect for UC, WI was not effective, or both. Low intervention engagement may be partially responsible. Self-reported abstinence rates were relatively high in both arms, although the biochemically verified rates indicate over-reporting of abstinence. These findings suggest brief bedside counseling for all hospitalized smokers is beneficial.

Trial Registration: This study is registered at www.clinicaltrials.gov NCT01277250.

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Introduction

Despite impressive declines during the past 50 years, tobacco use continues as a major public health issue in the U.S.[1] Approximately 18% of U.S. adults smoke cigarettes, with the highest prevalence in the South (19.7%).[2] Almost 0.5 million U.S. adults die prematurely each year because of smoking, with smoking-attributable annual health costs estimated at nearly $170 billion.[3]

Comprehensive tobacco control policies and programs have effectively reduced tobacco-related morbidity,

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mortality, and healthcare expenditures.[1,4] In 1992, the Joint Commission required hospitals to be smoke free and in 2012 adopted optional tobacco care quality measures.[5] This smoking ban, together with smoking-cessation interventions during hospitalization, has yielded smoking reduction and cessation among hospitalized patients.[4,6] The requisite indoor smoking ban may force abstinence initiating a smoking-cessation attempt. In addition, feelings of increased health vulnerability during hospitalization may raise smokers' perceptions of personal health risk, thereby increasing their motivation to quit.[7–9] During hospitalization, patients have easier access to smoking-cessation services, including pharmacotherapy for withdrawal symptoms, to assist a quit attempt. However, brief in-hospital interventions do not necessarily convert temporary smoking abstinence into long-term abstinence.[10] The meta-analysis of Rigotti and colleagues[11] indicates that interventions initiated during hospitalization and continued at least 1 month post-discharge increase the odds of cessation at 6 months by 37%–71%, depending on the population. Interventions continuing beyond discharge are suggested as essential to achieving long-term effects.

Web-assisted tobacco interventions (WATIs), an innovative e-health approach, have potential for low-cost reach to millions of smokers.[12] Reviews of WATIs among the general population indicate they can be effective in aiding cessation, especially when interactive and tailored, compared with self-help booklets or no intervention; however, results are mixed when compared with controls receiving in-person or telephone counseling.[13–15] WATIs have been found more effective when tailored among smokers seeking to quit and when used in addition to nicotine-replacement therapy.[16,17] This suggests the utility of tailored WATIs among smokers in general; however, the only report for hospitalized smokers was for German rehabilitation hospital patients who had double the quit rates than a control group.[18]

The purpose of this study was to examine the effectiveness and cost effectiveness of an interactive and semi-tailored web-based smoking-cessation intervention that transitioned patients from inpatient to outpatient care against usual care. This study is part of the Consortium of Hospitals Advancing Research on Tobacco collaborative,[19] NIH-funded projects testing the effectiveness and cost effectiveness of interventions initiated at hospitalization. This manuscript describes both intent-to-treat (ITT) and complete case (CC) analyses of 6-month follow-up smoking cessation and reduction by study condition, as well as predictors of smoking cessation, biochemical verification of abstinence, and cost results. In addition, findings regarding the use of cessation aides (pharmacotherapy, services) and e-cigarettes post-hospitalization and intervention engagement are presented.

Methods

This study was a 1:1-ratio two-arm RCT initiated with smokers during a hospitalization and continued post-discharge for 6 months. The study was approved by the University of Alabama at Birmingham IRB. Study methods have previously been published.[20]

Sample and Procedure

Patients were recruited from all patient care areas, excluding locked psychiatric, maternity, and intensive care units, of University of Alabama at Birmingham Hospital, a 1,000-bed state-of-the-art academic center hospital, between July 2011 and May 2013. A sample size of 1,488 was identified to detect a 5.12% two-sided difference among study arms, assuming a 12% usual care rate.[21] Patients of all races and genders identified as current smokers at admission were recruited to the study if they were willing, and met study inclusion criteria:

1. aged >18 years;
2. English-speaking/reading;
3. cognitively and physically able to participate;
4. current smoker (self-identified and smoked at least one cigarette in previous 30 days); and
5. having Internet and e-mail access.

Planning to quit smoking was not required. Those providing written informed consent and completing baseline assessments were randomized to study condition (Web Intervention [WI] or Usual Care [UC]) following an assignment list developed by the study statistician with SAS PROC PLAN within blocks of four per each patient care unit. Access to the randomized list was limited to the study coordinator who provided assignment upon each enrollment. Cessation pharmacotherapy was not provided by either study condition, although patients could receive it if their individual physician prescribed it for them.

Study Conditions

For UC, hospital-paid staff visited patients at bedside and provided a verbal message to consider quitting smoking for health reasons and a one-page handout detailing a quit plan template and cessation assistance resources (e.g., state quitline). Additionally, patients received brief smoking-cessation advice in the hospital admission booklet and additional quitting advice with discharge paperwork.[20] This "usual care" did not meet the optional Joint Commission quality measures for tobacco. These staff had minimal tobacco training and varied educational backgrounds, and the visit lasted about 3 minutes.

After receiving UC, participants assigned to WI were visited at bedside by hospital-paid Quit Staff and oriented to an adapted version of Decide2Quit (www.Decide2Quit.org), a WATI guided by Social Cognitive Theory[22] and the Transtheoretic Model.[23] This included website registration assistance and instructions for access from home. For patients discharged prior to website registration,

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