



Text messaging-based smoking cessation intervention: A narrative review[☆]



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HIGHLIGHTS

- We reviewed 15 smoking cessation interventions delivered via text messaging.
- All interventions used motivational messages grounded in social cognitive theories.
- 11 interventions used behavioral change techniques and 14 used tailored messages.
- The number of text messages and the duration of the intervention varied.
- 3 interventions yielded cessation outcomes greater than the control conditions.

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ABSTRACT

Introduction: Smoking cessation interventions delivered via text messaging on mobile phones may enhance motivations to quit smoking. The goal of this narrative review is to describe the text messaging interventions' theoretical contents, frequency and duration, treatment outcome, and sample characteristics such as age and motivation to quit, to better inform the future development of this mode of intervention.

Methods: Studies were included if text messaging was primarily used to deliver smoking cessation intervention and published in English in a peer-reviewed journal. All articles were coded by two independent raters to determine eligibility and to extract data.

Results: Twenty-two studies described 15 text messaging interventions. About half of the interventions recruited adults (ages 30–40) and the other half targeted young adults (ages 18–29). Fourteen interventions sent text messages during the quit phase, 10 had a preparation phase and eight had a maintenance phase. The number of text messages and the duration of the intervention varied. All used motivational messages grounded in social cognitive behavioral theories, 11 used behavioral change techniques, and 14 used individually tailored messages. Eleven interventions also offered other smoking cessation tools. Three interventions yielded smoking cessation outcomes greater than the control condition.

Conclusions: The proliferation of text messaging in recent years suggests that text messaging interventions may have the potential to improve smoking cessation rates. Detailed summary of the interventions suggests areas for future research and clinical application. More rigorous studies are needed to identify components of the interventions that can enhance their acceptability, feasibility and efficacy.

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1. Introduction

Text messaging, also known as short message service (SMS), is an increasingly available and affordable method of communication for many individuals. In the United States, monthly text messaging increased ten-fold from 19 billion in 2006 to 193 billion in 2011 (CTIA The Wireless Association, 2011). The popularity of text messaging and accessibility to mobile phone technology is likely to increase and become a mainstream way of communication and it has great potential to deliver health care and promote behavior change in many individuals, including vulnerable populations. It has been utilized to increase physical activity (Hurling et al., 2007), to improve outcomes in medication compliance (Andrade et al., 2005), and to manage asthma and diabetes (Kim & Kim, 2008; Ostojic et al., 2005). This popular communication technology may also be promising for smoking cessation (Whittaker et al., 2009, 2012).

Tobacco use is the leading cause of preventable disease worldwide (World Health Organization, 2009), and existing interventions aimed to reduce tobacco use rates have limited success. In the United States, 70% of adult smokers want to quit smoking but about 52% actually attempt to quit and only 6% are successful (Centers for Disease Control, 2011; Messer, Trinidad, Al-Delaimy, & Pierce, 2008). These rates suggest the need to develop effective and innovative interventions that appeal to smokers and can enhance treatment delivery.

Smoking cessation interventions delivered via text messaging may increase treatment accessibility because it requires minimal effort and resources. A recent economic evaluation showed that text-based smoking cessation interventions are cost effective (Guerriero et al., 2012). While traditional face-to-face smoking cessation interventions can be time-consuming and burdensome to both health care providers and clients, text messaging can ease the burden by providing real-time, proactive, and tailored support in a relevant context. Additionally, text messaging may appeal to traditionally hard-to-reach, at-risk populations who experience barriers to smoking cessation interventions, such as adolescents and young adults, socioeconomically disadvantaged individuals and individuals from ethnic/racial minority backgrounds (Cokkinides, Halpern, Barbeau, Ward, & Thun, 2008; Fagan et al., 2004; Garrett, Dube, Trosclair, Caraballo, & Pechacek, 2011), all of whom who have high rates of mobile phone and text messaging use (Smith, 2011).

Several recent reviews have examined the evidence of efficacy of text messaging as a tool for behavior change for an array of targeted behaviors such as disease prevention and management, including smoking cessation (see reviews by Buhi et al., 2012; Cole-Lewis & Kershaw, 2010; Ehrenreich, Richter, Rocke, Dixon, & Himelhoch, 2011; Fjeldsoe, Marshall, & Miller, 2009; Free et al., 2013; Gurman, Rubin, & Roess, 2012; Krishna, Boren, & Balas, 2009; Riley et al., 2011). In order to assess the utility of interventions using text messaging specifically for smoking cessations, we need to broaden our

understanding of the specific components of the interventions, for whom and how they can be used, and identify areas to improve already existing interventions. Thus, we closely examined the collective evidence on the components of the text messaging interventions solely focusing on smoking cessation.

Two meta-analyses (Whittaker et al., 2009, 2012) to-date reviewed the efficacy of text messaging interventions for smoking cessation through evaluating publications that met stringent inclusion criteria and which excluded non-randomized, feasibility studies. The earlier publication reviewed four studies and found evidence of short-term self-reported quitting (RR 2.18, 95% CI 1.80–2.65) at 4- to 6-week end-of-treatment; however, long-term efficacy could not be determined because of heterogeneity in the outcome measures. Additionally, two of the four studies included in the meta-analysis examined both Internet and text messaging interventions; therefore, making it difficult to attribute the positive treatment effects solely to text messaging. In the subsequent publication, Whittaker et al. (2012) reviewed five studies that primarily used text messaging for smoking cessation and demonstrated evidence supporting efficacy up to six months (RR 1.71, 95% CI 1.47–1.99). The results of these meta-analyses indicate that text messaging intervention may be a promising tool for improving smoking cessation outcomes; however, research synthesizing the components of the interventions to inform clinicians and researchers and improve feasibility and efficacy is lacking. Better understanding of these factors may also improve currently existing interventions. Ybarra, Holtrop, Bosi, and Emri (2012) and Cole-Lewis and Kershaw (2010) have noted that because text messaging is an intervention delivery tool, attention to factors such as how the messages are tailored and provided to various target groups needs to be carefully considered. Thus, this current narrative review attempts to expand upon the meta-analyses which examined the efficacy of smoking cessation interventions by Whittaker et al. (2009, 2012) by including a wide-range of smoking cessation interventions that used text messaging as a treatment delivery tool and describe the components of the interventions, such as the theoretical model in which the message contents were based, frequency of the text messages, duration of the interventions, other treatments offered in conjunction with the text messaging intervention, and treatment outcome rates. To examine these components and given the relative novelty of this mode of intervention delivery, we included all available feasibility and acceptability studies to identify trends in the development of such intervention.

2. Methods

Terms related to text messaging such as, “short message service (SMS)” “text message,” “txt,” “multimedia messaging service (MMS),” “mobile phone,” and “cellular phone” combined with “smoking,” “tobacco,” “cigarette,” and “cessation,” published in English in a peer-

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