Psychiatry Research 243 (2016) 255–262

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Text messaging interventions for individuals with mental health disorders including substance use: A systematic review

Tyler Watson, Scot Simpson, Christine Hughes *

Faculty of Pharmacy & Pharmaceutical Sciences, 3-171 Edmonton Clinic Health Academy, University of Alberta, 11405-87 Avenue, Edmonton, AB, Canada T6G 1C9

ARTICLE INFO

Article history:
Received 30 October 2015
Received in revised form
20 April 2016
Accepted 27 June 2016
Available online 29 June 2016

Keywords:
Medication adherence
Text message
Mental health
Schizophrenia
Depression
Bipolar disorder
Alcohol use disorder
Anxiety disorder

ABSTRACT

We completed a systematic review of the literature to characterize the impact of text messaging interventions on medication adherence or mental health related outcomes in people with mental health disorders including substance use. Four electronic databases were searched from January 1999 to October 2015. Seven studies met our inclusion criteria: three studies evaluated text messaging in patients with schizophrenia or schizoaffective disorder diagnosis, two studies evaluated text messaging in patients with chronic alcohol dependence, and two studies reviewed text messaging in patients with mood disorders. Six studies were randomized controlled trials and one was a prospective pilot study with pre-post intervention design. Text messaging frequency ranged from once weekly to twelve per day. The effect of text messaging on medication adherence was measured in five studies; one study reporting significant improvements in the text messaging intervention group. The effect of text messaging on mental health related outcomes was measured in all seven studies, with five studies showing significant improvements in a variety of psychiatric and social functioning assessments. Collectively, these studies suggest text messaging is a promising tool to support management of patients with mental illness. Further research examining theory-based text messaging interventions in larger samples of patients is required.

1. Introduction

Medication adherence is defined as the extent to which a patient's medication-taking behavior matches that agreed upon with the prescriber (Haddad et al., 2014; Osterberg and Blaschke, 2005). Poor medication adherence contributes to increased health care costs and suboptimal therapeutic outcomes (Kripalani et al., 2007; Sokol et al., 2005; DiMatteo et al., 2002). Research suggests about one-quarter to one-half of individuals taking medications for chronic conditions are non-adherent (DiMatteo et al., 2002; World Health Organization, 2003). The rates of medication non-adherence in patients with mental health disorders are even higher, leading to significant consequences in terms of emergency room visits and hospitalizations (Cramer and Rosenheck, 1998; Sajatovic et al., 2007; Kane et al., 2013; Julius et al., 2009). While reasons for medication non-adherence can be multifactorial, active substance use is considered one of the key causes in the field of psychiatry (Sowers and Golden, 1999; Weiss, 2004; Lacro et al., 2002).

Interventions to enhance medication adherence in psychiatric patients can be classified as psycho-social or pharmacologic in nature (Farooq and Naeem, 2014). Psycho-social interventions, such as cognitive-behavioral therapy or motivational interviewing, are designed to improve treatment adherence by promoting behavior change. Pharmacologic interventions, the effect of which depends on strong provider-patient relationships, attempt to encourage medication adherence through simplified and adaptable treatment regimens. Assessing the impact of these interventions has been complicated by numerous factors including: difficulties in defining and measuring adherence, stigma associated with psychotropic treatment, and clinician inattention to monitoring medication adherence in practice (Berk et al., 2010). What evidence does exist suggests that comprehensive, multi-faceted interventions are most effective in improving medication adherence in this population (Farooq and Naeem, 2014; Berk et al., 2010; Chong et al., 2011).

Although many existing strategies to improve adherence are expensive and impractical for regular clinical practice, an emerging approach is to use technology-based interventions (Granger and Bosworth, 2011). Among the many technological (or mobile) interventions available, text messaging or short messaging services has been identified as a particularly cost-effective and convenient method for promoting medication adherence and

* Corresponding author.
E-mail address: christine.hughes@ualberta.ca (C. Hughes).

http://dx.doi.org/10.1016/j.psychres.2016.06.050
0165-1781/

improving health outcomes (Krishna et al., 2009). Cellular phone ownership has become nearly ubiquitous, with an estimated 90% of individuals having access to devices worldwide (International Telecommunications Union, 2012). Within the mental health population, this percentage may be closer to 75% (Campbell et al., 2014). Cellular phones are now the most common form of mobile health tool available for use, and within these devices, text messaging is becoming the preferred form of communication (International Telecommunications Union, 2012; Campbell et al., 2014). Acceptance for using cell phones as a means of communicating about health has been demonstrated in the general population as well as in the mental health population (Campbell et al., 2014; U.S. Department of Health and Human Services, 2014; Schnall et al., 2013).

To date, several studies have evaluated the impact of text messaging interventions in people with mental health disorders. The purpose of this systematic review is to synthesize the information generated from studies that have evaluated the impact of text messaging interventions on medication adherence or mental health related outcomes (such as psychiatric symptoms and social functioning) in people with mental health disorders including substance use.

2. Methods

2.1. Search strategy and eligibility criteria

With assistance from a professional librarian, we conducted a search of the English language literature from January 1999 to October 1, 2015 using Medline, Embase, Psychinfo, and the Cochrane Systematic review databases. References from articles and reviews of interventions to improve medication adherence were also searched to identify additional articles. Key words and subject headings used in the search were: (*text message* or *text messaging* or *short message service* or *texting)* and (*mental disorders* or *mental illness* or *substance-related disorders* or *addiction* or *drug abuse*). Appendix A describes the Medline search strategy used.

Studies were included if they met the following inclusion criteria: controlled clinical trial or observational study, used text messaging as the intervention, enrolled adults (18 years of age and older) with a chronic mental health diagnosis or substance abuse, and either adherence or a mental health related outcome (e.g. psychiatric and social functioning assessments) was a pre-specified outcome.

2.2. Study selection

After duplicates were removed, two authors (TW and CH) independently screened titles and abstracts to identify potentially relevant citations. A citation was retained for further review if either investigator selected it. Once the full article for each potentially relevant citation was obtained, two investigators independently reviewed it to determine if it met the inclusion criteria. Discrepancies regarding study inclusion were resolved through discussion between the investigators.

2.3. Data abstraction and synthesis

Two investigators (TW and CH) used a standard template to extract the following information: location and practice setting of study, study design (including blinding or investigator involvement in the intervention), sample size, research personnel involved, characteristics of the study participants, details of the intervention and control (if applicable), study duration including follow up, outcome of interest and measurement method, and results reported. Assessment of methodological quality was completed using the tool developed by Downs and Black (1998). This tool assesses reporting quality, external validity, internal validity, and power; it was selected since we anticipated including both randomized controlled trials and observational studies. The investigators were not blinded to authors or journal type.

3. Results

3.1. Study selection and characteristics

Our literature search identified 694 unique citations, of which fourteen were identified as potentially relevant (Fig. 1). After a review of the full article, seven studies met the inclusion criteria (Agyapong et al., 2012; Beebe et al., 2014; Granholm et al., 2012; Montes et al., 2012; Moore et al., 2015; Stoner et al., 2015; van den Berg et al., 2015). Most citations were excluded because they did not assess adherence or mental health related outcomes, were not a controlled trial or observational study, or the intervention did not involve text messaging (Fig. 1). Information on the study design and patient characteristics are summarized in Table 1. Median study sample size was 55 participants (range 30–254).

The most common disease state in which text messaging interventions were trialed was schizophrenia or schizoaffective disorder (Beebe et al., 2014; Granholm et al., 2012; Montes et al., 2012). Two of these studies (Beebe et al., 2014; Montes et al., 2012) used the definition of schizophrenia as outlined in the fourth edition of the Diagnostic and Statistical Manual (DSM-IV); the other study (Granholm et al., 2012) did not describe the diagnostic criteria used. Two studies examined text messaging intervention in individuals with chronic alcohol use disorder or dependence (Agyapong et al., 2012; Stoner et al., 2015) and one of these studies included comorbid depression as defined by the DSM-IV criteria (Agyapong et al., 2012). One study tested their text messaging intervention in a sample of individuals diagnosed with anxiety or depression, however the criteria used for diagnosis were not described (van den Berg et al., 2015). The last study included patients with co-occurring bipolar disorder (as defined by the Composite International Diagnostic Interview) and HIV infection (Moore et al., 2015). Four studies provided information about the participant's medication regimens (Beebe et al., 2014; Granholm et al., 2012; Montes et al., 2012; Moore et al., 2015). Four studies recruited patients attending outpatient mental health centers (Beebe et al., 2014; Granholm et al., 2012; Montes et al., 2012) or hospital-affiliated programs (Moore et al., 2015), while two recruited patients discharged from an inpatient psychiatric program (Agyapong et al., 2012; van den Berg et al., 2015). One study recruited patients directly from the community through advertisements (Stoner et al., 2015). Three studies provided subjects with a direct incentive for participation (Beebe et al., 2014; Granholm et al., 2012; Moore et al., 2015). Two studies provided patients with reimbursement for completing follow up assessments (Beebe et al., 2014; Granholm et al., 2012), while the third study reimbursed participants for additional costs incurred by using their own cell phone for the study (Moore et al., 2015).

3.2. Quality assessment

Table 2 presents the overall quality assessment score (final column in the table) and individual elements from the checklist used to assess methodological quality of healthcare intervention studies (Downs and Black, 1998). These elements are used to highlight key differences in quality among the included studies. Columns 2 and 3 are elements used to assess quality of study reporting, column 4 assesses external validity, columns 5–7 assess