

Mobile Telephone Text Messaging for Medication Adherence in Chronic Disease: A Meta-analysis

The following is a synopsis of “Mobile Telephone Text Messaging for Medication Adherence in Chronic Disease: A Meta-analysis,” which was published in *March 2016 in Journal of the American Medical Association Internal Medicine*.



What is already known on this issue?

Improving medication adherence may be the intervention with the greatest potential for improving the health of a population. Poor medication adherence is linked to increased hospitalizations, medical interventions, morbidity, mortality, and costs, yet current strategies for improving adherence to medication therapies used to treat chronic diseases are complex and largely ineffective.

Text messages have been used to communicate health information to patients, but the evidence supporting this approach is limited to narrative reviews, not meta-analyses. Mobile apps, pagers, and dedicated devices for audiovisual reminders have also been used to communicate health information to patients, but are not as available as text messaging. Text messaging is available on any existing mobile device and is used by all socioeconomic groups and ages, and on all continents. In fact, in 2014, the number of mobile subscribers was approximately 7 billion, essentially equal to the global population. Therefore, the use of text messages sent to a patient's mobile telephone may be an effective way to improve adherence.

What is added by this article?

The authors of this article sought to estimate the effect of text messaging on medication adherence in adults with chronic disease. Their secondary objective was to look at frequency of messaging, interactivity, and customization, and to describe perceptions and acceptability to participants.

The authors conducted a literature search of MEDLINE, EMBASE, CINAHL, PsycINFO, Cochrane Central Register or Controlled Trials, and trial registries; their article is in accordance to the Preferred Reporting Items for Systematic Reviews and Meta-analyses statement and the Cochrane Collaboration reporting items for systematic reviews and meta-analysis. The inclusion criteria were: randomized clinical trials with at least four weeks' follow-up, involving adult patients with chronic disease who received a mobile telephone text message intended to improve medication adherence, and including a description of the quantitative effect of the messaging.

The exclusion criteria were: studies that included interventions beyond text messaging; did not report a quantitative measure of medication adherence; and/or involved psychiatric, military,

or institutionalized patients. Two reviewers independently screened all identified titles and abstracts using a predefined protocol, assessed the risk of bias in accord with the Cochrane Handbook for Systematic Reviews of Interventions, and used software called Comprehensive Meta-analysis (version 2.2.06) for statistical analysis.

Forty-four articles were assessed and 16 randomized clinical trials involving 2,742 patients were identified. The median sample size was 97, the median age of the participants was 39 years, and 50.3% were female. Several chronic diseases were represented in the studies discussed and the median duration of intervention was 12 weeks. The most common methods used to assess adherence were self-recall, medication event monitoring system, and pill count. The adherence cut-off ranged from 80% to 95% for each trial. Although the message content was primarily medication reminders, the characteristics of text messages varied considerably among studies and included both medical and non-medical information. The frequency of text messages also varied from daily to weekly; in some, customized patterns were used. The majority of studies used automated messaging, and a few timed the message with the medication administration time.

The authors concluded that text message based interventions significantly improved medication adherence in patients with chronic disease, even after taking into consideration publication bias. They did not find significant effects of text messages on adherence when the frequency of messaging was increased and 2-way communications were employed. However, a moderate effect was observed when messages were personalized and included the participant's name. There was no significant difference in adherence when the frequency of messaging varied from daily to less than daily. In 11 studies participant feedback was reported and most participants reported moderate to high levels of satisfaction with the text message

intervention and expressed a desire to continue receiving messages. A small number of patients reported that twice a day and early morning (7:00 a.m. and 10:00 a.m.) messaging were disruptive to daily routines.

What are the implications of these findings?

Text message based interventions have the potential for improving medication adherence.

A combination of strategies that can increase medication adherence to anti-hypertensive medications is usually necessary, but the implementation of multiple strategies is complex, resource intensive, and unrealistic in clinical practice. Text message-based interventions offer a simple, easy, and automated approach to improving medication adherence. Mobile phone text messaging approximately doubles the odds of medication adherence. This increase translates into adherence rates improving from 50% (assuming this baseline rate in patients with chronic disease) to 67.8%, or an absolute increase of 17.8%.

High quality studies in appropriate patient populations aiming to identify which features are most effective are now necessary, even as researchers must continue to look at sustained effects and influences on clinical outcomes. These results should be interpreted with caution given the short duration of trials and reliance on self-reported medication adherence measures. Unanswered questions remain. Is fixed message content or customized content more effective? Is fixed-frequency or real-time medication monitoring better? What about fixed message content vs. customized content, and standard vs. personalized messages? Finally, which has the greater effect on adherence: 1-way or 2-way communication?

Resources

Million Hearts

Improving Medication Adherence Among Patients with Hypertension: A Tip Sheet for Health Care Professionals
http://millionhearts.hhs.gov/files/TipSheet_HCP_MedAdherence.pdf

Centers for Disease Control and Prevention

Partnering with Pharmacists in the Prevention and Control of Chronic Disease
http://www.cdc.gov/dhdsp/programs/spha/docs/pharmacist_guide.pdf

Calculating Proportion of Days Covered (PDC) for Antihypertensive and Antidiabetic Medications: An Evaluation Guide for Grantees

<http://www.cdc.gov/pending>

Citation

Thakkar J, Kurup R, Laba, T, et al. Mobile Telephone Text Messaging for Medication Adherence in Chronic Disease: A Meta-analysis. JAMA Internal Medicine. 2016;176(3):340-349. doi:10.1001/jamainternmed.2015.7667

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

