

Mobile phone messaging for facilitating self-management of long-term illnesses

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ABSTRACT

Background

Long-term illnesses affect a significant proportion of the population in developed and developing countries. Mobile phone messaging applications, such as Short Message Service (SMS) and Multimedia Message Service (MMS), may present convenient, cost-effective ways of supporting self-management and improving patients' self-efficacy skills through, for instance, medication reminders, therapy adjustments or supportive messages.

Objectives

To assess the effects of mobile phone messaging applications designed to facilitate self-management of long-term illnesses, in terms of impact on health outcomes and patients' capacity to self-manage their condition. Secondary objectives include assessment of: user evaluation of the intervention; health service utilisation and costs; and possible risks and harms associated with the intervention.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL, *The Cochrane Library* 2009, Issue 2), MEDLINE (OvidSP) (January 1993 to June 2009), EMBASE (OvidSP) (January 1993 to June 2009), PsycINFO (OvidSP) (January 1993 to June 2009), CINAHL (EbscoHOST) (January 1993 to June 2009), LILACS (January 1993 to June 2009) and African Health Anthology (January 1993 to June 2009).

We also reviewed grey literature (including trial registers) and reference lists of articles.

Selection criteria

We included randomised controlled trials (RCTs), quasi-randomised controlled trials (QRCTs), controlled before-after (CBA) studies, or interrupted time series (ITS) studies with at least three time points before and after the intervention. We selected only studies where it was possible to assess the effects of mobile phone messaging independent of other technologies or interventions.

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Data collection and analysis

Two review authors independently assessed all studies against the inclusion criteria, with any disagreements resolved by a third review author. Study design features, characteristics of target populations, interventions and controls, and results data were extracted by two review authors and confirmed by a third. Primary outcomes of interest were health outcomes as a result of the intervention and capacity to self-manage long-term conditions. We also considered patients' and providers' evaluation of the intervention, perceptions of safety, health service utilisation and costs, and potential harms or adverse effects. The included studies were heterogeneous in type of condition addressed, intervention characteristics and outcome measures. Therefore, a meta-analysis to derive an overall effect size for the main outcome categories was not considered justified and findings are presented narratively.

Main results

We included four randomised controlled trials involving 182 participants.

For the primary outcome of health outcomes, including physiological measures, there is moderate quality evidence from two studies involving people with diabetes showing no statistical difference from text messaging interventions compared with usual care or email reminders for glycaemic control (HbA1c), the frequency of diabetic complications, or body weight. There is moderate quality evidence from one study of hypertensive patients that the mean blood pressure and the proportion of patients who achieved blood pressure control were not significantly different in the intervention and control groups, and that there was no statistically significant difference in mean body weight between the groups. There is moderate quality evidence from one study that asthma patients receiving a text messaging intervention experienced greater improvements on peak expiratory flow variability (mean difference (MD) -11.12, 95% confidence interval (CI) -19.56 to -2.68) and the pooled symptom score comprising four items (cough, night symptoms, sleep quality, and maximum tolerated activity) (MD -0.36, 95% CI -0.56 to -0.17) compared with the control group. However, the study found no significant differences between the groups in impact on forced vital capacity or forced expiratory flow in 1 second.

For the primary outcome of capacity to self-manage the condition, there is moderate quality evidence from one study that diabetes patients receiving the text messaging intervention demonstrated improved scores on measures of self-management capacity (Self-Efficacy for Diabetes score (MD 6.10, 95% CI 0.45 to 11.75), Diabetes Social Support Interview pooled score (MD 4.39, 95% CI 2.85 to 5.92)), but did not show improved knowledge of diabetes. There is moderate quality evidence from three studies of the effects on treatment compliance. One study showed an increase in hypertensive patients' rates of medication compliance in the intervention group (MD 8.90, 95% CI 0.18 to 17.62) compared with the control group, but in another study there was no statistically significant effect on rates of compliance with peak expiratory flow measurement in asthma patients. Text message prompts for diabetic patients initially also resulted in a higher number of blood glucose results sent back (46.0) than email prompts did (23.5).

For the secondary outcome of participants' evaluation of the intervention, there is very low quality evidence from two studies that patients receiving mobile phone messaging support reported perceived improvement in diabetes self-management, wanted to continue receiving messages, and preferred mobile phone messaging to email as a method to access a computerised reminder system.

For the secondary outcome of health service utilisation, there is very low quality evidence from two studies. Diabetes patients receiving text messaging support made a comparable number of clinic visits and calls to an emergency hotline as patients without the support. For asthma patients the total number of office visits was higher in the text messaging group, whereas the number of hospital admissions was higher for the control group.

Because of the small number of trials included, and the low overall number of participants, for any of the reviewed outcomes the quality of the evidence can at best be considered moderate.

Authors' conclusions

We found some, albeit very limited, indications that in certain cases mobile phone messaging interventions may provide benefit in supporting the self-management of long-term illnesses. However, there are significant information gaps regarding the long-term effects, acceptability, costs, and risks of such interventions. Given the enthusiasm with which so-called mHealth interventions are currently being implemented, further research into these issues is needed.

PLAIN LANGUAGE SUMMARY

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Many people suffer from long-term conditions such as asthma or diabetes. To make living with the long-term illnesses as easy as possible, people have to regularly monitor the symptoms of their conditions and adapt their lifestyles. This review studied whether mobile phone applications such as Short Message Service (SMS) (also known as text messaging) and Multimedia Message Service (MMS) can support people to better manage their long-term illnesses by sending medication reminders or supportive messages, or by offering a way for people to communicate important information to their healthcare providers and receive feedback.

We found moderate quality evidence that under some conditions these types of applications may indeed have some positive impacts on the health status of patients with diabetes, hypertension and asthma, and on their ability to manage their own condition, although for some outcomes no significant effect was observed. In two studies, there was very low quality evidence that participants evaluated the mobile phone messaging support positively. Also, in two studies, there was very low quality evidence that: there was no difference in health service utilisation by diabetes patients receiving text messaging support and those who did not (one study); and that asthma patients receiving text messages visited the doctor more often but were admitted to hospital less often than those not receiving the messages (one study).

Because of the small number of patients involved in these studies the evidence is not very strong. Furthermore, the usefulness and potential negative consequences of mobile phone messaging over extended periods of use for self-managing long-term conditions are not yet known.