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[Intervention Review]

Mobile phone messaging for preventive health care

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ABSTRACT

Background

Preventive health care promotes health and prevents disease or injuries by addressing factors that lead to the onset of a disease, and by detecting latent conditions to reduce or halt their progression. Many risk factors for costly and disabling conditions (such as cardiovascular diseases, cancer, diabetes, and chronic respiratory diseases) can be prevented, yet healthcare systems do not make the best use of their available resources to support this process. Mobile phone messaging applications, such as Short Message Service (SMS) and Multimedia Message Service (MMS), could offer a convenient and cost-effective way to support desirable health behaviours for preventive health care.

Objectives

To assess the effects of mobile phone messaging interventions as a mode of delivery for preventive health care, on health status and health behaviour outcomes.

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, and interrupted time series (ITS) studies with at least three time points before and after the intervention. We included studies using SMS or MMS as a mode of delivery for any type of preventive health care. We only included studies in which it was possible to assess the effects of mobile phone messaging independent of other technologies or interventions.

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 author. Primary outcomes of interest were health status and health behaviour outcomes. We also considered patients' and providers' evaluation of the intervention, perceptions of safety, health service utilisation and costs, and potential harms or adverse effects. Because the included studies were heterogeneous in type of condition addressed, intervention characteristics

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and outcome measures, we did not consider that it was justified to conduct a meta-analysis to derive an overall effect size for the main outcome categories; instead, we present findings narratively.

Main results

We included four randomised controlled trials involving 1933 participants.

For the primary outcome category of health, there was moderate quality evidence from one study that women who received prenatal support via mobile phone messages had significantly higher satisfaction than those who did not receive the messages, both in the antenatal period (mean difference (MD) 1.25, 95% confidence interval (CI) 0.78 to 1.72) and perinatal period (MD 1.19, 95% CI 0.37 to 2.01). Their confidence level was also higher (MD 1.12, 95% CI 0.51 to 1.73) and anxiety level was lower (MD -2.15, 95% CI -3.42 to -0.88) than in the control group in the antenatal period. In this study, no further differences were observed between groups in the perinatal period. There was low quality evidence that the mobile phone messaging intervention did not affect pregnancy outcomes (gestational age at birth, infant birth weight, preterm delivery and route of delivery).

For the primary outcome category of health behaviour, there was moderate quality evidence from one study that mobile phone message reminders to take vitamin C for preventive reasons resulted in higher adherence (risk ratio (RR) 1.41, 95% CI 1.14 to 1.74). There was high quality evidence from another study that participants receiving mobile phone messaging support had a significantly higher likelihood of quitting smoking than those in a control group at 6 weeks (RR 2.20, 95% CI 1.79 to 2.70) and at 12 weeks follow-up (RR 1.55, 95% CI 1.30 to 1.84). At 26 weeks, there was only a significant difference between groups if, for participants with missing data, the last known value was carried forward. There was very low quality evidence from one study that mobile phone messaging interventions for self-monitoring of healthy behaviours related to childhood weight control did not have a statistically significant effect on physical activity, consumption of sugar-sweetened beverages or screen time.

For the secondary outcome of acceptability, there was very low quality evidence from one study that user evaluation of the intervention was similar between groups. There was moderate quality evidence from one study of no difference in adverse effects of the intervention, measured as rates of pain in the thumb or finger joints, and car crash rates.

None of the studies reported the secondary outcomes of health service utilisation or costs of the intervention.

Authors' conclusions

We found very limited evidence that in certain cases mobile phone messaging interventions may support preventive health care, to improve health status and health behaviour outcomes. However, because of the low number of participants in three of the included studies, combined with study limitations of risk of bias and lack of demonstrated causality, the evidence for these effects is of low to moderate quality. The evidence is of high quality only for interventions aimed at smoking cessation. Furthermore, there are significant information gaps regarding the long-term effects, risks and limitations of, and user satisfaction with, such interventions.

PLAIN LANGUAGE SUMMARY

Mobile phone messaging for preventive health care

Many costly and disabling conditions such as cardiovascular diseases, cancer or diabetes are linked by common preventable risk factors like tobacco use, unhealthy nutrition, physical inactivity and excessive alcohol use. However, prevention still plays a secondary role in many health systems as all too often, healthcare workers fail to seize interactions with patient as opportunities to inform them about health promotion and disease prevention strategies. This review examined whether mobile phone applications such as Short Message Service (SMS) and Multimedia Message Service (MMS) can support and enhance primary preventive health interventions.

There was moderate quality evidence from one study which showed that pregnant women who received supportive, informative text messages experienced higher satisfaction and confidence, and lower anxiety levels in the antenatal period than women who did not receive these. There was low quality evidence that there was no difference in pregnancy outcomes.

We found one trial that provided high quality evidence that regular support messages sent by text message can help people to quit smoking, at least in the short-term. One study assessing whether mobile phone messaging promoted use of preventive medication reported moderate quality evidence of higher self-reported adherence by people receiving the messages. A fourth study on healthy behaviours in children found very low quality evidence showing that the interventions had no effect.

There was very low quality evidence from one study that people's evaluation of the intervention was similar between groups. There was moderate quality evidence from one study of no difference in harms of the intervention, measured as rates of pain in the thumb or finger joints, and car crash rates. There were no studies reporting outcomes related to health service utilisation or costs.

Although we find that, overall, mobile phone messaging can be helpful for some aspects of preventive health care, much is not yet known about the long-term effects or potential negative consequences.