



April 2017 – SUPPORT Summary of a systematic review

Does mobile phone messaging improve self-management of long-term illnesses?

Diseases such as diabetes, hypertension and asthma are long-term illnesses. Mobile phone messaging can be used as a tool to help people control and self-manage these conditions.

Key messages

- Mobile phone messaging support probably leads to little or no difference in people's knowledge about their diabetes but may improve people's self-efficacy in relation to their diabetes.
- Mobile phone messaging support probably leads to little or no difference in adherence to diabetes medication in young people with diabetes or care plan adherence in people with asthma but probably improves medication adherence in people with hypertension.
- Mobile phone messaging support for people living with diabetes probably leads to little or no difference in glycaemic control and may lead to little or no difference in diabetes complications.
- Mobile phone messaging support for people living with asthma or hypertension may lead to little or no difference in control of these conditions.
- It is uncertain whether mobile phone messaging support changes health service utilisation by people living with diabetes and asthma.
- All of the studies were conducted in high-income countries and the applicability of the findings to low income countries is likely to vary, depending on the availability of the technological infrastructure required and factors such as levels of patient literacy and the acceptability of this intervention among different groups.



Who is this summary for?

People making decisions facilitating the self-management of long-term illnesses.

! This summary includes:

- **Key findings** from research based on a systematic review
- **Considerations about the relevance of this research** for low-income countries

✗ Not included:

- Recommendations
- Additional evidence not included in the systematic review
- Detailed descriptions of interventions or their implementation

This summary is based on the following systematic review:

de Jongh T, Gurool-Urganci I, Vodopivec-Jamsek V, Car J, Atun R. Mobile phone messaging for facilitating self-management Of long-term illnesses. Cochrane Database of Systematic Reviews 2012, Issue 12. Art.No.:CD007459.DOI:10.1002/14651858.CD007459.pub2.

What is a systematic review?

A summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise the relevant research, and to collect and analyse data from the included studies

SUPPORT was an international project to support the use of policy relevant reviews and trials to inform decisions about maternal and child health in low- and middle-income countries, funded by the European Commission (FP6) and the Canadian Institutes of Health Research.

Glossary of terms used in this report:
www.supportsummaries.org/glossary-of-terms

Background references on this topic:
See back page

Background

The effective self-management of long-term diseases can play an important role in preventing and controlling complications associated with these diseases. Mobile phone messaging tools such as Short Message Service (SMS) (also known as text messages) and Multimedia Message Service (MMS) may help people to self-manage their conditions. This can be done by sending medication reminders to people with long-term illnesses, sending supportive care messages, or helping people communicate with healthcare providers and receive feedback from them. The extent to which mobile phone messaging applications can improve self management, increase the utilisation of services, and consequently enhance people's health outcomes, is unknown.

How this summary was prepared

After searching widely for systematic reviews that can help inform decisions about health systems, we have selected ones that provide information that is relevant to low-income countries. The methods used to assess the reliability of the review and to make judgements about its relevance are described here:

www.supportsummaries.org/how-support-summaries-are-prepared/

Knowing what's not known is important

A reliable review might not find any studies from low-income countries or might not find any well-designed studies. Although that is disappointing, it is important to know what is not known as well as what is known.

A lack of evidence does not mean a lack of effects. It means the effects are uncertain. When there is a lack of evidence, consideration should be given to monitoring and evaluating the effects of the intervention, if it is used.

About the systematic review underlying this summary

Review objective: To assess the effects of mobile phone messaging applications designed to facilitate self-management of long-term illnesses, on health outcomes and the capacity of patients to self-manage their conditions.

Types of	What the review authors searched for	What the review authors found
Study designs & Interventions	Randomised trials, non-randomised trials, controlled before–after studies, or interrupted time series studies with at least three time points before and after the intervention.	<p>Four randomised trials were included. Text messaging was used as an intervention in all the included studies. Multimedia Message Services (MMS) were not used in any of the included studies.</p> <p>Two studies of interventions for diabetes and hypertension respectively used one-way communication between an automated system and the study participants. One study about diabetes used two-way communication between patients and an automated system, and one study about asthma used two-way communication between patients and their physicians.</p>
Participants	Patients with long-term illnesses	182 participants: people with diabetes aged between 8 and 25 years (2 studies, 99 people); people over 18 years with hypertension (1 study, 67 people); people of any age with asthma (1 study, 16 people)
Settings	Any	Outpatient services in the USA, the UK, Spain and Croatia
Outcomes	<p><i>Primary outcomes:</i> Health outcomes as a result of the intervention, including physiological measures (e.g. blood pressure) and capacity to self-manage long-term conditions (e.g. lifestyle modification).</p> <p><i>Secondary outcomes:</i> User (patient, carer or healthcare provider) evaluation of the intervention (e.g. satisfaction); health service utilisation following the intervention; costs (direct and indirect) of the intervention; user perceptions of safety; potential harms or adverse effects of the intervention, such as misreading or misinterpretation of data.</p>	<p><i>Primary outcomes:</i> Glycaemic Control (Hb1Ac) in people with diabetes (2 trials); diabetic ketoacidosis (DKA) (1 trial), severe hypoglycaemia (1 trial), systolic and diastolic blood pressure(1 trial), forced expiratory volume in 1 second (FEV1) and forced vital capacity (FVC) in people with asthma (1 trial). The following outcomes were also evaluated across the 4 trials: self-efficacy for diabetes, diabetes social support interview, diabetes knowledge scale, hypertension treatment adherence at six months, diabetes treatment adherence, adherence of people with asthma to peak expiratory flow measurement.</p> <p><i>Secondary outcomes:</i> participant evaluation of the intervention and health services utilisation were evaluated in one trial.</p>

Date of most recent search: June 2009

Limitations: This is a well-conducted systematic review with only minor limitations.

de Jongh T, Gurol-Urganci I, Vodopivec-Jamsek V, Car J, Atun R. Mobile phone messaging for facilitating self-management of long-term illnesses. Cochrane Database of Systematic Reviews 2012, Issue 12. Art. No.: CD007459.

Summary of findings

The review identified four studies that included 182 participants. None of the studies was conducted in a low-income country.

1) Effects of mobile phone messaging support on capacity to self-manage diabetes, hypertension, and asthma

Four studies examined the effects of mobile phone messaging support on people's capacity to self-manage their diabetes, hypertension or asthma. This was compared with usual care or usual care with self-management support by email.

- ➔ **Mobile phone messaging support probably leads to little or no difference in people's knowledge about their diabetes. The certainty of this evidence is moderate.**
- ➔ **Mobile phone messaging support may improve people's self-efficacy in relation to their diabetes. The certainty of this evidence is low.**
- ➔ **Mobile phone messaging support probably leads to little or no difference in adherence to diabetes medication in young people with diabetes or care plan adherence in people with asthma but probably improves medication adherence in people with hypertension. The certainty of this evidence is moderate.**
- ➔ **Mobile phone messaging support may result in a higher number of self-testing results sent back by people with diabetes. The certainty of this evidence is low.**

About the certainty of the evidence (GRADE) *

⊕⊕⊕⊕

High: This research provides a very good indication of the likely effect. The likelihood that the effect will be substantially different† is low.

⊕⊕⊕○

Moderate: This research provides a good indication of the likely effect. The likelihood that the effect will be substantially different† is moderate.

⊕⊕○○

Low: This research provides some indication of the likely effect. However, the likelihood that it will be substantially different† is high.

⊕○○○

Very low: This research does not provide a reliable indication of the likely effect. The likelihood that the effect will be substantially different† is very high.

* This is sometimes referred to as 'quality of evidence' or 'confidence in the estimate'.

† Substantially different = a large enough difference that it might affect a decision

See last page for more information.

Effects of mobile phone messaging support on capacity to self-manage long-term illnesses			
People	People with long-term illnesses including diabetes, hypertension, and asthma		
Settings	Outpatient services in the USA, the UK, Spain and Croatia		
Intervention	Mobile phone messaging support for self-management of diabetes, hypertension and asthma		
Comparison	Usual care, or usual care with self-management support delivered by email		
Outcomes	Mean Difference (MD) (95% CI) / Impact	Number of participants (studies)	Certainty of the evidence (GRADE)
Self-efficacy for diabetes	MD 6.10 (0.45 to 11.75)	59 (1 study)	⊕⊕○○ Low
Knowledge of diabetes	MD -0.5 (-1.60 to 0.60)	59 (1 study)	⊕⊕⊕○ Moderate
Adherence to medication or care plans	Probably leads to little or no difference in adherence to diabetes medication in young people with diabetes or care plan adherence in people with asthma but probably improves medication adherence in people with hypertension	142 (3 studies)	⊕⊕⊕○ Moderate
Number of blood glucose results sent back	May result in a higher number of results sent back	40 (1 study)	⊕⊕○○ Low
Mean Difference (MD): Difference of means between the intervention and control group for the continuous variable. In the meta-analysis, the difference in means from each study was weighted by the precision of its estimate of effect and a pooled mean reported. CI: Confidence interval GRADE: GRADE Working Group grades of evidence (see above and last page)			

2) Effects of mobile phone messaging support on health outcomes

Three studies examined the effects of mobile phone messaging support for self-management, compared with usual care or usual care with self-management support by email, on health outcomes for diabetes, hypertension and asthma.

- **Mobile phone messaging support for people living with diabetes probably leads to little or no difference in glycaemic control. The certainty of this evidence is moderate.**
- **Mobile phone messaging support for people living with diabetes may lead to little or no difference in diabetes complications. The certainty of this evidence is moderate.**
- **Mobile phone messaging support for people living with hypertension may lead to little or no difference in blood pressure control, including diastolic and systolic blood pressure and the number of people with blood pressure not under control. The certainty of this evidence is low.**
- **Mobile phone messaging support for people living with asthma may lead to little or no difference in asthma control. The certainty of this evidence is low.**

Effects of mobile phone messaging support on health outcomes					
People	Patients with long-term illnesses including diabetes, hypertension, and asthma				
Settings	Outpatient services in the USA, the UK, Spain, and Croatia				
Intervention	Mobile phone messaging support for self-support of diabetes, hypertension and asthma				
Comparison	Usual care, or usual care with self-management support delivered by email				
Outcomes	With usual care	With mobile phone messaging	Relative effect (95% CI)	Number of participants (studies)	Certainty of the evidence (GRADE)
	Absolute effect* (95% CI) / Impact				
Diabetes complications – diabetic ketoacidosis	111 per 1000	62 per 1000 (11 to 347)	RR 0.56 (0.10 to 3.12)	59 (1)	⊕⊕○○ Low
Diabetes complications – severe hypoglycaemia	148 per 1000	31 per 1000 (4 to 264)	RR 0.21 (0.03 to 1.78)	59 (1)	⊕⊕○○ Low
Diabetes – glycaemic control	Probably leads to little or no difference in glycaemic control		–	88 (2)	⊕⊕⊕○ Moderate
Hypertension control	May lead to little or no difference in blood pressure control, including diastolic and systolic blood pressure and the number of people with blood pressure not under control		–	67 (1)	⊕⊕○○ Low
Asthma control	May lead to little or no difference in asthma control, based on a range of measures		–	8 (1)	⊕⊕○○ Low
CI: Confidence interval RR: Risk ratio GRADE: GRADE Working Group grades of evidence (see above and last page)					
* The risk WITHOUT the intervention is based on the median control group risk across studies. The corresponding risk WITH the intervention (and the 95% confidence interval for the difference) is based on the overall relative effect (and its 95% confidence interval).					

3) Effects of mobile phone messaging support on the utilisation of diabetes and asthma services

Two studies examined the effects of mobile phone messaging support for self-management, compared with usual care or usual care with self-management support by email, on utilisation of health services for diabetes, hypertension and asthma.

→ It is uncertain whether mobile phone messaging support changes health service utilisation by people living with diabetes and asthma. The certainty of this evidence is very low.

Mobile phone messaging and utilisation of services for diabetes, hypertension, and asthma			
People	Patients with long-term illnesses including diabetes, hypertension, and asthma		
Settings	Outpatient services in the USA, the UK, Spain, and Croatia		
Intervention	Mobile phone messaging support for self-management of diabetes, hypertension and asthma		
Comparison	Usual care, or usual care with self-management support delivered by email		
Outcomes	Impact	Number of participants (studies)	Certainty of the evidence (GRADE)
Service utilisation by people with diabetes	It is uncertain whether mobile phone messaging support changes the number of clinic visits (MD 0.30 (CI: -0.22 to 0.82)) or calls to an emergency hotline (RR 0.32 (CI: 0.09 to 1.08)) as the certainty of the evidence is very low	75 (2)	⊕○○○ Very low
Service utilisation by people with asthma	It is uncertain whether mobile phone messaging support changes health service utilisation (outpatient visits, hospitalisations) as the certainty of the evidence is very low	16 (1)	⊕○○○ Very low
Mean Difference (MD): Difference of the means between the intervention and control group for the continuous variable. In the meta-analysis, the difference in means from each study was weighted by the precision of its estimate of effect and the pooled mean reported. RR: Risk Ratio CI: Confidence Interval GRADE: GRADE Working Group grades of evidence (see above and last page)			

Relevance of the review for low-income countries

→ Findings	▷ Interpretation*
APPLICABILITY	
→ All of the included studies were conducted in high income countries.	<p>▷ The applicability of the findings to low-income countries is likely to vary, depending on the availability of the technological infrastructure required (including, for example, computerised patient record systems for providers). Consideration will also need to be given to additional factors such as the level of patient literacy and the acceptability of this intervention among different groups.</p> <p>▷ Where resources are limited, phone messaging services are poor, or people with long-term illnesses do not have adequate access to health services, support via mobile phone messaging is unlikely to be a useful option.</p>
EQUITY	
→ The included studies did not provide data regarding differential effects of the interventions across genders or across various levels of advantage	<p>▷ The intervention relies on technology that may be less affordable for or less accessible to disadvantaged groups, such as people with low levels of literacy or low incomes. The use of this technology may therefore exacerbate health inequalities if these aspects are not taken into account, for example by developing messaging that is accessible to people with low levels of literacy.</p> <p>▷ The use of mobile phone messaging may be less acceptable to groups, such as older people, that are less familiar with this technology. Such groups may be disadvantaged if this intervention is widely relied on to support people with long-term illnesses.</p>
ECONOMIC CONSIDERATIONS	
→ The review reports few data on the costs of the intervention or the resources used to implement it.	<p>▷ Although mobile phone messages are generally considered low cost interventions, their implementation at scale may require the provision of expensive infrastructure including linking messaging and computerised patient record systems and creating electronic back-up systems.</p> <p>▷ Where systems are implemented in which people can, or are expected to, respond to messages from the health services, this may result in additional costs for service users.</p>
MONITORING & EVALUATION	
<p>→ The certainty of the evidence for many outcomes was low or very low, including for impacts on health service utilisation and health outcomes</p> <p>→ Few data are available on the costs of these interventions.</p>	<p>▷ Larger and more rigorous studies, including studies in low-income countries, are needed. These studies should evaluate the full range of outcomes, including impacts on people's capacity to self-manage their long-term condition, their use of health services and the extent to which their health condition is controlled. These studies should explore the extent to which effects are sustained over time and whether there are differential impacts across different groups, such as poorer people or the elderly.</p> <p>▷ The acceptability, feasibility and costs of these interventions for both people living with long-term conditions and the health services should also be evaluated.</p>

*Judgements made by the authors of this summary, not necessarily those of the review authors, based on the findings of the review and consultation with researchers and policymakers in low-income countries. For additional details about how these judgements were made see: www.supportsummaries.org/methods

Additional information

Related literature

Berrouiguet S, Baca-García E, Brandt S, Walter M, Courtet P. Fundamentals for Future Mobile-Health (mHealth): A Systematic Review of Mobile Phone and Web-Based Text Messaging in Mental Health. *J Med Internet Res*. 2016;18(6):e135

Car J, Guroł-Urganci I, de Jongh T, Vodopivec-Jamsek V, Atun R. Mobile phone messaging reminders for attendance at healthcare appointments. *Cochrane Database of Systematic Reviews*. 2013; 12:CD007458.

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Thakkar J, Kurup R, Laba TL, Santo K, Thiagalingam A, Rodgers A, Woodward M, Redfern J, Chow CK. Mobile Telephone Text Messaging for Medication Adherence in Chronic Disease: A Meta-analysis. *JAMA Intern Med*. 2016;176(3):340-9

Vodopivec-Jamsek V, de Jongh T, Guroł-Urganci I, Atun R, Car J. Mobile phone messaging for preventive health care. *Cochrane Database of Systematic Reviews*. 2012;12:CD007457.

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Conflict of interest

None declared. For details, see: www.supportsummaries.org/coi

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de Jongh T, Guroł-Urganci I, Vodopivec-Jamsek V, Car J, Atun R. Mobile phone messaging for facilitating self-management of long-term illnesses. *Cochrane Database of Systematic Reviews* 2012, Issue 12. Art. No.:CD007459.

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About certainty of the evidence (GRADE)

The “certainty of the evidence” is an assessment of how good an indication the research provides of the likely effect; i.e. the likelihood that the effect will be substantially different from what the research found. By “substantially different” we mean a large enough difference that it might affect a decision. These judgements are made using the GRADE system, and are provided for each outcome. The judgements are based on the study design (randomised trials versus observational studies), factors that reduce the certainty (risk of bias, inconsistency, indirectness, imprecision, and publication bias) and factors that increase the certainty (a large effect, a dose response relationship, and plausible confounding). For each outcome, the certainty of the evidence is rated as high, moderate, low or very low using the definitions on page 3.

For more information about GRADE: www.supportsummaries.org/grade

SUPPORT collaborators:

The Cochrane Effective Practice and Organisation of Care Group (EPOC) is part of the [Cochrane Collaboration](http://www.cochrane.org). The Norwegian EPOC satellite supports the production of Cochrane reviews relevant to health systems in low- and middle-income countries. www.epocoslo.cochrane.org

The Evidence-Informed Policy Network (EVIPNet) is an initiative to promote the use of health research in policymaking in low- and middle-income countries. www.evipnet.org

The Alliance for Health Policy and Systems Research (HPSR) is an international collaboration that promotes the generation and use of health policy and systems research in low- and middle-income countries. www.who.int/alliance-hpsr

Norad, the Norwegian Agency for Development Cooperation, supports the Norwegian EPOC satellite and the production of SUPPORT Summaries. www.norad.no

The Effective Health Care Research Consortium is an international partnership that prepares Cochrane reviews relevant to low-income countries. www.evidence4health.org

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