Mobile phone text messaging for promoting adherence to antiretroviral therapy in patients with HIV infection

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There is high-quality evidence in favour of effectiveness of mobile telephone text messages of any length sent at weekly intervals for enhancing adherence to antiretroviral therapy and improving HIV viral load suppression.

1. INTRODUCTION

At the end of 2010, there were an estimated 34 million people were living with HIV worldwide (1). In November 2011, UNAIDS and WHO estimated that 47% (6.6 million) of the estimated 14.2 million people eligible for treatment in low- and middle-income countries were accessing lifesaving antiretroviral therapy (ART) in 2010, an increase of 1.35 million since 2009 (2). Adherence to ART is the principal predictor of the success of treatment of HIV/AIDS and remains a challenge to HIV/AIDS treatment and care with a wide range of associated risks (3).

Due to the growing ubiquity of mobile phones with more than 60% of the mobile telephone users now living in the developing world (4), the use of mobile phone technology has been explored for supporting the treatment of chronic conditions like diabetes and asthma (5). The advantages of using mobile phones in health care are manifold. Health messages and reminders can be made available to a larger, geographically diverse population and can be customized if required. Also, with increasing availability of mobile telephones in resource-constrained settings, the cost–effectiveness of using mobile telephones in health care is likely to increase (5, 6).

ART adherence is only one of many modifiable health behaviours that can be targeted through the use of mobile phones (8). High rates of adherence to medications have been reported in patients opting to receive text messages as medication reminders (7). This Cochrane review (9) aimed to compare the effect of use of mobile text messaging as an intervention for improving adherence to ART and better viral load control.

2. METHODS OF THE REVIEW

The review authors used the appropriate, standard Cochrane methodology, including a comprehensive search for trials, inclusion of trials according to predefined quality criteria, transparent data extraction and pre-specified analyses.

The outcome measures included adherence to the treatment and viral load suppression at 52 weeks. Quality of Life (QOL), measured as improvement in emotional and mental state, has been included as a secondary
In this updated review, the main comparisons evaluated for improving adherence to treatment and viral load suppression include: (i) standard care versus care supported with text messages; (ii) standard care versus a weekly message; (iii) standard care versus a daily message; (iv) a daily message versus a weekly message; and (v) short messages versus long messages.

3. RESULTS OF THE REVIEW

A large number of studies were identified. However, most studies did not have text messaging as an intervention or were not randomized control trials (RCTs). The systematic review included a total of two randomized controlled trials (RCTs) involving 969 patients on ART that met the reviewers’ inclusion criteria. One study was excluded though it had discussed the feasibility issues in implementing the intervention in one of the trials included in the review.

3.1 Standard care versus text messages

Only one study comprising of 273 participants initiating ART reported the effect of mobile phone text messaging on the adherence to treatment. Text messages were brief, sent once weekly with a response from the patients being requested within 48 hours of receiving the message. The patients receiving text messages were found to be at a lower risk of reporting non-adherence to ART at 12 months compared with those receiving standard treatment [relative risk (RR) 0.77, 95% confidence interval (CI) 0.63–0.93]. Patients receiving text messages were also reported to be at a lower risk of experiencing failure of viral load management compared with patients on standard care (RR 0.83, 95% CI 0.69–0.99).

3.2 Standard care versus weekly messages

Only one study in the systematic review comprising 431 participants who had recently (<3 months) initiated ART reported that a weekly message of any length put them at a lower risk of non-adherence compared with those randomized to a control group (RR 0.79, 95% CI 0.63–0.98).

3.3 Standard care versus a daily message

The same study with 431 participants who had recently (<3 months) initiated ART reported on this comparison. There was no difference in the risk of non-adherence in patients receiving a daily message of any length compared with those in the control group (RR 0.99, 95% CI 0.82–1.2).

3.4 Weekly versus a daily message

The study also reported that those who received weekly text messages were at a lower risk for non-adherence than those receiving daily messages (RR 0.79, 95% CI 0.64–0.99).

3.5 Short message versus a long message

In addition,…the study found that there was no difference in the risk of non-adherence in patients receiving short or long messages (RR 0.99, 95% CI 0.78–1.27).

4. DISCUSSION

4.1 Applicability of the results

The review’s authors concluded that there is high-quality evidence in favour of effectiveness of mobile phone text messages of any length sent at weekly intervals for enhancing adherence to ART and improving
HIV viral load suppression. However, there is low-quality evidence from one trial that text messaging at daily intervals is no more effective than standard care in promoting adherence to ART. These findings are likely to be applicable to most under-resourced settings.

### 4.2 Implementation of the intervention

With increasing availability of mobile phones worldwide, mobile text messaging is a feasible option for improving treatment adherence for ART in under-resourced settings. Mobile phone-based programmes to promote adherence can not only gain wider geographical access, but also surmount barriers such as stigma, privacy loss and transportation limitations associated with traditional interventions.

The review also concludes that the reminders received on a weekly basis have been found to be the most effective intervention in this context. The use of an interactive voice response system may be a consideration in the design of suitable adherence reminders, provided adequate training is given to the participant at the beginning of the intervention.

For this intervention to succeed, it is important to design the message in the local language. The barrier of language has also been discussed in previous literature. However, the use of mobile phone text message for treatment adherence may be an intervention with a lot of other limitations, especially in the areas where women respondents are patients themselves or are caregivers and have lower level of ownership of mobile phones, if they are not employed or are housewives. Also, mobile phone text messaging cannot overcome all of the factors that can hinder adherence to treatment, such as coping up with the side-effects of medicines, high pill burdens, high dosing frequency, lack of trust in the health-care provider, lack of time and lack of money, etc.

However, by applying mobile phone text messaging as a method to improve adherence to ART for as many individuals as possible, and reserving more resource-intensive interventions for the patients most in need of them, the overall cost-effectiveness of these interventions could increase.

### 4.3 Implications for research

The authors of the review identified the need for large randomized controlled trials for the use of mobile phone text messaging in adolescent population and caregivers for children and infants with HIV. Evidence on acceptability, culture specific content and length of message along with feasibility in the high- and middle-income countries would also be important to consolidate the recommendations on use of mobile phone text messaging service for improving adherence to ART and suppression of viral load. Also, there is a need to determine if text messaging improves medication adherence in patients known to be non-adherent, as well as to evaluate if text messaging promotes long-term improvements in medication adherence rates.

The feasibility and cost-effectiveness of using pictorial/multimedia and automated messages for improved adherence to ART can be explored in high- and middle-income countries.

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### References


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