

Text message communication in primary care research: a randomized controlled trial

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Background. Text message communication is increasingly used in clinical practice but rarely in research. Particularly in young people, this method of participation in primary care research appears both feasible and acceptable. However, previous experience shows that text messaging for research may lead to lower response rates.

Aim. To test the hypothesis that text message communication in primary care research does not lead to lower response rates compared to a paper-based method.

Methods. This randomized controlled trial took place in 26 randomly selected practices in Victoria, Australia. Consecutive patients aged 16–24 years attending general practice appointments were recruited as part of a larger study on patients' perspectives. Patients owning a mobile phone were randomized to receive a question about satisfaction with the consultation either by text message or on a card completed before leaving the practice. Logistic regression was used to estimate the effect on the response rate of using text message rather than the card method, adjusting for clustering within practices and for differences in baseline characteristics among participants.

Results. In total, 402 of 409 eligible young people agreed to participate and were randomized to either receive a text message ($n = 193$) or a card enquiry ($n = 209$). The response rate was 80.2% [95% confidence interval (CI): 73.3–87.1%] with text message and 85.6% (95% CI: 79.6–91.7%) with the card. The adjusted odds of responding (odds ratio: 0.62; 95% CI: 0.30–1.27) were not significantly lower in the group using text messaging compared to the group using the card response method.

Conclusion. These findings offer new perspectives for use of text message communication to gather information from patients in primary care research.

Keywords. Adolescent, cellular phone, randomized controlled trial, research methods.

Introduction

One of the challenges of primary care research lies in the mobility of the population. This can result in difficulties tracking patients to assess outcomes following a consultation, especially if follow-up is confidential and patients do not wish to be contacted at home. Electronic and mobile communications provide an alternative approach to existing methods to address this challenge.

Mobile phone use is widespread. By the end of 2007, there were >3.3 billion mobile phone subscribers globally.¹ In countries with established economies, >70% of households own at least one mobile phone.^{2,3} In Europe, where individuals increasingly use two or more different mobile phones, the average penetration rate for mobile phone subscriptions now exceeds 100%!¹ Increasingly, patients who attend family practices own a mobile phone.

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The use of text messaging offers potential advantages over telephone calls in primary care research, particularly with young people who have led the uptake of this technology. For example, while individuals may immediately notice a text message, they can choose a convenient time to reply. Texting is cheaper than many other follow-up approaches.⁴ While text messaging allows similar possibilities to e-mail in communicating written information, it offers better confidentiality as e-mails on a computer screen can be overseen by others. In daily clinical practice, text messages are commonly used to remind patients of appointments or to send test results with follow-up advice, thus shortening an often anxious wait until the next available consultation and decreasing time to treatment.⁴⁻⁶ Text messaging has also been shown to be valuable in chronic disease self-management programmes to support behaviour change.⁷⁻⁹

Despite these advantages, little use has been made of text messaging in primary care research to date. We recently demonstrated the feasibility and acceptability of text messaging in primary care research in a study involving 96 young people aged 16–24 years recruited from general practices in and around Melbourne, Australia.¹⁰ Most (91%) owned a useable mobile phone (that is, they could remember their number and had enough credits to send a text message response) and 98% of those who had a mobile phone were willing to provide their number for research purposes.

The results of this feasibility study suggest that text messaging in primary care research is highly acceptable. However, only 32 of 44 (73%) who were sent a text message replied, whereas use of the card response method led to a 90% response rate.¹⁰ Several factors could negatively impact on response rates when using text messaging in primary care research. Participants may be reluctant to provide their correct details to researchers they do not know; a message may thus be lost if sent to a phantom number. As participants bear the cost of text message responses, they may be happy to receive a message but not to reply. They may also lose interest in a study once they have left the practice and may ignore any message received from the primary care researcher, despite having agreed to participate.

Given these concerns, the aim of this trial was to test the hypothesis that text message communication in primary care research does not lead to lower response rates compared to a paper-based method.

Methods

Study design

This was a 1:1 randomized controlled trial comparing text message and a more traditional card response method to assess patient satisfaction following a primary care consultation.

Participants and procedure

Participants were recruited as part of a wider study of young people's perspectives in primary care.¹¹ Patient recruitment took place between July 2004 and April 2005 in 26 randomly selected practices in the state of Victoria, Australia. The sample was stratified so that the number of participating practices reflected the proportion of the Victorian population living in Rural, Remote and Metropolitan Areas. Consecutive patients aged between 16 and 24 years entering the practices during recruitment times were eligible for the study of young people's perspectives (an average of 20 patients per practice). If they owned a useable mobile phone, they were also eligible for the trial comparing the use of text messaging with the card response method. Exclusion criteria were an acute medical condition requiring immediate attention by the doctor and any other condition that could impair the young person's ability to consent (for example cognitive impairment or insufficient understanding of English).

Patients were approached by a researcher (D.M.H.) as they attended the clinic for a consultation. As part of the consent process for the study on young people's perspectives, they were asked whether they agreed to provide their mobile phone number to receive a single question on satisfaction following the consultation. Participants were only made aware of their group allocation after they had provided their mobile phone number.

The intervention and control conditions

In the intervention group, patients were sent a text message after the consultation enquiring about their satisfaction with the consultation. In the control group, patients were given a question on a card before the consultation. They were asked to complete it following the consultation and to drop the card in a box at reception before leaving the practice. In order for the control condition to be similar to usual research conditions using paper-based response options, the practice receptionists were encouraged to remind patients allocated to the card-response group to place their card in the box before leaving the practice. The text message and the question on the card were the same: 'Did this consultation meet your expectations? Yes/No/Unable to say'. Participants in the text message group typed in their responses, whereas those in the card-response group ticked a box next to the answer they chose.

Random allocation

Randomization was computer generated by an epidemiologist who was not involved in the trial. To limit uneven distribution of socio-demographic characteristics, randomization was stratified by practice (block randomization). For practical reasons (particularly to facilitate the work of the reception staff who assisted in reminding the patients to drop the card in the box

before leaving the practice), the unit of randomization was days and not patients. This means all patients recruited in a practice on a certain day were allocated to text message and on another day to card response. The randomization list for each practice was known to the researcher (D.M.H.) at the start of each day of recruitment in each of the practices. Neither this researcher nor the patients were blinded to the allocation group.

Outcome measure

The outcome of interest was the response rate using each method. We also compared the type of responses provided by patients in each group.

Sample size calculations

We estimated that a sample size of 400 participants would be sufficient to detect a 10% lower response rate using text message compared to the card response method, given $\alpha = 0.05$ and a power of 80%. We considered such a difference, if present, as significantly likely to affect the quality of the information gathered in a trial using text message rather than a paper-based response method.

Statistical analyses

All analyses were performed using Intercooled STATA 9.0 for Windows.¹² Patient characteristics and response rates were summarized using proportions with 95% confidence intervals (CIs) adjusted for clustering within practices. The main analysis was conducted on an intention-to-treat basis. Logistic regression was used to estimate the effect on the response rate of using text message rather than the card method, adjusting for clustering within practices and for differences in baseline characteristics among participants.

Results

Of 501 young people who were approached to participate in the study on young people's perspectives (of which this was a sub-study), 450 (90%) agreed. Of those, 409 (91%) had a useable mobile phone and were thus eligible for the trial. There were no differences in socio-demographic characteristics between those who owned a mobile phone and could be included in the trial and those who did not. Of those who were eligible for the trial, seven (1.6%) did not wish to provide their mobile phone number for research purposes. Thus, 402 (89.3%; 95% CI: 86.5–92.2%) were randomized: 193 to the intervention group and 209 to the control condition (Fig. 1).

There were no substantial differences in the baseline characteristics of the two trial groups, with the exception of the proportion of young people who held a health concession card, which was higher in the control group

(see Table 1) (Individuals with an income <450 AUD per week, including students, are entitled to this concession card and can receive less expensive care).

The response rate was 80.2 (95% CI: 73.3–87.1%) in the text message group and 85.6% (95% CI: 79.6–91.7%) in the card-response group. This difference in response rates was not significant: the adjusted odds of responding to the question about satisfaction were not significantly lower in the group using text message compared to the group using the card response method (odds ratio: 0.62; 95% CI: 0.30–1.27).

There was a higher tendency for those in the card group to indicate that they were satisfied with the consultation: the proportion of young people who responded that the consultation had met their expectation was 92.7% (95% CI: 88.6–96.8%) in this group compared to 87.7% (95% CI: 82.2–93.1%) in the text message group. The difference in proportion between the two groups did not, however, reach significance when adjusting for clustering. Several participants sent support and best wishes messages for the trial together with their texted response. None sent negative or unpleasant messages. No comments, neither good nor bad, were found on any of the response cards.

Discussion

To our knowledge, this is the first study examining the effects on response rates of using text message communication as a research tool in primary care. The use of text messaging did not significantly affect response rates in this primary care study, which suggests that text message communication is a suitable tool for primary care research.

Previous studies have shown that text messaging could successfully be used for communication with patients in the clinical context.^{5,7–9} In these studies, patients communicated with clinicians they knew. The present trial adds to these previous findings by showing that patients are also willing to provide their real contact details and to use text messaging to communicate with researchers they do not know.

Practical considerations imposed a randomization process by days rather than by patient. This may have led to some imperfections in group allocation. In particular, as the number of eligible patients entering a practice varied on different days, this led to including an unequal number of participants in the two different groups. A higher proportion of young people in the control group held a health concession card. Though adjustments were made in the analysis to take these differences into account, unmeasured factors may have led to an undetected bias. The study was unblinded and this may have introduced a bias in favour of text messages as patients could have been

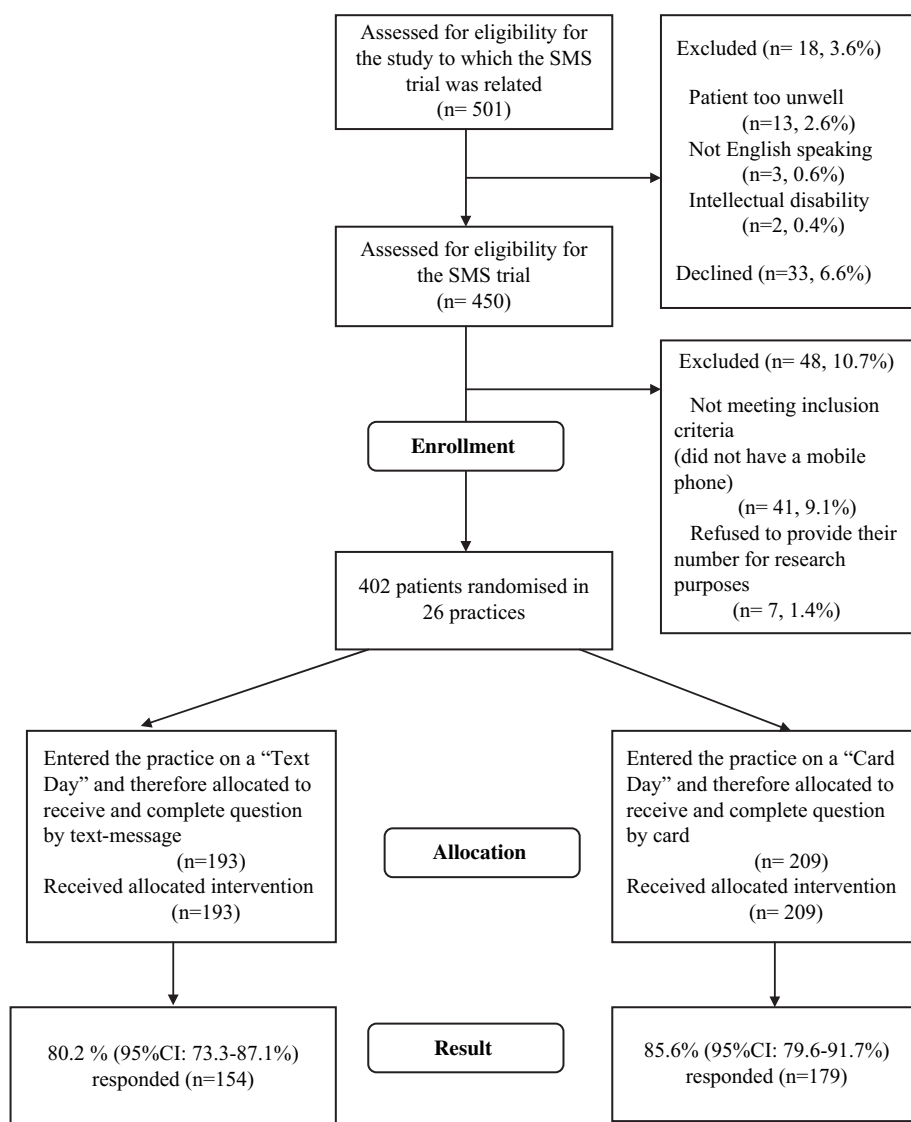


FIGURE 1 Study flowchart

TABLE 1 Baseline characteristics of the intervention (text message) and control (card) groups

Characteristics	Text message (n = 193)	Card (n = 209)	P value ^a
Mean age (SD)	20.1 (2.5)	19.8 (2.4)	0.24
Male, n (%)	56 (29)	77 (37)	0.06
Student, n (%)	120 (62)	117 (57)	0.24
Australian born, n (%)	156 (81)	180 (86)	0.07
Concession cardholder, n (%)	56 (29.2)	86 (41.6)	0.009

^at-test and χ^2 for the difference, adjusted for clustering within practices.

motivated to show that this new method was better than the traditional paper-based option. On the other hand, the fact that the receptionist reminded patients to drop the card into the box could also have favoured

a better response rate in the card-response group. Indeed, the two tested conditions could be seen to differ in more than the text message versus paper-based response method in that one group completed the question while still in the practice and the other answered after having left it. A mailed paper-based option would potentially have been a more comparable control group. However, our aim was to compare the new (text message) method against the one that most commonly would be used were text messaging not available. Due to its low cost and potential for high response rates, the card-response control condition seemed the best option. Since response rates to mailed paper-based surveys are typically <65% (without reminders), the 80% response rate in our text message group further highlights the potential of this new method. Only a short question was asked; we cannot be certain that the response rates would be similar if

a longer, more detailed questionnaire were to be sent using text messaging. Though shorter questionnaires are likely to yield a better response rate than longer ones, we found no evidence suggesting that the effect of a longer questionnaire on response rates could differentially affect paper-based and text message communication methods.¹³ In addition, early results from a study tracking young people's mood over time suggest response rates to longer and more frequent mobile phone questionnaires remain excellent.¹⁴

Finally, these results are from an Australian population aged 16–24 years. The sample was representative of the population in this age group in an entire State and as such is representative of young people living in a country with an established economy. The extent to which these results may be generalizable to an older population is unknown but the growing expansion of text message use far beyond the teenage years suggests good potential for the application of this method in older age groups as well.

Text messaging offers wide applications in primary care research. Easy communication and rapid feedback render text messaging an ideal tool to use to ask patients about their satisfaction with a service, as in the present study. Other applications include monitoring response to treatment, adverse effects or lifestyle factors. For example, text messaging has been shown to be a useful method for tracking young people's everyday experiences of mood, stress and coping behaviours.¹⁴ Text messaging could also be used to monitor diet in a clinical trial. Participants could be sent a message three times a day reminding them to keep a log of their meals or asking them to send a description of the content of their last meal. They could also be asked to send a picture of it to be analysed by a research dietician. The feasibility of collecting diary data using text messaging over 3 months has previously been demonstrated in a pilot study involving asthma patients.¹⁵ Alternatively, patients in a clinical trial could be asked to send a text message each time they experience an adverse event they relate to the treatment. This would assist online monitoring of side effects in such trials. Text messaging can also be very useful to keep track of patients in a longitudinal trial for example to arrange appointments for research follow-up interviews. In a study we recently conducted in Switzerland, 1 month follow-up by mobile phone (including text messages to arrange appointments for phone interviews) was much more efficient (response rate 91%) than e-mail (response rate 42%).¹⁶ Young people felt the mobile phone was more anonymous than e-mail in that their details could not be traced from the mobile phone number alone.

Some practical aspects need to be considered before applying this method in a primary care research project. Despite ongoing expansion of mobile phone networks, network coverage may still be insufficient in

some rural areas. In the present study, inadequate coverage led to delays in sending messages in two of the practices. Researchers also need to be reminded that mobile phone use may disrupt medical equipment if used less than a metre away.^{17 18} Thus, researchers may need to choose an appropriate location within the practice from which to send text messages. In the future, the manufacture of medical equipment resistant to electromagnetic interference is likely to remove this concern altogether.¹⁸ Participants had to bear the cost of their response. That response rates were high suggests this did not influence participants' willingness to respond. This is not surprising considering the low cost of a single text message (5–10 cents) and the high rate of daily text message exchanges among young people. Further research is needed, however, to identify whether cost could truly be a barrier to more extensive use of text messaging to communicate with research participants. In a study involving more frequent text message exchanges, offering participants mobile phone credits or prepaid SIM cards may be a useful strategy to limit potential bias related to costs.¹⁴ Future research might usefully explore the quality and validity of the different kinds of data that can be collected with this type of approach.

The ongoing development of hand-held technologies opens entire new scope for the use of text messaging and multimedia messaging in the future. Applying these methods in primary care research projects could help researchers better face some of the challenges they meet in studying the mobile population of patients attending primary care.

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Ethical approval: Ethics in Human Research Committee of the Royal Children's Hospital and the Ethical Committee of the University of Melbourne (approval as part of the study on young people's perspectives).

Conflict of interests: none.

Trial registration: Australian New Zealand Clinical Trials Registry (ACTRN) number: 12605000020684.

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