The use of weekly text messaging over 6 months was a feasible method for monitoring the clinical course of low back pain in patients seeking chiropractic care

Iben Axén, Lennart Bodin, Gunnar Bergström, Laszlo Halasz, Fredrik Lange, Peter W. Lövgren, Annika Rosenbaum, Charlotte Leboeuf-Yde, Irene Jensen

The Karolinska Institutet, Institute of Environmental Medicine, Unit of Intervention and Implementation Research, Nobels väg 13, 171 77 Stockholm, Sweden

Lund, Sweden

Stockholm, Sweden

Linköping, Sweden

Spine Centre of Southern Denmark, Hospital Lillebalt, Institute of Regional Health Research, University of Southern Denmark, Denmark

Accepted 3 July 2011; Published online 09 December 2011

Abstract

Objective: This study critically evaluates a new method of collecting frequent data using mobile phones and text messages. Fluctuating conditions such as low back pain (LBP) need frequent monitoring to describe the clinical course in detail and to account for individual and subgroup variations.

Study Design and Setting: In this multicentre prospective observational study, 262 subjects with nonspecific LBP were followed with weekly text messages for 6 months, with the question “How many days this previous week has your low back pain been bothersome?” The text replies were instantly recorded in a data file to be merged with baseline and follow up data (age, gender, pain intensity, duration, and self-rated health) collected through ordinary questionnaires. The response rate, user-friendliness, and compliance of this method were evaluated.

Results: The mean response rate for the text messages throughout the study was 82.5% and was unaffected by season. The method was found to be user friendly. Dropout was not affected by age and gender, but compliance was possibly somewhat affected by outcome.

Conclusion: Weekly text messages are a useful method of data collection to examine the clinical course of LBP in the primary care sector. © 2012 Elsevier Inc. All rights reserved.

Keywords: Low back pain; Clinical course; Bothersomeness; Frequent data collection; Text messages; Compliance

1. Introduction

In prospective studies, data are often collected only at a few instances, that is, at baseline and follow-up. A difference in the outcome measures at these time points is then considered a change in the condition. However, if the course is fluctuating, details of relapses and remissions cannot be captured by measuring only the two occasions. The measures may indicate stability, when in fact the patient has been feeling either worse or better between these two time points. Conversely, a difference could merely reflect a temporary fluctuation in an otherwise stable condition. To accurately describe the individual course in a fluctuating condition, a more dense data collection may be suitable.

Low back pain (LBP) is considered to be a fluctuating condition, recurrent in a large proportion of cases and truly persistent only in some [1,2]. Several authors have pointed out the need for exploring the details of the course of LBP [2–4], as little is known about this subject. Frequent data collection would therefore be advantageous to increase our knowledge into the extent and frequency of LBP events. However, questionnaire surveys are not ideal for collecting frequent data as they often yield poor response rates [5,6]. To improve response rates, several mailings are often needed, which increase the cost.

LBP is often measured by quantifying pain intensity or the resulting disability. However, recording only pain
2. Aim and objectives

The overall aim of this study was to critically evaluate a new method of collecting data using text messages. The objectives were to evaluate the response rate, including the association with season, user-friendliness, and compliance in a population treated for LBP. The clinical aspect of this study will be reported elsewhere.

3. Methods

3.1. Recruiting chiropractors and subjects

The data were collected in a prospective multicentre study that aimed to describe the clinical course of nonspecific LBP. In the present report, only variables relevant to the evaluation of the method are presented.

To recruit subjects with LBP, chiropractic clinics were chosen as LBP is the most commonly treated condition by chiropractors in Sweden [10]. A convenience sample of chiropractors, all members of the Swedish Chiropractors’ Association (in Swedish: Legitimerade Kiropraktorers Riksförening), was recruited in an earlier study [11].

The chiropractors were asked to recruit 10 participants each in the study. Subjects were included provided that they had nonspecific LBP with or without leg pain, were of working age (usually between 18 and 65 years old), and that they returned to the chiropractor for at least a second visit. Also, before the present episode of LBP, they should not have been under chiropractic care for the past 3 months. Patients were not recruited in the study if pregnant, unable to understand Swedish, if they did not have a mobile phone, or if they did not know how to text message. Subjects were enrolled from May to December 2008 and followed for 6 months. Patients with specific LBP (i.e., not to be included in the study) would be identified at the first chiropractic visit, which is not recorded in the study. To minimize the burden on the clinicians, subjects identified with nonspecific LBP were recruited in the study at the second visit.

3.2. Measurements

At the inclusion visit, the subjects were informed about the study verbally and in writing. They also received an information leaflet with details of the study’s purpose, methods, and length. The text message question was clearly stated. At this visit, the subjects filled in the first questionnaire with a pain drawing [12], self-rated general health (“How would you rate your health?” Answers given as a 5-point Likert scale ranging from Excellent [1] to Poor [5]) [13], pain intensity (numeric 11-point scale [numeric rating scale (NRS), anchors at no pain, and worst imaginable] [14], and the EuroQol, EQ-5D (scores ranging from 1.00 = perfect health to 0 = death) [15]. They signed a consent form and sent it all to the research center where the respondents were entered into the computer system for the
text message question. At the same visit, baseline data were collected by the chiropractor consisting of information on gender, age, and occupation, as well as area, intensity, duration, and frequency of the LBP. In addition, access to a mobile phone and knowledge of using text messages were noted by the chiropractor.

Treatment was decided by the chiropractor in charge of the case and is not reported in this article. As studies have shown that most patients improve by the fourth visit [3,16,17], this was decided to be the first follow-up time in the clinic. At this visit, the chiropractor interviewed the subject and noted pain intensity (numeric 11-point scale, with anchors at no pain and worst imaginable) and self-reported improvement (descriptive 5-point scale, ranging from definitely improved to definitely worse). These questions are part of a normal clinic routine, and it was not logistically possible to let a research assistant perform these interviews.

After 6 months, follow-up questionnaires with EQ-5D and a question on self-reported general health (5-point scale ranging from excellent to very poor) were sent to the respondents with a stamped return envelope. Nonresponders were called once by a research assistant and encouraged to answer.

3.3. The SMS-Track Questionnaire

The software used for the text message data collection in this study was the SMS-Track Questionnaire [18]. It allows for a high number of respondents receiving questionnaires as a text message via their mobile phones at a frequent rate [18]. Text messages are sent automatically at the same time every week. The respondents answer by replying with a text message (in this study: by typing a number), which is then automatically transferred to a data file and stored under safe conditions. The responsible researcher can, in real time, view the answers from each respondent on line.

Questions suitable for text messages should be short and preferably answered in an equally short manner. When measuring pain, intensity can reliably be described with the visual analogue scale [19] and the NRS [20]. However, several aspects of pain should be assessed [21,22], and researchers have proposed that pain severity limiting daily activities should warrant attention [22,23]. Further, pain-measuring instruments need to be clinically applicable to encourage utilization [23], and user-friendliness and interpretability should be considered [22,24]. The measure “bothersomeness” has been shown to be associated with pain intensity, disability, and psychological health [24] and to predict outcome [24]. In this study, this term is used as a proxy for the global effects of pain, both physical and psychological, on the subjects’ everyday life.

The question used in our study was: “How many days during this previous week has your low back pain been bothersome, (i.e. affected your daily activities or routines)? Please answer by a number from 0 to 7” [25].

3.4. Reminding

Reminders were automatically sent to nonresponders after 3 days by simply sending the question a second time. If no answer was recorded by the time the next message was due, the value was automatically recorded as missing. In our study, participants who failed to answer their text message 3 weeks in a row were called and reminded by the first author. If respondents could not be reached by phone, a reminder letter was sent. However, as the system records “missing” values when the next answer is due, these respondents could only answer last weeks’ question.

3.5. Ethical considerations

Subjects and chiropractors signed informed consent forms. Throughout the study, only subject codes were available to the researchers to assure anonymity. Permission to conduct this study was granted by the ethics committee (2007/1458-31/4) at the Karolinska Institutet, Stockholm, Sweden, and the study adheres to the Declaration of Helsinki.

3.6. Evaluation process

3.6.1. Response rate

A concern was that responders might be eager and conscientious in the beginning of a trial with a novel method, but as time passes, gradually they would become less interested and therefore less willing in answering. The response rates week by week were therefore evaluated over the 6 months.

3.6.2. Evaluation from a seasonal perspective

The response rates were compared week by week over the year of the study to assess any bias arising from seasonal influences, such as summer and Christmas, as these would possibly be times when daily routines are changed, including the routine of answering text messages.

3.6.3. User friendliness and dropout rate

To assess user-friendliness, we chose to focus on the dropouts. These subjects were asked about their reasons for choosing to discontinue to assess if the method itself was the cause, for example, if the repetitiveness or frequency of answering text messages was found tedious. The baseline variables of the dropouts were compared with those of the rest of the study sample to assess if any characteristics of the subjects themselves or their LBP could explain the withdrawal from the study.

3.6.4. Compliance

A specific concern was that people with a poor outcome, that is, where the LBP is persistent, might gradually feel less attached to the study, therefore eventually not bothering to answer, compared with those with a good outcome. On the other hand, also those with a good outcome might
grow tired of answering weekly text messages, as they might feel the question would become irrelevant over time. Thus, it would be a source of bias if respondents with different outcomes had different response patterns. By stratifying the sample into more compliant (high) and less compliant (poor) responders, this potential bias was evaluated by comparing the baseline variables and the clinical course of the two groups. The cut point for good and poor compliers was arbitrarily set at 80% of the returned answers over the 6 months.

The missing responses scattered over the study period were also evaluated in relation to the answer of the previous week, as bias could result if data were missing as a result of respondents with different outcome courses answering (and missing) differently. Furthermore, the course of LBP of those subjects who were reminded by a personal telephone call were compared with those who responded without being reminded. By comparing the total number of days with bothersome LBP between the two groups, information on whether the reminded respondents had a different LBP outcome was obtained.

3.7. Statistics

The questionnaire data from subjects (inclusion and 6 months follow-up) and chiropractors (inclusion and fourth visit) were entered into a data file and merged with the text message data described previously. In the present report, differences in self-rated health between baseline and fourth visit and between baseline and the 6 months’ follow-up, that is, comparisons within subjects, were analyzed using Student’s t-test for paired observations (continuous variables) and Wilcoxon’s signed rank test (categorical data). Comparisons of the baseline variables (gender, age, occupation, leg pain, pain intensity, pain duration, and self-rated health) and outcome (number of days with bothersome pain) between responders and dropouts, between high and poor compliers, as well as between reminded and not reminded subjects, that is, between groups of subjects, were analyzed with Student’s t-test for independent samples (continuous variables) or Chi-square tests (categorical data). All computations were done using PASW Statistics 18 (SPSS Inc., Chicago, IL).

4. Results

4.1. Description of the study sample

Thirty-five (77%) of the chiropractors who were contacted agreed to participate. Because of time constraints in the clinics, 262 subjects (75% of the possible number) were enrolled with complete inclusion data. Eighteen subjects dropped out of the study (further explained in “User Friendliness” below), leaving 244 subjects (93% of the intended sample) for full analysis. As can be seen in Table 1, 52% of the study sample was male. The mean age was 44 years, with an approximately normal distribution. Most (41%) respondents had a sedentary job, and only 9% described their occupation as physically demanding. Leg pain in addition to LBP was reported by 50% of subjects. At baseline, 57% reported having had LBP for altogether more than 30 days the previous year. The mean pain score (NRS) at inclusion was 4.4 of 10 with an approximately normal distribution, and at the fourth visit was 2.5 of 10, a statistically significant

<table>
<thead>
<tr>
<th>Table 1. Description of the study sample at baseline, stratified for respondents with high compliance (answering 21 weeks or more) and poor compliance (answering 20 weeks or less), and dropouts from the study population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics</td>
</tr>
<tr>
<td>Gender (%)</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Age, mean, (range)</td>
</tr>
<tr>
<td>Type of occupation (%)</td>
</tr>
<tr>
<td>Heavy</td>
</tr>
<tr>
<td>Varying</td>
</tr>
<tr>
<td>Standing</td>
</tr>
<tr>
<td>Sitting</td>
</tr>
<tr>
<td>Pain, mean, (SD)</td>
</tr>
<tr>
<td>Leg pain (%)</td>
</tr>
<tr>
<td>Pain duration (%) (&gt;30 d)</td>
</tr>
<tr>
<td>Self-rated health at baseline, median (interquartile range)</td>
</tr>
<tr>
<td>EQ-5D baseline, mean (range)</td>
</tr>
</tbody>
</table>

Abbreviation: SD, standard deviation.

a Statistically significant difference between the dropouts (n = 18) and the rest (n = 244) of the study population.
reduction of 1.9 points ($P < 0.001$), which is considered to be clinically important [19].

The median self-rated general health was “very good” (2 of 5), both at inclusion and at 6 months, thus no change over time. Another measure of self-rated health is presented as the EQ-5D weighted score. This variable showed a statistically significant improvement between the baseline and the 6-month follow-up (0.78 vs. 0.84, $P < 0.001$).

4.2. Response rate

The mean response rate for the text messages during the 6 months of the study was 82.5%. During the first week, 90% of the respondents answered the text message, and during the last week, 79% did (Fig. 1). At 6 months’ follow up, 214 of 244 (82%) subjects responded to the postal questionnaire.

4.3. Seasonal perspective

Overall, the response rate is fairly constant throughout the study period (Fig. 2) and compliance does not drop around the typical holiday times. The only exception is a marked decrease in responses around week 20, which is mid-May. However, because the number of participants in the study was at a minimum at this point, a few nonresponders seriously affected the measure of that period.

4.4. User-friendliness

Frequent data collection might be tedious for the participants. During the course of the study, 18 subjects (<7%) asked to be discontinued. In other words, it did not appear that repeatedly answering the same question every week for 6 months was considered sufficiently disturbing to stop participation in the study. We consider the reasons given in the telephone interviews with the dropouts of the study as the basis for evaluating user-friendliness. Five of the dropouts did not offer an explanation, seven were impossible to reach by telephone and mail, two had neck pain as their primary complaint, one subject thought it silly to answer “0” all the time, one subject found the text messages too costly, one did not have the time to answer, and one could not remember the degree of bothersomeness from the previous week. Thus, no common problem was identified.

The baseline variables of these subjects are summarized in Table 1. They differ from the responders in terms of less severe pain at baseline ($P = 0.004$) and shorter duration of LBP in the previous year ($P = 0.05$) compared with those who remained in the study.

4.5. Compliance

In Table 1, the data are stratified into high and poor compliers. There were no significant differences in the baseline data between these groups. The poor compliers answered on average 15 of the 26 weeks (mean: 14.9, standard deviation: 4.5).

A comparison of the clinical courses between the highly compliant respondents and the poor compliers (Fig. 3) reveals a rapid decrease in the number of days with bothersome LBP from week 1 till week 4 for both groups. For the high compliers, from week 9 there is a continuous decrease throughout albeit small after week 4. However, for the group of poor compliers, there is a small increase in the number of days with bothersome LBP from this point. We also noted a visible tendency to fail to answer if the previous week’s response was a high number of bothersome pain days (Table 2). Furthermore, 27 respondents were reminded to answer and 23 (85%) of these were also classified as poor compliers, that is, they answered less than 80% of the time. Their mean number of bothersome days per week for the full study period is somewhat higher than that of those not reminded (2.2 vs. 1.8), thus resembling the difference between poor and high compliers (2.2 vs. 1.7, in Fig. 3); however, this difference of less than half a day is hardly clinically significant.
response rates in the range of 84% to record the answers, was reported to have responses that the results can be trusted. A similar method, using personal variation, as well as the factors affecting compliance [8]. Evaluation of the response rate, also in relation to season.

Nonresponders can be instantly spotted and contacted, method as responses are recorded directly in data files. The high response rate, low dropout rate, and the reasons given for stopping participation by the few dropouts suggest that the method is user friendly. More information on this topic could perhaps have been obtained if all participants had been asked how they perceived the method.

It should be noted that the respondents were paying themselves for the reply messages. Although informed of the estimated total cost before consenting to participate, one of the dropouts discontinued because of cost. Thus, in this study economy is probably not causing bias, but it may in a different setting. One limitation of the study is that no record of eligible patients was kept, thus it is possible that some—already during the enrolment stage—thought it expensive or troublesome to answer weekly text messages and therefore declined participation.

Two unusual findings resulted from the evaluation process of this method of collecting data. First, the response rate in our study was high (82.5%) despite the fact that it was a longitudinal study that required respondents to react once a week over 6 months. A recent Danish study [3] using the same technology over a shorter period, 18 weeks, and without reminding calls, obtained a response rate of 63%. We conclude that the use of reminders in our study prompted participation by nearly 20%, although the reminded subjects remained poor compliers.

Two of the main advantages with this method to collect data (costs and time) would be compromised if participants have to be telephoned personally for reminders. In our study, the number of reminded subjects was small (11%). One will have to consider the effort and cost in reminding vs. the increased response rate; in our case, it was clearly advantageous to make the reminder calls.

Another unusual finding in our study is that the dropout is unaffected by gender and age. In recent Swedish, Dutch, and Danish studies on subjects with LBP in primary care, dropouts were predominantly younger [1] and men [3,28]. Thus, in our study, text messages as a data collecting method does not seem to generate dropouts observed in other studies.

It is interesting that dropouts had less severe and shorter duration of pain at baseline compared with subjects who stayed in the study, although caution is warranted when interpreting the results of such a small group. This is similar to the findings in the above-mentioned studies [1,3]. Maybe subjects with “minor” LBP cannot be bothered to answer research questions, regardless of data collection method. Possibly, this group would have reported few days with bothersome pain throughout, their exit leading to over-reporting of the final number of bothersome days. However,

![Graph](image-url)

**Fig. 3.** Stratifying the study population into high and poor compliant respondents. The first 9 weeks, the two groups follow a similar path, but during the rest of the study period, the low compliers report more days with bothersome LBP. *Abbreviations:* LBP, low back pain.

5. Discussion

The purpose of this study was to evaluate a method of frequent data collection by text messages used to describe the clinical course of nonspecific LBP. This method provides detailed information in a fluctuating condition. As the respondents only have a predetermined and limited time to answer a question, the method is less biased by recall than other methods [26]. Data handling is reduced with this method as responses are recorded directly in data files. Nonresponders can be instantly spotted and contacted, which should enhance compliance, and the method is far cheaper than sending out questionnaires by ordinary mail [8]. Evaluation of the response rate, also in relation to seasonal variation, as well as the factors affecting compliance and user-friendliness indicates that the method is useful and that the results can be trusted. A similar method, using smart phones as the collection tool but the Internet (not text messages) to record the answers, was reported to have response rates in the range of 84—97% [27].

5.1. Evaluation of response rate, season, and user-friendliness

A limitation of this data collection method is that questions and answers have to be brief to make them acceptable to participants. Judging by the high response rate, our participants found the text message question in this study easy to answer. A similar result was obtained in a 12-month Danish study, where the respondents stated that they would not have minded up to three questions each week [8]. As our response rate is fairly constant over the study period, the method is avoiding seasonal bias, which may influence other methods of data collection.

The high response rate, low dropout rate, and the reasons given for stopping participation by the few dropouts suggest that the method is user friendly. More information on this topic could perhaps have been obtained if all participants had been asked how they perceived the method.

It should be noted that the respondents were paying themselves for the reply messages. Although informed of the estimated total cost before consenting to participate, one of the dropouts discontinued because of cost. Thus, in this study economy is probably not causing bias, but it may in a different setting. One limitation of the study is that no record of eligible patients was kept, thus it is possible that some—already during the enrolment stage—thought it expensive or troublesome to answer weekly text messages and therefore declined participation.

Two unusual findings resulted from the evaluation process of this method of collecting data. First, the response rate in our study was high (82.5%) despite the fact that it was a longitudinal study that required respondents to react once a week over 6 months. A recent Danish study [3] using the same technology over a shorter period, 18 weeks, and without reminding calls, obtained a response rate of 63%. We conclude that the use of reminders in our study prompted participation by nearly 20%, although the reminded subjects remained poor compliers.

Two of the main advantages with this method to collect data (costs and time) would be compromised if participants have to be telephoned personally for reminders. In our study, the number of reminded subjects was small (11%). One will have to consider the effort and cost in reminding vs. the increased response rate; in our case, it was clearly advantageous to make the reminder calls.

Another unusual finding in our study is that the dropout is unaffected by gender and age. In recent Swedish, Dutch, and Danish studies on subjects with LBP in primary care, dropouts were predominantly younger [1] and men [3,28]. Thus, in our study, text messages as a data collecting method does not seem to generate dropouts observed in other studies.

It is interesting that dropouts had less severe and shorter duration of pain at baseline compared with subjects who stayed in the study, although caution is warranted when interpreting the results of such a small group. This is similar to the findings in the above-mentioned studies [1,3]. Maybe subjects with “minor” LBP cannot be bothered to answer research questions, regardless of data collection method. Possibly, this group would have reported few days with bothersome pain throughout, their exit leading to over-reporting of the final number of bothersome days. However,
the number of dropouts is small (<7%) and therefore not affecting the overall results in this study.

5.2. Compliance

There were no differences in the baseline variables between those who diligently answered their text message every week and those who were less compliant. Nevertheless, the clinical course was somewhat less advantageous for the poor compliers. Two possible explanations are offered for this observation. First, the poor compliers may be a subgroup of subjects with a poorer prognosis. In support of this theory was our finding that missing responses often followed after a week of reporting a high number of bothersome days. Similarly, in a study on LBP from both chiropractic and medical care, subjects reporting high levels of pain continued so throughout [29], explained by the “theory of stability,” that is, that patients experiencing persistent severe pain believe that no improvement is possible. Assuming that such a subgroup exists among our subjects, they would likely be poor compliers.

The second possible explanation is that some subjects may simply be less motivated in answering research questions, only answering when the LBP get really bothersome, which could explain the less advantageous course over time for the poor compliers. Had they answered more conscientiously, their course might have been similar to that of the high compliers. To support this theory, the self-rated health at baseline, as estimated by EQ-5D, was not associated with compliance. Thus, poor compliance could be because of low interest in the study rather than representing a disadvantaged subgroup with poorer health and worse outcome.

The difference in number of bothersome days between high and poor compliers was minor and probably not relevant in this particular study. However, such a difference should be kept in mind in other studies, in studies of other illnesses and different clinical settings.

This study was based in a clinical setting where subjects received treatment. There might therefore be concern that the clinicians during treatment sessions could have boosted the compliance rates by reminding and encouraging subjects to answer the SMSs, which would not occur in a non-clinical setting. However, the text message data collection was initiated from the research center and continued far beyond the treatment periods. Therefore, we do not believe that the clinicians added any systematic bias concerning compliance.

5.3. Generalizability

The external validity of the method will depend on the population under study. The similarity of subjects in this study to that of other Swedish samples was assessed by comparing their self-rated health scores (EQ-5D) to those of a normative sample [30] and a sample awaiting disc surgery [31] and found to be placed between them. Therefore, in terms of health level, this sample seems representative, placed between a “normally healthy” population and those presumed to be of poorer health. However, studies have shown that depression and anxiety, predictors of chronicity [32], are relatively rare in chiropractic patients, and when present, it was unimportant for outcome [28,33]. Whether such psychological factors influence the willingness of responding frequently is not known.

The rapid improvement seen in the beginning of the clinical course (Fig. 3) is similar not only to the results of a Danish study [9] on chiropractic subjects in primary care but also to the results of studies from other populations with acute LBP [34].

However, also factors other than health and development of LBP would determine whether participants in other settings are willing and able to answer a text message repeatedly. Two concerns are mobile phone ownership and knowledge of text messaging. In Sweden, mobile phone penetration was 94% in 2008 [35]. Generalizability of this method will depend on mobile phone penetration and maybe socioeconomic status, as it is associated with some cost.

5.4. Perspectives

With this method of collecting data several new research options arise. It will be possible to summarize the total number of days with bothersome LBP both for individuals and groups, suggested as a good estimate to capture the fluctuating course of LBP [26,36]. Also, frequent reporting of symptoms will make it possible to describe the duration of events and event-free periods, proposed to be an important research area [4]. For LBP, it will be possible to link different course patterns with specific subgroups.

In the clinical setting, this system could be used to monitor patients “at risk.” Patients could for instance report their blood sugar level, blood pressure, or pain level on a regular basis or when the measure reach a predetermined level. The system will require an initial cost but will offer the possibility to keep track of large groups of patients at a marginal cost.

6. Conclusion

In relation to our study population, collecting data with weekly text messages for 6 months yields a high response rate, which seems unaffected by season. The method is user friendly. Dropout was not gender or age related. Compliance was not affected by baseline characteristics but possibly somewhat by outcome. Thus, subjects experiencing less severe and shorter duration LBP may be prone to drop out from such a study and individuals who experience improvement may be more inclined to continue participation.

The use of weekly text messages is recommended when studying conditions such as this, where details of fluctuation or periodicity are wanted, and where individual
variation is important to consider. Obviously, this method should be useful for other purposes and in other settings, studying different conditions and populations.

Acknowledgments
The authors gratefully acknowledge the statistical help of Jan Hagberg, PhD. The study was funded in part by the Swedish Chiropractors’ Association and the European Chiropractors’ Union. They extend their gratitude to the chiropractors collecting data and to the respondents who answered the weekly text messages and additional questionnaires.

References