

Effect of a pain diary use on recovery from acute low back (lumbar) sprain

Robert Ferrari

Received: 22 May 2014 / Accepted: 19 June 2014
© Springer-Verlag Berlin Heidelberg 2014

Abstract The aim of the study was to examine the effect of a daily pain diary on recovery from acute low back sprain. Summary of background data: Pain diaries are often recommended to or used by patients suffering with acute lumbar (low back) sprain. Diaries have been shown to be associated, however, with a slower rate of recovery after whiplash (neck) injury. The effect of diary use on recovery from low back injury is unknown. Subjects with acute lumbar (low back) sprain were randomly assigned to one of the two groups: a diary group and control group. A total of 58 out of 62 initially recruited subjects were seen in follow-up 3-month post-injury, 29 in the diary group, and 29 in the control group. Data were gathered within 1 week of injury on sex, age, and Oswestry Disability Questionnaire (ODQ) scores. The diary group was asked then to keep a record of their overall pain experience, rating their pain on a scale of 1–10 on a daily basis for 4 weeks. At the outset, both groups had similar mean age, sex distribution, and mean ODQ scores. After 4 weeks of pain diary use, fewer diary group subjects reported recovery at 3 months compared with the control group (52 vs. 79 %, respectively, $p < 0.05$). The use of a pain diary for 4 weeks in acute lumbar sprain subjects is associated with a reduced rate of recovery.

Keywords Lumbar spine · Back pain · Injury · Diary · Recovery · Pain · Amplification

Introduction

It has been previously shown that the use of a symptom diary for 2 weeks, even in generally healthy subjects, results in increased recall of daily symptoms and increased perception of symptom severity [1]. In that study, generally, healthy female subjects were asked to recall symptoms experienced in the previous 2 weeks, after keeping a symptom diary for 2 weeks, while a control group was asked to recall symptoms experienced in the previous 2 weeks without having kept a symptom diary. While both groups had initially similar recall of their symptoms prior to the study interventions, the diary group subsequently experienced symptom amplification. That is, after 14 days of symptom diary use, the diary group recalled having symptoms on average 2.6 ± 0.7 days in the last 14 days, with an average intensity of symptoms at 5.1 ± 1.3 out of ten severities. This was nearly double their baseline measures. The control group experienced no statistically significant change in average number of days of recalled symptoms in the prior 14 days or in average recalled intensity of symptoms experienced in the last 14 days. It has subsequently been shown that the use of a pain diary after acute whiplash injury slows recovery. That is, Ferrari and Louw [2] examined the effect of a daily pain diary on recovery from acute whiplash injury. Subjects with acute whiplash injury were asked to keep a record of their overall pain experience, rating their pain on a scale of 1–10 on a daily basis for 4 weeks, while a control group was not asked to keep a pain diary. On evaluation at 3-month post-whiplash injury, fewer diary group subjects reported recovery at 3 months compared with the control group. The use of a pain diary in acute whiplash-injured subjects was associated with a reduced rate of recovery.

The ability to assess accurately the intensity, duration, and nature of a patient's pain has been considered an

R. Ferrari (✉)
Department of Medicine, University of Alberta,
13-103 Clinical Sciences Building, 11350-83 Avenue,
Edmonton, AB T6G 2P4, Canada
e-mail: rferrari@shaw.ca

important activity for the clinician managing a wide range of musculoskeletal and other complaints and to evaluate new treatments. Pain and other symptom diary assessments, for example, serve to guide physicians in their choice of treatment strategies, and in the clinical trial setting, they are often used to determine whether therapeutic interventions are effective or not. Extensive literature has demonstrated, however, that patients' pain experiences are heavily affected by numerous factors, such as their current emotional state in addition to the underlying disease processes [3, 4]. The problems of recalling of pain experiences are in broad agreement with the literature on human recall in general. The process of encoding and subsequent retrieval of the details of daily life is often prone to error and systematic biases [5] due, in part, because questions administered in clinical settings are often temporally distant from when the pain was originally experienced. In an attempt to avoid the problems associated with retroactive self-reports, researchers and clinicians have turned to diaries as a way of capturing data from patients closer in time to the events or experiences of interest [6–8].

In this study, it was hypothesized that 4 weeks of pain diary use in acute lumbar spine-injured subjects would reduce the rate of recovery relative to a control group.

Materials and methods

Design

This was a randomized, controlled, non-concealed allocation study. Subjects were randomly assigned to either a diary (intervention) group or control group.

Subjects

Subjects were recruited from a sample of consecutive lumbar spine-injured patients presenting within 7 days of their injury to a single primary care center. Patients with acute low back pain which they related to injury, either at work or not, were routinely referred from general practitioners at the clinic directly to the author, who was acting as a specialist consultant within that clinic. In this study, one general practitioner provided all the referrals. Data were gathered on subjects referred over a 4-month period (July to October 2010), the measurements being conducted at the initial consultation as a part of usual assessment. Prospective subjects were further assessed for inclusion and exclusion criteria at the time of initial interview. Lumbar sprain grade 1 or 2 patients were included if they had injuries without loss of consciousness, were 18 years of age or over, and presented within 7 days of their injury. Patients were excluded if they were told they had a fracture or

neurologic injury, pain above the region of the first lumbar vertebra, significant limb injury (e.g., fracture), had objective neurologic signs on examination (loss of reflexes, sensory loss), previous lumbar spine injury or a recollection of prior spinal pain requiring treatment, no fixed address or current contact information, were unable to communicate in English, had non-traumatic pain, or were admitted to hospital.

Recruitment and outcome measures

During the course of recruitment, subjects were randomly assigned to keep a pain diary (diary group) or not (control group). Those assigned to the diary group were given written instructions to examine their daily pain experience at the end of each day. They were asked to assess the overall pain experience (taking into account all their pains) and to consider on average how severe their pain was on that day. They were asked to record a number from 1 to 10 in a calendar provided or on a paper with dates recorded. They were instructed that one meant minimal or no pain, and ten meant severe and barely tolerable pain. They were asked to leave their pain diaries at the clinic after 4 weeks. A Diary was considered "achieved" if at least 75 % of the days had a rating (i.e., at least 21 of 28 days), or at least the first 2 weeks were complete.

Randomization procedure

These subjects represented primary care patients routinely referred by a single general practitioner to the author. The author had been routinely using questionnaire-based measures in lumbar sprains, but had not previously been using instructions to maintain a pain diary. To determine if the addition of formal instructions to maintain a pain diary had any effect on patient outcomes (beyond usual care), the author had the opportunity to administer randomly one of two sets of packages to subjects: one set containing an Oswestry Disability Questionnaire (ODQ), and second package included the ODQ, as well as instructions on completing the pain diary, as stated above.

A third party created 31 sets each of two sealed envelope packages to ensure blinding to the package contents. The author informed the patient that the author was studying the value of using questionnaires to monitor symptoms and outcomes including various means by which to track pain. The subjects provided verbal informed consent to open the packages, follow the instructions, complete a questionnaire, and then be prepared for follow-up in 3 months with the author. The envelope packages were labeled with either an "A" (contained only the ODQ) or a "B" (contained the aforementioned and instructions to maintain a pain diary for 4 weeks). The contents corresponding to this lettered

assignment was not known to the researcher. Each item within the package had a number from 1 to 62 to allow the responses to be collated for each subject. All subjects completed the component requiring the initial completion of the ODQ.

Outcomes

Subjects were asked to return for a three-month assessment even if improved or recovered and were contacted by phone if necessary to increase compliance with the three-month assessment. The author was blind to the pain diary results at the time of re-assessment. Recovery was assessed with the question: “Do you feel you have recovered from your injuries?” with responses of “yes,” “no,” or “not sure.” This question has been shown to be useful in other forms of spinal injury, including low back pain [9]. Subjects were also asked if they had complied with an initial referral for active, exercise therapy, delivered by a physiotherapist. This was a standard prescription for all subjects, involving an initial physiotherapy assessment and either home exercises or a supervised exercise program as deemed necessary by the physiotherapist. The same physiotherapist was referred to, in all cases, as it was known that the physiotherapist did not include diaries as a part of the physiotherapist’s back pain management recommendations.

Statistical analysis

Descriptive statistics were calculated for age, sex, and initial ODQ score in order to compare groups for similar baseline characteristics. The proportion of subjects responding with “yes,” “no,” or “not sure” to the question of recovery at 3 months was recorded and compared at 3-month follow-up. Significance was set at $p < 0.05$. These variables were compared between groups using either the Student’s t test or Chi-squared test for proportions, as appropriate.

Sample size calculation

No prior studies are available for comparison of sample size, except for a study with whiplash injury and of diary effects in healthy subjects [1, 2]. Based on this study demonstrating an observable effect of symptom amplification and symptom recall in two groups of 20 subjects each [1], the study aimed to recruit at least this number, assuming a low drop-out rate. Thus, the study was terminated when 30 subjects could be recruited in each group.

Ethics

The Research Ethics Board of the College of Physicians and Surgeons of Alberta approved the study.

Results

A total of 75 prospective subjects were assessed over the course of the study, and after evaluation for inclusion and exclusion criteria, each subject was provided with instruction if eligible for the study. During the course of recruitment, 13 were excluded (ten due to previous history, one due to loss of consciousness, one due to limb fracture, one due to language barrier). Thus, 62 subjects formed the sample for study, and all agreed to participate. Two subjects in the diary group and two subjects in the control group did not return for follow-up and were not included in the study. Thus, there were 29 subjects in the diary group and 29 in the control group (Fig. 1). The characteristics of both groups at the outset are shown in Table 1. The groups were similar in mean age, sex distribution, and initial Oswestry Disability scores. Thus, randomization was effective. Also, based on self-report, there was no difference in the number of subjects in each group who were compliant with the initial referral for active, exercise therapy.

One subject in the control group, despite not being asked to do so, was later found to have kept a pain and symptom diary. Two subjects in the diary group failed to maintain a diary at all. Only 60 % of the diary group subjects returned their diaries, but 83 % (25 of 30) reported that they had completed at least the first 2 weeks of the diary entries. Of those who did return their diaries (18–30 subjects), 100 % (18/18) had completed the first 2 weeks of entries and 44 % (8 of 18 subjects) had at least 75 % of the 4 weeks of entries complete.

At 3-month post-injury, 52 % (15/29) of the diary group reported recovery, while 79 % (23/29) of the control group

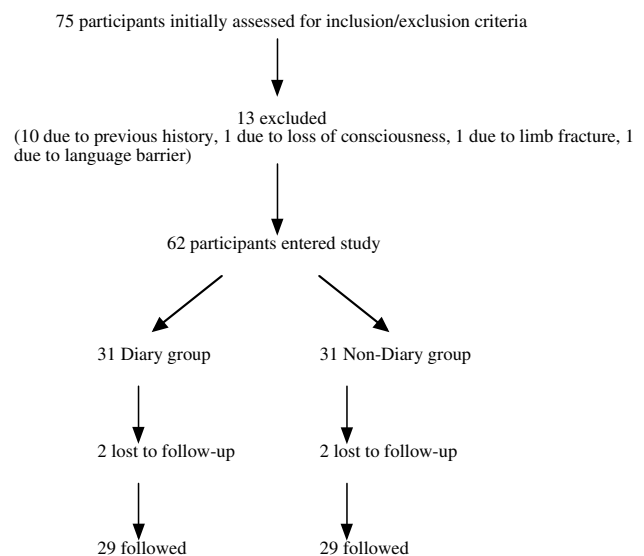


Fig. 1 Flow diagram showing recruitment of participants and losses to follow-up

Table 1 Descriptive statistics for diary group ($n = 29$) and control group ($n = 29$)

	Diary group (mean \pm SD)	Control group (mean \pm SD)
Age (years)	31.1 \pm 11.4	32.2 \pm 13.2
% males	59	62
Mean ODQ score	47.0 \pm 12.4	43.6 \pm 9.6
Compliance with physiotherapy referral	21/29	20/29

ODQ Oswestry Disability Questionnaire score at presentation

All p values in comparisons for this table were not statistically significant ($p > 0.05$)

reported recovery, a difference which is statistically significant ($p = 0.023$). None of the subjects responded “not sure” to the question of recovery (i.e., from the above figures of who responded “yes” to the recovery question, the remaining numbers responded “no” to the recovery question). If it is assumed that all subjects lost to follow-up in the diary group recovered, and all those lost to follow-up in the control group failed to recover (i.e., an assumption which would tend to reduce differences in recovery rates between the groups), the p value is 0.07. It is noteworthy, however, that the one subject in the control group who actually kept a symptom diary was among those in the sample who failed to recover at 3-month post-injury. Thus, if they are excluded from the analysis, as well as two subjects in the diary group who did not keep a diary (and who should be excluded because the intervention did not occur), the difference between groups is again significant.

Discussion

This study reveals that the assignment to use a daily pain diary for 4 weeks after acute low back pain presumed to be due to injury is associated with a lower rate of recovery at 3-month post-injury. Diaries are commonly used in clinical practice, and by a wide range of therapists when encountering acutely injured subjects. Often, patients are asked to keep more than a pain diary, and they are often asked to do so by more than one person. For example, at least one subject in the control group was advised by others to start a symptom diary, which tracked more than pain. While diaries may serve a useful purpose to facilitate practitioner–patient communication about symptoms, and to track the course of symptoms, the benefits have not been demonstrated. Moreover, maintaining a pain diary appears to impact recovery. Symptom diaries may increase the perception and recall of a greater frequency and intensity of symptoms.

The problem with diaries is that recovery is determined in part by how much one notices symptoms. Pain diaries

do not readily permit a subject *not* to notice symptoms. In fact, even by 3-month post-injury, it may be that the pain levels in the two groups were very similar, but pain levels in one group (the diary group) were simply more aware of pain. The duration of 4 weeks of diary use was chosen to increase the likelihood of compliance with the diary record, knowing that a two-week period of diary use has the effect of symptom amplification in healthy subjects [1]. There was no attempt to enforce or encourage the diary use further. Despite the possibility of significant non-compliance with the intervention, the mere initiation of diary use may be sufficient to induce symptom amplification and affect recovery in these cohorts. In fact, the intervention in this study is not so much the pain diary itself, but in essence is simply having a clinician provide instructions to a patient to track their pain. It would in fact be of interest to know if the results would have been even more divergent had the diary group been asked to keep a pain diary for a full 3 months, or had to provide the results of their diary every week to encourage further amplification. It would also be of interest to know, via future studies, if diary use affected perceptions of disability.

There are limitations to this study. First, although the subjects did not have contact with the author in the interval between being assigned a diary and evaluation 3 months later, it is possible that the family physician or treating therapist discovered that some subjects were keeping track of their pain. This possibility was not formally evaluated. On the one hand, if the practitioners were aware of diary use and advised patients against its use, the effect could only be to reduce the differences noted in this study, and this merely reinforces the powerful effect of diary use (i.e., an effect was noted even if there were actions taken by others that would diminish this effect). On the other hand, if knowledge of diary use affected how the patients were treated by the practitioners, and this in turn led to a worse outcome, that is exactly the point of this study: Diary use is not helpful and may even influence treatment.

In conclusion, until we have further data confirming that symptom diaries have an overall health benefit to their use, this study raises concerns about the potential for a detrimental effect of diary use in acute spinal injury in particular, where recovery may subsequently be adversely affected.

Conflict of interest None.

References

1. Ferrari R, Russell AS (2010) Effect of a symptom diary on symptom frequency and intensity in healthy subjects. *J Rheumatol* 37:2387–2389

2. Ferrari R, Louw D (2013) Effect of a pain diary use on recovery from acute whiplash injury, a cohort study. *JZUS Sci B* 14(11):1049–1053
3. Eich E, Reeves JL, Jaeger B, Graff-Radford SB (1985) Memory for pain: relation between past and present pain intensity. *Pain* 23:375–379
4. Kahneman D, Fredrickson BL, Schrieber CA, Redelmeier DA (1993) When more pain is preferred to less: adding a better end. *Psychol Sci* 4:401–405
5. Gorin AA, Stone AA (2001) Recall biases and cognitive errors in retrospective self-reports: a call for momentary assessments. In: Baum A, Revenson T, Singer J (eds) *Handbook of health psychology*. Erlbaum, New Jersey, pp 405–413
6. Sadovsky R, Dodick DW (2005) Identifying migraine in primary care settings. *Am J Med* 118(Suppl 1):11S–17S
7. Aaron LA, Turner JA, Mancl L, Brister H, Sawchuk CN (2005) Electronic diary assessment of pain-related variables: is reactivity a problem? *J Pain* 6:107–115
8. Roelofs J, Peters ML, Patijn J, Schouten EG, Vlaeyen JW (2006) Electronic diary assessment of pain-related fear, attention to pain, and pain intensity in chronic low back pain patients. *Pain* 112:335–342
9. Ferrari R, Russell AS, Kelly AJ (2006) Assessing whiplash recovery—the Whiplash disability questionnaire. *Aust Fam Physician* 35:653–654