

Effect of a Symptom Diary on Symptom Frequency and Intensity in Healthy Subjects

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ABSTRACT. Objective. Symptom and pain diaries are often recommended to or used by patients with chronic pain disorders. Our objective was to examine the effect on recall of symptoms after 14 days of daily symptom diary use in healthy subjects.

Method. Subjects were randomly assigned to 1 of 2 groups: the diary group and the control group. Both subject groups completed an initial symptom checklist composed of headache, neck pain, back pain, fatigue, abdominal pain, elbow pain, jaw pain, and numbness/tingling in arms or legs. Both groups indicated their symptom frequency and their perceived average symptom severity in the last 14 days. The diary group was asked then to examine the symptom checklist daily for 14 days while the control group was not. After 2 weeks, both groups then repeated the symptom checklist for recall of symptoms and symptom severity.

Results. A total 35 of 40 initially recruited subjects completed all the questionnaires, 18 in the diary group and 17 in the control group. At the outset, both groups had similar frequencies and intensities of symptoms. After 2 weeks of symptom diary use, diary group subjects had an increased frequency (doubled) of recalled symptoms, and significantly increased intensity of symptoms compared with the control group, which had not changed its mean frequency or intensity of symptoms.

Conclusion. 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. (First Release Oct 1 2010; J Rheumatol 2010;37:2387-9; doi:10.3899/jrheum.100513)

Key Indexing Terms:

CHRONIC PAIN PAIN SYMPTOMS AMPLIFICATION DIARY

The ability to accurately assess the intensity, duration, and nature of a patient's pain or other chronic, recurrent symptom is an important activity for the clinician managing the patient with chronic illness and for researchers trying 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.

Symptoms, and pain in particular, are a uniquely personal experience. Extensive literature has demonstrated that patients' pain experiences, for example, are heavily affected by numerous factors, such as their current emotional state in addition to the underlying disease processes^{1,2}.

The problems of recalling of pain and other symptom experiences are in broad agreement with the literature on human recall in general. The process of encoding and sub-

sequent retrieval of the details of daily life is often prone to error and systematic biases^{3,4}, 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^{5,6,7}.

Diaries have been viewed as helpful in refining the diagnosis or suggesting the need for further evaluation^{5,7} or for monitoring treatment effects⁶. There may be a problem, however, with diary use because diaries may create symptom amplification. Barsky and Klerman⁸ suggested that symptom amplification (experiencing ordinary symptoms in a more severe and more prolonged fashion than one expects because of increased attention to symptoms) is etiologic in a number of controversial syndromes such as fibromyalgia, chronic whiplash, and chronic fatigue syndrome. Clinical experience suggests that patients with these disorders frequently maintain informal diaries of their symptoms. Many of those patients feel it is important to ensure that their pain is validated, because they are concerned that, to some, they are presenting an illness that appears to lack face validity⁹. Similar experience suggests that patients with whiplash who are in litigation are often advised to keep symptom diaries, and are frequently asked by their treating therapists to com-

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plete a symptom checklist at regular intervals. While these actions may serve the purpose of documenting pain and suffering for compensation matters, or may assist the therapist in determining progress in treatment, one must also be assured that they are not harmful.

Barsky¹⁰ notes that “attention to a symptom amplifies it, whereas distractions diminish it. Thus the more frequently... patients are asked to rate their pain, the more intense they rate it.” Arntz and De Jong¹¹ conducted studies and reviewed others that show that even if one controls for anxiety levels, simply having attention focused on pain amplifies the pain or lowers the threshold for perception of pain. Thus, minor symptoms appear more severe and of greater duration. Viane, *et al*¹² investigated whether acceptance was related to less attention to pain, and to more engagement with daily activities. In a diary study, 62 patients with chronic pain reported pain intensity, attention to pain, and characteristics of goal-directed behavior 8 times a day using an experience-sampling method. It was found that acceptance of the chronic pain (and subsequently greater activity despite pain) was related to reduced attention to pain.

A further problem is that diaries may be reactive in clinical studies¹², altering the symptom pattern and severity by effects on recall. While randomized controlled trials in which both intervention and control groups use a diary may control for an effect of the diary method on symptoms, observational and descriptive studies and uncontrolled studies may introduce a bias by using a diary in the methodology.

The common clinical practice of many physicians or allied health professionals to recommend diary use or of patients to adopt diary use, especially those with chronic illness, may inadvertently add to the patient’s symptom burden or illness experience.

We hypothesized that a mere 14 days of symptom diary use, even in healthy subjects, would amplify symptoms (lead to increased recall of frequency and severity of symptoms) relative to a control group.

MATERIALS AND METHODS

We conducted a parallel, randomized, controlled unblinded study. The Research Ethics Board of the University of Alberta approved the study.

Setting and participants. We conducted this single-center study at a local university. A sample of female students was asked to participate, as advertised in a single faculty at the university. The students were screened by a single individual. They were included if they were 18 years of age or older, generally healthy by self-report, and excluded if they had any current acute illness or known chronic illness, or inability to communicate in English.

There were no previous studies of this nature with which to compare for sample size calculation. Studies suggest that on average, symptoms such as headache are present on at least 1 day in 14 in 20% of the population. We consider, however, a doubling of the frequency of those having a symptom (total number of subjects recalling the symptom being present on at least 1 day in the last 14) to be significant: thus 40% of our subjects in the diary group reporting a headache having been present on at least 1 day in 14. Calculating sample size with the following measures: alpha = 0.05, beta = 0.20, control group proportion having headache at least 1 day in the last 14 days at 20%, and an absolute effect size of 20% in the symptom diary

group, we calculated that 14 patients per group would be needed. There were expected to be 10% per group lost to followup or to fail to complete the study. Thus, we aimed to recruit 16 subjects per group.

Randomization and interventions. Subjects were randomly assigned to either a diary (intervention) group or control group, by being randomly assigned either a 1 or 0. The allocation was unblinded.

Outcomes. The diary group was asked at the initiation of the study to complete a checklist for 8 symptoms (headache, neck pain, back pain, fatigue, abdominal pain, jaw pain, elbow pain, and numbness/tingling in the arms or legs), estimating by recall the frequency (number of days in which the symptom occurred) over the last 2 weeks. The checklist also asked the subjects to rate the average intensity of the recalled symptom over the last 2 weeks, rating from a 1 (minimal) to 10 (extremely severe). The diary group was then asked to maintain a diary (a 14-day checklist provided to them with columns to check off symptoms and rate intensity). At the completion of the 14-day diary period, and after returning their diaries to the researchers (so the subjects could not refer back to them), subjects were again asked to complete the symptom checklist for 8 symptoms, estimating by recall the frequency (number of days in which the symptom occurred) over the last 14 days and rating the average intensity of the symptom, if recalled, over the last 14 days.

The subjects were asked to place the diary sheet (containing 14 days of entry columns) somewhere they could access it readily each day and to examine it daily at the end of the day to summarize their overall experience for the day rather than throughout the day. Thus, the subjects provided daily summary ratings.

The control group was asked at the initiation of the study to complete the same symptom checklist as the diary group. After a 14-day period, they were asked to repeat the same.

At the outset of the study, both groups were asked about age, smoking habits, and alcohol use.

Statistical analysis. Descriptive statistics were calculated regarding age, smoking history, and alcohol use. (All subjects recruited were female.) The mean number and range of days that subjects could recall having each symptom and the mean recalled intensity of each symptom was calculated for the diary and control groups. The mean number and range of recalled days for all combined symptoms and mean recalled intensity for all combined symptoms at the outset and after 14 days was also calculated for each group. These means were compared by the t-test, and the p value was set at 0.05 for statistical significance.

RESULTS

A total 35 of 40 initially recruited subjects completed all the questionnaires, 18 in the diary group and 17 in the control group. The groups were similar in mean age, smoking habits, and alcohol use ($p > 0.05$). At the outset, both groups had similar frequencies and intensities of symptoms ($p > 0.05$). After 2 weeks of symptom diary use, however, diary group subjects had an increased frequency (doubled) of recalled symptoms ($p < 0.01$), and the average intensity of symptoms was significantly increased in the diary group compared with the control group ($p < 0.05$), which had not changed its reported mean frequency or intensity of symptoms. All diary entries were complete.

When the diaries of the diary group were reviewed, their recall of symptoms matched well with their daily recordings, in terms of both frequency and severity. That is, the subjects were noting and registering more symptoms and more severe symptoms and their recollection of this experience was accurate.

The diary group, at the outset of the study, recalled having at least some of the symptoms provided in the checklist, on average 1.3 ± 0.3 days of the last 14 days (range 0–6 days in the last 14). The average symptom intensity recalled was estimated to be at 3.1 ± 0.8 out of 10 severity (range 1–6) when experienced in the last 14 days. There was no difference between these means and those of the control group, who recalled symptoms having occurred 1.6 ± 0.5 days of the last 14 (range 0–7 of the last 14 days), with an average intensity of 3.2 ± 0.7 out of 10 severity (range 1–6).

After 14 days of symptom diary use, however, the diary group recalled having symptoms on average 2.6 ± 0.7 days in the last 14 (range 0–9 days in the last 14), with an average intensity of symptoms at 5.1 ± 1.3 out of 10 severity (range 1–9). The control group experienced no statistically significant change in the average number of days of recalled symptoms in the last 14 or in the average recalled intensity of symptoms experienced in the last 14 days ($p > 0.05$).

DISCUSSION

We show that the use of a daily symptom diary for 14 days increases the individual's recall of symptom frequency (recalling symptoms as having occurred on more days) and symptom intensity (recalling symptoms as having been more severe) as compared to individuals not exposed to symptom diary use.

Diaries are commonly used in clinical practice, and by a wide range of therapists. They may serve a useful purpose, particularly to facilitate practitioner-patient communication about symptoms, to track the course of symptoms, level of functioning, and responses to treatment. The concern, however, is that the benefits, in terms of quality of health, quality of care, and influence over therapeutic choices, have not been demonstrated. We have shown, however, that symptom diaries may increase the recall of symptoms, and increase the perceived severity of symptoms. There does not intuitively appear to be any benefit to increasing a patient's perception of their symptom frequency or intensity, yet this occurs even in healthy subjects.

There are limitations to our study. First, as a matter of convenience, all subjects recruited were female. It is not clear if male subjects would be similarly affected. Second, these are healthy subjects, with infrequent, less severe symptoms. Patients are expected to have more frequent and more severe symptoms, which perhaps spur them to seek medical attention. As healthy subjects have fewer and less severe symptoms, there is more potential for an effect of

amplification to be experienced. Patients may have a level of symptoms for which there is essentially a ceiling effect (i.e., their symptoms cannot and will not be made much more frequent or severe by using a diary because they already are frequent and severe). Studies of diary use are needed in clinical populations.

Symptom diaries may increase the perception and recall of a greater frequency and intensity of symptoms. Until we have further data on the effect of symptom diaries in patients demonstrating an overall health benefit to their use, this study raises concerns about the potential for a detrimental effect of diary use in chronic illness in particular, where perception of symptoms may affect both illness behavior and quality of health.

REFERENCES

1. Eich E, Reeves JL, Jaeger B, Graff-Radford SB. Memory for pain: relation between past and present pain intensity. *Pain* 1985; 23:375-9.
2. Kahneman D, Fredrickson BL, Schriber CA, Redelmeier DA. When more pain is preferred to less: adding a better end. *Psychol Sci* 1993;4:401-5.
3. Gorin AA, Stone AA. Recall biases and cognitive errors in retrospective self-reports: a call for momentary assessments. In: Baum A, Revenson T, Singer J, editors. *Handbook of health psychology*. Mahwah, NJ: Lawrence Erlbaum Associates; 2001:405-13.
4. Hufford MR, Shiffman S, Paty J, Stone AA. Electronic momentary assessment: real-world, real-time measurement of patient experience. In: Fahrenberg J, Myrtek M, editors. *Progress in ambulatory assessment*. Seattle: Hogrefe and Huber; 2001:69-92.
5. Sadovsky R, Dodick DW. Identifying migraine in primary care settings. *Am J Med* 2005;118 Suppl 1:11S-7.
6. Aaron LA, Turner JA, Mancl L, Brister H, Sawchuk CN. Electronic diary assessment of pain-related variables: is reactivity a problem? *J Pain* 2005;6:107-15.
7. Roelofs J, Peters ML, Patijn J, Schouten EG, Vlaeyen JW. Electronic diary assessment of pain-related fear, attention to pain, and pain intensity in chronic low back pain patients. *Pain* 2006;112:335-42.
8. Barsky AJ, Klerman GL. Overview: hypochondriasis, bodily complaints, and somatic styles. *Am J Psychiatry* 1983;140:273-83.
9. Bennett RM. Disabling fibromyalgia: appearance versus reality. *J Rheumatol* 1993;20:1821-4.
10. Barsky AJ. Amplification, somatization, and the somatoform disorders. *Psychosomatics* 1992;33:28-34.
11. Arntz A, de Jong P. Anxiety, attention and pain. *J Psychosom Res* 1993;37:423-31.
12. Viane I, Crombez G, Eccleston C, Devulder J, De Corte W. Acceptance of the unpleasant reality of chronic pain: effects upon attention to pain and engagement with daily activities. *Pain* 2004;112:282-8.