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Activity Logs as a Measure of Daily Activity Among Patients with Chronic Fatigue Syndrome

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Abstract

Background—Self-report data collected through interviews has been one of the primary ways of assessing symptoms of patients with chronic fatigue syndrome (CFS). An alternative way to collect data involves activity logs, which involves patients writing down the pattern, intensity, and qualitative nature of activity over several days.

Aims—We examined the associations between activity, evaluation of activity and symptoms.

Methods—Activity log data over a two day period of time were used in the present study using a sample of patients with diagnosed CFS.

Results—Findings indicated that the percent of time spent feeling fatigued was positively associated with a higher percent of time in pain and doing activities that were fatiguing. However, time spent in meaningful activities was associated with less fatigue.

Conclusions—These findings and others suggest that activity logs can provide investigators and clinicians with valuable sources of data for understanding patterns of behavior and activity among patients with CFS.

Keywords

Activity Logs; Daily Activity; Chronic Fatigue Syndrome

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Activity can be assessed by having individuals wear a electrical monitoring device (Cartmel & Moon, 1992). One direct measure of physical activity is the actigraph, an electrical monitoring device which is placed on the waist and can be programmed to record at one-minute intervals, 24 hours a day, except when bathing. As an illustration of this actigraph method, Tryon, Jason, Frankenberry, and Torres-Harding (2004) found that patients with chronic fatigue syndrome (CFS) had a blunted circadian rhythm. Although actigraphs have occasionally been used to measure activity among patients with CFS, questionnaires have been the preferred instrument in surveys assessing physical activity (Paffenbargewr, Blair, Lee, and Hyde, 1993). Such questionnaires have the disadvantage of recall bias and other threats to validity (Cartmel & Moon, 1992).

Another approach to measuring activity is through activity logs and records. The National Institute of Health (NIH) activity record (ACTRE) is an example of a daily self-administered log of the quantity and intensity (e.g., sedentary, active, etc.) of an individual's physical activity (Gerber & Furst, 1992). The ACTRE also assesses more subjective features of physical activity by assessing whether each activity was associated with pain or fatigue, or was perceived as being enjoyable, meaningful, or difficult to perform (Gerber & Furst, 1992). Recently, Hawk, Jason, and Pena (2007) used the ACTRE activity log over the course of two days to examine whether differences existed in the pattern, intensity, and qualitative nature of activity among those with CFS, Major Depressive Disorder (MDD) and controls. On average, participants in the CFS group spent significantly more time resting than the MDD group or control group. The CFS group spent nearly 2.5 times more than the MDD group and 4 times more than the control group performing low intensity activity.

It is very possible that the use of these types of activity logs could help investigators better understand whether the type of activity engaged in might be related to their functioning (Jason, Melrose, et al., 1999). For example, Ray, Jefferies, and Weir (1995) found that positive life events contribute to the process of recovery in CFS, and LeRoy, Haney, Davis, and Jason (1996) found that the two highest-rated treatment items among patients were stress reduction and rest. Activity logs might help investigators explore these types of relationships. The study by Hawk et al. (2007) only had a sample of 15 patients with CFS complete the activity logs. The purpose of the current study is to investigate the utility of the ACTRE in a larger sample of patients with CFS and examine the associations between activity, evaluation of activity and symptoms. Given the cross-sectional nature of the data, no causal relations were tested.

Method

Patients

Participants were recruited from a variety of sources, including physician referrals. Information about the non-pharmacologic treatment trial study was disseminated to medical colleagues through mailings, phone communication, and invited grand rounds. One hundred and fourteen individuals were recruited (See Jason et al., 2007 for more details about this sample). The data presented in this study were collected before the intervention took place. All patients were diagnosed with CFS using the Fukuda et al. (1994) criteria.

Assessments

The CFS Questionnaire—This screening scale was initially validated by Jason et al. (1997). This scale is used to collect demographic, health status, medication usage, and symptom data, and it uses the definitional symptoms of CFS (Fukuda et al., 1994). Hawk, Jason, and Torres-Harding (2006) revised this CFS Questionnaire, and administered the questionnaire to three groups (those with CFS, Major Depressive Disorder, and healthy

controls). The revised instrument, which was used in the present study, evidences good test-retest reliability and has good sensitivity and specificity.

Psychiatric Interview and Medical Assessment—The Structured Clinical Interview for DSM-IV (SCID) (First et al., 1995) Axis I was used to establish psychiatric diagnoses. The physician screening evaluation included an in-depth medical and neurological history, as well as general and neurological physical examinations (See Jason et al., 2007 for more details).

The ACTRE—The ACTRE is a daily self-administered log of physical activity. Respondents log their daily activities per every half-hour over the course of two days. Respondents rate the intensity of their activity (e.g., sedentary or active) and classify the nature of their activity into one of the nine following categories for every recorded half-hour of activity: sleep (when you go to bed for the night), household activities (cooking, cleaning, mending, shopping for or putting away groceries, gardening, or other similar activities), work (paid or volunteer activities in or out of the home, school work, writing papers, attending classes, studying, or similar activities), self-care (personal care activities including dressing, grooming, exercises, normal meals, showering, or similar activities), recreation or leisure (hobbies, TV, games, reading (unless done during short rest breaks), sports, out-for-meals, movies, adult education classes, shopping, gardening, talking with friends, or other similar activities), rest (rest periods taking one-half hour or longer), preparation or planning (time spent preparing to do an activity or planning when and how to do your daily or weekly activities), transportation (traveling to and from activities), and treatment (doctor or therapy appointments, home exercises, etc). Respondents also answer eight questions for every half-hour of recorded activity that assess whether the activity is associated with pain, fatigue, or perceived as difficult to perform, meaningful, enjoyable, or well done. Need for rest is also assessed every half-hour. Data collected on the ACTRE can be totaled and specific abilities can be rated in terms of associated symptoms. In effect, clinicians are able to obtain a composite that represents a comprehensive profile of functioning as well as areas of dysfunction (Gerber & Furst, 1992). In a validation study of the ACTRE, Gerber and Furst (1992) demonstrated that the ACTRE has adequate psychometric properties as a measure of activity and functional status in a population with a chronic disabling condition. The ACTRE is significantly correlated with other measures of fatigue (Gerber & Furst, 1992).

Statistical Analyses

We conducted Pearson correlation coefficients between ACTRE variables. In addition, using percent of time feeling fatigued as the dependent variable, the other ACTRE variables were entered into a multiple regression analysis.

Results

Analysis of ACTRE Data

The ACTRE questionnaire was filled out by 103 participants with CFS, so the data below is on this target group. Some individuals did not complete the forms for a variety of reasons (e.g., forgot, found it to be too difficult, etc.). Table 1 presents the means and standard deviations of the ACTRE data collected over a two day period. As can be seen in this table, the participants reported spending 28.4% of their time in recreation and leisure activities, 16.1% doing work, 15.8% doing housework, 14.5% in self-care activities, 11.2% resting, 8.4% traveling, 3.0% planning, and 1.6% receiving treatment. Participants indicated that 73.5% of the time they felt fatigued, 53.2% of the time they engaged in activities that were fatiguing, 22% of the time they engaged in activities that were difficult, 13.2% of the time they performed poorly, and 8.7% of the time they rested during physical activities. The

overall percent of time spent in a lot of pain was 52.3%. Participants engaged in enjoyable activities 67.1% of the time and meaningful activities 64.2% of the time. The standard deviations of the ACTRE data are high suggesting that there is a lot of variation between patients in the type of activity but also in the experience of pain and fatigue.

Intercorrelations

Pearson correlation coefficients between ACTRE variables are located in Table 2. Below, we report all correlations that were at the .05 and .01 level of significance (given the number of correlations, those at the .01 level should be considered less likely to have been found by chance). The correlations represent associations and should not be considered causal.

Time spent feeling fatigued was positively associated with doing activities that were fatiguing, and time spent in pain, resting, and doing difficult activities; percent feeling fatigued was negatively associated with meaningful activities. Percent of time doing activities that were fatiguing was positively associated with doing household activities, time feeling fatigued, doing difficult activities, and time in a lot of pain. Percent of time in pain was positively associated with time spent feeling fatigued, doing fatiguing activities, doing difficult activities, performing poorly, resting during physical activity, and resting, but occurred less when doing work.

Percent of time in meaningful activities was positively associated with time spent on enjoyable activities, time spent on self-care, time spent on preparation and planning, resting during physical activity, and negatively related to time spent feeling fatigued. Time spent in enjoyable activities was positively associated with time spent in meaningful activities, time spent on self-care, time spent on leisure, and negatively related to time resting. Time spent on leisure was positively associated with enjoyable activities, and negatively related to doing household activities, work, and resting. Time spent in self-care was positively associated with time spent in meaningful activities and in enjoyable activities.

Percent time doing household activities was negatively associated with time spent in leisure and positively related to doing activities that are fatiguing. Time spent doing work was negatively associated with time spent on self-care, resting and in leisure, but more time working was associated with less pain. Time spent resting was negatively associated with time spent in leisure, transportation, and in enjoyable activities, but positively associated with time spent in a lot of pain, feeling fatigued, and spent doing difficult activities.

Time spent doing difficult activities was positively associated with time spent performing poorly, resting during physical activity, time spent resting, time spent doing activities that were fatiguing, and time spent feeling fatigued. Time spent performing poorly was associated with time in a lot of pain, and resting during physical activities. Percent of time resting during physical activities was positively associated with doing difficult activities, time spent in a lot of pain, performing poorly, and in meaningful activities. Finally, the variable time spent in treatment was only significantly associated with time spent in transportation.

Multiple Regression Analysis

Using percent of time feeling fatigued as the dependent variable, the other ACTRE variables were entered into a multiple regression analysis, using stepwise procedures. Only variables that were significantly related to percent of time feeling fatigued were entered into the multiple regression. A significant R square was .49, indicating that about half the variance in fatigue was explained by the other dependent variables selected for the model. Standardized coefficients, t values, and probabilities for the selected independent variables follow: pain

($Beta = .42$, $t = 5.16$, $p < .01$), doing activities that are fatiguing ($Beta = .38$, $t = 4.68$, $p < .01$), and meaningful activities ($Beta = -.27$, $t = -3.70$, $p < .01$).

Discussion

The present study used an activity log over the course of two days to examine patterns, intensities, and the qualitative nature of activity. It is important to recognize that these data are cross sectional, and can not be used to make causal statements. Although patients reported being fatigued and in pain 73.5% and 52.3% of the time, respectively, participants still reported that enjoyable and meaningful activity occurred for 67.1% and 64.2% of the time, respectively. This finding may indicate that fatigue and pain do not prevent patients from also being able to perceive their activities as both enjoyable and meaningful. In addition, it is interesting to note that recreation and leisure involved 28.4% of the time, whereas 14.5% of the time was devoted to self-care activities and 11.2% to resting. Involvement in these activities might also be one of the reasons participants were able to find both enjoyment and meaning in their lives even though levels of fatigue and pain were so high.

Using regression analyses, more time spent being fatigued was significantly associated with more time in pain and in activities that were fatiguing. In addition, more time in meaningful activities was associated with less time being fatigued. It is certainly possible that when fatigued, a person might have just completed more fatiguing activities and might also report more pain, and feel that the activities are less meaningful. However, it is also possible that being involved in more meaningful activities, doing activities that are less fatiguing, and experiencing less pain is related to less time being fatigued. Certainly, there are many ways to understand these associations, as being in more pain could lead to more fatigue.

We also found that engaging in meaningful activities was associated with being more likely to rest during physical activity, spend time in self-care, prepare and plan, and these activities were also associated with feeling less fatigue. Other investigators, such as Ray et al. (1995), have found that positive life events contribute to the process of recovery in CFS. Other studies have found that individuals who participate in intrinsically meaningful activities experience reductions in stress (Hutchinson, Loy, Kleiber, & Datillo, 2003; Winefield, Tiggeman, & Winefield, 1992).

We also found that the percent of time in pain was positively associated with time spent feeling fatigued, doing fatiguing activities, doing difficult activities, performing poorly, resting during physical activity, and resting. However, less pain occurred when working, and one way of interpreting this association is that patients who are able to do more work might have been in less pain. Of interest was that time spent doing work was negatively associated with time spent on self-care, resting and in leisure. Possibly, those who are working have less time for these other activities.

There were several limitations in the study. First, all measures involved self report, and there might be unreliability using these type of data, and some overlap in the variables that were being measured. It is important to confirm these types of self report data with either other more biological indices, electronic diaries, or electronic measurements of activity, such as actigraphs. In addition, there were 120 correlations in Table 2, and some might have been expected to occur by chance. Still, there were 31 significant correlations, which is far more than would be expected by chance. Because of the explorative nature of our study, we chose not to correct the significance level, thereby reducing the chance on a type II error and accepting an significant increased chance on a type I error. Certainly, more research is needed, but this study does suggest that activity logs can provide investigators and clinicians

with valuable sources of data for understanding patterns of behavior and activity among patients with CFS.

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Table 1**Means and Standard Deviations for ACTRE Data**

	M	SD
% of time doing housework	15.85	11.82
% of time working	16.06	16.88
% of time in self-care activities	14.53	07.67
% of time in leisure & recreational activities	28.39	17.96
% of time planning	03.01	04.73
% of time traveling	08.42	06.45
% of time in treatment	01.63	02.67
% of time resting	11.24	13.74
% of time in pain	52.31	34.57
% of time fatigued	73.54	25.47
% of time in difficult activity	22.01	19.24
% of time in meaningful activity	64.18	25.95
% of time in enjoyable activity	67.09	22.37
% of time awake time performing poorly	13.22	18.47
% of time rest during activity needed	08.67	09.71
% of time in fatigue causing activity	53.19	20.98

whether the activity is associated with pain, fatigue, or perceived as difficult to perform, meaningful, enjoyable, or well done. Need for rest is also assessed every half-hour

Table 2

Intercorrelations of the ACTRE Variables

	Rest/PA	House	House	Work	Care	Rest	Leisure	Prep	Trans	Treat	Pain	Fatigue	Act	Difficult	Perform	Meaning
House		.11														
Work			-.17	-.14												
Care				-.12	-.27**											
Rest					-.18	-.31**	.02									
Leisure						-.32**	-.44**	-.10	-.25*							
Prep							-.02	-.14	-.04	-.02	-.08					
Trans								-.05	-.04	-.07	-.23*	-.09	.06			
Treat									.02	-.19	.14	-.00	-.14	.02	.32**	
Pain										.16	-.28**	.09	.27**	-.07	.08	-.03
Fatigue											.13	-.17	-.10	.21*	-.07	-.03
Act												.17	.27**	-.03	-.04	.04
Difficult													.05	-.06	-.10	.30**
Perform														.06	-.15	.16
Meaning															-.00	-.14
Enjoy																-.07
																-.15
																-.02
																.45**

* Indicates statistical significance at the $p < .05$ level.** Indicates statistical significance at the $p < .01$ level.

Rest/PA- Time spent resting during physical activity

House- Time spent in household activity

Work-Time spent working

Care- Time spent in self care

Rest- Time spent resting

Leisure- Time spent in recreation and leisure

Prep- Time spent in preparation and planning

Trans- Time spent in transportation

Treat-Time spent in treatment

Pain-Time spent in a lot of pain

Fatigue-Time spent feeling fatigued

Act-Time spent doing activities that are fatiguing

Difficult-Time spent doing difficult activity

Perform-Time spent performing poorly

Meaning-Time spent in meaningful activity

Enjoy-Time spent in enjoyable activity