Journal of Psychosomatic Research 78 (2015) 427–432

Contents lists available at ScienceDirect

Journal of Psychosomatic Research

The role of insomnia in the treatment of chronic fatigue

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ARTICLE INFO

Article history:
Received 21 August 2014
Received in revised form 26 November 2014
Accepted 30 November 2014

Keywords:
Fatigue
Insomnia
Cognitive therapy
Stress

ABSTRACT

Background: The definition of Chronic Fatigue Syndrome (CFS) overlaps with definitions of insomnia, but there is limited knowledge about the role of insomnia in the treatment of chronic fatigue.
Aims: To test if improvement of insomnia during treatment of chronic fatigue was associated with improved outcomes on 1) fatigue and 2) cortisol recovery span during a standardized stress exposure.
Methods: Patients (n = 122) with chronic fatigue received a 3.5-week inpatient return-to-work rehabilitation program based on Acceptance and Commitment Therapy, and had been on paid sick leave > 8 weeks due their condition. A physician and a psychologist examined the patients, assessed medication use, and SCID-I diagnoses. Patients completed self-report questionnaires measuring fatigue, pain, depression, anxiety, and insomnia before and after treatment. A subgroup (n = 25) also completed the Trier Social Stress Test for Groups (TSST-G) before and after treatment. Seven cortisol samples were collected during each test and cortisol spans for the TSST-G were calculated.
Results: A hierarchical regression analysis in nine steps showed that insomnia improvement predicted improvement in fatigue, independently of age, gender, improvement in pain intensity, depression and anxiety. A second hierarchical regression analysis showed that improvement in insomnia significantly predicted the cortisol recovery span after the TSST-G independently of improvement in fatigue.
Conclusion: Improvement in insomnia severity had a significant impact on both improvement in fatigue and the ability to recover from a stressful situation. Insomnia severity may be a maintaining factor in chronic fatigue and specifically targeting this in treatment could increase treatment response.

Introduction

Chronic Fatigue Syndrome (CFS) is a condition primarily characterized by persistent and profound fatigue of at least six months duration (1). It causes substantial disruption to the individual's daily function. The fatigue has to be unexplained and not the result of ongoing exertion, and not substantially alleviated by rest. In addition to fatigue, the diagnostic criteria require the concurrence of four or more of the following symptoms: muscle- and joint-pain, headache, sore throat, impairment in memory or concentration, unrefreshing sleep, and postexertional fatigue lasting more than 24 h. The prevalence rates for CFS vary depending on the definition and the criteria used. Community and primary care studies have reported the prevalence to be between 0.2% and 2.6% (2).

Cognitive Behavior Therapy (CBT) has been shown to be an effective treatment of CFS (3). A meta-analysis of 1371 patients in 13 studies found that the mean between-group effect size for CBT compared to placebo was $d = 0.48$, which corresponds to a medium effect size. Although these are promising results, there is still room for improvement. It is therefore important to better understand the maintaining factors involved in CFS that could be potential therapeutic targets.

One factor that could be involved in the maintenance of CFS is insomnia. Insomnia can be defined as the subjective experience of disturbed or non-restorative sleep that gives rise to daytime impairment despite adequate opportunity and circumstances for sleep (4,5). Despite its high prevalence, insomnia is often overlooked in clinical settings (6), and it is underdiagnosed in patients with CFS (7).

CFS and insomnia have overlapping features. Between 87% and 95% of patients meeting criteria for CFS report non-restorative or

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http://dx.doi.org/10.1016/j.jpsychores.2014.11.022

unrefreshing sleep (8). On the other hand, fatigue is a core symptom of insomnia (5,9). Like in insomnia, CFS is more associated with subjective experience of sleep disturbance rather than objective measures of poor sleep (10). Impairment in memory or concentration is a symptom of both insomnia and of CFS (1,5). It is possible that a proportion of the fatigue CFS patients experience may be related to poor sleep quality and insomnia, whereas others have suggested that insomnia symptoms in CFS are secondary to pain and depression (11).

Adaptive response to stress could be a common factor between insomnia and CFS. Sleep is important to restore the capacity to regulate emotions when exposed to negative stimuli (8,12) and could have a stress-buffering effect (13). In CFS, the ability to recover after a stressor is impaired (14) and stress exacerbates the symptoms of fatigue (15). At a physiological level, CFS patients display a flattened cortisol variation when exposed to a naturalistic stressor such as awakening (16) or in laboratory with the Trier Social Stress Task (TSST) (17). This low cortisol variability has been claimed to be a physiological expression of vital exhaustion, a mental state where the ability to adapt to stress is disrupted (18,19) and one of the biological factors contributing to the maintenance of CFS (16). Interestingly, a flattened response on the TSST has also been found to be a consequence of poor sleep quality (13). The authors of this study suggested that the stress-buffering effect of sleep is associated with improved parasympathetic tone and normalized cortisol patterns during the day (13). Improvement in insomnia severity during treatment could therefore contribute to normalizing cortisol patterns for patients with CFS. Repeated standardized stress exposures, such as the TSST before and after treatment, has been argued as an ideal study design for the investigation of such treatment effects (20).

The overarching aim of this study was to examine a possible role of insomnia in the treatment of chronic fatigue. All patients were treated for chronic fatigue with a 3.5-week intensive return-to-work (RTW) rehabilitation program based on Acceptance and Commitment Therapy (ACT) (21). Specifically, our hypotheses were that 1) improvement in insomnia severity during treatment would predict lower levels of fatigue at treatment termination when controlling for the possible confounding effects of pain intensity, depression, and anxiety. 2) Improvement in insomnia severity during treatment would predict increased changes in the cortisol recovery span on the Trier Social Stress Test for Groups (TSST-G) from pre to post treatment over and above the effects of fatigue improvement.

Method

Setting

This was a repeated measures treatment study with participants being consecutively recruited from January 2012 to June 2013 to a 3.5-week occupational rehabilitation program at Hysnes Occupational Rehabilitation Center at St. Olav's University Hospital in Trondheim, Norway.

Prior to the enrolment, the patients had all been referred from their general practitioner and thereafter examined and selected by an outpatient multidisciplinary team at St. Olav's University Hospital consisting of a physician, a psychologist, and a physiotherapist. This team evaluated whether the referred patients met the requirements for participating in the RTW-program, which were the same as the inclusion and exclusion criteria for the study. Before being evaluated at the outpatient clinic, all patients were asked to complete 18 different questionnaires (386 items) through an online self-report survey. At the end of the program and the study, the patients again completed six of these questionnaires online.

Patients

The study population consisted of patients on long-term sick leave who upon inclusion to the program gave their informed consent to join the study. The inclusion criteria were age between 18 and 60 years and to have been on sick leave for at least eight weeks due to musculoskeletal disorders, pain, fatigue and/or common mental disorders. Further they should have self-defined goals of increasing labor participation, to be adequately assessed and treated beforehand for any specific health problems, and be able to attend a rehabilitation program from 8:30 to 3:00 p.m. all weekdays.

The exclusion criteria were severe mental illness (ongoing mania, psychosis or suicidal ideation), substance abuse and addiction, pregnancy, and unexpressed difficulty functioning in a group. Moreover, patients who could not communicate in Norwegian or who needed 24-hour personal assistance were not accepted for rehabilitation. In addition to the inclusion criteria in the RTW program, the patients in the current study had to report fatigue for more than six months and score 5 or above on the Chalder Fatigue Scale (22). According to Chalder et al. (22) a score above 5 may be considered a case of chronic fatigue. Moreover, to be included in all the planned steps of analyses, the patients could not have any missing data on any of the covariates targeted in the subsequent multivariable analysis. The patients were a subsample from larger clinical trial (21).

Twenty-five of these patients were selected using a list randomization as described in another study (18). They were administered the *Trier Social Stress Test for Groups* (TSST-G) before and after treatment. The subgroup was included in the analyses to test our secondary hypothesis.

Treatment

A rehabilitation program designed to increase return-to-work was used as a multidisciplinary inpatient intervention with ACT as an overarching treatment model. Details on the rehabilitation program are published elsewhere (21). The program was group-based with up to eight participants in each group. However, the program used both group-based and individual approaches to facilitate rehabilitation. It was organized through seven-hour workdays and lasted 17 workdays. The group sessions included socialization to the ACT model and motivating the patient for change, barriers and the issue of control, consequences of attempting to control the symptoms, family and important supporters, cognitive defusion (you are not your thoughts), communication and conflict, language and staying committed to value-guided behavior. In the individual sessions the focus was on identifying the patient's goals and values, and helping the patients commit to his/her chosen values.

The therapists were coined return-to-work coordinators, trained and supervised in ACT, and targeted three areas of rehabilitation: mental training, physical training and work-related problem solving. The team of coordinators had extensive and diverse backgrounds (e.g. physical therapy, psychology, exercise physiology, medicine, nursing), and each coordinator was responsible for mentoring two or three participants through the program. There were three multidisciplinary team meetings during the inpatient stay where the coordinators discussed possible strategies for handling the participants' obstacles and possibilities with regard to returning to work.

Assessments

Psychological and medical examination

A licensed clinical psychologist assessed the presence of comorbid mental disorders using the Structured Clinical Interview for DSM-IV (SCID-I) (23). A physician reviewed the participants' medical records and assessed current medication.

Fatigue

The Chalder Fatigue Scale was used to assess levels of fatigue (22). It is an 11-item self-report questionnaire assessing both mental and physical fatigue. Each item has four response categories scored bimodally 0–0–1–1. (e.g., 0 = better than usual; 0 = no more than usual; 1 = worse