

Work-related impairment and employment-focused rehabilitation options for individuals with chronic fatigue syndrome: A review

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Abstract

Background: Over the past decade, the need to measure work-related impairment of individuals with chronic fatigue syndrome (CFS) and develop rehabilitation programs focusing directly on employment has become increasingly clear.

Aims: Evidence in the scientific literature was sought to determine the extent of work-related impairment and the efficacy of rehabilitation programs that specifically focus on issues of work-related impairment and employment.

Methods: Three evidence-based medical review sources and five specialist databases were searched. English-language studies of adults with CFS published between 1 January 1966 and 15 July 2004 were included if functional or work-related impairment and employment were primary variables measured in the study.

Results: Few studies of work-related impairment and work-focused rehabilitation in CFS exist. Rates of unemployment ranged from 35–69% and rates of job loss ranged from 26–89%. Work-related impairment encompassed getting out of bed, transportation to work, communication at work, difficulties with energy and cognition at work, errors at work, falling asleep, lost work hours, and excessive dependence on coworkers. Most rehabilitation programs have not focused directly on employment outcomes but findings for improvement in work status following these programs offer promise for future research.

Conclusions: CFS is associated with considerable work-related disability. Preliminary findings support the need for the development of comprehensive rehabilitative programs that focus on volitional, functional, social, and environmental aspects of re-employment.

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Keywords: *Rehabilitation, impairment, work, employment, chronic fatigue syndrome*

Introduction

Over the past two decades, a growing number of studies of the range of functional limitations of individuals with chronic fatigue syndrome (CFS) have been introduced. These studies have documented functional and daily living consequences of CFS that range from debilitating cognitive symptoms (e.g., difficulties with information processing, attention span, problem-solving, concentration, short-term memory, reasoning, and verbal commu-

nication) to significant physical impairments that involve difficulties with general mobility, walking, grocery shopping, food preparation, bathing, and housekeeping (Bell, Cookfair, Bell, Reese, & Cooper, 1991; Buchwald, Sullivan, & Komaroff, 1987; Buchwald, Pearlman, Umali, Schmaling, & Katon, 1996; Christodoulou, et al., 1998; Claypoole et al., 2001; Garcia-Borreguero et al., 1998; Grafman et al., 1993; Komaroff & Buchwald, 1991; Lloyd, Gandevia, Brockman, Hales, & Wakefield, 1994; Natelson et al., 1995; Ray, Phillips, & Weir, 1993; Schmaling, Hamelos, DiClementi, & Jones, 1998; Tiersky, Johnson, Lange, Natelson, & DeLuca, 1997; Vercoulen et al., 1997).

The physical and cognitive impairments experienced by individuals with CFS are not only severe, but they are also enduring for many (Andersen, Permin, & Albrecht, 2004; Joyce, Hotopf, & Wessely, 1997; Tiersky et al., 2001). In a five-year follow-up study of the life impact of CFS, fewer than 6% of participants improved substantially in terms physical functioning, and only one participant's improvement approached full recovery (Andersen et al., 2004). Similarly, a review of prospective outcome studies revealed that substantial recovery occurs in less than 10% of cases, and 1/4 to 1/3 of individuals with CFS report worsening illness over time (Joyce, Hotopf & Wessely, 1997). Over ten years ago, Lloyd and Pender (1992) used formal health care utilization data and data on employment and income loss to estimate the yearly economic impact of CFS in Australia as at least 59 million dollars. A more recent study incorporating formal and informal service utilization and employment loss estimated that the average cost of CFS per person over a three-month period was 3,515 pounds sterling (McCrone, Darbishire, Ridsdale, & Seed, 2003). More than 90% of that cost was accounted for by care provided by friends and relatives and by lost employment.

Though a predominance of studies indicate that the functional impact of CFS is severe and enduring, evidence for variability in the nature and extent of functional impairment between individuals cannot be ignored. Wilson and associates (2001) surveyed 744 individuals with chronic fatigue of various origins recruited from eight international clinics and subclassified them based on symptom profiles. The first subgroup was characterized by younger age, lower female to male ratio, shorter duration of illness, lower rates of psychiatric comorbidity, and less functional impairment. The second subgroup exhibited features that were more consistent with a somatoform illness.

Notwithstanding the controversial role of psychiatric comorbidity, one potential reason for such poor prognostic and economic outcomes associated with CFS likely involves the lack of rehabilitation programs and other supportive systems available and known to this population. While the number of rehabilitative interventions and multidisciplinary programs are increasing (Taylor, 2004), relatively few of such programs have focused specifically on addressing issues of work-related impairment and employment (Ross et al., 2004). Rehabilitation professionals involved in providing and evaluating vocational and occupational services for individuals with CFS appear to agree that there is an urgent need for the creation of programs that focus on issues of work-related impairment and employment (Mounstephen & Sharpe, 1997; Uslan, 2003).

Whilst a growing number of studies report a wide range of functional limitations among individuals with CFS, a number of questions remain unanswered. These concern issues involving the nature and extent of work-related impairment among individuals with CFS and outcomes of employment-focused rehabilitation programs (Ross et al., 2004). The present review aims to answer two central questions pertaining to the area of work and CFS: (1) What is the extent of work-related impairment among individuals with CFS?, and (2) How efficacious are rehabilitation programs for individuals with CFS that specifically focus on issues of work-related impairment and employment?

Methods

Search strategy

The two questions posed in the preceding paragraph were developed to guide the review process. Three evidence-based medical review sources and five specialist databases were searched. These included MEDLINE, PSYCHINFO, CINAHL, ERIC, Science Citation Index, the Agency for Healthcare Research and Quality Clinical Guidelines and Evidence Reports, *British Medical Journal's* Clinical Evidence, and the Cochrane Database of Systematic Reviews. The retrieval cutoff date was 11 August 2004. This review was unsystematic and limited by a number of methodological considerations and is therefore subject to author bias.

Inclusion criteria

Articles covered in this review included the following:

- (1) Empirical English-language studies published between 1 January 1966 and 15 July 2004 were included if work-related impairment was a primary variable of interest measured in the study. In this review, work-related impairment was defined according to three dimensions: (a) rates of participants not working; (b) rates of job loss due to CFS; and (c) evidence of impaired work performance due to CFS.
- (2) Intervention studies of clinical trials or programs that used psychological, behavioral, physical, or psychosocial approaches to rehabilitation were only included if change in employment status was a measured outcome.
- (3) Participants that met criteria for chronic fatigue or chronic fatigue syndrome based on any single aspect (or all aspects) of any published diagnostic criteria for CFS, including those published by Holmes et al. (1988), Fukuda et al. (1994), Lloyd, Hickie, Boughton, Spencer & Wakefield and Sharpe et al. (1991).
- (4) Participants with comorbid physical (e.g., fibromyalgia) or psychiatric (e.g., anxiety disorders) disorders.
- (5) Observation-based (i.e., prospective/longitudinal, retrospective, cross-sectional) and intervention-based (i.e., randomized clinical trials and other clinical trials and outcome studies) designs were accepted.
- (6) Studies using qualitative or quantitative data were accepted.

Exclusion criteria

This review did not include the following:

- (1) Uncontrolled case studies.
- (2) Studies that only included individuals with fibromyalgia (not chronic fatigue or CFS).
- (3) Studies of functional limitations associated with CFS that did not measure employment status or work-related impairment.
- (4) Rehabilitation programs that did not evaluate change in employment status or work-related impairment as an outcome.
- (5) Studies of interventions that did not involve rehabilitation approaches (e.g., pharmacological interventions only).

Data synthesis

Tables I and II were designed to address the two focal questions around which this review was organized, respectively. In total, 15 observation-based studies and six intervention-based studies were reviewed. Table I presents data regarding the three dimensions of work-related impairment as it is defined in this review: (a) rates of participants not working; (b) rates of job loss due to CFS; and (c) evidence of impaired work performance due to CFS.

Table II presents information regarding the efficacy of rehabilitation programs on improving employment outcomes. In order to compare approaches to rehabilitation and examine the methodological rigor of these approaches, the following information was examined and summarized in Table II: approach to rehabilitation (intervention type); diagnostic criteria by which participants were selected (CFS criteria); number of therapy sessions (# sessions); study design (trial design), and outcomes of the study that were related to employment (employment outcomes). In addition, the following quality indicators were included: presence of control group, nature of assignment to study groups, blinding, dropout rates, and presence and times of a follow-up evaluation.

Results*Question 1: What is the extent of work-related impairment among individuals with CFS?*

Table I presents findings on work-related impairment in CFS according to the three aspects of work-related impairment, participants with CFS not working, job loss due to CFS, and evidence of impaired work performance due to CFS.

Participants with CFS not working. Of the 15 articles reviewed, 13 provided information about the rates of participants with CFS that were not working and studies varied in the extent to which unemployment rates could be directly attributable to CFS. Across studies, rates of unemployment ranged from 35% to 69%. Three studies presented longitudinal follow-up data on employment status (Bombardier & Buchwald, 1996; Tiersky et al., 2001; Vercoulen & Bleijenberg, 1996). Findings from all three of these studies revealed very little change in employment status over time among participants with CFS. Two studies compared individuals with CFS and no comorbid medical condition with individuals with both CFS and fibromyalgia (FM) (Assefi, Coy, Uslan, Smith, & Buchwald, 2003; Bombardier & Buchwald, 1996). Both of these studies found that rates of unemployment were higher among participants with both conditions than in the participants with CFS alone. All studies utilized various self-report questionnaires to collect data on work status, but the diagnostic criteria used to select participants with CFS varied widely between studies.

Job loss due to CFS. Only six of the 15 articles provided information about job loss due to CFS. Rates of job loss appeared to vary widely between studies and ranged from 26–89%. The highest rates were reported in a five-year follow-up study of Danish participants with CFS who met the original Holmes et al. (1988) CFS criteria. One study (Assefi et al., 2003) compared job loss in individuals with CFS alone versus those with CFS and FM and found that job loss was higher for individuals with both diagnoses.

Evidence of impaired work performance due to CFS. Twelve studies provided information about impaired work performance due to CFS. Five studies reported that many participants

Table I. Work-Related Impairment in Chronic Fatigue Syndrome

Source	% Not Working	% Job Loss	Evidence of Impaired Work Performance due to CFS
Akagi, Klimes, & Bass (2001)	37% not working	Not reported	77% reported some kind of occupational change in work or study due to CFS
Andersen, Permin, & Albrecht (2004)	Not reported	71% at initial interview 89% at 5-yr. follow-up	Work disability was 77% at initial interview and 91% at 5-yr. follow-up. Work disability was defined as stopping work completely, changing to a less demanding job, or reducing hours to part-time due to CFS.
Anderson & Ferrans (1997)	66% not working	Not reported	Not reported. However, 27% did report that they had no economic choice but to push themselves to work despite worsening CFS symptoms.
Assefi et al. (2003)	39% with CFS not working; 56% with both CFS and FM not working	29% with CFS and 49% with both CFS and FM lost job due to illness	CFS group: 44% decreased hours at work and had a mean of 9 hours of decreased work time. 23% changed job due to CFS, 25% took a job requiring fewer skills, and 30% took a significant pay cut due to CFS. CFS and FM group: 51% decreased hours at work and had a mean of 9 hours of decreased work time. 31% changed job due to illness, 25% took a job requiring fewer skills, and 44% took a significant pay cut due to illness.
Barrows (1995)	76% of women 81% of men not working	36% women and 44% of men lost job	Work performance difficulties were cited as the most frequently affected activity of daily living. Considerable memory loss, concentration and attention difficulties, calculation deficits, reading difficulty, word finding difficulties, deeply incapacitating fatigue, pain, and decreased endurance were cited as interfering with ability to perform previous job. For those who continued to work, many of their lives were limited to work activities only.
Bombardier & Buchwald (1995)	40% unable to work at all	Not reported	22% reported decreased performance while remaining at work.
Bombardier & Buchwald (1996)	Initial Assessment: 37% with CFS not working; 51% with both CFS and FM not working; 1.7 yr. follow-up: 35% with CFS not working; 52% with both CFS and FM not working	Not reported	23% of total sample reported decreased performance while remaining at work.
Jason et al. (2000)	41% not working	Not reported	No direct evidence. However, non-working participants had significantly more muscle and joint pain, lower social/recreational and work-related activity levels, and lower physical functioning as measured by the <i>MOS SF-36</i> .

(continued)

Table I. (continued)

Source	% Not Working	% Job Loss	Evidence of Impaired Work Performance due to CFS
Russo et al. (1998)	Not reported	Not reported	At a 2.5 year follow-up, 0% of the non-working participants with two or more enduring physical examination signs resumed work at follow-up. Psychiatric disorder predicted work disability at follow-up.
Schweitzer et al. (1995)	49% not working	47% had to resign or forced to quit due to CFS symptoms	100% reported a reduction in either the quantity or quality of their work due to CFS. Those returning to work had the same levels of impairment on the <i>Sickness Impact Profile</i> as non-working participants. Despite this finding, participants attributed this reduction to physical and cognitive symptoms of fatigue. 45% reported difficulty meeting deadlines, 30% reported producing more mistakes at work, 20% reported having to give up responsibilities of the job such as supervision and decision making. 76% were unable to work the same number of hours as prior to their illness and also reported having absent days, half-days, or having to leave after only a few hours. When performing work tasks, this same group (76%) reporting using strategies such as "pacing" their work by resting, taking work home with them, or choosing to spend more time in the office to make up for lost time despite their symptoms.
Tiersky et al. (2001)	Initial Assessment: 68% not working; 3.6 yr. follow-up 68% not working	Not reported	Not reported
Vercoulen et al. (1994)	69% not working	27% job loss due to CFS	80% reduced hours to part-time due to CFS. 62% reported marked difficulties at work or at home due to CFS, and the CFS group differed significantly from the impaired and non-impaired family practice patient groups in terms of reporting lower work performance as measured by the <i>Sickness Impact Profile</i> .
Vercoulen & Bleijenbergh (1996)	Initial Assessment: 55% not working 1.6 yr. follow-up 54% not working	Not reported	Not reported
Ware (1998)	50% not working	26% job loss due to CFS	Participants reported difficulties with carrying out morning routine before work, Transportation difficulties, difficulty committing to a set work schedule due to symptom and functional variability, compromised listening, speaking, and writing skills, cognitive impairments that inhibit job-related learning and tasks requiring short-term memory, difficulties meeting deadlines, cutting corners, falling asleep on the job, and co-worker burden due to excessive dependence on others in the workplace.
Wilson et al. (2001)	52% unable to work during the course of illness	Not reported	61% unable to complete more than one hour of daily work at some point during the course of their illness. Greater severity of symptoms was associated with inability to work, but depression was not.

Table II. Employment outcomes of rehabilitative interventions and programs.

Intervention type	CFS criteria	No. of sessions	Trial design	Employment outcomes	Quality indicators
CBT (increase activity) (Sharpe et al., 1996)	Oxford Criteria (Sharpe et al., 1991)	CBT group: 16 sessions	Randomized Clinical Trial CBT + Usual Medical Care ($N=30$) vs. Usual Medical Care only ($N=30$)	63% CBT vs. 20% usual care improved in work status. Improvements sustained (12-month follow-up)	Control Group: yes, not placebo Assignment: random Blinded: no Dropout = 0% Follow-up: 12 months
CBT (graded exercise) (Akagi, Klimes, & Bass, 2001)	Oxford Criteria (Sharpe et al., 1991)	Median of 6 sessions (range 1 – 39 sessions)	Within-Subjects design ($N=51$)	29% in work or study at initial assessment vs. 53% following CBT.	Control Group: no Assignment: not Random Blinded: no Dropout = 27.5% Follow-up: no
Graded Exercise (Fulcher & White, 1997)	Oxford Criteria (Sharpe et al., 1991)	12 weeks of graded aerobic exercise vs. 12 weeks flexibility treatment with relaxation therapy	Randomized Clinical Trial Exercise Group ($N=33$), Flexibility and relaxation ($N=33$)	At 12-month follow-up, 66% completing exercise therapy were working or studying at least part-time vs. 39% pre-treatment	Control Group: yes, placebo Assignment: random Blinded: no Dropout Rate = 4% Exercise Group, 3% Flexibility Group Follow-up: 3 & 12 months
Multi-disciplinary Inpatient Program with CBT and graded exercise (Masuda et al., 2002)	CFS defined as Schluenderberg et al.'s (1992) revision of Holmes et al. (1988) CDC criteria.	9 weeks <i>Stage I</i> : drug/herbal, bodywork, counseling. <i>Stage II</i> : CBT, biofeedback, autonomic training, family therapy. <i>Stage III</i> : Exercise Therapy, stretching, aerobics.	Post-infectious CFS ($N=9$) defined as having CFS following acute infection in past 3 years. vs. Non-infectious CFS ($N=9$) defined as no history of infection in past 3 years vs. no-fatigue controls ($N=20$)	89% returned to work in the post-infectious CFS group vs. 33% in the noninfectious CFS group.	Control Group: yes Assignment: not random Dropout Rate: 0% Follow-up: no
Multi-disciplinary Outpatient Program With CBT and graded exercise and anti-depressant medication (Sadlier et al., 2000)	Oxford Criteria (Sharpe et al., 1991) + CDC criteria (Fukuda et al., 1994)	$M=7$ sessions CBT with graded exercise & anti depressants.	Within-subjects design ($N=28$)	Two participants returned to school or work and regular exercise	Control Group: no Assignment: no Dropout Rates: 4% during the program, 34% by follow-up. Follow-up: 9 – 12 months

(continued)

Table II. (continued)

Intervention type	CFS criteria	No. of sessions	Trial design	Employment outcomes	Quality indicators
Community-Based Multidisciplinary Treatment Program (Marlin et al., 1998)	CFS defined by CDC criteria (Fukuda et al., 1994).	Visits from a consultant 2–3 times per week for 3–8 months.	Between-subjects design CFS program (N = 51) No treatment Controls (N = 20)	61% returned to gainful employment (verified through employers), 27% functioning at a level equivalent to employment, & 12% remained on disability (verified through insurance).	Control Group: yes Assignment: Not random Dropout Rate: 67% at follow-up Follow-up: 12–72 months

underwent a forced change in the nature of work or in the effort involved in work. Akagi, Klimes and Bass (2001) found that 77% of participants reported reduction in work or study. At a five-year follow-up, Andersen and associates (2004) reported that 91% of participants either discontinued work completely, changed to a less demanding job, or reduced their work hours to part-time due to CFS. Assefi and colleagues (2003) found that between 23–51% of individuals with either CFS alone or CFS and FM decreased their work time, changed jobs, assumed jobs requiring fewer skills, and took significant pay cuts. All participants in a study by Schweitzer and associates (1995) reported a reduction in either the quantity or quality of their work and 80% of participants in the Vercoulen et al. (1994) study reduced their work hours to part-time due to CFS.

Seven studies provided evidence of decreased performance while at work. Three of these studies found that between 22–62% of participants reported decreased performance while at work (Bombardier & Buchwald, 1995, 1996; Vercoulen et al., 1994). Specific performance difficulties included difficulties with morning routines before work, transportation difficulties, difficulties committing to a set schedule and meeting deadlines, compromised communication skills, cognitive difficulties that inhibited job-related learning and tasks requiring short-term memory, greater likelihood of producing mistakes at work, having to “cut corners”, having to give up higher-level roles involving supervision and decision-making, work attendance difficulties, falling asleep during work, and co-worker burden due to excessive dependence on others in the workplace (Schweitzer et al., 1995; Ware, 1998). One study reported that 61% of participants were unable to complete more than one hour of daily work at some point during the course of their illness (Wilson et al., 2001).

In terms of activities of daily living (ADL), Barrows (1995) evaluated 86 persons with CFS using a modified functional capacity evaluation and found that working at a previously performed job was the ADL most commonly described as seriously affected or too difficult to perform and many of the participants quit their jobs or were asked to leave as a result of not being able to perform job-related responsibilities. Considerable memory loss, concentration and attention difficulties, calculation deficits, reading difficulty, word finding difficulties, deeply incapacitating fatigue, pain, and decreased endurance were cited as interfering with ability to perform previous job. For those who continued to work, many of their lives were limited to work activities only.

With the exception of the functional capacity evaluation performed by Barrows (1995), data provided were, in large part, derived from unstandardized self-report questionnaires. Four studies also employed valid and reliable self-report measures, including the *Sickness Impact Profile* (Schweitzer et al., 1995; Vercoulen et al., 1994) and the *Medical Outcomes Study Short-Form General Health Survey* (MOS SF-36) (Jason et al., 2000; Russo et al., 1998). Studies that measured the relationship between work status and functional impairment produced contradictory findings. Some found no relationship between functional impairment and work status (Schweitzer et al., 1995), whereas others documented positive relationships between functional impairment and work status (Jason et al., 2000; Vercoulen et al., 1994). The study by Barrows (1995) was the only one to provide physiological, cognitive, and observational work performance data. These included measures such as range of motion, strength assessments, Valpar Work Samples, the Kasch Pulse Recovery Test, a 12-minute running test, dexterity tests, a Neurobehavioral Cognitive Status Examination, an Employee Aptitude Survey, the Raven Standard Progressive Matrices, the Rivermead Behavioral Memory Test, the Wide Range Achievement Test, and subjective measures of physical demand. One other study reported an association between failure to return to work and a persistence of two or more

physical signs detected during physical examination over a 2.5 year follow-up period (Russo et al., 1998).

Question 2: How efficacious are rehabilitation programs for individuals with CFS that specifically focus on issues of work-related impairment and employment?

Six studies of specific interventions and integrative rehabilitation programs have reported findings related to employment outcomes. Findings from these programs are presented in Table II.

All but one study (Marlin, Anchel, Gibson, Goldberg, & Swinton, 1998) utilized cognitive-behavioral therapy and/or graded exercise as a central approach to rehabilitation, and the latter program was the only one that focused specifically on improving work status among participants. Marlin and associates' (1998) controlled study examined the impact of a community-based program that involved home visits from a behavioral field consultant two- to three- times per week for a period of three to eight months. During these visits, the consultant worked with each participant on functional goals, many of which were related to re-employment. Consultants involved others in the treatment process, such as family members, employers, and insurers. Consultants also worked with employers and with the disability insurance companies to taper participants' disability benefits in order to encourage re-employment. Following the program, 61% returned to gainful employment and an additional 27% were functioning at a level equivalent to employment. Twelve percent did not improve and continued to receive disability income. Improvements in progress or maintenance of prior gains were observed at 12- and 72- month follow-ups. The study lacked randomization, and those participating in treatment were self-selected. Moreover, there was a moderate dropout rate at follow-up, which made positive findings somewhat difficult to interpret.

The other programs tended to focus on improving overall physical functioning and symptoms rather than on employment outcomes, per se. All studies documented some improvement in work status among some of the participants following intervention, with the exception of one program (Sadlier, Evans, Phillips, & Broad, 2000) in which only two subjects returned to work or school. The highest documented rate of improvement was achieved in a multi-disciplinary program initiated by Masuda, Nakayama, Yamanaka, Koga, & Tei (2002) that compared outcomes in post-infectious and noninfectious CFS participants. Eighty-nine percent of participants with post-infectious CFS returned to work following a three-stage intensive inpatient program that utilized cognitive behavioral therapy and graded exercise training as the central approach to intervention. The noninfectious CFS group, however, did not evidence as much improvement, and only 33% returned to work following the intervention. Three of the other four studies that employed cognitive behavioral therapy with graded exercise or graded exercise alone found that between 53% and 66% of participants improved in work status following therapy (Akagi et al., 2001; Fulcher & White, 1997; Sharpe et al., 1996). These positive outcomes were generally consistent across studies despite wide variation between the programs in terms of the intensity and means by which the therapy was administered.

In the remaining program that utilized cognitive behavioral therapy with graded exercise, it remains unclear why only two of 28 participants returned to school or work (Sadlier et al., 2000). In this program, each participant was encouraged to identify his or her own personal areas of desired improvement and corresponding measures of personal outcomes. Thus, the exact nature of the rehabilitation program that each participant received was a result of a shared decision-making process in which participants set goals and chose areas of focus

within an overarching program that consisted of seven sessions involving cognitive behavior therapy with graded exercise. It is possible that many of the participants did select goals related to employment. Though overall findings from this program appeared somewhat positive for a portion of the participants, it is not clear what kinds of participants benefited from the program. Moreover, findings were not uniformly positive for many of the participants and the clinical significance of the findings is currently unknown due to significant methodological limitations.

Discussion

Findings from this review indicate that CFS is associated with significant unemployment and job loss, and with a wide range of difficulties performing work-related duties for many individuals with this syndrome. Reported work performance limitations included difficulties getting to work, communicating, learning and remembering new material, keeping appointments and meeting deadlines, making more work-related errors, increased absenteeism and lost hours, and difficulty having the energy to sustain task-related effort and concentration, among others. Based on this review, rates of unemployment ranged from 35–69% and rates of job loss due to CFS ranged from 26–89%. The observed variation in rates may, in part, be attributable to differences between studies in case selection criteria, differences in measurement approaches, and variation between study samples in terms of participants' available social and economic resources. Because data in the reviewed studies were derived from six different countries, it is also possible that international differences in labor market policies and laws supporting disabled workers affected findings (Burstrom, Whitehead, Lindholm, & Diderichsen, 2000). Despite this variability, however, these rates are within the expected range of unemployment and job loss among individuals with other chronic illnesses and disabilities (Aronson, 1997).

Across studies, data regarding work-related impairment were derived from unstandardized self-report questionnaires and from broader self-report measures of functioning and quality of life, such as the *Sickness Impact Profile* and the *MOS SF-36*. As a result, the kinds of questions and measures assessing work-related disability varied widely between studies, making definitive conclusions about the specific nature and extent of work-related disability in CFS impossible. It is clear that current approaches to the measurement of work-related impairment in individuals with CFS are not adequate. Barrows (1995) and Uslan (1997) have recommended the use of functional capacity evaluations, neuropsychological testing, and exercise tolerance testing as essential elements of any professional vocational assessment of ability to work for individuals with CFS.

Few studies of CFS have documented the specific reasons behind unemployment and job loss, but some have suggested that illness severity (Jason et al., 2000; Russo et al., 1998), functional impairment (Jason et al., 2000; Vercoulen et al., 1994), or psychiatric comorbidity (Ross et al., 2004; Tiersky et al., 2001) may play a role. Other studies have produced evidence that appears to contradict these suggestions, at least in part. For example, Schweitzer and associates (1995) found that participants returning to work had the same levels of impairment as non-working participants. Although Wilson and associates (2001) found that greater symptom severity was associated with inability to work, in their study depression did not predict inability to work.

It is likely that other unexamined variables may be contributing, in part, to rates of unemployment and job loss among individuals with CFS. For instance, Kielhofner et al. (1999) and Braveman (1999) point out that employment success of disabled persons is a function of the convergence of personal and environmental factors. They note that personal

factors include volitional issues such as the person's belief in capacity and expectation of work success, satisfaction derived from work, and how working impacts on the person's value system. Personal factors also include the ability to make accommodations to disability in one's routine and balance work among other roles. These personal factors interrelated with the level and type of functional impairment. For instance, a person with CFS may have particular difficulty with maintaining a realistic sense of their own capacity and managing impairment through a functional routine due to the fluctuation in fatigue and other symptoms (Taylor et al., 2003).

Social and physical environmental barriers are also an important factor affecting employment of persons with disabilities (Kielhofner et al., 1999). Environmental factors affecting persons with CFS include available social and economic support from others, socioeconomic status, accessibility to transportation and within the workplace, issues of stigma and discrimination, knowledge about accommodation rights, and labor market policies (Taylor et al., 2003).

This multivariate understanding of work-related disability in persons with CFS is supported by the views of persons who have CFS. For instance, Heiman (1994) surveyed individuals with CFS about their vocational needs and found that, on a 20-point scale (with 20 indicating the highest need), individuals with CFS rated the following items with high scores in terms of need: professional assistance in negotiating with their employers for accommodation (mean score 17.19), reduce stress factors at work (17.72), assistance with career change (16.73), change in conditions when working (16.43), job sharing (15.73), do some work at home (15.40), and flexible hours (16.50).

Findings regarding employment outcomes from existing interventions and rehabilitation programs appear promising, but conclusions regarding their overall efficacy were not possible given a number of methodological limitations related to this review. First, only six programs that examined work-related outcomes were found. Only one of the six programs reviewed focused specifically on return to work as a primary intervention goal (Marlin et al., 1998). Measurement of work-related outcomes were not standardized and varied widely between studies. Studies also differed widely in terms of case selection criteria, treatment frequency and length, presence and quality of comparison groups, and experimental rigor (quality indicators). It is possible that the broadly-defined case selection criteria may have increased the likelihood of inclusion of individuals with primary or comorbid psychological distress or psychiatric disorders in studies that did not specifically exclude individuals with psychiatric disorders. As a result, a lack of clarity remains surrounding the effectiveness of these interventions in enabling return to work for individuals with CFS in the absence of psychiatric overlay. Another limitation of these studies is that all but the inpatient (Masuda et al., 2002) and community-based (Marlin et al., 1998) studies necessarily excluded individuals too impaired to travel to the treatment site and participate in graded activity or exercise therapy. These limitations present a challenge to interpreting overall outcomes.

While current findings have promise, additional research is necessary to determine the extent to which rehabilitation programs utilizing cognitive behavioral therapy (Akagi, Klimes, & Bass, 2001; Masuda et al., 2002; Sadler et al., 2000; Sharpe et al., 1996), graded exercise (Fulcher & White, 1997), and goal setting with active collaboration with employers and insurers (Marlin et al., 1998) are effective in treating more physically impaired CFS subgroups and those without psychiatric comorbidity.

In sum, while for many work is fundamental to quality of life and well being, persons with CFS experience significant work related impairment, difficulty sustaining work involvement and/or unemployment. There is some evidence that interventions positively impact work outcomes. However, documented programs tended to focus on impairment reduction or

management and generally do not focus on work related issues. Future rehabilitation programs for people with CFS should consider issues related to return to work as a central aspect of intervention. Moreover, programs should address the wider range of personal and environmental factors that are involved in work difficulty and success. If programs only continue to address issues related to functional capacity, they will likely fail to capture the full range of issues that may be critical for individuals with CFS in terms of returning to work, sustaining employment, and ultimately, enjoying an improved level of quality of life.

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