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COGNITIVE BEHAVIOUR THERAPY, MULTI-CONVERGENT THERAPY, AND THE MOOD AND COGNITIVE PERFORMANCE OF CHRONIC FATIGUE SYNDROME PATIENTS

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ABSTRACT

Background: Cognitive Behaviour Therapy (CBT) has been recommended as a suitable treatment for chronic fatigue syndrome (CFS). However, recently it has been suggested that the efficacy of CBT is limited, and there is little evidence that it changes objective outcomes. **Objectives:** The aim of the present analyses were to determine whether group CBT changed the mood and cognitive performance of CFS patients. CBT was compared to two conditions from the same study, namely education and support and standard medical care. Further analyses compared these conditions with a longitudinal study of untreated CFS patients, healthy controls and those having Multi-Convergent Therapy (MCT). **Methods:** CFS patients were referred to a pain management clinic and randomly assigned to CBT (N=53), education and support (N=49) or standard medical care (N=49). Mood and cognitive performance were measured pre-treatment and again at six and twelve months post-treatment. Comparisons were also made with a sample of untreated CFS patients (N = 195) and those who had participated in a study of MCT (N=35). **Results:** At baseline, the CFS patients showed the usual differences from healthy controls, namely a more negative mood, slower reaction times, and impaired recall and sustained attention. Analyses of the post-treatment data revealed little evidence of CBT leading to significant changes. In contrast, MCT was associated with significant improvements in mood and performance. **Conclusions:** Group CBT leads to a significant reduction in subjective symptoms but does not improve cognitive performance, whereas individual MCT does improve mood and performance.

KEYWORDS: Cognitive Behaviour Therapy (CBT); Chronic Fatigue Syndrome (CFS); Multi-Convergent Therapy (MCT); Mood; Cognitive performance.

INTRODUCTION

Chronic Fatigue Syndrome (CFS) describes a condition characterised by persistent, disabling fatigue. There is a constellation of concurrent symptoms but no conclusive evidence of physical or psychological disorders to explain the problem. Epidemiological studies have been hampered by the absence of specific diagnostic tests and inconsistent case definitions. Nevertheless, conservative estimates of prevalence.[1] describe a range of 0.5 to 2.6% in the primary care population.

CFS is an important healthcare issue and represents a considerable public health burden. The Centre for Disease Control (CDC 1989 - 1993), in a surveillance study [2], found that the mean illness duration is 7.5 years. This figure has not been confirmed by other epidemiological studies, which have shown wide variation in duration. However, there is agreement that the problem is long-term. The prognosis of CFS has been studied in numerous small case series.[3] Five studies with adults meeting strict CFS criteria found that less than 10% of subjects returned to premorbid levels of functioning, with the majority remaining significantly impaired.[3] One study[4] followed up 298 patients over a period of eighteen months and found that only 3% reported complete recovery, with 17% reporting some improvement. The principal predictor of improvement was found to be the subjective sense of control over symptoms.

Most CFS sufferers attend their General Practitioners for help. They may be referred to a variety of specialist secondary clinics for further investigation. However, management of the problem often remains in the primary healthcare team. Resource use may include GP attendance, medication, referral to specialist clinics (for example, Endocrinology, General Medicine, Urology, Psychiatry), attendance of alternative practitioners, and additional domestic and social support. Often patients are

dissatisfied with the care they receive and are unable to adapt to the presence of a chronic condition. Secondary disabilities may then develop, psychological distress, avoidance of activity, and increasing dependence on social services resources. The National Task Force (NTF 1994)[5] suggests that a major component of care for people with CFS is unravelling the secondary problems that subsequently develop. CFS is common and has a devastating impact on the lives of sufferers.[6]

Over 300 patients fitting the CDC criteria for CFS have been evaluated at a specialised outpatient clinic at the University Hospital of Wales in Cardiff using subjective and objective measures and psychometric testing [7-18]. An identical evaluation was completed by 201 of these patients at a 6-month follow-up. These patients received no formal treatment for their illness apart from antidepressant therapy where appropriate. And one hundred and one of this cohort were re-evaluated three years after their initial clinic visit. This, along with the control data (n=126) collected previously, provides a comparison group for treatment trials. The information collected in the above longitudinal study has been collated, derived scores for the questionnaire data calculated, the psychometric measures derived, resulting databases merged and primary analysis completed. The main findings can be summarised as follows:

- A global measure of the current state of CFS (ranging from worse ever to recovered) has been shown to be associated with scores on a symptom checklist, feelings of fatigue following exercise, feeling rested from sleep, ratings of fatigue, mental health, somatic symptoms, and cognitive difficulty. The mood and performance scores, and changes in these, are good indicators of changes in the severity of the illness.
- Using this measure of the current state of CFS, 2% of the sample recovered at six months, and 6% at three years. The best predictor of recovery is their state at the initial visit (i.e. those with relatively mild CFS and/or a shorter illness duration are the ones most likely to recover).

Cognitive Behaviour Therapy (CBT) is an intervention based on the management of the distressing and disabling problems (physical, psychological, or social) associated with chronic conditions. Its efficacy in rehabilitation has been demonstrated in other comparable disorders such as chronic pain. The expertise to deliver this treatment, therefore, already exists in the UK Pain Management Service. The treatment protocol incorporates both attempted modification of thoughts and beliefs about symptoms and illness and the modification of the behavioural responses to symptoms and illness, such as rest, sleep and activity. The role of self-management and lifestyle change is a fundamental aspect of this approach.

An early systematic review[6] of CBT for CFS found that only three trials had the methodological rigour required. All three demonstrated that CBT significantly benefited functional ability in adult outpatients with CFS when compared to standard medical care. There was no satisfactory evidence to evaluate the efficacy of CBT in a primary care population or through group delivery. They recommend further trials incorporating these criteria: -

- Treatment concealed prior to allocation.
- Outcomes of drop-out are described and included in the analysis (accounts for missing data).
- Valid outcome measures, with the assessors blind to treatment, adequate follow up period.
- Care programmes other than the interventions should be identical.
- There should be clearly defined inclusion and exclusion criteria.

CBT and graded exercise therapy (GET) are recommended evidence-based treatments for CFS, with research (the PACE Trial) showing they reduce fatigue and functional impairment [19]. However, others argue that these conclusions are problematic [20]. Some of the criticisms reflect changes from the original pre-planned protocol. For example, the overall improvement attributed to CBT and GET was no longer significant after correcting for the number of analyses. Rates of recovery were also low and did not differ between groups. Analyses of secondary outcomes showed that effects were restricted to subjective reports, and these did not last for more than two years. This is confirmed in studies of CBT and GET that have looked at sleep outcomes.[21]

CBT offers the positive management of a medically unexplained illness whilst at the same time providing treatment for the associated disability and suffering. Its efficacy is demonstrable in other conditions, notably pain management, where the expertise already exists. The efficacy of group CBT in a primary healthcare population suffering from CFS has been documented in a study[22] with certain outcomes. These outcomes were the SF-36 mental health score, the Chalder fatigue scale and a walking speed score. The group CBT was found to be as effective as individual CBT for these domains. However, other outcomes such as quality of life were not significantly improved by CBT. The study also found that education and support had some benefits.

Objective measures of cognitive performance and subjective ratings of mood were also taken during the trial, and the first aim of the present analysis was to examine whether therapy led to an improvement in these outcomes. Previous studies have shown that, compared to healthy controls, CFS patients usually report a more negative mood and have slower reaction times, impaired recall, and sustained attention[15]. These measures can be used as an indicator of the efficacy of treatment. This has been done in a study of the efficacy of Multi Convergent Therapy.[11,14] In this approach, the patient receives a combination of cognitive behaviour therapy, graded exercise, and other therapies in a personalised

programme, which very much depends upon the level and type of disability shown. A second aim of the present analysis was to compare the effects of CBT and MCT on groups of CFS patients with no formal treatment.

CBT STUDY

Methods and Materials

The present study was carried out with the approval of the local regional ethical committee and the informed consent of the participants.

Patient Recruitment

Patients were recruited from two sources: primary care and a secondary outpatient clinic. The secondary outpatient clinic provided only an assessment and diagnostic role.

Inclusion Criteria

Participants were initially screened by the primary healthcare team or the medical consultant to meet the diagnostic criteria of CFS from the Centre for Disease Control (CDC).[23] This has international consensus and is defined as:

- Fatigue, with definite onset, was the principal symptom.
- Four or more of the following symptoms concurrently present for six months or longer: impaired memory and concentration, sore throat, muscle pain, multi-joint pain, new headaches, unrefreshing sleep, post-exertion malaise, tender cervical or auxiliary lymph nodes.
- Fatigue is medically unexplained, i.e., by abnormalities on examination and investigation, by diagnosed physical disorder or by a major psychiatric disorder (psychosis, bipolar affective disorder, severe depressive illness).
- Fatigue is of sufficient severity to disable or distress the patient.

Exclusion Criteria

Exclusion criteria included

- Ongoing physical investigations
- Concurrent new treatment planned
- Inability to attend all treatment sessions

If participants met the criteria, the research trial was explained both verbally, and in writing, consent was sought from those willing to take part, and their details were subsequently randomised for allocation. The clinicians undertaking the screening assessments were not involved in the research assessments.

Randomisation

Patients in the trial were randomly allocated to one of three groups

- Standard medical care
- Support and education groups
- Cognitive behaviour therapy (CBT): group format

Details of the therapy are given in the initial report.[22]

Mood and Performance Tasks

Mood and performance data were collected using a standard desktop computer connected to a simple 3-button response box. Reaction times were measured to the nearest millisecond.

Mood Scales

Subjective mood was assessed using 18 computerised visual analogue mood scales. Each of the 18 bipolar scales was composed of a pair of adjectives, for instance, drowsy - alert or happy-sad. Participants were required to move the cursor from a central position on the scale anywhere along with the horizontal rule towards the ends of the scale until the cursor rested at a position that was representative of their mood state at that exact time. Three scores were derived from the 18 scales: alertness, hedonic tone and anxiety.

Free Recall

This task assessed episodic memory. The volunteers were shown a list of 20 words presented at a rate of one every two seconds. At the end of the list, the volunteer had two minutes to write down (in any order) as many of the words as possible on the sheet provided. The variable used in the current analysis was the number of correct words recalled.

Variable Fore-Period Simple Reaction Time Task (three minutes duration)

In this task, a box was displayed in the centre of the screen, and at varying intervals (from 1-8 seconds), a target square appeared inside the box. As soon as the participant detected the square, they were required to press the response key using the forefinger of their dominant hand only. The overall mean reaction time was the outcome analysed here.

Repeated Digits Vigilance Task (three minutes duration)

This visual cognitive vigilance task measured the ability to detect targets at irregular intervals. Participants were shown successive presentations of three-digit numbers in the centre of the screen (e.g. 473) at the rate of 100 per minute. Each three-digit number usually differed from the one immediately preceding it, with one out of the three digits being replaced with a different digit (e.g. 463, 563, 562). Occasionally (8 times a minute), the same three-digit number was presented on successive trials. It was these repetitions that the participant needed to detect and respond as quickly as possible by pressing a key on the keyboard using the forefinger of their dominant hand. The number of targets detected and the mean reaction time to these targets were the outcomes analysed.

Assessment Timetable

Mood and performance were measured at three-time points

- Assessment 1: Initial assessment at the time of inclusion

- Assessment 2: Six months later (i.e. post-therapy)
- Assessment 3: Twelve months (i.e. six months post-therapy)

Patient Demographics and Symptoms

Five people dropped out of the trial: Four from group 1 and one from group 2.

The demographics and symptoms for the three groups are shown in Table 1.

Table 1: Demographics and symptoms of the three intervention groups at baseline.

	CBT (n=53)	Education/Support (n=49)	Standard Medical Care (n=49)
Gender: %			
Male	43.4	27.1	29.4
Female	56.6	72.9	70.6
Mean age (s.e.m.)	44.0 (1.64)	40.7 (1.75)	45.3 (1.68)
Pain-related Symptoms: %			
Head and Neck	75.0	75.0	73.9
Shoulders	56.0	52.2	53.3
Chest	34.7	22.2	24.4
Upper Limbs	78.0	72.9	68.1
Abdominal	36.7	41.3	23.4
Back	59.2	68.1	39.6
Lower Limbs	88.2	89.8	84.3
Other Related Symptoms: %			
Numbness	47.2	57.1	56.9
Sensory Disturbance	73.1	75.5	76.5
Weakness	88.7	87.8	88.2
Dizziness*	69.8	91.8	80.4
Poor Concentration	94.3	98.0	96.1
Memory Loss	84.9	89.8	92.2
Breathlessness	47.2	59.2	52.9
Palpitations	66.0	59.2	62.7
Nausea	47.2	67.3	64.7
Insomnia	73.6	87.8	81.6
Other	88.0	91.5	89.8
Medication: %			
Currently taken (Taken in the past)	20.4(22.4)	23.9 (19.6)	22.0 (22.0)
SSRIs	29.8 (4.3)	19.6 (21.7)	9.5 (26.2)
Tricyclics*	6.5 (2.2)	2.2 (6.5)	7.3 (9.8)
Hypnotics	53.2 (0)	53.2 (8.5)	45.5 (9.1)
Analgesics	23.4 (4.3)	25.5 (6.4)	26.2 (11.9)
Anti-inflammatories	0 (4.4)	4.3 (2.1)	2.4 (4.9)
Benzodiazepines	37.0 (2.2)	23.4 (8.5)	20.9 (0)
Other			
Diagnosed by GP %	66.0	54.8	69.6
What were you advised to do to improve your condition: %			
Rest*	34.0	53.5	26.5
Pace yourself	47.9	51.1	34.7
Do what you can	34.8	32.6	15.2
Carry on as normal	13.6	11.6	6.5
Push yourself	6.8	2.4	2.2
Eat healthily	22.2	25.6	17.0
Other	41.7	41.3	43.8
Occupation prior to illness: %			
Full or part-time	93.8	85.7	88.0
Retired	0	0	2.0
House person	0	0	2.0
Other	6.3	14.3	8.0

RESULTS

Baseline Data

Initial analyses compared the overall current sample with a group of CFS patients from the Cardiff longitudinal study and healthy controls. The results are shown in Table 2.

The CFS patients reported a more negative mood, and this was observed for both the current study and the Cardiff one. The CFS patients recalled fewer words, detected fewer targets in the vigilance task, and had slower response times than the controls. Small numerical differences between the current sample and the Cardiff cohorts can be explained by normal fluctuations in a heterogeneous group. Also, the criteria for patient selection may have led to slight differences. These data are also not adjusted for age or education, which again may have led to slight differences between the current CFS group and the Cardiff study. However, the general conclusion is that the current group of CFS patients showed the predicted mood and performance differences from the healthy controls.

Table 2: Comparison of the pre-treatment mood and performance scores from the current study and Cardiff longitudinal study.

	Current CFS	Cardiff CFS	Cardiff Healthy Controls
Mood (higher scores = more positive mood):			
Alertness	169.7(4.2)	189.1(2.0)	290.6(3.7)
Hedonic Tone	168.0(3.1)	122.9(1.6)	234.2(2.7)
Anxiety	74.3(1.7)	73.9(1.1)	105.6(2.0)
Free Recall: Number of Words Recalled	5.2(0.13)	6.1(0.12)	7.5(0.18)
Simple Reaction Time (SRT): Mean Reaction Time	435.5(18.0)	481.1(13.6)	284.1(18.3)
Repeated Digits Vigilance Task (RP3):			
Mean Reaction Time	627.2(9.7)	614.3(7.0)	549.3(10.1)
Number of Correct Responses (Hits)	10.3(0.38)	11.2(0.25)	13.8(0.37)

Effects of treatment

Effects of treatment were assessed by using analyses of covariance, with the pre-treatment measure as the covariate and the post-treatment score as the dependent variable. Separate analyses were run for the six and twelve-month follow up periods.

There was only one significant effect. The CBT group reported higher alertness ratings than the other two groups at a six-month follow-up. Table 3 shows the results from the analyses of covariance for the mood and performance data for assessment 2 (six-month follow-up from baseline). Table 4 shows the results from assessment 3 (twelve-month follow-up).

Table 3: Mood and performance scores (adjusted means) at six months follow up.

	CBT	Education/ Support	General Medical Care	F values
Mood:				
Alertness	209.70 (7.82)	188.50(7.63)	181.80(7.45)	F(2,122)=3.58, p<0.03
Hedonic Tone	183.29 (5.28)	170.91(5.13)	168.41(5.02)	F(2,122)=2.34, p=0.10
Anxiety	81.75(3.29)	82.95(3.23)	82.96(3.14)	F(2,122)=0.05 p=0.95
Free Recall: No. words recalled	5.97(0.27)	5.43(0.27)	5.42(0.27)	F(2,126)=1.35, p=0.26
SRT: Mean RT (msec)	460.83(42.81)	401.13(42.15)	414.48(40.88)	F(2,121)=0.54, p=0.58
RP3:				
Mean RT (msec)	608.56(16.29)	616.86(15.73)	633.17(15.52)	F(2,120)=0.63, p=0.54
No. Hits	11.84(0.58)	11.67(0.57)	11.46(0.56)	F(2,122)=0.11, p=0.90

Table 4: Mood and performance scores (adjusted means) at 12 months follow up.

	CBT	Education/ Support	General Medical Care	F values
Mood Alertness Hedonic Tone Anxiety	 190.97(8.67) 183.10(5.84) 79.12(3.17)	 184.41(7.72) 172.06(5.15) 79.33(2.82)	 184.96(7.81) 172.30(5.25) 81.73(2.86)	 F(2,115)=0.19, p=0.83 F(2,115)=1.24, p=0.29 F(2,115)=0.25 p=0.78
Free Recall No. words recalled	5.79 (0.39)	5.60 (0.36)	5.94 (0.36)	F(2,121)=0.21, p=0.81
SRT Mean RT (msec)	379.19 (19.01)	393.56 (16.92)	412.02 (17.14)	F(2,115)=0.84, p=0.43
RP3: Mean RT (msec) No. Hits	607.82 (16.89) 12.35 (0.68)	618.37 (15.00) 11.83 (0.60)	620.71 (15.56) 10.32 (0.62)	F(2,113)=0.17, p=0.84 F(2,114)=2.75, p=0.07

Comparisons Between The Cardiff Mct Trial, Cardiff Longitudinal Study And The Cbt Trial

The sections below show the six-month follow-up data for each group of patients/controls (six months post-therapy for the MCT trial and six months post-therapy for the CBT). Analysis of covariance with baseline data as a covariate was used. The individual groups, with sample sizes, are described below.

Cardiff Studies

- MCT group (n=12)
- Relaxation group (n=14)
- CFS no treatment controls (n=9)
- CFS longitudinal study (n=195)

Current Trial

- CBT (n=42)
- Education and support (n=45)
- Standard healthcare (n=44)

Mood

Alertness

The Cardiff MCT group reported significantly greater alertness (mean = 260.0) than the Cardiff no treatment CFS controls (mean =176.2, p<0.001), Cardiff longitudinal study patients (mean =189.2, p<0.000), current study CBT group (mean =195.4, p<0.002), current study education and support (mean =188.7, p<0.000), and current study standard medical care group (mean =189.7, p<0.000). They also show marginally greater alertness than the Cardiff relaxation group (mean =207.4, p=0.059).

Hedonic tone

The Cardiff MCT group reported significantly greater hedonic tone (mean = 199.8) than the Cardiff no treatment CFS controls (mean =160.8, p<0.028), current study education and support (mean =158.5, p<0.001), current study standard medical care (mean =158.8, p<0.002) and the Cardiff longitudinal study group (mean=167.0, p<0.016). They also reported marginally greater hedonic tone than the CBT group (mean =169.4, p=0.052).

Anxiety (low scores = greater anxiety)

The Cardiff Relaxation Group reported significantly lower anxiety levels (mean = 89.9) than the education and support group (mean =79.9, p<0.048) and Cardiff Longitudinal study group (mean =75.9, p<0.002). They also reported marginally lower anxiety scores than the CBT group (mean =79.7, p=0.051).

Free recall task

The Cardiff MCT patients recalled significantly more words (mean = 8.0) than the CBT patients (mean=6.2, p<0.009), education and support group (mean =6.0, p<0.002), standard medical care group (mean =6.4, p<0.017) and marginally more words than the longitudinal study group (mean=6.8, p=0.051).

Simple reaction time task

There were no significant differences in the mean reaction times of the groups, although the numerical trend was for the Cardiff MCT group to have faster reaction times than the other groups.

Repeated digits vigilance task

The Cardiff MCT group recorded significantly more hits in 3 minutes (mean = 15.2) than the Cardiff longitudinal study group (mean =11.7, p<0.002), education and support group (mean =12.3, p<0.019) and standard medical care group (mean =10.8, p<0.000).

DISCUSSION

The present article presents analyses of the effects of group CBT on the mood and cognitive performance of CFS patients. The CBT was compared with education and support and standard medical care. An earlier report of the study[22] found that group CBT led to significantly higher mental health scores, less fatigue and faster walking than the standard medical care group. In contrast, the acute mood and cognitive performance scores showed no significant differences between the treatment groups. These selective effects of CBT on outcomes associated with CFS have been reported before.[20,21]

The pre-therapy mood and performance scores were compared with data from the Cardiff CFS programme, and the present CFS group showed the established differences from healthy controls. This confirms the sensitivity of these outcomes. Another comparison with MCT, which is a personalised form of therapy that can include CBT, demonstrated that MCT reduced cognitive impairments, whereas group CBT had no significant effect. This confirms that therapy can modify the behavioural abnormalities associated with CFS but suggests that the therapy must be tailored to the state of the individual patient.

It is potentially possible to combine group CBT with other individual therapies, and this could lead to a quicker throughput of patients with reduced waiting times. Group therapies are also more cost-effective but probably need to be combined with other therapies. Some of these may be group therapies, and there is some evidence that counselling and residential rehabilitation may benefit some individuals.[13] Other research has suggested that antidepressant medication may be useful for some individuals at certain stages of the illness.[12]

Overall, it would appear that multi-component therapy is required with the specific combinations reflecting the needs of the individual CFS patient. In addition, multiple outcomes need to be addressed to determine which of them may be altered by the different components of a therapy package.

CONCLUSIONS

CBT has been recommended as a suitable treatment for chronic fatigue syndrome. However, the efficacy of CBT may be limited to subjective outcomes, and there is little evidence that it changes objective outcomes. The present analyses examined whether group CBT changed the mood and cognitive performance of CFS patients. CBT was compared to education and support and standard medical care. Further analyses compared the present treatment groups with a longitudinal study of untreated CFS patients, healthy controls and those having Multi-Convergent Therapy (MCT). At baseline, the CFS patients showed the usual differences from healthy controls: a more negative mood, slower reaction times, and impaired sustained attention and recall. Analyses of the post-treatment data revealed little evidence of CBT leading to significant changes. In contrast, comparisons with MCT showed that MCT was associated with significant improvements in mood and performance. Overall, earlier analyses showed that group CBT leads to a significant reduction in subjective symptoms. The present analyses of this trial showed that group CBT does not improve the cognitive performance of CFS patients, whereas individual MCT does improve the mood and performance of those with CFS.

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