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Brief Cognitive Behavioural Therapy for Depression Associated with Parkinson's Disease: a Single Case Series

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Abstract. The feasibility of a brief home based cognitive behavioural intervention for depression associated with Parkinson's Disease (PD) was evaluated. Five depressed patients with PD participated. Their ages ranged from 54 to 82 and they all attended a movement disorder clinic. Outcome was assessed using mood and quality of life inventories (Beck Depression Inventory; Geriatric Depression Scale; Parkinson's Disease Quality of Life Questionnaire). Four individuals demonstrated a clinically reliable reduction of symptoms according to the GDS scores, with greater improvement reported for the two individuals with more severe pre-therapy levels of depression. The BDI findings suggested most of the improvement related to the cognitive dimensions of guilt, pessimism and failure. Overall, the change in mood was not accompanied by an enhancement of perceived quality of life, and little variation in the frequency of activities was reported over the course of therapy. Possible explanations for the findings are considered along with implications for theory and clinical practice.

Keywords: Cognitive therapy, depression, Parkinson's disease.

Introduction

Few therapeutic approaches have received more research attention in recent decades than cognitive behavioural therapy (CBT). The sphere of health psychology has seen CBT being tried with an ever-increasing range of medical problems including chronic pain, cancer and neurologically based disorders such as multiple sclerosis and dementia (Morley, Eccleston and Williams, 1999; Antoni, Lehman, Kibourn, Boyers and Culver. 2001; Mohr, Boudewynn, Goodkin, Bostrom and Epstien, 2001; Scholey and Woods, 2003). Medical specialists are beginning to consider the role of CBT for depression associated with Parkinson's disease (Meara and Koller, 2000; Playfer and Hindle, 2001), but so far there have been few published studies evaluating its effectiveness.

Parkinson's disease (PD) is a chronic age related neurodegenerative condition, characterized by motor disability, tremor and rigidity. It has been estimated that 1 in 100 of the over 60 population will develop the disorder (Cummings and Masterman, 1999). Depression is a common problem in patients with Parkinson's disease (Aarsland et al., 1999). Estimates of the frequency of PD depression have varied in accord with the assessment methods used, but two

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meta analyses suggest a rate of 40% (Cummings 1992; Miyawaki, Meah, Kormos and Tarsy, 1996).

The high prevalence of depression in people with PD has been attributed to a wide range of potential sources. Authors have speculated that PD depression may be organically determined, a psychological reaction to consequences of disease or a combination of both (Mayberg and Solomon, 1995; Schrag, Jahanshiahi and Quinn, 2001; Burn, 2002). Findings that support the biological perspective include associations between depression and dopamine levels (Racette et al., 2002), subtype of Parkinson's disease (Jankovic, McDermott and Carter, 1990; Starkstein et al., 1998), serotonin levels (Mayeux, Stern, Sano, Williams and Cote, 1988), and degree of cognitive impairment and information processing (Cubo, Bernard, Leurgans and Raman, 2000; Serra-Mestres and Ring, 1999). For the reactive hypothesis, depression has been linked to changes in quality of life (Karlsen, Larsen, Tandberg and Mealand, 1999), falling (Ashburn, Stack, Pickering and Ward, 2001) uncertainty of prognosis and increased disability (Backer, 2000; Brown, MacCarthy, Gothan, Der and Marsden, 1988), levels of functional activity (Liu et al., 1997), the inability to control motor freezing (Matson, 2002) and shame (Nijhof, 1995).

The complexity of variables associated with PD depression has provided a treatment challenge for medical personnel attempting to help. The literature suggests that between 50–93% of people with depression in PD are not treated (Lapane, Fernadez and Friedman, 1999; Meara, Mitchelmore and Hobson, 1999). Even though a minority of patients are prescribed antidepressant medication, the evidence for its effectiveness remains equivocal (NINDS, 2001). Thus, there would appear to be a clear rationale for trying psychological approaches with this population.

A study by Dreisig, Beckmann, Wermuth, Skovlund and Bech (1999) has highlighted the potential for using CBT with PD. Although therapy did not specifically target depression, individually tailored interventions for nine young PD patients indicated improvement on some psychological indices. Brief cost effective psychological interventions have also demonstrated effectiveness with people who have similar problems to people with PD (Leung and Orrell, 1993; Rokke, Tomhave and Jocie, 2000; Mohr et al., 2000). Therefore it ought to be possible to look at patterns of unhelpful thinking regardless of whether the content of thoughts are related to organic or psychosocial changes, though it would be worth considering features of the disease that might influence the success of therapy.

Parkinson's disease is primarily caused by basal ganglia dysfunction, and the slowness of processing characteristic of damage to this area is likely to impact on the individual's capacity to process information during therapy. Likewise, a proportion of PD patients experience motor fluctuations that have been labeled the "on-off" phenomena (Menza, Sage, Marshall, Cody and Duvoisin, 1990). As switching off can be accompanied by communication and concentration difficulties, it would seem reasonable to assume that the patient would find it harder to engage in collaborative explorations during these periods (Kaiser, Bodey and Bodey, 2000). Cognitive deficits also feature in Parkinson's disease (Dubois and Pillon, 1997). Although suggestions for modifying cognitive therapy to address these problems have been proposed, there is not enough information to evaluate their effectiveness (Crews and Harrison, 1995).

In this study, a structured self-help booklet was used as an aid to brief CBT intervention for depression associated with Parkinson's disease. The association between quality of life and depression (Karlsen et al., 1999) led us to consider whether any change in depressive symptoms would be accompanied by change in patients' perceived quality of life.

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Method

Design

The effectiveness of a brief home based CBT intervention for depression in Parkinson's disease was evaluated using an A-B design with follow-up. Patients completed pre, post and follow-up outcome measures. They also completed pre-treatment baseline measures of activity frequency and mood level for 5 or 10 days prior to intervention. Following baseline, CBT was delivered guided by the contents of a self-help booklet entitled, *Coping with depression when you have Parkinson's disease* (Beck, 2000). Resource limitations determined a brief approach, with one 60-minute session per week allocated for each section of the booklet over 7 weeks. One month following completion patients were asked to repeat baseline measures.

Participants

Three female and two male patients meeting the clinical diagnosis for PD according to the UK Brain Bank criteria for probable Parkinson's disease were referred for brief therapy directly from a Movement Disorder Clinic based in a North Wales hospital over a 6-month time period. The decision to refer was based on a diagnosis of possible depression in PD that had been made using a criterion of 5 or more on the GDS-15 Geriatric Depression Scale. None of the patients had been diagnosed with dementia, and all were taking anti-parkinsonian medication, which remained unchanged during the course of the intervention. Webster scale scores (1968), measuring the severity of PD indicated that four patients were moderately disabled and one patient (case 3) was in the advanced stage of the disease. Scores on the Hoehn and Yahr scale (1967), which categorizes patients according to motor ability on a 5-point scale, ranged from 2–4. Two of the five patients were taking antidepressant medication.

Measures

The Geriatric Depression Scale (GDS-15, Sheikh and Yesavage, 1986). The GDS-15 is a short inventory requiring a simple "yes/no" response to 15 items. The scale was designed to measure symptoms of depression observed in the older adult population and has recently been used as a screening instrument in a Parkinson's disease prevalence study (Meara et al., 1999). Research comparing the GDS with other depression scales has established the inventory as a reliable and sensitive measure of depression in older adults with medical conditions (Pomeroy, Clark and Philp, 2001).

The Beck Depression Inventory –II (BDI-II; Beck and Steer, 1993). The BDI is a key research tool used to measure outcomes following CBT with older adults, and depression associated with medical problems (Laidlaw, 2001; Mohr et al., 2001). It has been established as a reliable and valid measure of depression in PD (Levin, Llabre and Weiner, 1988), and a cut-off criteria for diagnosing depression in the PD population has been proposed (Leentjens, Verhey, Luijckx and Troost, 2000).

Parkinson's Disease Quality of Life Questionnaire (PDQL; De Boer, Wijker, Speelman and De Haies, 1996). The PDQL is a disease-specific instrument comprising 37 items, scored 1 to 5, looking at PD symptoms, systemic symptoms, emotional and social functioning. The total score gives an indication of the patient's overall perceived quality of life. Hobson, Holden and

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Table 1. Treatment protocol for CBT following format outlined in Beck (2000)

Session 1:	Education and information on the structure of future sessions.
	Booklet heading – *How do I know if I am depressed*
Session 2–5:	Behavioural work
	Booklet heading – *How should I change my behaviour*
	Cognitive work
	Booklet heading – *How do I change my depressed thinking*
Session 6:	Problems solving and barriers to compliance with medical advice
	Booklet heading – *How do I solve my problems*
	– *How can I help myself follow my doctor's advice*
Session 7:	Review of previous sessions

Meara (1999) found the anglicized version of the PDQL was a useful disease-specific measure with good convergent and discriminative validity.

During baseline, therapy and follow-up, mood level was monitored using a visual analogue scale adapted from Dick, Gallagher-Thompson, Coon, Powers and Thompson (1995) manualized treatment for older adults. Patients were asked to provide a rating of how low they were feeling on a range from 0 "very happy" to 10 "very low". Following a review of a typical day's activities, patients were also encouraged to provide a frequency count of the number of activities engaged in per day. Self-monitoring of mood and activity frequently feature together in depression research (Harmon, Nelson and Hayes, 1980), and commonly occur in CBT and PD studies (Rokke et al., 2000; Kemp, Corgiat and Gill, 1992; Leung and Orrell, 1993; Liu et al., 1997). The use of a simple frequency count of activities along with the visual analogue scale of Dick et al. (1995) have not featured together in published literature on PD but fulfilled the criteria for an unobtrusive repeated measures assessment (Barlow, Hayes and Nelson, 1984), and was believed to be less taxing for people with micrographia.

Procedure

Following referral, a home visit was arranged to explain the aims and structure of the intervention. Patients were given a copy of the self-help booklet to read and asked to complete baseline measures 5 or 10 days prior to treatment. The CBT protocol as guided by Beck (2000) is shown in Table 1. During the follow-up appointment any ongoing difficulties were addressed. Therapy was delivered by the first author who had applied advanced training on CBT to helping medical and mental health populations. Individual weekly supervision was provided by the second author.

Results

People with Parkinson's disease are a heterogeneous population, and this variation was demonstrated in the diversity of issues raised in therapy. Three patients (Cases 1, 2 and 4) did not admit to any of the cognitive identifiers of depression that were highlighted in the psychoeducation phase (e.g. worthlessness and guilt). The recommendation to introduce activities to lift mood was not always straightforward as individuals with mild depression were

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already attempting to maintain an active life, and those with more severe depression tended to have complex physical problems that hindered the application of behavioural work. A synopsis of the process of intervention per client is presented below. Some personal identifiers have been changed.

Case 1 was a 51-year-old married male who had been diagnosed with early onset Parkinson's disease 2 years previously and had been forced to give up employment as his symptoms advanced. Even though he was attempting to maintain an active life, he was afraid of falling. Switching off and freezing occurred in therapy, which led to shorter sessions on three occasions. The psychological component of his fear was evaluated during cognitive restructuring. The GDS score demonstrated a reduction in depressive symptoms, although BDI and self-ratings of mood suggested ongoing symptomatology, possibly maintained by concerns regarding the outcome of forthcoming surgery. During the follow-up appointment the therapist needed to go over apparently forgotten material previously covered in therapy.

Case 2 was a 72-year-old married female who had been diagnosed with late onset tremor dominant PD two years previously. She acknowledged minimizing her mood symptoms because it "was rooted in her generation" not to admit to feeling low. Her PD symptoms were mild and she was keeping up an active social life. Reductions in her mood coincided with the start of the internal tremor, when she began to ruminate on what her prognosis would be, and reflected on the progressive deterioration of a relative who died of a similar degenerative condition. Symptoms of depression as measured by the GDS and self-ratings of mood (see Figure 1) improved over the course of therapy. The follow-up appointment showed a return of some symptoms, which may have been attributable to a recent bereavement.

Case 3 was an 83-year-old married female who had received a diagnosis of PD 6 years previously. The pervasiveness of her health problems made it difficult to introduce pleasurable activities but it was possible to encourage her to plan letters to relatives. This lady was pessimistic about therapy because she believed she was too old and ill to try anything new, but she became more optimistic when the therapist shared how other people with PD were managing their thoughts. The outcome measures confirmed that an improvement in mood had occurred although she was not symptom free and her own self-reports demonstrated little variation (see Figure 1).

Case 4 was an 80-year-old married male who had received a diagnosis of PD 3 years previously. He had mild symptoms of tremor dominant PD, but had given up most activities. Low mood was linked to concerns about developing a particular health condition, which had been triggered by literature suggesting the condition was a complication in PD. It was difficult to motivate this client to introduce any pleasurable activities but by the final session he had started to visit a friend once a week. The irrational content of his thoughts was readily acknowledged. Although this patient was very appreciative of the therapy visits, there was little change in his mood levels, quality of life or activity over the course of the intervention.

Case 5 was an 82-year-old married female who had experienced depression following the suicide of a relative 30 years ago. Depression recurred following the PD diagnosis. The patient believed her symptoms of depression were closely tied to fluctuations in the PD symptoms. She was willing to comply with suggestions for behavioural activation but found it difficult to enact them when her PD symptoms were severe. During cognitive work she appreciated the opportunity to discuss thoughts related to becoming a burden to her family. Her mood improved substantially over the course of therapy, as did her perceived quality of life, and the number of pleasurable activities engaged in.

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Table 2. Demographic data and clinical findings for GDS, BDI-II, and PDQL

Patient (gender/age)	1 (M/51)	2 (F/72)	3 (F/83)	4 (M/80)	5 (F/82)
Medication for mood	No	No	Sinemet+	No	Mirtazapine
Hoehn and Yahr stage	3	2	4	2/3	3
Previous history of mental health problems	No	No	No	Yes	Yes
GDS					
Pre	7	5	12	5	13
Post	2	1	7	3	8
Follow-up	1	1	6	2	7
BDI-II					
Pre	16	7	20	12	34
Post	12	6	11	10	23
Follow-up	15	8	10	8	20
PQLQ (total)*					
Pre	118	158	95	132	86
Post	119	149	91	137	102
Follow-up	119	149	94	130	98
PQLQ (PD symptoms)					
Pre	40	60	40	46	37
post	42	60	38	48	45
Follow-up	42	60	37	46	43

* PQLQ higher score indicates a better perceived quality of life.
+ Sinemet is an antiparkinsonian drug which was used in this case to alleviate symptoms of low mood as well as motor impairment.

Scores on depression inventories and PDQL pre, post-treatment and follow-up for each participant are shown in Table 2. All pre-treatment scores on the GDS fell within the clinical range (recommended cut-off point 5) and three individuals had BDI-II scores above the cut-off point of 16 recommended to identify PD depression (Leentjens et al., 2000). An improvement in symptoms was shown by the lower scores in all mood measures following treatment, although the degree of reduction was marginal for people with less severe pre-therapy depression (Cases 1, 2, and 4). The changes in BDI-II scores following treatment were no longer evident one month later for Cases 1 and 2. Both of these individuals had experienced significant stressors (e.g. bereavement; preparation for surgery) in the week prior to the follow-up visit. Apart from Case 5, the data suggested that changes in mood did not appear to be linked to an improvement in the client's perceived quality of life.

In order to determine whether the levels of improvement observed were clinically meaningful, the Reliable Change Index (RCI, Jacobson and Truax, 1991) was calculated for the pre and post intervention difference for the GDS, BDI-II total scores, and BDI-II factors (see Table 3). The findings suggest a clinically reliable change had taken place for four patients according to the total GDS scores (test re-test reliability 0.85; Yesavage et al., 1983).

The BDI-II data (test-retest reliability 0.93; Beck, Steer and Brown, 1996), confirmed a reliable change for the two patients who had more severe pre-therapy depression. For these latter individuals, the scores for the BDI factors (Steer, Ball, Ranieri and Beck, 1999) indicated

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Table 3. Reliable change calculations (RCI) for pre and post GDS and BDI total/factor scores

	GDS			BDI total			BDI somatic/affective			BDI cognitive		
Patient	Pre	Post	RCI	Pre	Post	RCI	Pre	Post	RCI	Pre	Post	RCI
1	7	2	2.95*	16	12	0.91	10	9	0.22	6	3	1.10
2	5	1	2.36*	7	6	0.22	6	6	0	1	0	0.36
3	12	7	2.95*	20	11	2.05*	14	10	0.91	6	1	1.84
4	5	3	1.18	12	10	0.45	9	9	0	3	2	0.36
5	13	8	2.95*	34	23	2.50*	20	15	1.14	14	8	2.21*

* RCI values > 1.96 indicate a reliable change at the 5% significance level.

a trend for more change in the cognitive domain, although the results were only significant for case 5, assuming the conservative test-retest reliability score of 0.85. These patients reported less sadness, pessimism, feelings of failure and guilt at the end of therapy.

Figure 1 shows the self-reported recordings of mood level and frequency counts of activities for each individual. It is worth noting that trends for improvement can be difficult to interpret when factors such as feeling physically unwell have the potential to influence how people respond. Overall, there was little variation in the frequency of reported activities throughout the intervention.

In Case 1 there was no obvious decline in self-rated depression during the intervention phase. Rather, during the third session there was a noticeable worsening of mood, which corresponded to the identification of underlying assumptions. There was a trend towards improvement during the intervention phase for the second client, followed by a small deterioration during the follow-up period when the client was grieving the loss of a friend. The trends shown in Case 3 were particularly difficult to interpret given that the improvement in mood supported by the RCI calculations (e.g. less sadness, crying and pessimism) did not correspond with the patient's weekly reports that showed little change. It is possible that personality factors and ill health during sessions had influenced the style of responding for this client. Consistent with the questionnaire data, there was no obvious pattern of change for client 4, but for case 5, an improvement in mood was apparent and was maintained after therapy was completed.

Discussion

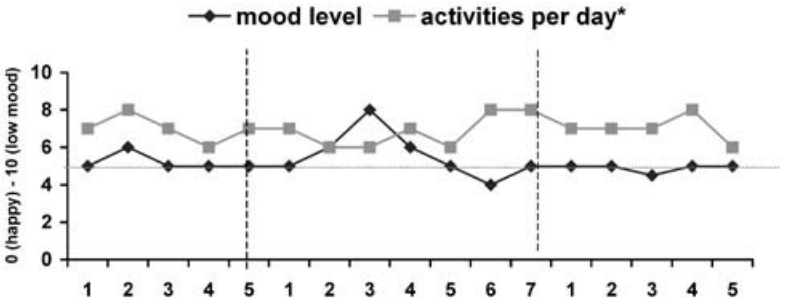
Overall, the results from this preliminary case series indicate that brief CBT may help to alleviate symptoms of depression in adults, particularly those with greater severity of depression in PD. The rate of improvement reported for the two cases with more severe depression, is consistent with outcomes from CBT group design research assessing adults with similar age and illness circumstances (Mohr et al., 2001; Leung and Orrell, 1993).

The finding that medically ill participants with less severe depressive symptoms did not benefit to the same degree and were not able to sustain the small gains made over time, has also been reported elsewhere (Price and Cooper, 2003; Kemp et al., 1992). A number of possibilities need to be taken in to account when interpreting this finding. It would be reasonable to claim that a radical shift in mood is less likely for people with mild depression. It is also possible that other factors influenced treatment responsivity including the occurrence of major stressors, comorbid illness or cognitive deficits. Cases 1 and 4 reported symptoms of anxiety, which is consistent with literature suggesting that 67% of people with PD depression

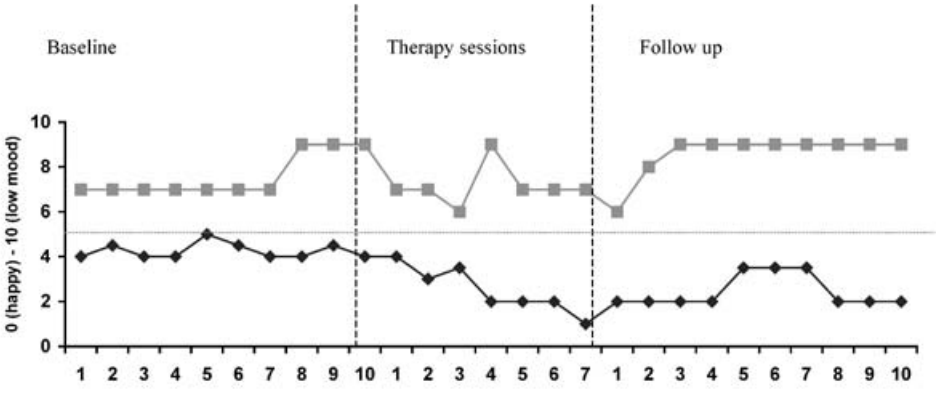
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have a diagnosis of anxiety (Menza, Robertson-Hoffman and Bonapace, 1993). Cognitive impairment as a potential moderator of treatment was also evident when the therapist needed to remind the first two clients concerning material previously covered.

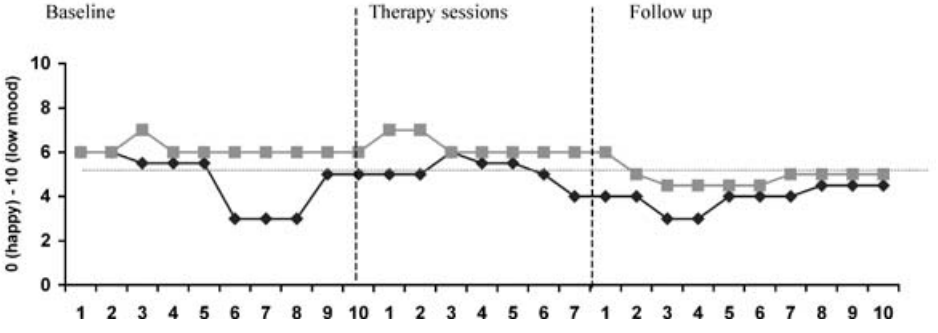
Case one



Case two



Case three



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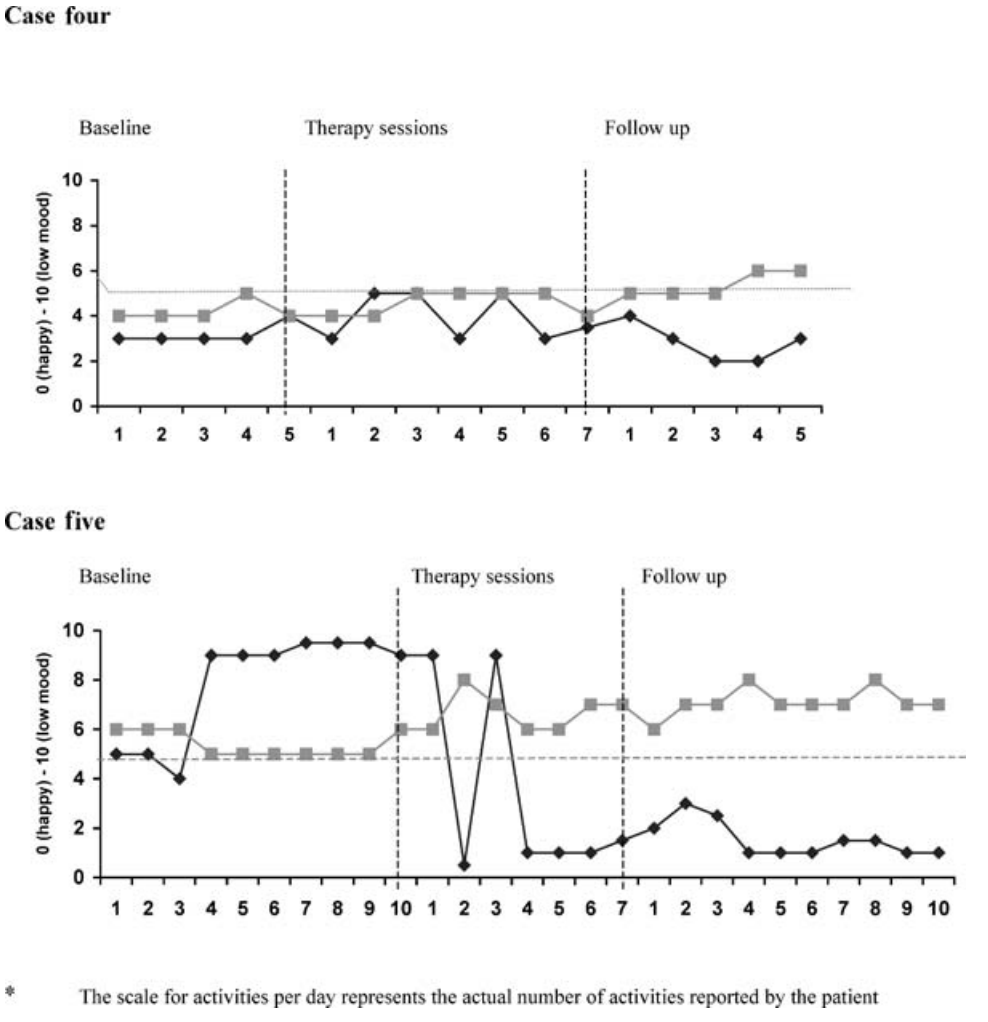


Figure 1. Self rating of mood and frequency of activities during baseline, treatment and follow-up for each patient

Since the validity of the outcome measures is a crucial consideration in any study, it is also worth drawing attention to the implications of the disparity between the BDI and GDS-15 in the initial diagnostic evaluations and clinical outcomes. The GDS-15 has been shown to have acceptable specificity comparable to other short depression scales for medical patients (Pomeroy et al., 2001). The use of the BDI has been questioned on the basis that somatic items might confound interpretation (Williams and Richardson, 1993). On the basis of this concern and on the findings of Leentjens et al. (2000), a high cut-off of 16 was adopted to limit the chances of false positives in PD. Unfortunately, as Leentjens noted, this level of specificity carries the risk of low sensitivity, which means that depression could be missed. Given that the GDS also contains somatic items, one might conclude that the designated cut off has the

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potential to overrate and the BDI to underrate the presence of depression in PD, which suggests we cannot be sure that the initial assessments of our milder cases were completely accurate. This classification dilemma is not new to PD depression research (Burn, 2002), and illustrates the need to find scales that effectively discriminate between depressive, cognitive and somatic symptoms of PD. This has been identified as a key research initiative by the National Institute of Neurological Disorders (NINDS, 2001).

Given the hypothesized link between quality of life and depression it was interesting to note that, apart from case five, there was no obvious connection between improvement in mood and changes in perceived quality of life (Karlsen et al., 1999). For most individuals, PD symptoms were either unremitting or worsening, which raises the possibility that physical frailty may prove to be more decisive for perceived quality of living in PD patients than poor mental health (De Ridder, Schruers and Bensing, 1998).

The negligible variation in activity frequency for four individuals was also unexpected. Efforts to increase the number of pleasurable activities were generally ineffective because disease factors often constrained what could be done (e.g. risk of falling in poor weather conditions, switching off). Recent and controversial findings have suggested that the behavioural component of CBT can lead to greater change in mood than the attempt to modify thinking (Jacobson and Gorter, 2000). The question raised by the present and similar findings (Kemp et al., 1992; Leung and Orrell, 1993) concerns what components of therapy facilitate improvement when the scope for increasing activity is restricted by poor health. Interestingly, the two cases who demonstrated the greatest improvement in depression were also the most severely incapacitated by PD symptoms. When their two BDI factors were analysed, the findings indicated that most of the improvement could be attributed to a reduction in cognitive symptoms. These findings suggest the cognitive aspects of therapy might be effective on their own, although further research would be needed to look at the nature of the interactions between changes in physical health and cognition.

Some studies (Gotham, Brown and Marsden, 1986; Huber, Freidenberg, Paulson, Shuttleworth and Christy, 1989) but not others (Erdal, 2001) have noted a difference in the type of cognitive symptoms endorsed on the BDI by people with PD depression. In this case series, three patients did not consider themselves worthless, guilty, or punished. The reluctance to acknowledge psychological symptoms has implications for the cognitive model of depression which assumes that depressed people usually attribute their depressogenic experience to a defect within themselves (Beck, 1967; Wright and Beck, 1983). Likewise, the concept of a cognitive triad (Beck, Rush, Shaw and Emery, 1979) that presumes that depressed people also hold distorted views of ongoing experience and the future does not appear to be a good fit with the PD depression experience, because many of the concerns raised may well have represented rational appraisals of ongoing circumstances. Nonetheless, as previous authors have proposed, it was possible to utilize cognitive techniques to work with adverse situations (Wright, Thase, Beck and Ludgate, 1993; Moorey, 1996).

The design of the present study has several limitations. First, we are unsure whether the patients seen were typical of people with PD depression, partly because they had chosen not to have contact with PD organizations. We are also aware that some of the problems known to be associated with PD depression, such as dementia, and depression following diagnosis of PD, were not represented among those that received the intervention (Cubo et al., 2000; Brown et al., 1988). The two baseline durations were relatively short because it was considered unethical to unduly delay treatment with vulnerable adults. In the absence of a control group,

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and with only one therapist to deliver the interventions, it is not known whether the outcomes were attributable to individual therapist factors, another non-specific research effect, or the CBT intervention. However, given the scarcity of treatment literature for PD depression we believe that the potential for improvement demonstrated constitutes adequate grounds for following-up with a more rigorous research study.

There have been few guidelines highlighting the type of changes to CBT delivery that might be required for people with PD depression. In retrospect, given that the cases presented here were complex, therapy of longer duration might have been more appropriate. Psychological issues were often closely tied to disease complications, which highlighted a need for a comprehensive understanding of the disorder, or to work in conjunction with other PD specialists to provide the best management for depression. The observation that some sessions needed to be terminated early highlighted the need for flexibility. Finally, it is easy to overlook the impact of cognitive deficits on therapy. Difficulties with constructing alternatives to negative thoughts and poor recall of previous sessions may be a consequence of the neurodegenerative process. Strategies such as encouraging the therapist to supply examples of tolerable thoughts, frequent summarizing and providing written material may improve treatment effectiveness.

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