THE IMPACT OF PSYCHOSIS ON TREATMENT RESPONSE TO COGNITIVE

BEHAVIORAL THERAPY FOR DEPRESSION IN PARKINSON'S DISEASE:

A CASE SERIES

A DISSERTATION

SUBMITTED TO THE FACULTY

OF

THE GRADUATE SCHOOL OF APPLIED AND PROFESSIONAL PSYCHOLOGY

OF

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY

BY

KIMBERLY NESSEL, PSYM, MA

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

DOCTOR OF PSYCHOLOGY

NEW BRUNSWICK, NJ   AUGUST 2018

APPROVED: _____
                 Roseanne D. Dobkin, PhD

                 _____
                 Robert W. Isenhower, PhD

DEAN: _____
                 Francine Conway, PhD

ABSTRACT

Depression and psychosis are common psychiatric features of Parkinson's disease that have a severe impact on quality of life, disease progression, and caregiver burden. There are currently several clinical trials investigating the efficacy of cognitive behavioral therapy (CBT) in treating depression in individuals diagnosed with Parkinson's disease (PD). Psychosis is frequently an exclusionary criterion, as it may affect treatment response. The present study aimed to examine the impact of psychosis on treatment response to CBT for depression. Three individuals diagnosed with PD experiencing symptoms of psychosis as well as depression received ten weekly sessions of telehealth cognitive behavioral therapy. Each participant completed evaluations at baseline, the midpoint of the treatment, the end of treatment, and at one month follow-up. A case series format was utilized to further understand differences in treatment response between the three participants and to inform treatment recommendations for this population. Change scores and observed treatment effects were compared to those in published studies providing CBT to individuals experiencing depression without co-occurring symptoms of psychosis. In this study, two out of three participants showed clinically significant improvement in symptoms of depression. However, clinical improvement was minimal and only occurred in relation to symptoms of depression, without generalizing to other areas such as anxiety or negative thinking. It appears that co-occurring symptoms of psychosis may affect treatment response to a CBT intervention for depression in PD. With appropriate tailoring and modification, telehealth CBT could be an effective intervention for depression individuals with Parkinson's disease experiencing symptoms of psychosis. Clinical recommendations and directions for future research are discussed. Results of this study should be considered carefully as the sample size was small.

ACKNOWLEDGEMENTS

I would like to thank Roseanne Dobkin for her kindness, patience, and generosity over the last several years. Her unwavering support has helped me to develop confidence in my abilities as well as challenge myself to grow. Her enthusiasm and dedication to her work and to the individuals she serves is inspiring. I have learned so much from working with her, about what makes an excellent clinician and also an excellent person. I would like to thank Rob Isenhower, who provided wisdom, encouragement, and support regarding my dissertation project and regarding life in general. I would also like to thank Michael Dennin, who assisted with study evaluations and data organization, even while moving cross-country.

I would like to thank my partner for his unwavering support, warmth and humor; my sister and my parents for their love and encouragement; and the family members and friends who have been by my side throughout this process. Special thanks to the friends I made while at Rutgers – I could not have done this without them. I have wonderful people in my life and I appreciate them more than I can say.

TABLE OF CONTENTS

LIST OF TABLES

Introduction

Rationale for study

Depression and psychosis are common psychiatric features of Parkinson's disease that have a severe impact on quality of life, disease progression, and caregiver burden. Cognitive behavioral therapy (CBT) has been shown to be an effective intervention for depression related to chronic medical illness, including Parkinson's disease (PD). Despite the high prevalence of psychotic features in a PD population, research has not explored the efficacy of CBT at addressing depression with co-occurring psychosis in PD. The experience of psychosis is often an exclusionary criterion for clinical trials offering psychotherapy to treat depression in PD. With no evidence base to guide care in the community, medication is often viewed as the only effective option to treat these individuals. This study will use quantitative and qualitative analysis to explore the effects of cognitive behavioral therapy for depression in PD for individuals with co-occurring symptoms of psychosis.

Psychiatric Features of Parkinson's disease

Parkinson's disease (PD) is the second most common neurodegenerative disease, after Alzheimer's. The European Parkinson's Disease Association estimates that there are approximately 6.3 million people currently living with Parkinson's disease worldwide (2016). Parkinson's disease is diagnosed based on four major motor symptoms, including rest tremor, rigidity, bradykinesia (slowed movement), and postural instability (Jankovic, 2008). These motor symptoms have historically been the focus of treatment for PD. However, Parkinson's disease is also marked by a variety of non-motor clinical issues, such as cognitive impairment, sensory symptoms, sleep disorders, and neuropsychiatric symptoms. Neuropsychiatric symptoms (NPS)

including depression, apathy, anxiety, impulse control disorders, and hallucinations, occur in up to 80% of PD patients. In recent years, research has shown that NPS have a significant impact on the course of disease progression and yet are under-recognized by clinicians, under-reported by patients, and under-treated (Aarsland & Kramberger, 2015; Ng et al., 2015).

Neuropsychiatric symptoms, particularly mood symptoms and psychotic symptoms, are associated with decreased quality of life and increased caregiver burden, affecting individual patients as well as their support systems (Alvarado-Bolanos et al., 2015; Martinez-Martin et al., 2015). Decreased quality of life in PD has been linked to increased disability, postural instability, and cognitive impairment (Schrag, Jahanshahi, & Quinn, 2000). Recent research has suggested that NPS are strongly associated with poor quality of life and that mood symptoms such as depression and apathy may in fact be a better predictor of decreased quality of life than the motor symptoms of the disorder (Prakash et al., 2015; Reuther et al., 2004).

Depression and Parkinson's disease

Clinically relevant symptoms of depression occur in approximately 20-50% of PD patients, likely due to a combination of psychological and neurobiological factors (Aarsland & Kramberger, 2015; Nuti et al., 2004; Reijnders et al., 2008). Persistent depression has been linked with an adverse impact on daily functioning, motor worsening, and cognitive decline (Ng, et al., 2015). Remitted depression has been associated with a return to levels of functioning comparable to those of individuals who had never reported depression (Pontone et al., 2016). This shows that effective treatment of depression in this population can have widespread benefits emotionally, physically, and socially.

In their most recent guidelines, the Movement Disorder Society (MDS) Task Force on Evidence-Based Medicine (EBM) cited a lack of research into the effectiveness of psychotherapy in treating psychiatric features of PD such as depression (Seppi, et al., 2011). Since that time, several studies have demonstrated the effectiveness of CBT in treating depression in chronic medical conditions, including PD (Calleo et al., 2015; Dobkin et al., 2011; Farabaugh et al., 2010). Berardelli et al. (2015) reviewed thirteen intervention studies and found that CBT can be effective in treating psychiatric disorders, primarily depression, in individuals diagnosed with PD. Fernie et al. (2015) systematically reviewed sixteen studies and found that CBT can be an effective treatment for depression comorbid with chronic neurological conditions. A recent conceptual framework for the use of CBT to address depression and anxiety in PD emphasizes the importance of understanding the role of Parkinson's disease in co-occurring mental health issues. Egan et al. (2015) cite specific strategies such as behavioral activation, thought diaries, and behavioral experiments as effective in targeting maintaining factors of depression such as maladaptive behavior (i.e. avoidance, rumination) and cognitive distortions (i.e. catastrophizing, unfair comparisons).

In the first randomized controlled trial of CBT for depression in PD, a group of 80 individuals with PD were randomized to receive CBT with clinical monitoring or clinical monitoring only. The group receiving CBT reported significant decreases in depression, anxiety, and motor disability, as well as improved coping skills and quality of life (Dobkin et al., 2011). In a pilot study providing personalized telehealth CBT to 34 participants, significant improvements in depression were observed. At one month follow-up, 69% of participants were characterized as treatment responders. Meaningful effects were also noted in anxiety, insomnia, quality of life, negative thinking, and caregiver burden (Dobkin et al., 2018).

Psychosis and Parkinson's disease

Parkinson's related psychosis (PDPsy) is also a common psychiatric symptom, affecting between 20 and 40% of PD patients (Lee & Weintraub, 2012; Morgante et al., 2013). Psychosis in PD frequently co-occurs with depression, anxiety, sleep impairment, and cognitive decline (Morgante et al., 2013). The development of psychosis in PD generally follows a course beginning with vivid dreams, nightmares, and misinterpretation of stimuli, progressing towards illusions and hallucinations with preserved insight, and eventually resulting in hallucinations without insight and delusional thinking (Levin et al., 2016). The diagnostic criteria for PD-related psychosis include at least one of the following: illusions, false sense of presence, hallucinations, and/or delusions. These symptoms must begin after the development of PD symptoms and must have a duration of at least one month. The symptoms must not be better accounted for by another diagnosis (i.e. dementia, delirium, schizophrenia). PD-related psychosis can also be specified as with/without dementia, with/without insight, and with/without treatment for PD (Fernandez et al., 2008).

Initial complaints often include particularly vivid nightmares and misinterpretation of stimuli (i.e. perceiving a person in the fold of curtain). Complex visual hallucinations, often recurring sightings of animals and people, are the most common reported. Also frequently reported are sensations of movement in the periphery and the sensation that others are present. Delusions are relatively rare and, when present, tend to be paranoid in nature while misidentification syndromes, including Capras syndrome, are more common in this population (Aarsland et al., 2015). Psychosis can present at any point in an individual's progression, however, hallucinations are more likely to occur in the later stages of PD, affecting 50% of

patients 15 years after diagnosis and occurring in 70% of patients 20 years after diagnosis (Levin et al., 2016).

Psychosis has been identified as a particularly challenging issue in a PD population, as it can severely diminish quality of life. It is associated with increased caregiver burden, is the primary reason for nursing home placement, and is associated with increased mortality (Goldman & Holden, 2014; Levin et al., 2016; Ravina, 2007). In a study of 130 PD patients receiving specialty treatment in the community, Weintraub et al. found a 10% prevalence of co-occurring depression and psychosis. Co-occurring depression and psychosis were associated with treatment with a dopamine agonist, a higher daily levodopa dose, and greater cognitive impairment (2006).

Research into the effect of CBT for psychosis has largely focused on a population diagnosed with schizophrenia, specifically in the context of building awareness of and challenging psychotic thoughts such as those related to delusions or paranoia. The effects of CBT on depression, anxiety and distress related to psychotic symptoms are unclear (Jauhaur et al., 2014). Treatment guidelines cite a combination of antipsychotic and antidepressants or electroconvulsive therapy as first line treatment for psychotic depression (Rothschild, 2013). However, medication management for psychosis in PD presents a treatment paradox. While dopamine agonists and other dopaminergic replacement therapies are effective in treating the motor symptoms of PD, they are associated with increased frequency and intensity of hallucinations and delusions. Traditional antipsychotic medications worsen motor function and may be associated with increased cognitive deficits (Aarsland & Kramberger, 2015). While many have called for investigation of treatment options outside the pharmacological, psychotherapy is often overlooked. A recent guideline for the treatment of psychosis in PD

recommends the re-establishment of circadian rhythms and a supportive familial environment, followed by medication review and adjustment (Levin et al., 2016). Cognitive behavioral therapy (CBT) is an appropriate intervention for sleep hygiene as well increasing social support; however, the only interventions proposed by Levin et al. were pharmacological. Cognitive behavioral therapy has occasionally been mentioned as a possible effective treatment, particularly early in the progression of the disease and when insight remains intact. It has been proposed that coping skills gained through CBT may help individuals with PD to deal with psychotic symptoms (Zahodne & Fernandez, 2010). Research is needed to determine the efficacy of CBT in treating depression, anxiety and distress related to psychotic symptoms in PD.

Telehealth Cognitive Behavioral Therapy

While CBT seems to be a promising treatment for depression in PD, the ability to access this type of care in the community presents a significant treatment barrier. Individuals diagnosed with a movement disorder such as PD report difficulty both in finding specialists and traveling to receive care. In a cross-sectional study of 769 patients with PD across the country, 52% reported a lack of services in their area while 45% reported physical disabilities that made travel difficult and 30% reported no transportation. Approximately 85% of participants reported that they would be more motivated to receive specialty care if it they could receive it at home (Dobkin et al, 2013).

Telehealth technologies are increasingly used to provide specialty services to individuals who may otherwise not have access. Telemedicine has been successfully used to provide specialty care in a PD population (Dorsey et al., 2010). Telehealth technologies have also been used effectively to provide psychotherapy for depression. In a meta-analysis of 14 studies,

Osenbach et al. (2013) found that treatment delivered via synchronous telehealth technologies appeared to be as effective in treating symptoms of depression as compared to non-telehealth approaches. Mohr et al. (2008) examined 12 trials of telephone-administered psychotherapy for depression and found a significant reduction in symptoms of depression. They also found that attrition rates were lower in telehealth treatments than those reported in face-to-face treatment. In a randomized controlled trial of 325 primary care patients in Chicago, telephone-delivered CBT for depression seemed to be no less effective than CBT delivered face to face (Mohr et al., 2012).

Telehealth cognitive behavioral therapy (TH-CBT) has been shown to be effective in treating depression as well as improving social functioning and quality of life among individuals diagnosed with Parkinson's disease and depression (Dobkin et al., 2011). In a small pilot study of telephone based CBT for depression in PD, treatment was found to be associated with significant improvements in depression, anxiety, negative thoughts, and coping (Dobkin et al., 2011b). It is unclear what effects the presence of psychosis will have on the effectiveness of this treatment. Considering the retention of insight in early psychosis in Parkinson's disease, individuals experiencing psychosis may see similar benefits from the treatment as those who are not. Additionally, it is possible that by treating depression in a population with co-occurring depression and psychosis, improvement may generalize to other areas (i.e. coping with psychotic symptoms).

Through the use of telemedicine, the current clinical trial addresses the inability of participants to access informed health care. All assessments and treatments associated with the study are performed over the phone.

Objectives and Hypotheses

The study used a case series format to explore the impact of the presence of psychosis on treatment response to cognitive behavioral therapy (CBT) for depression in Parkinson's disease (PD). Three individuals diagnosed with PD, depression and co-occurring psychosis received ten weekly sessions of telehealth cognitive behavioral therapy. Each participant completed evaluations at baseline, the midpoint of the treatment (5 weeks), the end of treatment (10 weeks), and at one month follow-up (14 weeks). It was hypothesized that participants in this group would experience decreases in depression, anxiety, and negative thoughts as well as improvements in quality of life, and that caregivers would report reduced burden following study participation. It was also hypothesized that these treatment effects would be similar to those in a population experiencing PD and depression without psychosis. Qualitative analysis was implemented in a case series format to better understand the utilization of the treatment in the three individuals experiencing symptoms of psychosis and to inform recommendations for clinicians working with this complex population.

Methods

Participants

Participants were initially recruited through an ongoing clinical trial at the Rutgers Robert Wood Johnson Medical School. The trial, run by Dr. Roseanne Dobkin, offered telehealth cognitive behavioral therapy to treat depression in Parkinson's disease. The presence of psychosis is an exclusionary criterion of the ongoing study. Potential participants experiencing psychosis as well as depression were referred to this study as an alternative. Nine individuals were contacted to discuss the study. Five of these nine individuals were referred by local

psychiatrists, while four were recruited through Fox Trial Finder, an online service to match individuals diagnosed with PD with a variety of ongoing clinical trials. Six individuals did not participate in the study for a variety of reasons. One individual had been referred by her daughter, however, she was experiencing frequent periods of severe confusion and delusions leading to repeated hospitalizations. Another participant had difficulty attending to the phone screening and did not feel that she would be able to focus for the required periods of time. One participant declined due to concerns that none of her family members would participate as a care partner; she was living with her son's family and but not feel comfortable asking or having the clinician reach out. One participant declined, citing concerns about the time commitment. Two participants were referred by their treating psychiatrists but did not respond to continued outreach. Of the three participants that completed the study, one was referred by a local treating psychiatrist while the other two were recruited through Fox Trial Finder.

Participants were required to meet the following inclusion criteria: 1) Confirmed diagnosis of Parkinson's disease based on the National Institute of Neurological Disorders and Stroke (NINDS) criteria (Gelb et al., 1999), 2) Between the ages of 35 and 85, 3) Diagnosis of Major Depressive Disorder, Dysthymia, or Depressive Disorder not otherwise specified based on the Structured Clinical Interview (SCID-I) for the Diagnostic and Statistical Manual of Mental Disorders 4th Edition (DSM-IV) (Spitzer et al., 1998), 4) Psychosis present, based on diagnostic assessment utilizing the Brief Psychiatric Rating Scale (BPRS) (Overall & Gorham, 1962) and the shortened Scale for the Assessment of Positive Symptoms (SAPS) (Voss et al., 2013).

Exclusionary criteria included: 1) Probable dementia or significant cognitive impairment, based on the Montreal Cognitive Assessment (MoCA) (Nasreddine et al., 2005), 2) Endorsement of suicidal intent, 3) Significant motor fluctuations (symptoms poorly controlled for more than

50% of the day), 4) Unstable medical conditions, and 5) Recent changes in medication regimen (within 6 weeks).

Patient One (A)

A was a 67 year old Jewish woman, married for 35 years, retired, with a Masters degree. She lived with her husband, the identified care partner. She was diagnosed with PD in 2010 at age 60.

At intake, she received a diagnosis of Major Depressive Disorder, recurrent, with a current episode lasting about nine months. She attributed her current episode of depression to a series of losses including her diagnosis in 2010, her retirement in 2016 and the loss of her cat in early 2017. She reported her first mental health treatment occurring in childhood and several periods of treatment for depression since that time, receiving both therapy and psychiatric medication. She had been seeing a social worker "on and off" for supportive therapy for approximately 15 years. At the time of the study, they had been meeting on a monthly basis. She described recent symptoms of depression including low mood, crying daily, feelings of guilt, low self-esteem, significant loss of interest in activities, social withdrawal, poor sleep, and decreased appetite. She also endorsed frequent feelings of anxiety related to her PD diagnosis, her relationship, and her appearance. She endorsed occasional passive suicidal ideation in the form of the thought that death would be easier as "this is too difficult." She denied any motivation or intent to harm herself, stating, "I would never do that."

A described symptoms of psychosis including auditory hallucinations including voices conversing and noises such as the TV or radio when none were present. She also described visual hallucinations and tactile hallucinations of her recently deceased cat occurring several times per

week. She would often see the cat turning a corner in the house or feel the cat curled up on her feet. She endorsed perceptions of movement and presence. She also endorsed occasional delusional thinking of a paranoid nature. She expressed suspicions about her husband's fidelity although she could not identify any specific concerns. She also gave several examples in which she thought someone had stolen something from her only to find the object later. She described one intense period of misidentification and paranoia lasting approximately 24 hours. During an international vacation, she came to believe her husband was a stranger who intended to harm her. While she appeared to retain insight regarding the hallucinations, she repeatedly expressed paranoid views that others were targeting her or meant her harm.

At intake, A scored a 23/30 on the MOCA, indicating possible mild cognitive impairment. She was able to complete the 90 minutes phone intake without any issues with attention or short-term memory. Occasionally, she consulted her husband when answering a question about her history. Regarding psychotropic medications, she is currently prescribed antidepressant medications Lexapro (20mg) and Wellbutrin (150mg), Clonazepam (0.5mg as needed) to treat anxiety, and Rivastigmine (6mg) to enhance cognition. In regards to her medical health, she reported a history of arthritis, back pain, and hip replacement surgery, but identified herself as "pretty healthy."

Patient Two (B)

B was a 49 year old Caucasian woman, widowed, with some college education, currently receiving disability, previously in general management. She resided with her two high school age children. Her identified care partner was a boyfriend she had been involved with for approximately 18 months at intake. She was diagnosed with PD in 2012 at age 40.

At intake, she received a diagnosis of Major Depressive Disorder, recurrent, with a current episode lasting about a year. She described a series of stressors and losses including her husband's cancer diagnosis in 2007, the death of her husband in 2008, her diagnosis of PD in 2012, and her departure from work in 2013. She reported a history of anxiety since her teens and periods of hopelessness and low mood since the loss of her husband. She indicated an increase in negative thinking after the loss of her job. At intake, she described recent symptoms of depression including apathy, feelings of guilt and "disgust" with herself, excessive sleep, social withdrawal, and loss of motivation and energy. She also endorsed feeling anxious "all the time" regarding her diagnosis, her children, and her financial situation.

B described symptoms of psychosis including auditory hallucinations including faint music or voices, perception of movement and presence, and visual hallucinations such as shadows, flashes of light, and animals occurring over the last few years and increasing in the months prior to the study. She appeared to present with retained insight, noting these experiences struck her as bizarre but were not particularly distressing. She largely viewed them as a medical issue.

At intake, she scored a 30/30 on the MOCA, indicating cognitive functioning within normal bounds. Regarding psychotropic medications, she has been prescribed the antidepressant medication Zoloft (50mg) since 2008. Medically, she indicated a history of orthostatic blood pressure, surgery to remove kidney stones, and surgery to remove a tumor on her parathyroid gland. She also described periods of weakness and fatigue related to back pain.

Patient Three (C)

C was a 63 year old Caucasian woman, married for 40 years, with a Bachelor's degree in English, currently receiving disability, previously a teacher of creative writing. She resided with her husband, her identified care partner. She was diagnosed with PD in 2010 at age 55.

At intake, she received a diagnosis of Major Depressive Disorder, recurrent, with a recent episode lasting approximately six months, as well as Generalized Anxiety Disorder. She described recent symptoms of depression including feeling hopeless and helpless, crying, guilty rumination, decreased motivation, and a tendency to "assume the worst." She also described daily anxiety regarding the future as well as predicted "terrible events." She reported a history of anxiety beginning approximately 30 years ago with a specific phobia related to flying. She first received treatment for anxiety and panic around 1990. Over time, she stated she experienced increasing anxiety related to driving, her health, bad weather, leaving the house, and being alone. At the time of this study, C was also participating in a nine month trial in which she received biweekly online mindfulness counseling. She had been participating in that trial for several months prior to this study and her participation was stable throughout.

C described symptoms of psychosis including auditory hallucinations of various noises or "voices mumbling." She endorsed illusions and visual hallucinations, indicating she frequently "misinterprets shapes" to be people or animals when they are not present. She also described complex visual hallucinations of animals performing human activities, for example a red squirrel holding up a sign that stated 'Red Squirrel.' She appeared to retain insight and reported distress regarding the visual hallucinations as they could be quite distracting when she was driving.

At intake, C scored a 29/30 on the MOCA, indicating cognitive functioning within normal bounds. She is currently prescribed the antidepressant medication Lexapro and Ativan as

needed to treat anxiety. Medically, C reported several recent medical issues including a gall bladder removal in 2016 that resulted in infection and gangrene and two recent hip replacements. She also had a history of endometriosis, fibroids, and atypical hyperplasia leading to a hysterectomy in 1995.

Procedures

Approval from the Institutional Review Board was obtained prior to screening participants. Participants were contacted and verbal consent was obtained prior to an initial phone screening. The study was explained in detail and participants were asked to provide basic information regarding their current medical and psychological treatment. If interested in the study, participants were sent consent forms for themselves as well as a care partner.

Once informed consent was obtained from the three participants, each of them completed a baseline evaluation composed of a semi-structured clinical interview and a diagnostic interview utilizing the Structured Clinical Interview (SCID-I) for the Diagnostic and Statistical Manual of Mental Disorders 4th Edition (DSM-IV) (Spitzer et al., 1998), and a brief neurocognitive screening, the Montreal Cognitive Assessment (MoCA) (Nasreddine et al., 2005). Depression, anxiety and psychosis were measured through a series of clinician administered semi-structured interviews including the Hamilton Depression Rating Scale (Hamilton, 1960), Hamilton Anxiety Rating Scale (Hamilton, 1959), Brief Psychiatric Rating Scale (Overall & Gorham, 1962) and the shortened Scale for the Assessment of Positive Symptoms (Voss et al., 2013). The shortened version of the SAPS eliminates sections that are less relevant for PD and reduces administration time and score variability while retaining reliability, effect size, and sensitivity to change of the longer scale. They also completed a series of self-report measures. The Beck Depression

Inventory was used to measure severity of depression (Beck et al., 1961). Negative thoughts were measured using the Inference questionnaire (Alloy et al., 1999). Quality of life was measured using the Medical Outcome Study Short Form (Ware & Sherbourne, 1992). Caregiver burden was measured using the Caregiver Distress Scale. Initial severity of illness and then responder status were measured by evaluators using the Clinical Global Impression-Improvement Scale (Guy, 1976).

Participants were offered and completed ten sessions of manualized cognitive behavioral therapy for depression in Parkinson's disease. Sessions occurred weekly, lasted approximately sixty minutes, and were delivered over the phone. Additionally, up to two brief booster sessions lasting approximately 30 minutes were offered in the month after completion, in order to facilitate adaptation of skills to daily life. Treatment modules included aspects of behavioral activation, activity scheduling, cognitive restructuring, worry management, relaxation skills, and sleep hygiene (see Table 1). Each module contained a psychoeducational component, examples and vignettes, and written assignments to be completed by the participant during the week. Treatment was individualized to address the specific symptoms and experience of the participant, with different participants spending various amounts of time on each component. Additionally, up to four care partner sessions were offered, to familiarize them with the treatment, provide support, and answer questions related to the study.

TABLE 1.

Treatment Modules

Week 1	Study Overview, Goal Setting, and Activity Planning
Week 2	Behavioral Activation and Thought Log
Week 3	Thought Log and Cognitive Distortions
Week 4	Cognitive Restructuring
Week 5	Cognitive Restructuring
Week 6	Cognitive Restructuring
Week 7	Relaxation Techniques
Week 8	Worry Management and Sleep Hygiene
Week 9	Review of Skills
Week 10	Review of Goals and Maintaining Progress
Boosters	Maintaining Progress

All participants entered the study with high motivation and engagement and completed sessions and assignments as requested for the first two weeks. However, as the study continued, motivation and ability to engage in treatment varied among participants. All three participants completed the ten modules, however, number of sessions, session time, material covered, and completion of homework varied across participants and will be discussed as it relates to each participant in the 'Outcomes' section below.

Outcome measures

Evaluations took place at baseline (T1), the midpoint of treatment at five weeks (T2), the completion of treatment at ten weeks (T3), and one month after treatment at fourteen weeks (T4). Each evaluation assessed emotional functioning, symptom status, and caregiver distress.

TABLE 2.

Evaluation Schedule

	Baseline/T1 (0 weeks)	Midpoint/T2 (5 weeks)	Endpoint/T3 (10 weeks)	Followup/T4 (14 weeks)
Montreal Cognitive Assessment	X			
Structured Clinical Interview	X			
Hamilton Rating Scale for Depression	X	X	X	X
Hamilton Rating Scale for Anxiety	X	X	X	X
Brief Psychiatric Rating Scale	X	X	X	X
Shortened SAPS*	X	X	X	X
Clinical Global Index	X	X	X	X
Beck Depression Inventory	X	X	X	X
Inference Questionnaire	X	X	X	X
Medical Outcome Study Short Form	X	X	X	X
Caregiver Distress Scale	X	X	X	X

*SAPS – Scale for the Assessment of Positive Symptoms

Measures were chosen after review of the recommendations of the Movement Disorder Society Task Force on Rating Scales in Parkinson's disease (Schrag et al., 2007; Fernandez et al., 2008). The measures for depression, responder status, anxiety, and psychosis (HAM-D, HAM-A, CGI, BPRS, SAPS) are clinician rated and were reviewed with Dr. Dobkin to improve reliability, while the measures for depression severity, negative thoughts, quality of life, and caregiver burden (BDI, Inference Questionnaire, MOS-36, CDS) are self report measures. All measures provided a numerical score and were compared at various time points to create change scores.

While B and C were able to complete evaluations at each time point, A did not complete the self report measures for her T3 evaluation and declined to participate in the T4 evaluation due to difficulties with fatigue, poor concentration, and disorganization.

Results

A repeated measure design was utilized with the small sample of three participants. Change scores were derived by finding the difference between baseline scores and follow-up scores at each evaluation point (midpoint at 5 weeks, end point at 10 weeks, and follow-up at 15 weeks). Change scores were examined for clinical significance determined by movement between the clinical ranges of a specific measure. Treatment effects across time points were then compared with published data from studies providing CBT to a population of individuals with PD and depression but without symptoms of psychosis.

TABLE 3.

Summary of Scores

	Patient One (A)	Patient Two (B)	Patient Three (C)
Age (years)	67	49	63
Gender	F	F	F
Duration of illness (years)	8	6	8
HAM-D Score (range: 0-52)			
Baseline	27 (v severe)	20 (severe)	17 (moderate)
Midpoint	28 (v severe)	16 (moderate)	17 (moderate)
Endpoint	27 (v severe)	14 (moderate)	15 (moderate)
Follow-up		18 (moderate)	13 (mild)
BDI Score (range: 0-60)			
Baseline	22 (moderate)	31 (severe)	15 (mild)
Midpoint	21 (moderate)	15 (mild)	13 (minimal)
Endpoint		11 (minimal)	10 (minimal)
Follow-up		11 (minimal)	10 (minimal)
HAM-A Score (range: 0-56)			
Baseline	17 (mild)	18 (moderate)	20 (moderate)
Midpoint	21 (moderate)	22 (moderate)	21 (moderate)
Endpoint	21 (moderate)	15 (mild)	20 (moderate)
Follow-up		17 (mild)	18 (moderate)

SAPS Score (range: 0-45)

Baseline	12	5	6
Midpoint	14	5	6
Endpoint	14	5	5
Follow-up		5	5

BPRS Score (range: 0-126)

Baseline	33	32	25
Midpoint	34	28	25
Endpoint	41	26	23
Follow-up		26	23

IQ Score (range: 0-16)

Baseline	3	14	3
Midpoint	2	14	4
Endpoint		10	5
Follow-up		8	3

CDS Score (range: 0-68)

Baseline	29	6	28
Midpoint	32	28	22
Endpoint		28	17
Follow-up		26	21

CGI-C Score (range: 0-7)

Midpoint	4 (no change)	3 (minimally improved)	4 (no change)
Endpoint	4 (no change)	2 (moderately improved)	3 (minimally improved)
Follow-up		3 (minimally improved)	3 (minimally improved)

HAM-D – Hamilton Rating Scale for Depression, BDI – Beck Depression Inventory, HAM-A – Hamilton Rating Scale for Anxiety, IQ – Inference Questionnaire, SAPS – Shortened Scale for the Assessment of Psychotic Symptoms, BPRS – Brief Psychiatric rating Scale, MOS-36 – Medical Outcome Study Short Form, CDS – Caregiver Distress Scale, CGI – Clinical Global Impressions of Severity and Change - Depression.

For all measures, a decrease in score indicates improvement.

Depression

Depression was primarily measured with the Hamilton Rating Scale for Depression (HAM-D) and the Beck Depression Inventory (BDI). As shown in Table 3, A's HAM-D score remained unchanged while her BDI score dropped one point but remained in the moderate range. B's score on the HAM-D dropped from 20 to 14 post-treatment, but went back up to 18 at follow-up. Her score moved from the severe range to the moderate range of depression. Her score on the BDI went from 31 to 11 post-treatment, remaining steady at 11 at follow-up, reflecting a shift from the severe range to the minimal range of reported symptoms of depression. C's HAM-D score decreased 2 points from 17 to 15 post-treatment, dropping another 2 points to 13 at follow-up, moving from the moderate to mild range of depression. Her BDI score dropped from 15 to 10, reflecting a shift from the mild range of reported symptoms to the minimal range of reported symptoms of depression.

Anxiety

Anxiety was measured with the Hamilton Rating Scale for Anxiety (HAM-A). All three participants experienced an increase in anxiety symptoms at the midpoint of treatment. This may be associated with the beginning of therapy, which often results in an increase in distress as someone begins to reflect on their thoughts and experiences and then a decrease when skills and strategies are put to use. A experienced an increase in her HAM-A score at midpoint, going from 17 to 21, moving from the mild range to moderate range of anxiety. Her score remained at 21 post-treatment. This could be due to her decreased participation in treatment or could be associated with the increase in cognitive symptoms. B's HAM-A score dropped from 18 to 15 post-treatment, going back up to 17 at follow-up. Her scores reflected a shift from the moderate

range of clinical symptoms to the mild range. C's score on the HAM-A remained unchanged at 20 post-treatment, dropping 2 points to 18 at follow-up, remaining in the moderate range.

Psychosis

Psychosis was primarily measured using the shortened Scale for the Assessment of Positive Symptoms (SAPS). The Brief Psychiatric Reporting Scale (BPRS) was also used to assess psychosis as well as overall psychiatric symptoms including depression, anxiety, and conceptual disorganization. The reported level of positive psychotic symptoms was largely stable throughout the study for each participant. A's SAPS score went from 12 to 14, indicating a slight increase in positive psychotic symptoms including delusional thinking. B's SAPS score remained unchanged while C's SAPS score went from 6 to 5, as she reported somewhat less distress surrounding positive symptoms of psychosis including hallucinations.

Psychiatric Symptoms

The BPRS is an instrument designed to assess overall psychopathology in individuals with schizophrenia. In clinical research with a PD population, it is commonly used to track changes in symptoms of psychosis. In this study, it was used to assess changes in symptoms of psychosis as well as other psychiatric symptoms. A's score on the BPRS increased from 33 to 41 between baseline and post-treatment, reflecting an increase in psychiatric symptoms overall. This increase was due to increases in reported and observed somatic concerns, anxiety, conceptual disorganization, guilt, depressive mood, and disorientation. B's BPRS score decreased from 32 to 26, reflecting a decrease in overall psychiatric symptoms, specifically a decrease in anxiety, guilt, and depressive mood, and an improvement in expression of affect. C's BPRS score

decreased from 25 to 23, reflecting a small decrease in psychiatric symptoms including anxiety and depressive mood.

Negative Thinking

Negative thinking was measured with the Inference Questionnaire (IQ). Participants provide an example of a recent stressful event and answer questions about the event. A's score dropped from 3 to 2 at the midpoint of treatment. B's score on the IQ decreased from 14 to 10 post-treatment, dropping another 2 points to 8 at follow-up. C's score on the IQ increased from 3 to 5 post-treatment, dropping back to 3 at follow-up to reflect no change.

Caregiver distress

Caregiver distress was measured using the Caregiver Distress Scales (CDS), which was filled out at each evaluation point by the participant's identified care partner. This scale asks for information regarding distress specifically related to caring for the participant. At the midpoint of treatment, A's care partner reported an increase in distress, with a score increase 3 points from 29 to 32. At baseline, B reported a score of 6 from her care partner. The score provided at the midpoint was 28 and this remained steady at 28 post-treatment, dropping 2 points to 26 at follow-up. C's care partner reported an overall decrease in distress, with an initial score of 28 decreasing to 22 at the midpoint and 17 post-treatment. This score increased slightly at follow-up, to 21.

Responder status

Responder status was measured using the Clinical Global Impressions of Change for Depression (CGI-C). CGI-C scores were assigned by the clinician completing the evaluations based on participants' responses to measures of depression and change scores. A showed no change in clinical status at the midpoint and endpoint of treatment. B showed minimal improvement at the midpoint and moderate improvement at the endpoint. At follow-up, B showed minimal improvement. C showed no change in clinical status at the midpoint and minimal improvement at the endpoint and at follow-up.

Overall findings

The data indicated minimal improvement in symptoms of depression for two out of three participants, based on clinically significant reductions in scores on the HAM-D and BDI. The third participant experienced no clinically significant change in symptoms of depression. There were no observable clinically significant effects on anxiety. One participant reported a decrease in negative thinking while one care partner reported a decrease in distress related to caregiving.

Comparisons to published findings

Berardelli et al. (2015) reviewed the main findings of thirteen intervention studies providing CBT to individuals diagnosed with PD and experiencing psychiatric disorders. While there are larger and more recent studies, including a randomized control trial, the current study was compared to other small pilot studies delivering CBT to individuals with PD experiencing depression. Three of these also used the Hamilton Rating Scale for Depression (HAM-D) and/or the Beck Depression Inventory (BDI) as the primary measure of depression. In 2005, Feeney et

al. found that eight weekly group sessions of CBT resulted in significant improvement in depression. Three participants reported improvement in mood evidenced by BDI scores decreasing by 4 (moving from the mild to normal range), 6 (moving from the moderate to mild range), and 18 (moving from the severe to moderate range), with one participant deteriorating with a BDI score increasing by 8 (moving from the normal to moderate range). Cole and Vaughan (2005) had five participants, with four experiencing a decrease in depressive symptoms and one experiencing an increase in depressive symptoms. The four participants who showed clinically reliable improvement in symptoms had BDI scores that decreased by 1 (remaining in the mild range), 4 (remaining in the minimal range), 10 (moving from the moderate to minimal range), and 14 (moving from the severe to moderate range). Dobkin et al. (2006) had a sample of three patients and observed significant improvement in depressive symptoms evidenced by decreases in HAM-D and BDI scores. One patient had a HAM-D score decreased by 8 (moving from the moderate to mild range) and a BDI score decreased by 12 (moving from the mild to minimal range). Another had a HAM-D score decrease by 11 (moving from the severe to moderate range) and a BDI score decrease by 8 (moving from the moderate to mild range). The third patient had a HAM-D score decrease by 17 (moving from the very severe to moderate range) and a BDI score decrease by 35 (moving from the severe to mild range).

The current study has a small sample size of three participants, with one individual showing no change in reported depressive symptoms and two reporting clinically significant reduction in symptoms of depression based on HAM-D scores, BDI scores, and CGI-C scores. Between pre- and post-treatment, B's HAM-D score decreased by 6, moving from the severe range to the moderate range while her BDI score decreased by 20, moving from the severe range to the minimal range. B's CGI-C scores reflected minimal improvement at the midpoint and

moderate improvement at the endpoint. C's HAM-D score decreased by 2, remaining in the moderate range while her BDI score decreased by 5, moving from the mild to minimal range. Based on CGI-C scores, C showed no improvement at the midpoint and minimal improvement at the endpoint.

Clinical improvement noted in the current study appears to be less than that described in literature involving CBT interventions for depression provided to individuals with PD and depression without symptoms of psychosis. In this study, clinical improvement was minimal and only occurred in relation to symptoms of depression, without generalizing to other areas such as anxiety or negative thinking. Treatment effects for depression were of a lesser magnitude than those observed in other studies. It appears that co-occurring symptoms of psychosis may affect treatment response to a CBT intervention for depression in PD. The section below will review course of treatment and discuss treatment barriers present for each participant while the discussion section will explore how the treatment may be modified and provide clinical recommendations for future work with this population.

Clinical Observations

Patient One (A)

Initial Presentation

A's baseline score on the HAM-D indicated her symptoms of depression were in the very severe range. Her first session lasted 75 minutes and focused on her current functioning and goals for treatment. During the initial phone call, she presented with some distraction and required structure from the therapist. She was best able to engage with the material through main ideas and concrete examples. She described some paranoia regarding others overhearing her

phone conversations and using this information against her. Therapist and patient engaged in problem solving to ensure she was speaking in a private area of the house and therapist reminded patient that her sessions are confidential. She identified triggers for depressive thoughts including "not being able to do things the same way I used to" and feeling as though she was "not good enough" during social interactions. When she experienced motor symptoms in public, she frequently thought others were judging her or labelling her as "crazy." She expressed, "no one wants to deal with someone who is falling apart." When she started treatment, A had an existing exercise routine consisting of daily stretching as well as weekly boxing and yoga classes. She attended weekly PD discussion group and engaged in two to three social activities each week. She spent most days with a companion, who she referred to as her "paid friend." She was already engaged in creative problem solving around motor symptoms, such as making smoothies to avoid manipulating silverware. She appeared motivated to increase pleasurable activities and decided to research available art classes as well as other classes through the local library.

Course of Treatment

In each session, the therapist began each session with a review of confidentiality and focused on main ideas and specific examples from the patient's life. The first several sessions of treatment focused on behavioral activation, goal setting, self-monitoring, and keeping a thought log. After building an understanding of her individual triggers and negative thinking, the treatment focused on cognitive restructuring.

After completing self-monitoring exercises, A noted that certain activities such as exercise groups and support groups were associated with positive emotions such as enthusiasm and confidence. She began to make changes to her schedule in order to increase pleasurable

activities and modify activities associated with negative feelings. She became more involved in her Rock Steady boxing program and PD support group and made more social plans with specific individuals she identified as supportive. Near the end of the study, A experienced a series of falls, including one in which she hit her head and was treated in the hospital. She experienced significant back pain and required increased assistance from her husband and companion to complete daily tasks. As a result, her participation in exercise classes, support group, and social activities decreased significantly. She reported increasing symptoms of depression, including suicidal ideation with no intent but thoughts of a plan. Safety planning was carried out in collaboration with her care partner.

A quickly grasped the concept of cognitive distortions and recognized that the majority of her negative thoughts were based on negative evaluations of herself and assumptions that she was being judged by others. She identified negative thoughts that presented in social context such as "I am not good enough" and learned that visible motor symptoms were associated with negative interpretations such as "people think I'm crazy." She also acknowledged that she tended to generalize an interpretation of one incident to her global worth as a person. She engaged in cognitive restructuring and was able to generate appropriate reframes for her negative thoughts. While she was able to engage in cognitive restructuring in session, she did not practice these skills during the week and consistently struggled to access a reframe in the moment.

Throughout the treatment, A described ongoing symptoms of psychosis such as paranoia, auditory hallucinations, and disorganization. She described distress related to paranoid thinking, such as an incident when she could not find something in her purse and began to follow other shoppers in order to "look for thieves." She also appeared to be experiencing auditory hallucinations in session, presenting as distracted and stating, "someone asked me a question, I

thought it was you." She occasionally presented with disorganized thinking, switching topics and making unrelated statements. At times, she noticed when this happened, making statements such as "that was a bad segue," apologizing for "poor context" or "sounding dopey," or noting that she was having trouble organizing her thoughts. She was generally responsive to redirection from the therapist and was able to engage in meaningful discussion of the material. However, these symptoms increased over time and in later weeks she repeatedly ended sessions early as she could not focus or engage over the phone. During the last weekly session, she became confused, put the phone down and then left. The therapist was able to contact her husband, who indicated she was sleeping in another room.

After a few sessions, A's care partner contacted the therapist and requested that A stop her participation in the trial, as he felt the modules were overwhelming and the homework was causing her distress. The therapist explained to A and her care partner that she should complete whatever aspects of the reading and homework she could outside of session, but that main points would be reviewed and exercises could be completed during session. A expressed that she would like to continue in the study and did so. However, she no longer engaged with the material or completed homework assignments outside of session. While he was frequently available and occasionally assisted the participant during session, A's care partner had limited engagement with the therapist in treatment. He assisted with practical matters, such as printing treatment modules and evaluation forms for the participant. However, he declined to participate in discussions with the therapist. He was offered four care partner sessions, but engaged in only one brief conversation.

Treatment Barriers

Primary treatment barriers for A included cognitive difficulties such as poor attention, confusion, and disorganization. This resulted in sessions being cut short or rescheduled and also interfered with her ability to complete work outside of session. At times, active symptoms of psychosis including paranoia and auditory hallucinations made it difficult for her to attend to phone sessions. Her paranoid thinking also increased stress in her relationships with her care partner and companion at times. A's care partner did not want her participating in the study as he had a low tolerance for her discussing her distress. His negative feelings toward the treatment likely had some effect on her motivation and ability to engage in treatment, particularly outside of session. Medical issues also affected her engagement in treatment in the form of pain, fatigue, and limited mobility after a serious fall. A was unable to participate in her usual exercise, activities and groups, resulting in social isolation and an increase in negative thinking and passive suicidal ideation.

Patient Two (B)

Initial Presentation

At baseline, B's score on the HAM-D reflected symptoms of depression in the severe range. In her initial session, B described herself as "stuck," indicating she had fallen into a pattern of sleeping most of the day and stating she lacked motivation and coping skills to change her situation. She presented with a flat voice, with little expressed emotion even when describing difficult topics. She described herself as "pathetic" and reported feeling very guilty that she is not providing a better example for her teenage children. She described feeling "safe" in her home and embarrassed and afraid when interacting with others. She was not engaging in any regular exercise and did not socialize much outside of one or two activities with her boyfriend each

week. At the end of the first session, she expressed a desire to change, stating her behavior over the last few years had been "out of character."

Course of Treatment

The first several sessions of treatment focused on behavioral activation, goal setting, self-monitoring, and keeping a thought log. After building an understanding of her individual triggers and negative thinking, the treatment focused on cognitive restructuring.

B appeared to benefit from the activity of self-monitoring immediately. She quickly noticed that there were very few parts of her week that she looked forward to or found enjoyable. In reaction to this, she set a variety of goals for exercise and social activities. Her initial goals were somewhat unrealistic, but she worked with the therapist on setting specific and attainable goals. She worked toward a goal of 30 minutes of exercise every day. As she did so, her sleep schedule became more regular and her energy level increased. B experienced medical difficulties during the intervention phase, eventually receiving a diagnosis related to compressed discs in her spine. However, she was able to be flexible with her goals, engaging in daily physical therapy and moving her workouts to the pool to increase mobility. She made steady progress each week in increasing social events and pleasurable activities. She made a habit of recording positive moods associated with socializing and used this evidence as motivation to continue to set and follow through with her goals. When she experienced back pain, she planned ahead to ensure that her social activities were physically manageable.

B worked hard to build awareness of cognitive distortions and thought patterns, re-reading modules and making notes to herself outside of the assigned homework. She recognized that the majority of her negative thoughts were negative evaluations of herself and were closely tied to feelings of guilt regarding her depression and inactivity. Some of her most frequent

negative thoughts were "I am pathetic" and "I have failed my children" Once she grasped cognitive restructuring, she practiced regularly throughout the week until it became habitual. Over time, she engaged her care partner as well as other close social supports in her treatment, educating them about the skills she was working on and utilizing them as resources for cognitive restructuring. This was particularly helpful when challenging thoughts such as "I am a bad parent," as she was able to engage in discussions with other parents and realize that others also struggled with similar issues in dealing with their own teenagers. The more she engaged with others, the more she recognized that she was not alone in her difficulties. As treatment progressed, she became increasingly emotionally engaged and expressive in session. She sounded increasingly confident in her ideas and opinions, and her sense of humor became more prominent.

While B endorsed continuing symptoms of psychosis such as auditory and visual hallucinations when asked, she did not discuss them in session. She did not identify these symptoms as sources of distress and they did not seem to be attached to negative thoughts.

B's care partner did not participate in the treatment. He was offered four care partner sessions and initially expressed interest in being involved. However, his relationship with the participant became somewhat tenuous following an argument with her son.

Treatment Barriers

B's primary treatment barriers included interpersonal stress in her relationships and pain and limited mobility related to a medical issue with her back. B described significant interpersonal difficulties with her teenage children as well as her current romantic partner. At times, her distress surrounding these relationships made it difficult for her to focus on anything else. The therapist was able to use interpersonal examples to illustrate cognitive distortions and

maladaptive behaviors, however, B sometimes ran out of session time to discuss additional important topics. B reported frequent back pain, resulting in limited mobility. Near the end of treatment, B was diagnosed with several bulging discs in her spine. As she progressed in treatment, B was largely able to adapt her goals and problem solve in order to keep up with regular exercise and social activities.

Patient Three (C)

Initial Presentation

C's score on the HAM-D at baseline indicated her symptoms of depression were in the moderate range. C presented as motivated and engaged, with an open and direct style of communication. She initially dismissed her experience of symptoms of depression, indicating she had more difficulty with anxiety. After reviewing her recent experiences, she began to recognize that her negative thinking and rumination were impacting her mood significantly, resulting in negative evaluations of herself as well as negative predictions for the future. She identified frequent feelings of helplessness. When she presented for treatment, C engaged in occasional exercise but often avoided it due to concerns about her hip, which had recently been replaced a second time. She primarily socialized with family and her attendance had decreased at activities such as knitting group. She was able to identify several pleasurable activities such as knitting, reading, piano, and painting, but did not engage in these regularly.

Course of Treatment

The first several sessions of treatment focused on behavioral activation, goal setting, self-monitoring, and keeping a thought log. After increasing awareness of her individual triggers and patterns of negative thinking, the treatment focused on cognitive restructuring.

C engaged in regular weekly sessions, with sessions often going slightly over one hour. C easily grasped the main ideas of treatment and completed the self-monitoring and forms as requested. She appeared to benefit from the structure of daily and weekly goal setting forms. She identified the "accountability" of a list and the "satisfaction" of completing a task as powerful motivators. She quickly re-established regular attendance at her weekly knitting group and began to look for more local social opportunities. She also made an effort to leave her home more often, visiting parks, shops, and restaurants by herself, referring to this practice as "treating" herself. When it came to goal setting, C indicated she preferred a flexible approach to a structured one. Her daily schedule was variable and largely relied on the availability of others. As a result, she preferred to set larger, less specific goals – for example, to engage in some form of exercise five days per week. Over times, she gradually began to be more specific, noting when she was more likely to engage in exercise and finding specific exercises that she preferred. However, she still hesitated to commit to a regular schedule and her progress in achieving exercise goals was intermittent. Similarly, she identified effective coping skills for anxiety, including social interactions and pleasurable activities, but hesitated to plan these ahead of time and had trouble establishing a routine. As a result, she often found herself ruminating without a clear and practiced way to interrupt the cycle.

C was very quick to identify common cognitive distortions such as catastrophizing and making negative predictions, and was aware of them when they surfaced. She acknowledged how often her tendency to "assume the worst" was affecting her mood and behavior, often

resulting in her staying home. C was able to restructure negative thoughts in session and generate a reframe, however, she had difficulty in accessing the reframe at other times. She recognized that her fears were not entirely likely, but persisted in believing she had "bad luck" when compared to others. She had difficulty establishing a routine that might assist her in generalizing her skills to daily life. She benefitted from consistent social support from her husband and adult children and began to involve them in her cognitive restructuring, which was helpful.

C described relatively consistent symptoms of psychosis throughout the treatment, including auditory and complex visual hallucinations. She did not discuss these symptoms very often in treatment but spoke openly about them when asked. It is unclear whether her anxiety may have been influenced by some level of psychotic symptoms. Several of the specific fears she cited as distressing involved strangers breaking into her home or attempting to harm her. This could be linked to subtle symptoms of PD related psychosis including vivid nightmares, perceptions of movement or presence, or mild paranoia.

C's care partner had limited direct engagement in the treatment, largely due to scheduling difficulties. He was offered four care partner sessions and expressed interest in being involved. However, his work schedule and travel plans made it difficult to commit to sessions. He participated in one care partner session near the end of the patient's treatment.

Treatment Barriers

C also struggled with medical issues, primarily limited mobility and anxiety related to a recent hip replacement, her second. She avoided several activities and exercises due to concern that her hip would pop out of joint as it had previously. It is possible that C was experiencing subtle symptoms of PD related psychosis including vivid nightmares, perceptions of movement or presence, or mild paranoia that exacerbated her anxiety. While she described their relationship

as incredibly supportive, her care partner had limited involvement in her treatment. His schedule was very full, largely due to extra work he had started after C left work due to disability.

Discussion

Treatment effects for depression in this small sample were of a lesser magnitude than those observed in other studies carried out with a population experiencing depression without psychosis. It appears that co-occurring symptoms of psychosis may affect treatment response to a CBT intervention for depression in PD. There were a number of treatment barriers observed in the current study, including cognitive difficulties such as confusion and poor attention; active symptoms of psychosis such as paranoia and auditory hallucinations; pain, fatigue, and limited mobility related to medical issues; lack of involvement by care partners; and interpersonal distress. For many individuals diagnosed with PD and struggling with depression and co-occurring symptoms of psychosis, telehealth CBT may be an effective treatment in improving mood. In order to optimize the effectiveness of treatment, these barriers need to be addressed.

Clinical recommendations

Cognitive difficulties acted as a barrier to engagement in treatment, both over the phone and when participants were asked to complete tasks outside of session. Treatment content and delivery should be tailored to the individual as much as possible. The intervention could be modified and broken down into a series of smaller modules with concrete language and frequent examples to be delivered in shorter more, frequent sessions. There would likely need to be some repetition of content to assist with retention. Additionally, scheduling will likely need to be flexible in order to account for periods in which cognitive symptoms are more severe. If

possible, care partners could be integrated into the sessions in order to assist with practical aspects such as note taking and scheduling. As telemedicine progresses, it may be helpful for both parties to have access to the same live documents in real time in order to provide structure and specificity. At times, participants became distracted and were not able to attend to phone sessions; it is possible that video sessions could improve focus for the participant and allow the therapist to better gage participant attention and adjust accordingly.

For individuals experiencing symptoms of PD related psychosis, psychotherapy should be provided as early in the course of illness as possible. Over time, the loss of insight regarding symptoms such as hallucinations, delusions, and paranoia may interfere with the patient's ability to utilize the treatment. Paranoia and confusion may decrease the patient's ability to engage with the therapist as well as care partners and available social supports. Psychoeducation should be provided regarding PD-related psychosis, including descriptions of common symptoms. Additionally, after rapport is established and when a participant expresses some level of insight, symptoms of psychosis could be targeted for specific interventions. This could mean challenging delusional thoughts or using self-monitoring to collect evidence regarding delusional beliefs.

In addition to psychotherapy, patients should also be encouraged to take advantage of other resources available to them as appropriate, such as medication, PD specific support groups, PD specific exercise groups, physical therapy, speech therapy, couples or family counseling, and assistance with local resources (transportation, insurance, etc…). It would be helpful to deliver this type of therapy as part of a multidisciplinary care model including coordination with providers such as neurologists, psychiatrists, social workers, physical therapists, and family therapists. In the current study, it would have been helpful to collaborate with providers regarding medical and psychiatric symptoms.

In the current study, care partners played a limited role for a variety of reasons including practical issues with scheduling as well as interpersonal difficulties in their relationships with the participants. With this population, it will likely be very important to get care partners involved in the treatment in order to provide appropriate support and consistency with concepts. Care partners can provide practical help with organizing information, keeping track of schedules, and increasing accountability for goals. They can also be active participants in cognitive restructuring, providing an additional perspective or appropriate reality testing. Distress related to care giving has been shown to be elevated when symptoms of psychosis are present. Care partners in this population should be provided with psychoeducation and additional resources if possible, such as referrals to support groups or couples or family therapy. Additionally, interpersonal effectiveness skills could be integrated into the treatment to assist the participants and their partners in maintaining healthy communication.

TABLE 4.

Clinical Recommendations

1	**Early intervention** to address symptoms of depression is important, particularly for individuals experiencing symptoms of PD related psychosis
2	Treatment content and delivery should be as **flexible** as possible to address various levels of cognitive difficulties and fluctuation of motor, cognitive, and psychiatric symptoms
3	Treatment should be delivered in a **multidisciplinary care model** with coordination between as many disciplines as possible
4	**Care partners** should be engaged early and often in treatment and should be referred to receive their own support as appropriate
5	Considering the increase in care partner distress associated with symptoms of psychosis, **interpersonal effectiveness skills** should be integrated into the treatment

Limitations and future research

      The current study had a very small sample size of only three participants, making it difficult to present findings with certainty. Future research providing this type of psychotherapy to individuals with PD experiencing depression and co-occurring symptoms of psychosis should include a much larger sample with individuals experiencing a wide range of psychiatric and neurological symptoms. A large sample would provide an opportunity to better understand how factors such as cognitive functioning, various symptoms of psychosis, and medical setbacks such as falls affect treatment engagement. This information could inform efforts to make appropriate treatment adaptations or additional referrals.

      The current study was time-limited and delivered in a relatively brief ten weeks. While the therapist made efforts to tailor the treatment to the needs of each participant, further sessions would have been helpful to review concepts and provide additional practice. Participants provided feedback that they felt overwhelmed by initial treatment modules as they contained a large amount of information.

      The primary focus of the current study was to explore the efficacy of CBT for depression in this population. Therefore, symptoms of Parkinson's related psychosis were not specifically discussed during the treatment sessions unless introduced by the participant. In the future, psychoeducation could be provided and symptoms of psychosis could be continuously assessed in more detail to better understand any subtle influences they may have on symptoms of depression and anxiety.

      As discussed above, care partner involvement was very limited in the current study, partially due to scheduling constraints. Future studies should attempt to engage care partners early and often in order to best support participants.

Conclusion

While CBT has been shown to be an effective treatment for depression in chronic medical illness, it is not commonly used to treat depression in individuals also experiencing psychosis in a PD population. In this study, two out of three participants showed clinically significant improvement in symptoms of depression. However, clinical improvement was minimal and only occurred in relation to symptoms of depression, without generalizing to other areas such as anxiety or negative thinking. It appears that co-occurring symptoms of psychosis may affect treatment response to a CBT intervention for depression in PD. Treatment barriers included cognitive difficulties such as confusion and poor attention; active symptoms of psychosis such as paranoia and auditory hallucinations; pain, fatigue, and limited mobility related to medical issues; lack of involvement by care partners; and interpersonal distress. Clinical recommendations included early intervention, a flexible approach to treatment, a multidisciplinary care model, involvement of care partners, and interpersonal effectiveness skills.

Further research in this area is needed. With appropriate tailoring and modification, telehealth CBT could be an effective intervention for depression individuals with Parkinson's disease experiencing symptoms of psychosis.

References

Aarsland, D., & Kramberger, M. (2015). Neuropsychiatric Symptoms in Parkinson's Disease. *Journal of Parkinson's Disease, 5*(3), 659-667.

Alloy, L. B., & Abramson, L. Y. (1999). The Temple—Wisconsin Cognitive Vulnerability to Depression Project: Conceptual Background, Design, and Methods. *Journal of Cognitive Psychotherapy*, *13*(3), 227-262.

Alvarado-Bolaños, A., Cervantes-Arriaga, A., Rodríguez-Violante, M., Llorens-Arenas, R., Calderón-Fajardo, H., Millán-Cepeda, R., ... & Zuñiga-Ramírez, C. (2015). Impact of Neuropsychiatric Symptoms on the Quality of Life of Subjects with Parkinson's Disease. *Journal of Parkinson's Disease*, *5*(3), 541-548.

Beck, AT, Ward, CH, Mendelson, M., Mock, J., & Erbaugh, J.(1961). An inventory for measuring depression. *Archives of General Psychiatry*, *4*, 561-571.

Berardelli, I., Pasquini, M., Roselli, V. Biondi, M. Berardelli, A., & Fabbrini, G. (2015). Cognitive Behavioral Therapy in Movement Disorders: A Review. *Movement Disorders Clinical Practice, 2*(2), 107-115.

Calleo, J. S., Amspoker, A. B., Sarwar, A. I., Kunik, M. E., Jankovic, J., Marsh, L., ... & Stanley, M. A. (2015). A Pilot Study of a Cognitive–Behavioral Treatment for Anxiety and Depression in Patients With Parkinson Disease. *Journal of geriatric psychiatry and neurology*, 0891988715588831.

Cole, K. & Vaughan, F. (2005). Brief cognitive behavioural therapy for depression associated with Parkinson's disease: a single case series. *Behavioural and Cognitive Psychotherapy, 33*(1), 89-102.

Cousins, R., Davies, A. D., Turnbull, C. J., & Playfer, J. R. (2002). Assessing caregiving distress: A conceptual analysis and a brief scale. *British Journal of Clinical Psychology*, *41*(4), 387-403.

Dobkin, R. D., Menza, M., Allen, L. A., Tiu, J., Friedman, J., Bienfait, K. L., Gara, M.A. & Mark, M. H. (2011). Cognitive–Behavioral Therapy for Depression in Parkinson Disease: A Randomized Controlled Trial. *Journal of geriatric psychiatry and neurology*, *24*(4), 206-214.

Dobkin, R. D., Rubino, J. T., Friedman, J., Allen, L. A., Gara, M. A., & Menza, M. (2013). Barriers to mental health care utilization in Parkinson's disease. *Journal of geriatric psychiatry and neurology*, *26*(2), 105-116.

Dobkin, R. D., Tröster, A. I., Rubino, J. T., Allen, L. A., Gara, M. A., Mark, M. H., & Menza, M. (2014). Neuropsychological outcomes after psychosocial intervention for depression in Parkinson's Disease. *The Journal of neuropsychiatry and clinical neurosciences*.

Dobkin, R. D. (2014). The relationship between telephone-administered cognitive- behavioral therapy for depression and neuropsychological functioning in Parkinson's disease. *The Journal of neuropsychiatry and clinical neurosciences*.

Dobkin, R. D., Rubino, J. T., Allen, L. A., Friedman, J., Gara, M. A., Mark, M. H., & Menza, M. (2012). Predictors of treatment response to cognitive-behavioral therapy for depression in Parkinson's disease. *Journal of consulting and clinical psychology, 80*(4), 694.

Dobkin, R. D., Interian, A., Durland, J.L., Gara, M.A., & Menza. M.A. (2018). Personalized telemedicine for depression in Parkinson's disease: A pilot trial. *Journal of Geriatric Psychiatry 31*(4) 171-176.

Dorsey, E. R., Constantinescu, R., Thompson, J. P., Biglan, K. M., Holloway, R. G., Kieburtz, K., ... & Tanner, C. M. (2007). Projected number of people with Parkinson disease in the most populous nations, 2005 through 2030. *Neurology*, *68*(5), 384-386.

Dorsey, E., Deuel, L. M., Voss, T. S., Finnigan, K., George, B. P., Eason, S., Miller, D., Reminick, J.I., Appler, A., Polanowicz, J., Viti, L., Smith, S., Joseph, A. & Biglan, K. M. (2010). Increasing access to specialty care: a pilot, randomized controlled trial of telemedicine for Parkinson's disease. *Movement Disorders*, *25*(11), 1652-1659.

Egan, Laidlaw, & Startstein (2015). Cognitive behavioral therapy for depression and anxiety in Parkinson's disease. *Journal of Parkinson's Disease, 5*(3), 659-667.

European Parkinson's Disease Association (2016). Prevalence of Parkinson's disease. Retrieved from http://www.epda.eu.com/en/resources/life-with-parkinsons/part-1/prevalence-of-parkinsons-disease/

Farabaugh, A., Locascio, J. J., Yap, L., Growdon, J., Fava, M., Crawford, C., Matthews, J., McCutchen, J., Buchin, J., Pava, J., & Alpert, J. E. (2010). Cognitive–Behavioral Therapy for Patients With Parkinson's Disease and Comorbid Major Depressive Disorder. *Psychosomatics*, *51*(2), 124-129.

Fernandez, H, Aarsland, D, Fenelon, G, Friedman, JH, Marsh, L, Troster, AI, Poewe, W, Rascol, O, Sampaio, C, Stebbins, GT, and Goetz, CG (2008). Scales to Assess Psychosis in Parkinson's Disease: Critiques and Recommendations. *Movement Disorders, 23 (4),* 2008, pp. 484–500.

Fernie et al. (2015). Cognitive behavioural interventions for depression in chronic neurological conditions: A systematic review. *Journal of Psychosomatic Research. Vol.78*(5), May 2015, pp. 411-419.

Gelb, D. J., Oliver, E., & Gilman, S. (1999). Diagnostic criteria for Parkinson disease. *Archives of neurology*, *56*(1), 33-39.

Goldman, J. G., & Holden, S. (2014). Treatment of psychosis and dementia in Parkinson's disease. *Current treatment options in neurology*, *16*(3), 1-18.

Guy, W. (1976). *ECDEU Assessment Manual for Psychopharmacology: 1976*. National Institute of Mental Health.

Hamilton, M. (1960). A rating scale for depression. *Journal of neurology, neurosurgery, and psychiatry*, *23*(1), 56.

Hamilton, M. (1959). The assessment of anxiety states by rating. *British journal of medical psychology*, *32*(1), 50-55.

Jankovic, J. (2008). Parkinson's disease: clinical features and diagnosis. *Journal of Neurology, Neurosurgery & Psychiatry*, *79*(4), 368-376.

Jauhar, S., McKenna, P. J., Radua, J., Fung, E., Salvador, R., & Laws, K. R. (2014). Cognitive-behavioural therapy for the symptoms of schizophrenia: systematic review and meta-analysis with examination of potential bias. *The British Journal of Psychiatry*, *204*(1), 20-29.

Lee A.H., & Weintraub, D. (2012) Psychosis in Parkinson's disease without dementia: common and comorbid with other non-motor symptoms. *Movement Disorders 27*:858–863.

Levin, J., Hasan, A., & Höglinger, G. U. (2016). Psychosis in Parkinson's disease: identification, prevention and treatment. *Journal of Neural Transmission*, *123*(1), 45-50.

Martinez-Martin, P., Rodriguez-Blazquez, C., Forjaz, M. J., Frades-Payo, B., Agüera-Ortiz, L., Weintraub, D., ... & Chaudhuri, K. R. (2015). Neuropsychiatric symptoms and caregiver's burden in Parkinson's disease. *Parkinsonism & related disorders*, *21*(6), 629-634.

Mohr, D. C., Vella, L., Hart, S., Heckman, T., & Simon, G. (2008). The Effect of Telephone-Administered Psychotherapy on Symptoms of Depression and Attrition: A Meta- Analysis. *Clinical Psychology: Science and Practice*, *15*(3), 243-253.

Mohr, D. C., Ho, J., Duffecy, J., Reifler, D., Sokol, L., Burns, M. N., Ling, J. & Siddique, J. (2012). Effect of telephone-administered vs face-to-face cognitive behavioral therapy on adherence to therapy and depression outcomes among primary care patients: a randomized trial. *JAMA*, *307*(21), 2278-2285.

Morgante, L., Colosimo, C., Antonini, A., Marconi, R., Meco, G., Pederzoli, M., ... & Ramat, S. (2012). Psychosis associated to Parkinson's disease in the early stages: relevance of cognitive decline and depression. *Journal of Neurology, Neurosurgery & Psychiatry*, *83*(1), 76-82.

Nasreddine, Z. S., Phillips, N. A., Bédirian, V., Charbonneau, S., Whitehead, V., Collin, I., Cummings, J.L. & Chertkow, H. (2005). The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment. *Journal of the American Geriatrics Society*, *53*(4), 695-699.

Ng, A., Chander, R. J., Tan, L. C., & Kandiah, N. (2015). Influence of depression in mild Parkinson's disease on longitudinal motor and cognitive function. *Parkinsonism & related disorders*, *21*(9), 1056-1060.

Nuti, A., Ceravolo, R., Piccinni, A., Dell'Agnello, G., Bellini, G., Gambaccini, G., & Bonuccelli, U. (2004). Psychiatric comorbidity in a population of Parkinson's disease patients. *European Journal of Neurology, 11*(5), 315-320.

Osenbach, J. E., O'Brien, K. M., Mishkind, M., & Smolenski, D. J. (2013). Synchronous telehealth technologies in psychotherapy for depression: A meta- analysis. *Depression and anxiety*, *30*(11), 1058-1067.

Overall, J. E., & Gorham, D. R. (1962). The brief psychiatric rating scale. *Psychol. Rep.* 1962; 10: 799-812.

Pontone, G.M., Bakker, C. C., Chen, S., Mari, Z., Marsh, L., Rabins, P. V., Williams, J. R., and Bassett, S. S. (2016). The longitudinal impact of depression on disability in Parkinson disease. *International Journal of Geriatric Psychiatry. Vol.31*(5), May 2016, pp. 458-465.

Prakash, K. M., Nadkarni, N. V., Lye, W. K., Yong, M. H., & Tan, E. K. (2016). The impact of non- motor symptoms on the quality of life of Parkinson's disease patients: a longitudinal study. *European journal of neurology*.

Ravina, B., Marder, K., Fernandez, H. H., Friedman, J. H., McDonald, W., Murphy, D., ... & Factor, S. (2007). Diagnostic criteria for psychosis in Parkinson's disease: report of an NINDS, NIMH work group. *Movement Disorders*, *22*(8), 1061-1068.

Reijnders MA, Ehrt U, Weber WEJ, Aarsland D, Leentjens AF. A systematic review of prevalence studies of depression in Parkinson's disease. *Movement Disorders 23*(2):183–189.

Reuther M, Spottke EA, Klotsche J, et al. (2007). Assessing health related quality of life in patients with Parkinson's disease in a prospective longitudinal study. *Parkinsonism Related Disorders;* 13:108–114.

Rothschild, A. J. (2013). Challenges in the treatment of major depressive disorder with psychotic features. *Schizophrenia bulletin*, *39*(4), 787-796.

Schrag A, Jahanshahi M, Quinn N. (2000). What contributes to quality of life in patients with Parkinson's disease? *Journal of Neurology Neurosurgery and Psychiatry, 69,* 308– 312.

Schrag, A., Barone, P., Brown, R. G., Leentjens, A. F., McDonald, W. M., Starkstein, S., Weintraub, D., Poewe, W., Rascol, O., Sampaio, C., Stebbins, G.T., & Goetz, C. G. (2007). Depression rating scales in Parkinson's disease: critique and recommendations. *Movement disorders*, *22*(8), 1077-1092.

Seppi K, Weintraub D, Coelho M, Perez-Lloret S, Fox SH, Katzenschlager R, Hametner EM, Poewe W, Rascol O, Goetz CG, Sampaio C (2011). The Movement Disorder Society Evidence-Based Medicine Review Update: treatments for the non-motor symptoms of Parkinson's disease. *Movement Disorders, 26*(Suppl 3):S42–S80.

Spitzer, R. L., Gibbon, M., & Williams, J. B. (1998). Structured Clinical Interview for DSM-IV Axis I Disorders: Patient Edition (February 1996 Final), SCID-I/P. Biometrics Research Department, New York State Psychiatric Institute.

Voss T, Bahr D, Cummings J, Mills R, Ravina B, Williams H (2013) Performance of a shortened Scale for Assessment of Positive Symptoms for Parkinson's disease psychosis. *Parkinsonism Related Disorders* 19:295–299.

Ware Jr, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical care*, 473-483.

Weintraub, D., Morales, K. H., Duda, J. E., Moberg, P. J., & Stern, M. B. (2006). Frequency and correlates of co-morbid psychosis and depression in Parkinson's disease. *Parkinsonism & related disorders*, *12*(7), 427-431.

Zahodne, L. B., & Fernandez, H. H. (2010). Parkinson's psychosis. *Current treatment options in neurology*, *12*(3), 200-211.