

## **Anxiety and Depression in Individuals with Parkinson's Disease with and without Deep Brain Stimulation**

### **INTRODUCTION**

Research has found that there is a greater prevalence of anxiety and depression in people with Parkinson's disease (PWP) compared to the general population.<sup>1</sup> As many persons can attest, anxiety and depression can be very disabling. Although anxiety greatly affects the quality of life of PWP, it has received relatively little attention from the PD research community. A number of studies have reported that between 24% and 75% of individuals with PD showed significant levels of anxiety.<sup>2,3</sup> Other studies have identified that depression is especially prevalent in PD patients, with the majority of estimates ranging between 20 and 40%.<sup>3,4,5</sup>

### **OBJECTIVE**

The goal of this project was to learn more about anxiety and depression in individuals with Parkinson's disease who have and have not undergone **Deep Brain Stimulation of the Subthalamic Nucleus (DBS-STN)**, and to study the relationship between anxiety, depression and certain patient variables (e.g., disease duration, time since DBS, and other clinical features).

### **METHODS**

The participants were recruited from a variety of sources. Some had participated in previous surveys conducted by The Parkinson Alliance; others responded to study announcements in medical clinics around the country, and still others found out about the study through their participation in local PD support groups, The Parkinson Alliance website ([www.parkinsonalliance.org](http://www.parkinsonalliance.org)), or our affiliate website devoted to DBS ([www.dbs-stn.org](http://www.dbs-stn.org)). Participants came from around the United States as well as Canada and the UK. The participants in this report included 87 individuals with PD who underwent DBS and 76 individuals with PD without DBS.

### **RESULTS**

The summary of the demographic information for this study can be found in Table 1. The average age of PD onset was 46 years for the **DBS group** and 58 years for the **Non-DBS group**. Male and female participants were equally represented for each group and most of the patients were married. The **DBS group** was younger and had an earlier age of onset of PD than the **Non-DBS group**.

**Table 1. Demographics and clinical features of the sample**

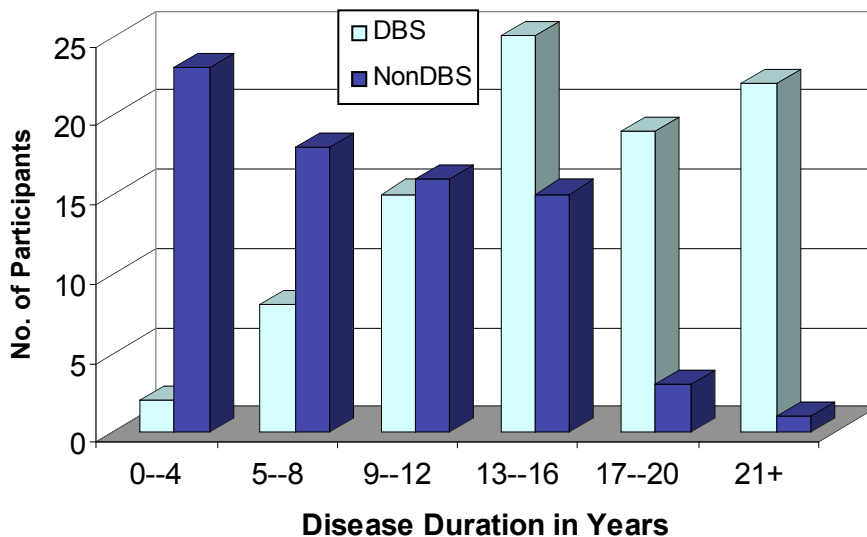
Variable	DBS (n=87)	Non-DBS (n=76)
Mean Age in years *	62	66
Duration of PD in years *	15.9	8.3
Percent Male	52%	53%
Percent Female	48%	47%
Percent Married	73%	71%
Mean Age of PD onset (in years)*	46	58
Average Time since DBS-STN (in years)	3.8	n/a

\* denotes significant differences between the groups

***Duration of PD within the two groups:***

There was a significant difference in duration of PD between the two groups (**DBS>Non-DBS**; see Figure 1). For research purposes it is important to take duration into consideration, which was done for all of the results reported below.

**Figure 1. Disease Duration Categories (in Years) for DBS and Non-DBS Groups**



## Self-reported Anxiety and Depression Symptoms:

Almost a third of the **Non-DBS group** reported that they were experiencing anxiety, while approximately one-fifth of the participants in the **DBS group** reported experiencing anxiety (See Table 2). Approximately one-third of the participants in **both groups** reported that they were experiencing depression. The majority of patients were treated by their neurologist or primary care physician for depression/anxiety, rather than receiving treatment from a psychiatrist. Additionally, only a small number of PD patients were receiving psychotherapy for depression or anxiety.

**Table 2. Self-reported Depression and Anxiety**

Variable	DBS	Non-DBS
Self-report Depressed	33.3%	34.7%
Positive Effectiveness of Antidepressants	94.7%	96.6%
Self-report Anxiety	21.0%	31.9%
Positive Effectiveness Anxiety Medication	92.3%	100%
Do you see someone to treat the depression? or anxiety?		
Therapist	7.4%	13.0%
Psychiatrist	12.7%	21.0%
General Practitioner	31.7%	32.7%
Neurologist	49.3%	57.1%

## Summary of Brief Symptoms Inventory-18 (BSI-18):

Each group was asked to complete a questionnaire that assessed symptoms of anxiety and depression called the BSI-18<sup>6</sup>. This section will summarize the results obtained from the BSI-18 questionnaire as it relates to anxiety and depression.

Table 3 below reflects that, while both groups reported a significant amount of anxiety and depression on the BSI-18, there were a greater number of participants in the **Non-DBS group** who reported significant levels of anxiety than those in the **DBS group**.

**Table 3. Percentage of Participants who obtained Elevated Scores on the Brief Symptoms Inventory-18**

Symptom	DBS Group (n=85)	Non-DBS Group (n=75)
* Anxiety	18%	25%
Depression	24%	29%

\*Denotes significance between the two groups

Specific responses to the questionnaire can be reviewed in Table 4, which is located at the end of this report. Looking at the individual items showed that the **Non-DBS group** reported that they experienced greater “Nervousness or shakiness inside” when compared to the **DBS group**.

### ***DBS Specific Questionnaire:***

The **DBS group** was also asked to rate whether they perceived changes in their anxiety and depression as a result of DBS. 41% experienced a decrease in anxiety and 28% a decrease of depression, while 16% experienced an increase of anxiety and 18% an increased amount of depression (refer to the table below).

**Table 5. Percentage of the DBS Group Reporting changes in Depression and Anxiety following DBS**

Reported Change	Anxiety (n=44)	Depression (n=46)
More	16%	18%
Less	41%	28%
No Change	43%	54%

## **DISCUSSION**

- Both the **DBS group** and the **Non-DBS group** experienced significant levels of anxiety and depression in comparison to the normal population. This finding is consistent with the literature to date indicating that a substantial percentage of persons with Parkinson’s disease experience emotional distress. These findings point to an ongoing need to explore the non-motor symptoms related to emotional distress in greater depth.
- The general prevalence of anxiety within adults nationwide (ages 18+) is 18.1%<sup>7</sup>, which is equivalent to the findings for the **DBS group** in this study. A significantly higher number of the **Non-DBS group** (25%) was found to be experiencing anxiety.
- For the participants who have been diagnosed with specific anxiety disorders, there was no difference between the two groups as to the type of anxiety they were experiencing (e.g., generalized anxiety, obsessive/compulsive, panic disorder, or social anxiety).
- Consistent with the literature, both groups reported a higher percentage of depression compared to the general adult population in the United States, which is about 9.5%.<sup>8</sup> 24% of the **DBS group** and 29 % of the **Non-DBS group** reported elevated scores on a measure of depression, reaffirming that depression is very prevalent in PD. This finding certainly points to the importance of assessing for depression in this population and providing appropriate treatment, such as counseling and medication.
- Approximately half of the **DBS group** indicated that they experienced changes in their level of anxiety and depression following DBS, the majority of whom stated that they experienced less emotional distress. This is an interesting and important finding that warrants mention and further study.

- The **Non-DBS group** experienced a greater amount of anxiety than the **DBS group**. This may be due to the **DBS group's** motor symptoms being better controlled/managed compared to the **Non-DBS group**. One must also consider other possibilities, such as the impact of medications that may influence emotional states, such as dopaminergic medications such as Sinemet, or the use and effectiveness of medications treating depression and/or anxiety. Further still, one would need to keep in mind the subjective improvement of emotional well-being as a result of DBS surgery (wanting to be better following the surgical procedure). Regardless of the cause, there appears to be a decrease in the overall level of distress after having had DBS surgery.
- The findings of this study indicated the majority of participants with psychiatric symptoms tend to be managed by either the patient's neurologist (in the main) or primary care physician. Additionally, the majority of the patients who experienced emotional distress were being treated by medications for those symptoms without the additional intervention of psychotherapy. This raises the question as to whether or not patients are being evaluated and treated by the ideal treatment team for psychological problems (e.g., Is the patient being treated by a multi-disciplinary team? Are psychiatrists and/or psychologists part of the team and evaluating and treating the patient's psychological well-being?). Further investigation in this realm is warranted.

### **UPCOMING REPORTS**

1. Summary of the results for the project entitled: **Sleep in Individuals with Parkinson's Disease with and without Deep Brain Stimulation.**
2. Summary of the results for the project entitled: **The Relationship between Sleep and Emotional Well-being in Individuals with Parkinson's Disease with and without Deep Brain Stimulation.**

### **ACKNOWLEDGEMENTS**

As we complete our fourth DBS-STN patient survey, which will be divided into three reports (anxiety and depression; sleep disturbance; and the relationship between sleep and emotional disturbance in PD patients), I am fortunate to be working with three People with Parkinson's (PWPs), Richard Kramer, who also had DBS, John Wherry and Ram Ramchandran. Their input and data analysis is very important to our work. We also have two neuropsychologists who analyze the data and add their professional skills to our work, including Dr. Jeffrey C. Wertheimer, staff neuropsychologist for Brooks Rehabilitation Hospital, and Dr. Julie Smith, staff neuropsychologist for Henry Ford Hospital. Additionally, I want to thank Valentina Trepatschko, a staff member of The Parkinson Alliance, for all of her diligence and assistance in data collection and organization. I want to acknowledge the ongoing dedication and tenacity of Carol Walton, Executive Director for The Parkinson Alliance, as she phoned, wrote, and visited a multitude of DBS facilities across the country to recruit participants for this research project. Finally, I would like to thank the rest of The Parkinson Alliance staff for their contributions.

I am very grateful to the people who took time to fill out the survey and to the many caregivers without whom our lives would not be as meaningful.

Margaret Tuchman,  
President,  
The Parkinson Alliance

**Table 4. Individuals Items on the Brief Symptoms Inventory-18: Differences between the DBS and Non-DBS group**

<b>BSI-18 Individual Items</b> (Rate how much that problem has distressed or bothered you <b><u>during the past 7 days including today</u></b> )	<b>DBS (n=85)</b>	<b>Non-DBS (n=75)</b>
<b><u>Anxiety Symptoms</u></b>		
Feeling Tense or Keyed up:		
Not at all	35%	24%
A little bit	33%	32%
Moderately	24%	23%
Quite a bit/Extremely	8%	21%
* Nervous or Shakiness inside:		
Not at all	42%	21%
A little bit	34%	32%
Moderately	11%	31%
Quite a bit/Extremely	13%	16%
Suddenly Scared for no Reason:		
Not at all	77%	72%
A little bit	17%	17%
Moderately	4%	7%
Quite a bit/Extremely	2%	4%
Spells of terror or panic:		
Not at all	84%	68%
A little bit	6%	23%
Moderately	11%	7%
Quite a bit/Extremely	0%	3%
Feeling so restless you couldn't sit still:		
Not at all	51%	45%
A little bit	25%	27%
Moderately	15%	17%
Quite a bit/Extremely	9%	11%
Feeling fearful:		
Not at all	68%	47%
A little bit	17%	36%
Moderately	12%	9%
Quite a bit/Extremely	4%	8%
<b><u>Depression Symptoms</u></b>		
Hopeless:		
Not at all	53%	32%
A little bit	24%	35%
Moderately	13%	15%
Quite a bit/Extremely	10%	18%

Feeling Worthless:			
	Not at all	62%	47%
	A little bit	18%	33%
	Moderately	14%	7%
	Quite a bit/Extremely	6%	13%
Feeling no interest in things:			
	Not at all	47%	39%
	A little bit	28%	35%
	Moderately	9%	19%
	Quite a bit/Extremely	15%	8%
Feeling Lonely:			
	Not at all	43%	44%
	A little bit	31%	24%
	Moderately	16%	16%
	Quite a bit/Extremely	10%	16%
Feeling Blue:			
	Not at all	41%	37%
	A little bit	26%	36%
	Moderately	25%	16%
	Quite a bit/Extremely	8%	11%
Thoughts of ending your life:			
	Not at all	84%	73%
	A little bit	8%	23%
	Moderately	6%	1%
	Quite a bit/Extremely	2%	2%

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\* Denotes significant differences between groups

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