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COMMENTARY

# Parkinson's Disease

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## Introduction

Parkinson's disease (PD) is a brain disorder that causes unintended or uncontrollable movements, such as shaking, stiffness, and difficulty with balance and coordination (1). Symptoms usually begin gradually and worsen over time. As the disease progresses, people may have difficulty walking and talking.

Parkinson's disease affects 1-2 per 1000 of the population at any time. PD prevalence is increasing with age and PD affects 1% of the population above 60 years (2).

The risk of developing PD is twice as high in men than women, but women have a higher mortality rate and faster progression of the disease (3).
A race that is most affected is the Caucasian population.

The prevalence rate of Parkinson's disease has grown more than 50% in the span of five years. Sex is an important fact in PD, as a matter of fact it is more common in men than woman by a 2:1 ratio (4). One clear risk is age, Parkinson's develops after 60 and there is a 1% chance of getting Parkinson's disease, but at 80 the chances increase by 5%. The largest study of Parkinson's disease shows Hispanics (16%), followed by non-Hispanic whites (13.6%), which are the biggest ethnicities that are affected by Parkinson's disease, and the least likely to get Parkinson's disease are African Americans (5). Parkinson's disease keeps growing, and at the rate that it's going it is soon to become the worst brain disease.

## Prevalence

Parkinson's disease (PD) is the second most common, age-related neurodegenerative disorder, affecting about 3% of the population by the age of 65 and up to 5% of the people over 85 years (6). Parkinson's disease is most common in the Midwest and the Northeast and is twice as likely to affect whites. Studies have shown the prevalence in the white population compared to blacks and Asians (6).

## Pathophysiology

The study of pathophysiology defines Parkinson's Disease as the loss of dopaminergic neurons which are the main source of dopamine, a type of neurotransmitter and hormone located in the mammalian central nervous system in the substantia nigra which helps the brain move the body (7). In other words, it tells the brain to create movement of the

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body. The loss of dopaminergic neurons creates a lewy body which is an abnormal clumping of alpha synuclein, a protein, which when found, indicates the onset of PD (8).

## Clinical Presentation

### *Motor Symptoms*

According to The Clinical Symptoms of Parkinson's disease, up to 80% dopaminergic cells in the nigro-striatal system are lost before the symptoms of Parkinson's disease start to appear (9). When fewer dopaminergic neurons in the striatum, it causes impairment of motor control in people with PD (10). Initial symptoms of this disease include muscular rigidity (muscle stiffness), resting tremor or loss of balance (11). Symptoms of disease progression include sharp muscle pain, loss of mobility, and loss of normal daily activities such as simply being able to walk (12).

Sex-related differences in motor symptom pattern also play a big role in diagnosis. Symptoms in females develop longer after diagnosis than in males (13).In males, usually the first symptoms that show up are signs of freezing gait. Freezing gait is one of the most weakening motor symptoms in a patient with Parkinson's disease. It is characterized by a patient's experience of short and temporary episodes of an inability to move their feet forward despite the intentions to walk (14). This leads to frequent falls and loss of independence. Although there are differences in the appearance of symptoms, ultimately, PD can be debilitating for both men and women.

### *Non-motor Symptoms*

Parkinson's disease is a progressive neurological disorder characterized by a large number of motor and non-motor features that can impact on function to a variable degree (15). It is said that Non motor features play an excessively important and sometimes dominant role in the management and even the diagnosis of the disorder (16). Non-motor symptoms of PD include drooling, loss of smell, and disturbances in sleeping patterns with restless leg syndrome (16). Non motor symptoms occasionally appear years ahead of the motor symptoms (17). Alongside these symptoms, mental health is also disrupted with bouts of depression, increased risk of dementia, and occurrences of autonomic disturbance (18). Patient reflection essays have reported *"I feel trapped inside my body . . . as if I'm not in control . . . almost as if someone or something else is running my life.''* PD makes patients feel they have lost their sense of control of their own mind which then leads to mental health problems (18). Although PD is known for its motor symptoms, the non-motor symptoms can be just as debilitating.

## Treatment/Diagnosis/Risk Factors

According to the research of John Hopkins Medicine, it shows that Parkinson's is not a curable disease. Treatment for Parkinson's does help with the risk of progression of the disease, doctors typically prescribe medication, or supportive therapies such as occupational therapy, speech therapy, physiotherapy, and even surgery (19). The success rate for physical therapy is four weeks of gait training and eight weeks for balance training, which needs to be continued for the maximum positive results (20). Drug development since 1999 had a success rate of 14.9% with the overall 357 trials. The drugs that are used for the patients are levodopa, safinamide, and droxidopa (21). For self-care, usually patients that are affected with Parkinson's take care of themselves by diet and exercise, like aerobic training, strength training workouts, and balance training workouts. In some cases, people resort to traditional Chinese medicine and acupuncture, which aids the patient by relieving symptoms of the disease (22, 23). Patients that are diagnosed by a neurologist (diagnosed by the given medical history and signs/symptoms) (24), are given medication, but the medications come with complications. Carbidopa- levodopa (Sinemet) can induce nausea, hallucinations, confusion, lightheadedness, and dyskinesia. On the other hand, dopamine agonists (pramipexole, ropinirole, rotigotine patch) can induce nausea, dizziness, leg swelling, sleepiness, sleep attacks, worsening cognition, hallucinations, and impulse control disorders (25). With the side effects and the rising cost, depending on whether the person's insurance may be covered or they might not have insurance in general, some patients would resort to not taking any treatments. If the patient does not take any form of treatment, PD will progress at a much faster rate, and more complications will occur throughout the patient's life such as apathy, depression, anxiety, psychosis, sleep disorders, and cognitive impairment (26).

## Therapies

Medical therapies should address both motor and non-motor symptoms. There are several therapies that can help patients recuperate involving exercise that encourages maintaining muscle strength, increasing flexibility and motion, improving cardiovascular function, walking, jogging, running,

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swimming, cycling. While not curative, these exercises reduce the risk of progression of the disease. Other non-pharmacological therapies for Parkinson's include education, support groups, speech therapy and nutrition therapy (27). There was a hypothesis about empirical evidence, turns out their hypothesis was indeed incorrect. Although there are some factors, there's no remedy that can help the disease from advancing from the host.

In addition to non-medicinal therapies, drugs such as levodopa, can be very effective against the disease. If a patient consumes (Carbidopa/Levodopa) with 10/100mg and is weight 2263. The Side effect will be low blood pressure, nausea, confusion, dynsekia. The drug's main focus is converting dopamine into the cerebrum (28).

Although there are many therapies to combat or stabilize Parkinson's disease that are not possible to prevent, some habits can reduce it.

## Surgical Therapies

There is only one approved surgical therapy of the different brain structures that has been studied and used for Parkinson's disease for several decades. People who are living with Parkinson's disease may be a candidate for deep brain stimulation (29). Deep brain stimulation has become an official therapeutic tool for treating patients with Parkinson's disease. It is an elective surgical procedure in which electrodes are implanted into certain areas of the brain. Although, one of the main dilemmas of deep brain stimulation are side effects such as tiredness, depression, and suicide (30). This treatment is clear for people who have had Parkinson's disease for at least four years. Some benefits of deep brain stimulation are to get up to five additional good movements without dyskinesia. It also benefits you to use less medication, and just improves a better quality of life.

## Experimental Therapies

While traditional therapies may help some patients, there is no known cure for PD. Parkinson's disease is a progressive disorder that affects the nervous system and the parts of the body controlled by the nerves. Current treatment focuses on the symptoms of the disease and mainly involves replacement of dopamine deficiency. (31) Dopamine deficiency is having low levels of dopamine, a neurotransmitter and hormone that regulates blood pressure, motivation, helps with memory and learning, increasing attention and focus. (31). Patients with Parkinson's disease benefit from dopamine replacement therapy by seeing improved outcomes for conditions linked to interference and decreased results for disorders linked to facilitation. While treatment for Parkinson's is very scarce one of the current experimental treatments is medical marijuana. Medical Marijuana is being used at the moment as an experimental therapy to relax the minds (32). Medical marijuana is currently being used by 44% of the population with PD (32). CBD (cannabidiol) and THC (tetrahydrocannabinol) are responsible for the medicinal effects of marijuana. Medical marijuana helps with regulating memory, pleasure, concentration, thinking, movement, concentration, sensory and time perception, pain, and much more. CBD (cannabidiol) inhibits the psychotropic effects of THC (tetrahydrocannabinol) and improves its tolerability and therapeutic window, without being intoxicated. (32) Medical marijuana helps both motor and non-motor symptoms including bradykinesia, rigidity, tremor, sleep, and pain. Medical marijuana has greatly improved PD patients.

## Conclusion

Parkinson's disease has reached many people throughout our society. It has affected both men and women. Parkinson's disease is the second most neurodegenerative disease; it has affected more than 6 million people in the world (33). Knowledge of the disease manifestations, the treatments, and the progressive long-term course of the disease is necessary to maintain a normal life. No cure has yet been found for such illness, however, clinical trials continue with research for a better quality of life.

Clinical trials have advanced for Parkinson's Disease to gain access for new research treatments to find cure for disease. Clinical trials are performed by nonprofit organizations, such as the Michael J. Fox Foundation (33). It focuses on studies that increase the chances of slowing the progression of PD. Patients participating in clinical research are important in an effort to provide research and outcomes in which studies were expanded to include anti-inflammatory agents to reduce inflammatory processes in the brain (33). There are ongoing studies in every clinical phase. Studies are focusing on targeting dopaminergic symptom relief, and evaluating supplements and other remedies such as cannabidiol, melatonin, and probiotics (33). The hope and goal of research is that some day in the near future a cure is found to treat PD to improve the quality of life of patients afflicted with PD. In addition, a cure would make PD a disease of the past, so that patients with PD can enjoy a life of dignity/happiness with loved ones.

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