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# Unmasking nonmotor symptoms of Parkinson disease

By Susan A. LaRocco, PhD, RN, MBA, CNL

MOST NURSES ARE familiar with the characteristic features of Parkinson disease (PD) such as tremor, rigidity, bradykinesia, and postural instability. But nonmotor symptoms—those that don't involve movement, coordination, physical tasks, or mobility—are also of concern because they can greatly affect the quality of life of individuals living with PD. With an awareness of the signs and symptoms associated with PD and careful history taking, nurses can provide high-quality care to these patients. This article provides an overview of PD with a focus on common nonmotor clinical manifestations, along with suggestions for managing them.

## Overview of PD

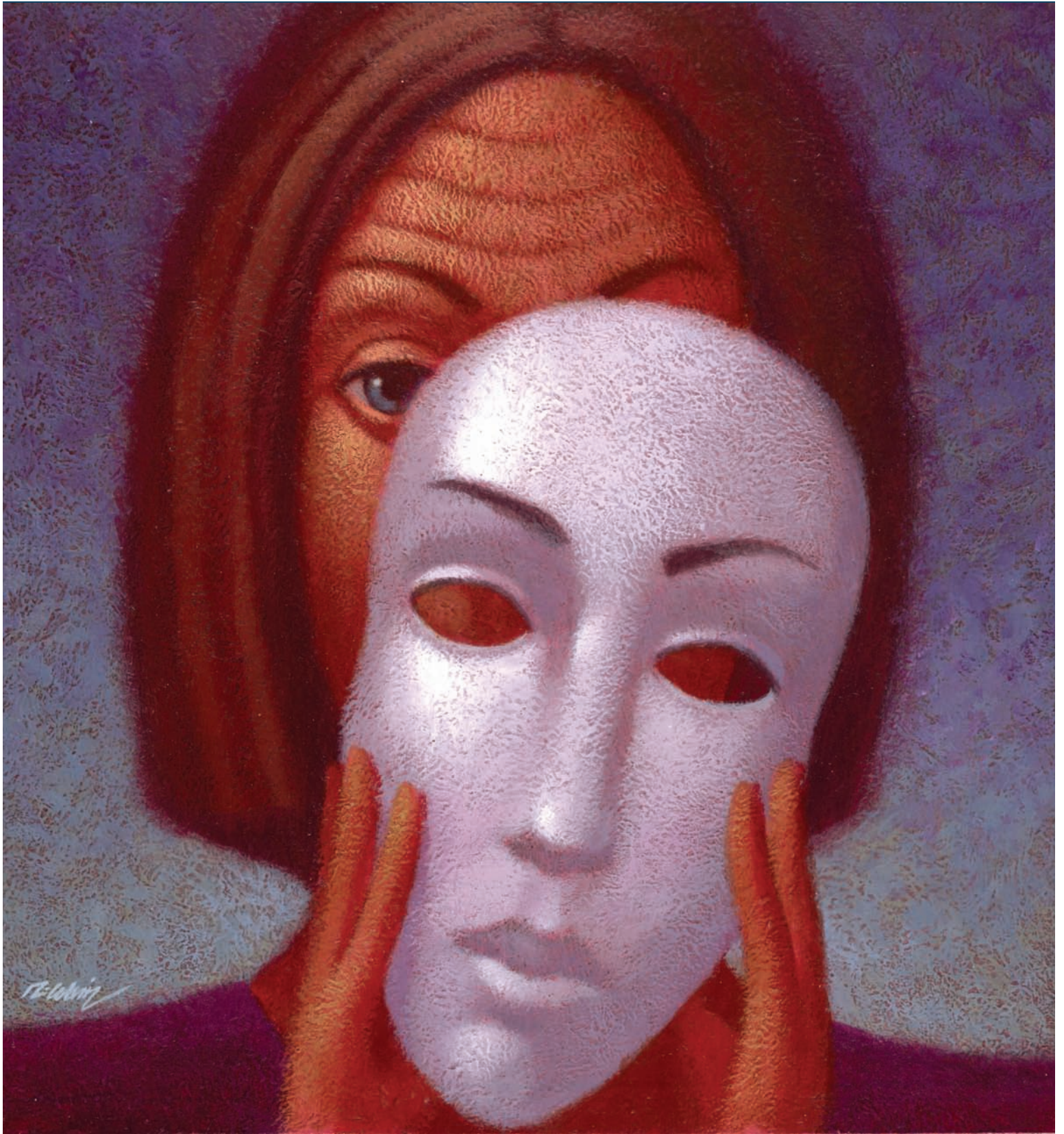
PD is a progressive, degenerative disease of the central nervous system. In the United States, as many as 1 million people have been diagnosed with PD, and approximately 60,000 new cases are diagnosed each

year. While the average age of onset is 60, 5% to 10% of patients are considered early onset, with their diagnosis occurring before age 50. Fifty percent more men than women develop PD.<sup>1,2</sup>

It's estimated that many patients in the early stages of PD aren't diagnosed, either because their symptoms aren't well defined or because they don't seek medical care. Because the prevalence and incidence of PD increases with age, an increase in the number of patients with this disease will likely increase as the baby boom generation ages.<sup>1</sup>

The lack of dopamine resulting from a decrease in dopamine-producing cells in the substantia nigra portion of the brain causes PD symptoms (see *Pathophysiology of PD*), but it's speculated that environmental factors such as exposure to neurotoxins may accelerate the death of dopamine-producing cells. It's also likely that some people have a genetic

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predisposition to being susceptible to these neurotoxins.<sup>3</sup>

Diagnosis of PD is based on presentation of signs and symptoms and medical history. No lab test, imaging study, or biopsy can confirm the diagnosis, although certain tests can help rule out other disorders.<sup>1</sup>

Two rating scales are used to monitor the patient's functionality and disease progression: the Unified Parkinson Disease Rating Scale and the Modified Hoehn and Yahr Scale. Other assessment tools, such as the Mini Mental State Exam and quality of life and depression scales, are also

useful in clinical practice and research protocols.<sup>4</sup>

Although PD can't be cured, medications such as carbidopa-levodopa can help alleviate signs and symptoms. Adverse reactions may be severe and some medications become less effective over time, requiring more frequent doses. Of particular concern are the adverse reactions of carbidopa-levodopa related to long-term therapy, which may include dyskinesia, delusions, hallucinations, and impulse control disorders.<sup>5</sup>

For some patients, deep brain stimulation, which involves implantation of two leads and an implantable pulse generator, increases motor control. (See *A surgical option: Deep brain stimulation*.) Today, the device has been implanted in more than 100,000 people worldwide.<sup>6</sup>

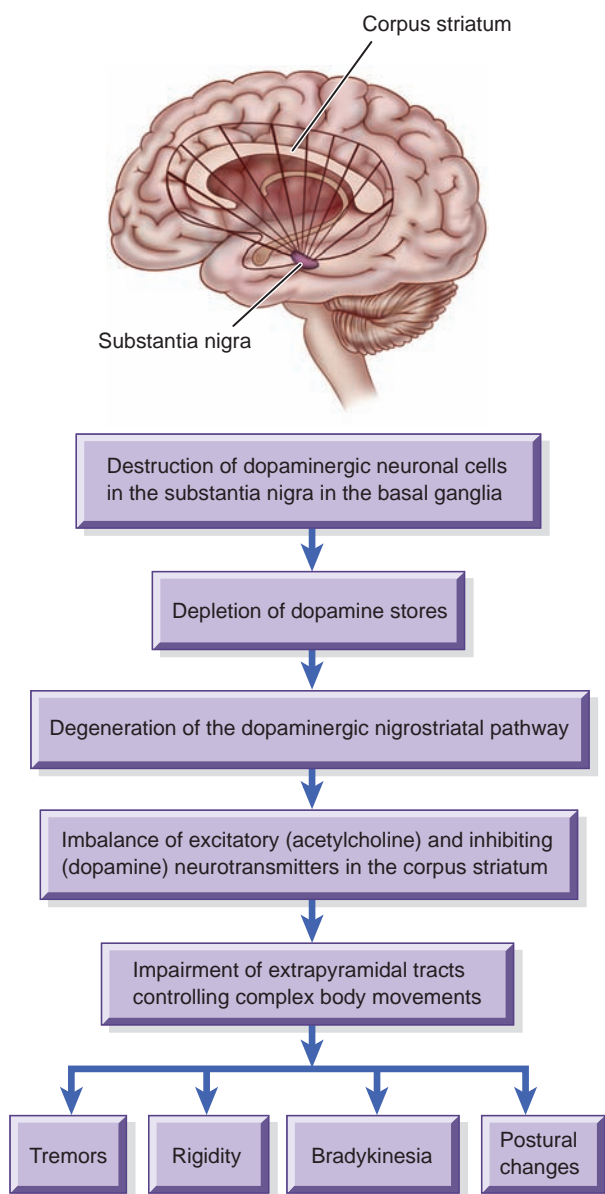
Because of the complexity of symptoms and the variability of the progression of PD, treatment must involve an interdisciplinary team including a neurologist, nurses, physical therapists, occupational therapists, a dietitian, a speech therapist, and a social worker. Ideally, a patient should be followed by a clinical group that specializes in movement disorders.

### Recognizing nonmotor symptoms of PD

Nonmotor symptoms can be divided into three categories: those that involve the autonomic nervous system (ANS), those with non-ANS involvement, and neuropsychiatric symptoms. Examples include nocturia, fatigue, mood changes, pain, and excessive salivation (sialorrhea) and drooling. These symptoms may be due to the disease process or adverse reactions to medications taken to control motor symptoms.

In some cases, nonmotor symptoms appear before a patient is diagnosed with PD. But because many

## Pathophysiology of PD



Source: Grossman S, Porth CM. *Porth's Pathophysiology*. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2014:473.

of these symptoms can occur with other diseases, they may not be recognized as related to the primary diagnosis of PD. The patient may attribute symptoms to “old age” and fail to mention them.

One of the issues with PD is that it's not easy to diagnose unless the cardinal symptoms are present. Nocturia and fatigue are common in older adults, often due to poor sleep. Pain is frequently ignored by older adults because they think it's normal to have aches and pains at their age.

Nonmotor symptoms can have a significant impact on a patient's quality of life. A large international study found a close association between the number of nonmotor symptoms and decreased health-related quality of life. Almost two-thirds of the participants had three nonmotor symptoms such as nocturia, fatigue, sialorrhea, and drooling. Other symptoms that had a strong negative impact on quality of life were apathy, fatigue, and unexplained pain.<sup>7</sup>

In a qualitative study of patients with PD and their caregivers, nonmotor symptoms were also identified as barriers to functioning. Caregivers' frustration with unremitting fatigue and the pain experienced by patients were at times more distressing than the motor symptoms. Caregivers and patients expressed despair and frustration when they described dealing with these symptoms on a daily basis.<sup>8</sup>

### Symptoms with ANS involvement

The ANS, which controls involuntary body functions, is composed of the sympathetic and parasympathetic divisions. Vasoregulation, heart rate, peristalsis, and gastric secretions are altered when the ANS is impaired. Some of the most common ANS-related complaints of patients with PD include:



### Nonmotor symptoms that can have a strong negative impact on quality of life are apathy, fatigue, and unexplained pain.

- *constipation.* Degeneration of the nerves in the colon and delayed gastric emptying, as well as adverse reactions to anticholinergic medications such as benztropine and trihexyphenidyl, contribute to this problem. Decreased mobility is often an additional factor.<sup>9</sup>

- *orthostatic hypotension.* Twenty to fifty percent of patients with PD experience orthostatic hypotension.<sup>10</sup> Medications such as carbidopa-levodopa and dopamine agonists such as ropinirole cause hypotensive adverse reactions.<sup>11</sup>

- *sexual dysfunction.* This can include erectile dysfunction and premature ejaculation for men, difficulty becoming aroused or reaching orgasm and painful intercourse for women, and general dissatisfaction with

sexual life for both.<sup>12</sup> While sexual problems aren't uncommon for many people in the age group most affected by PD, the motor aspects of the disease can contribute to sexual problems. Rigidity, loss of fine motor skills, and loss of spontaneous movement may limit a person's ability to enjoy sexual relations, leading to frustration and dissatisfaction for the patient as well as his or her partner.<sup>7</sup>

- *thermoregulation disturbances.*

These can be any one of three problems related to diaphoresis: excessive amount (hyperhidrosis), decreased amount (hypohidrosis or oligohidrosis), or complete absence of sweating (anhidrosis).<sup>7</sup> For patients with hyperhidrosis, the major problem is embarrassment. For those with anhidrosis, altered thermoregulation can result in hyperthermia that can be associated with seizure activity. Both autonomic dysfunction and carbidopa-levodopa-associated adverse reactions are implicated in disturbances of thermoregulation.

- *urinary dysfunction.* An overactive bladder results from changes in the ANS. Functional incontinence may result from diminished mobility.<sup>7</sup> Patients with PD often have problems with frequency, urgency, and urge incontinence. They also experience reduced bladder capacity due to involuntary detrusor muscle contractions at the early stages of bladder filling.<sup>13</sup>

### Symptoms without ANS involvement

Patients with PD also experience signs and symptoms caused by the decrease in dopamine that aren't related to either the ANS or a neuropsychiatric etiology. These include:

- *sleep disorders.* Insomnia, in the form of sleep fragmentation or early awakening, is a common complaint that may be symptomatic of PD or

related to comorbid conditions.<sup>12</sup> Sleep disorders may be related to motor symptoms such as restless leg syndrome or periodic limb movement disorder.<sup>13</sup> Rapid eye movement sleep behavior disorder (RBD) is characterized by the acting out of vivid, intense, and violent dreams. RBD may precede a PD diagnosis by several years.<sup>13,14</sup> Individuals must be protected from injuring themselves or their bed partner. Excessive daytime sleepiness, in spite of a good night's sleep, is thought to be related to either PD or dopamine agonist medications.<sup>10</sup>

- **pain.** Identified as a symptom of PD since the first clinical case study was published in 1817, pain is often episodic and unpredictable, and has been identified as related to fluctuating dopamine levels. Patients report musculoskeletal, visceral, and neuropathic pain.<sup>15</sup> Visceral pain may be caused by constipation. Neuropathic pain is primarily radicular pain caused by damage to the lumbar spine due to festination (the shuffling gait with head bent toward the floor that's characteristic of PD, kyphosis, and dystonia).<sup>15</sup>

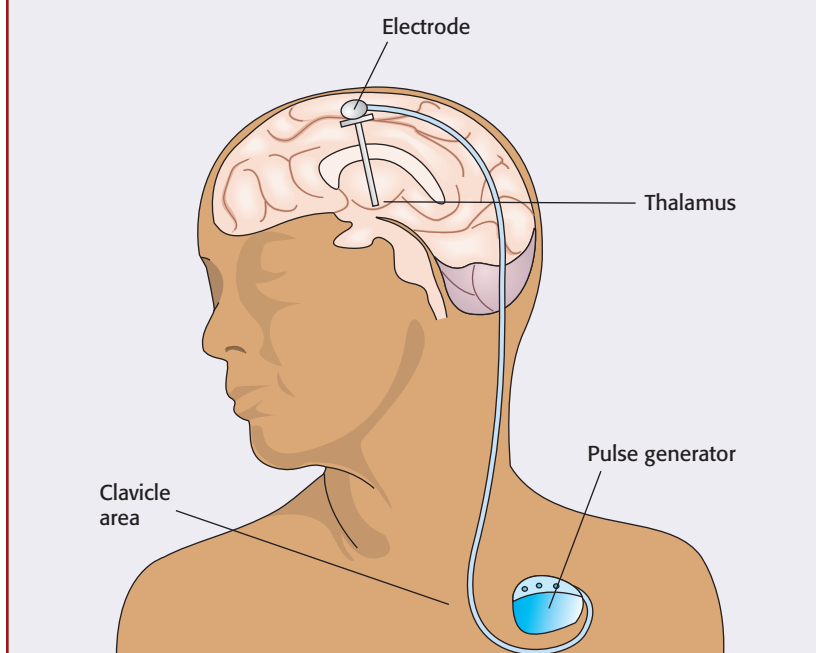
- **olfactory dysfunction.** In a recent study in Japan, the ability to detect odors was noted to be impaired in patients with PD when compared to age-matched control subjects.<sup>16</sup> This loss often is present at the early stages of the disease. While the reason for this deficit hasn't been thoroughly investigated, an argument can be made for assessing Cranial Nerve I (olfactory nerve) function in patients who are suspected of having PD. Anosmia (loss of the sense of smell) can lead to anorexia or ingestion of spoiled food.

Other nonmotor symptoms include fatigue, dermatologic findings (seborrhea), and rhinorrhea.

## A surgical option: Deep brain stimulation

Deep brain stimulation (DBS) is the surgical implantation of a pulse generator into the thalamus, subthalamic nucleus, or globus pallidus area of the brain of a person with PD. The electrical stimulation to the deep brain helps improve symptoms such as tremor, rigidity, stiffness, slowed movement, and gait. Prior to implantation, the patient will undergo either magnetic resonance imaging or computed tomography.

The three components of the system are the lead (electrode), the extension, and the implantable pulse generator (battery pack). The electrode is inserted through a small opening in the skull. The extension is placed under the skin to the battery pack, which is typically placed under the skin near the clavicle. After it's implanted, the electrical impulses help to control motor symptoms. The National Institute of Neurological Disorders and Stroke supports continuing research on DBS.<sup>21</sup>



## Neuropsychiatric symptoms

Many patients with PD experience a variety of neuropsychiatric symptoms, including:

- **depression.** Most likely caused by physiologic changes in the brain as well as a psychological reaction to the disease itself, depression is the most common psychiatric disturbance seen in patients with PD and may be difficult to diagnose.<sup>13,17</sup> Many of the usual manifestations, such as masked facial expression and sleep disorders, may be independent symptoms of the disease and not indicative of an underlying mood disorder.<sup>17</sup>

- **anxiety.** Patients may describe feelings of nervousness, apprehension, or tension, all of which may be exacerbated by social situations. The association with motor symptoms is complex, with an increase in motor symptoms triggering increased anxiety, or increased anxiety resulting in an increase in motor symptoms such as tremor.<sup>17</sup>

- **apathy.** Described as a multidimensional construct that includes "lack of goal-directed behavior, cognition, or emotion," apathy often manifests in patients with PD who report losing interest in their surroundings, lacking motivation, and

having difficulty experiencing pleasure.<sup>7,18</sup>

- *impulse control disorders.* Pathologic gambling, compulsive buying, hypersexuality, and compulsive or binge eating are often a consequence of treatment for PD.<sup>5</sup> Impulse control disorders are more common in patients taking a dopamine agonist such as pramipexole or ropinirole.<sup>19</sup> Because of embarrassment, many patients may be reluctant to reveal these behaviors, limiting the ability of clinicians to help them cope with these symptoms. In particular, hypersexuality may cause distress to the patient's partner, and compulsive shopping may strain the household finances.

- *cognitive impairment.* Ranging from subtle deficits such as word-finding difficulty and poor complex task planning to advanced dementia, many patients with PD demonstrate some cognitive deficits in the early stages of the disease. These include a slowed cognitive reaction time and difficulty with recall.<sup>12</sup>

### **Alleviating the impact of symptoms**

Many of the nonmotor symptoms of PD, such as constipation and orthostatic hypotension, are typical of many diseases and the interventions are well known. Constipation can be diminished by a high-fiber diet, adequate intake of fluids, and a regular bowel program involving suppositories and/or bulk-forming laxatives such as psyllium or food such as prunes. Patients with orthostatic hypotension, no matter the cause, are encouraged to change position slowly, particularly when getting out of bed. Pain management should be initiated as it would be for patients with any chronic illness.

Other nonmotor symptoms are more specific to PD and require treatments that are tailored to the patient. While it's unlikely that every patient will have all of the

nonmotor symptoms mentioned above, it's especially important to assess for them and work with the interdisciplinary team to provide comprehensive care.

Some sleep disorders may be effectively treated with medications. Excessive daytime sleepiness may respond to a central nervous system stimulant such as modafinil.<sup>12</sup> Insomnia may be improved by good sleep hygiene habits such as an established regular bedtime and waking schedule; avoiding alcohol, caffeine, and nicotine in the evening; a darkened room; and bedtime rituals. Whenever possible, however, it's best to encourage nonpharmacologic means to promote sleep because of potential adverse reactions and drug interactions.

Neuropsychiatric symptoms, including mood disorders, may respond to psychotherapy and antidepressants. In particular, impulse control disorders may cause stress

and be difficult for a patient to reveal. With the patient's permission, interviews with family members may provide information that will aid in treatment. A nonjudgmental approach is crucial. Recognition that medications used to control motor symptoms are a factor in the impulse control disorder may help alleviate some of the patient's embarrassment.

Botulinum toxin is an effective treatment for sialorrhea, but its effect wears off after a few months, requiring the patient to return for another injection.<sup>20</sup>

### **Improving quality of life**

PD is a complex chronic illness that affects all aspects of a patient's life, with an economic and social impact on patients and their families. Being aware of the many problems that patients with PD face beyond the familiar motor symptoms is instrumental in seeing that

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**<http://www.apdaparkinson.org>**

Downloadable publications; news of events; location of local chapters and referral centers

### **ClinicalTrials.gov, a service of the U.S. National Institutes of Health**

**<http://www.clinicaltrials.gov>**

Search for clinical trials related to PD

### **Michael J. Fox Foundation for Parkinson's Research**

**<http://www.michaeljfox.org>**

General information about PD; extensive list of books about living with PD

### **National Institute of Neurological Disorders and Stroke**

**[http://www.ninds.nih.gov/disorders/parkinsons\\_disease/parkinsons\\_disease.htm](http://www.ninds.nih.gov/disorders/parkinsons_disease/parkinsons_disease.htm)**

General information about PD

### **National Parkinson Foundation**

**<http://www.parkinson.org>**

Official website of an organization devoted to research and education

### **Parkinson Disease Foundation**

**<http://www.pdf.org>**

Nonprofit organization dedicated to PD research, education, and advocacy



patients are appropriately referred to other disciplines, such as psychiatric counselors. Enhanced quality of life depends on a highly skilled team of healthcare professionals, and nurses must be knowledgeable members of the team. ■

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