

Parkinson's Disease Associated Sleep Disturbance

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Parkinson's Disease

- **2nd most common** neurodegenerative disorder
- Peak age at onset is 60 years
- PD **risk increases with age**, lifetime risk being 2%
- Positive FH increases risk to 4%
- Prevalence of PD is 1.8% over age 65 and is 2.6% at age 85-89
- Males to female ratio **3:2**



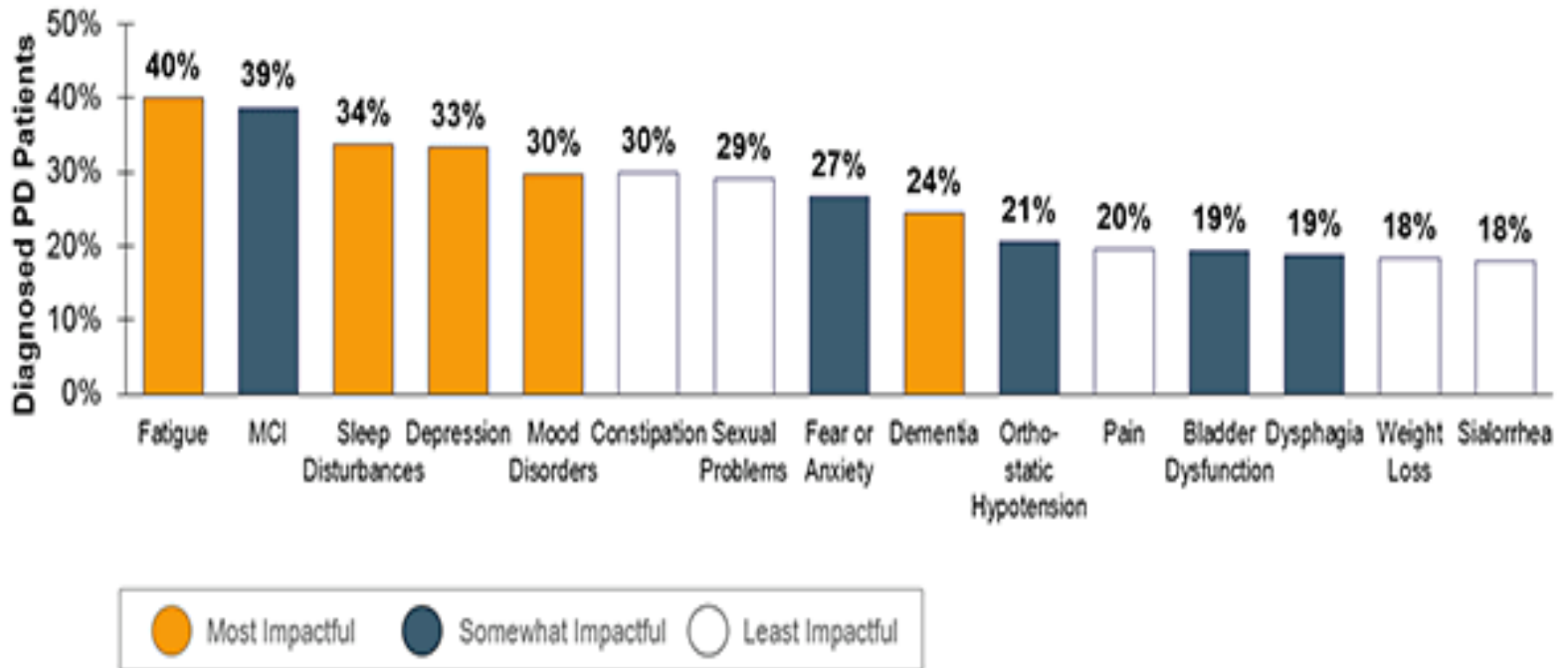
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Parkinson's Disease

- Etiology remains multifactorial
- Due to **loss of dopamine** - producing brain cells
- ~70% DA loss for symptom manifestations
- Cardinal features:
 - **Bradykinesia**: slowness of movements
 - **Tremor**
 - **Rigidity**: stiffness
 - **Postural instability**: impaired balance and coordination



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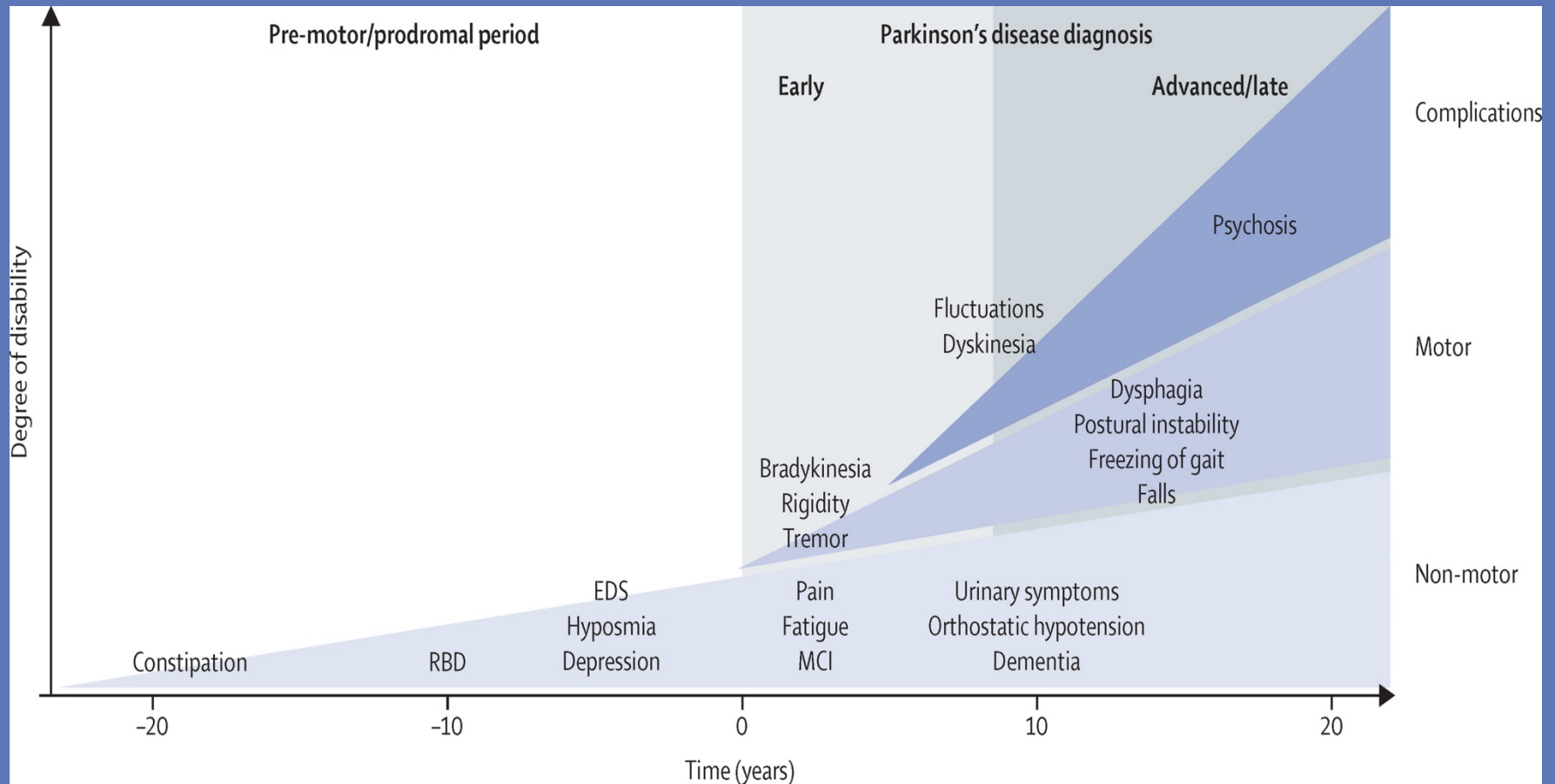
PD gives rise to a spectrum of cognitive/neurobehavioral and other non-motor symptoms that highly impact quality of life of patients

Health Advances, based on ~200 physicians



The Michael J. Fox Foundation for Parkinson's Research

Parkinson's Disease



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PD Associated Sleep Disturbance

- Sleep benefit
 - **Improvement** in mobility and motor state the **morning after drug intake** at night
 - Recovery of dopaminergic function and storage
 - **Circadian rhythm** related phenomenon
 - Pharmacological response to dopaminergic medications



PD Related Sleep Disturbance

- **Sleep disorders** are significantly more **common in PD** compared to control - estimates have ranged from 60-98%
- Sleep architecture studies in PD show:
 - Reduced total sleep time and sleep efficiency
 - Sleep arousals and fragmentation
 - Circadian variation of symptoms
 - Classified into the “morning better or worse”

PD –Sleep Disturbance

- **Insomnia:** defined as a recurrent difficulty to fall asleep or stay asleep, with daytime psychological or cognitive consequences
 - REM behavior (RBD), parasomnia, sleep apnea(OA), excessive daytime sleepiness
- **Motor:** Restless legs(RLS), Periodic limb movements (PLM), Akinesia
- **Urinary:** Nocturia
- **Neuropsychiatry problems:** Depression, Vivid dreams, Altered dream content, Hallucinations, RBD, Non-REM-related disorder

Parkinson's Disease Sleep Scale (PDSS)

How would you rate the following, based on your experience during the past one week.
(Place a cross at the appropriate point on the line)

1. The overall quality of your night's sleep is:

AWFUL EXCELLENT

2. Do you have difficulty falling asleep each night?

ALWAYS NEVER

3. Do you have difficulty staying asleep?

ALWAYS NEVER

4. Do you have restlessness of legs or arms at night or in the evening causing disruption of sleep?

ALWAYS NEVER

5. Do you fidget in bed?

ALWAYS NEVER

6. Do you suffer from distressing dreams at night?

ALWAYS NEVER

7. Do you suffer from distressing hallucinations at night (seeing or hearing things that you are told do not exist)?

ALWAYS NEVER

8. Do you get up at night to pass urine?

ALWAYS NEVER

9. Do you have incontinence of urine because you are unable to move due to "off" symptoms?

ALWAYS NEVER

10. Do you experience numbness or tingling of your arms or legs which wake you from sleep at night?

ALWAYS NEVER

11. Do you have painful muscle cramps in your arms or legs whilst sleeping at night?

ALWAYS NEVER

12. Do you wake early in the morning with painful posturing of arms or legs?

ALWAYS NEVER

13. On waking do you experience tremor?

ALWAYS NEVER

14. Do you feel tired and sleepy after waking in the morning?

ALWAYS NEVER

15. Have you unexpectedly fallen asleep during the day?

FREQUENTLY NEVER

PD – Sleep Disturbances

- Excessive day-time sleepiness:
 - Disabling trend to doze or **fall asleep in various circumstances** that interferes with family, professional and social life
 - Results in **poor attention, memory and hallucinations** and predisposes to accidents
 - Effects approx 15-16% of PD patients
 - May be a primary feature of PD- differentiate from fatigue



PD – Sleep Disturbances

- Excessive day-time sleepiness
 - **Identify triggers**: Advancing disease, sleep habits, nocturnal sleep disruption- OSA, PLM, parasomnias, depression, drugs (dopaminergic, antihistamines, hypnotics, anxiolytics, SSRIs)
 - **Epworth sleepiness scale** (ESS): practical tool to assess severity
 - Consider sleep study or multiple sleep latency test to rule out primary sleep disorders

Use the following scale to choose the most appropriate number for each situation:-

- 0 = would never doze
- 1 = Slight chance of dozing
- 2 = Moderate chance of dozing
- 3 = High chance of dozing

Situation

Chance of dozing

Sitting and reading

Watching TV

Sitting, inactive in a public place (e.g. a theatre or a meeting)

As a passenger in a car for an hour without a break

Lying down to rest in the afternoon when circumstances permit

Sitting and talking to someone

Sitting quietly after a lunch without alcohol

In a car, while stopped for a few minutes in the traffic

Total

Score:

0-10 Normal range

10-12 Borderline

12-24 Abnormal

PD – Sleep Disturbances

- Excessive daytime sleepiness management
 - Avoid underlying triggers
 - Dopaminergic dose adjustment
 - Manage underlying sleep disorder
 - Modafinil, caffeinated products??



PD – Sleep Disturbances

- REM behavior disorder: (RBD)
 - Present in about 25-50% of PD patients
 - Has been linked with increased risk of developing PD
 - Precedes motor PD symptoms by years
 - Characterized by dream enactment during REM sleep



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PD – Sleep Disturbances

- REM behavior disorder (RBD)
 - Leads to complex, **vigorous and sometimes violent behaviors** and in turn injury to self or bedpartner
 - Pathological basis unclear; thought to be related to the **degeneration of lower brainstem nuclei** - *pedunculo pontine, subcoeruleal nucleus*
 - Polysomnography (Sleep study) required for definite diagnosis



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PD – Sleep Disturbances

- REM behavior disorder (RBD) Management:
 - Avoid triggers- SSRI have been implicated
 - mild to moderate- none indicated
 - Conservative/ protective measures
 - Clonazepam- low doses
 - Melatonin 3-12mg doses
 - Pramipexole
 - Ramelteon

PD – Sleep Disturbances

- Restless legs syndrome:
 - **Irresistible urge to move** with associated discomfort, exacerbated by rest, relieved by movement
 - Associated with peripheral neuropathy, renal failure, iron/ folate deficiency
 - **Medications** implicated: antidepressants, neuroleptics, dopamine antagonist, sedating histamines
 - **Treatment:** Avoidance of triggers, iron supplementation,
 - Pramipexole, ropinirole, L-dopa, Gabapentin, benzodiazepine, narcotics

PD – Sleep Disturbances

- Obstructive sleep apnea
 - Typically associated with **increased body mass index (BMI)**
 - 20-50% of normal BMI PD patients have been shown to have significant apnea
 - Typical features include **snoring, breathing pauses, non-refreshing sleep**
 - Snoring has been shown to predict EDS
 - **Treatment:** Weight loss, CPAP, etc.



ndation

Obstructive Sleep Apnea

STOP-Bang Questionnaire

1. **Snoring:** Do you snore loudly (loud enough to be heard through closed doors)?
Yes No
2. **Tired:** Do you often feel tired, fatigued, or sleepy during daytime?
Yes No
3. **Observed:** Has anyone observed you stop breathing during your sleep?
Yes No
4. **Blood Pressure:** Do you have or are you being treated for high blood pressure?
Yes No
5. **BMI:** BMI more than 35 kg/m²?
Yes No
6. **Age:** Age over 50 years old?
Yes No
7. **Neck circumference:** Neck circumference greater than 40 cm?
Yes No
8. **Gender:** Male?
Yes No

High risk of OSA: Yes to 3 or more questions

Low risk of OSA: Yes to less than 3 questions

Chung F et al. *Anesthesiology* 2008;108:812-21.

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General Principles

- Identify triggers/ medications etc.
- Optimize control of motor symptoms
- Relaxation techniques, cognitive therapy, biofeedback
- Regular sleep and wake pattern/ times
- Regular exercise and exposure to sunlight
- Reduce daily nap time
- Comfortable sleep environment



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General Principles

- Regular meals
- Avoid excessive liquids, caffeinated beverages, alcohol in the evening
- Emptying bladder before bed, use condom catheter/ bedside commode
- Use the bedroom only for sleep and sexual activity
- Do not stay in the bed if not sleepy



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