

Excessive Sleepiness and Depression in Parkinson's Disease

Aliya I. Sarwar, MD^{1,3} and Max Hirshkowitz, PhD^{2,4}

Michael E. DeBaakey Veterans Affairs Medical Center: ¹Parkinson's Disease Research, Education and Clinical Center and ²Sleep Disorders Center
Baylor College of Medicine: ³Department of Neurology and ⁴Department of Internal Medicine, Houston, Texas

Objective: To determine the severity of Excessive Sleepiness (ES) and its association with Depression in Veterans with Parkinson's disease (PD).

Background: ES is common in PD. However, its distribution with respect to severity and association with depression has not been clearly defined in Veterans with PD. This information may be useful in therapeutics and in improving understanding of the pathophysiology of these conditions.

Methods: 100 consecutive PD patients were assessed with respect to subjective sleepiness, depression, and motor impairment using Epworth Sleepiness Scale (ESS), Zung's Self reported Depression Scale (ZDS) and Hoehn and Yahr (H&Y) scale, respectively. Excessive sleepiness and depression were defined as having ESS score > 10 and ZDS score > 49, respectively.

Results: 45 subjects (97.8% men, 82% W, mean age 72.1, mean H&Y 2.59) had ESS ≤ 10 (mean 6.98, 95% CI 6.18-7.77) and were termed "non-sleepy".

55 subjects (96.4% men, 89% W, mean age 72.7, mean H&Y 2.85) had ESS > 10 (mean 14.69, 95% CI 13.79-15.59). 41/55 (74.5%) had ESS score between 11-17 and were termed "mild-moderately sleepy" [mean 13, (11-17)]. 14/55 (25.4%) had ESS ≥ 18 and were termed "severely sleepy" [mean 19.5, (18-24)]

In the mild to moderately sleepy group, 6/41 subjects (15%) were depressed (100% = mild, mean score 52.0 (50-57). In the severely sleepy group, 6/14 (42.9%) subjects were depressed (28.6% mild, 14.3% moderate, mean 56.3, (53-61). In the non sleepy group: 1/45 subject (2.2%) was depressed (100% mild, score 56).

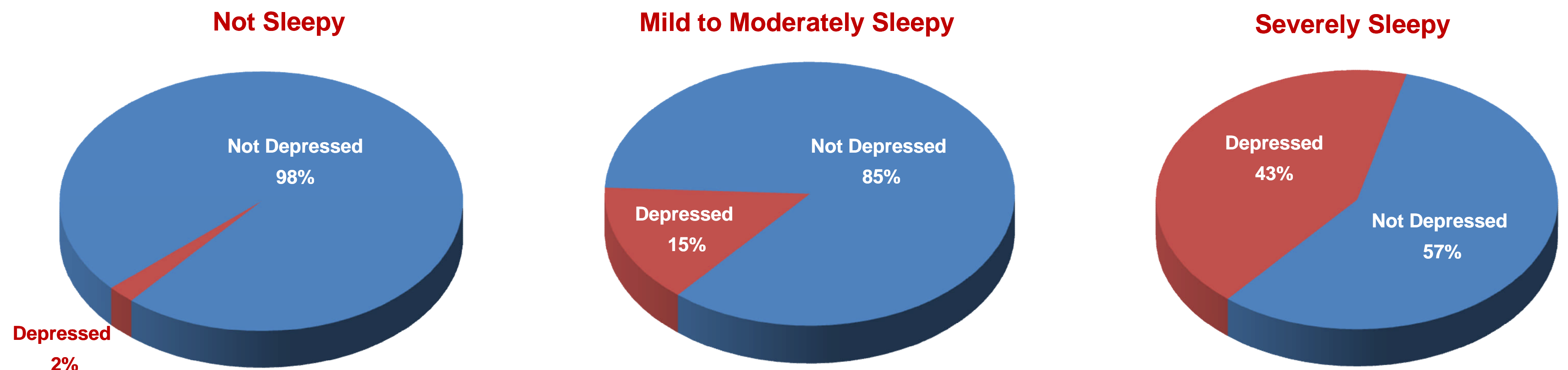
There was no statistically significant difference between the mean ages and H&Y scores of the three groups.

Comparison of group differences by level of sleepiness

| Level of Sleepiness | N | Age | | Mean Rank | Kruskal-Wallis test | H & Y | | Mean Rank | Kruskal-Wallis test | Depression | | Mean Rank | Kruskal-Wallis test |
|----------------------|----|------|--------|-----------|---|-------|--------|-----------|---|------------|--------|-----------|--|
| | | Mean | Median | | | Mean | Median | | | Mean | Median | | |
| Not Sleepy | 45 | 72.1 | 73.0 | 48.76 | X ² = 0.336 df= 2 Sig= 0.846 | 2.59 | 2.5 | 45.2 | X ² = 3.32 df=2 Sig= 0.190 | 37.3 | 38.0 | 44.0 | X ² = 6.40 df=2 Sig= 0.041* |
| Mild-moderate Sleepy | 41 | 72.8 | 72.0 | 52.26 | | 2.82 | 2.5 | 53.4 | | 40.5 | 40.0 | 52.4 | |
| Severe Sleepy | 14 | 72.7 | 73.5 | 51.6 | | 2.96 | 3.0 | 59.0 | | 45.9 | 44.5 | 65.9 | |

(* = statistically significant)

Comparison of Depression in groups by level of Sleepiness



Significance testing for all groups and by 2 x 2 comparisons

| Level of Sleepiness | Depressed | Not Depressed | Total |
|---------------------------|-----------|---------------|-------|
| Not Sleepy | 1 | 44 | 45 |
| Mild to moderately Sleepy | 6 | 35 | 41 |
| Severely Sleepy | 6 | 8 | 14 |

(Fisher's exact) Significance = 0.001

Not sleepy compared with severely sleepy
(Fisher's exact) Sig=<0.0005

Not sleepy compared with mild to moderately sleepy
(Fisher's exact) Sig = 0.050

Mild to moderately sleepy compared with severely sleepy
(Chi-square) Sig= 0.027

Demographic distribution of study subjects

| Demographics | All | Not Sleepy | Mild to Moderately Sleepy | Severely sleepy |
|----------------------------|-----|------------|---------------------------|-----------------|
| Gender | | | | |
| Men | 97% | 44 (97.8%) | 40 (97.6%) | 13 (92.9%) |
| Women | 3% | 1 (2.2%) | 1 (2.4%) | 1 (7.1%) |
| Ethnicity | | | | |
| White | 86% | 37 (82.2%) | 35 (85.4%) | 14 (100%) |
| Black | 9% | 5 (11.1%) | 4 (9.8%) | |
| Hispanic | 5% | 3 (6.7%) | 2 (4.9%) | |
| Hoehn & Yahr Score | | | | |
| 1.0 | 1% | 0 (0%) | 1 (2.4%) | 0 (0%) |
| 1.5 | 5% | 3 (6.7%) | 1 (2.4%) | 1 (7.1%) |
| 2.0 | 19% | 10 (22.2%) | 7 (17.1%) | 2 (14.3%) |
| 2.5 | 31% | 16 (35.6%) | 12 (29.3%) | 3 (21.4%) |
| 3.0 | 29% | 13 (28.9%) | 13 (31.7%) | 3 (21.4%) |
| 3.5 | 0% | 0 (0%) | 0 (0%) | 1 (7.1%) |
| 4.0 | 11% | 2 (4.4%) | 5 (12.2%) | 4 (28.6%) |
| 5.0 | 3% | 1 (2.2%) | 2 (4.9%) | 0 (0%) |
| Depression | | | | |
| Not depressed (<50 on ZDS) | 87 | 44 (97.8%) | 35 (85.4%) | 8 (57.1%) |
| Depressed (≥ 50 on ZDS) | 13 | 1 (2.2%) | 6 (14.6%) | 6 (42.9%) |
| Total | 100 | | | |

Conclusions: More than half of the Veterans with Parkinson's disease (PD) suffer from excessive sleepiness. The majority of these patients are mildly sleepy. Depression is significantly more common in PD patients who suffer from excessive sleepiness and increases in frequency with worsening sleepiness. This observation requires further investigation.