

# 'Excessive Daytime Sleepiness': A Phenotypic Variant of Parkinson's Disease (EDS-PD) A Preliminary Analysis from a Longitudinal Cohort Study

Corinne Borley<sup>1</sup>, Carolina Sportelli<sup>1</sup> & K Ray Chaudhuri<sup>1,2</sup>

1. Parkinson's Foundation Centre of Excellence, King's College Hospital, London, UK. 2. King's College London, London, UK

## Background & Objectives

- Excessive daytime sleepiness (EDS) is a key non-motor symptom (NMS) of Parkinson's disease (PD) affecting up to 60% of patients.<sup>1</sup>
- EDS contributes significantly to disease burden and has been associated with various NMS, dopamine agonist (DA) dose and motor vehicle accidents.<sup>2,3</sup>
- DAs have been documented to exacerbate EDS<sup>1</sup> and phenotypic correlations of PD with EDS have been of recent interest.<sup>4</sup>
- From a large cohort of PD patients, our primary objective was to explore EDS as a phenotypic variant of PD in relation to NMS. Our secondary objective was to investigate DA use and road safety.

## Methods

- Cross-sectional exploratory analysis of a cohort of 437 patients with idiopathic PD enrolled in the global Non-motor International Longitudinal Study (NILS).
- Retrospective data analysis on the EDS group (> 10 Epworth Sleepiness Scale (ESS) Score) and non-EDS group (≤ 10 ESS Score).
- Primary outcomes were total scores of:
  - ✓ Hospital Anxiety and Depression Scale (HADS)
  - ✓ Parkinson's Disease Sleep Scale (PDSS)
  - ✓ Mini Mental State Examination (MMSE)
  - ✓ Non-Motor Symptom Scale (NMSS)
  - ✓ Parkinson's Disease Quality of Life-8 (PDQ-8)
 Level of significance was  $p = 0.05/5 = 0.01$  (adjusted for multiple comparisons).
- Secondary outcomes were DA use between groups as well as in a specific 'high risk' subgroup of the EDS group scoring ≥ 1 on ESS Question 8 (chance of dozing in a car while stopped in traffic for a few minutes), indicating potential risk of motor vehicle accidents. Level of significance was  $p = 0.05$ .
- Group differences were explored using the Mann Whitney U-test, T-test or Chi-Squared test. Data reported as mean ± standard deviation unless specified otherwise.

## Conclusions

**Those with the EDS phenotype have substantial risk of falling asleep suddenly, 'sleep attacks' (>50%) and 55.4% of this 'high risk' group were taking DAs. This raises important concerns around the prescribing of DAs known to exacerbate EDS symptoms and emphasises the need for routine screening for sleep events in clinical practice.**

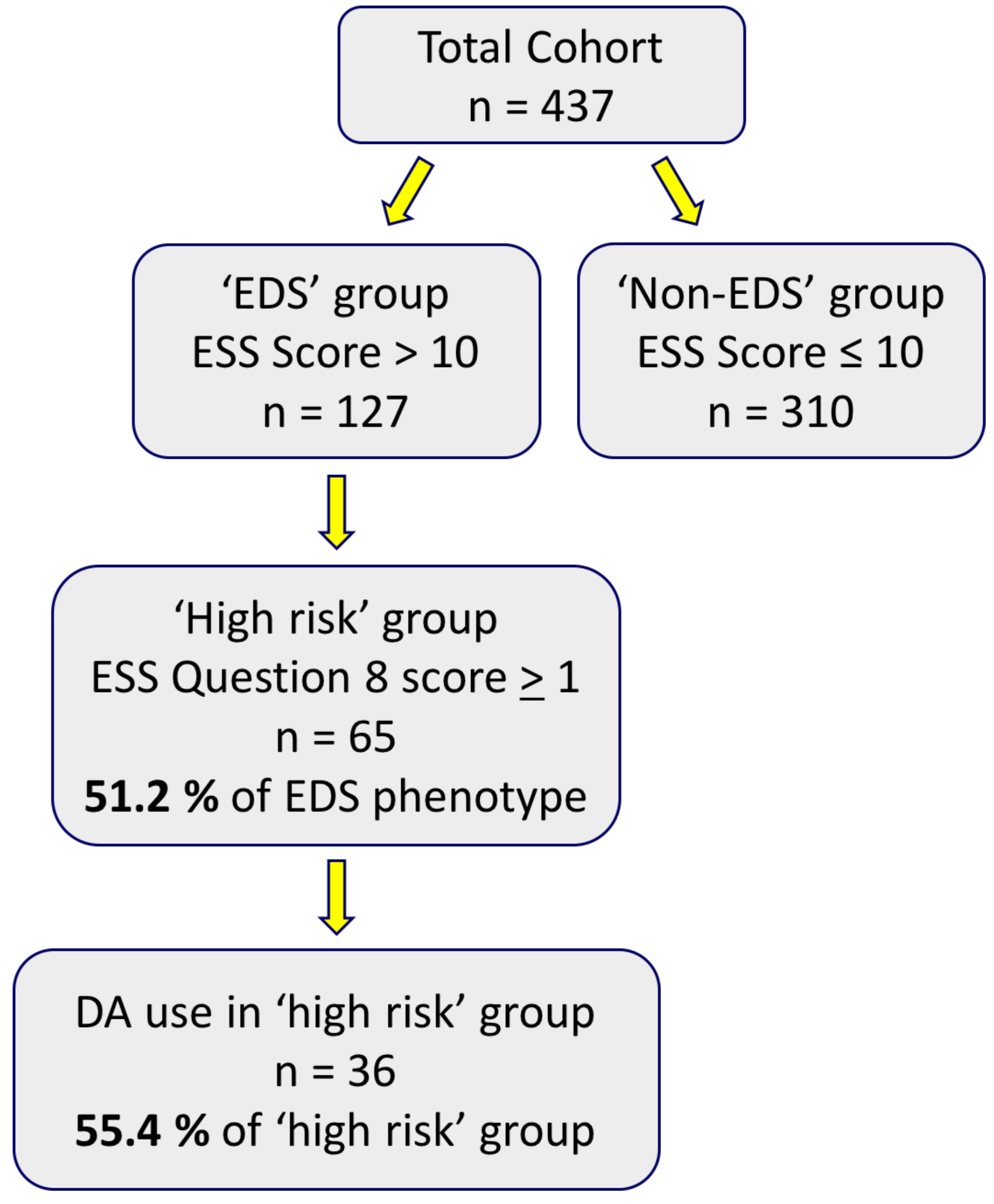
## Results

- The EDS group had significantly worse total scores on the HADS, PDSS, NMSS and PDQ-8, showing higher NMS burden and DA use (Table 1).
- Figure 1 shows that 51.2% of the EDS phenotype formed the 'high risk' group who may be at risk of motor vehicle accidents. Of this 'high risk' group, 55.4% were taking a range of DAs.

**Table 1. Group comparisons of patient demographics, NMS scales total scores and DA use**

	EDS Group (n=127)	Non-EDS Group (n=310)	p-value
<b>Demographics:</b>			
Sex	♂ 72% ♀ 28%	♂ 64.5% ♀ 35.5%	0.133
Age at assessment	64.91±9.70	64.16±11.40	0.768
Age of PD onset	57.38±10.79	59.67±11.52	0.522
Disease duration (years)	7.46±6.24	4.37±4.85	<b>0.000</b>
LEDD (mg)	802.31±529.94	546.10±526.65	<b>0.000</b>
H&Y stage (median, IQR)	3.00 (2.00-3.00)	2.00 (1.75-3.00)	<b>0.000</b>
SCOPA-MOTOR	13.13±6.60	9.91±5.15	<b>0.000</b>
<b>NMS:</b>			
HADS (cut off >8)	14.69±7.31	10.81±6.89	<b>0.000</b>
PDSS (cut off <83)	89.13±26.23	107.91±26.53	<b>0.000</b>
MMSE (cut off <24)	27.59±3.27	28.51±20.08	0.019
NMSS	69.48±42.87	40.67±32.72	<b>0.000</b>
PDQ-8	11.98±6.60	7.51±5.86	<b>0.000</b>
<b>DA Use:</b>	<b>55.1%</b>	<b>41.6%</b>	<b>0.01</b>

**Figure 1. Number of patients included in each group**



## References

1. Chahine LM, Amara AW, Videnovic A. A systematic review of the literature on disorders of sleep and wakefulness in Parkinson's disease from 2005 to 2015. *Sleep Med Rev.* 2017;35:33-50. 2. Zhu K, van Hilten JJ, Marinus J. Course and risk factors for excessive daytime sleepiness in Parkinson's disease. *Parkinsonism Relat Disord.* 2016;24:34-40. 3. Ueno T, Kon T, Haga R, Nishijima H, Tomiyama M. Motor vehicle accidents in Parkinson's disease: A questionnaire study. *Acta Neurol Scand.* 2018;137(2):218-223. 4. Xiang YQ, Xu Q, Sun QY, et al. Clinical Features and Correlates of Excessive Daytime Sleepiness in Parkinson's Disease. *Front Neurol.* 2019;10:121.