

Max A. Laansma¹, Eva M. van Heese¹, Karin D. van Dijk^{2,3}, Evelien Lemstra⁴, Miranda Ringnalda², Ronald Koekenbier², Juliette L. van Alphen⁴, Odile A. van den Heuvel^{1,5}, Ysbrand D. van der Werf¹

¹ Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Anatomy & Neurosciences, Amsterdam Neuroscience, Amsterdam, The Netherlands.

² Stichting Epilepsie Instellingen Nederland (SEIN), Sleep-Wake Centre, Heemstede, The Netherlands.

³ Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Neurology, Amsterdam Neuroscience, Amsterdam, The Netherlands.

⁴ Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Neurology, Alzheimer Center Amsterdam, Amsterdam Neuroscience, Amsterdam, Netherlands.

⁵ Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Psychiatry, Amsterdam Neuroscience, Amsterdam, The Netherlands.

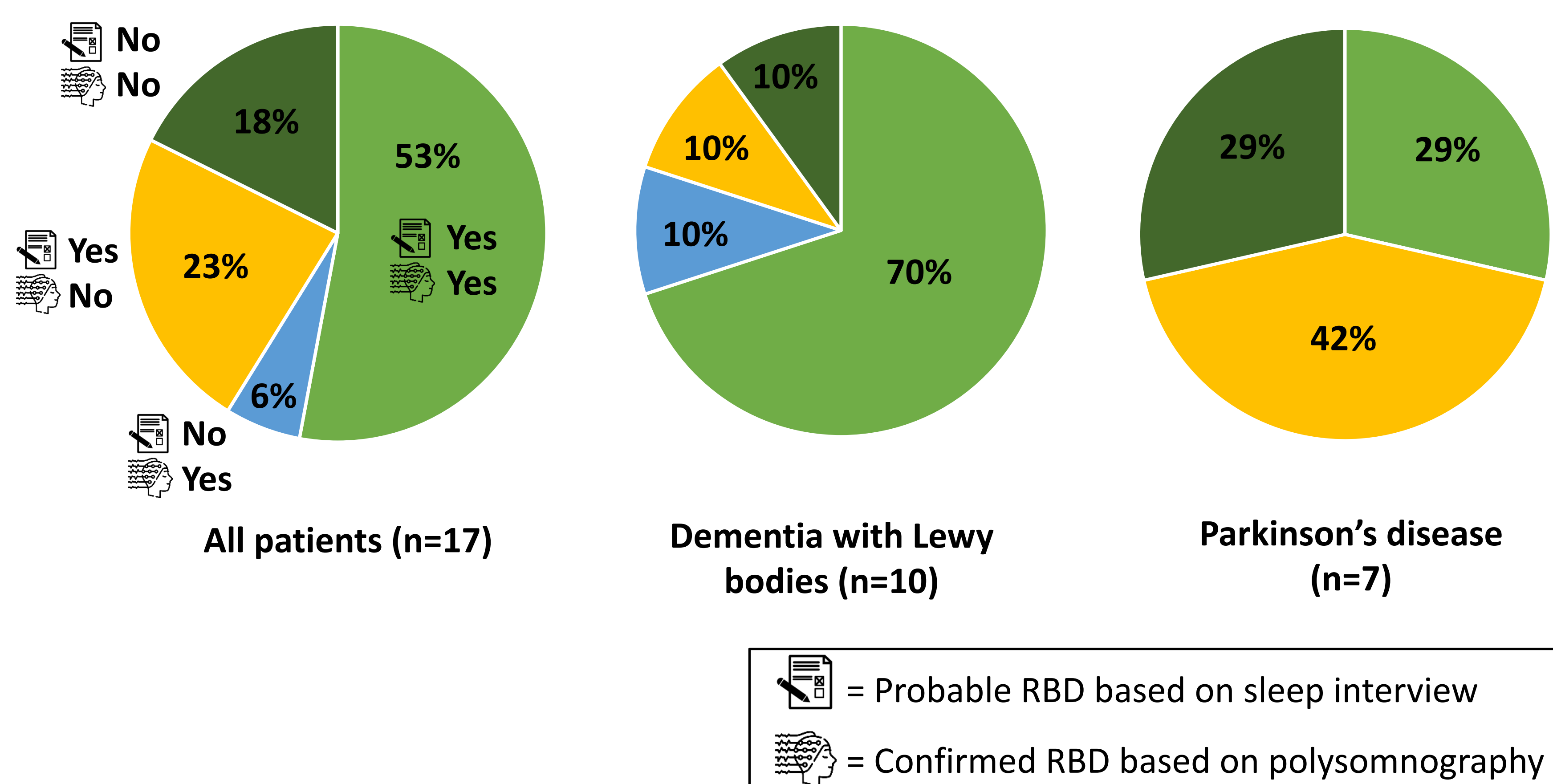
INTRODUCTION

REM-sleep behavior disorder (RBD) is characterized by often violent dream enactments using movements and vocalizations, following the pathological loss of muscle atonia during REM-sleep (i.e. RSWA). RBD is strongly linked to Lewy body diseases, including Parkinson's disease (PD) and dementia with Lewy bodies (DLB), showing an estimated prevalence of 30-50% in PD and around 76% in DLB.¹⁻³ There is debate on why some but not all individuals with a Lewy body disease have concomitant RBD, and how well current diagnostic tools (i.e. questionnaires vs polysomnography) capture the full range of RBD. In this study we used video polysomnography (v-PSG) to examine the severity of RSWA in Lewy body diseases.

CONCLUSIONS

Our findings emphasize that the severity of RSWA is variable across individuals with Lewy body disease. The discrepancy between interview and v-PSG outcome in some cases challenges the existing dichotomous criteria for diagnosis in cases with a history of dream enactment that did not reach the RSWA threshold. It should be noted that this sample may not be fully representative to the patient population. A larger sample will be required to confirm these findings and further investigate differences between PD and DLB.

Figure 1



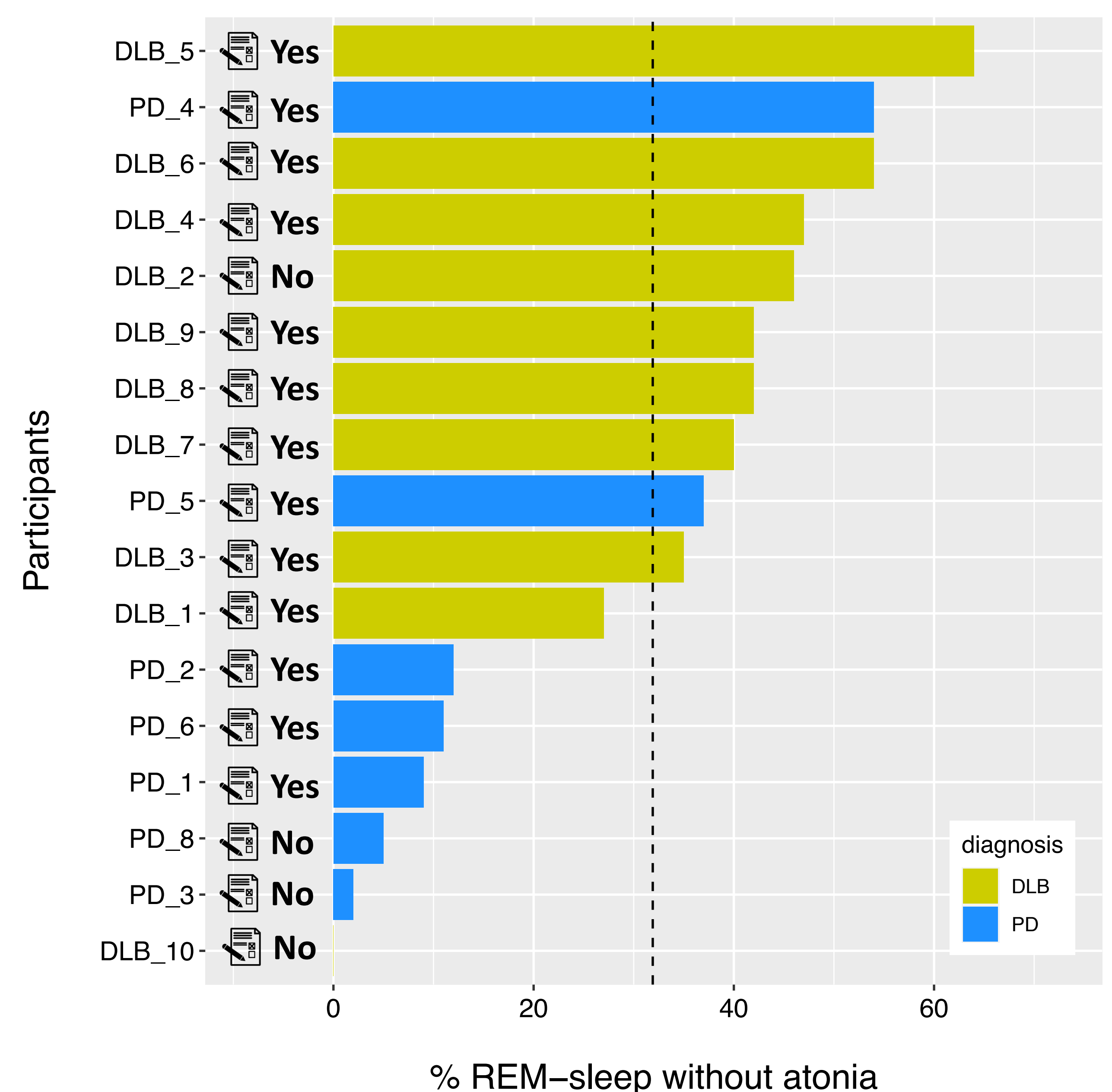
METHODS

Sleep interviews and v-PSG were performed in 17 Lewy body cases; 10 individuals with DLB (age (sd) = 66 years (6.6), all male) and 7 individuals with PD (70 years (8.1), 6 males and 1 female), who did not use antidepressants or melatonin, and had no history of other sleep disorders that are known to influence a valid measurement. Muscle atonia during REM-sleep was assessed by combining any activity in the chin and phasic activity in the flexor digitorum superficialis muscles using 3-sec mini epochs according to the guidelines of the International RBD Study Group (cut-off value 31.9%).⁴ RBD was diagnosed when there was both dream enactment (interview and/or PSG) and an increased amount of RSWA, in accordance with current diagnostic criteria.⁵

REFERENCES

- Mollenhauer B, Trautmann E, Sixel-Döring F, et al. Nonmotor and diagnostic findings in subjects with de novo Parkinson disease of the DeNoPa cohort. *Neurology*. 2013;81(14):1226-1234.
- Plomhause L, Dujardin K, Duhamel A, et al. Rapid eye movement sleep behavior disorder in treatment-naïve Parkinson disease patients. *Sleep Med*. 2013;14(10):1035-1037.
- Ferman TJ, Boeve BF, Smith GE, et al. Inclusion of RBD improves the diagnostic classification of dementia with Lewy bodies. *Neurology*. 2011;77(9):875-882.
- Cesari, M, Heidbreder, A, St. Louis, E, et al. Video-polysomnography procedures for diagnosis of rapid eye movement sleep behavior disorder (RBD) and the identification of its prodromal stages: guidelines from the International RBD Study Group. *Sleep*. 2022;45(3), zsab257.
- American Academy of Sleep Medicine. International classification of sleep disorders—third edition—text revision (ICSD-3-TR). AASM Resour Libr. 2023.

Figure 2



Amount of REM-sleep without atonia for each participant. The dashed line depicts the cut-off for RBD diagnosis based on v-PSG. DLB = Dementia with Lewy bodies. PD = Parkinson's disease

RESULTS

13/17 cases reported dream enactment during the sleep interview; in 10 cases an increased amount of RSWA was found by v-PSG (35-64% RSWA). RBD was not confirmed by v-PSG in 4 cases (9-27% RSWA) in which RBD was therefore provisionally diagnosed based on clinical judgment. One case without dream enactment at the sleep interview showed increased RSWA (46%) and dream-enactment during REM-sleep on v-PSG and was diagnosed with RBD. Finally, 3 cases without reported history of dream enactment accordingly did not show increased RSWA. The RBD severity scale (RBDSS) ranged between 1 (distal movements, no vocalizations) and 3.1 (maximal score; axial movements and sounds). See **Figure 1 and 2** for an overview.