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INTRODUCTION

PROBLEM

- Paediatric Obstructive Sleep Apnoea (OSA) is a respiratory disorder characterized by apnoeic events
- Heart Rate Variability (HRV) changes in the presence of apnoeic events and across sleep stages
- HRV segment-level characterization, regardless children diagnosis, has not been performed yet
- HRV evolution across sleep stages in a novel paediatric OSA-specific spectral band (BW2: 0.028 – 0.074 Hz) has not been evaluated neither

OBJECTIVE

- To characterize HRV segments in BW2, as well as in the classical frequency bands that contains BW2, Very low frequency (VLF, 0-0.04 Hz) and Low Frequency (LF, 0.04-0.15 Hz)
- To compare HRV segments changes inside these bands based on sleep stages (Wake, W; Non-Rapid Eye movement, NREM; REM) and the presence of apnoeic events

MATERIALS AND METHODS



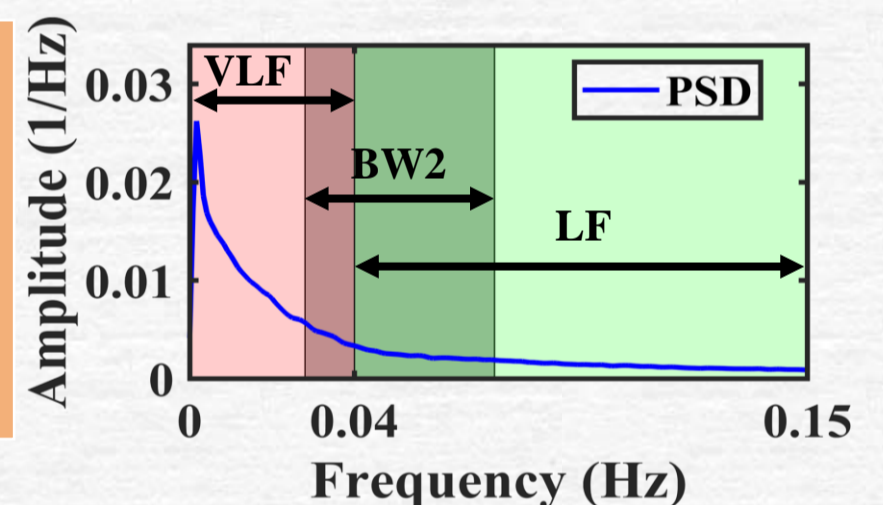
SUBJECTS

- ❖ 1018 children
- Age (years): 7.0 [2.1]
- Apnea-hypopnea index (events/h): 2.23 [4.15]
- Sex (M:F): 500:518
- BMI (kg/m²): 17.28 [5.81]

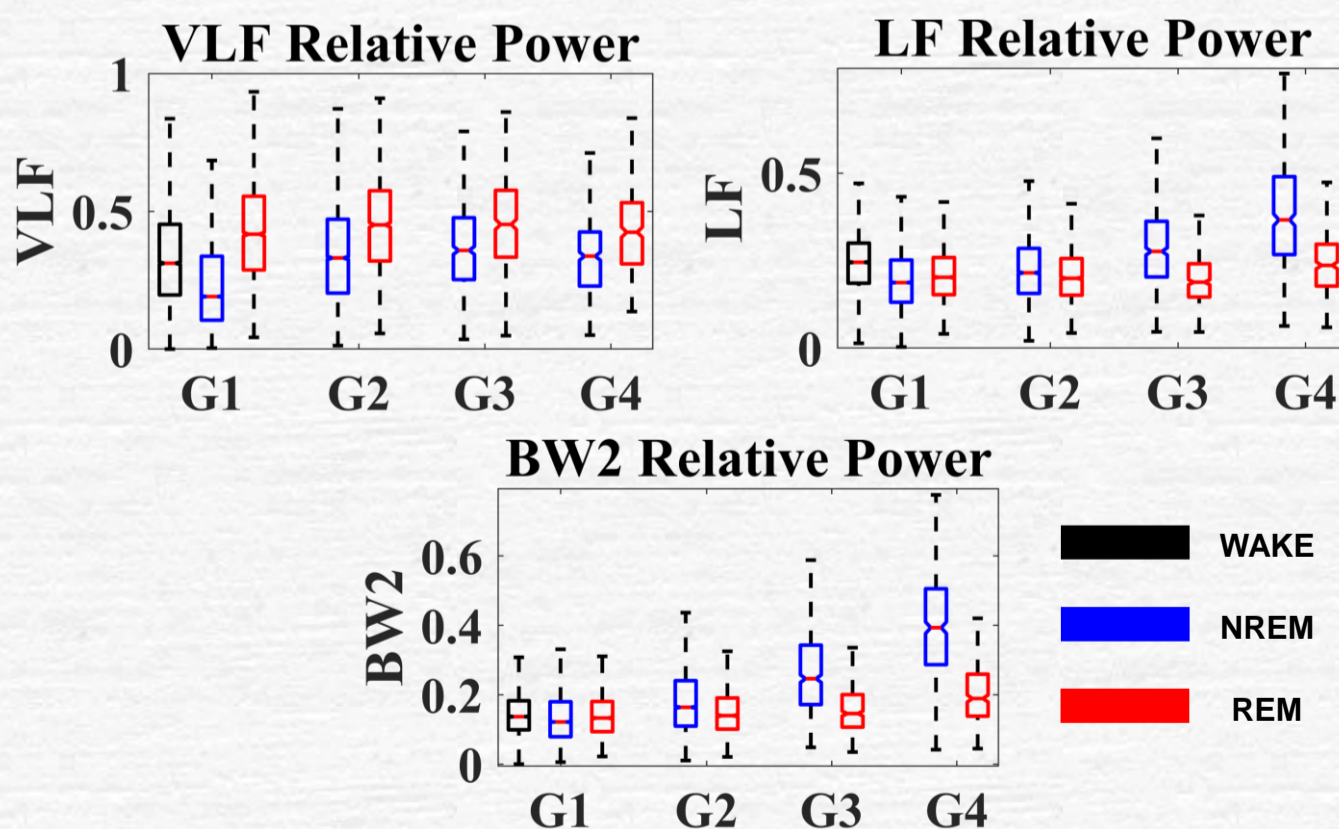


HRV: SEGMENTATION AND SPECTRAL ANALYSIS

- ❖ HRV
- 10-minute epochs
- Artifact rejection (N-N intervals)
- ❖ Segment Classification based on:
 - Sleep stage: W, NREM or REM
 - Apnoeic events presence: G1 (no events); G2: 1-5 events; G3: 5-10 events; G4: over 10 events



RESULTS



Cohen's *d*

Intra Sleep Stages: NREM Segments						
	G1 vs G2	G1 vs G3	G1 vs G4	G2 vs G3	G2 vs G4	G3 vs G4
VLF	0.610*	0.754*	0.579*	0.137*	0.035	0.201*
LF	0.325*	1.007*	2.038*	0.628*	1.553*	0.733*
BW2	0.546*	1.531*	3.106*	0.779*	2.017*	0.963*
Intra-Stages: REM Segments						
	G1 vs G2	G1 vs G3	G1 vs G4	G2 vs G3	G2 vs G4	G3 vs G4
VLF	0.142*	0.194*	0.064	0.054	0.080	0.142
LF	0.046	0.177*	0.423*	0.134	0.473*	0.587*
BW2	0.105*	0.220*	0.875*	0.113	0.751*	0.573*
Inter-Stages: G1						
	W vs REM	W vs NREM	REM vs NREM	REM vs NREM	REM vs NREM	REM vs NREM
VLF	0.547*	0.441*	1.074*	0.597*	0.569*	0.647*
LF	0.417*	0.261*	0.158*	0.210*	0.927*	1.096*
BW2	0.062*	0.021	0.080*	0.351*	1.005*	1.420*

* Statistically significant differences

CONCLUSIONS

- REM sleep is associated with enhanced sympathetic activity, which may be masking OSA effects on HRV
- BW2 allows for better characterization of HRV alterations due to apnoeic events than LF or VLF
- In absence of apnoeic events, sleep stages are better differentiated through classic VLF and LF bands