

**Manuscript Title: Association Between Respiratory Event-Specific Oxygen Desaturation Rate and Blood Pressure Surge in Obstructive Sleep Apnea**  
**Authors: Yanli Gu<sup>1+</sup>, Yujiao Wan<sup>1+</sup>, Jiani Shen<sup>1,2</sup>, Yujie Yuan<sup>1</sup>, Qiyun Ma<sup>1</sup>, Guihong Wei<sup>1</sup>, Xiaochen Xie<sup>1</sup>, Fengjuan Xu<sup>1</sup>, Xiaoxiao Han<sup>1</sup>, Jing Xu<sup>1\*</sup>**

**Table s1** Multiple linear regression analysis with BP surge parameters as dependent variables in subgroups according to age, AHI, BMI

	BP amplitude				BP peak				BP surge rate			
	Model 1 (unadjusted)		Model 2 (adjusted)		Model 1 (unadjusted)		Model 2 (adjusted)		Model 1 (unadjusted)		Model 2 (adjusted)	
	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P
<b>Age &lt; 60 years (n = 221)</b>												
ODR, %/s	9.23 (6.67, 11.78)	<0.001***	6.23 (3.30, 9.16)	<0.001***	6.06 (-5.55, 17.67)	0.305	-7.10 (-21.16, 6.95)	0.320	1.08 (0.76, 1.39)	<0.001***	0.60 (0.25, 0.95)	0.001**
Δt, s	0.04 (-0.06, 0.13)	0.483	0.11 (0.02, 0.20)	0.021	-0.77 (-1.15, -0.39)	<0.001	-0.83 (-1.23, -0.42)	<0.001	-0.01 (-0.02, -0.00)	0.032	-0.00 (-0.01, 0.01)	0.688
ΔSpO <sub>2</sub> , %	0.14 (-0.09, 0.35)	0.228	-0.05 (-0.26, 0.16)	0.626	0.35 (-0.55, 1.25)	0.446	-0.22 (-1.17, 0.73)	0.651	0.01 (-0.02, 0.03)	0.676	-0.02 (-0.04, 0.01)	0.222
Event duration, s	0.01 (-0.19, 0.22)	0.892	0.11 (-0.07, 0.29)	0.226	-0.70 (-1.52, 0.13)	0.096	-0.58 (-1.41, 0.26)	0.175	-0.01 (-0.03, 0.02)	0.704	0.01 (-0.01, 0.03)	0.362
<b>Age ≥ 60 years (n = 76)</b>												
ODR, %/s	3.87 (0.16, 7.59)	0.041*	1.65 (-2.08, 5.38)	0.381	-2.23 (-26.17, 21.70)	0.853	-10.90 (-35.53, 13.72)	0.379	0.21 (-0.30, 0.72)	0.408	-0.07 (-0.66, 0.52)	0.806
Δt, s	-0.08 (-0.16, 0.01)	0.089	-0.04 (-0.12, 0.04)	0.320	-0.44 (-0.99, 0.11)	0.112	-0.48 (-1.01, 0.06)	0.081	-0.02 (-0.03, -0.01)	0.002	-0.02 (-0.03, -0.01)	0.002
ΔSpO <sub>2</sub> , %	0.05 (-0.11, 0.21)	0.526	0.06 (-0.08, 0.21)	0.374	-0.07 (-1.08, 0.95)	0.899	0.21 (-0.74, 1.16)	0.664	-0.00 (-0.02, 0.02)	0.998	0.00 (-0.02, 0.02)	0.967
Event duration, s	-0.06 (-0.20, 0.09)	0.447	-0.03 (-0.17, 0.10)	0.627	-0.13 (-1.04, 0.79)	0.780	-0.10 (-0.97, 0.78)	0.829	-0.02 (-0.04, 0.00)	0.102	-0.02 (-0.04, 0.00)	0.047
<b>AHI &lt; 50 events/h (n = 137)</b>												
ODR, %/s	4.38 (1.79, 6.97)	0.001**	2.62 (-0.09, 5.34)	0.058	-7.35 (-22.52, 7.81)	0.339	-2.75 (-19.85, 14.34)	0.750	0.54 (0.18, 0.89)	0.003**	0.28 (-0.10, 0.66)	0.149
Δt, s	0.06 (-0.01, 0.13)	0.110	0.07 (0.00, 0.14)	0.046	-0.36 (-0.75, 0.03)	0.066	-0.58 (-0.99, -0.16)	0.007	-0.01 (-0.02, 0.00)	0.102	-0.01 (-0.02, 0.00)	0.174
ΔSpO <sub>2</sub> , %	0.05 (-0.19, 0.29)	0.672	0.03 (-0.20, 0.25)	0.814	0.39 (-0.97, 1.75)	0.575	0.42 (-0.97, 1.80)	0.555	0.02 (-0.02, 0.05)	0.333	0.01 (-0.02, 0.04)	0.510
Event duration, s	0.06 (-0.10, 0.22)	0.440	0.09 (-0.05, 0.24)	0.208	-0.57 (-1.46, 0.32)	0.208	-0.88 (-1.78, 0.01)	0.053	-0.00 (-0.03, 0.02)	0.689	-0.00 (-0.02, 0.02)	0.929
<b>AHI ≥ 50 events/h (n = 160)</b>												
ODR, %/s	9.71 (6.57, 12.84)	<0.001***	7.16 (3.50, 10.82)	<0.001***	3.08 (-10.88, 17.04)	0.663	-8.48 (-25.31, 8.36)	0.321	1.13 (0.74, 1.52)	<0.001***	0.67 (0.23, 1.11)	0.003**
Δt, s	-0.04 (-0.17, 0.08)	0.502	0.03 (-0.09, 0.14)	0.681	-0.85 (-1.33, -0.38)	0.001	-0.89 (-1.38, -0.39)	0.001	-0.02 (-0.04, -0.01)	0.009	-0.01 (-0.02, 0.00)	0.143
ΔSpO <sub>2</sub> , %	0.03 (-0.17, 0.22)	0.780	0.01 (-0.17, 0.18)	0.951	-0.15 (-0.93, 0.63)	0.703	-0.34 (-1.12, 0.44)	0.390	-0.01 (-0.03, 0.02)	0.457	-0.01 (-0.03, 0.01)	0.371
Event duration, s	-0.09 (-0.29, 0.10)	0.349	0.05 (-0.14, 0.24)	0.588	-0.29 (-1.08, 0.50)	0.472	-0.05 (-0.87, 0.77)	0.906	-0.02 (-0.04, 0.01)	0.148	0.00 (-0.02, 0.02)	0.879
<b>BMI &lt; 30 kg/m<sup>2</sup> (n = 137)</b>												
ODR, %/s	7.33 (4.49, 10.17)	<0.001***	4.70 (1.58, 7.82)	0.003**	12.04 (-3.85, 27.94)	0.136	5.37 (-13.53, 24.27)	0.575	0.81 (0.42, 1.19)	<0.001***	0.55 (0.11, 0.99)	0.014*
Δt, s	-0.01 (-0.09, 0.07)	0.797	0.03 (-0.05, 0.11)	0.518	-0.41 (-0.83, 0.02)	0.059	-0.47 (-0.94, -0.01)	0.046	-0.02 (-0.03, -0.01)	0.002	-0.01 (-0.02, 0.00)	0.035
ΔSpO <sub>2</sub> , %	0.07 (-0.19, 0.34)	0.590	0.02 (-0.22, 0.26)	0.842	-0.51 (-1.88, 0.85)	0.459	-0.71 (-2.11, 0.68)	0.312	0.02 (-0.02, 0.05)	0.286	0.01 (-0.02, 0.04)	0.595
Event duration, s	0.09 (-0.14, 0.31)	0.455	0.13 (-0.07, 0.32)	0.208	-0.84 (-2.00, 0.32)	0.154	-0.83 (-1.98, 0.32)	0.155	-0.01 (-0.04, 0.02)	0.671	-0.00 (-0.03, 0.03)	0.854
<b>BMI ≥ 30 kg/m<sup>2</sup> (n = 160)</b>												

ODR, %/s	8.79 (5.65, 11.92)	<b>&lt;0.001***</b>	5.20 (1.75, 8.65)	<b>0.003**</b>	-4.80 (-18.57, 8.97)	0.492	14.78 (-30.97, 1.42)	0.073	1.00 (0.62, 1.38)	<b>&lt;0.001***</b>	0.49 (0.07, 0.91)	<b>0.023*</b>
Δt, s	-0.00 (-0.12, 0.12)	0.981	0.09 (-0.02, 0.20)	0.094	-0.89 (-1.35, -0.44)	<0.001	-1.00 (-1.46, -0.54)	<0.001	-0.01 (-0.03, 0.00)	0.076	-0.00 (-0.02, 0.01)	0.638
ΔSpO <sub>2</sub> , %	0.07 (-0.12, 0.26)	0.476	0.01 (-0.16, 0.18)	0.909	0.29 (-0.49, 1.06)	0.467	-0.04 (-0.82, 0.75)	0.925	-0.01 (-0.03, 0.02)	0.571	-0.01 (-0.03, 0.01)	0.253
Event duration, s	-0.10 (-0.28, 0.08)	0.256	0.01 (-0.15, 0.18)	0.870	-0.31 (-1.02, 0.41)	0.403	-0.43 (-1.19, 0.33)	0.264	-0.02 (-0.04, 0.00)	0.086	-0.01 (-0.03, 0.01)	0.524

**Notes:** In multiple regression model, no covariable was adjusted in model 1. Adjusted covariables in model 2 include age, gender, BMI, smoking, alcohol consumption, AHI, T90, TST, history of hypertension, diabetes, CHD and antihypertensive medication. The bold fonts represent statistical significance. \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001. **Abbreviations:** AHI, apnea-hypopnea index; BMI, body mass index; BP, blood pressure; CHD, coronary heart disease; CI, confidence interval; ODR, oxygen desaturation rate; SpO<sub>2</sub>, peripheral oxygen saturation; T90, percentage of sleep time with SpO<sub>2</sub> < 90%; TST, total sleep time.

**Table s2** Comparison of BP parameters in patients taking different antihypertensive drugs

Variables	CCBs (n = 52)	ACEIs/ARBs (n = 44)	CCBs + ACEIs/ARBs (n = 31)	P
Age, years	54.00 (49.00, 62.75)	55.00 (44.00, 62.75)	53.00 (45.00, 63.00)	0.835
BMI, kg/m <sup>2</sup>	30.11 (27.56, 33.10)	29.19 (26.11, 33.61)	30.41 (27.02, 34.93)	0.604
CHD, n (%)	22 (37.29)	15 (28.30)	11 (31.43)	0.678
Diabetes, n (%)	22 (37.29)	20 (37.74)	16 (45.71)	0.712
AHI, events/h	52.30 (29.80, 62.08)	46.00 (31.80, 62.85)	60.10 (34.60, 77.20)	0.114
T90, %	17.40 (5.33, 36.03)	20.00 (5.15, 38.33)	22.00 (7.60, 56.90)	0.500
ODR, %/s	0.37 (0.28, 0.44)	0.31 (0.23, 0.40)	0.35 (0.19, 0.48)	0.177
Awake SBP, mmHg	126.41 (121.72, 134.28)	129.43 (120.69, 134.00)	131.61 (126.00, 136.87)	0.235
Awake DBP, mmHg	79.90 (76.73, 82.21)	79.70 (78.00, 83.45)	80.00 (75.21, 86.25)	0.762
Nighttime SBP, mmHg	123.18 (114.10, 130.44)	126.84 (115.44, 134.21)	129.26 (120.00, 138.91)	0.066
Nighttime DBP, mmHg	79.00 (76.29, 82.41)	79.50 (76.56, 82.54)	79.00 (74.93, 88.24)	0.996
BP rise time, s	12.09 (10.57, 14.01)	12.40 (11.09, 13.97)	11.90 (10.22, 14.44)	0.937
BP surge rate, mmHg	1.43 (1.06, 1.72)	1.55 (1.35, 1.81)	1.60 (1.49, 1.80)	<b>0.043*</b>
BP amplitude, mmHg	13.73 (12.17, 15.17)	14.82 (13.37, 17.83)	14.87 (13.14, 16.43)	<b>0.019*</b>
BP peak, mmHg	120.62 (111.13, 128.91)	122.77 (111.25, 132.69)	129.73 (119.66, 143.13)	<b>0.048*</b>

**Notes:** Continuous variables were expressed median [interquartile range] and statistically analyzed by Kruskal-Wallis. Categorical variables were expressed as number (percentage) and tested by chi-square test. The bold fonts represent statistical significance. \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001. **Abbreviations:** ACEI/ARB, angiotensin-converting enzyme inhibitor/angiotensin II receptor blocker; AHI, apnea-hypopnea index; BMI, body mass index; BP, blood pressure; CCB, calcium channel blocker; CHD, coronary heart disease; DBP, diastolic blood pressure; ODR, oxygen desaturation rate; SBP, systolic blood pressure; SpO<sub>2</sub>, peripheral oxygen saturation; T90, percentage of sleep time with SpO<sub>2</sub> < 90%.