

Do Obese Children with Non-Severe Sleep Apnea Benefit From Overnight Observation

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Abstract

Introduction: Current clinical guidelines from the American Academy of Otolaryngology-Head and Neck Surgery recommend that obese children with severe (AHI ≥ 10) obstructive sleep apnea (OSA) be admitted overnight after adenotonsillectomy (T&A). We reviewed our institutional OSA database to assess whether children with non-severe OSA would benefit from being monitored overnight.

Methods: This study utilized a retrospective, single-institution dataset of T&As performed from 2017 to 2023. We divided our non-severe OSA ($1 \leq \text{AHI} < 10$) patients into two groups: those who stayed overnight and those who did not. These groups, along with patients who had severe OSA, all of whom stayed overnight, were used to create our primary predictor. Our outcomes included total time in the PACU and post-operative emergency department (ED) visits, among others. Demographics, risk factors, and surgical characteristics were analyzed across OSA categories using chi-square/fisher and ANOVA. Multivariate linear and logistic regressions were employed to evaluate the effects of these variables on the stated outcomes.

Results: Of the 276 patients in the database, 141 had non-severe OSA and did not stay overnight, 55 had non-severe OSA and stayed overnight, and 80 had severe OSA. 29 patients visited the ED post-operatively, and of these, 17 were readmitted. Compared to those that did not stay overnight, patients with non-severe OSA who stayed overnight were associated with longer PACU stays ($B = 49.005$, P-Value = < 0.0001). Patients with higher O_2 nadirs were associated with shorter PACU stays ($B = -1.344$, P-Value = 0.023). There were no significant differences between the groups in terms of ED visits.

Conclusion: This single-institution retrospective review demonstrated no significant difference in ED visitation irrespective of sleep apnea severity or overnight stay. Patients with non-severe OSA with overnight stay were associated with a longer PACU stay compared to non-severe OSA patients with no stay. Higher O_2 nadirs were associated with shorter PACU times. This study suggests using O_2 nadir as another metric for determining post-operative admission.

Introduction

- Current clinical guidelines from the American Academy of Otolaryngology-Head and Neck Surgery recommend that obese children with severe (AHI ≥ 10) obstructive sleep apnea (OSA) be admitted overnight after adenotonsillectomy (T&A).
- Children with mild to moderate sleep apnea stay on a case-by-case basis, but there is no unifying clinical recommendation on whether they would benefit from overnight observation.
- We reviewed our institutional OSA database to assess whether children with non-severe OSA would benefit from being monitored overnight.

Methods and Materials

- This study utilized a retrospective, single-institution dataset of T&As performed from 2017 to 2023.
- We divided our non-severe OSA ($1 \leq \text{AHI} < 10$) patients into two groups: those who stayed overnight and those who did not.
- These groups, along with patients who had severe OSA, all of whom stayed overnight, were used to create our primary predictor.
- Our outcomes included total time in the PACU and post-operative emergency department (ED) visits, among others.
- Demographics, risk factors, and surgical characteristics were analyzed across OSA categories using chi-square/fisher and ANOVA.
- Multivariate linear and logistic regressions were employed to evaluate the effects of these variables on the stated outcomes.

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Results

	Mean (SD)	Range
Total AHI [n = 277]	9.89 (11.43)	1.2 - 126.3
Obstructive AHI [n = 243]	7.88 (8.45)	0.5 - 57.5
O ₂ Nadir [n = 271]	85.52 (7.8)	51 - 95

Table 1: Patient OSA Characteristics

	Total	Non-Severe with no Stay	Non-Severe with Stay	Severe	P-Value
Age at Time of Surgery Mean [SD]	7.45 [3.97]	8.41 [3.24]	5.38 [3.56]	7.29 [4.76]	<0.0001
Sex					
Male	44 (16)	24 (17.02)	11 (20.37)	9 (11.25)	0.3296
Female	231 (84)	117 (82.98)	43 (79.63)	71 (88.75)	
Ethnicity					
1. Non-Hispanic White	145 (52.73)	75 (53.19)	30 (54.55)	40 (50.63)	0.2769
2. Non-Hispanic Black	62 (22.55)	32 (22.7)	13 (23.64)	17 (21.52)	
3. Hispanic	47 (17.09)	28 (19.86)	5 (9.09)	14 (17.72)	
4. Other	21 (7.64)	6 (4.26)	7 (12.73)	8 (10.13)	
Insurance Type					
Public	199 (73.16)	105 (76.09)	39 (70.91)	55 (69.62)	0.5358
Private	73 (26.84)	33 (23.91)	16 (29.09)	24 (30.38)	
Risk Factors/Comorbidities					
Smoke Exposure	81 (29.78)	46 (33.09)	15 (27.78)	20 (25.32)	0.4525
Asthma	59 (21.38)	29 (20.57)	17 (30.91)	13 (16.25)	0.1177
Autism Spectrum Disorder	18 (6.52)	4 (2.84)	8 (14.55)	6 (7.5)	0.0118*
Type 1 Diabetes	2 (0.72)	2 (1.42)	0 (0)	0 (0)	0.7028*
Known genetic syndromes?					
None	254 (92.36)	140 (99.29)	47 (87.04)	67 (83.75)	<0.0001*
Cystic Fibrosis	1 (0.36)	1 (0.71)	0 (0)	0 (0)	
Down Syndrome	14 (5.09)	0 (0)	7 (12.96)	7 (8.75)	
Prader-Willi Syndrome	2 (0.73)	0 (0)	0 (0)	2 (2.5)	
DiGeorge Syndrome (22q11.2 deletion)	2 (0.73)	0 (0)	0 (0)	2 (2.5)	
Other craniofacial syndrome	2 (0.73)	0 (0)	0 (0)	2 (2.5)	
BMI Percentile Mean [SD]	97.83 [1.29]	97.86 [1.29]	97.86 [1.33]	97.76 [1.26]	0.7109

Table 2: Baseline Demographics for Patients with Tonsillectomy

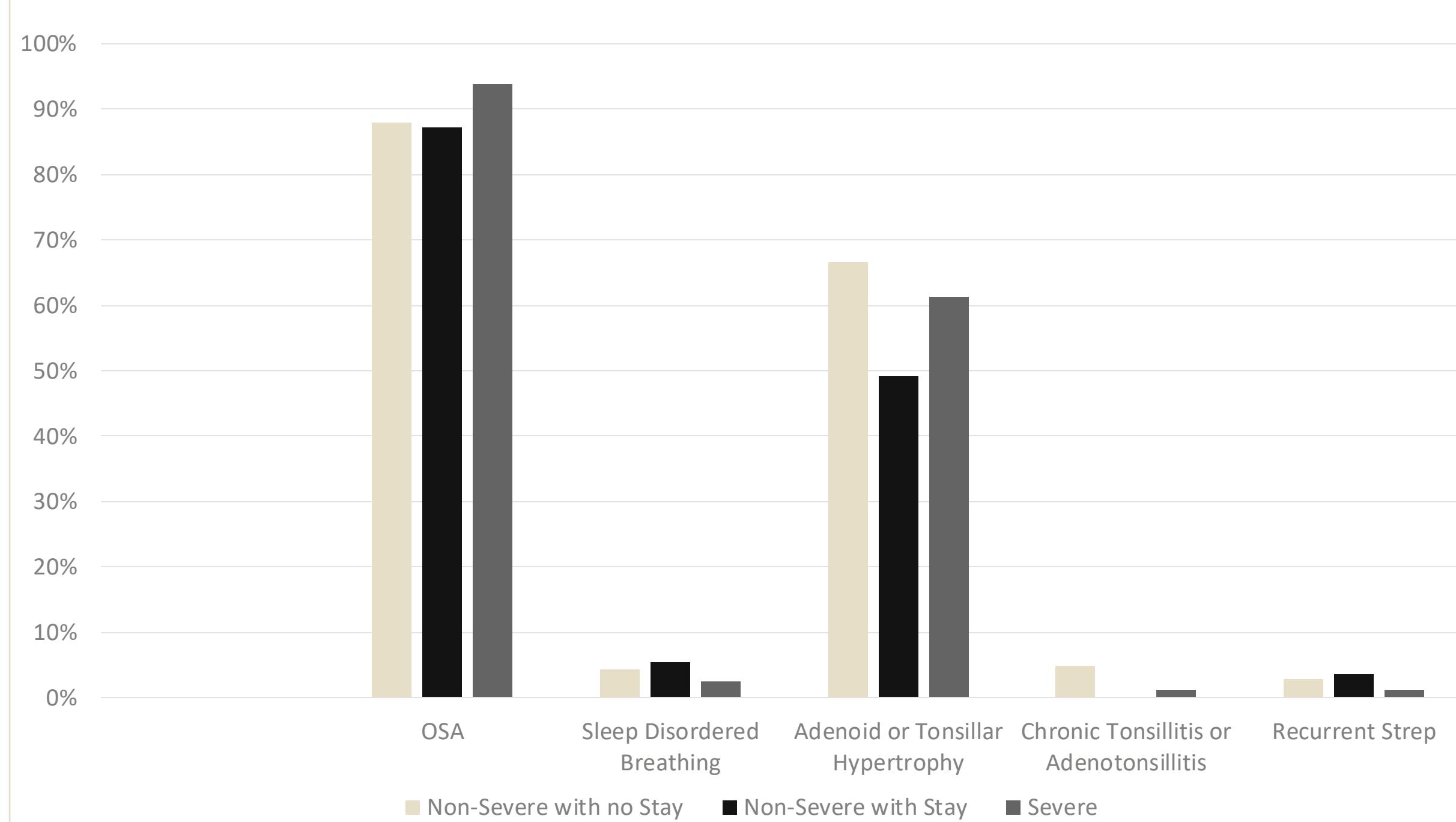


Figure 1: Reasons for undergoing T&A

	Total	Non-Severe with no Stay	Non-Severe with Stay	Severe	P-Value
One or More ED Visits					
No	243 (89.34)	125 (88.65)	49 (90.74)	69 (89.61)	0.9107
Yes	29 (10.66)	16 (11.35)	5 (9.26)	8 (10.39)	
Readmission					
Yes	17 (60.71)	9 (56.25)	3 (60)	5 (71.43)	0.7899
No	11 (39.29)	7 (43.75)	2 (40)	2 (28.57)	
Total Time in the PACU (Minutes) Mean [SD]	125.05 [66.62]	108.15 [55.25]	160.15 [69.69]	130.87 [73.11]	<0.0001

Table 3: Outcomes for Patients with Tonsillectomy

Results

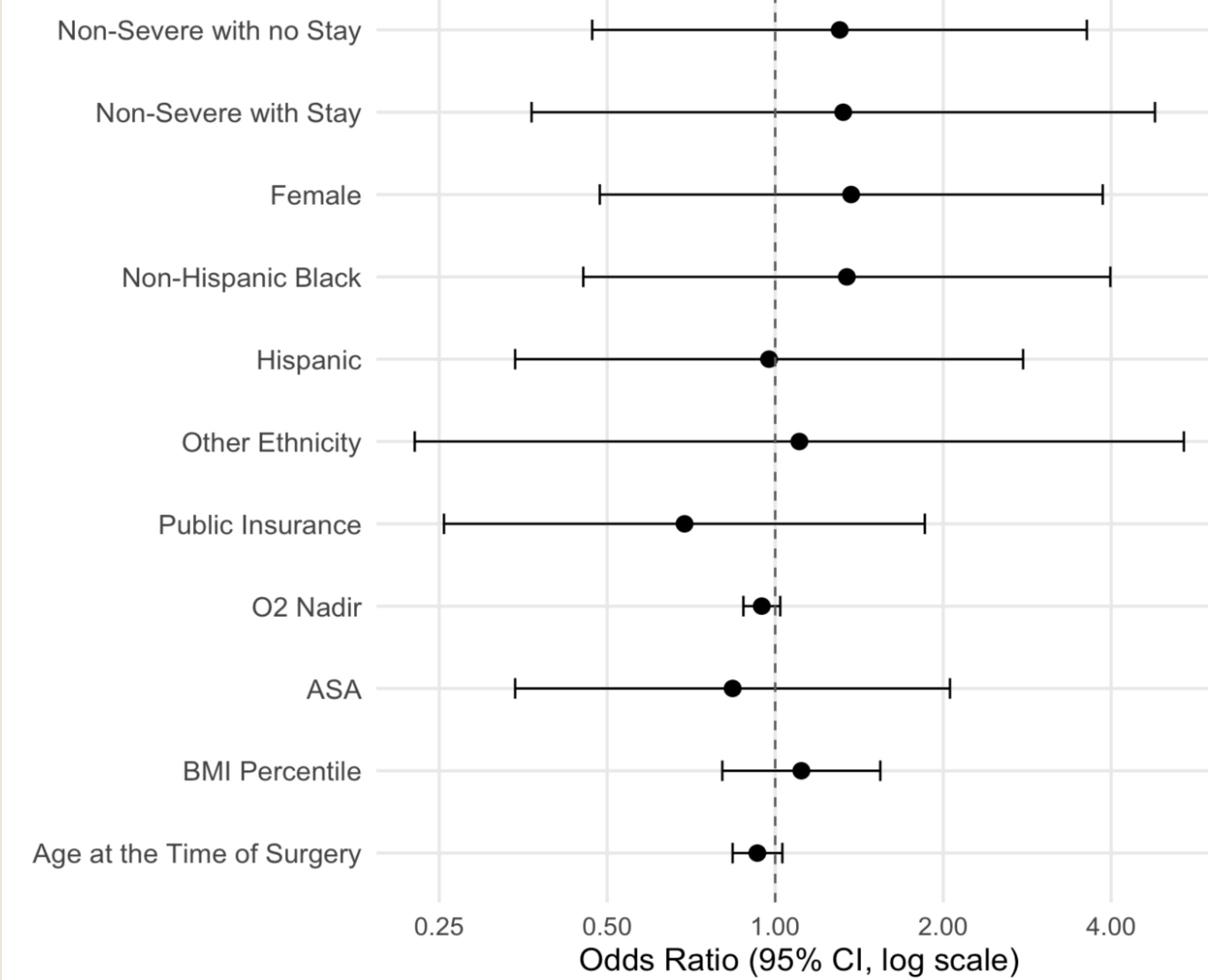


Figure 2: Forest plot showing the adjusted analysis of factors associated with ED visits after surgery

Patient Type	Estimate	Standard Error	P-Value
Non-Severe with no Stay	-8.4200	10.7927	0.436
Non-Severe with Stay vs. Severe	36.7846	12.5644	0.0037
Sex			
Female	4.7468	11.3091	0.675
Ethnicity			
Non-Hispanic Black	5.7091	10.2932	0.5796
Hispanic	-7.2396	11.4491	0.5278
Other	-16.5218	15.6030	0.2907
Insurance			
Public	-7.7532	9.5345	0.4169
O2 Nadir	-1.3815	0.5859	0.0192
ASA	7.7341	9.3449	0.4087
BMI Percentile	0.1699	3.2942	0.9589
Age at the Time of Surgery	-0.2840	1.0835	0.7934

Table 4: Adjusted Analysis of factors associated with length of time in the PACU after surgery

Conclusions

- This single-institution retrospective review demonstrated no significant difference in ED visitation irrespective of sleep apnea severity or overnight stay.
- Patients with non-severe OSA with overnight stay were associated with a longer PACU stay compared to non-severe OSA patients with no stay.
- Higher O_2 nadirs were associated with shorter PACU times.
- This study supports using O_2 nadir as another metric for determining post-operative admission.