



# The Impact of Approved Anti-obesity Medications on the Incidence of Obstructive Sleep Apnea, Healthcare Resource Utilization and Costs Among Patients with Obesity: A Retrospective Cohort Study

Baser O<sup>1,2,3</sup>, Mohamed M<sup>4</sup>, Samayoa G<sup>4</sup>, Yapar N<sup>4</sup>, Baser E<sup>5</sup>

<sup>1</sup>Graduate School of Public Health, City University of New York, New York, NY, USA; <sup>2</sup>Department of Internal Medicine, University of Michigan, Ann Arbor, MI, USA; <sup>3</sup>Department of Economics, Bogazici University, Istanbul, Turkey; <sup>4</sup>Columbia Data Analytics, New York, NY, USA; <sup>5</sup>Mergen Medical Research, Bilkent Cyberpark, Ankara, Turkey

## BACKGROUND

Obesity has risen sharply since 1990<sup>1</sup>, leading to significant health issues, including obstructive sleep apnea (OSA), which affects nearly 1 billion people globally.<sup>2,3</sup> Obesity is the leading risk factor for OSA, and weight loss can improve both sleep quality and overall health.<sup>4</sup> Direct medical costs associated with obesity are estimated at \$147 billion annually, largely attributable to OA management.<sup>5</sup>

## OBJECTIVES

This study analyzed the impact of anti-obesity medications (AOMs) on OSA incidence, HCRU, and cost among US patients with obesity.

## METHODS

Utilizing the Kythera Labs data population, a retrospective cohort study from November 2022 to June 2024 was performed.

**Sample:** Patients with obesity were classified into 2 cohorts:

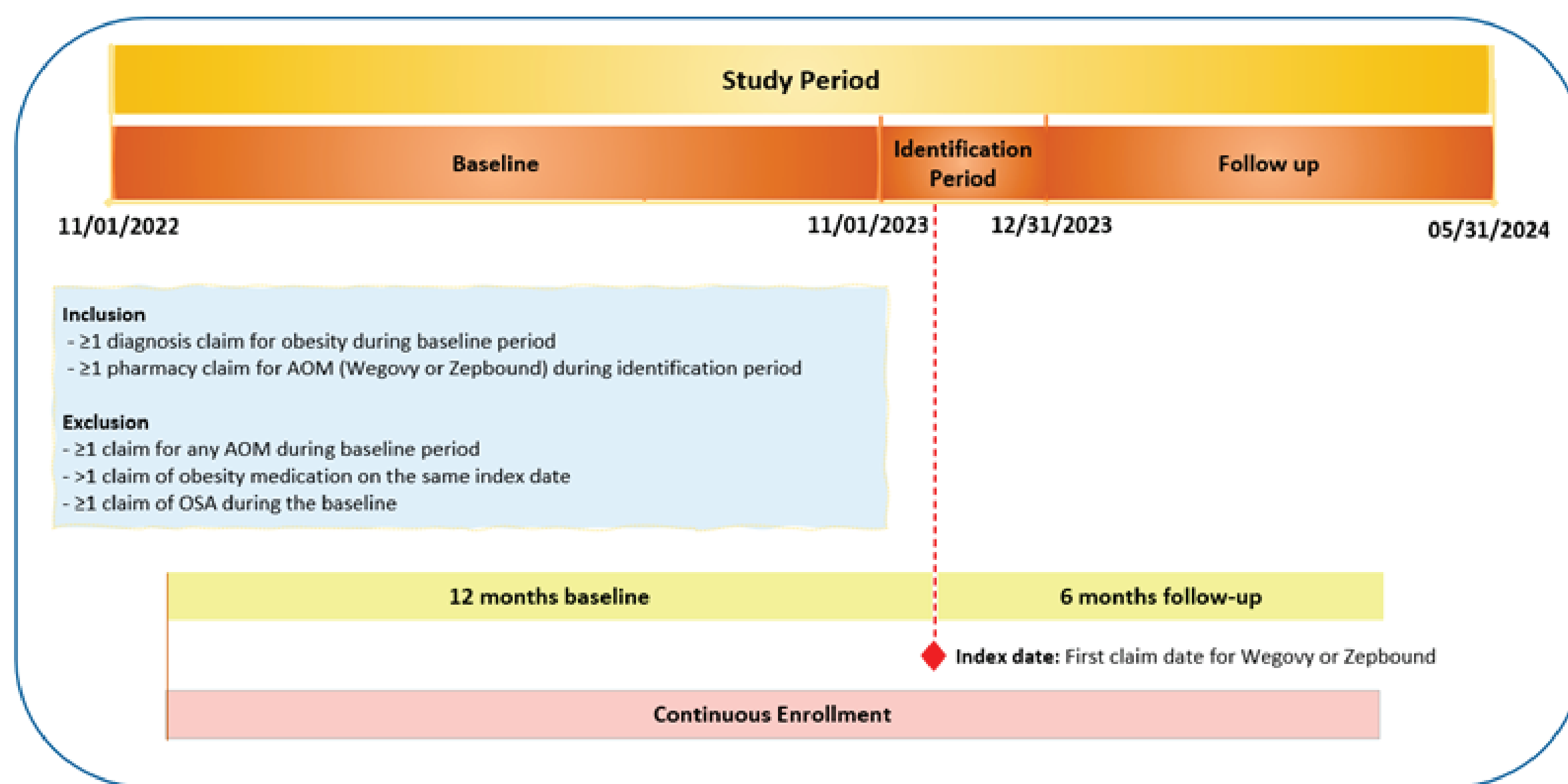
- **AOM cohort:** Evidence of tirzepatide (Zepbound) or semaglutide (Wegovy) use during the identification period (index date = first AOM claim date)
- **Non-AOM cohort:** No evidence of AOM use during the study period; random index dates were selected within the AOM cohort's range; a 1% random sample of eligible patients was included.

**Outcomes:** OSA risk assessed for a 6-month follow-up period

Patients with obesity and AOM use were identified based on diagnosis and prescription claim(s) for tirzepatide or semaglutide (identification period: 01NOV2023-31DEC2023), with 6 months of follow-up to measure OSA incidence, HCRU, and cost.

Multivariable analyses were employed to adjust for comorbidities and sociodemographic factors when assessing OSA incidence, HCRU, and cost.

Figure 1. Study design



AOM: anti-obesity medication; OSA: obstructive sleep apnea

## RESULTS

We identified 20,384 patients for the AOM cohort (semaglutide: 17,859; tirzepatide: 2,525) and 85,018 patients in the non-AOM cohort. AOM users had a significantly lower incidence of OSA (3.12%) vs non-AOM users (12.56%,  $p < 0.0001$ ; **Table 1**).

Table 1. Baseline characteristics of patients with vs without AOM use

Characteristics	AOM Cohort (Semaglutide or Tirzepatide) (N = 20,384)	Non-AOM Cohort (N = 85,018)	P-value	SMD
Age (years), mean (SD)	45.49 (12.45)	51.14 (18.39)	<0.0001	0.3247
<b>Age Group, n (%)</b>				
18-40 years	7016 (34.42)	18 948 (22.29)	<0.0001	0.2833
41-60 years	10 821 (53.09)	32 176 (37.85)	<0.0001	0.3124
61-80 years	2 349 (11.52)	26 190 (30.81)	<0.0001	0.4404
80+ years	35 (0.17)	3 663 (4.31)	<0.0001	0.2257
<b>Sex, n (%)</b>				
Male	3 562 (17.47)	35 082 (41.26)	<0.0001	0.5033
Female	16 822 (82.53)	49 935 (58.73)	<0.0001	0.5034
<b>Comorbidity Scores, n (%)</b>				
CCI Score ≥2	1 368 (6.71)	4 446 (5.23)	<0.0001	0.0649
CDS ≥2	10 651 (52.25)	7 174 (8.44)	<0.0001	1.3176
Elixhauser Index Score ≥2	12 625 (61.94)	13 441 (15.81)	<0.0001	1.1794
<b>SES, n (%)</b>				
Low	5 736 (28.14)	28 412 (33.42)	<0.0001	0.1129
Medium	6 599 (32.37)	27 438 (32.27)	0.7834	0.0021
High	7 667 (37.61)	27 452 (32.29)	<0.0001	0.1130
<b>Baseline CVD-related Comorbidities, n (%)</b>				
Hypertension	6 898 (33.84)	10 619 (12.49)	<0.0001	0.5888
Hyperlipidemia	3 831 (18.79)	5 308 (6.24)	<0.0001	0.4531
Type 2 diabetes	981 (4.81)	5 594 (6.58)	<0.0001	0.0731
Cardiovascular diseases	1 481 (7.27)	3 635 (4.28)	<0.0001	0.1393
COPD	2 404 (11.79)	2 884 (3.39)	<0.0001	0.3894
Depression	4 412 (21.64)	3 282 (3.86)	<0.0001	0.7100
GERD	3 379 (16.58)	2 979 (3.50)	<0.0001	0.5625
Metabolic disorders	789 (3.87)	259 (0.30)	<0.0001	0.3631
Somnolence	79 (0.39)	32 (0.04)	<0.0001	0.1080
Stroke	71 (0.35)	175 (0.21)	0.0002	0.0295
<b>Follow-up incidence</b>				
Sleep apnea	635 (3.12)	10 682 (12.56)	0.0001	0.3075

AOM: anti-obesity medication; COPD: chronic obstructive pulmonary disease; SD: standard deviation; SES: socioeconomic status; SMD: standardized mean difference

## RESULTS (cont'd)

- AOM users also had lower hospital admission rates (1.75% vs 7.41%,  $p < 0.0001$ ), shorter length of stay (0.15 days vs 1.55 days,  $p < 0.0001$ ), and lower ED visit (6.55% vs 13.52%,  $p < 0.0001$ ) and outpatient visit rates (79.91% vs 81.96%,  $p < 0.0001$ ; **Table 2**).
- Total health expenditures were also lower for AOM users than non-AOM users (\$7,965.56 vs \$10,133.50,  $p < 0.0001$ ; **Table 2**).

Table 2. Healthcare utilization and costs: AOM cohort vs non-AOM cohort

Outcome	AOM Cohort (Wegovy or Zepbound) (N = 20,384)		Non-AOM Cohort (N = 85,018)		p-value	SMD
	N/Mean	%/SD	N/Mean	%/SD		
<b>Healthcare utilization</b>						
Hospital admissions (%)	356	1.75%	6,299	7.41%	<0.0001	0.2338
Length of stay (days)	0.15	2.53	1.55	11.51	<0.0001	0.1345
Emergency visits (%)	1,336	6.55%	11,491	13.52%	<0.0001	0.2137
Outpatient visits (%)	16,288	79.91%	69,685	81.96%	<0.0001	0.0531
<b>Health expenditures (\$)</b>						
Total	\$7,965.56	\$8,171.39	\$10,133.50	\$17,356.78	<0.0001	0.1355
Inpatient	\$103.85	\$1,741.74	\$1,066.91	\$7,925.23	<0.0001	0.1345
Outpatient	\$3,185.85	\$4,338.63	\$5,627.77	\$9,962.08	<0.0001	0.2669
Emergency	\$193.15	\$890.73	\$520.53	\$2,265.23	<0.0001	0.1580
Pharmacy	\$4,482.71	\$5,385.87	\$2,918.28	\$6,721.20	<0.0001	0.2413

AOM: anti-obesity medication; SD: standard deviation; SMD: standardized mean difference

Table 3. Healthcare utilization and costs: Semaglutide vs tirzepatide

Outcome	Semaglutide (N = 17,859)		Tirzepatide (N = 2,525)		p-value	SMD
	N/Mean	%/SD	N/Mean	%/SD		
<b>Healthcare utilization</b>						
Hospital admissions (%)	317	1.78%	39	1.54%	0.4080	0.0176
Length of stay (days)	0.16	2.67	0.09	1.02	0.0085	0.0296
Emergency visits (%)	1,244	6.97%	92	3.64%	<0.0001	0.1344
Outpatient visits (%)	14,363	80.42%	1,925	76.24%	<0.0001	0.1045
<b>Health expenditures (\$)</b>						
Total	\$8,080.62	\$8,404.57	\$7,151.70	\$6,220.43	<0.0001	0.1138
Inpatient	\$110.24	\$1,842.01	\$58.64	\$700.09	0.0085	0.0296
Outpatient	\$3,274.84	\$4,456.50	\$2,556.46	\$3,323.22	<0.0001	0.1658
Emergency	\$206.23	\$923.38	\$100.65	\$603.99	<0.0001	0.1186
Pharmacy	\$4,489.32	\$5,521.87	\$4,435.95	\$4,303.55	0.5747	0.0099

SD: standard deviation; SMD: standardized mean difference

## CONCLUSION

AOM use was associated with lower OSA incidence, reduced HCRU, and lower healthcare-related expenditures.

These results highlight the importance of how newly-approved medications for obesity can potentially alleviate the disease and economic burden of OSA.

## REFERENCES

- 1 World Health Organization. Obesity and overweight. 2024. 1 March 2024. <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
- 2 Lin X, Li H. Obesity: Epidemiology, pathophysiology, and therapeutics. *Front Endocrinol (Lausanne)*. 2021;12:706978.
- 3 Slowik JM, Sankari A, Collen JF. Obstructive sleep apnea. *StatPearls*. 2024.
- 4 Edwards BA, Bristow C, O'Driscoll DM, et al. Assessing the impact of diet, exercise and the combination of the two as a treatment for OSA: A systematic review and meta-analysis. *Respirology*. 2019;24(8):740-751.
- 5 Finkelstein EA, Trogon JG, Cohen et al. Annual medical spending attributable to obesity: Payer- and service-specific estimates. *Health Affairs*. 2009;28(Suppl 1):w822-w831.



Columbia Data Analytics

Columbia Data Analytics  
145 Hudson St, Suite 205  
New York, NY 10013  
[www.cdanyc.com](http://www.cdanyc.com)