The Effect of Newly Approved Obesity Medications on Cardiovascular Complications

Onur Baser, MA, MS, PhD[1,2,3]; Gabriela Samayoa, MD, MPH[4]; Katarzyna Rodchenko, MA, MPH[4]; Lauren Isenman, MPH[4]; Erdem Baser, MA, MS, PhD[4]; Nehir Yapar, MS[4]

[1]Graduate School of Public Health, City University of New York, New York, NY, USA; [2]Department of Internal Medicine, University of Michigan, Ann Arbor, MI, USA; [3]Department of Economics, Bogazici University, Istanbul, Turkey; [4]Columbia Data Analytics, New York, NY, USA

BACKGROUND

Obesity and its cardiovascular complications are significant causes of morbidity and mortality.[1,2] Newly approved anti-obesity medications (AOMs) have demonstrated effectiveness in managing obesity and reducing the risk for obesity-related complications.[3] There is limited research using real-world data to explore the association between AOM use and cardiovascular disease (CVD).

OBJECTIVES

This study analyzed the impact of approved AOMs, namely, Ozempic, Wegovy, and Mounjaro, on the risk of developing CVD.

METHODS

A retrospective cohort study was performed utilizing Kythera Medicare claims data from January 2020 through August 2022. Two patient cohorts were identified: 1) Patients diagnosed with obesity treated with an AOM; 2) Patients with obesity who were not treated with an AOM.

AOM Cohort:

a. At least 1 pharmacy claim for Ozempic, Wegovy, or Mounjaro 01JAN2021-31AUG2022 (first prescription claim date was designated as the index date), and
b. At least 1 diagnosis claim for obesity before the index date.

Non-AOM Cohort:

a. At least 1 diagnosis claim for obesity during the baseline period (01JAN2020-01JAN2021); a random sample of 10% of patients was included in the final study population.

For both cohorts, continuous enrollment for 1 year pre-index date was required.

METHODS (cont'd)

Descriptive analysis was conducted to determine sociodemographic and clinical characteristics.

Cox regression and Aalen's regression were used to determine risk of CVD using International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) codes in the outpatient and inpatient settings.

Table 1. Codes Used for Cardiovascular Disease Definition

CVD Endpoints	ICD-10 Codes
Coronary artery disease	I25
Heart failure	I50
Atrial fibrillation	I48.91
Arrhythmia	I49
Ischemic heart disease	I25.9
Stroke	I63.9
Peripheral vascular disease	I73.9

SES: socio-economic status; SD: standard deviation

RESULTS

We identified 5,926 patients treated with an AOM, including Ozempic (5,404 patients), Wegovy (375 patients), and Mounjaro (147 patients). Patients with AOM use were younger, had more comorbidities, and had lower SES than patients without AOM use.

Hypertension, type 2 diabetes, and hyperlipidemia were the most common comorbidities (**Table 2**).

Furthermore, patients with obesity using AOMs had a lower risk of heart failure (4.89% vs 6.13%, p<0.0001), atrial fibrillation (3.83% vs 5.17%, p<0.0001), arrhythmia (3.59% vs 4.14%, p<.0153), and peripheral vascular disease (3.44% vs 2.94%, p<0.0395) than the non-AOM cohort (**Table 3**).

After controlling for sociodemographic and clinical factors, patient risk for CVD increased with age and residing in lower SES score areas.

Patients with COPD, smoking history, and chronic kidney disease had a higher risk of developing CVD.

RESULTS (cont'd)

Table 2. Baseline Characteristics of Patients with Obesity and AOM Utilization

	Ozempic (N = 5,404)		Wegovy (N = 375)		Tirzepatide (N = 147)		p-value
Characteristics	N/Mean	%/SD	N/Mean	%/SD	N/Mean	%/SD	
Age (years)	71.58	4.50	70.55	3.97	72.22	4.28	<0.0001
Age Group: 65-70	2,639	48.83%	228	60.80%	58	39.46%	<0.0001
Age Group: 71-80	2,516	46.56%	140	37.33%	83	56.46%	0.0001
Age Group: 80+	249	4.61%	7	1.87%	6	4.08%	0.0434
Gender							
Male (%)	1,957	36.21%	84	22.40%	51	34.69%	<0.0001
Female (%)	3,447	63.79%	291	77.60%	96	65.31%	<0.0001
Comorbidity Scores							
Charlson Comorbidity Index Score (≥ 2)	2,817	52.13%	85	22.67%	67	45.58%	<0.0001
Chronic Disease Score (≥ 2)	4,418	81.75%	262	69.87%	120	81.63%	<0.0001
Elixhauser Index Score (≥ 2)	4,940	91.41%	301	80.27%	127	86.39%	<0.0001
Socio-economic Status (SES)							
Low	1,758	33.13%	119	32.51%	43	29.66%	0.6655
Medium	1,774	33.43%	106	28.96%	39	26.90%	0.0610
High	1,774	33.43%	141	38.52%	63	43.45%	0.0072
Basline Cardiovascular Disease-related Comorbidities							
Hypertension	3,959	73.26%	237	63.20%	97	65.99%	<0.0001
Hyperlipidemia	2,150	39.79%	125	33.33%	41	27.89%	0.0009
Diabetes Type 2	3,697	68.41%	66	17.60%	79	53.74%	<0.0001
Chronic Obstructive Pulmonary Disease	374	6.92%	17	4.53%	14	9.52%	0.0884
Smoking Hx	400	7.40%	27	7.20%	13	8.84%	0.7938
Alcohol Use Disorder	31	0.57%	2	0.53%	0	0.00%	0.6525
Chronic Kidney Disease	183	3.39%	6	1.60%	6	4.08%	0.1487
Cardiovascular Disease - (endpoint/outcome)							
Coronary Artery Disease	532	9.84%	29	7.73%	8	5.44%	0.0905
Heart Failure	275	5.09%	9	2.40%	6	4.08%	0.0590
Atrial Fibrillation	207	3.83%	14	3.73%	6	4.08%	0.9828
Arrhythmia	186	3.44%	15	4.00%	6	4.08%	0.7871
Ischemic Heart Disease	20	0.37%	0	0.00%	0	0.00%	0.3795
Stroke	101	1.87%	5	1.33%	1	0.68%	0.4397
Peripheral Vascular Disease	164	3.03%	6	1.60%	4	2.72%	0.2785
Any Cardiovascular Disease	1,072	19.84%	54	14.40%	21	14.29%	0.0104

SES: socio-economic status; SD: standard deviation

Table 3. CVD-Related Outcomes for Patients with Obesity with vs without AOM Use

	Patients with AOM Use (Ozempic or Wegovy or Mounjaro) (N = 5,926)		Patients with No AOM Use (N = 79,118)		p-value	Std. Diff.
	N/Mean	%/SD	N/Mean	%/SD		
Cardiovascular Disease - (endpoint/outcome)						
Coronary Artery Disease	569	9.60%	7,355	9.30%	0.4352	0.0105
Heart Failure	290	4.89%	4,848	6.13%	0.0001	0.0518
Atrial Fibrillation	227	3.83%	4,091	5.17%	<0.0001	0.0611
Arrhythmia	207	3.49%	3,276	4.14%	0.0153	0.0327
Ischemic heart disease	20	0.34%	160	0.20%	0.0289	0.0294
Stroke	107	1.81%	1,376	1.74%	0.7063	0.0051
Peripheral Vascular Disease	174	2.94%	2,721	3.44%	0.0395	0.0277
Any CVD	1,147	19.36%	16,745	21.16%	0.0010	0.0444

AOM, anti-obesity medication; CVD, cardiovascular disease; SD, standard deviation; Std. Diff., standardized difference.

RESULTS (cont'd)

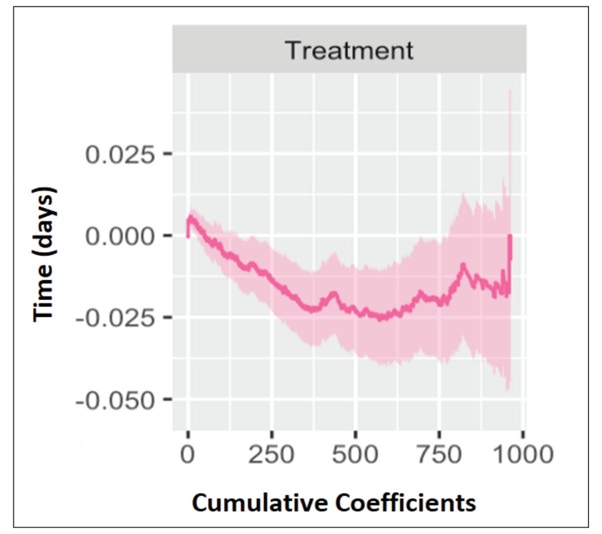
Table 4. Cox Regression Results for Time to CVD among Patients with Obesity and AOM Use

	Hazard Ratio	Conf. Interval		p-value
		Lower	Upper	
Treatment				
Yes	0.92	0.86	0.98	0.0068
No	1.00	1.00	1.00	
Characteristics				
Age Group: 65-70	1.00	1.00	1.00	
Age Group: 71-80	0.67	0.64	0.70	<0.0001
Age Group: 80+	2.01	1.92	2.10	<0.0001
Gender				
Female	0.74	0.72	0.77	<0.0001
Male	1.00	1.00	1.00	
Comorbidity Scores				
Charlson Comorbidity Index Score (≥ 2)	1.40	1.34	1.45	<0.0001
Chronic Disease Score (≥ 2)	1.12	1.08	1.15	<0.0001
Elixhauser Index Score (≥ 2)	0.98	0.94	1.02	0.3622
SES				
Low	1.09	1.05	1.13	<0.0001
Medium	1.07	1.03	1.11	0.0003
High	1.00	1.00	1.00	
Comorbidities				
Hypertension	0.99	0.95	1.03	0.5483
Hyperlipidemia	0.95	0.91	0.98	0.0012
Type 2 Diabetes	0.98	0.95	1.02	0.4382
COPD	1.41	1.33	1.48	<0.0001
Smoking Hx	1.12	1.06	1.19	0.0001
Alcohol Use Disorder	1.01	0.85	1.21	0.8995
Chronic Kidney Disease	1.17	1.07	1.27	0.0005

AOM, anti-obesity medications; COPD, chronic obstructive pulmonary disease; CVD, cardiovascular disease; SES, socio-economic status

Patients with obesity and AOM use showed an 8% risk reduction in any CVD (hazard ratio [HR]=0.92, p=0.0068; **Table 4**). The protective effect on CVD was apparent over the first 375 days (**Figure 1**).

Figure 1. Aalen's Additive Regression Results for Risk of CVD (cumulative effect AOM use over time)



CONCLUSION

These results suggest that the utilization of AOMs could potentially alleviate the high prevalence of CVD and related social and economic costs.

REFERENCES

1. Guh DP, Zhang W, Bansback N, et al. The incidence of comorbidities related to obesity and overweight: A systematic review and meta-analysis. *BMC Public Health.* 2009;9:88.
2. Caleyachetty R, Thomas GN, Toulis KA, et al. Metabolically healthy obese and incident cardiovascular disease events among 3.5 million men and women. *J Am Coll Cardiol.* 2017;70(12):1429-37.
3. Müller TD, Blüher M, Tschöp MH, DiMarchi RD. Anti-obesity drug discovery: advances and challenges. *Nat Rev Drug Discov.* 2022;21(3):201-23.

145 Hudson St., Suite 205
New York, NY 10013 USA
cdanyc.com

COLUMBIA DATA ANALYTICS

Presented at the ISPOR Annual Meeting
May 5-8, 2024, Atlanta, GA