Socioeconomic Status and Anti-obesity Medications: Impact on Cardiovascular Risk in Medicare Patients with Obesity

Onur Baser, MA, MS, PhD[1]; Katarzyna Rodchenko, MA, MPH[2]; Munira Mohamed, MPH[2]; Alexandra Passarelli, MPH[2]; Shuangrui Chen, MS[2]; Nehir Yapar[2]
[1]Graduate School of Public Health, City University of New York (CUNY), New York, NY; [2]Columbia Data Analytics, New York, NY

BACKGROUND

Obesity, a major risk factor for cardiovascular disease (CVD), is closely linked to socioeconomic status (SES), with lower SES often exacerbating adverse outcomes. The glucagon-like peptide 1 (GLP-1)–based medications semaglutide (Ozempic, Wegovy) and tirzepatide (Zepbound, Mounjaro) have been shown to lead to weight loss and/or better glucose control, thereby contributing to a reduced risk of CVD.[1,2]

Almost half of Medicare beneficiaries 65 years and older have at least 1 heart condition; those patients incurred, on average, almost twice the total cost of care of those without heart conditions.[3]

OBJECTIVES

This retrospective cohort study explored the relationship between the use of GLP-1–based anti-obesity medications (AOMs) and CVD risk, emphasizing the role of SES in modifying outcomes.

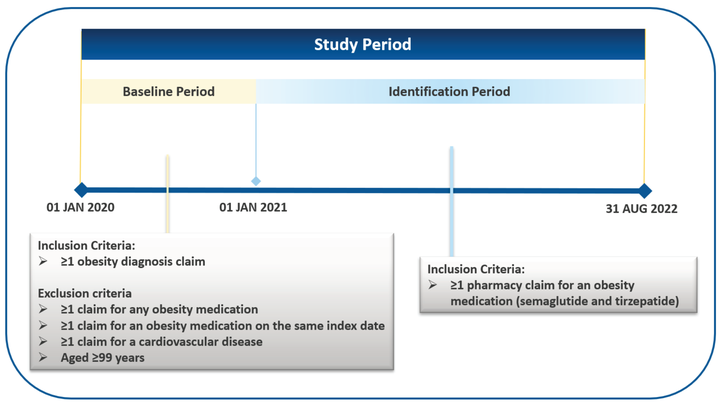
METHODS

Using 2020–2022 Medicare claims data, patients with obesity treated with semaglutide or tirzepatide (N=5,926) were compared with those not treated with AOMs (N=79,118). During this period, Wegovy was the only FDA-approved medication for weight loss; however, Ozempic and Mounjaro, which had been approved for diabetes treatment, were included in the AOM cohort since they had also been shown to cause significant weight loss.[2,4]

Two patient cohorts with obesity were identified and were required to have continuous medical and pharmacy benefits for 1 year pre- and post-index date (**Figure 1**):

- **AOM Cohort:** The first prescription claim date was designated as the index date.
- **Non-AOM Cohort:** The index date was randomly selected between a minimum and maximum date of index medication use from the AOM cohort. After applying inclusion and exclusion criteria for the non-AOM cohort, 10% of these patients were randomly chosen for the final sample.

Figure 1. Study Design Timeline and Study Criteria



The likelihood of CVD was defined as the presence of coronary artery disease, heart failure, atrial fibrillation, arrhythmia, ischemic heart disease, stroke, and peripheral vascular disease.

Descriptive analysis was performed by comparing AOM and non-AOM cohorts; subgroup analysis was performed by comparing the variables by medication type.

Cox regression and Aalen's additive regression models were used to assess CVD risk, controlling for demographic and clinical factors.

RESULTS

Baseline clinical and demographic characteristics in the Medicare population (**Table 1**):

- Patients in the AOM cohort were younger on average, more likely to reside in low-SES regions, had higher comorbidity scores and higher rates of CVD-related comorbidities than those in the non-AOM cohort.
- Most patients in both cohorts were female.
- The most prevalent comorbidities in both cohorts were hypertension, type 2 diabetes, and hyperlipidemia, followed by smoking history, chronic obstructive pulmonary disease, and chronic kidney disease (**Table 1**).

Table 1. Baseline Characteristics Among Patients with and without AOM Use

Characteristics	AOM Cohort (Ozempic or Wegovy or Mounjaro) (N = 5,926)		Non-AOM Cohort (N = 79,118)		*P* Value	Std. Diff.
	N/Mean	%/SD	N/Mean	%/SD		
Age Group	71.53	4.47	73.67	5.65	<0.0001	0.3821
65-70 years	2,925	49.36%	27,804	35.14%	<0.0001	0.2968
71-80 years	2,739	46.22%	40,596	51.31%	<0.0001	0.1019
80+ years	262	4.42%	10,718	13.55%	<0.0001	0.2728
Sex						
Male	2,092	35.30%	30,738	38.85%	<0.0001	0.0729
Female	3,834	64.70%	48,380	61.15%	<.0001	0.0729
Comorbidity Scores						
CCI score ≥2	2,969	50.10%	20,009	25.29%	<0.0001	0.5645
CDS ≥2	4,800	81.00%	29,613	37.43%	<0.0001	0.9113
Elixhauser Index score ≥2	5,368	90.58%	54,347	68.69%	<0.0001	0.4823
Socioeconomic Status						
Low	1,998	34.35%	25,581	32.93%	0.0262	0.0302
Medium	1,875	32.23%	25,662	33.03%	0.2119	0.0170
High	1,944	33.42%	26,448	34.04%	0.3331	0.0132
Baseline CVD-related Comorbidities						
Hypertension	4,293	72.44%	48,321	61.07%	<0.0001	0.2345
Hyperlipidemia	2,316	39.08%	24,070	30.42%	<0.0001	0.1874
Type 2 diabetes	3,842	64.83%	20,125	25.44%	<0.0001	0.8983
COPD	405	6.83%	4,895	6.19%	0.0468	0.0268
Smoking history	440	7.42%	4,993	6.31%	0.0007	0.0456
Alcohol use disorder	33	0.56%	550	0.70%	0.2133	0.0168
Chronic kidney disease	195	3.29%	1,785	2.26%	<0.0001	0.0686

AOM: anti-obesity medications; CCI: Charlson comorbidity index; CDS: Chronic Disease Score; COPD: chronic obstructive pulmonary disease; CVD: cardiovascular disease; SD: standard deviation

CVD-related outcomes among patients with AOM use were significantly lower than for those without AOM use, including heart failure, atrial fibrillation, arrhythmia, and peripheral vascular disease.

Only ischemic heart disease was higher (**Table 2**).

Table 2. CVD-related Outcomes Among Patients with Obesity, with and without AOM Use

Cardiovascular Diseases	AOM Cohort (Ozempic, Wegovy, or Mounjaro) (N = 5,926)		Non-AOM Cohort (N = 79,118)		*P* Value	Std. Diff.
	N/Mean	%	N/Mean	%		
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 medications; CVD, cardiovascular disease; Std. diff., standardized difference.

Cox regression (**Table 3**) reveals:

- AOM use among was associated with an 8% reduction in the risk of CVD vs no AOM use.
- Patients aged 71-80 years had a 33% reduced risk of CVD vs those aged 65-70 years. However, patients aged 80+ years had a 2.01 times greater risk vs those aged 65-70 years.
- Women had a 26% reduced risk of CVD vs men.
- Individuals in low- and medium-SES regions had a higher risk of CVD than those in high-SES regions.
- Charlson Comorbidity Index scores >2, Chronic Disease Score >2, and CVD-related comorbidities were associated with an increased risk of CVD.
- Patients in low-SES regions had a 9% increased risk of CVD; those in medium-SES regions had a 7% increased risk vs high-SES regions.

Table 3. Cox Regression Results for Time to CVD (Hazard Ratio)

	Hazard Ratio	Confidence Interval		*P* Value
		Lower	Upper	
Treatment				
Yes	0.92	0.86	0.98	0.0068
No	1	1	1	
Age Groups				
65-70 years	1	1	1	
71-80 years	0.67	0.64	0.7	<0.0001
80+ years	2.01	1.92	2.1	<0.0001
Sex				
Female	0.74	0.72	0.77	<0.0001
Male	1	1	1	
Comorbidity Scores				
CCI score ≥2	1.40	1.34	1.45	<0.0001
CDS ≥2	1.12	1.08	1.15	<0.0001
Elixhauser Index score ≥2	0.98	0.94	1.02	0.3622
Socioeconomic Status				
Low	1.09	1.05	1.13	<0.0001
Medium	1.07	1.03	1.11	0.0003
High	1	1	1	
CVD-related 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	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.

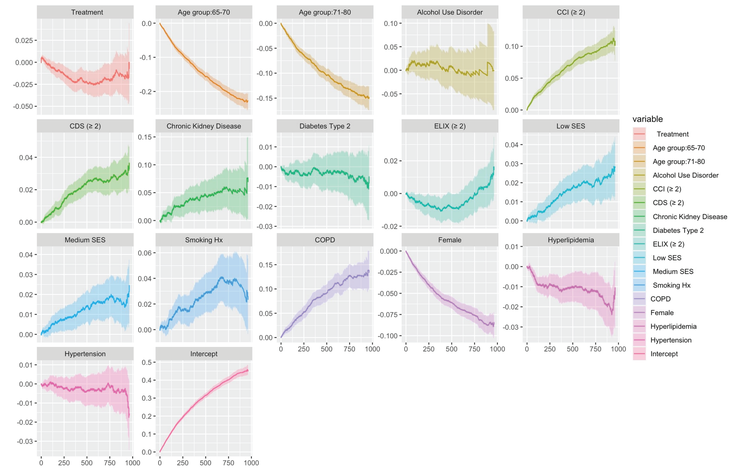
RESULTS (cont'd)

Aalen's additive regression analysis showed that AOM treatment had a protective effect on CVD over approximately the first 375 days (**Figure 2**). After that, AOM treatment did not significantly affect CVD outcomes.

Younger age and female sex had a protective effect on CVD over the period analyzed. Conversely, a sustained increased risk of CVD was found for patients with high CCI scores and CDS, those residing in low- and medium-SES areas, and those with COPD.

Hyperlipidemia had a protective effect against CVD in the first 120 days and between 760 and 920 days, but increased the risk of CVD after ~920 days. Smoking history increased the risk of CVD in the first 660 days, and CKD increased the risk of CVD during approximately the first 700 days.

Figure 2. Aalen's Additive Regression Results for Risk of CVD (cumulative effect of the use of AOMs over time)



X axis = cumulative coefficients; Y axis = time
CCI: Charlson Comorbidity Index; CDS: Chronic Disease Score; CVD: cardiovascular disease; ELIX: Elixhauser index score; SES: socioeconomic status.

CONCLUSION

While AOMs demonstrated a protective effect against CVD in patients with obesity, lower SES was associated with an increased risk of cardiovascular events. The 8% reduction in relative risk and lower prevalence of CVD outcomes indicate that AOMs may be effective in alleviating the heavy clinical burden and high prevalence of CVD in the United States.

REFERENCES

1. Zaffina I, Pelle MC, Armentaro G, et al. *Front Endocrinol*. 2023;14
2. Kolata G. https://www.nytimes.com/2023/08/17/health/weight-loss-drugs-obesity-ozempic-wegovy.html. Accessed Nov 3, 2023.
3. Ward C, Ewald E, Koenig K, Schluterman N. https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/MCBS/Downloads/HeartConditions_DataBrief_2017.pdf. Accessed Nov 29, 2023.
4. Lilly.com. https://investor.lilly.com/news-releases/news-release-details/lilly-receives-us-fda-fast-track-designation-tirzepatide. Accessed Nov 2, 2023.

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

COLUMBIA DATA ANALYTICS

Presented at ISPOR 2025
May 12-16, 2025, Montreal, Quebec, Canada