

# The Effect of Approved Obesity Medications on Cardiovascular-Related **Comorbidities of Obesity**

## BACKGROUND

Obesity and its comorbidities, including cardiovascular disease (CVD), are major causes of morbidity and mortality in the United States.<sup>1,2</sup> Over 70% of American adults aged 20 and older have obesity or are overweight.<sup>3</sup> Studies have shown that Ozempic, Wegovy, and tirzepatide have the potential to reduce body weight substantially.<sup>4</sup> Little is known about the effect of anti-obesity medications (AOM) on CVD among patients with obesity.

## **OBJECTIVES**

To compare the effect of Ozempic, Wegovy, and tirzepatide on CVD in patients with obesity in the United States.

## METHODS

Kythera Medicare closed claims data from January 2020 to August 2022 were used in this retrospective cohort study.

### Inclusion criteria

- ≥1 claim for Ozempic, Wegovy or tirzepatide in the identification period
- ≥1 claim for obesity in the baseline period
- Continuous enrollment for 1 year pre-index date

#### **Exclusion criteria**

- $\geq 1$  claim with any AOM in the baseline period
- ≥1 claim for CVD in the baseline period
- ≥1 claim of AOM on the same index date
- Age ≥99 years

### **Analytical method**

- Descriptive analysis
- Cox regression was applied to determine the risk of CVD, as determined through ICD-10 codes at outpatient and inpatient visits.
- Multivariate analysis was utilized to adjust for demographic variables and comorbidities.

#### Table 1. Codes Used for CVD Definition

| ICD-10<br>Codes |
|-----------------|
| 125             |
| 150             |
| I48.91          |
| 149             |
| 125.9           |
| 163.9           |
| 173.9           |
|                 |

CVD: cardiovascular disease

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| RES | ULT | S |
|-----|-----|---|
|     |     |   |

We identified a total of 5,926 patients treated with AOM, including Ozempic (5,404 patients), Wegovy (375 patients), and tirzepatide (147 patients). Descriptive characteristics are shown in Table 2.

Table 2. Baseline Characteristics of Ozempic, Wegovy, and Tirzepatide

|  | Oz(<br>(N =                             | empic<br>5,404) | We<br>(N : | egovy<br>= 375) | Tirze<br>(N : | epatide<br>= 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 |  |
| 65-70                                  | 2,639                                   | 48.83%          | 228        | 60.80%          | 58            | 39.46%            | <0.0001 |  |
| 71-80                                  | 2,516                                   | 46.56%          | 140        | 37.33%          | 83            | 56.46%            | 0.0001  |  |
| 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                     | 1                                       |                 |            |                 |               |                   |         |  |
| 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 |  |
| SES Score                              |   |                 |            |                 |               |                   |         |  |
| 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 | Comorbiditi                             | es              | •          |                 |               | •                 | •       |  |
| 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-related Outcome | Cardiovascular Disease-related Outcomes |                 |            |                 |               |                   |         |  |
| 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

## **RESULTS (cont'd)**

Patients treated with Wegovy had a 12% lower risk (HR=0.88, p=0.391) of developing CVD than those treated with Ozempic. Moreover, patients treated with tirzepatide had a 2% lower risk (HR=0.98, p=0.919) than those treated with Ozempic. However, these differences were not statistically significant. Results are shown in Table

#### Table 3. Cox Regression Results for Time to CVD among Ozempic, Wegovy, and Tirzepatide Users

|                                       |      | Conf. I | nterval |         |
|---------------------------------------|------|---------|---------|---------|
|                                       | HK   | Lower   | Upper   | p-value |
| Treatment                             |      |         |         |         |
| Wegoy                                 | 0.88 | 0.66    | 1.17    | 0.3905  |
| Tirzepatide                           | 0.98 | 0.63    | 1.52    | 0.9189  |
| Ozempic                               | 1.00 | 1.00    | 1.00    |         |
| Characteristics                       |      |         |         |         |
| Age Group: 65-70                      | 0.67 | 0.52    | 0.86    | 0.0016  |
| Age Group: 71-80                      | 0.79 | 0.62    | 1.01    | 0.0628  |
| Age Group: 80+                        | 1.00 | 1.00    | 1.00    |         |
| Gender                                |      |         |         |         |
| Female                                | 0.74 | 0.65    | 0.83    | <.0001  |
| Male                                  | 1.00 | 1.00    | 1.00    |         |
| Comorbidity Scores                    |      |         |         |         |
| Charlson Comorbidity Index Score (≥2) | 1.72 | 1.49    | 1.98    | <.0001  |
| Chronic Disease Score (≥2)            | 1.08 | 0.92    | 1.26    | 0.3554  |
| Elixhauser Index Score (≥2)           | 1.01 | 0.77    | 1.33    | 0.9334  |
| SES Score                             |      |         |         |         |
| Low                                   | 1.05 | 0.91    | 1.21    | 0.5218  |
| Medium                                | 1.17 | 1.01    | 1.35    | 0.0306  |
| High                                  | 1.00 | 1.00    | 1.00    |         |
| Comorbidities                         |      |         |         |         |
| Hypertension                          | 1.22 | 1.04    | 1.42    | 0.0137  |
| Hyperlipidemia                        | 0.99 | 0.88    | 1.12    | 0.8984  |
| Diabetes Type 2                       | 0.86 | 0.74    | 0.99    | 0.0367  |
| Chronic Obstructive Pulmonary Disease | 1.23 | 1.00    | 1.51    | 0.0456  |
| Smoking History                       | 1.06 | 0.86    | 1.32    | 0.5728  |
| Alcohol Use Disorder                  | 1.07 | 0.51    | 2.26    | 0.8522  |
| Chronic Kidney Disease                | 1.19 | 0.91    | 1.57    | 0.2054  |

HR: hazard ratio; SES: socio-economic status



## CONCLUSION

We found no significant differences between treatment with Ozempic, Wegovy, or tirzepatide for CVD. Therefore, the absence of a statistically significant difference in the risk of CVD among Ozempic, Wegovy, and tirzepatide users demonstrates that one medication is no more effective than the others for reducing the risk of CVD. However, when we compared patients with obesity on AOM with those not receiving AOM, Cox regression demonstrated an 8% risk reduction (p=0.0068) in CVD. Therefore, we can conclude AOM does help in reducing the risk of CVD.

Table 4. Cox Regression Results for Time to CVD

| Treatment | Hazard | <b>Confidence Interval</b> |       | p-value |
|-----------|--------|----------------------------|-------|---------|
|           | капо   | Lower                      | Upper |         |
| Yes       | 0.92   | 0.86                       | 0.98  | 0.0068  |
| No        | 1.00   | 1.00                       | 1.00  |         |

CVD: cardiovascular disease

## REFERENCES

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