# The Impact of Approved Anti-Obesity Medications on Osteoarthritis Risk in Patients With Obesity: A Retrospective Cohort Study

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## BACKGROUND

Osteoarthritis (OA) is a common degenerative joint condition[1], and is the most prevalent type of arthritis, impacting 32.5 million adults in the United States.[2,3] One of the most significant risk factors for OA is obesity, which puts extra stress on weight-bearing joints such as the knees, hips, and spine.[4,5] Additionally, fat tissue releases chemicals that promote inflammation, which can further contribute to joint damage.[5,6] Although there is ample evidence linking obesity to OA, little is known regarding the impact of approved anti-obesity medications (AOMs).

## OBJECTIVES

This study aimed to investigate the effect of AOM utilization on the risk of OA among patients with obesity in the United States.

## METHODS

Utilizing Kythera Medicare data, we conducted a retrospective cohort study from January 2020 to August 2022. Patients with obesity were classified into two cohorts: Patients 1) with vs 2) without AOM use.

- A 10% random selection of identified patients wihtout AOM use were included in the latter cohort.
- Patients in the AOM cohort had at least 1 pharmacy claim for Ozempic or Wegovy.

Diagnosis codes were used to identify OA in the inpatient and outpatient settings.

### Analytic Methods

- Descriptive analysis was used to determine sociodemographic and clinical characteristics.
- The risk of OA was determined using Cox regression and Aaelen's regression. Multivariable analysis was used to control for comorbidities and demographic factors.

## RESULTS

After the inclusion and exclusion criteria, 7,078 patients were identified for inclusion in the AOM cohort (6,733 Ozempic users, and 345 Wegovy users) and 91,137 patients were included in the non-AOM cohort (**Table 1**).

### Table 1. Inclusion and Exclusion Criteria

| Inclusion Criteria | Patients with AOM Use |
|---|---|
| a) ≥1 pharmacy claim for obesity medications (OZEMPIC or WEGOVY) during the identification period (1/1/21 - 8/31/22); first prescription claim date was considered the treatment initiation date | 151,483 |
| b) ≥1 diagnosis claim for obesity prior to index date | 19,652 |
| c) Continuous medical and pharmacy benefits for 12 months pre-index date | 12,226 |
| **Exclusion Criteria** | |
| a) Prescribed any obesity medication during the baseline period | 9,770 |
| b) ≥1 claim for an obesity medication on the same index date | 9,685 |
| c) Osteoarthritis diagnosis during the baseline period | 7,078 |
| d) ≥99 years of age | **7,078** |

| Inclusion Criteria | Patients with No AOM Use |
|---|---|
| a) ≥1 obesity diagnosis during the identification period (1/1/21 - 8/31/22) | 1,983,241 |
| b) Continuous medical and pharmacy benefits for 12 months pre-index date | 1,244,584 |
| **Exclusion Criteria** | |
| a) Prescribed any obesity medication during the study period | 1,210,689 |
| b) Osteoarthritis diagnosis during baseline period | 909,675 |
| c) ≥99 years of age | 909,675 |
| d) Random 10% sample of obese patients without medication use | **91,137** |

AOM, anti-obesity medication

## RESULTS (cont'd)

### Table 2. Baseline Characteristics of Patients with Obesity with vs without AOM Use

| Characteristics | Patients with AOM Use (N = 7,078) | | Patients without AOM Use (N = 91,137) | | P-Value | Std. Diff. |
|---|---|---|---|---|---|---|
| | N/Mean | %/SD | N/Mean | %/SD | | |
| Age | 72.03 | 4.74 | 74.25 | 5.87 | <0.0001 | 0.3836 |
| Age Group: 65-70 | 3,211 | 45.37% | 29,003 | 31.82% | <0.0001 | 0.2893 |
| Age Group: 71-80 | 3,428 | 48.43% | 47,123 | 51.71% | <0.0001 | 0.0655 |
| Age Group: 80+ | 439 | 6.20% | 15,011 | 16.47% | <0.0001 | 0.2828 |
| **Sex** | | | | | | |
| Male (%) | 3,238 | 45.75% | 42,008 | 46.09% | 0.5739 | 0.0069 |
| Female (%) | 3,840 | 54.25% | 49,129 | 53.91% | 0.5739 | 0.0069 |
| **Comorbidity Scores** | | | | | | |
| Charlson Comorbidity Index Score (≥2) | 4,313 | 60.94% | 34,203 | 37.53% | <0.0001 | 0.4831 |
| Chronic Disease Score (≥2) | 5,762 | 81.41% | 33,744 | 37.03% | <0.0001 | 0.9310 |
| Elixhauser Index Score (≥2) | 6,625 | 93.60% | 69,236 | 75.97% | <0.0001 | 0.4230 |
| **Socioeconomic Status** | | | | | | |
| Low | 2,423 | 34.90% | 29,385 | 32.85% | 0.0005 | 0.0435 |
| Medium | 2,170 | 31.25% | 29,685 | 33.19% | 0.0010 | 0.0411 |
| High | 2,350 | 33.85% | 30,375 | 33.96% | 0.8489 | 0.0024 |
| **Baseline Comorbidities** | | | | | | |
| Hypertension | 5,771 | 81.53% | 64,130 | 70.37% | <0.0001 | 0.2470 |
| Congestive Heart Failure | 990 | 13.99% | 11,255 | 12.35% | 0.0001 | 0.0496 |
| Myocardial Infarction | 159 | 2.25% | 1,583 | 1.74% | 0.0018 | 0.0386 |
| Cerebrovascular Disease | 294 | 4.15% | 3,384 | 3.71% | 0.0600 | 0.0232 |
| Peripheral Vascular Disease | 921 | 13.01% | 10,736 | 11.78% | 0.0020 | 0.0381 |
| Diabetes | 5,599 | 79.10% | 32,566 | 35.73% | <0.0001 | 0.9143 |
| Chronic Obstructive Pulmonary Disease | 1,270 | 17.94% | 15,087 | 16.55% | 0.0025 | 0.0373 |
| Depression | 1,097 | 15.50% | 10,576 | 11.60% | <0.0001 | 0.1204 |

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

### Table 3. Cox Regression Results for Time to Osteoarthritis

| | Hazard Ratio | Confidence Interval | | p-value |
|---|---|---|---|---|
| | | Lower | Upper | |
| **Treatment** | | | | |
| Yes | 0.90 | 0.85 | 0.95 | <0.0001 |
| No | 1.00 | 1.00 | 1.00 | |
| **Characteristics** | | | | |
| Age Group: 65-70 | 0.91 | 0.87 | 0.95 | <0.0001 |
| Age Group: 71-80 | 0.98 | 0.94 | 1.02 | 0.3369 |
| Age Group: 80+ | 1.00 | 1.00 | 1.00 | |
| **Sex** | | | | |
| Female | 1.39 | 1.35 | 1.43 | <0.0001 |
| Male | 1.00 | 1.00 | 1.00 | |
| **Comorbidity Scores** | | | | |
| Chronic Disease Score (≥2) | 1.21 | 1.18 | 1.25 | <0.0001 |
| **Socioeconomic Status** | | | | |
| Low | 1.01 | 0.98 | 1.05 | 0.5304 |
| Medium | 0.98 | 0.94 | 1.01 | 0.1907 |
| High | 1.00 | 1.00 | 1.00 | |
| **Comorbidities** | | | | |
| Hypertension | 1.00 | 0.97 | 1.03 | 0.9175 |
| Congestive Heart Failure | 0.96 | 0.92 | 1.01 | 0.0858 |
| Myocardial Infarction | 0.91 | 0.81 | 1.02 | 0.0980 |
| Cerebrovascular Disease | 0.93 | 0.86 | 1.00 | 0.0645 |
| Peripheral Vascular Disease | 1.09 | 1.04 | 1.14 | <0.0001 |
| Diabetes | 0.94 | 0.91 | 0.97 | <0.0001 |
| Chronic Obstructive Pulmonary Disease | 1.09 | 1.05 | 1.13 | <0.0001 |
| Depression | 1.18 | 1.13 | 1.23 | <0.0001 |

## RESULTS (cont'd)

After adjusting for demographics and clinical factors, patients in the AOM cohort demonstrated a significantly lower OA risk (hazard ratio [HR]=0.90; p<0.0001). Patients 65 to 70 years of age had a 9% lower risk than those over 80 years (HR=0.91, p<0.0001).

Patients with peripheral vascular disease, chronic obstructive pulmonary disorder, and depression had an increased risk of OA.

In individuals with obesity, AOM utilization correlated with a 10% lower OA risk (HR=0.90, p<0.0001) (**Table 3**).

## CONCLUSION

**Our study reveals a significant association between AOM use and a lowered risk of OA, even after meticulous adjustment for demographic and clinical variables.**

**These results underscore the potential of AOM utilization as a valuable component in mitigating the risk of OA in relevant patient populations.**

## REFERENCES

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