Healthcare Costs and Resource Utilization Associated with Knee Osteoarthritis and Obesity in the United States: A Retrospective Database Study

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OBJECTIVE

- To describe the healthcare costs and resource utilization among people with knee osteoarthritis (OA-K) and obesity in the United States.

CONCLUSIONS

- Numerically higher costs (all-cause total, medical, and pharmacy) were observed in higher BMI categories, emphasizing the broader economic impact of obesity among individuals with OA-K.
- Individuals with a BMI ≥35 kg/m^2 (Class 2 and Class 3 obesity) incurred numerically greater OA-K-related total, medical, and pharmacy costs compared to those with overweight or Class 1 obesity. This suggests that higher levels of obesity may drive both general and disease-specific healthcare utilization.
- These findings emphasize the need for weight management in individuals with OA-K to avoid disease progression, reduce long-term healthcare costs, and ease the economic burden on both patients and the healthcare system.

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BACKGROUND

- Knee osteoarthritis (OA-K) affects 4.0% of adults and 13.2% of the elderly in the United States, costing an estimated $5.7B to $15B annually.[1]
- Obesity significantly increases the risk of onset and progression of OA-K.[2]
- The American College of Rheumatology and the National Institute for Health and Care Excellence recommend weight reduction for individuals with overweight or obesity and OA-K.[3-4]
- Furthermore, both Osteoarthritis Research Society International and the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases consider weight management in combination with exercise to be effective and safe for patients with OA-K and support their use as a core treatment in OA-K regardless of background comorbidities. [5, 6]
- With continuous treatment development and innovation in weight management, understanding the economic implications for these individuals becomes increasingly important.

METHODS

- This retrospective, observational study used Optum's de-identified Market Clarity Database, which links medical and pharmacy claims with electronic health records.
- Inclusion criteria included:
  - Age ≥45 with at least 1 claim with an International Classification of Diseases-10 diagnosis code for OA-K between October 1, 2016, and March 31, 2023 (index period).
  - Diagnosed with moderate-to-severe OA-K (MTS-OA) pain[7] and baseline body mass index (BMI) ≥25 kg/m^2.
  - Continuous enrollment in commercial or Medicare insurance plan with medical and pharmacy benefits 12-month pre-index through ≥12-month post-index period (≤30-day gap allowed).
- Exclusion criteria included:
  - Claims for pregnancy, childbirth, or malignant cancer during the study period.
  - BMI measurements <18.5 kg/m^2 during the study period.
- Study outcomes and analyses:
  - Outcomes were stratified by baseline BMI into the following categories: overweight (25 to ≤29.99 kg/m^2), Class 1 (30 to ≤ 34.99 kg/m^2), Class 2 (35 to ≤ 39.99 kg/m^2), and Class 3 obesity (≥40 kg/m^2).
  - Healthcare costs (total, pharmacy, and medical [outpatient, inpatient]) and visits (emergency, outpatient, inpatient) were described using descriptive statistics - mean (SD) for continuous variables and frequency (%) for categorical variables.
  - All-cause and OA-K-related healthcare costs by BMI categories were analyzed using a generalized linear model with a Gamma distribution. The adjusted covariates included age, sex, payor type, baseline Charlson Comorbidity Index, and baseline costs.

RESULTS

	Overweight	Class 1 obesity	Class 2 obesity	Class 3 Obesity
All-cause healthcare visits				
Emergency visits	0.8 (1.2)	0.8 (1.3)	0.9 (1.4)	0.9 (1.6)
Inpatient visits	1.2 (3.1)	1.1 (2.6)	1.1 (3.0)	1.2 (3.2)
Outpatient visits	18.6 (14.2)	19.2 (14.3)	20.0 (14.9)	20.3 (15.3)
Inpatient days	5.3 (18.0)	4.8 (16.4)	4.7 (16.3)	6.1 (21.1)
OA-K-related healthcare visits				
Emergency visits	0.4 (0.3)	0.4 (0.3)	0.4 (0.3)	0.4 (0.3)
Inpatient visits	0.4 (0.4)	0.4 (0.3)	0.4 (0.4)	0.4 (0.4)
Outpatient visits	1.6 (2.4)	1.7 (2.5)	1.8 (2.5)	1.8 (2.4)
Inpatient days	1.5 (6.7)	1.5 (8.5)	1.5 (8.0)	2.1 (14.5)

Data presented as mean (SD) unless otherwise noted. Results are reflective of unadjusted descriptive rates.
Abbreviations: OA-K- knee osteoarthritis

- The overall frequency of healthcare visits was similar across the BMI category; however, the number of outpatient visits tended to increase with higher BMI.

KEY RESULTS

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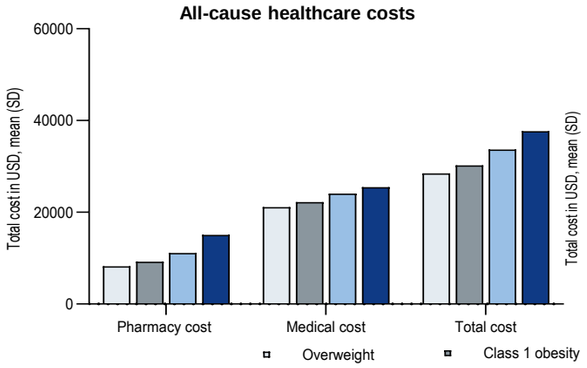
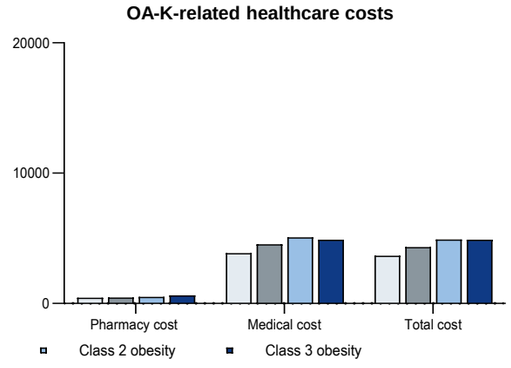
All-cause total, medical, and pharmacy healthcare costs increased in the higher BMI categories.





	Overweight	Class 1 obesity	Class 2 obesity	Class 3 obesity
Pharmacy cost	8,230 (29,710)	9,228 (31,205)	11,103 (34,005)	15,051 (41,885)
Medical cost	21,134 (14,756)	22,221 (14,859)	24,061 (15,493)	25,489 (16,883)
Total cost	28,485 (27,578)	30,227 (27,688)	33,656 (29,571)	37,667 (34,090)

	Overweight	Class 1 obesity	Class 2 obesity	Class 3 obesity
Pharmacy cost	434 (196)	451 (197)	509 (216)	629 (257)
Medical cost	3,861 (603)	4,537 (672)	5,078 (704)	4,898 (676)
Total cost	3,657 (402)	4,327 (454)	4,903 (480)	4,890 (468)

All costs are reported in USD, mean (SD). All cost variables used Optum's standard pricing. These costs have been adjusted for inflation using the Consumer Price Index (CPI) to reflect the most current year through a standard cost variable.
All costs are model-adjusted annualized data, adjusted for the covariates of age, sex, payor type, baseline Charlson Comorbidity index score, and baseline costs. Cost data below 1% and above 99% were excluded.
Abbreviations: OA-K- knee osteoarthritis, USD: US Dollar

- OA-K-related pharmacy costs increased progressively with the higher BMI category.
- OA-K-related medical costs were numerically higher in individuals with BMI ≥35 kg/m^2 compared to those with BMI <35 kg/m^2.

Baseline characteristics

	Overweight	Class 1 obesity	Class 2 obesity	Class 3 Obesity
	37,610 (32.5)	36,161 (31.2)	22,389 (19.3)	19,696 (17.0)
Female	21,018 (55.9)	20,129 (55.7)	13,731 (61.3)	13,483 (68.5)
Age (years), mean (SD)	65.38 (10.4)	63.44 (9.8)	61.59 (9.2)	59.19 (8.5)
Age categories (years)				
45 to <65	18,817 (50.0)	20,903 (57.8)	14,617 (65.3)	14,758 (74.9)
65+	18,793 (50.0)	15,258 (42.2)	7,772 (34.7)	4,938 (25.1)
Race/Ethnicity				
Caucasian	30,184 (80.3)	28,837 (79.8)	17,388 (77.7)	15,176 (77.1)
African American	3,149 (8.4)	3,839 (10.6)	3,054 (13.6)	3,100 (15.7)
Hispanic	1,537 (4.1)	1,532 (4.2)	906 (4.1)	714 (3.6)
Asian	731 (1.9)	300 (0.8	81 (0.34)	32 (0.2)
Other/Unknown	2,009 (5.3)	1,653 (4.6)	960 (4.3)	674 (3.4)
CCI Score, mean (SD)	1.1 (1.6)	1.2 (1.7)	1.3 (1.7)	1.5 (1.8)
Baseline complications				
Hypertension	20,571 (54.7)	22,633 (62.6)	15,364 (68.6)	14,374 (73.0)
Dyslipidemia	21,866 (58.1)	21,797 (60.3)	13,350 (59.6)	11,030 (56.0)
Back pain	10,554 (28.1)	10,169 (28.1)	6,389 (28.5)	5,676 (28.8)
T2D	6,700 (17.8)	8,889 (24.6)	6,943 (31.0)	7,308 (37.1)
OSA	2,998 (8.0)	5,363 (14.8)	5,165 (23.1)	6,827 (34.7)
CAD	5,530 (14.7)	5,336 (14.8)	3,093 (13.8)	2,425 (12.3)
CKD	3,732 (9.9)	3,740 (10.3)	2,540 (11.3)	2,359 (12.0)
OA hip	3,456 (9.2)	3,042 (8.4)	1,820 (8.1)	1,489 (7.6)
CHF	1,872 (5.0)	1,995 (5.5)	1,380 (6.2)	1,593 (8.1)
CVD	2,138 (5.7)	1,811 (5.0)	1,025 (4.6)	781 (4.0)
Baseline weight (kg), mean (SD)	79.4 (10.9)	93.2 (12.5)	106.4 (13.8)	128.2 (21.5)
Baseline BMI (kg/m^2), mean (SD)	27.6 (1.4)	32.3 (1.4)	37.2 (1.4)	45.7 (5.5)

Data presented as n (%) unless otherwise noted.
Abbreviations: CCI- Charlson Comorbidity Index, CAD- Coronary artery disease, CVD- Cardiovascular disease, CKD- Chronic kidney disease, CHF- Chronic heart failure, OA-K- knee osteoarthritis, OA- osteoarthritis, OSA- Obstructive sleep apnea, T2D- type 2 diabetes

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Scan this QR code to access the supplementary data