

OUTPATIENT COSTS IN RHEUMATOID ARTHRITIS (RA) PATIENTS WITH VS WITHOUT COMORBIDITIES



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1. BACKGROUND AND OBJECTIVE

With increased use of biologic disease-modifying antirheumatic drugs (bDMARDs), there is a need to analyze the impact of comorbidities on RA costs to inform new payment methodologies. We evaluated RA-related outpatient treatment costs in a community practice cohort.

2. METHODS

Using electronic medical records from 8 large mid-Atlantic rheumatology practices, adult patients with RA diagnosis (International Classification of Diseases 9th revision (ICD-9) 714, ICD-10 M05, M06) who initiated or switched to a new bDMARD during April 2016-March 2018 were selected. We accounted for cost of care provided by the rheumatology practices including E&M, DMARDs, bDMARDs, steroids, other services including drug administration and labs. Patients were followed for 12 months from initiation of biologic or switch.

Annual costs were standardized to 2019 USD using Centers for Medicare & Medicaid Services Average Sales Price, Part D Medication Price, Physician, and Clinical Laboratory Fee Schedules. Comorbidities were assigned based on patient reported medications. Differences between patients with comorbidities vs. without were assessed using t-test for continuous variables and chi-square test for categorical variables; costs were also assessed using propensity score matching (PSM) and generalized linear models (GLM) with gamma distribution and log link function to account for differences in patient characteristics.

3. RESULTS

Of 2140 patients, who met the study criteria, 1744 (82%) had at least 1 comorbidity. Compared to patients without comorbidities, patients with comorbidities were older, more likely to be white, female, and Medicare-insured (Table 1).

Before accounting for differences in demographics, patients with comorbidities had significantly higher costs of bDMARDs, labs/other services, and total costs (Table 2). After accounting for differences in demographics using GLM, patients with comorbidities had statistically higher E&M costs (\$569 (CI: 524-618) vs. \$519 (CI: 471-573), $p=0.030$) but no difference in costs of bDMARDs, labs, other medications, and total costs. After PSM there were no differences in age, race, insurance, and gender between cohorts and 350 patients per group matched without replacement, representing 20% of patients with comorbidities and 88% of patients without comorbidities.

Among PSM patients, there were no differences in annual costs between cohorts. Prescription of the commercially available biosimilars was found low (1%) during the study period, thus their impact on costs was not evaluated.

When comparing total RA-related costs for top 5 comorbidities, there were no statistically significant differences between patients with vs. without CVD, psychiatric disorders, and infection, while the differences between patients by COPD/Asthma and diabetes status were statistically significant when accounting for differences in age, gender, insurance type, and race (Figure 1). Statistical differences were observed in the same groups when comparing costs of labs and other services (Figure 3).

When comparing costs of bDMARDs for top 5 comorbidities, statistically significant differences were found between patients with vs. without asthma/COPD (Figure 2).

Costs of E&M were statistically different in patients with vs. without asthma/COPD and patients with vs. without infection (Figure 4). Lastly, mean costs of non-biologic medications were statistically different in patients with vs. without CVD and with vs. without diabetes (Figure 5).

TABLE 1: PATIENT CHARACTERISTICS

| | ALL PATIENTS n=2140 | WITHOUT COMORBIDITIES n=396 | WITH COMORBIDITIES n=1744 | p ¹ | PSM ² WITHOUT COMORBIDITIES n=350 | PSM ² WITH COMORBIDITIES n=350 | p |
|-----------------------------|------------------------|--------------------------------|------------------------------|----------------|-------------------------------------------------|----------------------------------------------|--------|
| Age, mean (SD) | 58.7 (13.8) | 50.7 (14.4) | 60.5 (13) | <0.001 | 51.9 (14.2) | 52.5 (13.9) | 0.575 |
| Female, n (%) | 1686 (79) | 291 (73) | 1395 (80) | 0.004 | 266 (76) | 266 (76) | 1.000 |
| RACE, n (%) | | | | <0.001 | | | 1.000 |
| White | 1531 (72) | 265 (67) | 1266 (73) | | 253 (72) | 253 (72) | |
| Black | 225 (11) | 40 (10) | 185 (11) | | 31 (9) | 31 (9) | |
| Other | 71 (3) | 35 (9) | 36 (2) | | 14 (4) | 14 (4) | |
| Unknown | 313 (15) | 56 (14) | 257 (15) | | 52 (15) | 52 (15) | |
| PAYER TYPE, n (%) | | | | <0.001 | | | 0.215 |
| Commercial | 861 (40) | 214 (54) | 647 (37) | | 197 (56) | 197 (56) | |
| Medicaid | 33 (2) | 12 (3) | 21 (1) | | 6 (2) | 6 (2) | |
| Medicare | 895 (42) | 99 (25) | 796 (46) | | 89 (25) | 89 (25) | |
| Self-pay or Copay Assist | 210 (10) | 47 (12) | 163 (9) | | 38 (11) | 37 (11) | |
| Other | 88 (4) | 6 (2) | 82 (5) | | 6 (2) | 15 (4) | |
| Unknown | 53 (2) | 18 (5) | 35 (2) | | 14 (4) | 6 (2) | |
| NEW ON BIOLOGIC, n (%) | 1985 (93) | 374 (94) | 1611 (92) | 0.151 | 336 (96) | 336 (96) | 1.000 |
| RECEIVED BIOSIMILARS, n (%) | 22 (1) | 3 (1) | 19 (1) | 0.554 | 3 (1) | 1 (1) | 0.316 |
| TOP 5 COMORBIDITIES, n (%) | | | | | | | |
| CVD ³ | 1250 (58) | 0 (0) | 1250 (72) | <0.001 | 0 (0) | 227 (65) | <0.001 |
| Psychiatric ⁴ | 872 (41) | 0 (0) | 872 (50) | <0.001 | 0 (0) | 175 (50) | <0.001 |
| Infection ⁵ | 446 (21) | 0 (0) | 446 (26) | <0.001 | 0 (0) | 83 (24) | <0.001 |
| Asthma/COPD ⁶ | 441 (21) | 0 (0) | 441 (25) | <0.001 | 0 (0) | 82 (23) | <0.001 |
| Diabetes | 369 (17) | 0 (0) | 369 (21) | <0.001 | 0 (0) | 56 (16) | <0.001 |

¹ Differences for continuous variables were assessed using t-test, differences for categorical variables were assessed using chi-square test. P-value <0.05 was considered significant.

² PSM=propensity score matched.

³ CVD=cardiovascular disorders including hypertension, heart failure, acute coronary syndrome, angina, blood clots; identified based on patient reported medications.

⁴ Patients are considered to have a psychiatric condition if they are receiving medications for schizophrenia, bipolar disorder, depression, panic attacks, anxiety, and other mental health conditions.

⁵ Patients are considered to have infection if they are receiving antibiotics or antifungals.

⁶ COPD=chronic obstructive pulmonary disease.

TABLE 2. ANNUAL RA-RELATED COSTS

| ANNUAL COST, USD | ALL UNADJUSTED MEAN (SD) N=2140 | UNADJUSTED WITHOUT CO-MORBIDITIES MEAN (SD) N=396 | UNADJUSTED WITH CO-MORBIDITIES MEAN (SD) N=1744 | p ¹ | ADJUSTED WITHOUT CO-MORBIDITIES MEAN (CI) N=396 | ADJUSTED WITH CO-MORBIDITIES MEAN (CI) N=1744 | p ² | PSM ³ WITHOUT CO-MORBIDITIES MEAN (SD) N=350 | PSM ³ WITH CO-MORBIDITIES MEAN (SD) N=350 | p ¹ |
|-------------------------|---------------------------------|---------------------------------------------------|-------------------------------------------------|----------------|-------------------------------------------------|-----------------------------------------------|----------------|---------------------------------------------------------|------------------------------------------------------|----------------|
| Total cost | 55089.7 (62606.2) | 49297.5 (52907.0) | 56404.8 (64547.1) | 0.021 | 48484.0 (43061.3, 54589.6) | 52209.3 (47343.5, 57575.2) | 0.144 | 47611.7 (49175.2) | 47697 (55878.9) | 0.983 |
| Labs and other services | 1097.2 (1546.2) | 887.3 (1380.4) | 1142.5 (1576.4) | 0.002 | 807.8 (679.8, 960.1) | 920.8 (799.5, 1060.5) | 0.080 | 884 (1373.4) | 970.2 (1323.6) | 0.430 |
| bDMARDs | 52041.6 (59254.7) | 46845.9 (50637.5) | 53221.4 (60993.5) | 0.030 | 46051.0 (40802.2, 51975.1) | 49056.5 (44394.5, 54208.1) | 0.222 | 45165.5 (46666.5) | 44969 (53756.9) | 0.959 |
| Other medications | 1677.8 (5303.7) | 1324.2 (4100.7) | 1756.7 (5534.6) | 0.100 | 1143.9 (913.4, 1432.4) | 1526.1 (1258.5, 1850.5) | 0.750 | 1337.1 (4279.9) | 1490.3 (2721.6) | 0.599 |
| E&M | 575.3 (653.3) | 531.2 (559.6) | 585.3 (672.5) | 0.097 | 519.5 (470.5, 573.4) | 568.9 (524.1, 617.6) | 0.030 | 526.5 (558.5) | 564.3 (520.5) | 0.355 |

¹ Differences for continuous variables were assessed using t-test, differences for categorical variables were assessed using chi-square test. P-value <0.05 was considered significant.

² Generalized linear means adjusted for age, gender, insurance type, and race.

³ PSM=propensity score matched.

4. LIMITATIONS

The findings are limited to the cohort observed in the study and may not fully represent the entire US population or a different treatment period. Cost of care outside given rheumatology practices was not accounted for. Comorbidities were assessed based on patient reported concomitant medications and may be over or under estimated. Medicare-based or average wholesale prices were used in the study, thus cost of care by payer was not accounted for due to the study design to limit the differences to patient and treatment related factors to the extent possible.

FIGURE 1. MEAN ESTIMATED ANNUAL TOTAL RA-RELATED COSTS FOR TOP 5 COMORBIDITIES

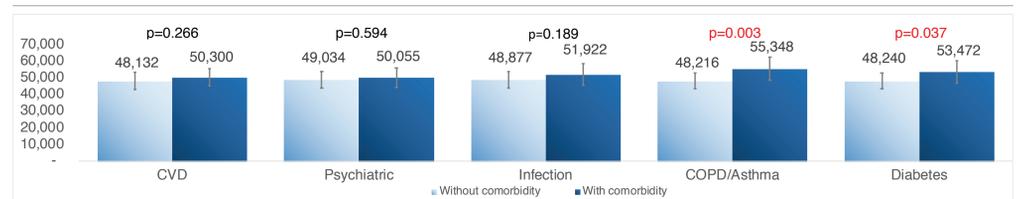


FIGURE 2. MEAN ESTIMATED ANNUAL BIOLOGICS COSTS FOR TOP 5 COMORBIDITIES

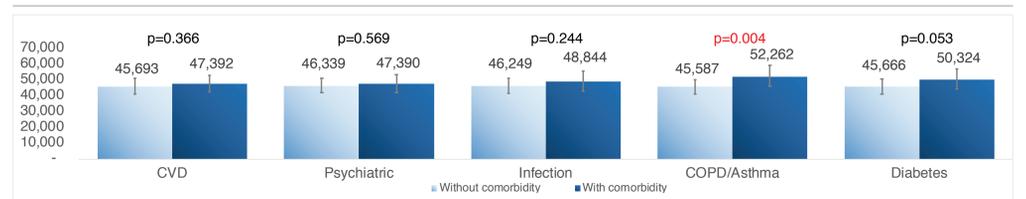


FIGURE 3. MEAN ESTIMATED ANNUAL COST OF LABS AND OTHER SERVICES FOR TOP 5 COMORBIDITIES

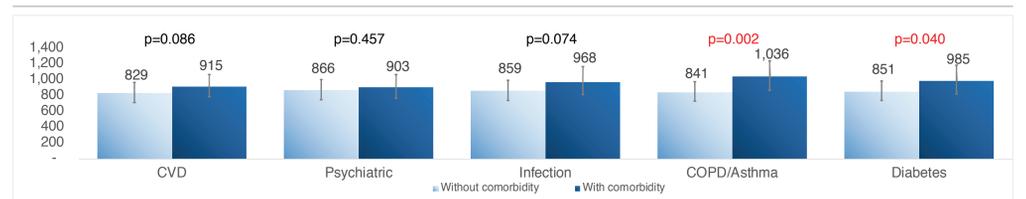


FIGURE 4. MEAN ESTIMATED ANNUAL COST OF E&M FOR TOP 5 COMORBIDITIES

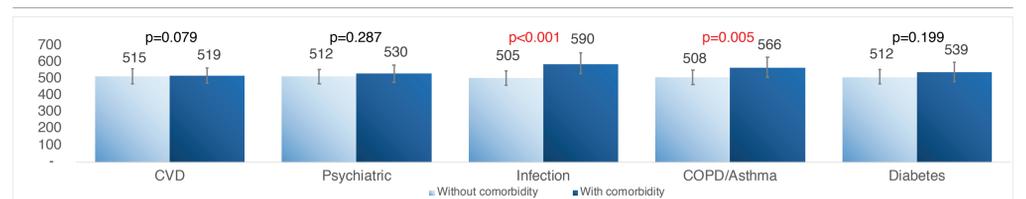
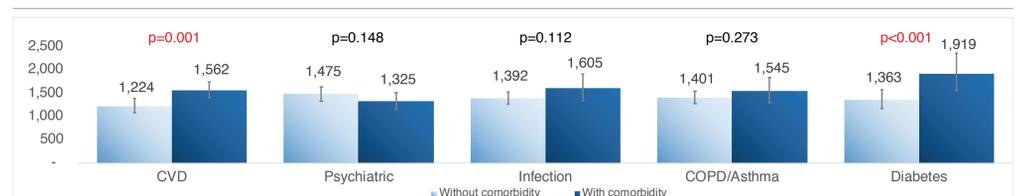


FIGURE 5. MEAN ESTIMATED ANNUAL COST OF NON-BIOLOGIC MEDICATIONS FOR TOP 5 COMORBIDITIES



5. CONCLUSION:

Among RA patients treated with bDMARDs in the community setting from 2016 to 2018, the majority of the patients had comorbidities. Patients with comorbidities had significant differences in their characteristics compared to those without comorbidities and incurred higher RA-related annual costs, however when accounting for differences in patient characteristics, annual costs of RA-related care were not statistically different between the groups. When comparing top 5 comorbidities, higher total RA-related costs were found in patients with Asthma/COPD and diabetes compared to patients without these comorbidities even after accounting for differences in patient characteristics. No significant differences were found in total RA-related cost of the patients with/without cardiovascular, psychiatric disorders, and infections.