Relationship Between Adherence to Antihypertensive Medication Regimen and Out-of-Pocket Costs Among People Aged 35 to 64 With Employer-Sponsored Health Insurance

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Relationship Between Adherence to Antihypertensive Medication Regimen and Out-of-Pocket Costs Among People Aged 35 to 64 With Employer-Sponsored Health Insurance

Madeleine M. Baker-Goering, PhD; Kakoli Roy, PhD; David H. Howard, PhD

Abstract

We used administrative claims data from 2014 on people with employer-sponsored health insurance to assess the proportion of patients taking antihypertensive medications, rates of nonadherence to these medication regimens, and out-of-pocket costs paid by patients. We performed multivariate logistic regression analysis to examine the association between out-of-pocket costs and nonadherence. Results indicated that patients filled the equivalent of 13 monthly prescriptions and paid $76 out of pocket over the calendar year; the likelihood of nonadherence increased as out-of-pocket costs increased (adjusted odds ratios ranged from 1.04 to 1.78; \( P < .001 \)). These findings suggest a need for improvement in adherence among patients with employer-sponsored insurance.

Objective

Hypertension is a leading risk factor for cardiovascular disease, and only 40% to 74% of people with diagnosed hypertension are adherent to prescribed medication (1–3). Nonadherence can result in uncontrolled hypertension, which increases the risk of acute cardiovascular disease events (4,5). People who take many different drugs, experience side effects from hypertension medication, have comorbidities, or face high out-of-pocket costs are more likely to be nonadherent (6). No recent studies among the privately insured population of the United States describe rates of nonadherence and actual out-of-pocket payments for antihypertensive medications.

Methods

We used 2014 administrative claims data from the IBM MarketScan Commercial Database (IBM Corp), which provided de-identified health care claims data for enrollees and their dependents in employer-sponsored health insurance plans. We limited the study sample to adults aged 35 to 64 who were continuously enrolled with prescription drug coverage in 2014 (\( N = 3,362,633 \)). We focused on 2014 after using the IBM Treatment Pathways online tool (IBM Corp), which reported stable trends of proportions of patients with any hypertension diagnosis (25%–26%) and proportions of patients filling an antihypertensive medication prescription (29%–30%) in 2010 through 2014.

We identified people with hypertension by the appearance of International Classification of Diseases, 9th Revision (ICD-9), dia-
costs (patient and insurer) for antihypertensive medications were $17 per 30-day supply and $229 annually. People who used branded medications had the highest out-of-pocket costs ($13.60 per 30-day supply) and highest total costs ($40.73 per 30-day supply). Patients in health maintenance organizations had higher out-of-pocket costs that those in other types of insurance plans. Residents of rural areas also had higher out-of-pocket costs than those paid by those in urban areas, but they used less expensive medications.

About 90% of patients incurred out-of-pocket costs for medications, but 83% paid less than $10 per 30-day supply of antihypertensive medications. However, 30% of patients paid the full costs of their medications (approximately $41 in annual out-of-pocket costs for an average of 10 fills during the calendar year.).

We calculated the unadjusted and multivariate-adjusted odds ratios for the association between nonadherence and patient characteristics (Table 2). The likelihood of nonadherence increased as out-of-pocket costs increased (odds ratios, compared with those with no out-of-pocket costs, ranged from 1.04 for those paying less than $5, to 1.78 for those paying more than $50).

The likelihood of nonadherence was greatest among patients who used branded antihypertensive medications and those living in the South and was smallest among those with a hypertension diagnosis in 2014 and patients aged 55 to 64. When we restricted the sample to patients with a hypertension diagnosis as a sensitivity analysis, the associations were similar in magnitude and significance.

Discussion

We found that nonadherence to antihypertensive medication regimens was common and was most common among patients with higher out-of-pocket costs. A 2016 study estimated that patients with commercial insurance paid about $4.13 in copayments per antihypertensive medication prescription filled in 2014, slightly lower than the out-of-pocket cost estimate reported in our study, which provides a more comprehensive estimate that includes copayments, coinsurance, and deductibles (10).

Numerous experimental and quasi-experimental studies have found a causal relationship between lowering patients’ out-of-pocket costs and reducing medication nonadherence (11). Our study shows an association between out-of-pocket costs and nonadherence among enrollees in employer-sponsored insurance plans. However, nonadherence is influenced by many other factors unrelated to cost, such as number of pills to be taken (eg, 1 daily medication versus combination medications) or the burden of filling prescriptions (eg, increasing the number of doses per pre-
scription, delivering prescriptions by mail) (6,10,12). The data we used were collected for administrative purposes and were not nationally representative. In addition, claims data have many documented limitations, including that prescriptions filled do not measure actual medication used.

Our study findings show that there is room for improving adherence to antihypertensive medications among patients with employer-sponsored insurance and that patients who faced higher out-of-pocket costs had a greater likelihood of being nonadherent.

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Table 1. Characteristics of Sample of Adults Aged 35 to 64 (N = 3,362,633), Study of Relationship Between Nonadherence to Antihypertensive Medication (AHM) Regimen and Enrollment in an Employer-Sponsored Health Insurance Plan, United States, 2014

| Variable         | No. Enrollees | Diagnosed With Hypertension, N (%) | Treated With AHM, N (%) | Nonadherent Among Treated, N (%) | Number of AHM Prescriptions Filled\(^{bc}\) | Out of Pocket Cost, AHM, $\(^d\) | Total Cost, AHM, $\(^{re}\) |
|-------------------|---------------|-----------------------------------|-------------------------|----------------------------------|-----------------------------------------------|---------------------------------|-------------------------------|
|                   | Total         | 13,035,703                         | 2,897,548 (22)          | 3,462,582 (27)                  | 1,428,298 (41)                                | 13.2                            | 5.78                          | 76.24                        | 17.34 | 228.57                      |
| Age, y            | 35–44         | 4,067,167                          | 436,240 (11)            | 576,964 (14)                    | 3,187,186 (52)                                | 10.1                            | 5.93                          | 59.67                        | 17.02 | 171.15                      |
|                   | 45–54         | 4,759,074                          | 2,897,548 (21)          | 1,237,594 (26)                  | 2,756,655 (43)                                | 12.5                            | 5.86                          | 73.22                        | 17.36 | 217.02                      |
|                   | 55–64         | 4,209,462                          | 1,440,155 (34)          | 1,648,024 (39)                  | 2,409,621 (36)                                | 14.8                            | 5.70                          | 84.30                        | 17.40 | 257.35                      |
| Sex               | Male          | 6,073,363                          | 1,469,555 (24)          | 1,690,278 (28)                  | 2,442,685 (40)                                | 13.7                            | 5.81                          | 79.55                        | 17.67 | 241.87                      |
|                   | Female        | 6,962,340                          | 1,427,993 (21)          | 1,772,304 (25)                  | 2,448,195 (43)                                | 12.7                            | 5.75                          | 73.08                        | 16.99 | 215.89                      |
| Insurance plan\(^f\) |              |                                   |                         |                                  |                                               |                                 |                               |                               |                   |                             |
| PPO               | 7,438,985     | 1,806,162                          | 1,996,135 (27)          | 2,286,115 (41)                  | 13.2                                          | 5.84                            | 77.14                         | 18.26                        | 241.06 |                          |
| HMO               | 1,342,925     | 290,178 (22)                       | 351,450 (26)            | 3,261,165 (43)                  | 13.1                                          | 6.23                            | 81.77                         | 16.45                        | 216.07 |                          |
| CD/HD             | 2,158,440     | 445,098 (21)                       | 519,476 (24)            | 3,261,165 (43)                  | 13.8                                          | 5.42                            | 69.40                         | 15.35                        | 196.63 |                          |
| Other\(^g\)       | 1,240,828     | 333,465 (27)                       | 372,064 (30)            | 3,243,771 (41)                  | 13.5                                          | 5.94                            | 80.44                         | 16.54                        | 223.83 |                          |
| Region\(^h\)      |              |                                   |                         |                                  |                                               |                                 |                               |                               |                   |                             |
| Northeast         | 2,708,175     | 503,112 (19)                       | 665,342 (25)            | 3,047,219 (38)                  | 13.7                                          | 5.13                            | 70.10                         | 17.02                        | 232.63 |                          |
| Midwest           | 2,685,343     | 576,972 (22)                       | 708,806 (26)            | 3,025,079 (38)                  | 13.6                                          | 5.14                            | 70.04                         | 14.57                        | 198.38 |                          |
| South             | 5,156,805     | 1,378,328 (27)                     | 1,533,458 (30)          | 2,604,672 (44)                  | 12.9                                          | 6.40                            | 82.32                         | 19.13                        | 246.10 |                          |
| West              | 2,156,128     | 345,237 (16)                       | 454,118 (21)            | 3,196,654 (41)                  | 12.9                                          | 5.23                            | 67.36                         | 15.68                        | 202.14 |                          |
| Geographic area   |              |                                   |                         |                                  |                                               |                                 |                               |                               |                   |                             |
| Urban             | 11,269,871    | 2,441,266 (22)                     | 2,810,705 (25)          | 1,807,038 (41)                  | 13.2                                          | 5.66                            | 74.41                         | 17.33                        | 228.05 |                          |
| Rural             | 1,765,832     | 456,282 (26)                       | 551,928 (31)            | 3,141,037 (42)                  | 13.3                                          | 6.00                            | 79.94                         | 16.87                        | 224.55 |                          |
| Type of AHM used\(^i\) |            |                                   |                         |                                  |                                               |                                 |                               |                               |                   |                             |
| Generics only     | 3,041,215     | 1,855,141 (61)                     | 3,041,215 (100)         | 1,216,486 (40)                  | 12.8                                          | 4.41                            | 56.45                         | 10.72                        | 137.23 |                          |
| Ever use branded  | 421,367       | 290,743 (69)                       | 421,367 (100)           | 223,325 (53)                    | 16.1                                          | 13.60                           | 219.03                        | 40.73                        | 655.75 |                          |

Abbreviations: CD/HD, consumer driven or high deductible health plan; HMO, health maintenance organization; HTN, hypertension; PPO, preferred provider organization.

\(^a\) Data are from IBM’s MarketScan Commercial Database.

\(^b\) Outliers (negative values and ≥99th percentile for annual AHM cost and total payment) and missing values excluded.

\(^c\) 30-day equivalent fills.

\(^d\) This includes copayments, coinsurance, and deductibles.

\(^e\) Total payments include all payments made, including insurer payments, copayments, coinsurance, deductibles, and coordination of benefits payments.

\(^f\) Plan type was missing for 7% of the sample.

\(^g\) Other includes comprehensive, exclusive provider organization, and point of sale plans.

\(^h\) Region was missing for 3% of the sample.

\(^i\) This splits AHM users into 2 mutually exclusive groups: those who only filled prescriptions for generic AHMs in 2014 (88%) and those who ever filled a prescription for a branded AHM in 2014 (12%).
Table 2. Odds of Nonadherence to an Antihypertensive Medication Regimen in Relation to Out-of-Pocket Costs, Adults Aged 35 to 64 Enrolled in an Employer-Sponsored Health Insurance Plan, United States, 2014

| Variables | Unadjusted Odds Ratio (95% CI) | P Value | Adjusted Odds Ratio (95% CI) | P Value |
|-----------|--------------------------------|---------|-----------------------------|---------|
| Out-of-pocket cost, 30-day supply of antihypertensive medication, $ | | | | |
| 0 | 1 [Reference] | | | |
| <5 | 0.99 (0.98–1.00) | .003 | 1.04 (1.04–1.05) | <.001 |
| 5–<10 | 1.35 (1.34–1.37) | <.001 | 1.36 (1.35–1.37) | <.001 |
| 10–<15 | 1.60 (1.58–1.61) | <.001 | 1.51 (1.49–1.52) | <.001 |
| 15–<20 | 1.77 (1.74–1.79) | <.001 | 1.50 (1.48–1.52) | <.001 |
| 20–<50 | 1.89 (1.87–1.92) | <.001 | 1.44 (1.42–1.46) | <.001 |
| ≥50 | 2.45 (2.39–2.52) | <.001 | 1.78 (1.73–1.83) | <.001 |
| Age, y | | | | |
| 35–44 | 1 [Reference] | | | |
| 45–54 | 0.69 (0.68–0.69) | <.001 | 0.69 (0.68–0.69) | <.001 |
| 55–64 | 0.52 (0.51–0.52) | <.001 | 0.51 (0.51–0.51) | <.001 |
| Sex | | | | |
| Male | 1 [Reference] | | | |
| Female | 1.14 (1.13–1.14) | <.001 | 1.14 (1.14–1.15) | <.001 |
| Hypertension diagnosis in 2014 | | | | |
| No | 1 [Reference] | | | |
| Yes | 0.89 (0.89–0.90) | <.001 | 0.88 (0.87–0.88) | <.001 |
| Cardiovascular disease event in 2014 | | | | |
| No | 1 [Reference] | | | |
| Yes | 2.00 (1.97–2.02) | <.001 | 2.12 (2.09–2.15) | <.001 |
| Type of AHM used | | | | |
| Generic AHMs only | 1 [Reference] | | | |
| Any use of branded AHMs | 1.72 (1.71–1.73) | <.001 | 1.52 (1.51–1.52) | <.001 |
| Type of insurance plan | | | | |
| PPO | 1 [Reference] | | | |
| HMO | 1.07 (1.06–1.08) | <.001 | 1.07 (1.06–1.08) | <.001 |
| CD/HD | 1.03 (1.02–1.03) | <.001 | 1.05 (1.04–1.06) | <.001 |
| Other | 1.01 (1.00–1.01) | .15 | 1.04 (1.03–1.04) | <.001 |
| Region | | | | |
| Northeast | 1 [Reference] | | | |
| Midwest | 1.03 (1.02–1.04) | <.001 | 1.02 (1.02–1.03) | <.001 |
| South | 1.31 (1.30–1.31) | <.001 | 1.24 (1.23–1.25) | <.001 |

Abbreviations: CD/HD, consumer driven or high deductible health plan; CI, confidence interval; HMO, health maintenance organization; PPO, preferred provider organization.

* Data are from IBM’s MarketScan Commercial Database.

* Adjusted for variables listed in the table.

* This splits AHM users into 2 mutually exclusive groups: those who only filled prescriptions for generic AHMs in 2014 (88%) and those who ever filled a prescription for a branded AHM in 2014 (12%).

(continued on next page)
Table 2. Odds of Nonadherence to an Antihypertensive Medication Regimen in Relation to Out-of-Pocket Costs, Adults Aged 35 to 64 Enrolled in an Employer-Sponsored Health Insurance Plan, United States, 2014

| Variables          | Unadjusted Odds Ratio (95% CI) | P Value | Adjusted Odds Ratioa (95% CI) | P Value |
|--------------------|---------------------------------|---------|-------------------------------|---------|
| West               | 1.18 (1.17–1.19)                | <.001   | 1.16 (1.15–1.17)              | <.001   |
| Rural              | 1 [Reference]                   |         |                               |         |
| Urban              | 0.98 (0.97–0.98)                | <.001   | 0.99 (0.98–1.00)              | .002    |

Abbreviations: CD/HD, consumer driven or high deductible health plan; CI, confidence interval; HMO, health maintenance organization; PPO, preferred provider organization.

Data are from IBM’s MarketScan Commercial Database.

Adjusted for variables listed in the table.

This splits AHM users into 2 mutually exclusive groups: those who only filled prescriptions for generic AHMs in 2014 (88%) and those who ever filled a prescription for a branded AHM in 2014 (12%).