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A Comparison of Self-Reported Medication Adherence to Concordance Between Part D Claims and Medication Possession

Samuel T. Savitz^{1,2}, Sally C. Stearns, PhD^{1,2}, Lei Zhou, MSPH¹, Emily Thudium, PharmD³, Khalid A. Alburikan, PharmD, BCPS^{3,4}, Richard Tran, PharmD³, and Jo E. Rodgers, PharmD, FCCP, BCPS³

¹Department of Health Policy & Management, College of Pharmacy, Riyadh, Kingdom of Saudi Arabia

²Cecil G. Sheps Center for Health Services Research, College of Pharmacy, Riyadh, Kingdom of Saudi Arabia

³UNC Eshelman School of Pharmacy, College of Pharmacy, Riyadh, Kingdom of Saudi Arabia

⁴King Saud University, College of Pharmacy, Riyadh, Kingdom of Saudi Arabia

Abstract

Objective—Medicare Part D claims indicate medication purchased, but people who are not fully adherent may extend prescription use beyond the interval prescribed. This study assessed concordance between Part D claims and medication possession at a study visit in relation to self-reported medication adherence.

Methods—We matched Part D claims for six common medications to medications brought to a study visit in 2011–2013 for the Atherosclerosis Risk in Communities Study (ARIC). The combined data consisted of 3,027 medication events (claims, medications possessed or both) for 2,099 ARIC participants. Multinomial logistic regression estimated the association of concordance (Visit Only, Part D Only, or Both) with self-reported medication adherence while controlling for socio-demographic characteristics, veteran status, and availability under Generic Drug Discount Programs (GDDPs).

Results—Relative to participants with high adherence ($p < 0.05$), medication events for participants with low adherence were approximately 25 percentage points less likely to match and more likely to be Visit Only. The results were similar but smaller in magnitude (approximately 2–3 percentage points) for participants with medium adherence. Compared to females, medication events for male veterans were approximately 11 percentage points less likely to match and more likely to be Visit Only. Events for medications available through GDDP were 3 percentage points more likely to be Visit Only.

Corresponding Author: Sally C. Stearns, PhD, Dept. of Health Policy & Management, The University of North Carolina at Chapel Hill, 135 Dauer Drive; 1104c McGavran-Greenberg Hall, CB #7411, Chapel Hill, NC 27599-7411, sally_stearns@unc.edu, Tel: +1 919 843-2590 Fax: +1 919 966-3671.

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Conclusions—Part D claims were substantially less likely to be concordant with medications possessed at study visit for participants with low self-reported adherence. This result supports the construction of adherence proxies such as proportion days covered using Part D claims.

INTRODUCTION

Medicare Part D claims are a critical resource for measuring medication adherence for approximately 40 million Part D beneficiaries.¹ The Centers for Medicare & Medicaid Services incorporates medication adherence into quality measures for Part D plans,² so Part D claims should be as complete as possible. Claims data are subject to validation procedures while being processed to improve accuracy,³ but Part D claims may not reflect actual utilization. Patients may have other sources for medications (e.g., the Veteran's Administration Pharmacy Benefit, out-of-pocket purchase, or free samples) or they may not take medications as prescribed (e.g., due to forgetfulness or to reduce costs or side effects). Therefore, studies using Part D claims to measure medication adherence routinely provide a disclaimer that claims reflect purchase, which is an imperfect measure of adherence.⁴ Patients with low adherence are hypothesized to be more likely to have gaps in their Part D claim history.⁵ However, the literature lacks assessments of the extent to which people with lower adherence possess medications for which their Part D fill should have been completed and refilled if they had been fully adherent.

This analysis capitalizes on a unique assessment in which participants in the Atherosclerosis Risk in Communities Study were asked to bring medications they were currently taking to a study visit in 2011–2013 and to complete a medication adherence survey. The self-reports of “possessed” medications and adherence behaviors were merged with Part D claims. The merged data allow a test of the hypothesis that participants who self-report lower adherence will be more likely to bring (possess) a medication that does not have a corresponding Part D claim (i.e., a claim that would be available from a filled prescription if the person was fully adherent). While other behaviors are possible (e.g., people purchasing medications through mail order pharmacies could have claims for continuously filled prescriptions but still be non-adherent), support for this hypothesis would constitute evidence that the “proportion days covered” measures calculated using Part D claims provide a valid surrogate for true adherence.

METHODS

Study Population

Data are from Visit 5 of the Atherosclerosis Risk in Communities (ARIC) Study. The prospective cohort component of ARIC recruited participants for a first study visit in 1987–1989 from four communities in the United States: Forsyth County, North Carolina; Jackson, Mississippi; Minneapolis, Minnesota; and Washington County, Maryland;⁶ 6,538 ARIC cohort members participated in a fifth study visit in 2011–2013.

Medications

Study protocol asked participants to bring all medications they were taking to the visit; only 42 respondents did not bring medications or provide the information otherwise. ARIC staff

recorded the medication name from the containers but did not record pill counts. We restricted the analysis to six medications frequently used to treat common diseases (Table 1) used in a previous ARIC study.⁷

Sample Selection

We identified the study sample by: (i) selecting anyone bringing or reporting any of the six medications at the study visit; and (ii) separately identifying Part D claims for the six medications for cohort participants with at least four months of continuous Part D coverage prior to Visit 5. For the claims to be considered an “active” medication at the time of the visit, the fill dates plus number of days supplied (for prescriptions of any length, including 90 day fills) had to fall within 30 days prior to the Visit 5 clinic date. We then matched medications brought to the visit to “active” Part D claims (Figure 1). The six medications represent 15.6% of all “active” Part D medications for all 6,538 cohort members who attended Visit 5. The final sample consisted of 3,027 medication events (claims, medications brought to the visit, or both) for 2,099 cohort participants who took at least one of the six medications and provided complete responses to questions about medication adherence behaviors.

Variable Selection

Medication adherence was measured using the four-item Morisky Green Levine scale (MGLS),⁸ created from a four-item questionnaire with yes or no responses (Figure 2). The key explanatory variable was self-reported medication adherence based on the number of “yes” responses: high (0), medium (1–2), and low (3–4) adherence.⁸

We controlled for age, study site/race, male veteran status (only a few females were veterans), and Generic Drug Discount Program (GDDP) medication status (Appendix Table 1). The only ARIC site that enrolled substantial numbers of both white and black participants was Forsyth. Since Medicare claims do not reflect prescriptions filled through the VA Pharmacy Benefit, veterans are more likely not to have Part D claims for medications they report taking.^{7,11} Veteran status came from an ancillary study that sampled from the ARIC study.¹⁴ Prior studies have shown that medications purchased through GDDPs are commonly reported in Part D claims,^{7,9–11} though these comparisons used data from before 2010 when GDDP use among the elderly was relatively low.¹²

Statistical Methods

The dependent variable of concordance was a three-category variable:

1. Visit Only: medication reported at the ARIC visit but not in the Part D claims;
2. Part D Only: “active” Part D claim but medication not reported at the ARIC visit;
3. Both: medication reported at the ARIC visit and in the “active” Part D claims.

We evaluated concordance between the ARIC visit data and the Part D claims using the kappa statistic and multinomial logistic regression. For the kappa statistic, we allowed for a fourth concordance category for potential medication events not reported as visit medications or “active” Part D claims. The kappa statistic measures overall concordance,

which includes agreement on medication events (i.e., reported in both sources) and agreement when a medication event does not exist (i.e., not reported in both sources).

RESULTS

Descriptive Statistics

The first two columns of Table 2 provide descriptive statistics for the sample and medication events. The most common adherence category reported by the sample was high (59.7%), followed by medium (38.1%) and low (2.2%). The MGLS question most commonly responded to affirmatively (34%) was “Do you ever forget to take your medications” (Figure 2). Sample members with medication events were, on average, 75.8 years old, and 18.3% were male veterans. A majority (55.2%) of the events (claims or medications possessed at visit) were for GDDP medications.

Overall concordance between Part D and medications presented was high. Appendix Table 2 shows that 81.7% of events were identified by both sources ($k=0.87$). Only 14.0% and 4.3% of events were in Visit Only and Part D Only, respectively. Concordance was lower for cohort members with low adherence ($k=0.66$) relative to medium adherence ($k=0.87$) and high adherence ($k=0.88$).

Regression Results

The last three columns of Table 2 provide the marginal effects of the multinomial logistic regression; Figure 3 illustrates the predicted probabilities and marginal effects from the regression. Self-reported medication adherence was significantly associated with concordance status (Figure 3). Medication events for cohort participants with low adherence relative to high adherence were 25.7 percentage points (95% confidence interval (CI): 11.3 to 40.1) more likely to be in the Visit Only data and 25.2 percentage points (95% CI: 10.5 to 39.9) less likely to be in both the claims and visit data. For medium relative to high adherence, events were 3.1 percentage points (95% CI: 0.1 to 6.1) more likely to be in Visit Only data. The marginal effects for adherence were not significantly different for events being in Part D only.

Medication events for blacks in Jackson were significantly more likely to be brought to the Visit Only (and less likely to match) compared to events for sample members living in Minneapolis, though because of the ARIC study design it is difficult to know if this difference is due to race or site. Veteran status was also associated with concordance. Relative to events for females, events for male veterans were 11.2 percentage points (95% CI: 6.3 to 16.0) more likely to be in the Visit Only data and 9.8 percentage points (95% CI: 4.8 to 14.8) less likely to be in both sources. Events for medications commonly available through GDDP were 2.9 percentage points (95% CI: 0.5 to 5.3) more likely to be in Visit Only than events not commonly available through GDDP.

DISCUSSION

This study provides a novel assessment of the association of self-reported medication adherence with concordance between Part D claims and medications possessed at a study

visit. The marginal effects for persons reporting low versus high adherence suggest that medications were substantially and significantly more likely to be brought to the Visit Only without matching to a corresponding “active” Part D claim. The results suggest that patients with low or medium adherence may be stretching out their medications beyond the number of days supplied.

This finding has important implications for the assessment of medication adherence with Part D claims data. The result supports the use of medication adherence measures such as proportion days covered which assume medication use is spread over a period of time when gaps occur in the claims data.¹⁵ These measures would account for individuals who are not taking their medications as prescribed and are stretching a prescription over a longer time period.

We could not identify previous studies that examined the relationship between self-reported adherence and concordance, so our results add to the literature by demonstrating that patients with low adherence use their medications over a longer period of time than directed.¹⁶ Our findings were also fairly consistent with a previous study that assessed Part D claims and medications reported by ARIC phone interviews rather than an in-person visit.⁷ Both studies found veteran status to be associated with events being more common in the ARIC data and less likely to be in both data sources. The prior ARIC study and other assessments before 2010 did not find an association of GDDP status with concordance.¹¹ In contrast, for the period 2011–2013 for the medications studied, we found that GDDP medications were slightly more likely (2.9 percentage points) to be brought to a visit but not found in “active” Part D claims. Another notable difference between our study and the previous ARIC study is that the proportion of events that matched from both sources was higher for medications brought to a study visit (81.7%) than reported during a phone interview (74.9%).⁷ This finding points to recall bias in telephone queries and further supports the value of Part D claims for measuring medication use.

The study has several limitations. First, while the cohort participants were asked to bring medications they were currently taking, we did not check prescription dates on bottles to assess adherence. Instead, we used self-reported adherence measured by the MGLS, which has been validated for predicting medication adherence.⁸ Second, we focused on medications typically used for hypertension, diabetes, and hyperlipidemia. The association between adherence and concordance (between claims and medications possessed) may not be generalizable to medications for other diseases. However, the medications we studied are all taken on a regular basis and are not “pro re nata” (i.e., take as needed). Third, our medication use measures (ARIC visit and Part D claims) are both imperfect, and neither is a gold standard. Finally, the ARIC sample is limited to four communities and is not nationally representative.

In summary, this study supports the value of constructing medication adherence measures using Part D claims for Part D enrollees. Participants who reported that they sometimes forget to take their medications or were non-adherent for other reasons were more likely to bring a medication to a study visit that could not be matched to a Part D claim. In those who self-reported high adherence, concordance between claims and medications was very high.

These findings support the hypothesis that low-adherence patients continue to possess medications after the time they would have been expected to complete them if they had been fully adherent. While researchers should continue to caution that Part D claims measure purchase rather than adherence in an absolute sense, using claims to calculate proportion days covered or dichotomous measures of adherence over longer time periods likely provides a valid surrogate for adherence.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Analysis File Construction (Inclusions, Exclusions, and Sample Sizes)

Figure 2.
Proportion of Yes Responses to the Four Morisky Green Levine Scale Questions (n=2,099
ARIC Visit 5 Participants)

Figure 3.
Concordance by Medication Adherence Categories

Table 1

Characteristics of Analysis Medications (n=3,027 events after merging)

GDDP Status	Generic Drug Name	Drug Class	Typical Indication	Events
Yes	Atenolol	Beta Blocker	Hypertension	376
Yes	Lisinopril	ACE Inhibitor	Hypertension	779
Yes	Metformin	Antidiabetic Agent	Type 2 Diabetes	515
Varied *	Amlodipine	Calcium Channel Blocker	Hypertension	748
No	Atorvastatin	HMG-CoA Reductase Inhibitor	Hyperlipidemia	486
No	Valsartan	Angiotensin Receptor Blocker	Hypertension	123

Note: GDDP stands for Generic Drug Discount Programs

* Starting in 2012, Amlodipine was offered through GDDPs at 3 of 6 major commercial pharmacies. See Appendix.

Descriptive Statistics and Multinomial Logistic Regression Results for Concordance Between Part D Claims and Visit 5 Medications

Table 2

Variables	Sample Members (N=2,099 people)	Medication Events (N=3,027 events)	Regression Estimated Marginal Effects (Percentage Points)		
			Part D Only (N=130 events)	Visit Only (N=423 events)	Both (N=2,474 events)
Adherence (MoriskyGreen Levine Scale)					
High (No to all four questions)	59.7%	60.0%		Reference	
Medium (Yes to 1 or 2 questions)	38.1%	37.8%	-1.03 (0.77)	3.07* (1.52)	-2.04 (1.65)
Low (Yes to 3 or 4 questions)	2.2%	2.2%	-0.55 (0.77)	25.71*** (2.55)	-25.17*** (2.55)
Sample Member Age (in years)	75.8	75.7	3.11 (0.07)	7.33 (0.14)	7.50 (0.16)
Minneapolis, MN / White	30.0%	31.3%		Reference Site	
Forsyth, NC / Black	1.7%	1.9%	4.33 (4.37)	5.81 (7.68)	-10.14 (8.40)
Forsyth, NC / White	18.0%	17.2%	-1.61 (0.98)	4.93 (2.55)	-3.32 (2.67)
Jackson, MS / Black	28.5%	28.5%	1.30 (1.06)	8.96*** (2.39)	-10.25*** (2.53)
Washington County, MD / White	21.8%	21.1%	-1.48 (0.98)	1.78 (2.23)	-0.30 (2.37)
Female	61.4%	61.3%		Reference Gender	
Male Veteran	18.3%	17.6%	-1.36 (0.96)	11.15*** (2.49)	-9.79*** (2.56)
Male Non-veteran	20.3%	21.1%	-0.65 (1.00)	3.85 (2.02)	-3.20 (2.22)
Generic Drug Discount Program (GDDP) Med	NA	55.2%	-0.37 (0.75)	2.90* (1.22)	-2.53 (1.38)

p<0.001,

Standard errors in parentheses.

50.0>d
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*,10<0.01
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