Cost of Prescription Non-adherence Among Immunosuppressant Patients

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The associations between patients' non-adherence to their prescribed immunosuppressant medication and hospitalization outcomes.

BACKGROUND

- Immunosuppressive medication treatment regimens are complex and therefore likely to present adherence challenges for patients relative to other medication classes.
- Studies have shown that non-adherence to immunosuppressants, especially among transplant recipients can lead to negative clinical outcomes such as graft failure.[1]
- Despite the potential impact of adherence there is a lack of a uniform definition of adherence in the literature, suggesting the need standardized measures.[2]
- Accordingly, it is critical to develop standardized measures of immunosuppressant adherence and to validate them using clinical outcomes such as inpatient costs and length of stay.

OBJECTIVES

- This research aimed to examine associations between patients' non-adherence to their prescribed immunosuppressant medication and hospitalization outcomes.

METHODS

- This study was a retrospective analysis of the MarketScan Commercial Claims and Encounters database from calendar year 2019.
- We calculated a PQA-like3 measure of Proportion of Days Covered (PDC) to assess adherence among adult patients (aged 18-65) who were prescribed immunosuppressant medication during the year. Patients were eligible for PDC calculation if they had:
    - ≥ 2 prescription fills for any immunosuppressant medication during the year
    - With a cumulative days' supply of ≥ 56 days
    - And had > 150 days between their first and last fill for an immunosuppressant
- Patients were categorized as "Adherent" if they had PDC scores of ≥ 80%.

- Additionally, as this study was concerned primarily with patients who had been hospitalized during the year, patients were excluded if either of the following were true:
    - Patient was not continuously enrolled in a healthcare plan during the year
    - Not admitted to the hospital for surgical or medical care
- Primary endpoints for this study were inpatient costs and length of stay (LOS) in the hospital. Both were measured as continuous outcomes.
- Endpoints were modelled as a function of adherence group, age, gender, admission type, and geographical region, using proc GLM in SAS 9.4 (Cary, NC).
- Differences in sample characteristics between adherent and non-adherent groups were assessed using Student's t-test for continuous variables (age) and Pearson's chi-square for categorical variables.
- The overall unadjusted effect of adherence on both outcomes as well as the effect of adherence when controlling for covariates were both assessed via linear regression.
- We chose $p < .001$ as our criteria for judging statistical significance.

RESULTS

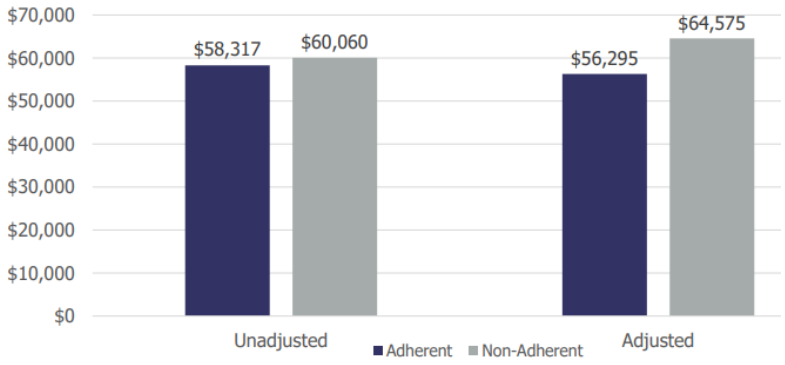
- In total, 3,408 patients had at least one medical (n=2,056) or surgical (n=1,352) admission during the year and met criteria for PDC calculation. Of these patients (n=2,354; 69.1%) were adherent.
- Of the medical admissions 1,366 (66.4%) were adherent, among the surgical admissions 988 (73.1%) were adherent.
- Descriptive statistics for patient characteristics of adherent and non-adherent patients and inferential statistics comparing them statistically are presented in **Table 1**.
- Of the four variables examined in **Table 1**, only Admission Type differed significantly between the adherent and non-adherent groups. Accordingly, Admission Type was controlled for in subsequent analyses.

Table 1: Adherent and Non-Adherent Patient Characteristics

	Adherent (n = 2,354)		Non-Adherent (n = 1,054)		
	n	%	n	%	*p*
Admission Type					< .001
Medical	1,366	58.0	690	65.5	
Surgical	988	42.0	364	34.5	
Age in Years (M, SD)	49.7	11.6	48.3	12.6	.002
% Female	996	42.3	479	45.5	.088
Geographic Region					.255
North Central	505	21.5	219	20.8	
Northeast	427	18.1	204	19.4	
South	1,114	47.3	516	49.0	
West	299	12.7	114	10.8	
Unknown	9	0.4	1	0.1	

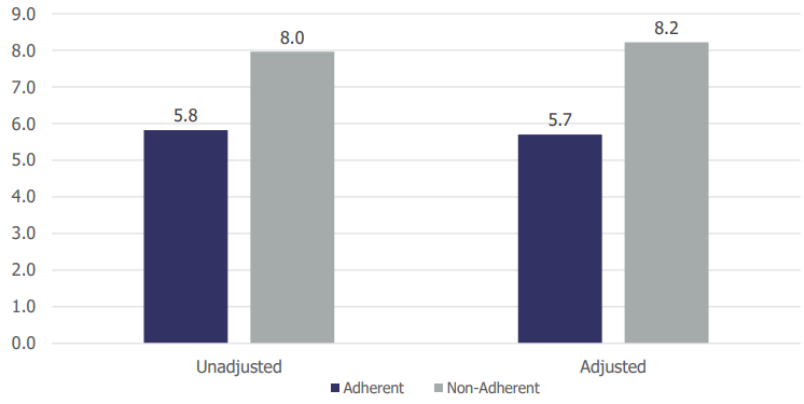
- The overall, unadjusted means for Inpatient costs between adherent and non-adherent groups can be found in **Figure 1**.
- As can be seen in the figure, non-adherent patients had inpatient costs that were $1,743 higher than adherent patients, however this difference was non-significant (p=.709).
- When adjusting for admission type, the estimated difference was $8,279 (p = .039; **Figure 1**).
- The full model for this adjustment was: $inpatient\ cost$=$21,425+$8,280($if\ non-adherent$)+$87,898($if\ surgical\ patient$).

Figure 1: Unadjusted and Adjusted Inpatient Costs by Adherence Group



- The overall, unadjusted means for Inpatient costs between adherent and non-adherent groups can be found in **Figure 2**.
- As can be seen in the figure, non-adherent patients had lengths of stays that were 2.2 days longer than adherent patients (p < .001).
- The difference in average length of stay was 2.5 days longer for non-adherent patients when adjusting for admission type (p < .001; **Figure 2**).
- The full model for this adjustment was: LOS=4.0 + 2.5 ($if\ non-adherent$)+4.2 ($if\ surgical\ patient$)

Figure 2: Unadjusted and Adjusted Length of Stay (days) by Adherence Group



CONCLUSIONS

- A PQA-like proportion of days covered adherence metric for immunosuppressant drugs had associations that approached significance with the cost of inpatient hospitalization and significant with the length of stay when controlling for the type of hospital admission.
- In addition to providing validity evidence for this adherence measure, these results suggest that non-adherence to immunosuppressants can be costly both in terms of time spent in the hospital and inpatient costs.
- These results provide validity evidence for this measure of immunosuppressant adherence suggesting it may be a good candidate for a more uniformly agreed upon method of adherence measurement.

LIMITATIONS

- The generalizability of this study may be limited as it was conducted on data from a database of primarily working age adults with commercial insurance. Therefore, these results may not generalize to the entire population of patients who are prescribed immunosuppressants.

References:
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3. 2019 PQA Measurement Manual. Pharmacy Quality Alliance. Alexandria, VA; 2019.

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