



Multiple sclerosis disease modifying therapies' adherence and hospital costs using Pharmacy Quality Alliance guidelines and MarketScan Commercial Claims and Encounters database

Staskon¹, F., PhD; Kirkham¹, H., PhD, MPH; Borysyuk¹, M., PharmD; Love², K., RN

BACKGROUND

- The Pharmacy Quality Alliance (PQA) approved a quality metric for monitoring adherence to disease-modifying therapies (DMT) used to treat multiple sclerosis (MS) in 2017.
- Research is needed to demonstrate that adherence to DMT medications can reduce both hospitalization events and related costs, by use of PQA-approved measure methods.

OBJECTIVE

- To identify significant associations between PQA DMT medication adherence and healthcare cost and utilization over a 2-year period.

METHODS

- We used a retrospective cohort design with commercially-insured patients from the MarketScan Commercial Claims and Encounters database from 2015--2017.
- DMT adherence was calculated with PQA criteria: age (≥ 18 years), continuous enrollment, 365 day follow-up from index date for proportion of days covered (PDC), and non-infused DMT list (i.e., *interferon beta 1a*, *interferon beta 1b*, *peginterferon beta-1a*, *glatiramer*, *fingolimod*, *teriflunomide*, and *dimethyl fumarate*).
- Selected patients had at least two DMT fills (56 plus day supply) starting 1/1/2015 (with 2nd year follow-up starting up to Dec 2017 from index), and no indications of death or hospice stay.
- MS diagnosed patients were categorized as (a) consistently adherent (PDC $\geq 80\%$) in both years, (b) adherent only in one year, or (c) adherent in neither year.
- Outcomes were a combined 2-year total for hospital costs, count of hospital admissions, bed days for those hospitalized, DMT pharmacy costs, and associated medication pharmacy costs.
- General Linear and Logistic models' covariates included gender (female vs. male), age (log transform), census region (southern vs. other), metropolitan location (metro vs. not metro), count of associated MS medication therapy groups (0-9), DMT switching (more than single ingredient over 2 years), DMT mail order (all vs. mix or other), and changed insurance type (category changes over 2 years).

RESULTS

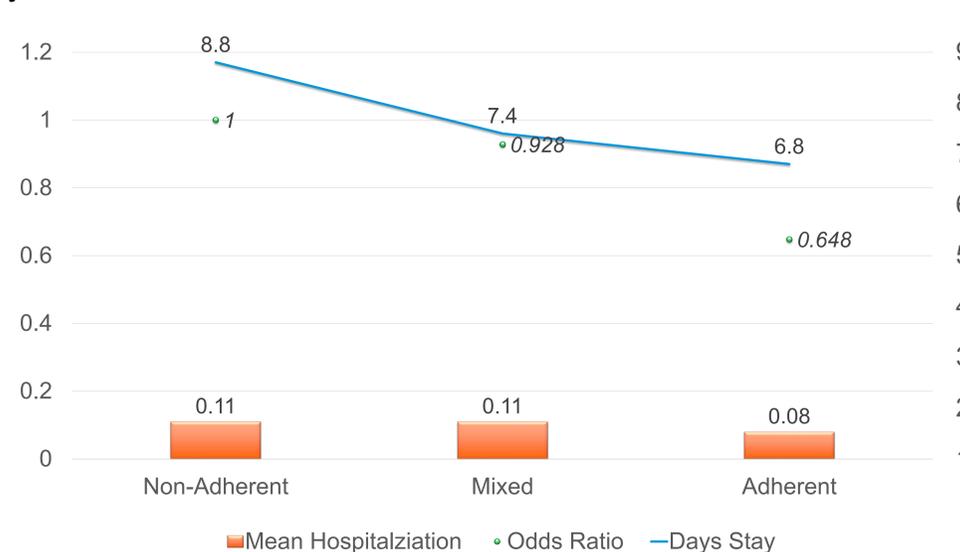
- A total of 18,519 MS patients met criteria for the study. Of these, 60.6% were adherent in both years, 26.5% were adherent in 1 of 2 years, and 12.9% of patients were non-adherent in both years.
- To note, adherence was significantly lower in the second year compared to the first year, with PDC decreasing significantly by 7.3% ($p < 0.0001$) in the second year and percent adherent drops from 80.6% to 67.0% ($p < 0.0001$).
- General linear models for pharmacy costs with covariate coding described in methods indicated that adjusted costs for DMT pharmacy were significantly higher for those consistently adherent vs never adherent ($p < 0.0001$; see Table 1. a mean difference of \$55,982). Other significant covariates were lower costs for older patients ($p < 0.02$) and females ($p < 0.0001$), but higher costs for southern region ($p < 0.0001$), DMT change ($p < 0.0001$), mail order ($p < 0.0001$), and number of associated therapy classes ($p < 0.0001$).

Table 1. Outcomes: Adjusted Means and Standard Errors (s.e.) for Cohort Effect

Modeled Outcomes	Non-adherent		Mixed adherence		Adherent		Cohort Effect p value
	mean	s.e.	mean	s.e.	mean	s.e.	
2-year sum							
DMT costs	\$86,119*	\$621	\$115,554*	\$542	\$142,101*	\$542	<.0001
Associated Rx	\$13,456*	\$1,531	\$22,738*	\$1,337	\$30,327*	\$1,262	<.0001
Inpatient costs	\$4,058*	\$484	\$3,959	\$423	\$2,845*	\$399	<.0001
Hospitalization	0.11*	0.01	0.11	0.01	0.08*	0.01	<.0001
Days Stay	8.8*	1.1	7.4	0.9	6.8*	0.9	<.043

Note. Estimated adjusted means from full models and p value for cohort effect. Asterisk indicates significant pairwise comparison between mean values with asterisk.

Figure 1. Hospitalization (odds ratio, estimated means) and Days Stay (estimated means) by Adherence Cohort



RESULTS (continued)

- A similar significant difference is present for the associated therapy prescriptions costs (e.g., CNS agents, muscle relaxers, antidepressants, etc.) between the adherent cohort vs never adherent cohort ($p < 0.0001$; see Table 1. a mean difference of \$16,871). Other significant covariates were lower costs for age ($p < 0.0001$) and females ($p < 0.0006$), but higher costs for southern region ($p < 0.02$), metropolitan areas ($p < 0.02$), insurance change ($p < 0.02$), mail order ($p < 0.0001$), and number of associated therapy classes ($p < 0.0001$).
- Total net inpatient costs indicated an increasing cost with lower adherence patterns (see Table 1). Compared to patients who were not adherent in either year, consistently adherent patients had significantly lower adjusted hospital costs over a two year period (-\$1,213, $p < 0.0001$).
- Additional significant covariates for inpatient costs included increased costs for older patients ($p < 0.0001$) and number of associated therapy classes ($p < 0.0001$), but lower costs for females ($p < 0.003$), and the southern region ($p < 0.02$).
- In addition to the costs outcomes, hospitalization was examined as a binary event, as well as length of stay if hospitalized as days hospitalized, over the two year follow-up period.
- Logistic regression analysis established significantly fewer admissions for the adherent cohort compared to the non-adherent cohort (odds ratio of 0.65, $p < 0.0001$). (See Figure 1. bars for adjusted means or point values of odds ratios). Other covariates indicated significantly higher odds for older patients ($p < 0.0001$), change in insurance ($p < 0.04$), DMT change ($p < 0.0001$) and increased use of associated therapies ($p < 0.0001$), but lower odds for females ($p < 0.003$), southern region residence ($p < 0.02$), and mail order only ($p < 0.05$).
- For hospitalized patients, the model indicated a trend towards shorter days with increasing adherence (see Table 1 and Figure 1 blue line), with significantly fewer bed days for the adherent cohort compared to the non-adherent cohort (about 2 fewer days, $p < 0.043$). Significant covariates indicated older patients with a longer stay ($p < 0.05$) as well as those with more associated therapy classes ($p < 0.0001$).

CONCLUSION

- DMT medication adherence (PDC ≥ 80) can lead to lower hospitalization costs and fewer such events or length of stay over a two year period, compared to non-adherent cohorts.