Multiple sclerosis disease modifying therapies' adherence and total medical costs among women with maternity services using administrative data.

Staskon[1], F., PhD; Kirkham[1], H., PhD, MPH; Love[2], K., RN

All authors are employees of Walgreen Co[1] or AllianceRx Walgreens Prime[2] for whom this research was conducted.

Presented at the Americas Committee for Treatment & Research in Multiple Sclerosis (ACTRIMS), 2021 Forum.

This research was approved by Advarra IRB (#Pro00039505) and funded internally by Walgreen Co.

Please contact: research@walgreens.com. This research was funded internally by Walgreen Co.

Background

- Women with multiple sclerosis (MS) who become pregnant and utilize maternity services may find their use of disease-modifying therapies (DMT) impacted for a number reasons.
- Research is needed to investigate the impacts of that life change upon adherence to DMT medications, healthcare utilization and healthcare costs.

Objective

- To identify significant associations between DMT adherences among women utilizing maternity services in regards to comorbidities, 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.

- Selected patients had at least two DMT fills (>56 day supply) starting 1/1/2015 (with 2nd year follow-up starting up to 12/1/2017 from index), and no indications of death or hospice stay. Maternity was identified with both inpatient and outpatient ICD-9 or 10 coding or inpatient admission type and associated costs summed per patient.

- 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*).

Methods continued

- MS pregnancies were categorized as (a) consistently adherent (PDC ≥ 80%) in both years, (b) adherent only in one year, or (c) adherent in neither year, with b or c including discontinuations.
- Outcomes were a combined 2-year total adjusted medical costs (inpatient and outpatient costs less maternity service costs), DMT pharmacy costs, and associated medication pharmacy costs.
- General Linear models' covariates included initial maternity year (first vs. second), 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), presence of comorbidity (any Charlson comorbidity index category), and changed insurance type (category changes over 2 years).

Results

- Of the 604 females who utilized maternity services, 82.7% were in the first year follow-up period. Most common treatment pattern was 79% of these 500 first year pregnancies discontinuing DMT utilization in the second year timeline

- The largest number of patients used *glatiramer* at index (46.4%), followed by *dimethyl fumarate* (12.1%), and *glatiramer* was most likely switched to (37.7%) among the 53 not maintaining their index DMT. The adherent group percentage per maintained index DMT is as high as 11.2% for *glatiramer* and as low as 0% for *interferon beta 1b.*

- Comorbidities were present among 48 patients, (e.g., diabetes with/without complications (n=10) or chronic pulmonary disease (n=22). Table 1 provides the distribution of comorbidities (with combinations in 4 patients as unique condition).

Results continued

Table 1. Comorbid conditions counts on study sample (less single cost outlier).

Comorbidity	Modeled sample
Chronic pulmonary disease	22
Diabetes without complications	9
Paraplegia and Hemiplegia	8
Cerebrovascular Disease	8
Diabetes with complications	1
Cancer	1
Dementia	1

Note: single patient had high cost (>$85k) had both cancer and metastatic cancer conditions. Dual conditions are represented as two distinct counts.

Analysis on remaining 603 patients DMT utilization found 9.2% adherent in both years, 36.9% adherent in one year and 53.9% of patients were non-adherent in both years. Discontinuations were included in either non-adherent cohort group depending upon adherence level in other year.

Results continued

- 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 or mixed adherent groups ($p<.0001$ for all comparisons; see Table 2. with the largest mean difference of $88,358). Other significant covariates were higher costs for DMT change ($p<.0001$), mail order ($p<.008$), and number of associated therapy classes ($p<.0001$).

- For MS associated medications (see Table 2.), costs was not significantly different across cohort levels ($p<.36$). However, there were higher costs for increased number of associated therapy classes ($p<.0001$), DMT change ($p<.02$), and mail order ($p<.007$).

- As reported in Table 2. patients who were consistently adherent had significantly lower adjusted medical costs compared to consistently non-adherent patients (-$4,383, $p<.002$), or to mixed adherence patients (-$2,951, $p<.05$).

Results Continued

Table 2. Outcomes: Adjusted means and standard errors (s.e.) for cohort effect

Modeled Outcomes	Non-adherent		Mixed adherence		Adherent		Cohort Effect
2 year sum	mean	s.e.	mean	s.e.	mean	s.e.	p value
DMT costs	$54,014[a]	$3,727	$97,671[a]	$3,849	$142,372[a]	$4,553	<.0001
Associated Rx Costs	$5,615	$4,640	$9,183	$4,791	$6,435	$5,668	<.36
Adjusted Medical Costs	$6,697[a]	$1,356	$5,265[b]	$1,401	$2,314[a,b]	$1,657	<.002

Note: Estimated adjusted means from full models (less outlier) and p value for cohort effect; Use identical superscript letter to indicate significant pairwise comparison between mean values.

Results Continued

- Other significant covariates were increased adjusted medical costs with DMT change ($p<.03$), number of associated therapy classes ($p<.0001$), and comorbidity ($p<.0007$). However, the southern region ($p<.04$) had lower costs compared to other regions.

Conclusion

- MS patients in maternity typically reduce their DMT medication adherence, but a significant number continue, and even demonstrate good adherence levels (PDC ≥ 80%). Mean non-maternity medical costs for adherent patients was significantly lower compared to other two DMT non-adherent or discontinued patient groups.