RELATIONSHIP BETWEEN ADHERENCE FOR MULTIPLE SCLEROSIS MEDICATIONS AND HEALTH CARE COSTS

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Abstract

Research Objective:
The purpose of this research is to examine the relationship between medical and/or overall healthcare costs and medication adherence among multiple sclerosis (MS) patients.

Study Design:
Retrospective analysis using data from commercial claims files from Truven Health Analytics Marketscan® Databases from 2012 and 2013. Outcome variables include adjusted MS related medical and overall healthcare costs and average ER visits in 365 days following the index date. Multivariate modeling included independent variables such as MS medication adherence, as measured by the proportion of days covered (PDC), and other patient level factors that may influence outcomes. Adherence was categorized into the ranges 1-19%, 20-39%, 40-59%, 60-79% and 80-100%.

Population Studied:
Patients with an index MS drug claim in the last 6 months of 2012 and at least one ICD-9 code for MS in the 180 days prior to the first claim were included. Patients also had to be continuously enrolled in the 6 months prior to and 12 months after the index date.

Principal Findings:
The final sample for the analysis consisted of 15,298 patients that met all inclusion criteria. The number of patients in each of the adherence categories (1-19%, 20-39%, 40-59%, 60-79% and 80-100%) was 202, 820, 1,295, 2,348 and 10,633 respectively. Adjusted MS related medical costs for each category were $23,253, $20,486, $20,266, $18,063 and $17,814 respectively. Average number of MS related Emergency Room (ER) visits for each category were 0.584, 0.428, 0.369, 0.291 and 0.195 respectively. MS medication and costs contributed to an adjusted overall MS related healthcare cost for each adherence category.

Conclusions:
Increased adherence to MS medications was found to be associated with a decrease in adjusted MS related medical costs. Although total health care costs increased with medication adherence (due to the fact that decreases in medical costs were not enough to offset the increase in MS prescription medication costs), it is imperative for patients to maintain appropriate levels of medication in order to manage their MS disease progression and severity.

Background

Medication adherence has been shown to be associated with lower medical costs in some chronic diseases such as hypertension, diabetes and high cholesterol[1-5]. This study evaluated the medical costs and emergency room visit rate of patients who take specialty medications for multiple sclerosis, according to their rate of adherence.

Methods

Study Cohort:
Data from the Truven Health Analytics Marketscan® Databases 2012 and 2013 integrated pharmacy and medical databases for commercially insured patients aged 18 to 64 were used to construct the study cohort.

Research Design:
Retrospective claims analysis.

MS population inclusion criteria:
- Had an index MS drug claim in the last 6 month of 2012 (the first claim date within this period is the index date).
- Were continuously enrolled in the 6 months prior to and 12 months after the index date
- At least two MS claims any days of supply, or 1 claims of > = 84 days supply of MS drug within 365 days following index date
- Had at least 1 MS (ICD9 - 340) diagnosis (dx1 or dx2) 180 days prior to the first claim date (inclusive).

MS population exclusion criteria:
- Excluded patients who had any MS disease modifier claimed under medical benefits in 365 days after index date.
- Excluded patients with IV drug claimed under pharmacy.
- Excluded anyone with non-oral drug claims of days' supply of 1 or 2 (as explorative study shows such claims' days' supply are likely invalid entries).

Dependent variables:
- MS related* medical costs in post period.
- MS related* overall healthcare (medical + pharmacy) cost in post period.
*Medical claims with either first or secondary diagnosis code ICD-9 code of 340

Independent variables:
- Level of patient adherence, based on proportion of days covered (PDC) in post period.
- Demographics
- Flag of new/continuous MS medication user
- Comorbidity, based on CDS score
- Average copay per adjusted MS prescription
- Flags of primary comorbidity attributing to MS non-adherence (depression, Urinary tract infections and hypertension , or pressure ulcer/decubitus/venous stasis
- Flag of index drug being non-oral or oral. Since new oral drug are more expensive thus use of oral drug has impact on cost. This will be measured by the route of administration of first MS drug claims.
- Flag of Switchers between non-oral and Oral. Switching between oral and non-oral may impact on the cost. This will be measured as whether both oral drug and non-oral drug were used by patients in the 365 days follow up period.

Analysis

An individual MS patient was the unit of analysis for this study. Adherence to MS medications was calculated as the percent days covered (PDC) during the post period. Multi-variable modeling with retrospective claims to examine the relationship MS medication adherence and medical and overall healthcare cost was performed. Multivariate Poisson regression was used to assess the relative risk of an ER visit among patients with the lowest average PDC compared to patients in highest PDC segment. Adherence was categorized into ranges as per Sokol et al. (1-19%, 20-39%, 40-59%, 60-79%, 80%-100%).

Results

Increased adherence to MS medications is associated with 23% lower adjusted MS-related medical costs. Average MS related medical cost for patients with PDC between 0% and 19% was $23,253 while medical cost for those between 80% and 100% was $17,814.

Unadjusted findings show that the average number of ER visits among MS patients decreased 66% as their adherence rose. Those members with PDC between 0% and 19% averaged 0.584 ER visits compared to 0.195 for those with PDCs between 80% and 100%.

Conclusions

Patients with high adherence to medication used to treat multiple sclerosis (MS) have lower MS-related annual medical costs and have a lower risk of visiting an emergency room (ER). When compared to patients with the lowest adherence rates to MS medications, patients with the highest adherence rates have 66% fewer ER visits and incur 23% lower medical costs (approximately $5,400) per patient.

References

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Principal Findings

Table 1: Descriptive statistics of patients at different PDC levels

	1.PDC 0%-19%		2.PDC 20%-39%		3.PDC 40%-59%		4.PDC 60%-79%		5.PDC 80%-100%		P value
	N=	202	N=	820	N=	1295	N=	2348	N=	10633	
	Mean/STD (#/%)		Mean/STD (#/%)		Mean/STD (#/%)		Mean/STD (#/%)		Mean/STD (#/%)		
Dependent Variables											
Adjusted MS related medical cost	$23,253		$20,486		$20,266		$18,063		$17,814		<0.0001
Adjusted MS related healthcare cost	$34,501		$39,306		$51,016		$61,354		$76,115		<0.0001
ER Utilization Variable											
Average MS related number of ER Visits	.0584	1.299	0.428	1.484	0.369	0.926	0.291	0.828	0.195	0.601	<0.0001
Independent Variables											
Age	43.26	11.09	44.21	10.36	44.90	10.14	45.96	9.73	47.47	9.56	<0.0001
Female	160	79%	654	80%	1016	78%	1872	80%	8018	75%	<0.0001
MS drug average copay per rxs 30											<0.0001
$0-$100	161	80%	651	79%	1,034	80%	1,861	79%	8,318	78%	
$100-$300	31	15%	121	15%	166	13%	353	15%	1,808	17%	
$300 and +	10	5%	48	6%	95	7%	134	6%	507	5%	
Chronic Disease Score											<0.0001
0-5	173	86%	747	91%	1,121	87%	2,038	87%	9,366	88%	
6-8	26	13%	58	7%	148	11%	270	11%	1,128	11%	
9 and +	3	1%	15	2%	26	2%	40	2%	139	1%	
Continuous MS Users	129	64%	591	72%	1054	81%	2070	88%	9717	91%	<0.0001
Index Drug Route											<0.0001
Intramuscular	39	19%	177	22%	224	17%	475	20%	2601	24%	
Oral	18	9%	51	6%	67	5%	205	9%	1270	12%	
Subcutaneous	145	72%	592	72%	1004	78%	1668	71%	6762	64%	
Swtichers between Oral and Non-Oral	18	9%	108	13%	188	15%	354	15%	925	9%	<0.0001
Study period Depression	21	10%	59	7%	128	10%	184	8%	699	7%	<0.0001
Study period Urinary Tract Infection	34	17%	133	16%	207	16%	356	15%	1502	14%	0.1339
Study period Hypertension	52	26%	187	23%	296	23%	559	24%	2566	24%	0.7335
Study period Pressure Ulcer	2	1%	13	2%	28	2%	27	1%	143	1%	0.1242

Figure 1: Adjusted MS-Related Medical Cost and Average Emergency Room Visits by Adherence Levels. Adherence measured by proportion of days covered (PDC).