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Original article

Using a single product (calcipotriene/betamethasone topical suspension) vs multiple products to manage body and scalp psoriasis: comparisons in resource utilization and costs

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Abstract

Objectives:
To compare resource utilization and costs among patients who used calcipotriene/betamethasone dipropionate topical suspension (Taclonex Scalp Topical Suspension, Leo Pharma A/S) vs those who used multiple body and scalp formulations for psoriasis.

Research design and methods:
A retrospective study using Truven Health MarketScan Commercial Database from 2006–2011 was performed to identify patients with psoriasis (ICD code 696.1x). Two study cohorts analyzed were cohort A (used body-only formulations for psoriasis and switched on the index date to using calcipotriene/betamethasone dipropionate topical suspension alone) and cohort B (used multiple body and scalp formulations for psoriasis). Patients were required to be continuously enrolled during 180-days pre- and post-index periods. Multiple regression analyses adjusting for baseline demographic and clinical covariates were performed.

Main outcomes measures:
Number of psoriasis-related outpatient visits, total healthcare costs, psoriasis-related costs, and use of systemic agents during post-index period.

Results:
A total of 1923 patients were identified with at least one prescription for calcipotriene/betamethasone dipropionate scalp topical suspension (cohort A = 367, cohort B = 1556). Patients using multiple medications (cohort B) were associated with 48% higher number of outpatient visits as compared with those who used a single formulation (cohort A) after controlling for baseline covariates ($p < 0.001$). A generalized linear model adjusting for baseline covariates showed significantly higher post-index total and psoriasis-related healthcare costs for cohort B as compared with cohort A (both $p < 0.001$). Patients in Cohort B also had twice the odds of using systemic agents as compared to patients in Cohort A ($p < 0.001$).

Conclusions:
Patients with body and scalp psoriasis using a single product had significantly lower overall and psoriasis-related healthcare costs, needed fewer psoriasis-related outpatient visits, and used less systemic agents during the post-index period. A lack of robust clinical measures to define the disease severity may have limited the interpretations from this study.

Introduction

Psoriasis is a chronic immune disease, affecting up to 7.5 million Americans with considerable suffering[1]. Plaque psoriasis, the most prevalent form of psoriasis, manifests as dry, scaly, red skin lesions that can be itchy and painful. Every part of the skin can be affected, and managing psoriasis can be extremely burdensome for patients and caregivers. Topical medications are commonly used to treat psoriasis, however they may be difficult and time-consuming to use. Adding to the difficulty of treating psoriasis is the need to use different products in different areas. The ointments that are typically used on the body are too messy for use in the scalp, and scalp psoriasis affects many patients with psoriasis[2,3]. The need for different topical formulations for different areas adds to the cost and complexity of treatment, and patients report that treatment of the disease is one of the worst aspects of having psoriasis[4]. The resulting adherence to topical psoriasis treatments is poor[5].

The mainstays of topical psoriasis treatment include topical corticosteroids and topical vitamin D analogs[6]. The combination of the two works better than either alone[7], but use of multiple products results in a complex regimen. Simplifying treatments to one product has the potential to improve adherence and treatment outcomes. A fixed dose combination of calcipotriene, a vitamin D analog, and betamethasone dipropionate, a high potency corticosteroid, is available in an ointment formulation for psoriasis of the body (Taclonex Ointment, Leo Pharma A/S, Parsippany, NJ, USA) and in a gel/suspension formulation for scalp psoriasis (Taclonex Scalp Topical Suspension)[8]. The American and European guidelines recommend the calcipotriene/betamethasone dipropionate fixed-dose combination products as a first line topical treatment for mild-to-moderate plaque psoriasis of the body and scalp[9].

To further simplify treatment, the gel/suspension formulation of calcipotriene with betamethasone dipropionate can be used for psoriasis lesions on both the body and the scalp. The potential advantages associated with using a single topical product for both scalp and body psoriasis are not well characterized. The objective of this study was to compare economic outcomes and resource utilization among patients who used single product (calcipotriene/betamethasone dipropionate topical suspension) vs those who used multiple body and scalp formulations for managing their psoriasis.

Patients and methods

Data source

A retrospective observational study was carried out using the Truven Health MarketScan Commercial Database (Truven Health MarketScan Databases, Truven Health Analytics, Inc, Ann Arbor, MI). These claims data provide a nationally representative sample of the commercially-insured population in the US. These longitudinal data include pharmacy, inpatient, and outpatient claims, integrated at the patient level on over 110 million Americans. Data are available from 125 contributing employers, 13 health plans, and 11 state Medicaid programs. The database includes both inpatient and outpatient diagnoses (in ICD-9 format) and procedures (in CPT-4 and HCPCS formats), as well as both retail and mail order prescription records.

Available data on prescription records include the NDC code as well as quantity dispensed. Additional data elements include enrollees' demographic variables (age, gender, geographic region), provider characteristics, payer type (e.g., commercial, self-pay), and start and end dates for plan enrollment. The current study used de-identified claims data and, hence, was determined not to require institutional review board review.

Sample selection

The database was queried from January 1, 2006 to March 31, 2011 to identify a cohort of psoriasis patients (ICD-9 code 696.1x). A sub-set of patients with at least one claim for calcipotriene/betamethasone dipropionate topical suspension was identified using NDC codes (00430323015, 00430323016, 50222022704, 50222022781, 00430324015, 50222050106) between January 1, 2007–March 31, 2010. This prescription identification window was selected to allow at least 1 year before and after the first service date for calcipotriene/betamethasone dipropionate topical suspension.

The first service date for a prescription of calcipotriene/betamethasone dipropionate topical suspension during this period was an index date. For this study, patients were required to be continuously enrolled during 180 days pre- and post-index dates. The following study cohorts were identified:

- *Cohort A*: used multiple body and scalp formulations for psoriasis during 180 days prior to the index date, when they switched to using calcipotriene/betamethasone dipropionate scalp topical suspension alone. These patients did not have any claims for other psoriasis medications on or after the index date.
- *Cohort B*: used multiple body and scalp formulations for psoriasis (e.g., calcipotriene/betamethasone dipropionate topical suspension and another medication) during 180 days before and after index date. Patients were required to be continuously enrolled during 180 days pre- and post-index periods. The sample attrition is described in Table 1.

Table 1. Sample attrition.

	n
Patients with psoriasis diagnosis between January 1, 2006 and March 31, 2011	579,835
Patients with psoriasis medications/procedures (after their first psoriasis diagnosis) between January 1, 2007 and March 31, 2010	279,266
Patients using body only formulations	2568
Patients continuously enrolled during 180-days pre- and post-index periods	2506
Patients with at least one claim for calcipotriene/betamethasone suspension during 180-days pre-index	1923
Patients using scalp only formulation (i.e., at least one claim for body formulation during 180-days pre-index and no claims for body formulation during the 180 days post-index) (Cohort A)	367
Patients using both body and scalp formulations (i.e., at least one claim for the body formulation during the 180 days post-index) (Cohort B)	1556

Study measures

Patients' demographic characteristics were derived from the enrollment information in conjunction with information from the index claim. Characteristics related to index medications were also assessed using the information from the index claim. Psoriasis-related comorbidities were identified using diagnosis codes during the pre-index period. The specific study measures used can be found in Table 2.

Since claims data do not have clinical measures to ascertain disease severity, the following algorithm was used as a proxy to assess psoriasis severity. Patients were categorized as having moderate–severe disease if they had $\geq$1 claims for systemic therapies or certain medical procedures in the pre-index period (Table 3)[10,11].

Patients with no pre-index claims for any systemic therapies or medical procedures mentioned above were categorized as having mild psoriasis.

Study outcomes

Number of psoriasis-related outpatient visits in the post-index period

This was defined as any outpatient visits with psoriasis diagnosis-ICD-9 code 696.1. Psoriasis-related outpatient visits were defined as outpatient claims with a diagnosis code of 696.1. Multiple claims on a single day were considered as a single visit to avoid any double-counting of visits on the same day.

Total healthcare costs in the post-index period

This includes pharmacy cost and cost of inpatient and outpatient services reported in the claims data (adjusted for 2011 US dollars using the medical component of the consumer price index).

Psoriasis-related healthcare costs in the post-index period

This includes pharmacy cost and cost of inpatient and outpatient services associated with a psoriasis claim identified using ICD-9 code 696.1 (adjusted for 2011 US dollars using the medical component of the consumer price index).

Use of systemic agents during post-index period

This was defined as at least one claim during the post-index period for any psoriasis-related systemic agent (including biologic agents, and non-biologic systemic agents).

Statistical analyses

Descriptive analyses (frequencies and percentages) of baseline characteristics and univariate (one-way analysis of variance and chi-squared) analyses were performed. Differences in number of psoriasis-related outpatient visits and total healthcare costs during pre- and post-index periods were compared using *t*-tests. Use of any systemic agents (yes/no) in the post-index period was compared using chi-squared tests. Multiple regression analyses were performed to study the association between type of treatment (single agent vs multiple agents) and study outcomes controlling for demographic and clinical characteristics, comorbidities, and psoriasis severity. The Adjusted Poisson regression model was used to study the association between the number of psoriasis-related outpatient visits and type of treatment. The coefficients obtained from the model were then exponentiated to obtain the differences in actual number of visits. The association between post-index healthcare costs and type of treatment was examined using the adjusted generalized linear model (GLM) with gamma distribution and log-link function. The adjusted logistic regression model was used to study the association of use of any systemic agents (yes/no) in the post-index period and type of treatment. For all multivariate models, cohort A was used as a reference category. Thus, positive coefficients in Poisson regression indicated that cohort B had higher logs of expected counts of outcomes (psoriasis-related visits) as compared to cohort A. Because of the difficulty in interpreting arithmetic mean ratios, we calculated the average marginal effects for costs and psoriasis-related outpatient visits by treatment types.

Table 2. Demographic and clinical characteristics.

	All ($n=1923$)		Cohort A ($n=367$)		Cohort B ($n=1556$)		p-Value
Female gender	1105	57.5%	231	62.9%	874	56.2%	0.0182
Age group, *n* (%)							0.5176
<18 years	90	4.7%	21	5.7%	69	4.4%	
18–34 years	352	18.3%	69	18.8%	283	18.2%	
35–44 years	399	20.8%	71	19.4%	328	21.1%	
45–54 years	538	28.0%	94	25.6%	444	28.5%	
55–64 years	544	28.3%	112	30.5%	432	27.8%	
Plan type, *n* (%)							0.6126
Comprehensive	43	2.2%	8	2.2%	35	2.3%	
EPO	28	1.5%	4	1.1%	24	1.5%	
HMO	231	12.0%	41	11.2%	190	12.2%	
POS	189	9.8%	42	11.4%	147	9.5%	
PPO	1283	66.7%	243	66.2%	1040	66.8%	
POS with capitation	27	1.4%	2	0.5%	25	1.6%	
CDHP	60	3.1%	14	3.8%	46	3.0%	
HDHP	25	1.3%	6	1.6%	19	1.2%	
Missing	37	1.9%	7	1.9%	30	1.9%	
Employment status							0.7236
Active full time	925	48.1%	185	50.4%	740	47.6%	
Active part time or seasonal	24	1.3%	7	1.9%	17	1.1%	
Early retiree	113	5.9%	18	4.9%	95	6.1%	
Medicare eligible retiree	10	0.5%	2	0.5%	8	0.5%	
Retiree (status unknown)	26	1.4%	5	1.4%	21	1.4%	
COBRA continuee	7	0.4%	0	0.0%	7	0.5%	
Long-term disability	2	0.1%	0	0.0%	2	0.1%	
Surviving spouse/dependant	4	0.2%	1	0.3%	3	0.2%	
Other/unknown	812	42.2%	149	40.6%	663	42.6%	
Geographic region							0.6554
Northeast	296	15.4%	50	13.6%	246	15.8%	
Northcentral	544	28.3%	113	30.8%	431	27.7%	
South	825	42.9%	158	43.1%	667	42.9%	
West	235	12.2%	41	11.2%	194	12.5%	
Unknown	23	1.2%	5	1.4%	18	1.2%	
Comorbidities							
Psoriatic arthritis	108	5.6%	11	3.0%	97	6.2%	0.0154
Diabetes	157	8.2%	27	7.4%	130	8.4%	0.5300
Heart diseases	67	3.5%	11	3.0%	56	3.6%	0.5718
Atherosclerosis	15	0.8%	3	0.8%	12	0.8%	0.9278
Peripheral arterial disease	6	0.3%	2	0.5%	4	0.3%	0.3737
Hypertension	419	21.8%	75	20.4%	344	22.1%	0.4852
Cerebrovascular disease	21	1.1%	3	0.8%	18	1.2%	0.5736
Depression	148	7.7%	26	7.1%	122	7.8%	0.6249
Obesity	55	2.9%	12	3.3%	43	2.8%	0.6007
Psoriasis severity[a]							0.0001
Moderate–severe	538	28.0%	73	19.9%	465	29.9%	
Number of psoriasis-related outpatient visits[b] during pre-index period							0.0004
0	337	17.5%	42	11.4%	295	19.0%	
1–2	1087	56.5%	238	64.9%	849	54.6%	
3–4	267	13.9%	53	14.4%	214	13.8%	
5+	232	12.1%	34	9.3%	198	12.7%	
Therapeutic class[c] of psoriasis-related medications during pre-index period							
Biologic agents	149	7.8%	16	4.4%	133	8.6%	<0.001
Non-biologic systemic agents	205	10.7%	27	7.4%	178	11.4%	0.002
Topical agents	1671	86.9%	329	89.7%	1342	86.3%	0.09
Number of unique psoriasis-related medications[d] during pre-index period							<0.0001
0	220	11.4%	0	0.0%	220	14.1%	
1–2	860	44.7%	193	52.6%	667	42.9%	
3–4	613	31.9%	133	36.2%	480	30.9%	
5+	230	12.0%	41	11.2%	189	12.2%	

Cohort A: used body-only formulations for psoriasis and switched on the index date to using one drug (calcipotriene/betamethasone dipropionate scalp topical suspension).

Cohort B: used multiple body and scalp formulations for psoriasis (calcipotriene/betamethasone dipropionate scalp topical suspension and another medication). Only patients with more than 90 days of follow-up period were considered.

[a]Moderate–severe psoriasis defined as use of biologics, non-biologic systemic medications, or phototherapy during the pre-index period and/or index date.

[b]Psoriasis-related outpatient visits defined as any outpatient visits with psoriasis diagnosis (ICD-9 code 696.1), more than one record on a single day counted as one visit.

[c]Not mutually exclusive.

[d]Unique psoriasis-related medications identified based on generic drug names.

Table 3. Algorithm for disease severity.

Moderate-to-severe psoriasis	At least one claim for any of the following during pre-index period: Biologic agents: Abatacept, Adalimumab, Alefacept, Basiliximab, Canakinumab, Certolizumab Pegol, Efalizumab, Etanercept, Golimumab, Infliximab, Omalizumab, Tocilizumab, Ustekinumab. Non-biologic systemic medications: Acitretin, Azathioprine, Azathioprine Sodium, Cyclosporine, Cyclosporine, Modified, Hydroxyurea, Isotretinoin, Methotrexate, Methotrexate Sodium, Mycophenolate Mofetil, Mycophenolate Mofetil Hydrochloride, Mycophenolate Sodium, Prednisone, Prednisone, Micronized, Sirolimus, Sulfasalazine, Thioguanine Procedure codes: Photochemotherapy, PUVA
Mild psoriasis	Topical medications Laser treatment UVA/UVB

Results

A total of 1923 patients were identified with at least one prescription for calcipotriene/betamethasone dipropionate topical suspension during the study period from January 1, 2007 to March 31, 2010 [cohort A (single treatment) = 367; cohort B (multiple treatments) = 1556). The median age of patients was ~47 years, with more than half of the patients being females (57.5%). Significantly more females than males used a single treatment to treat their psoriasis (62.9% vs 56.2%, $p = 0.02$). No significant differences in comorbidities were found between study cohorts except for psoriatic arthritis, the rate of which was significantly higher among cohort B as compared to cohort A (3% vs 6.2%, $p = 0.02$). Significantly more patients in cohort B also had severe disease and a higher number of psoriasis-related outpatient visits during the pre-index period (Table 2).

In bivariate analyses, there were no statistically significant differences in the psoriasis-related outpatient visits prior to index date (1.92 ± 4.03 vs 1.87 ± 4.17; $p = 0.84$, Figure 1). During the post-index period (180 days), the mean number of psoriasis-related outpatient visits in cohort A was significantly lower than that in cohort B (1.51 ± 3.91 vs 2.49 ± 6.06, $p = 0.0001$). A lower percentage of patients in cohort A used systemic agents in the post-index period as compared to patients in cohort B (10.9% vs 22.4%, $p < 0.0001$). Mean total healthcare costs were also significantly lower during the post-index period in cohort A ($4013.71 ± $7634.33, median = $1645.48) as compared with cohort B ($5873.19 ± $10,020.64, median = $2865.84, $p < 0.0001$) (Figure 1). While pre-index psoriasis related costs did not differ significantly between the study cohorts, the post-index costs were almost twice among cohort B as compared with cohort A ($1296.92 ± $2859.98; median = $630.95 vs $2634.87 ± $4042.35; median = $1223.92).

The study outcomes were also examined separately among patients with moderate-to-severe psoriasis vs those with mild psoriasis. Among moderate-to-severe psoriasis patients, there were no statistically significant differences in the mean number of psoriasis-related outpatient visits during pre- and post-index periods (4.34 ± 7.9 vs 3.73 ± 7.03; $p = 0.49$ in the pre-period and 3.73 ± 7.03 vs 4.55 ± 9.03; $p = 0.07$ in the post-periods). A lower percentage of patients in cohort A used systemic agents in the post-index period as compared to patients in cohort B (38.4% vs 53.3%, $p < 0.017$). Mean total healthcare costs were also significantly lower during the post-index period in cohort A ($4810.62 ± $5303.06, median = $2579.7) as compared with cohort B ($9672.25 ± $14,680.56, median = $5518.46, $p < 0.001$). Similarly, psoriasis-related costs during the post-index period were significantly lower among cohort A as compared with cohort B ($5043.90 ± $6031.54, median = $2487.65 vs $2657.44 ± $3952.78, median = $881.3). For mild psoriasis patients, all study outcomes except for total healthcare costs were significantly lower among cohort A as compared with cohort B (Tables 4 and 5).

Table 6 describes a summary of regression analyses. Poisson regression analyses indicated that, after controlling for baseline covariates, patients using multiple treatments had 48% (95% CI = 34–63%) more psoriasis-related outpatient visits in the post-index period as compared with those using a single treatment ($p < 0.0001$). The adjusted post-index total healthcare costs were $986 higher in cohort B as compared with cohort A ($p = 0.002$). The adjusted psoriasis-related costs were $999 higher in cohort B as compared with cohort A ($p < 0.0001$). Finally, multiple logistic regression analyses indicated that patients in cohort B had twice the odds of using systemic agents (biologic and non-biologic) in the post-index period as compared to patients in cohort A (OR = 2.31, $p < 0.001$).

Discussion

Medication non-adherence to topical treatments in psoriasis is associated with poor clinical and economic outcomes[12]. The most common patient-reported reasons for poor adherence to topical therapies are low efficacy, time consumption, and poor cosmetic characteristics of topical agents[13]. A growing body of literature supports using

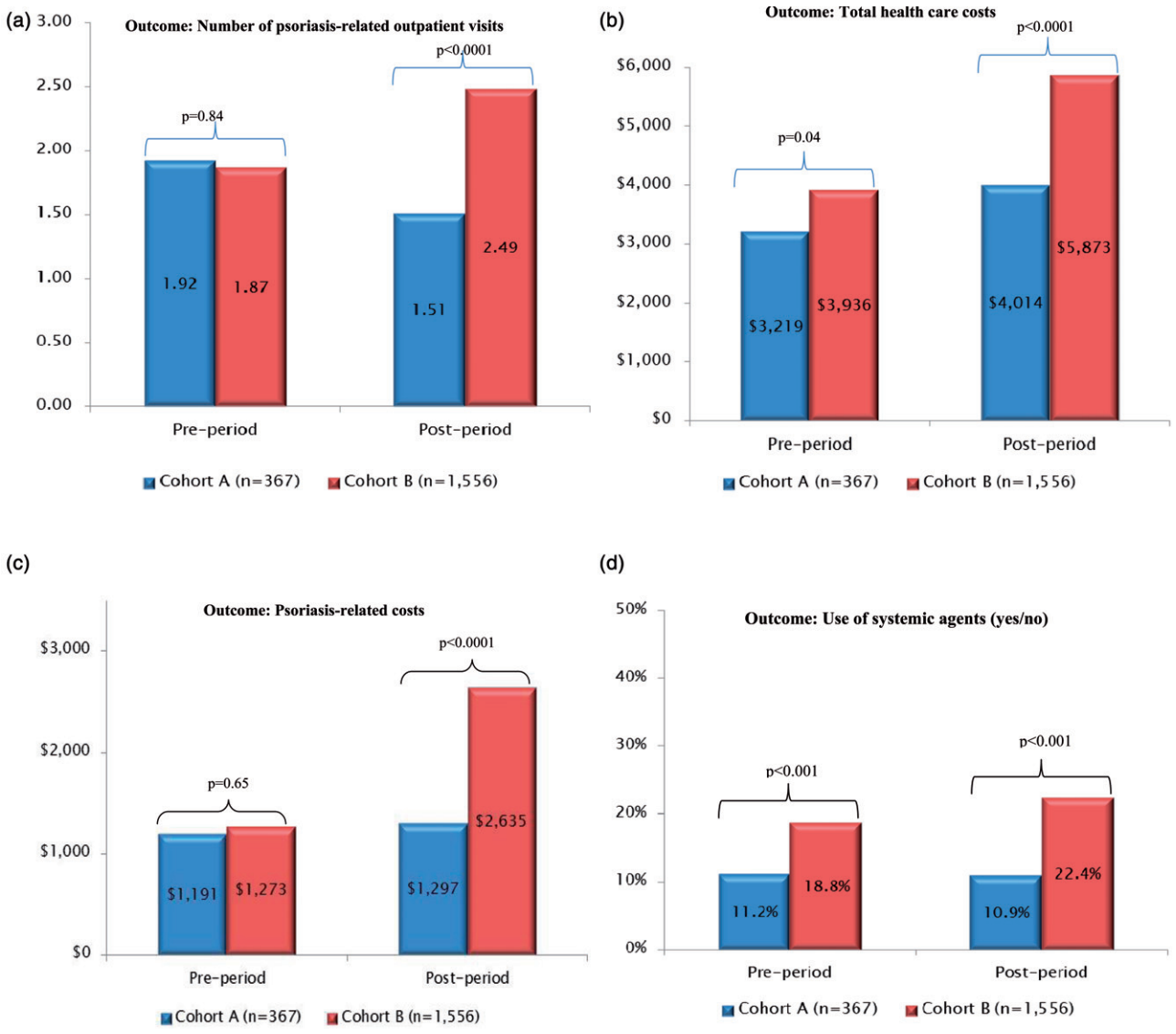

Figure 1. Association between study outcomes and treatment type (bivariate analyses). (a) Association between treatment type and post-index number of psoriasis-related outpatient visits. (b) Association between treatment type and post-index total healthcare costs. (c) Association between treatment type and post-index psoriasis-related costs. (d) Association between treatment type and post-index use of systemic agents. Cohort A: used body-only formulations for psoriasis and switched on the index date to using one drug (calcipotriene/betamethasone scalp topical suspension). Cohort B: used multiple body and scalp formulations for psoriasis (calcipotriene/betamethasone scalp topical suspension and another medication). * *t*-tests were used to study the association between type of treatment and number of psoriasis-related outpatient visits and total healthcare costs in the post-index period. ** Chi-squared test was used to study the association between type of treatment and use of systemic agents in the post-index period.

simplified treatment regimens for improving adherence in chronic skin conditions[12]. For the treatment of scalp psoriasis, where the drug application is particularly cumbersome and the treated areas are visible, a once daily treatment regimen could potentially improve adherence compared with two or more separate applications, which may in turn lead to higher treatment efficacy[14]. Our results suggested there may also be economic advantages of using calcipotriene/betamethasone suspension in psoriasis management, particularly involving psoriasis of both body and scalp. These results are consistent with data reported by Devaux *et al.*[15]. Further studies are required to examine medication adherence rates among the study cohorts and its impact on healthcare utilization and costs.

In this study, more females were managed on calcipotriene/betamethasone topical suspension alone (cohort A) than with multiple products for body and scalp psoriasis (cohort B). Psoriasis patients who were switched to calcipotriene/betamethasone topical suspension alone had a lower number of psoriasis-related outpatient visits in the pre-index period than those managed with multiple products. In addition, these patients appeared to have milder

Table 4. Study outcomes by disease severity (bivariate analyses) for mild psoriasis.

	Cohort A ($n=294$)		Cohort B ($n=1091$)		p-Value	
	Pre-index	Post-index	Pre-index	Post-index	Cohort A vs Cohort B (pre-index outcomes)	Cohort A vs Cohort B (post-index outcomes)
Total number of psoriasis-related outpatient visits						
Mean	1.32	1.12	1.08	1.61	0.0307	0.0256
SD	1.77	3.10	1.32	3.90		
Median	1	0	1	1		
Use of biologics or non-biologic systemic medications					–	0.0040
n	0	12	0	101		
%	0.0%	4.1%	0.0%	9.3%		
Total overall costs						
Mean	$2686.98	$3815.84	$2804.41	$4253.98	0.7426	0.3931
SD	$5645.23	$8105.30	$5384.67	$6536.43		
Median	$1315.34	$1564.19	$1217.26	$2238.54		
Total psoriasis-related costs						
Mean	$660.04	$959.10	$477.20	$1608.10	0.2087	<0.0001
SD	$2368.50	$2408.79	$1476.72	$2072.26		
Median	$298.71	$487.02	$141.11	$1073.87		

Table 5. Study outcomes by disease severity (bivariate analyses) for moderate-to-severe psoriasis.

	Cohort A ($n=73$)		Cohort B ($n=465$)		p-Value	
	Pre-index	Post-index	Pre-index	Post-index	Cohort A vs Cohort B (pre-index outcomes)	Cohort A vs Cohort B (post-index outcomes)
Total number of psoriasis-related outpatient visits						
Mean	4.34	3.08	3.73	4.55	0.4958	0.0733
SD	7.90	5.96	7.03	9.03		
Median	1	1	1	1		
Use of biologics or non-biologic systemic medications					0.2781	0.0173
n	41	28	292	248		
%	56.2%	38.4%	62.8%	53.3%		
Total overall costs						
Mean	$5361.20	$4810.62	$6591.37	$9672.25	0.0992	<0.0001
SD	$5310.20	$5303.06	$8707.61	$14,680.56		
Median	$3209.09	$2579.70	$3782.98	$5518.46		
Total psoriasis-related costs						
Mean	$3330.09	$2657.44	$3141.73	$5043.90	0.7296	<0.0001
SD	$4873.17	$3952.78	$4235.17	$6031.54		
Median	$820.39	$881.30	$1237.65	$2487.65		

psoriasis (based on the use of systemic therapies in the pre-index period) than patients managed by multiple products.

Although it is possible that patients with milder psoriasis can be managed on one product and that more severe disease requires the use of multiple therapies, nonetheless patients using one product required less systemic agents and had fewer psoriasis-related outpatient visits, perhaps indicating better management of disease following the treatment with calcipotriene/betamethasone topical suspension alone. In order to examine the potential impact of severity on study outcomes, we ran the outcomes analyses stratified by disease severity and also added disease severity as an independent variable in the regression models. A higher percentage of patients with more severe disease used multiple agents to manage their psoriasis as compared to those with milder disease (30% vs 20%). However, more interestingly, among patients with severe psoriasis, those who switched to calcipotriene/betamethasone topical suspension alone had significantly lower use of systemic agents in the post-index period as compared to those who continued to use multiple products. Although not statistically significant, the mean number of psoriasis-related outpatient visits was also lower in the cohort that used a single agent to treat their body and scalp psoriasis. Total and psoriasis-related costs remained higher for those who used multiple products.

Table 6. Estimates from regression models.

Outcome	Parameter estimates	Standard error	95% CI		Chi-square	*p*-Value
Number of psoriasis-related outpatient visits	0.3924	0.0485	0.2949	0.486	64.18	<0.0001
Total healthcare costs	0.1988	0.0628	0.0757	0.322	10.01	0.0016
Psoriasis-related healthcare costs	0.553	0.0603	0.4347	0.6712	84.02	<0.0001
Use of systemic agents	0.8391	0.2119	0.4239	1.2544	15.69	<0.0001

Primary predictor variable: Treatment Type - Patients who used multiple psoriasis medications (cohort B) [Reference: patients who used calcipotriene/betamethasone topical suspension only (cohort A)].
Other predictions in the models included: gender, age groups, plan type, employment status, geographic status, Psoriatic arthritis, Diabetes, Heart diseases, Atherosclerosis, Peripheral arterial disease, Hypertension, Cerebrovascular disease, Depression, Obesity, Severity, Unique psoriasis-related medications (therapeutic class) during pre-index period, number of psoriasis-related outpatient visits during pre-index period, number of psoriasis medications on index date, Pre-index costs.
Full regression models available upon request.

Similar trends were seen among patients who had mild psoriasis. Further studies with a robust indicator for disease severity would be needed to examine the impact of disease severity on prescription patterns in patients with both body and scalp psoriasis.

This study, however, should be considered as an initial exploration of these issues, and caution should be exercised in interpreting these findings due to a number of study limitations. First, the observational study design does not permit causal inference of our results. Second, the study has inherent limitations associated with using the retrospective claims data, thus limiting randomization of the study cohorts. Due to a lack of clinical measures, the study used a proxy to ascertain severity of psoriasis in the study population. A clinical measure may be more robust in identifying psoriasis severity. Finally, since the study used claims data, any untreated scalp psoriasis or patients who used over-the-counter (OTC) scalp psoriasis medications were not captured in the analyses.

Conclusions

In this retrospective claims data analyses, patients using calcipotriene/betamethasone topical suspension alone had significantly lower overall and psoriasis-related healthcare costs, needed fewer psoriasis-related outpatient visits, and used less systemic agents during the post-index period as compared to patients who used multiple psoriasis medications to manage their psoriasis. The analyses controlled for baseline demographic and clinical covariates including pre-index disease severity (ascertained by the use of systemic agents during the pre-index period) in the multivariate regression models. A significantly lower healthcare utilization in the follow-up period may have resulted in the overall reduction of healthcare costs among these patients. This study suggests that using only one product suitable for both body and scalp psoriasis (such as calcipotriene/betamethasone topical suspension) could be a simpler and more economical regimen for psoriasis patients.

Transparency

Declaration of funding
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Declaration of financial/other relationships
Dr Feldman is a consultant for LEO Pharma, Inc. Outcomes, Inc. provided editorial support. Dr Levi is an employee of Leo Pharma. Mr Pathak and Ms Kakatkar are paid consultants at Outcomes, Inc. Dr Balkrishnan is Principal Consultant to Outcomes, Inc. and provided research support for this study. JME Peer Reviewers on this manuscript have no relevant financial or other relationships to disclose.

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