Depression- and anxiety-related healthcare costs associated with treatment patterns among patients with psoriasis

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INTRODUCTION

Moderate-to-severe psoriasis is managed with systemic agents including conventional systemic agents (CSA), such as methotrexate, cyclosporine and acitretin, and biologic agents such as tumor necrosis factor inhibitors and ustekinumab (TNFi/UST) when CSA are ineffective. Failure of these treatments may trigger depression and anxiety. The economic burden of mental health disorders among patients with psoriasis has not been well studied.

OBJECTIVE

To assess depression- and anxiety-related healthcare costs by treatment patterns among patients with psoriasis initiating a CSA.

METHODS

Database: Quebec's provincial health administrative database from January 01, 1997 until December 31, 2015.

Study population: Adult patients with psoriasis who initiated a CSA and did not have a depression or anxiety diagnosis in the previous year (January 2002 – December 2013).

Follow-up: Two years and divided in monthly intervals.

Exposure to systemic agents: Seven exposure groups (see Figure 1) were assessed at each monthly interval.

Costs: Healthcare systemic perspective. Costs included those of antidepressants, benzodiazepine, physician outpatient and emergency department encounters, and hospitalization for depression and anxiety. Costs were converted to 2020 Canadian $.

STATISTICAL ANALYSIS

Sequence analysis: We measured the similarity between individuals' treatment trajectories by using the Dynamic Hamming Measure which assigns time-varying weights to the number of operations needed to allow two trajectories to become strictly similar. We generated a dissimilarity matrix that minimized the total weight of transforming each individual's trajectory into every other individuals' trajectories by summing the transformation weight of each monthly interval in the 24-month trajectory.

Hierarchical cluster analysis: We used Ward's minimum variance criterion on the dissimilarity matrix to create homogeneous clusters of patients with similar trajectories.

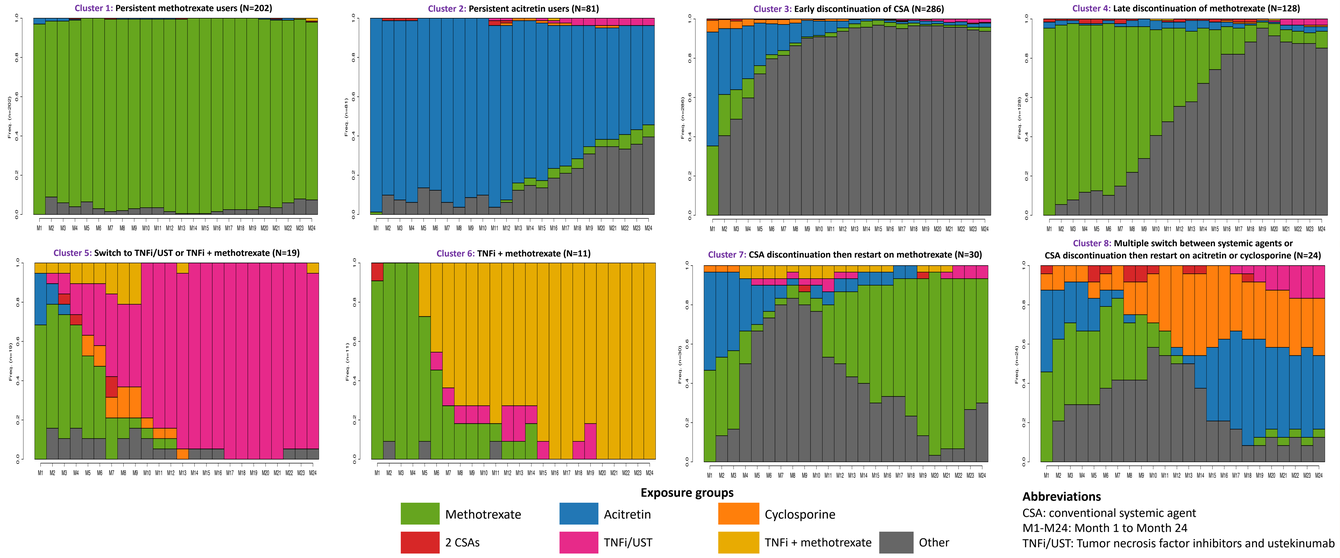
Cost analysis: We used two-part models determine the adjusted cost ratios between the different trajectories while accounting for excess zero costs. The first part was a multivariate logistic regression modeling the probability of having a nonzero cost, and the second part was a generalized linear model estimating cost values with a gamma distribution and log link function conditional on having a nonzero cost. We used the bootstrap resampling method with 10,000 iterations to estimate the predicted mean annual cost ratios per patient between the trajectories and their 95% confidence intervals (CI).

RESULTS

Table 1: Baseline Characteristics

Characteristics	N (%)
Male sex	399 (51.1)
Mean Age (SD)	61.0 (15.1)
Urban area (vs rural)	619 (79.3)
Charlson Comorbidity index	
0	453 (58.0)
1	199 (25.5)
≥2	129 (16.5)
Psoriatic arthritis	122 (15.6)
Rheumatoid arthritis	105 (13.4)
Ankylosing spondylitis	12 (1.5)
Mental health disorders other than dep/anxiety	61 (7.8)
Phototherapy	129 (16.5)

Figure 1: Chronograms describing the eight treatment trajectories for systemic agents



- Our study included 781 patients initiating a CSA (mean age 61.0±15.1 years 51.1% males) [Table 1].
- Using sequence and hierarchical analysis, we identified 8 trajectories of systemic agent use among patients with psoriasis initiating on CSA [Figure 1].
- The trajectories included patients persistent to their initial CSA [clusters 1 and 2], patients who discontinued their initial CSA [Clusters 3 and 4], patients who switched to TNFi/UST or who received a combination of TNFi + methotrexate [Clusters 5 and 6] and those who discontinued their initial CSA then restart a CSA or had multiple switches between systemic agents [Clusters 7 and 8].
- Cluster 8 is the most heterogeneous because it included patients discontinuing their initial CSA then restarting on acitretin or cyclosporine and patients with multiple switches.

Table 2: Unadjusted annual total cost for depression and anxiety in each trajectory

	N of patients with healthcare costs	Total costs in Canadian $
All study sample	165	44,593
Clusters		
Persistent MTX users	43	13,272
Persistent ACI users	13	7,697
Early discontinuation of CSA	60	11,402
Late discontinuation of MTX	26	2,558
Switch to TNFi/UST	0	0
TNFi + MTX	5	915
CSA discontinuation then restart on MTX	7	546
Multiple switch between systemic agents or CSA discontinuation then restart o ACI or CYC	11	8,203

Table 3: Adjusted annual mean cost per patient in each trajectory

	Mean costs in Canadian $ (SD)	Cost ratio (95% CI)
All study sample	60 (175)	–
Clusters		
Persistent MTX users	40 (88)	reference
Persistent ACI users	54 (72)	1.40 (0.85, 1.98)
Early discontinuation of CSA	47 (72)	1.22 (0.82, 1.66)
Late discontinuation of MTX	44 (103)	1.14 (0.66, 1.81)
Switch to TNFi/UST	–	–
TNFi + MTX	140 (140)	3.63 (1.47, 5.97)
CSA discontinuation then restart on MTX	19 (18)	0.49 (0.29, 0.71)
Multiple switch between systemic agents or CSA discontinuation then restart o ACI or CYC	513 (755)	13.30 (5.76, 22.47)

Abbreviations: ACI: Acitretin; CI: Confidence interval; CSA: conventional systemic agent, CYC: Cyclosporine; MTX: Methotrexate; SD: Standard deviation; TNFi/UST: Tumor necrosis factor inhibitors and ustekinumab

- 165 (21.1%) patients had at least one medical cost associated with treatment or healthcare service use for depression or anxiety, with a total annual cost of $44,593 [Table 2].
- The adjusted mean annual cost per patients estimated from the two-part model was 60$ (±175$) [Table 3].
- Compared to persistent methotrexate users, patients with a combination of TNFi + methotrexate and patients with multiple switches between systemic agents or CSA discontinuation then restart on acitretin or cyclosporine had higher depression- and anxiety-related healthcare costs. Patients with a CSA discontinuation then restarting on methotrexate had lower costs [Table 3].

CONCLUSION

1) Using a novel methodological approach, eight treatment trajectories were identified among patients with psoriasis initiating a CSA.

2) Among all treatment trajectories, patients with a combination of TNFi and methotrexate, patients with multiple switches between systemic agents and patients discontinuing their CSA then restarting on acitretin or cyclosporine had the highest depression and anxiety related-healthcare costs

LIMITATIONS

- Some clusters included a small number of patients. Care should be made while interpreting the results.
- With cluster analysis, individual trajectories can be included in a cluster in which they do not belong.
- Healthcare costs may have been underestimated because we did not account for the cost of psychotherapy.

ACKNOWLEDGMENTS

Fonds de recherche Santé Québec

RQRM Réseau québécois de recherche sur les médicaments