The Economic and Patient Burden of Mild-to-Moderate Atopic Dermatitis in Pediatric Patients in Sweden

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BACKGROUND

- Atopic dermatitis (AD) is a relapsing chronic inflammatory skin condition characterized by pruritus and eczematous lesions, affecting 20% of children and 2–8% of adults. [1]
- There is currently no cure for AD, management of the disease targets symptoms to achieve long-term control, which generates ongoing healthcare costs. [2]
- Comorbidities appear to be a major driver of higher costs, as does hospitalization and medical resource utilization. [3]
- Given the recent increases in reported prevalence of AD [1], and limited economic studies [4], particularly focused on mild-to-moderate disease, analyses are needed for patient characteristics, disease burden, and outcomes to inform health economic evaluations.

OBJECTIVE

- To describe and compare patient characteristics, treatment patterns and economic and clinical burden for patients with mild-to-moderate AD in Sweden versus a matched non-AD control group.

METHODS

- This study used aggregated register data from the Swedish national patient register which contains all in- and out-patient visits in secondary care and from the prescribed drug register (PDR) which includes all prescriptions dispensed at pharmacies, originating from both primary and secondary care.
- Pediatric (0-14 years, inclusive) mild-to-moderate AD (pM2M-AD) patients with a topical corticosteroids (TCS) dispensation between 2009-2017 were selected from the PDR. Patients with a diagnosis of other skin diseases or concomitant use of moderate or potent corticosteroids or antipsoriasics or salicylates were excluded. [5-6]
- The first TCS dispensation was defined as patients' index date and patients were defined as severe (and hence excluded from the study population) if they had been dispensed any topical calcineurin inhibitor (TCI), systemic treatment (ATC-codes: D11, H02, J04) or if they had a secondary care visit with a main diagnosis of AD prior to index. pM2M-AD patients were matched 1:1 on age and gender to non-AD controls.
- Elixhauser index (a comorbidity score index) and the prevalence of asthma and rhinitis were assessed at index. The cumulative incidence of asthma was assessed after index.
- Healthcare resource use (HRU), including secondary-care visits (dermatology + other), number of dispensed drugs and associated costs were calculated each year following index (2018 Euros).
- Each outcome was compared between pM2M-AD patients and non-AD controls, evaluated at α = 0.05 using t-test (continuous variables) and Chi-square test (categorical variables).
- This study was approved by the Swedish Ethical Review Board (2019-02986).

RESULTS

Patient characteristics & comorbidities

- 59,134 pediatric patients (52.3% male) were included in each study cohort. Average age was 4.8 years at index date and mean follow-up was 4.3 years (**Table 1**).
- The comorbidity profile in the two groups was similar at index, but after index the pM2M-AD group had a 97.3% increased risk of developing asthma compared to the non-AD controls (**Figure 1**).

Health care resource utilization & costs

- In the index year, the incidence rate ratio of secondary care visits between the pM2M-AD patients and non-AD controls was 1.50. In subsequent years, pM2M-AD patients continued to have a higher HRU in terms of secondary care visits (**Figure 2**) and number of dispensed drugs (Data not shown).
- In total, the pM2M-AD patients had 24,688 [2,184] more out-patient [in-patient] visits than controls after 1 year and 78,784 [4,008] after 5 years.
- Total direct health-care costs were 350 € higher per patient in the pM2M-AD cohort compared to the non-AD the first year and continued to increase in subsequent years (**Figure 3**).
- Total direct medical cost of pM2M-AD patients was €20.7 and €54.3 million higher than controls after 1 and 5 years, respectively.
- Persistence with topical corticosteroids in the pM2M-AD cohort was low and only 33.74% filled at least one prescription during the year after index (**Figure 4**). Treatment with TCIs and systemic corticosteroids was also low following index.
- All statistics were statistically significant.

Limitations

- The data used in this study was provided on a patient level. However, the granularity of certain variables was limited in order to assure the anonymity of the individual, which limits the extent of detailed information that could be extracted from the variables.
- The first contact with the health care services in Sweden for non-acute diseases such as atopic dermatitis is in primary care. Data on primary care contacts were only available through the prescription the patient received from the general practitioner in the primary care setting.
- Another limitation for this study is the inability to verify the accuracy of the inclusion and exclusion algorithm for the AD population.

	pM2M-AD cohort		non-AD cohort		Mean difference (p-value)
Variable description	Number of patients	Percentage	Number of patients	Percentage	
Gender					
Female	28 233	47.74%	28 233	47.74%	
Male	30 901	52.26%	30 901	52.26%	
Age					
0-4	35 931	60.76%	35 931	60.76%	
5-9	13 879	23.47%	13 879	23.47%	
10-14	9 324	15.77%	9 324	15.77%	
Atopic march comorbidities					
Asthma	1 105	1.87%	768	1.30%	0.57% (0.00)
Rhinitis	205	0.35%	127	0.21%	0.13% (0.00)
Elixhauser index					
Elixhauser index score <0	251	0.42%	164	0.28%	0.15% (0.00)
Elixhauser index score 0	56 094	94.86%	56 935	96.28%	-1.42% (0.00)
Elixhauser index score 1	2	0.00%	2	0.00%	0.00% (1.00)
Elixhauser index score 2	9	0.02%	13	0.02%	-0.01% (0.39)
Elixhauser index score 2+	2 778	4.70%	2 020	3.42%	1.28% (0.00)

The pM2M-AD cohort and the non-AD cohort were matched on age and gender. Both cohorts included 59,134 patients.

Figure 1: Cumulative incidence of asthma in the pM2M-AD & non-AD cohort

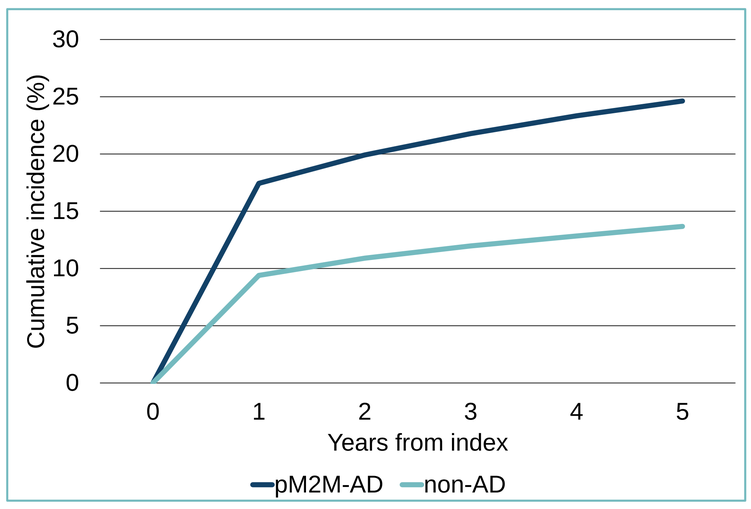
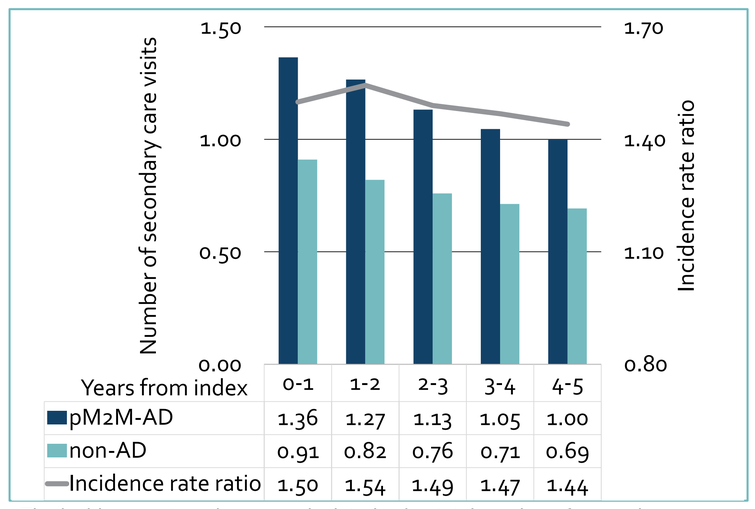


Figure 2: Average number of secondary care visits per year and incidence rate ratio



Years from index	0-1	1-2	2-3	3-4	4-5
pM2M-AD	1.36	1.27	1.13	1.05	1.00
non-AD	0.91	0.82	0.76	0.71	0.69
Incidence rate ratio	1.50	1.54	1.49	1.47	1.44

The incidence rate ratio were calculated using total number of secondary care visits, including hospitalizations.

Figure 3: Cumulative difference in costs per patient between the pM2M-AD and non-AD cohort

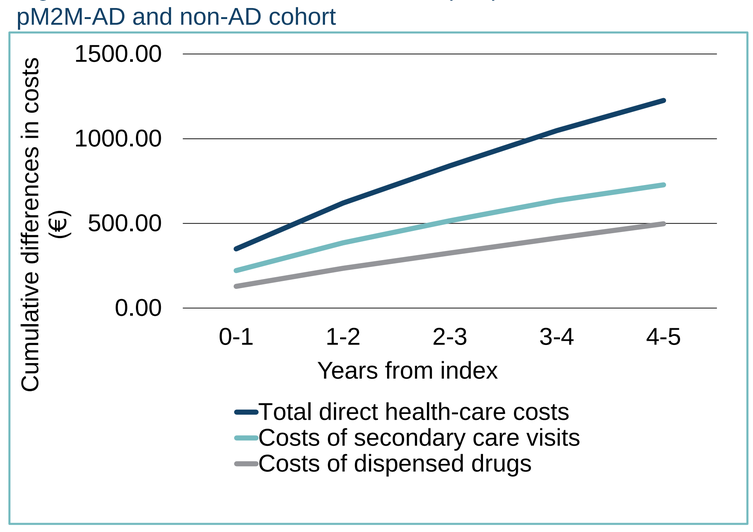
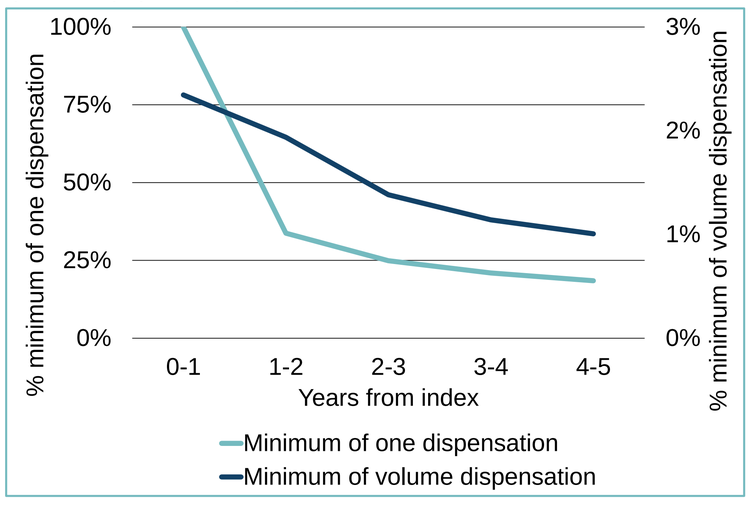


Figure 4: Treatment persistence with topical corticosteroids, pediatric population (0-14 years)



Treatment persistence was defined using two methods, either at least one filled dispensation or dispensation of at least 360 grams per year

CONCLUSIONS

- In this large retrospective cohort study of pediatric mild-to-moderate patients with AD, considerable patient and economic burden were identified, highlighting the need for novel, effective therapies. Given the high prevalence of pM2M-AD, the health resource use and economic burden for the health system is substantial.
- The comorbidity profile at study inclusion was low in both cohorts but pM2M-AD patients had a higher risk of developing asthma post index. Post index date, health care resource use, and consequently direct medical costs, were higher in pM2M-AD patients compared to non-AD matched controls.
- Persistence with topical corticosteroids in the pM2M-AD patients was low in the years after index date. This may possibly signal that symptoms decline after treatment initiation. However, high, although declining, HRU seems to indicate that burden of atopic dermatitis continues to be high for several years after onset of the disease.
- This study excluded patients who initiated treatment with any TCI which likely led to the exclusion of some moderate patients. Moreover, data on primary care visits were not available in this study. Taking into account these limitations, the estimated burden of atopic dermatitis in this study may be a conservative estimate.

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