



Healthcare Demographics and Specialty Variation in Atopic Dermatitis: A Retrospective Cohort Analysis

David W Brodell*, Julie Ryan, Ted Ryser and Lisa A Beck

Abstract

Importance: Atopic dermatitis (AD) is a common chronic skin disease with significant comorbidities and a dramatic impact on quality of life. Despite this, there is little published information about healthcare utilization patterns for adults and children with AD.

Objective: To examine healthcare utilization for patients with AD who are cared for in a regional academic medical center.

Design: Retrospective cohort analysis.

Setting: A mixed urban, suburban and rural catchment in the Western NY region.

Participants: All patients seeking medical care for their AD from March of 2011 to September 2015.

Exposure(s) for observational studies: Active AD.

Main Measure(s): Age, sex, race, ethnicity, (demographics) and medical specialty (healthcare utilization). Patients were stratified and analyzed by age group.

Results: Adult AD patients (n=767) accounted for 38.2% of the AD population seeking healthcare in our system with a mean age of 42.7 ± 18.7 years. Among adults, females were seen more commonly than males (65.3% vs. 34.7%). In contrast, both genders were equally represented in the pediatric population (<18 years, n=1,242). The racial and ethnic distribution in the total population was as follows: 49.3% African American, 36.3% Caucasian, and 3.2% Asian, 11.2% other and 0.3% Hispanic. African-Americans accounted for the largest proportion of the pediatric population (<18 years; 58.1%), which was not the case in the adult population (>18 years; 35.2%). Dermatologists cared for the majority of patients (35.2%), followed by pediatricians (25.7%) and family medicine physicians (10.1%). African-Americans were nearly 3 times more likely than Caucasians to visit primary care physicians for their initial AD management ($p < 0.001$).

Conclusions and relevance: This study demonstrates that adult AD patients account for over a third of all AD visits in a regional academic medical center. Dermatologists managed the greatest number of AD patients, and the pediatric population was notable for a greater proportion of African American patients relative to the adults. This disparity between the proportions of African Americans

in pediatric vs adult patients may reflect reduced access to care for adults. Alternatively, African-Americans may simply have a greater prevalence of pediatric onset AD coupled with greater disease resolution prior to adulthood. African-Americans also appear to seek attention from primary care physicians more frequently than Caucasians.

Keywords: Atopic dermatitis; Atopic eczema; Healthcare demographics; Hygiene hypothesis; Topical corticosteroids; Systemic treatment

Background

The demographics of childhood and adult atopic dermatitis (AD) patients and their providers have not been carefully examined in the American healthcare system. To better understand health care utilization within a mid-sized academic medical center that serves surrounding urban, suburban and rural communities we undertook this retrospective study [1]. It is important to understand healthcare utilization patterns for common disorders such as AD that affects 7-10% of US adults and approximately 17% of children [2,3].

Methods

The University of Rochester Medical Centers (URMC) e-Record database (Epic Systems Corp., Verona, WI) was used to identify AD patients seen from March 2011 through September 2015. During this time, the URMC network provided care to approximately 930,000 patients. Active AD was identified using ICD-9 diagnostic code 691.8 for an initial visit (n=3,284). This analysis was limited to patients who were prescribed either topical corticosteroid (TCS) or topical calcineurin inhibitor (TCI) to improve diagnostic validity (n=2,046). AD records with a psoriasis code (696) appended were excluded (n=2,009). From this refined AD population, the demographic data and patterns of health care utilization were collected. Each record represents the first visit at one of 156 unique clinical care locations, including outpatient clinics, hospitals and emergency rooms by one of 327 health care providers (MD, DO, NP) representing 55 medical and pediatric specialties.

A clinical data query tool (i2b2) was used to select patient information from e-Record and Flow cast (GE Healthcare, Buckinghamshire, United Kingdom) at URMC sites. Differences in demographics among age groups were assessed using the chi-square test. Logistic regression was used to determine the tendency of specific groups to use primary vs. specialty care for the first visit in 1,825 records. The former included Internal Medicine, Family Medicine, Pediatrics, Geriatrics, Medicine-Pediatrics, General Preventive Medicine, and the latter included General Dermatology, Pediatric Dermatology, Allergy and Immunology, and Pediatric Allergy. All other specialties were dropped for this analysis (n=184). We controlled for age, sex, ethnicity, and marital status. All analyses were performed using Stata SE software (StataCorp, College Station, TX). This study was approved by the IRB at URMC.

Results

Of 2,009 eligible AD records, 61.8% of patients were less than 18 years old. In the entire AD population, the racial distribution was

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49.3% African American, 36.3% Caucasian, and 3.2% Asian, and 11.2% other. The majority of patients were non-Hispanic (99.7%, Table 1).

Most health care interactions were in outpatient clinics (94.6%) with only 1.9% of visits occurring in the ED and 1.3% resulting in hospitalization. Dermatologists cared for the majority of patients (35.2%), followed by general pediatricians (25.7%) and family medicine physicians (10.1%) (Table 2). The patient: provider ratios were highest for pediatric allergy at 42.0 followed closely by dermatology at 32.2 and pediatrics at 12.9 (Table 2).

In the pediatric population (7.4 ± 4.3 years [mean ± SD]), 37.8% sought healthcare from general pediatricians, 32.4% from general dermatologists and 7.3% from family medicine physicians (Table 3). Although males represented exactly half of the pediatric population, males were in the minority (34.7%) in the adult group (Table 3). African Americans were over-represented in the pediatric population (58.1%).

In the adult AD population the mean age was 43.6 ± 18.4 years. Thirty-seven percent were managed by dermatology, 22.2% by internal medicine, and 14.6% by family medicine. There was greater percentage of Caucasians in the adult population (55.4%) compared to the pediatrics cohort (Table 3).

Using logistic regression with physician specialty as the dependent variable (primary vs. specialist care), we found that African-Americans were much more likely to see primary care physicians than Caucasians (Odds ratio of 2.99; p<0.001, 95% CI 2.37-3.77) (Table 4).

Discussion

The demographics and healthcare utilization of patients with active AD were characterized at an academic medical institution in the Greater Rochester, NY region that provides healthcare for approximately 1 million people [4]. Most encounters occurred in outpatient clinic settings, with the pediatric population accounting for the majority of visits (61.8%). The adult population had a predominance of women compared to the pediatric cohort (65.3% vs. 50.0%, respectively). A similar sex-difference has previously been reported in hospitalized asthmatic subjects [5].

AD healthcare utilization by African Americans was higher (49.3%) than their representation in the 2010 census distribution (15.2%) for Monroe county strongly suggesting that African Americans have a higher prevalence of AD or more commonly obtain their healthcare from an academic institution than Caucasians [6]. This observation is consistent with the 2003 National Survey of Children’s Health which concluded that African Americans have an increased risk of AD [7]. In contrast, the 2010 National Health Interview Survey suggested that AD was more common in Caucasians (10.5% vs. 7.7%, respectively) [8]. Although there was an over-representation of African-American AD patients seeking care from this regional medical center, they were three times more likely to see primary care physicians than Caucasians. Management by less experienced physicians may reflect disparities in access to health care.

In terms of ethnicity, we observed that Hispanics sought care for their AD at a lower rate than would be expected based on the Monroe County Census (0.3% vs. 7.3%, respectively) [6]. This may reflect lower AD susceptibility as Silverberg et al., observed that adults of Hispanic origin had lower rates of eczema than non-Hispanics (6.0% vs. 10.8%, respectively) [8].

The majority of AD patients see dermatologists. On average dermatologist cared for a larger number of AD patients than pediatricians, internists or family medicine physicians although pediatric allergists had the highest AD patient load (42.0 patients/provider), which may have largely reflected the fact that URMC network had only two pediatric allergists during the study period. Nevertheless, AD patients appear to recognize dermatologists and pediatric allergists as the healthcare providers with the greatest expertise.

This study has several limitations. The findings may not be universally generalizable as they reflect biases related to the population/healthcare system studied, regional climate, and lifestyle/health habits. As with many other insurance-based or electronic record-based studies, our study relied on the accuracy of diagnostic coding and therefore may have underestimated the number of AD patients seeking care at URMC sites. The concern would be that physicians may have used the AD ICD-9 code, 691.8, for other eczematous conditions and this might be of greater concern for non-specialists.

Table 1: Demographics and Utilization of Healthcare by 2,009 AD subjects within the URMC Network.

Demographics	Cases N (%)
Age	
<5	318 (15.8%)
5-11	666 (33.2%)
12-17	258 (12.8%)
18-50	466 (23.2%)
50-64	195 (9.7%)
>64	106 (5.3%)
Sex	
Male	1,122 (55.8%)
Female	887 (44.2%)
Race	
White	729 (36.3%)
African American	991 (49.3%)
Asian	64 (3.2%)
Other	225 (11.2%)
Ethnicity	
Hispanic	7 (0.3%)
Non-Hispanic	2,002 (99.7%)
Visit type	
Emergency Room	39 (1.9%)
Inpatient	26 (1.3%)
Outpatient	1,901 (94.6%)

Table 2: Top 10 Medical Specialties AD patients Visit for their Healthcare.

Specialty	Number of AD cases (%)	Number of Providers	Patients/ Provider
Dermatology	708 (35.2%)	22	32.2
Pediatrics	516 (25.7%)	40	12.9
Family Medicine	203 (10.1%)	42	4.8
Internal Medicine	170 (8.5%)	62	2.7
Medicine-Pediatrics	92 (4.6%)	19	4.8
Pediatric Allergy	84 (4.2%)	2	42.0
Pediatric Dermatology	41 (2.0%)	3	13.7
Emergency Medicine	24 (1.2%)	18	1.3
Psychiatry	23 (1.1%)	11	2.1
OBGYN	23 (1.1%)	21	1.1

Table 3: Demographics of the Pediatric versus Adult AD populations.

	<18 years (n = 1,242)	≥ 18 years (n = 767)	p
Mean Age (± SD)	7.2 (4.0)	42.7 (18.7)	<0.001
Specialty			
n (%)			<0.001
Dermatology	403 (32.4)	284 (37.0)	
Pediatrics	470 (37.8)	46 (4.4)	
Internal Medicine	0 (0.0)	170 (22.2)	
Family Medicine	91 (7.3)	112 (14.6)	
Sex			
n (%)			<0.001
Male	621 (50.0)	266 (34.7)	
Female	621 (50.0)	501 (65.3)	
Race			
n (%)			<0.001
Asian	45 (3.6)	19 (2.5)	
African American	721 (58.1)	270 (35.2)	
White	304 (24.5)	425 (55.4)	
Other	172 (13.8)	53 (6.9)	

Table 4: Primary vs Specialty Care for AD management.

	OR	95% CI		P> z
Race (vs Caucasian)				
Black	2.78	2.21	3.51	<0.05
Other	1.32	0.98	1.79	0.07
Hispanic (vs non-Hispanic)				
Hispanic	0.80	0.17	3.72	0.78
Age (vs <18)				
>17	1.12	0.88	1.42	0.35
Sex (vs female)				
Male	1.03	0.85	1.25	0.10
Marital Status (vs Single)				
Married	2.02	1.40	2.89	0.82
Divorced	3.40	1.58	7.30	0.08
OR, odds ratio; CI confidence interval				
Bold values are statistically significant (<0.05)				

Conclusion

This study confirmed that dermatologists see more AD patients than other providers. As expected, pediatric AD patients accounted for the majority of visits. Somewhat surprisingly, African-Americans were more likely to visit primary care physicians than Caucasians. The unusually high percentage of African American patients in the pediatric cohort may reflect higher disease prevalence or greater disease severity in this population. In contrast the reduced percentage of African American AD patients in the adult population might reflect greater treatment success, higher rates of disease remission or reduced access to care. A prospective, longitudinal study to assess AD natural history and disease severity in different races and ethnicities is needed. Future studies need to address the ability of different health care providers to successfully manage AD.

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Author Attribution

David Brodell designed the proposed study, wrote the first draft of this manuscript and carried out data analysis. Lisa Beck designed the proposed study, reviewed/edited multiple drafts and approved the content of the final draft. Ted Ryser worked with the IRB for study approval and critically revised the manuscript. Julie Ryan reviewed/edited multiple drafts and refined/approved the statistical analysis.

Conflict of Interest

David Brodell, Ted Ryser, and Julie Ryan have no conflicts of interest. Lisa Beck has been a consultant for Abbvie, Array Biopharma, Celgene, Hoffman-LaRoche, Genentech, Janssen, Regeneron, Novartis, Sanofi and Unilever.

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References

- Schram ME, Tedja AM, Spijker R, Bos JD, Williams HC, et al. (2010) Is there a rural/urban gradient in the prevalence of eczema? A systematic review. *Br J Dermatol* 162: 964-973.
- Mortz CG, Andersen KE, Dellgren C, Barington T, Bindslev-Jensen C (2015) Atopic dermatitis from adolescence to adulthood in the TOACS cohort: prevalence, persistence and comorbidities. *Allergy* 70: 836-845.
- Silverberg JI (2015) Association between adult atopic dermatitis, cardiovascular disease, and increased heart attacks in three population-based studies. *Allergy* 70:1300-1308.
- Crump R, Eusepi S, Moench E (2016) Federal Reserve Bank of New York Staff Reports. Federal Reserve Bank of New York website.
- Lin RY, Ji R, Liao W (2013) Age dependent sex disproportion in US asthma hospitalization rates, 2000-2010. *Ann Allergy, Asthma Immunol* 111: 176-181.
- David Brodell (2016) US Census Bureau 2010 Census Summary File 1; Table QT-P3.
- Shaw TE, Currie GP, Koudelka CW, Simpson EL (2011) Eczema prevalence in the United States: data from the 2003 National Survey of Children's Health. *J Invest Dermatol* 131: 67-73.
- Silverberg JI, Hanifin JM (2013) Adult eczema prevalence and associations with asthma and other health and demographic factors: A US population-based study. *J Allergy Clin Immunol* 132: 1132-1138.

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