Burden of Illness in Adults with Atopic Dermatitis: Analysis of National Health and Wellness Survey Data from France, Germany, Italy, Spain, and the UK

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Presented at the European Academy of Allergy and Clinical Immunology (EAACI), Helsinki, Finland, June 17–21, 2017
This study was funded by Sanofi and Regeneron Pharmaceuticals, Inc.
Author disclosures

- Laurent Eckert and Puneet Mahajan are employees of and stockholders in Sanofi.
- Shaloo Gupta is an associate of Kantar Health which received research funding from Sanofi/Regeneron Pharmaceuticals, Inc. for the current study.
- Wenhui Wei is a former employee of Sanofi and an employee of and stockholder in Regeneron Pharmaceuticals, Inc.
- Abhijit Gadkari is an employee of and stockholder in Regeneron Pharmaceuticals, Inc.
- Joel M. Gelfand is an employee of the University of Pennsylvania Perelman School of Medicine which has received research funding from Sanofi/Regeneron Pharmaceuticals, Inc. In the previous 12 months, Joel M. Gelfand served as a consultant for AbbVie, AstraZeneca, Celgene Corp, Coherus, Eli Lilly, Janssen Biologics (formerly Centocor), Sanofi, Merck, Novartis Corp, Regeneron Pharmaceuticals, Inc., Valeant, and Pfizer Inc., receiving honoraria; and received research grants (to the Trustees of the University of Pennsylvania) from AbbVie, Eli Lilly, Janssen, Novartis Corp, Regeneron, Sanofi, and Pfizer Inc.; and has received payment for continuing medical education work related to psoriasis. He is also a co-patent holder of Resiquimod for the treatment of cutaneous T cell lymphoma.
**Introduction**

- Atopic dermatitis (AD) is a Type 2 immune disease driven by interleukin (IL)-4 and IL-13 cytokines, characterized by a chronic inflammatory skin condition and intense pruritus\(^1\)–\(^3\)
- Moderate-to-severe AD carries substantial patient burden due to itch, sleep disturbances, functional impairment, depression, anxiety, and reduced overall health-related quality of life (HRQoL)\(^4\)–\(^7\)
- High rates of co-morbid Type 2 immune disease such as asthma and allergic rhinoconjunctivitis add to the disease burden\(^8\)
- In adults, AD also impairs work productivity and activity\(^5\)
- Currently, there are limited real-world data on the burden of illness among adult patients with AD in Europe

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Objective

• To assess the burden of illness in adult AD patients in 5 European countries (France, Germany, Italy, Spain, and UK) by comparing outcomes among
  – AD patients vs. non-AD controls
  – Inadequately controlled AD patients vs. non-AD controls
Methods

Study design and analysis population

- Cross-sectional study utilized the 2016 National Health and Wellness Survey (NHWS); a large general population survey using a self-administered, internet-based questionnaire

- Data were from the entire 2016 NHWS dataset, which comprised 80,600 adult participants from France, Germany, Italy, Spain, and the UK

- Patients with a self-reported diagnosis of AD were 1:1 propensity-score-matched with non-AD controls on the following demographic characteristics: country, age, gender, education, income, employment status, body mass index (BMI), smoking status, and Charlson Comorbidity Index (CCI)

- Patients with self-reported AD diagnosis AND a Dermatology Life Quality Index (DLQI) score >10 were categorized as “Inadequately controlled AD patients”
  - DLQI >10 implies a “very large effect on patient’s life”; hence used as a threshold
Outcomes and statistical methods

The following patient-reported outcomes were compared across groups:

- HRQoL [36-item Short Form Health Survey (SF-36v2) Mental Component Summary (MCS) and Physical Component Summary (PCS) scores]¹
- Work productivity and activity impairment questionnaire (WPAI)²
- Comorbidities including atopic (asthma and nasal allergies/hay fever) and non-atopic (anxiety, depression, sleep disorders)
- Healthcare utilization (e.g., provider visits, emergency room [ER] visits, hospitalizations)

Chi-square and t-tests were used to compare differences between groups for categorical and continuous variables, respectively

Results
Patient characteristics

• Overall, 1860 subjects with a self-reported diagnosis of AD were matched to 1860 subjects with no diagnosis of AD

• Patients were from
  – France (n = 706, 19.0%)
  – Germany (n = 393, 10.6%)
  – Italy (n = 914, 24.6%)
  – Spain (n = 1377, 37.0%)
  – UK (n = 330, 8.9%)

• Patient characteristics were comparable between both groups

• In total, 441 AD patients reported DLQI, of whom, 58 AD patients had DLQI >10
## Results

### Patient characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>AD patients (n = 1860)</th>
<th>Non-AD controls (n = 1860)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years, mean (SD)</td>
<td>43.94 (14.50)</td>
<td>43.57 (14.96)</td>
<td>0.439</td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>1312 (70.54)</td>
<td>1266 (68.06)</td>
<td>0.102</td>
</tr>
<tr>
<td>Employed, n (%)</td>
<td>1140 (61.29)</td>
<td>1172 (63.01)</td>
<td>0.279</td>
</tr>
<tr>
<td>College educated, n (%)</td>
<td>1014 (54.52)</td>
<td>1017 (54.68)</td>
<td>0.995</td>
</tr>
<tr>
<td>BMI, mean (SD)</td>
<td>25.33 (5.48)</td>
<td>25.27 (5.52)</td>
<td>0.748</td>
</tr>
<tr>
<td>Married/living with partner, n (%)</td>
<td>1119 (60.16)</td>
<td>1152 (61.94)</td>
<td>0.445</td>
</tr>
<tr>
<td>Annual household income €50,000+/£50,000+, n (%)</td>
<td>292 (15.70)</td>
<td>282 (15.16)</td>
<td>0.721</td>
</tr>
<tr>
<td>Charlson Comorbidity Index (CCI), mean (SD)</td>
<td>0.42 (0.94)</td>
<td>0.37 (1.05)</td>
<td>0.123</td>
</tr>
<tr>
<td>Dermatology Life Quality Index (DLQI) &gt;10, n (%)</td>
<td>58 (13.2*)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Prevalence of patients with DLQI>10 among patients who answered the DLQI question in the NHWS survey (n = 441)
Results

Health-related quality of life

• All AD patients vs non-AD controls and AD patients with DLQI >10 vs non-AD control had significantly reduced HRQoL on mean SF-36v2 MCS and PCS scores
Results

**Activity and work impairment**

- Work productivity and activities were negatively impacted by the presence of AD and especially among AD patients with DLQI >10

<table>
<thead>
<tr>
<th>Impairment (%)</th>
<th>AD patients (n = 1860)*</th>
<th>Non-AD controls (n = 1860)*</th>
<th>AD patients with DLQI &gt;10 (n = 58)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absenteeism</td>
<td>8.69</td>
<td>9.00</td>
<td>12.84</td>
</tr>
<tr>
<td>Presenteeism†</td>
<td>24.72</td>
<td>21.22</td>
<td>27.00</td>
</tr>
<tr>
<td>Overall work impairment‡</td>
<td>53.51</td>
<td>57.11</td>
<td>57.11</td>
</tr>
<tr>
<td>Activity impairment§</td>
<td>24.72</td>
<td>26.48</td>
<td>26.48</td>
</tr>
</tbody>
</table>

*P-values listed are for activity impairment. Only employed respondents answered the three metrics; absenteeism, presenteeism, and overall work impairment. †Percentage of impairment experienced at work because of one’s health. ‡Percentage of overall work impairment due to health problem (absenteeism + presenteeism). §Percentage of activity impairment in daily activities due to health problem.
• Atopic and non-atopic comorbidities were significantly greater in AD patients vs non-AD controls and in AD patients with DLQI >10 vs non-AD controls

Results

Comorbidities

<table>
<thead>
<tr>
<th>Condition</th>
<th>AD patients (n = 1860)</th>
<th>Non-AD controls (n = 1860)</th>
<th>AD patients with DLQI &gt;10 (n = 58)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep disorders</td>
<td>12.63</td>
<td>12.63</td>
<td>22.74*</td>
</tr>
<tr>
<td>Depression</td>
<td>12.90</td>
<td>14.41</td>
<td>36.21†</td>
</tr>
<tr>
<td>Anxiety</td>
<td>14.41</td>
<td>20.75</td>
<td>51.72†</td>
</tr>
<tr>
<td>Nasal allergies/hay fever</td>
<td>20.75</td>
<td>20.91*</td>
<td>39.66†</td>
</tr>
<tr>
<td>Asthma</td>
<td>7.31</td>
<td>20.91*</td>
<td>39.66†</td>
</tr>
</tbody>
</table>

*All P-values between AD vs. non-AD cohort: P < 0.001
†All P-values between non-AD cohort vs AD patients with DLQI >10: P < 0.001
Results

Healthcare utilization

- The incidence of ER and traditional provider visits were significantly higher in AD patients vs non-AD controls, and the incidence of all types of visits were significantly higher in AD patients with DLQI >10 vs non-AD controls.
Limitations

• While the NHWS was designed to be representative of the general adult population of a country, the sample is likely to favor younger, healthier adults and hence under-represent AD patients, especially AD patients with more severe and/or inadequately controlled disease.

• Diagnoses and other clinical variables were not verifiable by patient medical charts due to the self-reported nature of the data; self-reported data are also subject to recall bias

• An objective physician report of AD severity was not obtained during the study
Conclusions

• In adult patients from France, Germany, Italy, Spain, and the UK, AD is associated with significantly greater disease burden in terms of impaired HRQoL, lower work productivity and everyday activities, higher prevalence of atopic and psychological comorbidities, and healthcare utilization, compared with non-AD controls

• The disease burden is even higher among patients inadequately controlled on current therapies based on the DLQI score as a proxy

• The results of this study demonstrate a high medical, humanistic, economic, and societal burden associated with AD, especially inadequately controlled AD, in the European adult population
Back up slides
Methods

**Short Form 36 (SF-36) Health Survey**

- The SF-36 is a health survey used to measure HRQoL
- SF-36 yields an 8-scale profile of scores, and physical component summary (PCS) and mental component summary (MCS) scores:
  - Physical functioning
  - Bodily pain
  - General health perceptions
  - Physical role functioning
  - Mental health
  - Emotional role functioning
  - Social role functioning
  - Vitality

- Scores are weighted sums of the questions in each section, and scores range from 0–100
  - Lower scores denote more disability, and higher scores denote less disability

**Methods**

*Dermatology Life Quality Index (DLQI)*

- The DLQI questionnaire is designed for use in adults to measure the impact of a skin problem on quality of life (QoL).

- The DLQI comprises 10 questions, which are analyzed under six headings:
  - Symptoms and feelings
  - Daily activities
  - Leisure
  - Work and school
  - Personal relationships
  - Treatment

- Each question is scored, giving a possible total score range from 0–30.

- The higher the score, the more QoL is impaired:
  - 0–1 (no effect on QoL), 2–5 (small effect on QoL), 6–10 (moderate effect on QoL), 11–20 (very large effect on QoL), 21–30 (extremely large effect on QoL)

Results

Health-related quality of life

• AD patients had significantly reduced HRQoL for all SF-36 domains
Results

Healthcare utilization

- Healthcare provider and ER visits were significantly greater in AD patients versus non-AD controls (Table A)
- All visits were significantly greater in patients with DLQI >10 versus non-AD controls (Table B)

<table>
<thead>
<tr>
<th>(A)</th>
<th>Mean ± SD</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type of visit</td>
<td>AD patients (n = 1860)</td>
<td>Non-AD controls (n = 1860)</td>
</tr>
<tr>
<td></td>
<td>Healthcare provider visits in past 6 months</td>
<td>7.36 ± 11.19</td>
<td>4.46 ± 7.17</td>
</tr>
<tr>
<td></td>
<td>ER visits in past 6 months</td>
<td>0.46 ± 1.76</td>
<td>0.32 ± 1.46</td>
</tr>
<tr>
<td></td>
<td>Hospitalizations in past 6 months</td>
<td>0.15 ± 0.73</td>
<td>0.14 ± 0.59</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(B)</th>
<th>Mean ± SD</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type of visit</td>
<td>Non-AD controls (n = 1860)</td>
<td>DLQI &gt;10 (n = 58)</td>
</tr>
<tr>
<td></td>
<td>Healthcare provider visits in past 6 months</td>
<td>4.46 ± 7.17</td>
<td>13.88 ± 17.78</td>
</tr>
<tr>
<td></td>
<td>ER visits in past 6 months</td>
<td>0.32 ± 1.46</td>
<td>0.90 ± 1.65</td>
</tr>
<tr>
<td></td>
<td>Hospitalizations in past 6 months</td>
<td>0.14 ± 0.59</td>
<td>0.43 ± 1.35</td>
</tr>
</tbody>
</table>