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The Family Impact of Atopic Dermatitis in the Pediatric Population: Results from an International Cross-sectional Study

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Abstract

Objective To evaluate the impact of atopic dermatitis on families of pediatric subjects.

Study design This cross-sectional, web-based survey of children/adolescents (6 months to <18 years old) with AD and their parents/caregivers was conducted in 18 countries encompassing North America, Latin America, Europe, Middle East/Eurasia, and East Asia. Children/adolescents with AD and their parents/caregivers were identified by the International Study of Asthma and Allergies in Childhood (ISAAC) criteria *and* ever being told by a physician that they had “eczema”. AD severity was assessed using Patient Oriented Eczema Measure (POEM) and Patient Global Assessment. AD impact on families’ lives was evaluated using the Dermatitis Family Impact questionnaire (DFI), and stand-alone questions on hours of AD-related care (past week) and missed work days (past 4 weeks) due to their child’s AD.

Results A total of 7465 pairs of pediatric participants with AD and their parents/caregivers were surveyed. Across age groups, DFI total score for all regions ranged from 7.1-8.6, 13.2-14.9, and 17.0-17.2 for POEM mild, moderate, and severe AD, respectively; Subscale scores showed that higher AD severity had a greater impact on all family life domains, including sleep and tiredness. No specific patterns or trends were observed across age groups. Time spent on childcare and missed work days increased with AD severity.

Conclusions Across pediatric age groups and geographic regions, higher AD severity was associated with a greater negative impact on physical, emotional, social, and economic components of family life.

Key words: atopic dermatitis, family burden, parents/caregivers, Dermatitis Family Impact questionnaire

Abbreviations

AD, Atopic dermatitis

DFI, Dermatitis Family Impact questionnaire

ISAAC, International Study of Asthma and Allergies in Childhood

POEM, Patient-Oriented Eczema Measure

PtGA, Patient Global Assessment

INTRODUCTION

Patients with atopic dermatitis often report a disease burden that includes intense and frequent itch, sleep disturbances, pain, anxiety/depression, reduced function and productivity, and lower quality-of-life.[1-8] Onset of AD often occurs during the first years of life, with a variable disease course that may resolve or persist into adulthood in some children who present with higher disease severity or predisposing risk factors.[9] The presence of AD during childhood and adolescence has a negative impact on parents and caregivers, resulting from effects on sleep, mental health, and quality-of-life, the additional care required for daily treatment and the need for meeting with healthcare providers.[10-16]

Much of the information on parent/caregiver burden is based on anecdotal reports or derived from pediatric clinics, which may represent more severe disease not reflective of the general AD population.[16] In addition, few multinational studies have evaluated the impact of pediatric AD on caregivers and family. The Epidemiology of Children with Atopic Dermatitis Reporting on their Experience (EPI-CARE) study was conducted to provide current information on the epidemiology and burden of AD among children and adolescents 6 months to less than 18 years old from countries in different geographic regions worldwide.[17, 18] The current analysis evaluated the impact of pediatric AD on the family as reported by the parents/caregivers , focusing on overall family life consequences and temporal components associated with the need for caregiving.

Methods

Study Design

EPI-CARE was a multinational, cross-sectional study designed to be representative of the general pediatric populations of 18 countries encompassing 5 geographic regions including North America (Canada and the US), Latin America (Argentina, Brazil, Columbia, Mexico), Europe (France, Germany, Italy, Spain, and the United Kingdom [UK]), the Middle East/Eurasia (Israel, Kingdom of Saudi Arabia [KSA], Turkey, United Arab Emirates [UAE], Russia), and East Asia (Japan, Taiwan). Data collection was conducted according to ethical codes of the European Society for Opinion and Marketing Research (ESOMAR) and European Pharmaceutical Market Research Association (EphMRA); data collected in the US were compliant with the US Health Insurance Portability and Accountability Act (HIPAA) of 1996. All participants provided informed consent.

As described for a similar multinational epidemiologic study of AD in adults, EPI-AWARE,[19] data were collected through a web-based survey using recruitment sources that included broad-reach portals, special interest sites, and direct emailing campaigns. The survey questionnaire was administered between 26 September 2018 and 5 March 2019 for all countries except Turkey and Taiwan, which were surveyed between 7 October and 2 December 2019. The questionnaire, with a maximum total completion time of 30 minutes, was administered in the native language of each country including validated translations of previously developed outcome measures.

Participant recruitment was via parents from online respondent panels in their respective countries (LightSpeed Health, Kantar World Panel, Research Now/SSI, Toluna, AIP and Borderless Access). To reduce selection bias, panelists were blinded to the research topic when invited. Panel members who completed the survey received points redeemable for items in a prize catalogue.

Study Population

In each country, members of the consumer panels who met the inclusion criteria (parents/guardians of children 6 months to less than 18 years old) received an e-mail invitation to participate in the study. For completion of the survey, participants were required to meet all items of the ISAAC criteria,[20] which includes: *itchy rash that was coming and going for at least 6 months, had this itchy rash in the past 12 months, and this itchy rash affected any of the regions including folds of the elbows, behind the knees, in front of the ankles, under the buttocks, or around the neck, ears or eyes*. The analyzed population consisted of eligible survey participants who were categorized as having "diagnosed AD" based on all items of the ISAAC criteria *and* self-reported having ever been told by a physician that they suffer from eczema. Because pediatric AD presents with age-dependent characteristics that include facial, scalp, and extensor involvement in infants and young children,[21] children < 6 years old were also required to meet two additional criteria: the itchy rash affecting at any time the face (cheeks, forehead) *and* affecting at any time elbows to wrists or knees to ankles.

Survey Questionnaire and Outcomes

The survey questionnaire consisted of 2 sections in the following order: the first section included questions that confirmed participant eligibility, collected demographic information, and enabled the selection algorithm for families with multiple children. The second section assessed disease severity and collected information on the patient burden of AD as well as on the impact of AD on parents/caregivers. Severity of AD was assessed according to established severity bands on the Patient Oriented Eczema Measure (POEM),[22, 23] and the Patient Global Assessment (PtGA); severity levels were reported as mild, moderate, or severe during the past week by parents/caregivers of children 6 months to < 12 years old and by self-report by adolescents 12 to < 18 years old.

The impact of AD on the quality-of-life of a parent or caregiver was evaluated using the Dermatitis Family Impact (DFI) questionnaire and two stand-alone questions. The DFI is a validated dermatology-specific measure that assesses the impact of AD on the daily activities and quality-of-life of family members of affected children.[24, 25] The DFI asks "how much effect has your child having eczema had on…" and includes 10 questions that assess impact on 10 domains (housework, feeding, sleep of family, family leisure, shopping, expenditures, tiredness, emotional distress, relationships, and help with treatment) over the past week that are scored as 0 = not at all, 1 = a little, 2 = a lot, and 3= very much. The total score range is 0–30 with higher score indicating a higher impact; a mean (standard deviation) DFI score of 9.6 (7.0) represents affected families in contrast to 0.4 (0.9) representing unaffected families.[24]

Additionally, two stand-alone questions, one asking about the number of hours spent on AD-related care in the past week, and the other asking about number of days missed from work in the past 4 weeks due to their child's AD completed the family impact assessment.

Statistical Analysis

To ensure that samples were representative of the pediatric population in each country, quota apportionment was used for specific demographic characteristics including sex and age (https://www.census.gov/ for all countries), geographic regions (country-specific databases), and urban vs. rural except for Argentina, Colombia, Mexico, Brazil, UAE, KSA and Turkey (https://knoema.fr).[26, 27] If quota objectives were not exactly met at a country level, a weighting adjustment was applied to have the structure of the total number of respondents per country match exactly the structure of the general population on the quota variables.[26, 27] In families with more than one child, the child to be surveyed was selected by an algorithm based on the birthday closest to the survey date unless the child belonged to a category for which the quota had been reached, in which case another child with the following birthday was selected. For children with an identical birth date in the same family, the algorithm selected the child alphabetically based on the first letter of the first name.

Descriptive statistics were used to characterize the demographics of the children and parent/caregivers by region. Pairwise comparisons of the burden based on severity assessed using POEM and PtGA were examined using the T-test and Pearsons chi-square test for continuous and categorical variables, respectively.

Results

Populations

The survey included a total of 7465 pairs of pediatric participants with diagnosed AD and their parents/caregivers, consisting of 1489 children 6 months to < 6 years old, 2898 children 6 to < 12 years old, and 3078 adolescents 12 to < 18 years old; the regional distribution was representative within each country. The mean age was similar across all regions within each age strata, and that there was no trend regarding sex distribution (Table I). Severity of AD was primarily reported as mild or moderate, with consistently low proportions of severe AD (4.1%-13.6% and 1.5%-8.7% based on POEM and PtGA, respectively).

Across all countries, the mean age of parents/caregivers was higher in each increasing pediatric age stratum, and with few exceptions, parents/caregivers tended to be female, and most parents/caregivers were employed (Table II).

Family Impact

As shown by the mean total scores on the DFI, there was a substantial impact on the families of children with AD in all age groups across geographic regions. Although this impact was consistently greater at higher levels of AD severity regardless of whether severity was assessed using POEM (ranges of 3.3 to 11.3 for mild, 6.9 to 17.1 for moderate, and 11.0 to 20.3 for severe AD) (Figure 1; available at www.jpeds.com) or PtGA (ranges of 3.1 to 12.5 for mild, 8.1 to 15.7 for moderate, and 12.2 to 23.6 for severe AD) (Figure 2; available at www.jpeds.com), not all pairwise comparisons of the DFI scores between severity levels demonstrated statistical significance. Reported impact showed no patterns overall across age groups but varied by region and age, and was generally lowest in East Asia. Additionally, the large standard deviations indicate a similarly high variability within and across age groups, severity levels, and geographic regions.

A DFI score > 9.6 was reported for 37.2%, 70.7%, and 78.0% in all participants with POEM-based mild, moderate, and severe AD, respectively. Among those with PtGA-based mild, moderate, and severe AD, the proportions with a DFI score > 9.6 were 43.3%, 67.4%, and 84.0%, respectively.

The proportion of parents/caregivers who reported "a lot" or "very much" impact of AD was generally higher for each DFI domain as AD severity increased, assessed using POEM (Table III; available at www.jpeds.com), although not all pairwise comparisons were statistically significant. No patterns were observed for the DFI total scores across age groups, and within each domain the magnitude of impact varied across age groups and geographic regions (even within the same AD severity level), and respondents from East Asia consistently reported the lowest impact on all domains. Results were generally similar when AD severity was assessed using the PtGA (Table IV; available at www.jpeds.com).

Temporal Components of Care

With few exceptions, the hours that parents/caregivers spent on AD-related childcare during the past week increased at higher AD severity levels, regardless of whether severity was assessed using POEM or PtGA (Table V). Adolescents generally required less hours of care than younger age groups.

Parents/caregivers generally reported an increasing number of missed work days in the past 4 weeks due to their child's AD at higher levels of AD severity (Table VI; available at www.jpeds.com). Even among children who had mild AD, parents/caregivers missed up to 3.9

days of work, and among parents of children with severe AD, the number of missed work days was as high as 9.7 (40-50% of working days). Although there was no clear pattern observed for number of missed work days based on age groups, East Asia generally had the lowest rate of missed work days across age groups and AD severity levels.

DISCUSSION

Despite availability of dermatology-related measures to assess family burden[28] and recommendations that this burden should be assessed,[29] few studies evaluated the impact of AD on parents/caregivers of children with AD in real-world populations.

Based on the total DFI score and regardless of whether AD severity was assessed using POEM or PtGA, results show that parents/caregivers report an impact of their child's AD on family life with this impact substantially greater at higher disease activity. Mean DFI scores for children with moderate or severe AD were almost consistently higher than the estimated mean of 9.6 that represents affected families,[24] with 67.4% of moderate and 84.0% of severe reporting scores > 9.6. Although cutoff thresholds for interpreting DFI scores in terms of magnitude of effect have not been validated,[25] several published studies in AD have considered non-validated descriptor bands of 0–5 as normal, 6–10 as having a minor family impact, 11–20 as moderate, and >20 as high family impact.[30-32] Based on these bands, the scores observed in the current study generally suggest a minor impact on the family of children with mild AD, and at least a moderate family impact among those with moderate or severe AD. Additionally, there did not appear to be a relationship between the child's age and the impact on families' lives, which is consistent with a previous study that found no significant correlation between age and DFI,[33] although there are reports of contrasting evidence for such an association.[34] Severity of AD, in contrast, was reported to be the most significant correlate with family impact,[35] which is also supported by findings in the current analysis. Although the standard deviations suggested that there was similarly-large variability in the magnitude of the impact, with the exception of the consistently lower impact in East Asia, the family impact of AD was generally comparable across geographic regions within age groups and severity levels.

The individual DFI domains demonstrated that AD has an impact on a broad range of dimensions that affect family function and daily activities, including effects on sleep and tiredness. Sleep problems, in particular, were reported to be a factor that may exacerbate other effects associated with daily management of a child with AD, such as tiredness/fatigue and psychosocial stress.[15, 16, 36] Although the family impact of AD generally increased with disease severity on all domains, differences among the domains with regard to their relative importance and the magnitude of impact appeared to vary with age and geographic region, the latter suggesting that cultural factors or differences in disease management may also contribute to perceptions of the family burden. There was consistent report of an impact on sleep and tiredness domains of the DFI, especially for moderate and severe AD, and sleep problems and tiredness may both impair productivity at work (presenteeism).[37, 38]

Caring for children with AD is time intensive across all age groups and regions. Although it may be expected that the youngest age group might require more caregiving, time spent on care appeared to be more related to severity and geographic region than age. More time was reported among parents/caregivers taking care of children with moderate and severe AD relative to mild disease. A greater amount of time needed for care at higher AD severity levels, as well as a substantial time requirement among children with mild AD, has been reported in another survey, albeit of smaller sample size.[15] That study also reported wide variability in hours of caregiving, with a mean (SD) of 22 (18) hours per week, providing further support that studies may be warranted to understand the reasons for the variability in care as well as the caregiving needs that contribute to this time commitment.

Missed days of work were substantially higher with moderate and severe AD relative to mild AD; severe AD in particular, with few exceptions, was associated with missed work equivalent to one work-week or more (i.e., ≥ 5 working days) in the prior month. As with time spent on care, there was no clear relationship between work days missed and age. Missed work is of importance to the family by adding to the overall costs that may include transportation and other out of pocket costs related to informal caregiving and their child's treatment,[12, 16] as was also suggested by the substantial proportions of parents/caregivers who reported an impact on the expenditures domain of the DFI questionnaire. Additionally, missed work, in the context of lost productivity, has broader relevance from the perspective of employers and society. In this regard, the variability observed among geographic regions for both hours of care and days missed from work may likely reflect behavioral or cultural dynamics as well as differences in availability of social support systems.

Strengths of this study include the large sample sizes that were representative of the individual countries, and the criteria that were used to identify AD (ISAAC *and* self-reporting of having ever been told by a physician that they suffer from eczema). ISAAC criteria, which are wellrecognized and widely used, rely on presence and duration of clinical signs, enabling a consistent method of identifying AD across countries. Limitations of EPI-CARE include the lack of clinical assessment for confirmation of diagnosis and severity; the small sample sizes in some regions, especially for severe AD; and the fact that the stand-alone questions were not validated. Although absence of a control group may also be considered a limitation, the main objective of this study was characterization of family burden across disease severity levels. Additionally, identification of AD and reported outcomes were all based on self-report, which may have introduced the potential for recall bias. Similarly, use of an online survey may represent a form of selection bias, because participation in the study was limited to those with online access and either a computer or smartphone. There is also the potential limitation of unmeasured confounding factors including demographic characteristics such as race/ethnicity, level of education, and household income that may impact the reported burden. Although race/ethnicity was not captured in the study, other variables may be considered for future analyses. Last, there was lack of representation of some geographic regions, e.g., Africa.

In conclusion, this international study showed that across geographic regions, AD has a substantial and multidimensional impact on parents/caregivers' lives, and that even though more severe AD was associated with a significantly higher parent/caregiver burden, even mild AD affected family life. This burden was observed regardless of pediatric age group and geographic region. Living with a child with AD may also have economic implications resulting from missed work days (absenteeism) as well as presenteeism (impaired productivity while at work). These results emphasize that the burden of AD and its treatment extends beyond the individual patient, and potentially impacts parents/caregivers who are committed to meeting the caregiving needs of their children, especially at higher levels of disease severity. These results also suggest the importance of assessing the broader humanistic and economic impact on parents/caregivers in addition to the patient-reported burden.

Figure 1. Impact of atopic dermatitis on parent/caregiver quality-of-life, evaluated using the Dermatitis Family Impact (DFI) questionnaire, by atopic dermatitis severity assessed using the Patient-Oriented Eczema Measure (POEM).

References

1. Wittkowski A, Richards HL, Griffiths CE, Main CJ. Illness perception in individuals with atopic dermatitis. Psychol Health Med. 2007;12:433-44.

2. Simpson EL, Bieber T, Eckert L, Wu R, Ardeleanu M, Graham N, et al. Patient burden of moderate-to-severe atopic dermatitis: insights from a phase 2b clinical trial of dupilumab in adults J Am Acad Dermatol. 2016;74:491-8.

3. Vakharia PP, Chopra R, Sacotte R, Patel KR, Singam V, Patel N, et al. Burden of skin pain in atopic dermatitis. Ann Allergy Asthma Immunol. 2017;119:548-52.

4. Li JC, Fishbein A, Singam V, Patel K, Zee PC, Attarian H, et al. Sleep disturbance and sleep related impairment in adults with atopic dermatitis: A crosssectional survey-based study. Dermatitis. 2018;29:270-7.

5. Ronnstad ATM, Halling-Overgaard AS, Hamann CR, Skov L, Egeberg A, Thyssen JP. Association of atopic dermatitis with depression, anxiety, and suicidal ideation in children and adults: A systematic review and meta-analysis. J Am Acad Dermatol. 2018;79:448-56 e30.

6. Silverberg JI, Gelfand JM, Margolis DJ, Boguniewicz M, Fonacier L, Grayson MH, et al. Patient-burden and quality of life in atopic dermatitis in US adults: A population-based cross-sectional study. Ann Allergy Asthma Immunol. 2018;121:340-7.

7. Ramirez FD, Chen S, Langan SM, Prather AA, McCulloch CE, Kidd SA, et al. Association of Atopic Dermatitis With Sleep Quality in Children. JAMA Pediatr. 2019:e190025.

8. Silverberg JI. Comorbidities and the impact of atopic dermatitis. Ann Allergy Asthma Immunol. 2019;123:144-51.

9. Irvine AD, Mina-Osorio P. Disease trajectories in childhood atopic dermatitis: an update and practitioner's guide. Br J Dermatol. 2019;181:895-906.

10. Chamlin SL, Frieden IJ, Williams ML, Chren MM. Effects of atopic dermatitis on young American children and their families. Pediatrics. 2004;114:607-11.

11. Carroll CL, Balkrishnan R, Feldman SR, Fleischer AB, Jr., Manuel JC. The burden of atopic dermatitis: impact on the patient, family, and society. Pediatr Dermatol. 2005;22:192-9.

12. Filanovsky MG, Pootongkam S, Tamburro JE, Smith MC, Ganocy SJ, Nedorost ST. The Financial and Emotional Impact of Atopic Dermatitis on Children and Their Families. J Pediatr. 2016;169:284-90 e5.

13. Moore K, David TJ, Murray CS, Child F, Arkwright PD. Effect of childhood eczema and asthma on parental sleep and well-being: a prospective comparative study. Br J Dermatol. 2006;154:514-8.

14. Marciniak J, Reich A, Szepietowski JC. Quality of Life of Parents of Children with Atopic Dermatitis. Acta Derm Venereol. 2017;97:711-4.

15. Capozza K, Gadd H, Kelley K, Russell S, Shi V, Schwartz A. Insights From Caregivers on the Impact of Pediatric Atopic Dermatitis on Families: "I'm Tired, Overwhelmed, and Feel Like I'm Failing as a Mother". Dermatitis. 2020;31:223-7.

16. Yang EJ, Beck KM, Sekhon S, Bhutani T, Koo J. The impact of pediatric atopic dermatitis on families: A review. Pediatr Dermatol. 2019;36:66-71.

17. Silverberg JI, Barbarot S, Gadkari A, Simpson EL, Weidinger S, Mina-Osorio P, et al. Atopic dermatitis in the pediatric population. A cross-sectional, international epidemiologic stud. Ann Allergy Asthma Immunol. 2021;126:417-28.

18. Weidinger S, Simpson EL, Silverberg JI, Barbarot S, Eckert L, Mina-Osorio P, et al. The patient-reported disease burden in adolescents with atopic dermatitis: a cross-sectional study in the United States and Europe. Poster presented at the 28th European Academy of Dermatology and Venereology Congress (EADV 2019), Madrid, Spain, 9–13 October 2019.

19. Barbarot S, Auziere S, Gadkari A, Girolomoni G, Puig L, Simpson E, et al. Epidemiology of atopic dermatitis in adults: Results from an international survey. Allergy. 2018;73:1284-93.

20. Asher MI, Keil U, Anderson HR, Beasley R, Crane J, Martinez F, et al. International Study of Asthma and Allergies in Childhood (ISAAC): rationale and methods. Eur Respir J. 1995;8:483-91.

21. Lyons JJ, Milner JD, Stone KD. Atopic dermatitis in children: clinical features, pathophysiology, and treatment. Immunol Allergy Clin North Am. 2015;35:161-83.

22. Charman CR, Venn AJ, Williams HC. The patient-oriented eczema measure: development and initial validation of a new tool for measuring atopic eczema severity from the patients' perspective. Arch Dermatol. 2004;140:1513-9.

23. Charman CR, Venn AJ, Ravenscroft JC, Williams HC. Translating Patient-Oriented Eczema Measure (POEM) scores into clinical practice by suggesting severity strata derived using anchor-based methods. Br J Dermatol. 2013;169:1326-32.

24. Lawson V, Lewis-Jones MS, Finlay AY, Reid P, Owens RG. The family impact of childhood atopic dermatitis: the Dermatitis Family Impact Questionnaire. Br J Dermatol. 1998;138:107-13.

25. Dodington SR, Basra MK, Finlay AY, Salek MS. The Dermatitis Family Impact questionnaire: a review of its measurement properties and clinical application. Br J Dermatol. 2013;169:31-46.

26. Deville JC. A Theory of Quota Surveys. Surv Methodol. 1991;17:163-81.

27. Flohr C, Weinmayr G, Weiland SK, Addo-Yobo E, Annesi-Maesano I, Bjorksten B, et al. How well do questionnaires perform compared with physical examination in detecting flexural eczema? Findings from the International Study of Asthma and Allergies in Childhood (ISAAC) Phase Two. Br J Dermatol. 2009;161:846-53.

28. Sampogna F, Finlay AY, Salek SS, Chernyshov P, Dalgard FJ, Evers AWM, et al. Measuring the impact of dermatological conditions on family and caregivers: a review of dermatology-specific instruments. J Eur Acad Dermatol Venereol. 2017;31:1429-39.

29. Chernyshov PV, Tomas-Aragones L, Manolache L, Marron SE, Salek MS, Poot F, et al. Quality of life measurement in atopic dermatitis. Position paper of the European Academy of Dermatology and Venereology (EADV) Task Force on quality of life. J Eur Acad Dermatol Venereol. 2017;31:576-93.

30. Ricci G, Bendandi B, Bellini F, Patrizi A, Masi M. Atopic dermatitis: quality of life of young Italian children and their families and correlation with severity score. Pediatr Allergy Immunol. 2007;18:245-9.

31. Al Shobaili HA. The impact of childhood atopic dermatitis on the patients' family. Pediatr Dermatol. 2010;27:618-23.

32. Ho RC, Giam YC, Ng TP, Mak A, Goh D, Zhang MW, et al. The influence of childhood atopic dermatitis on health of mothers, and its impact on Asian families. Pediatr Allergy Immunol. 2010;21:501-7.

33. Chernyshov PV, Ho RC, Monti F, Jirakova A, Velitchko SS, Hercogova J, et al. An International Multi-center Study on Self-assessed and Family Quality of Life in Children with Atopic Dermatitis. Acta Dermatovenerol Croat. 2015;23:247-53.

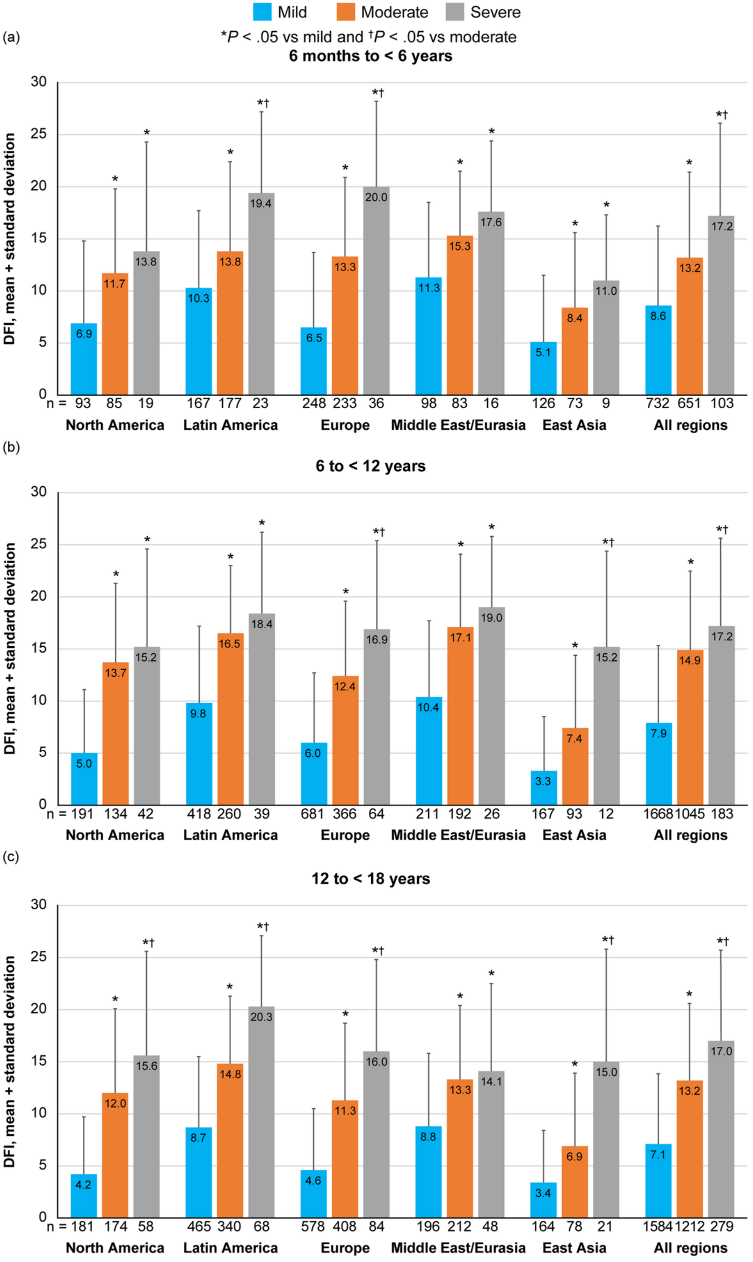
34. Drucker AM, Wang AR, Li W-Q, Sevetson E, Qureshi AA. Audit: Burden of Eczema. The burden of disease of atopic dermatitis. National Eczema Association; 2015.

35. Balkrishnan R, Housman TS, Grummer S, Rapp SR, Clarke J, Feldman SR, et al. The family impact of atopic dermatitis in children: the role of the parent caregiver. Pediatr Dermatol. 2003;20:5-10.

36. Angelhoff C, Askenteg H, Wikner U, Edell-Gustafsson U. "To Cope with Everyday Life, I Need to Sleep" - A Phenomenographic Study Exploring Sleep Loss in Parents of Children with Atopic Dermatitis. J Pediatr Nurs. 2018;43:e59-e65.

37. Rosekind MR, Gregory KB, Mallis MM, Brandt SL, Seal B, Lerner D. The cost of poor sleep: workplace productivity loss and associated costs. J Occup Environ Med. 2010;52:91-8.

38. Gingerich SB, Seaverson ELD, Anderson DR. Association Between Sleep and Productivity Loss Among 598 676 Employees From Multiple Industries. Am J Health Promot. 2018;32:1091-4.


Mild
Moderate
Severe
*P < .05 vs mild and †P < .05 vs moderate
(a)
6 months to < 6 years
DFI, mean + standard deviation
0
5
10
15
20
25
30
6.9
11.7
13.8
10.3
13.8
19.4
6.5
13.3
20.0
11.3
15.3
17.6
5.1
8.4
11.0
8.6
13.2
17.2
*
*
*
*†
*
*†
*
*
*
*
*
*
*†
n = 93 85 19
167 177 23
248 233 36
98 83 16
126 73 9
732 651 103
North America
Latin America
Europe
Middle East/Eurasia
East Asia
All regions
(b)
6 to < 12 years
DFI, mean + standard deviation
0
5
10
15
20
25
30
5.0
13.7
15.2
9.8
16.5
18.4
6.0
12.4
16.9
10.4
17.1
19.0
3.3
7.4
15.2
7.9
14.9
17.2
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*
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*†
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*†
*
*†
n = 191 134 42
418 260 39
681 366 64
211 192 26
167 93 12
1668 1045 183
North America
Latin America
Europe
Middle East/Eurasia
East Asia
All regions
(c)
12 to < 18 years
DFI, mean + standard deviation
0
5
10
15
20
25
30
4.2
12.0
15.6
8.7
14.8
20.3
4.6
11.3
16.0
8.8
13.3
14.1
3.4
6.9
15.0
7.1
13.2
17.0
*
*†
*
*†
*
*†
*
*
*
*†
*
*†
n = 181 174 58
465 340 68
578 408 84
196 212 48
164 78 21
1584 1212 279
North America
Latin America
Europe
Middle East/Eurasia
East Asia
All regions

Table III. Impact of atopic dermatitis on domains of quality-of-life of parents/caregivers, evaluated using the Dermatitis Family Impact (DFI) questionnaire, by atopic dermatitis severity assessed using the Patient-Oriented Eczema Measure (POEM).

DFI item	**Percent of respondents who reported "very much" or "a lot" of impact based on mild/moderate/severe AD**					
	North America	**Latin America**	**Europe**	**Middle East/Eurasia**	**East Asia**	**All regions**
6 months to < 6 years, n	93/85/19	167/177/23	248/233/36	98/83/16	126/73/9	732/651/103
Housework	18.5/36.9*/40.8*	29.6/50.7*/71.8*	16.2/43.1*/68.8*†	31.4/56.9*/63.8*	9.8/22.8*/47.4*	23.4/45.8*/60.2*†
Food preparation/feeding	15.8/34.2*/40.8*	26.7/41.8*/62.2*	14.3/32.7*/63.8*†	29.2/51.7*/57.3*	8.4/19.7*/39.8*	21.0/38.7*/54.8*†
Sleep	21.0/37.1*/49.2*	30.5/50.0*/68.3*	13.2/47.0*/68.5*†	29.7/53.1*/63.8*	10.5/28.0*/40.4*	23.5/46.1*/61.0*†
Leisure activities	12.7/32.6*/43.7*	25.6/44.1*/67.6*†	16.4/39.4*/68.7*†	22.4/46.7*/67.5*	11.8/19.5/39.8*	19.6/39.9*/59.9*†
Shopping	15.8/28.0*/41.5*	22.0/34.9*/59.3*†	11.0/34.6*/63.8*†	20.9/52.9*/57.3*	7.3/14.8/26.7*	17.2/34.8*/53.4*†
Expenditures	19.9/35.7*/53.2*	29.6/53.2*/75.3*†	15.3/39.5*/78.9*†	29.3/54.7*/57.3*	11.5/18.1/40.0*	23.4/45.4*/65.1*†
Tiredness	18.5/38.2*/43.7*	32.6/50.6*/75.3*†	15.2/51.0*/74.8*†	28.9/66.9*/83.2*	11.2/21.2/34.3*	24.1/48.8*/66.0*†
Emotional distress	16.5/36.2*/43.7*	27.9/48.6*/65.4*	19.5/48.7*/73.5*†	31.2/56.8*/68.1*	13.0/27.4*/27.8	23.3/46.2*/59.6*†
Relationships	13.1/34.1*/35.3*	24.6/43.6*/65.2*	14.8/36.1*/72.5*†	26.2/44.4*/74.0*†	10.8/20.2/19.5	19.6/39.1*/57.8*†
Help with treatment	16.6/24.1/40.8*	30.4/49.6*/65.2*	12.3/37.8*/66.5*†	29.5/34.8/72.5*†	7.9/15.6/13.1	22.2/38.5*/57.6*†
6 years to < 12 years, n	191/134/42	418/260/39	681/366/64	211/192/26	167/93/12	1668/1045/183
Housework	9.6/48.7*/50.4*	29.2/60.8*/75.1*	16.9/44.7*/56.7*	24.1/60.6*/65.8*	6.9/21.1*/59.3*†	21.1/53.7*/62.3*†
Food preparation/feeding	8.6/36.5*/41.6*	24.3/47.4*/58.3*	12.2/38.8*/55.7*†	25.7/58.7*/63.7*	5.6/15.0*/49.4*†	18.1/44.8*/53.4*†
Sleep	7.6/40.5*/46.7*	26.9/51.7*/72.3*†	14.2/41.8*/66.6*†	25.0/63.7*/67.6*	8.0/19.3*/49.6*†	19.4/48.9*/62.2*†

DFI item	Percent of respondents who reported “very much” or “a lot” of impact based on mild/moderate/severe AD					
	North America	Latin America	Europe	Middle East/Eurasia	East Asia	All regions
Leisure activities	7.2/42.3*/48.9*	25.2/53.1*/64.5*	13.3/43.5*/58.3*†	32.1/56.1*/55.7*	4.9/18.0*/49.4*†	19.5/48.4*/56.9*†
Shopping	7.6/30.9*/46.6*	19.7/44.4*/63.1*†	9.8/33.5*/55.2*†	22.5/47.3*/53.3*	4.1/12.6*/49.4*†	15.0/39.1*/54.8*†
Expenditures	9.8/50.0*/50.6*	29.9/60.5*/70.2*	13.2/40.9*/57.5*†	30.1/56.4*/68.1*	5.7/18.8*/39.6*	21.4/52.0*/60.6*†
Tiredness	8.0/40.6*/52.1*	26.5/54.6*/69.8*	14.5/40.9*/62.9*†	31.6/59.3*/56.9*	4.7/19.3*/59.3*†	20.3/48.9*/61.0*†
Emotional distress	10.8/50.9*/60.6*	22.6/53.4*/65.8*	14.6/42.7*/65.2*†	33.1/59.9*/68.1*	5.8/18.0*/49.4*†	19.6/50.6*/64.0*†
Relationships	7.6/38.3*/49.2*	22.7/45.5*/63.2*†	11.0/41.1*/59.0*†	20.9/50.1*/64.5*	3.4/19.7*/49.4*†	16.2/43.2*/58.0*†
Help with treatment	11.8/36.0*/51.3*	26.3/56.4*/58.5*	13.7/32.3*/52.0*†	25.2/48.9*/73.6*†	5.4/11.4/49.4*†	19.7/44.5*/57.2*†
12 years to < 18 years, n	181/174/58	465/340/68	578/408/84	196/212/48	164/78/21	1584/1212/279
Housework	10.1/38.9*/48.1*	21.4/44.8*/69.6*†	10.1/34.8*/44.9*	21.9/35.4*/52.4*†	5.0/17.6*/39.2*†	17.1/39.3*/56.3*†
Food preparation/feeding	8.5/31.9*/46.3*†	18.4/41.5*/62.8*†	9.2/28.5*/45.2*†	19.8/30.0*/36.3*	3.7/12.3*/42.7*†	14.9/34.4*/49.7*†
Sleep	7.7/37.8*/54.3*†	17.0/45.4*/67.9*†	8.3/32.0*/49.3*†	20.7/34.5*/43.5*	2.5/18.2*/50.4*†	14.0/38.8*/55.9*†
Leisure activities	9.1/35.6*/54.8*†	20.5/50.3*/72.1*†	8.7/38.0*/52.3*†	23.7/39.4*/36.3	8.1/15.7/48.0*†	16.7/42.4*/56.2*†
Shopping	7.3/29.2*/51.5*†	13.6/37.5*/67.8*†	6.3/25.3*/44.9*†	15.1/29.7*/36.0*	4.1/14.3*/48.0*†	11.2/31.7*/52.8*†
Expenditures	12.6/35.0*/49.4*	25.8/53.1*/78.3*†	9.3/36.0*/55.8*†	18.8/34.3*/44.4*	4.4/21.2*/48.0*†	18.7/42.3*/59.7*†
Tiredness	9.4/34.2*/53.6*†	20.6/46.0*/73.3*†	9.6/38.9*/54.3*†	24.7/41.8*/38.7	7.3/13.3/52.1*†	17.1/41.0*/57.4*†
Emotional distress	8.8/38.8*/55.0*†	19.5/46.4*/69.8*†	11.2/37.0*/62.6*†	22.3/45.3*/52.1*	6.1/18.5*/58.0*†	16.3/42.5*/61.0*†
Relationships	7.6/29.4*/51.7*†	15.8/40.6*/62.4*†	8.4/32.3*/52.5*†	18.6/32.5*/35.0*	7.3/15.3*/48.0*†	13.4/34.9*/51.7*†

DFI item	Percent of respondents who reported “very much” or “a lot” of impact based on mild/moderate/severe AD					
	North America	Latin America	Europe	Middle East/Eurasia	East Asia	All regions
Help with treatment	7.3/26.1*/45.2*†	22.6/45.5*/73.1*†	7.5/30.2*/49.3*†	15.3/39.1*/27.1	4.5/9.4/48.0*†	15.6/37.3*/51.9*†

*$P < .05$ vs mild and †$P < .05$ vs moderate

Table V. Time spent to take care of the child in the past week due to the atopic dermatitis by atopic dermatitis severity assessed using the Patient-Oriented Eczema Measure (POEM) and Patient-Global Assessment (PtGA).

Region	**Hours, mean±SD (n)**								
	6 months to < 6 years			**6 years to < 12 years**			**12 years to < 18 years**		
	Mild	**Moderate**	**Severe**	**Mild**	**Moderate**	**Severe**	**Mild**	**Moderate**	**Severe**
POEM									
North America	4.0±6.8 (93)	9.6±18.9 (85)*	10.1±10.6 (19)*	3.2±6.3 (191)	9.4±12.5 (134)*	14.7±20.9 (42)*	2.7±5.9 (181)	6.9±10.3 (174)*	8.7±10.2 (58)*
Latin America	10.8±18.2 (167)	13.0±23.7 (177)	21.1±29.9 (23)	8.8±13.1 (418)	16.4±24.3 (260)*	25.9±26.7 (39)*†	7.1±10.9 (465)	12.8±17.1 (340)*	19.6±22.1 (68)*†
Europe	4.5±8.7 (248)	12.4±21.9 (233)*	23.9±30.7 (36)*†	3.7±8.3 (681)	8.0±12.0 (366)*	12.0±14.6 (64)*†	3.6±7.8 (578)	8.7±15.6 (408)*	13.5±16.7 (84)*†
Middle East/Eurasia	11.0±24.4 (98)	14.6±20.2 (83)	20.9±28.1 (16)	6.3±11.4 (211)	13.1±19.9 (192)*	12.5±10.0 (26)*	6.2±12.7 (196)	10.4±11.6 (212)*	13.0±14.7 (48)*
East Asia	5.0±12.6 (126)	10.0±23.1 (73)	7.4±9.8 (9)	2.4±6.9 (167)	5.2±9.5 (93)*	12.3±14.2 (12)*	2.7±7.8 (164)	6.8±9.9 (78)*	19.1±29.4 (21)*
All regions	7.8±16.4 (732)	12.3±22.1 (651)*	17.9±25.8 (103)*†	5.9±10.9 (1668)	12.3±19.4 (1045)*	17.5±21.5 (183)*†	5.5±10.2 (1584)	10.5±14.8 (1212)*	14.8±18.5 (279)*†
PtGA									
North America	4.6±7.6 (124)	10.9±21.3 (61)*	11.4±12.2 (12)	4.6±8.5 (239)	10.3±15.3 (108)*	15.8±19.3 (19)*	2.8±5.3 (214)	7.2±9.7 (164)*	11.7±15.1 (35)*

Region	**Hours, mean±SD (n)**								
	6 months to < 6 years			**6 years to < 12 years**			**12 years to < 18 years**		
	Mild	**Moderate**	**Severe**	**Mild**	**Moderate**	**Severe**	**Mild**	**Moderate**	**Severe**
Latin America	11.0±20.5 (218)	13.5±23.0 (132)	23.6±27.6 (17)	8.7±13.6 (416)	17.8±25.2 (276)*	16.4±11.4 (24)*	7.3±11.5 (495)	12.4±15.5 (332)*	27.1±28.4 (46)*†
Europe	5.0±8.8 (304)	14.7±25.0 (167)*	21.9±29.6 (46)*	4.0±9.3 (717)	8.5±11.6 (355)*	10.3±12.9 (39)*	4.0±9.4 (650)	9.9±15.8 (368)*	12.5±15.2 (52)*
Middle East/Eurasia	9.5±15.6 (119)	18.0±29.6 (67)*	32.0±39.9 (11)	6.2±8.8 (237)	13.0±21.6 (179)*	23.2±15.5 (13)*†	7.2±12.9 (246)	10.7±11.2 (187)*	12.9±16.7 (23)
East Asia	6.9±19.0 (159)	6.9±10.4 (42)	8.4±9.9 (7)	2.5±6.6 (202)	6.8±12.3 (63)*	13.0±10.0 (7)*	2.1±4.3 (167)	9.3±17.0 (92)*	36.6±28.4 (4)*
All regions	8.0±16.3 (924)	13.6±23.9 (469)*	20.5±27.6 (93)*†	6.0±10.9 (1811)	13.6±21.1 (981)*	16.4±14.9 (102)*	5.8±10.7 (1772)	10.7±14.2 (1143)*	18.7±23.2 (160)*†

**P* < .05 vs mild and †*P* < .05 vs moderate

Table VI. Days missed from work in the past 4 weeks due to the child's atopic dermatitis among parents currently working by atopic dermatitis severity assessed using the Patient-Oriented Eczema Measure (POEM) and Patient-Global Assessment (PtGA).

Region	**Days, mean±SD (n)**								
	6 months to < 6 years			**6 years to < 12 years**			**12 years to < 18 years**		
	Mild	**Moderate**	**Severe**	**Mild**	**Moderate**	**Severe**	**Mild**	**Moderate**	**Severe**
POEM									
North America	0.9±1.3	2.6±3.2	5.1±5.2	0.8±1.5	3.4±4.0	3.9±4.5	1.0±2.2	2.8±2.8	4.9±6.4
	(64)	(64)*	(13)*	(127)	(107)*	(35)*	(133)	(130)*	(46)*†
Latin America	2.8±3.2	4.4±4.1	8.0±4.5	2.4±3.0	4.4±3.5	7.1±6.7	2.1±2.5	4.4±4.1	6.3±5.0
	(159)	(166)*	(18)*†	(400)	(249)*	(37)*†	(428)	(326)*	(62)*†
Europe	1.6±2.7	4.2±4.5	9.7±8.8	1.2±2.0	3.3±4.1	4.7±5.3	1.1±2.6	2.9±3.8	4.5±4.6
	(203)	(190)*	(33)*†	(597)	(331)*	(55)*	(489)	(368)*	(79)*†
Middle East/Eurasia	3.1±2.4	5.2±4.6	6.1±6.6	2.5±2.3	4.9±3.9	6.0±6.7	2.7±3.8	4.8±4.7	7.8±7.8
	(84)	(77)*	(16)	(193)	(174)*	(24)*	(178)	(198)*	(41)*†
East Asia	1.4±2.7	2.5±3.3	3.1±2.3	0.6±1.3	1.3±2.0	1.8±1.9	0.9±2.4	1.9±2.4	3.0±2.7
	(102)	(54)*	(6)	(145)	(80)*	(11)*	(145)	(72)*	(17)*
All regions	2.2±2.8	4.1±4.2	7.1±6.4	1.8±2.6	4.0±3.8	5.5±6.0	1.8±2.8	4.0±4.1	6.0±6.1
	(612)	(551)*	(86)*†	(1462)	(941)*	(162)*†	(1373)	(1094)*	(245)*†
PtGA									
North America	1.7±2.7	3.0±3.8	2.0±2.0	1.7±2.5	2.8±4.1	5.1±5.9	1.6±2.7	2.4±3.5	5.4±6.1
	(94)	(41)*	(6)	(167)	(85)*	(16)	(161)	(122)	(26)*†

Region	**Days, mean±SD (n)**								
	6 months to < 6 years			**6 years to < 12 years**			**12 years to < 18 years**		
	Mild	**Moderate**	**Severe**	**Mild**	**Moderate**	**Severe**	**Mild**	**Moderate**	**Severe**
Latin America	3.1±2.8	4.6±4.8	7.8±5.3	2.6±2.9	4.2±4.4	6.7±3.2	2.5±3.0	4.1±3.9	7.3±5.1
	(207)	(122)*	(14)*†	(394)	(267)*	(24)*†	(455)	(320)*	(41)*†
Europe	2.3±3.5	3.8±5.0	8.5±7.4	1.7±2.9	2.9±4.0	4.4±4.0	1.5±3.0	2.8±3.9	4.8±4.1
	(242)	(140)*	(44)*†	(635)	(318)*	(30)*	(545)	(342)*	(49)*†
Middle East/Eurasia	3.3±2.4	5.3±4.9	9.7±7.4	3.0±2.8	4.5±3.8	7.3±8.0	3.9±4.8	4.3±4.8	7.8±7.9
	(102)	(64)*	(11)*	(220)	(159)*	(12)	(227)	(168)	(22)*
East Asia	1.8±3.1	1.7±2.3	3.3±2.3	0.6±1.1	1.8±2.6	1.8±1.8	0.9±2.3	2.0±2.6	4.4±2.5
	(127)	(28)	(7)	(175)	(55)*	(6)	(145)	(85)*	(4)*
All regions	2.6±3.0	4.3±4.7	7.3±6.5	2.2±2.8	3.8±4.2	6.0±5.3	2.4±3.5	3.6±4.1	6.6±6.0
	(772)	(395)*	(82)*†	(1591)	(884)*	(88)*†	(1533)	(1037)*	(142)*†

**P* < .05 and †*P* < .05 vs moderate