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ORIGINAL ARTICLE

The Burden of Atopic Dermatitis in U.S. Adults: Results from the 2013 National Health and Wellness Survey

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Key words: Burden of illness, Health related quality of life, atopic dermatitis, Health care resource utilization

[Short title: The Burden of Atopic Dermatitis in U.S. Adults]

Abstract

OBJECTIVES: To characterize comorbidities, health-related quality-of-life (HRQoL), productivity, and healthcare resource use in adults with atopic dermatitis (AD) relative to those without AD, and to evaluate the impact of patient-reported AD severity on these outcomes.

METHODS: Data were from the 2013 National Health and Wellness Survey (NHWS), which collected self-reported information on demographics, comorbidities, HRQoL (SF-36v2 Health Survey), productivity (Work Productivity and Impairment questionnaire [WPAI]), and healthcare utilization, which were weighted to the US general population. The AD cohort consisted of subjects who reported they experienced AD within the past 12 months (n=428), and the non-AD cohort included all other subjects who did not report experiencing AD (n=74,572); 366 AD subjects self-reported mild (n=182) or moderate/severe (n=184) disease. Univariable and multivariable analyses compared characteristics and outcomes between cohorts and between AD severity levels.

RESULTS: The AD cohort was younger than non-AD cohort (44.3 vs 46.6 years; $P=0.0033$), and had a higher proportion of females (64.4% vs 51.8%; $P<0.0001$). Relative to the non-AD cohort, AD cohort had a significantly higher prevalence of atopic conditions including nasal allergies (46.4% vs 19.8%) and asthma (22.4% vs 7.9%), and neuropsychiatric conditions such as anxiety (42.5% vs 21.3%) and depression (37.2% vs 20.9%) (all $P<0.0001$). Units of resource use (healthcare practitioner visits, emergency room, hospitalizations) were higher (all $P<0.05$) and HRQoL was poorer ($P<0.0001$) with AD. On the WPAI, AD employees reported almost twice as much lost work productivity as non-AD employees (30.0% vs 16.3%; $P<0.0001$). No clear differences in

outcomes were observed among patient-reported AD severity categories, except greater impairment of work productivity and daily activities in those with moderate/severe AD relative to mild.

CONCLUSIONS: The significant burden associated with AD relative to those without AD suggests an unmet need for more effective management strategies. There also appears a need for further characterization of disease severity and its impact on health resource and quality of life.

JUST ACCEPTED

Atopic dermatitis (AD) is a chronic, inflammatory skin disease with an estimated prevalence ranging from 1%-20% that varies by country and geographic region.¹ The pathophysiologic basis of AD appears to be an immune-mediated response that results in skin barrier disruption, with clinical presentation that includes pruritus, lichenification, papulation, and excoriations that may cover an extensive proportion of body surface area.² AD can occur at any age, although onset is generally associated with early childhood. While remission in late childhood is possible, AD becomes a chronic disease for many patients,³ and since there is no known cure, therapy is required over the lifetime of the patient. Current management guidelines recommend an integrated approach that relies primarily on symptomatic treatment but also incorporates therapies that target the underlying pathophysiology.^{4,5}

AD has a profound impact on pediatric patients and their families.⁶⁻⁸ However, the burden of AD has been less characterized in adults.⁹ While the effects of AD on sleep, mood, function, and health-related quality-of-life (HRQoL) have been recognized,¹⁰⁻¹⁴ there is a dearth of comparative data on the disease burden in adults relative to the general population. To expand our understanding of the adult burden of AD, the objective of this study was to characterize comorbidities, HRQoL, work productivity, and healthcare resource use among U.S. adults with AD relative to those without AD. A secondary objective was to evaluate the impact of patient-rated AD severity on these outcomes.

Methods

Data source and population

Data were obtained from the 2013 U.S. National Health and Wellness Survey (NHWS). The NHWS is a self-administered, internet-based survey that includes disease-specific measures and is administered annually to adults ≥ 18 years of age. It is fielded through an opt-in panel and uses a random stratified sampling framework (gender, age, and race/ethnicity) to ensure that it is representative of the demographic composition of the U.S. adult population. NHWS data have been suggested to compare favorably with estimates of U.S. demographic composition according to the census and with estimates from the National Health Interview Survey.^{15,16} The NHWS has received Institutional Review Board approval by Essex IRB (Lebanon, NJ).

Of 1,176,292 individuals who were contacted to complete the 2013 NHWS, 109,388 responded (9.3% response rate), and of those responders, 75,000 gave their informed consent, met the inclusion criteria (age ≥ 18 years), and completed the survey instrument. From this population, two cohorts were identified: those with AD, defined as subjects who reported they experienced AD within the past 12 months, and those without AD, defined as all other subjects who did not report experiencing AD within the past 12 months. The AD subjects self-rated their AD severity based on the question “How severe is your dermatitis?” with potential responses of “mild,” “moderate,” and “severe”. Subjects were then stratified for additional analysis by mild vs moderate/severe.

Outcomes

In addition to demographic characteristics (age, race/ethnicity, marital status, education, employment status, annual household income, and health insurance), health and clinical characteristics were also captured. These characteristics included body mass index, the presence of atopic-related comorbidities (nasal allergies, skin allergies defined as hives and other contact allergies, and asthma), and neuropsychiatric conditions that have been suggested to be associated with AD such as attention deficit hyperactivity disorder (ADHD), anxiety, and depression.¹⁷ Participants also self-reported whether a physician had ever diagnosed them with AD, and whether they had used a prescription medication for AD.

Work productivity was measured using the Work Productivity and Activity Impairment (WPAI) questionnaire.¹⁷ The WPAI is a validated instrument used to measure loss of productivity at work and impairment in daily activities over the past 7 days. The questionnaire includes four items: absenteeism, presenteeism, overall work impairment, and activity impairment that range from 0%-100%, with higher values indicating greater impairment. While absenteeism represents the percentage of work time missed due to health problems, presenteeism represents the percentage of impairment while at work due to health problems. Overall work impairment represents the total percentage of work time missed due to either absenteeism or presenteeism (since those are mutually exclusive). Only employed respondents provided data on absenteeism, presenteeism, and overall work impairment. In contrast, all respondents provided data on activity impairment, which represents the percentage of impairment during daily activities other than work.

The 4-items are all evaluated using an 11-point Likert-type scale from 0 (no effect) to 10 (completely prevented), and the scores are multiplied by ten to arrive at a percentage.

HRQoL was assessed using the physical (PCS) and mental component summary (MCS) scores from the self-reported SF-36 v2 Health Survey,¹⁸ which is a generic instrument comprising 36 questions encompassing physical and mental domains affecting HRQoL. Scores for the PCS and MCS are normed to the US population (mean = 50, SD = 10) and vary from 0 to 100, with higher scores indicating better quality of life.

Healthcare resource utilization within the past six months was self-reported and included number of traditional healthcare practitioner visits as well as emergency room visits and hospitalizations.

Analyses

The demographic and health characteristics of the AD and non-AD cohorts were characterized and initially compared using t-tests for continuous variables, and the Rao-Scott chi-square test for categorical variables. For comparisons based on AD severity, between groups comparisons were performed using t-tests (continuous variables) and the Rao-Scott chi-square test for categorical variables. All analyses were performed using the survey procedure in SAS version 9.2 (SAS Institute, Cary, NC) and included statements for strata and 2013 census weights. Two-tailed statistical significance was set a priori as $P < 0.05$.

Results

Subject populations

A total of 75,000 subjects responded to the 2013 wave of the NHWS, of whom 428 reported experiencing AD within the past 12 months; the other 74,572 subjects served as the comparator cohort. Among those with AD, 366 subjects graded their disease severity as mild ($n = 182$), moderate ($n = 148$), or severe ($n = 36$), 84.5% reported that they received a diagnosis of AD from a physician, but less than half (48.0%) reported prescription medication use for AD.

As shown in Table 1, the AD population was significantly younger than non-AD subjects (44.3 vs 46.6 years; $P = 0.0033$), and was characterized by a higher proportion of females (64.4% vs 51.8%; $P < 0.0001$). Although significant differences were also observed across race distribution, marital status, and education level, with the latter suggesting an overall higher level of education among those with AD, there was no difference between populations in income (Table 1). Among employment status categories, significantly more AD subjects relative to non-AD subjects were self-employed, and significantly fewer were retired or unemployed (Table 1). However, the rate of long-term disability was significantly higher among AD subjects, by approximately two-fold.

Demographic characteristics were generally similar between the mild and moderate/severe AD groups (Table 2). The only notable difference was a significantly higher rate of long-term disability among those who reported moderate/severe AD

(13.8% vs 6.5%; $P = 0.0002$), although the moderate/severe group also appeared to be characterized by a significantly greater proportion of students (Table 2). While similar proportions of the mild and moderate/severe groups reported that they received a diagnosis of AD from a physician (83.1% and 89.5%; $P = 0.1469$, respectively), a significantly greater proportion of moderate/severe subjects reported prescription medication use for AD (57.2% vs 41.8%; $P = 0.0243$).

Comorbid conditions

Subjects with AD had a significantly higher self-reported prevalence of all evaluated comorbid conditions relative to those without AD (all $P < 0.0001$) (Table 3). Among the atopic conditions, almost half of the subjects with AD (46.4%) reported nasal allergies, and more than one-fifth (22.4%) reported asthma, in contrast to 19.8% and 7.9% of non-AD subjects, respectively. The neuropsychiatric conditions with the highest prevalence in AD subjects were anxiety (42.5%) and depression (37.2%).

While there was a higher prevalence of nasal allergies, skin allergies, and asthma among subjects with moderate/severe AD relative to mild (Table 3), only for the skin allergies was the difference significant (43.6% vs 30.8%; $P = 0.0252$). No significant differences in the prevalence of neuropsychiatric comorbidities were observed between severity categories.

Health-related quality of life

Subjects with AD reported impaired HRQoL relative to subjects without AD as indicated by significantly lower scores on the SF-36 PCS (47.1 vs 50.1; $P < 0.0001$) and MCS (42.8 vs 48.3; $P < 0.0001$) (Figure 1A). Subjects who self-reported moderate/severe AD had significantly worse PCS scores than the mild group (44.6 vs 49.5; $P < 0.0001$) (Figure 1B). However, the MCS scores were not significantly different between mild and moderate/severe AD (Figure 1B).

Work productivity

As shown in Figure 2A, work productivity and overall activity were impaired to a significantly greater extent among AD subjects relative to those without AD (all $P < 0.0001$). Among those who were employed and responded to the WPAI, absenteeism and presenteeism were 3- and 1.7-fold greater, respectively, in those with AD compared with non-AD subjects; lost productivity appeared to be driven by presenteeism in both cohorts. Overall, workers with AD reported 30% lost work productivity, almost twice as much as non-AD workers (16.3%).

In the disease severity groups (Figure 2B), moderate/severe AD was consistently associated with greater impairment than mild AD across all WPAI items, showing significance except for presenteeism. Regardless of AD severity, presenteeism appeared to be the driver of lost work productivity.

Healthcare resource utilization

Subjects with AD reported using significantly greater mean healthcare resource units in the prior 6 months across the three evaluated healthcare resource categories (Figure 3A), even though use of emergency room and hospitalizations overall were low. Outpatient visits were reported as the most frequently used resource category in both mild and moderate/severe AD (Figure 3B), with both severity groups reporting similar levels of use. Only for the emergency room was the difference between severity groups significant, with moderate/severe subjects reporting twice as many visits than mild (0.8 vs 0.4; $P < 0.05$).

Discussion

This study provides an initial characterization of the patient-reported burden of AD in the US general population. The results show that subjects with AD had a higher prevalence of comorbidities, poorer HRQoL, greater loss of work productivity among those employed, and increased utilization of healthcare resources than subjects without AD, with all differences showing statistical significance.

These results are consistent with the described impact of AD on patient function and daily life,¹²⁻¹⁴ and further suggest the magnitude of these burdens relative to those without AD. In particular, atopic and neuropsychiatric comorbidities were reported by significantly higher proportions of subjects with AD, although it should also be noted that the temporal relationship between AD and these comorbidities could not be established. The higher prevalence of other atopic conditions was not surprising, given the “atopic march” that has been characterized as showing progression to multiple atopic

comorbidities.¹⁹ The prevalence of neuropsychiatric conditions provides further support for the increasing recognition of the effects of AD on mental health.^{13,14} Notably, the prevalence of anxiety was higher than depression, consistent with previous studies,^{13,14,20} although the proportion of patients who self-reported these comorbid conditions was higher than in studies that used a clinical measure to assess anxiety and depression.^{13,14} Mental health in AD not only shows a correlation with HRQoL,²¹ as also indicated by the significantly higher MCS and PCS scores relative to non-AD in the current study, but is also clinically relevant because of potential suicidal ideation.^{22,23} Interestingly, the prevalence of ADHD and ADD was also significantly higher in the AD cohort relative to non-AD, consistent with an increasing recognition of an association between AD and ADHD/ADD.^{17,24} These observations indicate the importance of recognizing and addressing mental health issues as a component integral to the management of AD.

While a recent burden of illness study using pre-treatment data from moderate-to-severe AD patients participating in a clinical trial suggested profound effects of AD on work or study,¹⁴ there is little quantitative information in the literature on the impact of AD on work productivity. The results reported here from the WPAI not only show that the difference between AD and non-AD subjects is both statistically significant and substantial, but the data are consistent with a previous study in suggesting that lost work productivity is primarily driven by presenteeism.¹² However, two important differences between the studies should be noted. These differences include potential cultural differences toward work as well as different methodology, as the other study evaluated a

Japanese population and used a disease-specific version of the WPAI, whereas the current study used a general health version.

Healthcare resource utilization was significantly higher in the AD cohort for all resource categories, and was driven by outpatient visits. Although there were relatively few reported emergency room visits and hospitalizations, the utilization of these categories was 3- and 4-times higher, respectively in the AD cohort relative to non-AD, both showing statistical significance. Pharmacy utilization, which was only captured in the AD cohort with regard to AD-specific prescription medications, showed an overall low use of these medications. Less than half (48.0%) of the total cohort reported such use, and even among those who reported AD severity, the proportions were low in both severity groups, with 41.8% of those with mild and 57.2% with moderate/severe AD reporting prescription medication use. The reasons for the low use of prescription medications for AD could not be determined, but may relate to the limited availability of effective therapies and the variable effectiveness of therapies that are prescribed, which may also result in the poor adherence that has been reported in AD patients.^{25,26}

Although significantly higher burdens were observed in the AD relative to the non-AD cohort, this study also showed that self-reported disease severity did not consistently demonstrate a statistical association with the magnitude of the disease burden. Indeed, among the comorbidities evaluated, only the prevalence of skin allergies was significantly higher in subjects who reported moderate/severe AD compared with mild. Similarly, with respect to healthcare resource utilization, only emergency room visits

were greater and among those with moderate/severe AD. With regard to HRQoL, the PCS score but not the MCS differed between the groups, with lower PCS scores associated with moderate/severe AD.

The lack of consistency for the association between self-reported disease severity and burden is in contrast to what has been reported across a range of conditions that have also been evaluated using the NHWS such as osteoarthritis,²⁷ multiple sclerosis,²⁸ painful diabetic peripheral neuropathy,²⁹ and post-menopausal vasomotor symptoms³⁰; the disease burdens were significantly higher at greater levels of severity. The reasons for the general lack of association between severity and burden in the current study are not clear and warrant further investigation; however, there are several possibilities. For example, the majority of the subjects in the moderate/severe categories reported moderate AD; therefore, there may not have been sufficient statistical power to detect minimal differences in outcomes between the groups. Additionally, these results may reflect variability in how patients perceive and rate their disease severity. Indeed, AD remains problematic for rating severity both from the patient and clinical perspectives. While investigator global assessment scales that are frequently used for rating AD severity lack consistency and consensus,³¹ there has also been a lack of studies evaluating how patients and physicians determine AD severity in clinical practice and the extent of rating agreement between patients and clinicians.

Strengths and limitations

Strengths of this study include enhanced generalizability resulting from a weighted analysis to reflect the US general population, and inclusion of employed subjects for evaluation of work productivity. However, several limitations should be noted in addition to those previously mentioned. One key limitation is that the NHWS is a patient-reported internet survey. The self-administration of the survey may have resulted in recall bias or misclassification due to potential lack of understanding of the question, technical difficulties or the fact that the AD diagnosis and rating of severity were not verified against clinical data. Furthermore, since this study is cross-sectional, causal inferences cannot be made. An additional limitation is that the resource utilization cannot be ascribed to AD, since claims directly linking resource use with AD are lacking. In addition, with regard to other outcomes, neither the WPAI nor the HRQoL instrument were disease-specific. Therefore, the perceived impact of AD on work productivity, daily activities, and HRQoL could not be isolated. Lastly, the NHWS provides a broad evaluation of disease burden but lacks the ability to evaluate AD-specific symptoms and patient complaints such as itch and sleep disturbance, and precludes categorization of severity using clinical measures (e.g., Scoring of Atopic Dermatitis scale³² and the Eczema Area and Severity Index³³).

Conclusion

Despite these limitations, this study suggests that, relative to those without AD, there is a substantial patient burden associated with AD that is manifested by reductions in physical and mental components of HRQoL, substantial impairments in work productivity, and an increased prevalence of comorbid conditions. Subjects with moderate/severe AD

generally reported a higher burden than those with mild AD with regard to work productivity and physical components of HRQoL, although the comorbidity burden appears to have less of a distinction between mild and moderate/severe disease. These findings not only suggest a need for greater characterization of disease severity levels, but also an unmet need for effective and comprehensive management strategies.

Transparency

Declaration of funding:

This study was sponsored by Pfizer

Declaration of financial/other relationships:

JW was an employed by Pfizer during and after completion and submission of this study. BE, RS and GM are employees of Pfizer, Inc. CMRO Peer Reviewers on this manuscript have no relevant financial or other relationships to disclose.

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Figure legends

Figure 1. Component summary scores of the 36-item Short Form Health Survey (SF-36).

A) Subjects with atopic dermatitis relative to those without atopic dermatitis. B) Subjects with atopic dermatitis stratified by self-reported atopic dermatitis severity.

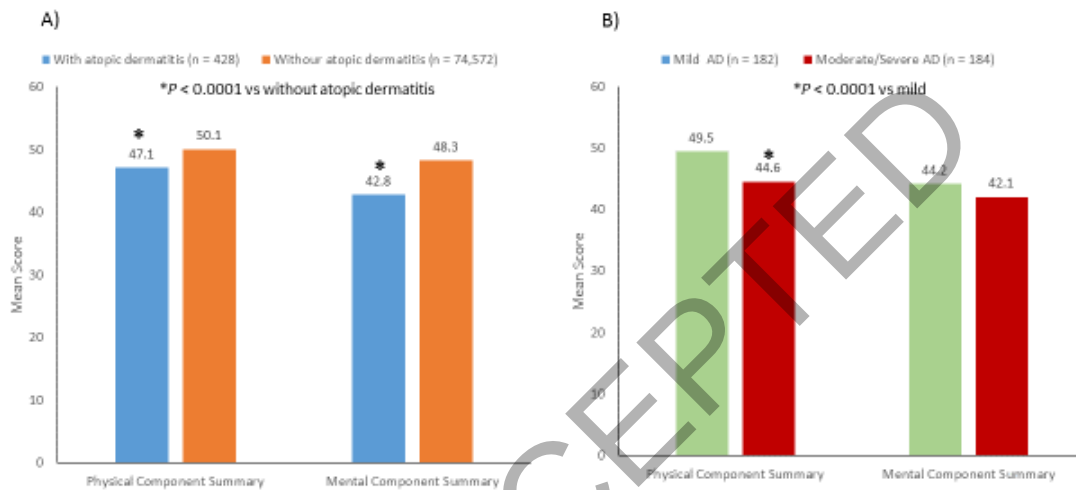


Figure 2. Percent lost productivity and activity impairment in the past week as measured by the Work Productivity and Activity Impairment questionnaire (WPAI).³⁴ A) Subjects with atopic dermatitis relative to those without atopic dermatitis. B) Subjects with atopic dermatitis stratified by self-reported atopic dermatitis severity.

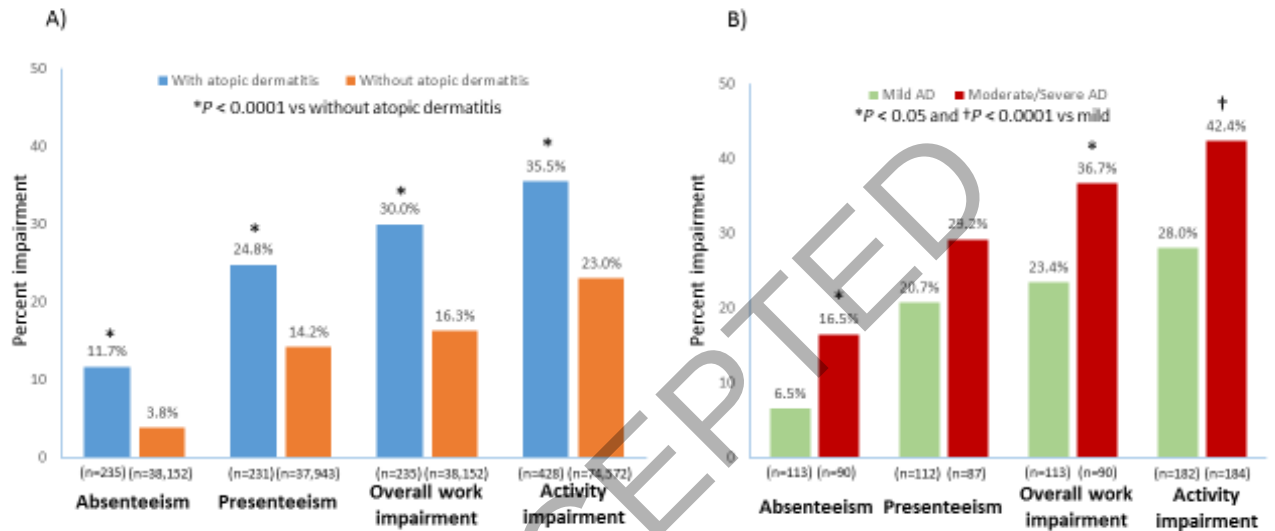


Figure 3. Self-reported healthcare resource utilization in the past 6 months. A) Subjects with atopic dermatitis relative to those without atopic dermatitis. B) Subjects with atopic dermatitis stratified by self-reported atopic dermatitis severity.

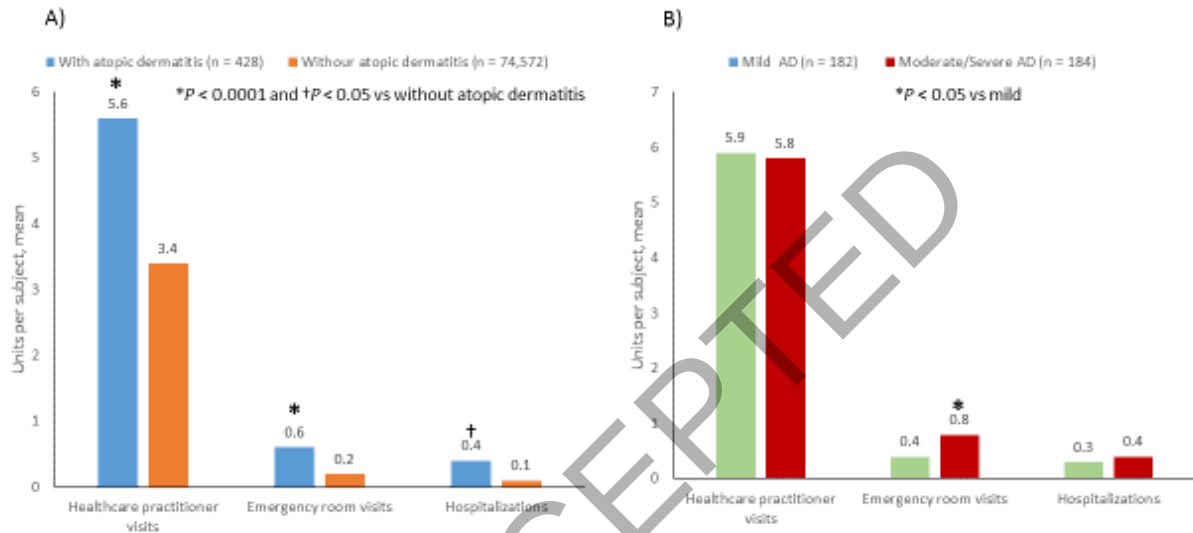


Table 1. Demographic and clinical characteristics of the atopic dermatitis and comparator cohorts.

Variable	With atopic dermatitis (n = 428)	Without atopic dermatitis (n = 74,572)	P
Age, mean (SE)	44.3 (0.8)	46.6 (0.02)	0.0033
Sex, n (%) ^a			< 0.0001
Male	148 (35.6)	36,141 (48.2)	
Female	280 (64.4)	38,431 (51.8)	
Race, n (%) ^a			< 0.0001
White	301 (70.7)	57,615 (75.1)	
Black/African-American	47 (11.0)	8,824 (11.8)	
Asian/Pacific Islander	39 (7.4)	3,837 (4.3)	
Native American/Alaskan native	8 (2.5)	831 (1.4)	
Other	31 (7.2)	3,167 (4.2)	
Declined to answer	2 (0.8)	298 (0.8)	
Body mass index, kg/m ² , mean (SE) ^b	28.6 (0.4)	28.3 (0.03)	0.4408
Marital status, n (%) ^a			0.0199
Married	213 (47.1)	38,585 (47.8)	
Single, never married	114 (27.8)	18,654 (28.0)	
Divorced	59 (15.3)	8,328 (10.9)	
Separated	5 (1.1)	1,187 (1.7)	
Widowed	10 (2.1)	3,176 (4.9)	

Variable	With atopic dermatitis (n = 428)	Without atopic dermatitis (n = 74,572)	P
Living with partner	27 (6.6)	4,642 (6.7)	
Education, n (%) ^a			< 0.0001
High school or less	49 (14.9)	15,145 (20.3)	
More than high school	371 (85.1)	59,427 (79.7)	
Employment status, n (%) ^a			
Employed full time	167 (37.7)	27,356 (35.8)	0.4387
Self-employed	35 (8.7)	4,521 (5.9)	0.0396
Employed part time	41 (10.1)	8,047 (11.2)	0.5540
Homemaker	37 (8.7)	5,448 (7.6)	0.3978
Retired	63 (14.1)	16,014 (18.7)	0.0247
Student	18 (4.0)	2,788 (4.8)	0.4381
Not employed, looking for work	24 (5.9)	5,939 (9.4)	0.0154
Not employed, not looking for work	6 (1.4)	1,456 (2.3)	0.2778
Long-Term Disability	36 (8.9)	2,807 (4.0)	< 0.0001
Short-Term Disability	1 (0.4)	196 (0.3)	0.7177
Income, n (%) ^a			0.4979
< \$25,000	124 (31.7)	20,966 (31.6)	
\$25,000 to \$49,999	107 (26.6)	19,759 (27.1)	
\$50,000 to \$74,999	70 (14.9)	12,039 (14.7)	

Variable	With atopic dermatitis (n = 428)	Without atopic dermatitis (n = 74,572)	<i>P</i>
≥ \$75,000	80 (16.1)	13,062 (14.2)	
Does not have personal income	23 (5.0)	5,437 (7.4)	
Declined to answer	24 (5.7)	3,309 (5.0)	
Health Insurance, n (%) ^a	364 (84.0)	61,951 (79.6)	0.0385
SE, standard error			

^aAll percentages reflect weighted frequency

^bBody mass index was available for 418 subjects with atopic dermatitis and 72,678 of the comparator subjects.

Table 2. Demographic and clinical characteristics of subjects with atopic dermatitis stratified by self-reported disease severity.

Variable	Mild AD (n = 182)	Moderate/Severe AD (n = 184)	P
Age, mean (SE)	44.2 (1.0)	43.8 (1.0)	0.8279
Sex, n (%) ^a			0.5578
Male	65 (34.9)	64	
Female	117 (65.1)	120	
Race, n (%) ^a			0.4972
White	133 (74.7)	118 (63.8)	
Black/African-American	15 (7.8)	28 (13.7)	
Asian/Pacific Islander	16 (7.0)	18 (8.1)	
Native American/Alaskan native	3 (1.9)	5 (3.7)	
Other	14 (7.6)	3 (2.3)	
Declined to answer	1 (1.0)	1 (0.9)	
Body mass index, kg/m ² , mean (SE) ^b	28.1 (0.5)	29.2 (0.4)	
Marital status, n (%) ^a			0.7671
Married	100 (51.3)	84 (43.9)	
Single, never married	46 (25.2)	56 (32.4)	
Divorced	22 (15.0)	25 (14.5)	
Separated	2 (0.9)	2 (0.9)	

Variable	Mild AD (n = 182)	Moderate/Severe AD (n = 184)	P
Widowed	3 (1.3)	4 (1.9)	
Living with partner	9 (6.3)	13 (6.3)	
Education, n (%) ^a			0.0682
High school or less	13 (10.7)	29 (19.2)	
More than high school	169 (89.3)	155 (80.8)	
Employment status, n (%) ^a			
Employed full time	80 (43.3)	66 (33.1)	0.0663
Self-employed	18 (11.1)	12 (6.8)	0.2147
Employed part time	19 (11.9)	15 (8.2)	0.3111
Homemaker	18 (9.7)	14 (8.1)	0.6134
Retired	23 (11.1)	29 (16.4)	0.1931
Student	3 (1.5)	12 (6.1)	0.0224
Not employed, looking for work	7 (3.2)	9 (5.9)	0.8424
Not employed, not looking for work	1 (0.6)	3 (1.6)	0.4077
Long-Term Disability	12 (6.5)	24 (13.8)	0.0002
Short-Term Disability	1 (1.1)	0	—
Income, n (%) ^a			0.0729
< \$25,000	41 (25.2)	58 (34.6)	
\$25,000 to \$49,999	48 (27.4)	46 (26.8)	

Variable	Mild AD (n = 182)	Moderate/Severe AD (n = 184)	P
\$50,000 to \$74,999	29 (14.1)	33 (16.9)	
≥ \$75,000	45 (22.7)	25 (10.5)	
Does not have personal income	11 (6.4)	12 (6.2)	
Declined to answer	8 (4.2)	10 (5.0)	
Health Insurance, n (%) ^a	160 (87.0)	(83.3)	0.3518
SE, standard error			

^aAll percentages reflect weighted frequency

^bBody mass index was available for 176 subjects with mild AD and 180 subjects with moderate/severe AD.

Table 3. Self-reported comorbid conditions.

Comorbidity	Weighted percent of subjects					
	By AD presence			By self-reported AD severity		
	With	Without	<i>P</i>	Mild	Moderate/Severe	<i>P</i>
	atopic dermatitis (n = 428)	atopic dermatitis (n = 74,572)		AD (n = 182)	AD (n = 184)	
Atopic comorbidities						
Nasal allergies	46.4	19.8	< 0.0001	44.7	49.4	0.4237
Skin allergies	34.3	4.5	< 0.0001	30.8	43.6	0.0252
Hay fever	30.3	10.1	< 0.0001	32.4	29.5	0.5654
Asthma	22.4	7.9	< 0.0001	22.9	24.7	0.7072
Neuropsychiatric comorbidities						
Bipolar	10.4	3.2	< 0.0001	7.9	12.1	0.2470
Depression	37.2	20.9	<	34.6	39.4	0.3814

