

SHORT COMMUNICATION

Is Adult Atopic Eczema More Common Than We Think? – A Population-based Study in Danish Adults

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Atopic eczema (AE) is a common chronic skin disease which primarily affects children but may extend into adulthood. Mutations of filaggrin and abnormalities of stratum corneum ceramides are currently considered to be major aetiological factors of AE (1). Epidemiological studies suggest a marked increase in the prevalence of AE over the last decades, but recent studies in children suggest that the prevalence in countries with the highest prevalence has reached a steady level (2, 3). Worldwide prevalence rates for children range from 0.2–24.6% (2, 4). Much less is known about adult AE. Based on the current understanding of the disease as a consequence of a genetically determined barrier defect, a cohort effect may be hypothesised, which would lead to adult AE prevalence rising. Different screening methods have suggested the adult one-year prevalence estimates range between 0.3–11.5% (5–7).

Questionnaire studies present an appealing method for the collection of prevalence data in large population samples. The UK Working Party's Diagnostic Criteria for Atopic Dermatitis (now UK diagnostic criteria) (8) are used in many studies; however additional validation in the very young and in adults may be needed. For adults former use of the UK diagnostic criteria (questionnaire) showed an overall one-year prevalence of 2.9% in Japan (9). Additional population-based studies of adult AE therefore appear warranted, as such studies are rare and the results show considerable variation. The aim of this study was to investigate the prevalence of AE in a Danish adult population using the UK diagnostic criteria.

MATERIAL AND METHODS

Data were obtained from the Danish General Suburban Population Study (GESUS), a general cross-sectional population study of the health status of the population in Naestved Municipality, 70 km south of Copenhagen. The study included a self-administered questionnaire. GESUS was initiated in January 2010 and is still ongoing. All people aged > 30 and a random selection of 25% of people aged 20–30 years (population size 81,000) were invited (10). The prevalence of AE was investigated in the questionnaire by use of the UK diagnostic criteria for epidemiological studies. The version with questions only was used (itch plus 2 or more out of the remaining 4 features) as no physical examination by a dermatologist was performed. These criteria can be used with an estimated diagnostic sensitivity of 85%, specificity of 91% and positive predictive value

of 59% compared to the sensitivity of 80%, specificity of 97% and positive predictive value of 80% for the criteria using itch and 3 plus more features (8).

Categorical data were presented by frequency and percentage and were compared with χ^2 test. The association between the prevalence of atopic dermatitis and age was analysed with the χ^2 test for trend. All analyses were performed using SAS[®] software (SAS Institute Inc., Cary, NC, USA) version 9.2.

The study was approved by the appropriate institutional review boards and ethical committees (SJ-113, SJ-114, SJ-147, SJ-278), and reported to the Danish Data Protection Agency. Written informed consent was obtained from all participants. The investigation conformed to the principles of the Declaration of Helsinki.

RESULTS

A total of 17,454 individuals had participated in GESUS by the cut-off date of the 21st of March 2013. Among people aged 40–79 the participation rate was 53.9% (57.0% among women and 50.6% among men) (10).

Of the 17,454 participants, 609 were excluded due to missing data (not answering the main question “have you had an itchy skin condition in the last 12 months?”), and people aged 20–29 and 90–100 were excluded due to low participation rates (10). The analysis was thus based on 16,507 participants of which 54.3% were women and 45.7% were men. The age group 60–69 was the most represented as every fourth participant belonged to this group (26.0%) followed by the age-groups 40–49 and 50–59 (data not shown).

The 1-year prevalence of AE was found to be 14.3% in adults aged 30 to 89 years (Table I). The prevalence of AE was highest in the younger age groups with a maximum value of 19.2% in those aged 30–40. In all age groups, except those aged 70–90, the prevalence of AE was higher in women compared with men. The association between prevalence and age was statistically significant for all participants as well as each sex group, showing decreasing prevalence with increasing age (trend, $p < 0.001$).

DISCUSSION

While the suggested prevalence of 14.3% is markedly higher than most of the previously reported (6, 7, 9), it is in agreement with a recent Swedish study which reported a population-based self-reported 1-year prevalence of 11.5% (lifetime prevalence of 40.1 %) for

Table I. Patients with atopic dermatitis: frequency and 1-year prevalence

Age group, years	Women n (%) [95% CI]	Men n (%) [95% CI]	p-values ^a	Total n (%) [95% CI]
30s	316 (22.4) [20.2–24.5]	160 (15.0) [12.8–17.1]	<0.001	476 (19.2) [17.6–20.7]
40s	360 (17.7) [16.0–19.3]	199 (12.5) [10.9–14.1]	<0.001	559 (15.4) [14.2–16.6]
50s	354 (16.3) [14.8–17.9]	214 (12.0) [10.5–13.5]	<0.001	568 (14.4) [13.3–15.5]
60s	308 (13.7) [12.3–15.1]	217 (10.7) [9.3–12.0]	<0.003	525 (12.2) [11.3–13.2]
70s	103 (11.2) [9.2–13.2]	96 (11.3) [9.1–13.4]	NS	199 (11.2) [9.8–12.7]
80s	19 (10.6) [6.0–15.1]	21 (10.1) [6.0–14.3]	NS	40 (10.3) [7.3–13.4]
Total	1,460 (16.3) [15.5–17.0]	907 (12.0) [11.3–12.8]	<0.001	2,367 (14.3) [13.8–14.9]

^aComparison between women and men. Test for trend: with increasing age, the prevalence is decreasing, $p < 0.001$.

people aged 16–75 (5). The higher prevalence found in women and the declining prevalence with increasing age are in good agreement with existing data (5, 9).

While other previously reported prevalence rates of AE have generally been lower (6, 7, 9), these studies are difficult to compare because of different diagnostic criteria, sampling methods used and the different age groups studied. Some of the previous studies have utilised simpler and less validated diagnostic questions which may therefore produce less predictable and valid results. Similarly, only patients previously diagnosed as having AE by a physician have been reported as representative of the prevalence rate of the disease, which introduces a strong selection bias.

The current paradigm implies the disease goes into spontaneous remission in 40–60% within 10–20 years (11) but longitudinal data from cohort studies are limited. A Swedish long-term follow-up (25–38 years) study of adult out-patients with AE found that 59–68% had AE at some time during the past 12 months (12). A long-term follow-up study of children diagnosed with AE found that 62% of those treated as in-patients and 40% of those treated as out-patients were still suffering from AE at the time of follow-up, which was at least 24 years later (13). In 1993, a cumulative incidence of childhood (7-year-olds) AE of 18.9% was found in Denmark, and 5 years later a repeated study found the cumulative incidence to be 19.6% (3). In the ISAAC Phase One multicentre study in 1999 the highest prevalence rate of the children aged 6–7 was found in Sweden (18.4%), whereas the prevalence rate of the Swedish 13–14 years olds was 14.5% (4). Although no Danish data are available from the ISAAC study, the reported prevalence rates for 7-year-olds in Sweden and cumulative incidence in Denmark appear similar. Because of the close proximity and many similarities between these two countries this would not be unexpected.

It is therefore hypothesised that the conspicuously high prevalence of possible AE found in this study is a cohort effect, reflecting the rise in AE prevalence seen in children over the last decades. A previous review reached a similar conclusion, suggesting that the numbers of patients with adult AE are likely to become more abundant in the near future (14). Although conclusive proof of a cohort effect requires longitudinal

observations it has long been known that impaired skin barrier function and a parental history of AE are major risk factors for the continuation of AE into adolescence (15). This may be interpreted as signs of persistent predispositions to AE which would in turn provide support of the hypothesis of a cohort-effect.

The main advantage of our study is the ability to use prevalence data from GESUS. Using a population-based approach, it is hoped that selection biases (e.g. sampling bias) may be minimised.

Our study shares limitations with cross-sectional epidemiological questionnaire studies, where recall and information bias may affect the results. The lack of physician-validated diagnosis further weakens the results as misclassification may be present, although diagnostic questions were used.

Finally, the UK Working Criteria have not been validated in Danish adults and the diagnosis of AE may therefore also be more conservatively interpreted as having an itching condition (rash) rather than AE.

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