



Occupational aspects

AE can have a negative impact on work life and is associated with a higher risk of hand eczema.	State- ment	<p>100%</p>  <p>100 % Agreement</p> <p>(15/15) Expert Consensus</p>
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We suggest individual pre-employment counselling regarding choice of profession, including risk assessment, avoidance strategies and protective measures.	↑	<p>100%</p>  <p>100 % Agreement</p> <p>(23/23) Expert Consensus</p>
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A number of occupational aspects are relevant to AE patients, as they are running a significant risk of developing occupational contact dermatitis. Atopy amplifies the effects of irritant and allergen exposure in several professions such as hairdressers, nurses, metalworkers, mechanics and cleaners, where hand eczema is a very common disease.¹ The risk for hand eczema in AE patients is increased about 4-fold.² Physicians should inform AE patients about the increased risk, and provide good guidance about prophylactic skin protection and irritant/contact allergen avoidance. All dermatologists treating adolescent patients with AE should advise these early on occupational aspects of their skin disease and suitable career choices.¹

Impact of atopic eczema on work life

AE has an adverse impact on QoL of patients and families, but may also impact work life and career choice. Knowledge is scarce though the socio-economic and individual costs due to loss of work activity is likely to be considerable.

The systematic review of Nørreslet et al. examined the literature up to February 2017 regarding impact on work life for AE patients, with a specific focus on choice of education and occupation, sick leave, change of job and disability pensions due to AE.³ No meta-analysis could be performed due to wide methodological heterogeneity of included publications. Quality assessment was performed by the authors based on a validated list of criteria.³ 23 papers were found eligible, including 26 studies with 103,343 participants from 12 different countries comprising 7,789 AE patients. Supplementary Table 4 provides an overview of these 26 studies.

Influence on job choice

Out of five studies on the influence of AE on job choice, only one study in three of moderate/high quality showed significant influence on job choice.⁴⁻⁶ Two studies of low quality demonstrated influence on job.^{7,8} Thus, no consistent conclusion can be drawn.

Influence on sick leave

For the nine studies on sick leave, only one was of moderate/high quality,⁹ the rest of low/moderate quality.^{6,7,10-15} Sick leave was assessed indirectly as work-loss costs, lost work productivity or days away from work. In all studies sick leave was self-reported, proposing a risk of recall bias. Eight out of nine studies found increased sick leave due to AE.^{6,7,10-15}

Social compensations due to AE

The two low quality studies on social compensations showed a negative impact.^{7,16}

Influence on work life

For the twelve studies assessing influence on work life due to AE, nine were of moderate or moderate/high quality^{6,9,17-23} and three of low/moderate or low quality.²⁴⁻²⁶ Objectives, outcomes and study designs were very heterogeneous. Overall, three studies reported significant influence of AE on change or loss of job,^{6,17,25} while five reported no marked association.^{9,18,21,22,26} The remaining studies did not assess this outcome.

This systematic review strongly suggests that AE negatively affects sick leave and possibly also job choice, change or loss of job and disability pensions.

After publication of the systematic review by Nørreslet et al.,³ several studies have been undertaken regarding the economic burden of AE. All studies report similar results with reduced work productivity and activity in AE patients.²⁷⁻³³ One study estimated annual costs of productivity loss at \$2400 higher for employed US adult AE patients vs. employed non-AE controls.²⁷ A Dutch study estimated costs of productivity loss at €6886 per patient per year (PPY) for controlled AE patients and €13.702 PPY for uncontrolled AE patients.²⁹

Risks in atopic eczema patients when starting / during work life

Apart from the risks mentioned above, another risk when starting or during work life may be the onset of hand eczema (HE). Ruff et al. conducted a systematic review and meta-analyses to establish the association estimate between AE and the point, 1-year and lifetime prevalence of HE compared to controls.² Thirty-five studies were included with 168.311 participants, of which twenty-six in the meta-analyses with 90.336 participants. Of these 26, 10 were considered of high quality, 15 of moderate quality and one of low quality.

Prevalence of HE was significantly increased and associated with AE (point prevalence OR 2.35 (95% CI 1.47-3.76), 1-year prevalence OR 4.29 (95% CI 3.13-5.88), lifetime prevalence OR 4.06 (95% CI 2.72-6.06)). Positive significant associations between AE and occupational HE were found (1-year OR 4.31 (95% CI 2.08-8.91), lifetime prevalence OR 2.81 (95% CI 2.08-3.79)). In general population studies these results were confirmed (1-year prevalence of HE in individuals with and without AE - OR 4.19 (95% CI 3.46-5.08), lifetime prevalence OR 5.69 (95% CI 4.41-7.36)).

The systematic review was limited by different methods to diagnose both AE and HE (questionnaires versus clinical observation; only 5 of 26 studies used the validated U.K. working party's diagnostic criteria; risk of misclassification), lack of prospective studies for 1-year and lifetime prevalence of HE

(only through questionnaires; risk of misclassification, reporting bias) and poor clinical phenotype descriptions.

Based on this systematic review AE patients have a three- to four-fold increase in prevalence of HE compared to controls. Therefore, special attention and individual guidance should be given to AE patients, both prior to and during active work life and when affected by occupational HE.

Atopic eczema and counselling regarding work life

Several studies provide recommendations regarding counselling and follow-up of workers with AE,^{3, 31, 34} based on the findings that AE is associated with HE and with a negative impact on work life. Pre-employment counselling with special attention on risk communication, avoidance strategies (see chapter avoidance techniques in AE) and protective measures (including higher need of emollients, see chapter basic emollients and moisturizers) is advised. Above all, guidance is recommended to be given to AE patients to avoid professions with skin irritating tasks or with contact with sensitizing substances, especially in patients with a history of persistent or relapsing HE. This includes a range of professions with wet-work, frequent use of gloves and exposure to sensitizing compounds, a non-exhaustive list is presented in Table 4.^{2-4, 17-19, 35, 36} Secondary prevention is important, including frequent medical follow-up of the course of symptoms over the first few years on the job.³⁶ In case of problems, referral to a health and safety officer can be helpful to relieve the disease burden. However, no specific studies in the AE population were found regarding the effectiveness of such primary and secondary prevention measures.

Table 1: Occupations with an elevated risk of hand eczema

Job/occupation	Possible sensitizing compounds and atopic eczema triggers
Hairdresser	hair dyes, perm products, haircare products, rubber auxiliary materials, bleaching agents, detergents, wet-work, cosmetic preservatives
Beauticians	acrylics, acrylates, cosmetic preservatives, rubber auxiliary materials, wet-work
Cleaning and housekeeping	disinfectants, rubber auxiliary materials, abrasives, wet-work
Baker	flour and grain dust, rubber auxiliary materials, wet-work
Painter	paints, isocyanates, resins, turpentine, paint pigments, preservatives
Construction and cement worker	isocyanates, cement, concrete, glues, paints, resins, fiberglass, and metals
Carpenter	woods
Agricultural worker	animal particles, disinfectants, plants, rubber auxiliary materials
Florist and gardener	plants, rubber auxiliary materials, wet-work
Healthcare worker	latex, disinfectants, rubber auxiliary materials, medications, wet work

Veterinarian, animal lab worker, zookeeper	animal particles, disinfectants, rubber auxiliary materials, medications, tools, wet work
Catering and cooking employees	detergents, disinfectants, foods, rubber auxiliary materials, wet-work
Wind energy technician	solvents, glues, paints, epoxy, resins, fiberglass, acids and alkalis, detergents
Mechanic and metal worker	cutting fluids, coolants, detergents, metals, petroleum products, preservatives

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