Allergy EUROPEAN JOURNAL OF ALLERGY AND CLINICAL IMMUNOLOGY EAACI

Atopic Dermatitis Score 7 (ADS7): a promising tool for daily clinical assessment of atopic dermatitis

Journal:	*Allergy*
Manuscript ID	Draft
Wiley - Manuscript type:	Letter to the Editor
Date Submitted by the Author:	n/a
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Keywords:	atopic dermatitis, education, quality-of-life

Atopic Dermatitis Score 7 (ADS7): a promising tool for daily clinical assessment of atopic dermatitis

Running title: A new tool in atopic dermatitis: Atopic Dermatitis Score 7

To the editor,

Atopic dermatitis (AD) is a chronic inflammatory skin disease known for its evolution with recurrent flare-ups[1]. The Harmonizing Outcome Measure for Eczema (HOME) initiative, an international group working on a core outcome set for AD, has established that the evaluation of AD patients should explore clinical signs, patient-reported symptoms, long term control and quality of life (QoL)[2,3]. Eczema Area and Severity Index (EASI)[4] and Patient Oriented Eczema Measurement (POEM) are preferred scoring systems for respectively clinical signs and patient-reported symptoms. Many other scoring systems have been developed among them SCORing Atopic Dermatitis index (SCORAD) is the most validated[5]. Nevertheless, those scoring methods are time consuming, useful for clinical trials but not for daily clinical practice. The effect of generalized AD on health-related QoL in children is similar to that of other major chronic diseases (renal disease, cystic fibrosis) and higher than asthma[6]. Itch, sleep disturbance and social embarrassment are the key items to explore QoL in AD patients, in children and their parents and also in adults[7]. Any score used in AD evaluated both the severity of AD and the burden for the patient. It is also very important to assess the weekly evolution of the disease (flare-up, relapse and recovery) to evaluate the efficiency of the treatment between two clinical medical consultation. Indeed, the clinical evaluation performed during the consultation does not always reflect the actual state of the disease i.e., patients could stop or conversly apply their topical treatment a few days before the consultation.

The Atopic Dermatitis Score 7 (ADS7) (Fig1) is inspired from the Urticaria Activity Score 7 (UAS7)[8], used and validated in chronic spontaneous urticaria. The ADS7 assesses the daily extension of eczema as well as the itching and sleep disturbance, and their effect on daily activities and social impairment.

Fifty-three patients, 3 months to 76 years old (26.66±18.63 years), consulting for an AD between December 2017 and September 2018 in the department of dermatology in Brussels (Belgium) were

included. One investigator evaluated the patients with SCORAD, EASI, POEM (adapted to age) and DLQI (collected only in adult patients) at the first consultation, and patients were asked to fill in the ADS7 the week following that consultation. ADS7 is calculated on one week: the patients (or the patient's parents if under 8 years old) fill in the daily chart for the 2 items: the first item, the extension of the eczema, titled "Plaques" and the second item, itch, pain or social impairment, titled "Itch/Pain/Discomfort". Each item is filled with a score from 0 to 4, 0 equivalent to "no symptoms" and 4 equivalent to "severe symptoms". To evaluate the extension of the AD, the patient had to determine the dryness, the redness or crusts with a cut-off of 5 palms of hand to facilitate the evaluation of body surface area. For the second item, the patient had to determine the impact of itching on his daily activities, on his sleep and on his social relationship. The chart is introduced by a legend for the score. A weekly score is calculated by addition of the daily scores. The minimal ADS7 score is 0, the maximum is 56. Thirty-three patients were over 18 years old; ten were under 8 years old. The mean SCORAD (n=52) was 37.66±17.41(1-84.5). The mean EASI (n=53) was 12.49±1.40 (0-63.8), and the mean POEM (n=50) was 15.16± 6.78 (2-28). The mean DLQI was 9.67±6.94(1-30) (n=33). Correlation analyses showed that ADS7 was strongly correlated with POEM (p<0,001), SCORAD (p<0,001), EASI (p=0,001) and DLQI (p<0.001). The mean ADS7 in all patients was 26.11±11.06 (0-50) and in adult patients (n=29) was 27.62±10.59(9-45). Using an optimal cutoff value of 17.5 for ADS7, sensitivity and specificity were 94.9% and 61.5% respectively. The positive predictive value and negative predictive value were 88% and 80%. Thirty-two patients gave their appreciation of the ADS7 in a supplementary questionnaire. It took 5 minutes or less daily to fulfill the score for 24 patients (75%), 2 minutes or less for 14 patients (44.75%). Five patients (15.62%) did not give an estimation of time. 28 patients (87.5 %) thought using the ADS7 was useful, and 29 (90.63%) thought it helped the dermatologist for a better assessment of the disease.

ADS7 seems to be a very promising tool to evaluate the daily impact on quality of life of the patients and to reflect the clinical AD course (remission or flare-up) between two medical consultations. We choose to have one single measure of ADS7 for each new AD patient to minimize bias linked to repeated measurement and to have a broad spectrum of the disease severity. It has been realized in real-life conditions, with no limitation on age and disease severity, and no standardized treatment. The limitation

of this preliminary study is first the small sample size. Recently a daily score has been proposed by Lee *et al* on a smartphone application to assess AD symptoms (itching, sleep disturbance, erythema, dryness, oozing and edema)[9]. It has been validated for children and teenagers, however a large majority of the studied population was under the age of 6 and most of the patients presented mild-to-moderate AD. Moreover, it does not assess the chronicity of the disease, nor the body surface affected and the score was not correlated to DLQI.

The ADS7 is very easy and quick to fill in for the patient, simple to analyze by the dermatologist. It seems to be a useful new tool for dermatologists to assess and measure the global burden of AD, on a daily basis. This score included all the outcomes recommended by the HOME initiative, including severity and extension of the eczema, as well as subjective appreciation of the QoL. This preliminary study shows a good correlation with the currently used AD scores (i.e. SCORAD, POEM, EASI and DLQI) with good sensitivity and correct specificity. Further larger study is needed to evaluate the ADS7 over a longer period and to validate the reproducibility of the score.

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Word count for the manuscript: 985

Figures: 1

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Funding sources : none

Conflict of interest: none.

Acknowledgments: We thank the Société Française de Dermatologie for the grant accorded to Dr Anne-Sophie Darrigade.

Figure legends:

Figure 1: Atopic Dermatitis Score 7 (ADS7).

The patients fill in the daily chart with a score from 0 to 4 for the extension of eczema and for itch, pain and social impairment. The chart is introduced by a legend for the score. A weekly score is calculated by addition of the daily scores. The minimal ADS7 score is 0, the maximum is 56.

Fill in the table on the next page by giving a score ranging from 0 to 4 to the item « the extension of the eczema » as well as the item « your itch, pain or social impairement ». Please pay attention to the following gradation.

	Plaques
0	The skin is not dry. There is no redness or crust.
1	Dry skin represents at least half of the skin surface.
2	A surface measuring less than 5 palms of hand presents redness or crusts.
3	Redness or crusts affect an area measuring more than 5 palms of hand but less than half the entire surface of the skin.
4	There is redness or crust on more than half of the entire skin.

	Itching/Pain/Discomfort
0	« I do not suffer from itching. My eczema has no impact on my daily life (daily activities or sleep). »
1	« I have some itching but it doesn't disturb my sleep or my daily activities.»
2	« The itch sensation (pain) is important. It caused me to awaken at least once last night and/or disturbed my daily activities.»
3	«The itch sensation (pain) is intense. It significantly affected my quality of sleep, and/or my daily activities, and/or caused me to feel discomfort while with other people.»
4	«The itch sensation (pain) is unbearable. It caused me to stay awake most of the night and/or had a severe impact on my daily activities and/or caused me to want to stay home because I was afraid of what other people might think.»

Atopic dermatitis – Daily journal ADS7

		Plaques	Icth/ pain/ social impairement		
Date	Day	Score from 0 to 4	Score from 0 to 4	Total score	Other symptoms/remarks
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	Total Score				

153x210mm (144 x 144 DPI)

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Brussels, August 28th 2019,

Title: Atopic Dermatitis Score 7 (ADS7): a promising tool for daily clinical assessment of atopic dermatitis
Name of corresponding author: Professor Marie Baeck,

Dear Editor,

We present a new clinical score for atopic dermatitis, that we've called Atopic Dermatitis Score 7 (ADS7) in reference to the UAS7 score for chronic spontaneous urticaria.

- There is a need of a global score for atopic dermatitis to daily assess the severity of the disease as well as the impairment of the quality of life.
- The Atopic Dermatitis score 7 (ADS7), a daily evaluation, has been tested in 53 patients. The correlation with commonly used scores for atopic dermatitis was significant.
- This score is really simple to use and not time consuming. Indeed, we noticed that most validated atopic dermatitis scores are not used by physicians in their daily practice.

We designed this score to assess both the daily objective and subjective symptoms of atopic dermatitis, for patients of any age, from infants to adults and any severity.

Our preliminary results found a significant correlation with the most used existing scores (Eczema Area Severity Score (EASI), SCORing Atopic Dermatitis (SCORAD), Patient Oriented Eczema Measurement (POEM) and Dermatology Life Quality Index (DLQI)). Most of the patients found it easy to use and very useful for the assessment of the severity of the disease.

We think that this article could be of uppermost interest for the readers of the journal Allergy. Indeed, we expect this new score to be used in daily practice, as it can help the management of the patients suffering from atopic dermatitis. We think that it is the first score that can assess all the aspects of the disease (as recommended by the Harmonizing Outcome Measure for Eczema (HOME) initiative), along with being easy and quick to use.

I confirm that this manuscript has not been published previously and is not under consideration elsewhere. All authors have approved the manuscript as submitted.

We truly hope that you'll find an interest in our article,

Best regards,

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