

Evaluation of patient's subjective severity using various scoring system in Korean children with atopic dermatitis

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Summary

Background: Although several scoring systems are available to measure the severity of atopic dermatitis (AD), they all have limitations with regard to the subjective expression of severity by patients.

Objective: This study was designed to evaluate the correlation of patients subjective symptom score with various scoring systems.

Methods: Fifty children with AD were recruited from the pediatric allergy and respiratory center at Soonchunhyang University hospital from June 1 to July 31, 2007. We measured their SCORAD score, EASI score, SASSAD score, parental visual analog scale (PTVAS, 0-10 point), and investigator visual analog scale (INVAS, 0-10 point). Each scoring system was analyzed and the results compared.

Results: The objective scoring systems including the SCORAD, EASI, and SASSAD showed a statistically significant correlation. (SCORAD vs EASI; $r = 0.84$, SCORAD vs SASSAD; $r = 0.92$, and EASI vs SASSAD; $r = 0.86$) The INVAS showed a more significant correlation than the PTVAS with the objective scores (SCORAD, EASI, and SASSAD). ($r = 0.60, 0.52, 0.52$ vs. $0.37, 0.23, 0.33$)

Conclusions: Our results demonstrated that all scoring systems did not reflect the subjective severity experienced by the patient. Therefore, a new severity scoring system including the subjective symptoms is needed. In addition, patient's subjective symptoms are a point to be

considered by physician. (*Asian Pac J Allergy Immunol 2010;28:130-5*)

Key words: Atopic dermatitis, Severity, Visual analogue scale

Introduction

Atopic dermatitis (AD) is a common chronic recurrent allergic disease of the skin with a prevalence of around 10-20% among all children; 50% of all cases of atopic dermatitis occur before one year of age, and 30% between one and five years of age.¹⁻⁴ The prevalence of atopic dermatitis is increasing around the world, particularly in countries that have Western life styles. The diagnosis of AD has rapidly increased during the last 10 years in Korea.⁵⁻⁷

Atopic dermatitis has a chronic and recurrent course. In addition to physical problems due to severe itching, it also is associated with psychological problems such as depression, an inferiority complex, and withdrawal. AD can be a great burden to family members as well as the patient. Early diagnosis and proper treatment according to severity are crucial to good patient management.⁸⁻¹⁰ However, because there is no specific serological test to diagnose atopic dermatitis and measure its severity, clinical diagnostic standards are used such as the diagnostic criteria of Hanifin and Rajka, and severity measurements are obtained by the distribution and intensity of eczema as well as various signs used for its diagnosis and treatment.¹¹⁻¹²

The efficacy of objective severity scoring systems such as the SCORAD (SCORing Atopic Dermatitis) score, EASI (Eczema Area and Severity Index) score, and SASSAD (Six Area, Six Sign Atopic Dermatitis) score has been confirmed, and they are used for classification of the severity and determination of the treatment effects of atopic dermatitis worldwide.¹³⁻¹⁷

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However, although the existing scoring systems accurately reflect severity based on objective clinical findings, they do not appear to reflect the subjective severity experienced by patients and/or their parents.

Accordingly, in the absence of a gold standard scoring system for the severity of atopic eczema, the assessment of the severity of atopic eczema might vary among physicians, as well as between physicians and their patients. The aim of this study was to compare the severity of symptoms as measured by existing severity scoring systems and the correlation between the objective measures of disease severity and the subjective severity as perceived by parents and investigators at a single point in time during a clinic visit.

Methods

Study design

The subjects included in this study were 50 children with atopic dermatitis that visited the pediatric allergy and respiratory center of Soonchunhyang University Hospital over two months from June 1 through July 31, 2007 and were diagnosed with atopic dermatitis for the first time. Atopic dermatitis was diagnosed using the diagnostic criteria suggested by Hanifin and Rajjka in 1980.¹¹

The severity of AD was assessed by the SCORAD, the EASI score, and the SASSAD score in all patients by a single pediatric allergist. The SCORAD score (Intensity + Distribution + Subjective symptoms), EASI score, and SASSAD score were measured according to the extent and intensity of the atopic dermatitis. Then the PTVAS score, which is a parental subjective measure of overall severity for the last two weeks was recorded using the visual analog scale (0-10 scores, 0: very good, 10: most severe). Blinded to these results, another pediatric allergist examined the same patients and recorded the INVAS, which is a doctor's subjective overall severity score. The correlations between the objective severity scores and the subjective severity scores were analyzed and recorded by the parents and pediatric allergist.

Clinical scoring methods

1 Objective severity scoring systems

The SCORAD (SCORing Atopic Dermatitis) score: This measure consists of the intensity and extent of the eczema, and subjective symptoms. For the intensity, 0 to 3 points were assigned to six clinical signs (erythema, edema/papulation,

Table 1. Scores of objective severity by SCORAD, EASI, and SASSAD and subjective severity of parents and investigator

	Objective scores			Subjective scores	
	SCORAD	EASI	SASSAD	PTVAS	INVAS
Mean	41.9	9.9	19.6	5.0	5.2
SD	36.4	11.5	13.5	2.7	2.6
Range	13.3-99.5	0.5-46.2	3-77	0-10	0-10

SCORAD=SCORing Atopic Dermatitis; EASI=Eczema Area and Severity Index; SASSAD=Six Area, Six Sign Atopic Dermatitis; PTVAS=Parental Visual Analogue Scale; INVAS=Investigator's Visual Analogue Scale

oozing/crust, excoriation, lichenification, dryness). The extent was assessed by the "rule of nine" applied to a front-back drawing of the inflammatory lesions; dry skin was not taken into account. For the subjective symptoms, 10 points were assigned to itching and sleep disturbance respectively for the last three days. These three scores were added to determine the severity. The maximum score was 103.¹³⁻¹⁴

The EASI (Eczema Area and Severity Index) score: This measure consists of the intensity of the eczema and its distribution in four areas (head and neck, upper limbs, body, and lower limbs). One to 3 points were assigned to the intensity of four clinical signs (erythema, edema/papulation, excoriations, lichenification). For the distribution, 0 to 6 points were given depending on the expansion of the eczema, and the maximum score was 72.^{16,18}

The SASSAD (Six Areas, Six Sign Atopic Dermatitis) score: Zero to 3 points were assigned to six signs (erythema, excoriations, oozing/crusting, lichenification, dryness, cracking) of eczema in six areas (arms, hands, feet, legs, body, head and neck), and the maximum score was 108.¹⁵

2 Subjective severity scoring systems using Visual analog scale were:

The Parental visual analog scale (PTVAS, 0-10 point), The Investigator's VAS (INVAS, 0-10 point)

Statistical analysis

For statistical processing and data analysis, we used SPSS version 14.0 (SPSS Inc., Chicago, IL, USA), and obtained the correlation coefficient between various measurements using *Pearson's* correlation analysis. Statistical significance was determined by a p value lower than 0.05.

Ethical approval

The study protocol was approved by the Soonchunhyang University Hospital Research



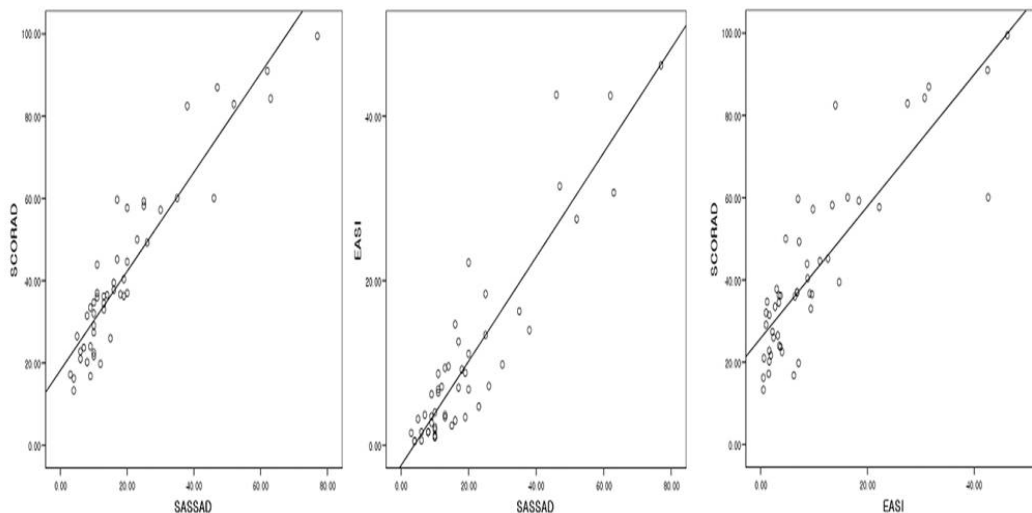


Figure 1. Values derived from the SCORAD and the EASI, the SCORAD and the SASSAD, the EASI and the SASSAD showed a statistically significant correlation. ($p < .01$, $r = .84$), ($p < .01$, $r = .92$), ($p < .01$, $r = .86$)

Ethics Committee before commencement of the study. Each patient and their parents provided written informed consent before the study-related interview was performed.

Results

Subject Characteristics

The mean age of the subjects was 3 ± 3.63 years (0 to 12 years) and 26 of them were males. The mean objective severity scores were 41.9 ± 36.4 for the SCORAD (Mean \pm SD), 9.9 ± 11.5 for the EASI, and 19.6 ± 13.5 for the SASSAD.

The mean subjective severity scores were 5.0 ± 2.7 for the PTVAS and 5.2 ± 2.6 for the INVAS. (Table 1)

Correlations between Objective Severity Scoring Systems

Regarding the correlations between the worldwide validated atopic dermatitis severity scoring systems, the SCORAD score showed strong positive correlation with the EASI and SASSAD scores ($r = 0.84$ vs $= 0.92$), and the EASI and SASSAD scores also showed strong positive correlations with each other ($r = 0.86$). (Figure 1.)

Correlation between subjective severity score and each of the objective severity scores

The SCORAD showed a weak correlation with the subjective severity experienced by parents (PTVAS) and a significant correlation with the subjective severity reported by doctors (INVAS). ($p < .01$, $r = .37$ vs $p < .01$, $r = .60$) (Figure 2.)

The EASI score did not show a correlation with the subjective severity reported by parents, but showed a significant correlation with the subjective severity reported by doctors. ($p = 0.11$, $r = .23$ vs $p < .01$, $r = .52$) (Figure 3.)

The SASSAD score showed a weak correlation with the subjective severity reported by parents, and a significant correlation with the subjective severity reported by doctors. ($p = 0.02$, $r = .33$ vs $p < .01$, $r = .52$) (Figure 4.)

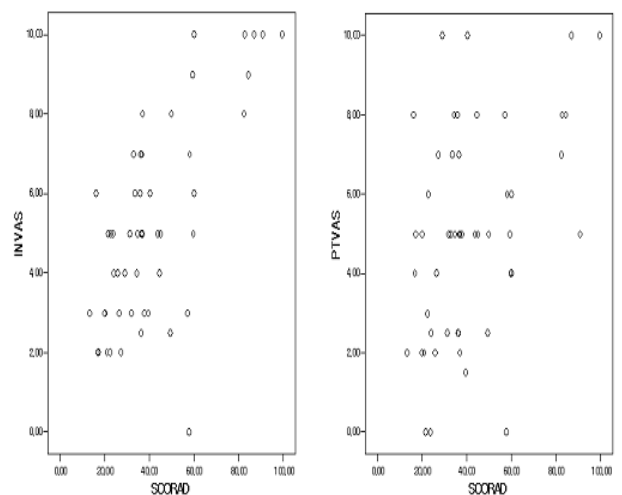


Figure 2. Values derived from the SCORAD showed greater statistically significant correlation with INVAS score ($p < .01$, $r = .60$) than that of the PTVAS. ($p < .01$, $r = .37$)

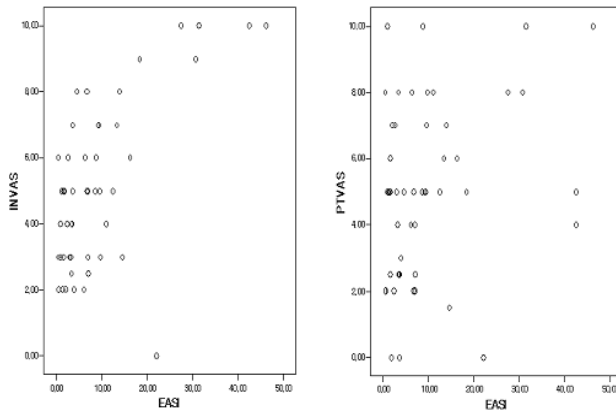


Figure 3. Values derived from the EASI showed a greater statistically significant correlation with the INVAS score ($p < .01$, $r = .52$) than the PTVAS. ($p = .11$, $r = .23$)

Correlation between the subjective severity scores reported by doctors and parents

The subjective severity scores reported by doctors and parents showed a weak correlation. ($p < .01$, $r = .40$) (Figure 5.)

Discussion

Atopic dermatitis in infancy is known to be a risk factor for both sensitization of inhaled allergens and allergic disease such as asthma and allergic rhinitis. Both early and severe manifestations of AD have been associated with an increased risk of asthma.¹⁹⁻²⁶ In addition, AD is considered an entry point during the development of allergic diseases. Therefore, the assessment of AD severity is crucial not only for research purposes, but also in clinical practice for patient care. However, because there is no serological test available that accurately reflects the severity of atopic dermatitis, measuring the severity of atopic dermatitis eczema based on signs (e.g. erythema, induration/ edema/ papulation, excoriation, lichenification, scaling, and oozing/ weeping/ crusting) and symptoms is important for treatment.

Although many objective methods such as the SCORAD (SCORing Atopic Dermatitis) score, EASI (Eczema Area and Severity Index) score, and SASSAD (Six Area, Six Sign Atopic Dermatitis) score have been validated and are widely used to measure the severity of atopic dermatitis, these scores do not reflect the severity experienced by patients and parents. The patient's symptoms are subjective. By contrast, in clinical practice, the severity of AD is most likely based on the physician's impression.²⁷

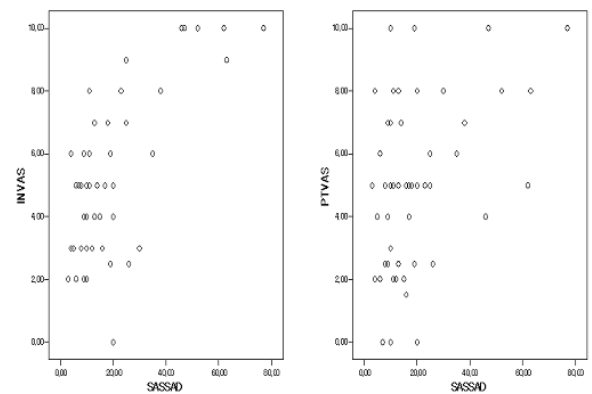


Figure 4. Values derived from the SASSAD showed a greater statistically significant correlation with INVAS score than ($p < .01$, $r = .52$) the PTVAS. ($p < .02$, $r = .33$)

Most of the current scoring systems include visual observation of the extent and intensity of the eczema that is graded. Even though the extent and intensity of eczema are important to measure the disease severity, the symptoms of patients are subjective; therefore, an ideal scoring system would include the subjective symptoms such as itching and sleep disturbance that interfere with the patients quality of life. Identifying the changes of disease severity and establishing a treatment plan with the consideration of subjective symptoms would be more useful for both doctors and patients.^{28,29} Moreover, identifying the factors affecting the quality of life is important in the management of non-fatal chronic diseases such as atopic dermatitis. Recent studies have found that it was important to measure the subjective severity of chronic diseases, such as with asthma and rheumatoid arthritis; however, its importance with regard to atopic dermatitis has not been previously investigated.³⁰⁻³³

Interobserver and Intraobserver variation has been a problem with most of the currently available scoring systems and is unlikely to properly reflect the severity experienced by patients.¹⁷ Therefore, this study attempted to measure the variation among these scoring systems and determine whether they accurately reflect the subjective severity of patients and their parents.

Among the existing severity scoring systems, the SCORAD index, EASI, and the SASSAD index are most widely used and their value has been recognized. Therefore, this study used these



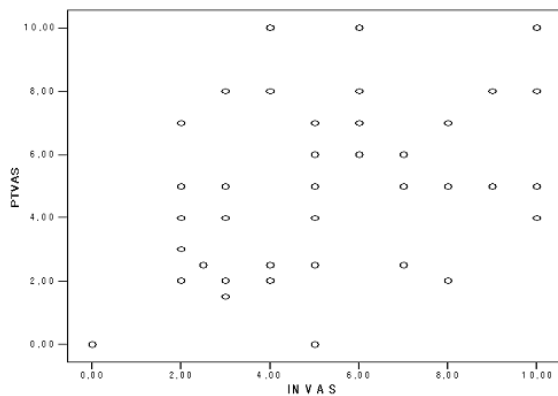


Figure 5. Values derived from the PTVAS and the INVAS showed a statistically significant correlation. ($p < .01$, $r = .40$)

three severity scoring systems to compare with the subjective severity experienced by patients. These three scoring systems convert the intensity and distribution of eczema into a score; only the SCORAD index includes 20 points for the subjective symptoms. However, some studies have reported that these systems are not objective scores; they show variations in the measurements among the observers depending on their subjective opinions.^{16,34-36} To exclude inter-observer variation in this study, one investigator measured the severity of AD using the three scoring systems; the results showed significant correlation among the measurements. That is, although there could be variation among observers, the severity scores for eczema measured by one observer were consistent.

An analysis to determine whether the existing severity scoring systems accurately reflect the severity experienced by patients, which was the main purpose of this study, showed that the severity scores had a strong correlation with the severity reported by the doctors, but a weak correlation with the severity experienced by patients. These findings show that the severity classification by the existing scoring systems reflect not the subjective severity experienced by patients such as inconvenience and pain from the atopic dermatitis but rather the visual severity reported by doctors. If the subjective severity of the patient is high, their demand for treatment will be also high. Therefore, in order to improve the satisfaction and compliance with treatment of patients with atopic dermatitis, the subjective severity of patients as well as the visual severity

of physicians must be taken into consideration for the appropriate treatment plan.

The limitations of this study include the following: first, it did not compare severity after treatment, and could not compare the improved severity of eczema and the severity experienced by the patient after improvement of the eczema. Future studies are needed for this comparison. Second, when the investigator measured the INVAS, they listened the complaints about the conditions of the patients from their parents especially in patients of very young children. As a result, the feelings of the parents were communicated to the doctor, and this could explain the finding of no significant differences between the subjective severity scores reported by the doctor and parents. If we observed patients without parents, the differences between the INVAS and PTVAS would probably be significant.

In conclusion, the results of this study showed that the existing severity scoring systems do not reflect the subjective severity experienced by patients. Therefore, in order to classify the severity of atopic dermatitis and develop individualized therapeutic plans, a new standardized scoring system and questionnaire, including quality of life (QOL) topics, in patients with atopic dermatitis are needed that reflects not only the objective severity score but also the subjective patient symptom scores.

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