Clinical validation of the updated Korean diagnostic criteria for atopic dermatitis: a multicenter cross-sectional study

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Background: Why diagnostic criteria matter

Why are diagnostic criteria for AD so important?

- **AD cannot be diagnosed using definitive diagnostic tools.**

There are currently no **objective tests** or **biomarkers** that can clearly confirm atopic dermatitis.

Diagnosis depends entirely on **clinical observation** and **patient history**.

- **Clinical presentation varies significantly between individuals.**

Symptoms differ depending on **age**, **affected areas**, **genetic background**, and **environmental factors**.

It often requires **differentiation from similar conditions** such as contact dermatitis, seborrheic dermatitis, or psoriasis.

- **Accurate diagnosis enables timely and appropriate treatment.**

When diagnostic criteria are **impractical** or **unclear**, diagnosis can be **delayed**, leading to **postponed treatment** and **poor long-term disease control.**

Diagnosis is the **first step** toward **proper management**.

- **Existing international criteria may not reflect Asian AD phenotypes.**

Most criteria were developed based on Western populations and may show **reduced sensitivity** in **Asian patients**, including **Koreans**—raising the risk of **underdiagnosis.**

Background: Why diagnostic criteria matter

Why was it necessary to revise the Korean criteria?

- **The 2005 KADA criteria were based on the Hanifin & Rajka system, requiring multiple major and minor items, making them complex and impractical.**

- **They included nonspecific features and test-based components (e.g., IgE, skin prick test), limiting their use in routine clinical settings.**

- **An update was needed to improve clinical usability, diagnostic sensitivity, and reflect Korean AD phenotypes.**

Updated diagnostic criteria for atopic dermatitis by Korean Atopic Dermatitis Association.

Diagnostic Criteria (all three below are required)
1. Pruritus
2. Eczema with age-specific pattern
i. Face, neck and extensor involvement in infants
ii. Current or previous flexural lesions in any age group
3. Chronic or relapsing history
Diagnostic aids
1. Xerosis
2. Immunoglobulin E reactivity
3. Hand–foot eczema
4. Periorbital changes
5. Periauricular changes
6. Perioral changes
7. Nipple eczema
8. Perifollicular accentuation
9. Family or personal history of atopy

Study Objectives & Design

• Objective

To validate the updated Korean diagnostic criteria for AD by comparing their diagnostic accuracy with previous KADA and JDA criteria.

• Study design

Multicenter, cross-sectional observational study conducted across **7 university hospitals** in South Korea.

• Participants

Total **312 participants**: 231 AD patients and 81 non-AD controls with other skin conditions.

• Enrollment

Participants were initially diagnosed using **Hanifin & Rajka criteria**, but H&R was excluded from final analysis to avoid bias.

• Analysis

Diagnostic performance was evaluated using **sensitivity, specificity, PPV, NPV, Youden's index, and error rate**.

Results

Patient Characteristics

- Total participants: **312**
- AD group: **231** patients
- Control group: **81** patients with non-AD dermatoses

- **No significant difference in age or sex**
  Age: AD **27.95**, Control **33.84** ($p = 0.116$)
  Female %: both groups ~41%

- **AD group had significantly higher disease severity**
  EASI score: AD **12.4**, Control **3.5** ($p < 0.001$)

- **Serum IgE was markedly elevated in AD group**
  1830 vs 53 IU/mL ($p < 0.001$)

- **Early onset in most AD patients**
  82.7% developed AD before age 18

- **Eosinophil % and ECP levels were also higher in AD**
  Eosinophils: **6.76 vs 3.21%**
  ECP: **90.9 vs 51.5 ng/mL**

Variable	non-AD (N=81)	AD (N=231)	P-value
Age (years)	33.84±18.72	27.95±11.14	0.116
Sex			0.797
female	35 (43.21%)	96 (41.56%)	
male	46 (56.79%)	135 (58.44%)	
EASI score (N=78 / 225)	3.48±7.44	12.38±10.50	<0.001
mild (<6)	62 (76.54%)	87 (37.66%)	<0.001
moderate (≥6, <18)	13 (16.05%)	63 (27.27%)	<0.001
severe (≥18)	3 (3.70%)	77 (33.33%)	<0.001
Total IgE (IU/mL, N=53 / 142)	53.22±148.35	1830.83±3395.83	<0.001
AD onset (years)		8.24±10.10	
childhood onset (age <18)		191 (82.68%)	
adult onset (age ≥18)		19 (8.23%)	
Laboratory findings			
Eosinophil count (10^9/L, N=18 / 131)	0.24±0.16	2296.12±26210.66	
ESR (mm/h, N=30 / 133)	4.77±4.57	4.78±5.87	
CRP (mg/dL, N=30 / 144)	0.20±0.49	0.53±1.96	
WBC diff. eosinophil (%, N=37 / 171)	3.21±2.41	6.76±5.15	
LDH (U/L, N=30 / 92)	212.40±58.96	239.86±80.02	
CPK (U/L, N=30 / 78)	104.38±71.36	110.60±57.78	
HBsAg positive (N=20 / 67)	0 (0%)	23 (34.32%)	
HBsAb (IU/L, N=15 / 135)	238.76±370.07	131.74±311.04	
25(OH)vitamin D (ng/mL, N=17 / 75)	32.08±14.31	23.03±11.84	
ECP (ng/mL, N=6 / 47)	51.51±27.15	90.94±56.86	

Results

Diagnostic Performance Comparison

Comparator	Sensitivity (%)	P-value (vs. Updated KADA)	Specificity (%)	P-value (vs. Updated KADA)	PPV (%)	NPV (%)	Youden's Index	Error Rate
Updated KADA	63.20%	-	82.72%	-	91.01%	44.10%	0.459	31.41%
Previous KADA	61.04%	0.815	88.89%	0.424	94.01%	44.44%	0.499	31.73%
JDA	47.62%	<0.001	95.06%	0.002	96.49%	38.89%	0.427	40.06%

- **Updated KADA had the highest sensitivity (63.2%)**

→ Better at identifying **mild or atypical cases** compared to other criteria.

- **Updated KADA showed the lowest error rate (31.4%)**

→ Best balance between sensitivity and specificity.

- **JDA had the highest specificity (95.1%)**

→ But lowest sensitivity (**47.6%**) and **highest error rate (40.1%)**.

- **PPV was >90% across all criteria**

→ High reliability when AD is diagnosed.

Results

Diagnostic Value of Clinical Features

Symptoms	Prevalence in AD patients (N=231, %)			Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Youden's Index	Error Rate	P-value
	total	mild	moderate to severe							
Pruritus	88.31%	80.46%	95.71%	**90.04%**	50.00%	83.87%	63.49%	**0.400**	20.19%	<0.001
Eczema with age-specific pattern	**64.94%**	**52.87%**	**74.29%**	**66.67%**	**72.84%**	**87.50%**	**43.38%**	**0.394**	**31.41%**	**<0.001**
Chronic or relapsing	**84.85%**	**74.71%**	**96.57%**	**86.14%**	**67.95%**	**88.46%**	**63.25%**	**0.541**	**18.59%**	**<0.001**
Family or personal history of atopy	81.82%	78.16%	86.43%	83.12%	60.49%	85.71%	55.68%	0.436	22.76%	<0.001
Immunoglobulin E hypersensitivity (cutoff 158)	57.58%	43.68%	67.86%	67.97%	67.90%	85.64%	42.96%	0.359	31.09%	<0.001
Xerosis	63.20%	48.28%	74.29%	64.34%	72.82%	87.05%	41.84%	0.372	33.01%	<0.001
Hand foot eczema	42.86%	40.23%	45.71%	**44.16%**	50.00%	71.83%	23.66%	**0.442**	54.17%	<0.001
Nipple eczema	20.35%	16.09%	23.57%	20.44%	60.49%	59.49%	21.12%	0.209	69.87%	<0.001
Perifollicular accentuation	28.57%	18.39%	35.71%	29.68%	76.54%	78.16%	27.79%	0.062	56.73%	<0.001
Perioral changes (cheilitis)	41.99%	32.18%	49.29%	42.86%	79.01%	85.35%	32.65%	0.219	47.12%	<0.001
Periauricular changes (periauricular eczema)	49.35%	32.18%	61.43%	**50.65%**	91.36%	94.35%	39.37%	**0.420**	38.78%	<0.001
Periorbital changes	41.99%	29.89%	50.71%	47.62%	87.65%	91.67%	36.97%	0.353	37.82%	<0.001
Atypical vascular response (white dermographism)	21.65%	11.49%	28.57%	**22.06%**	92.50%	89.47%	29.14%	**0.146**	65.06%	0.0011
Keratosis pilaris	29.87%	20.69%	36.43%	30.74%	82.72%	83.53%	29.51%	0.135	55.45%	0.0721
Pityriasis alba	8.23%	5.75%	10.00%	**8.23%**	87.65%	65.52%	25.08%	**0.041**	71.79%	0.1336
Hyperlinear palms	16.02%	17.24%	15.71%	**16.02%**	90.12%	82.22%	27.33%	**0.061**	63.78%	0.0024
Early-age onset	26.84%	24.14%	29.29%	27.68%	93.83%	92.75%	31.26%	0.215	58.33%	<0.001
Icthyosis	10.82%	4.60%	15.00%	10.87%	95.06%	86.21%	27.31%	0.059	67.63%	0.0029
Itch when sweating	74.89%	67.82%	81.43%	76.61%	71.60%	88.50%	51.79%	**0.482**	23.40%	<0.001
Tendency toward cutaneous infections	19.05%	16.09%	21.43%	19.05%	87.65%	81.48%	27.51%	0.067	64.42%	0.0194
Anterior neck folds	42.42%	24.14%	55.00%	43.28%	87.65%	90.91%	35.15%	0.309	39.10%	<0.001
Intolerance to wool and lipid solvents	46.75%	37.93%	53.57%	47.62%	85.19%	90.16%	36.31%	0.328	39.10%	<0.001
Course influenced by environmental/emotional factors	58.87%	44.83%	69.29%	59.74%	79.01%	89.03%	40.76%	0.388	30.77%	<0.001
Skin prick test reactivity	14.29%	14.94%	14.29%	15.22%	95.06%	89.74%	28.29%	0.103	64.74%	0.0011
Facial pallor/erythema	38.96%	34.48%	42.86%	40.25%	95.00%	95.83%	35.52%	0.353	33.01%	<0.001
Food intolerance	23.81%	31.03%	20.00%	25.44%	95.06%	93.55%	31.17%	0.205	60.26%	0.0424
Lichen amyloidosis	4.33%	1.15%	6.43%	4.33%	98.77%	90.91%	26.56%	0.031	68.91%	0.2536
Scalp eczema	41.56%	25.29%	52.86%	42.41%	86.42%	89.09%	34.47%	0.287	38.14%	<0.001
Symmetrical distribution	52.81%	35.63%	65.00%	54.12%	86.42%	91.92%	39.76%	0.405	30.77%	<0.001

- **Core diagnostic features** such as **pruritus**, **age-specific eczema**, and **chronic course** showed the **highest sensitivity and predictive value**.

- **Top-performing diagnostic aids** included **hand-foot eczema (0.442)**, **periauricular eczema (0.420)**, and **itch when sweating (0.482)**.

- **Low-performing features**, including **pityriasis alba**, **white dermographism**, and **hyperlinear palms**, showed **minimal diagnostic contribution** and were excluded in the updated criteria.

Conclusion

Strengths and Limitations

Strengths

Multicenter clinical validation across **7 university hospitals**

Highest sensitivity (63.2%) among criteria tested

Lowest error rate (31.4%)

No laboratory testing required – based on **observation and history only**

Easy to apply in **primary care, outpatient clinics, and pediatrics**

Limitations

Study included only **Korean patients** → Limited generalizability

Small control group (n = 81) → May reduce statistical power

NPV was low (44.1%) → Potential for underdiagnosis

Sensitivity improvement over previous KADA was **not statistically significa nt** (p = 0.815)

Validation in multi-ethnic or international cohorts is still needed

Conclusion

Clinical Implications & Future Directions

Clinical Implications

Quick and accurate diagnosis using 3 core features

Captures mild and atypical AD cases with improved sensitivity

No testing required – applicable in all care settings

Enables early treatment and supports long-term disease control

Future Directions

Validation in multi-ethnic populations needed

Tailoring criteria by **age** and **disease severity**

Research on clinical outcomes after implementation

Evaluate impact on QoL and treatment response

Summary and Take-home Message

- **First clinical validation of the 2023 Korean AD criteria**
- Demonstrated **improved sensitivity**, **practicality**, and **real-world utility**
- **Balanced diagnostic performance**
- Highest sensitivity (63.2%), lowest error rate (31.4%) among tested criteria
- **Simple, observation-based structure**
- Requires no lab testing — ideal for **daily clinical use**
- **Supports broader, earlier diagnosis and better patient access to care**
- **Future studies**
- Needed in **multi-ethnic populations** and to assess **treatment outcomes**

Thank you for your attention.

I am presenting on behalf of the original authors.
For further questions or detailed inquiries, please contact:

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