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Risk factors associated with severe atopic dermatitis in adult Malagasy patients

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Aim : pilot study to identify the predictive factors of severe AD in Malagasy adult patients

Take Home Message: : Male gender, along with environmental factors and societal habits, plays a significant role in determining the severity and risk factors of AD within a population, which is crucial for optimizing treatment strategies. Our findings suggest potential risk factors for severe forms of AD among Malagasy adults, which will guide the design of a future nationwide study

The authors declare no conflict of interest

Contact details

Introduction

- **Atopic Dermatitis (AD) [1;2]**
  - Chronic inflammatory skin disease marked by itching and recurrent flare-ups
  - Affects many People worldwide: both children and adults
  - Is among the major causes of skin-related morbidity in the world with rising prevalence in SSA
- **Madagascar [3]**
  - Geography: area= 591 896 km2km^2; located in Eastern Africa ; 23 regions; Capital city: Antananarivo
  - Demographics: estimated population over 28 Millions ; predominately female and young, literacy rate= 77,48%
  - Climate: tropical on coasts and temperate in highlands; 2 main seasons: winter and summer
  - Economy and health system: 77.9% agriculture-based activity; limited access to healthcare
- **AD in Malagasy adult patient [4;5]**
  - Hospital prevalence: 0.5% among adults
  - Clinical profile: predominance of moderate form according to SCORAD assessment.
  - Significant association was observed between clinical severity and the quality of life of both patients and their families, in Malagasy pediatric studies
  - Factors influencing AD severity in Malagasy patients are still unclear

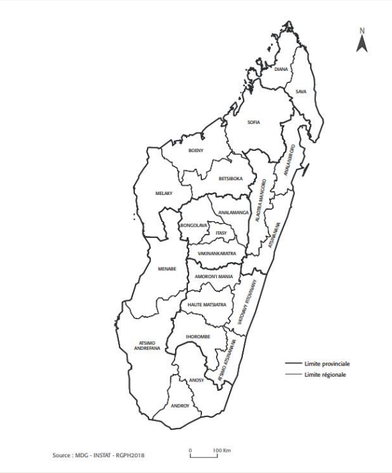

Photo1: Map of Madagascar with the 23 administrative Regions [3]

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Materials and Methods (1)

- **Setting:** multicentric study conducted in the referral departments of dermatology in Antananarivo
- **Study design:** cross-sectional, descriptive and analytical study, pilot study
- **Duration of the study:** from June 2023 to July 2025, for 24 months
- **Inclusion criteria:** Malagasy patients aged ≥ 18 years old; diagnosed with moderate to severe AD according to the SCORAD and/ or EASI assessment
- **Sample size and sampling method:** all patients who meet the inclusion criteria were selected through exhaustive sampling
- **Data collection:** using a structured survey form comprising standardized questionnaires administered to patients
- **Data analysis:** Bivariate analyses (using the Chi-square test or Fisher's exact test) were first performed according to the SCORAD index, followed by a multivariate binary logistic regression model assessing disease severity for each item.

  A p-value < 0.05 was considered statistically significant.
- **Ethical consideration:** respect of the confidentiality of the patient, informed consent written

Photo 2: Befelatanana Hospital, Antananarivo

Materials and Methods (2)

- **Variables studied:** were classified into seven categories.
  - Socio-demographic parameters: age; gender; occupation; educational level; geographical location (urban / suburban / rural); Region
  - AD disease history parameters
    - Duration of disease; duration of current episode;
    - Age of the patient at onset: early onset (<2 years) / Late onset (>2 years) / Adult onset (>18 years);
    - Previous treatment received; self-medication; treatment from traditional healer; treatment from general practitioner; treatment from dermatologist;
    - Identified triggering factors; number of flare-ups per year: (rare / moderate/ frequent/unknown) .
  - Comorbidities
    - Personal and familial atopy (food allergy; allergic rhinitis; asthma; allergic conjunctivitis; urticaria)
    - Smoking(past / current); passive smoking; alcohol consumption (past or current)
  - Environmental factors and societal habits
    - Number of room per person:<0.5 (crowded) 0.5–1 (moderate)1 (good condition)
    - Exposure: pets; combustion (smoke/firewood)
  - Severity of AD: according to SCORAD index; EASI score; BSA (Body Surface Index); NRS (Numerical Rating Scale) for the itch assessment
  - Quality of life: according to DLQI (Dermatology Life Quality Index)
  - Blood eosinophilia: Eosinophil count: <500/mm^3 or >500/mm^3

Results (1)

Table 1- Association between socio-demographics parameters

Socio-demographic parameters	Sample size (n=36)	p-value	Odds- ratio	IC à 95%
Age (years)	Mean Age= 41±19.6; Age <65= 31 (86%)	**0.028**	**0.064**	**[0.003; 1.309]**
Sex ratio	1.12	**0.014**	**8.42**	**[1.157; 60.35]**
Occupation		-	-	-
Student	8 (22%)			
Retired	7 (19%)			
Employee	17 (47%)			
Farmer	3 (8%);			
Unemployed	1 (3%)			
Educational level		0.716	-	-
University	27 (75%)			
High school	6 (17%)			
Secondary	2 (6%)			
Primary	1 (3%)			
Geographical location		0.080	-	-
Urban	16 (44%)			
Suburban	13 (36%)			
Rural	7(19%)			
7/23 Regions represented		-	-	-
Region Analamanga	28 (78%),			
Others	8 (22%)			

Results (2)

Table 2- AD history

Parameters	Sample size (n=36)	p-value	Odds-Ratio	IC à 95%
Mean Duration of disease	139.1 ± 160.3 months	0.292	-	-
Onset according to age (years)		0.780	-	-
Early onset (<2years)	4 (11%)			
Late onset (>2 years)	10 (28%)			
Adult onset (>18 years)	22 (61%)			
Treatment				
Self-treated	10 (28%)	0.716	-	-
Traditional healer	14 (39%)	0.501	-	-
General practitioner	23 (64%)	0.890	-	-
Dermatologist	12 (33%)	0.720	-	-
Identified triggers	27 patients (75%)	0.422	-	-
Number of flares up per year		0.635	-	-
Rare (<2)	5 (14%)			
Moderate (2-6)	10 (28%)			
Frequent (>6)	5 (14%)			
Unknown	16 (44%)			

Results (3)

Table 3- Comorbidities, environmental factors and societal habits

Parameters	Sample size (n=36)	p-value	Odds-Ratio	IC à 95%
Comorbidities				
Personal atopy associated	30 (83%)	0,80	-	-
Asthma	11 (37%)	0.076	0.16	[0.021;1.194]
Urticaria	9 (25%)	0.693	-	-
Food Allergy	2 (6%)	0.525	-	-
Allergic rhinitis	23 (77%)	0.727	-	-
Allergic conjunctivitis	13 (36%)	0.049	-	-
Familial atopy	23 (77%)	0.890	-	-
Smoking	10 (28%)	0.716	-	-
Passive smoking	6 (17%)	0.468	-	-
Alcohol consumption	12 (33%)		-	-
***Environmental factors and* societal habits**				
Crowded living condition (Nb of room/ person)		0.686	-	-
Overcrowded (<0.5)	16 (44%)			
Moderate (0.5 to 1)	13 (36%)			
Good condition (>1)	7(19%)			
Exposure to				
Use of charcoal, firewood	24 (67%)	0,068	0.17	[0.025; 1.14]
Pets	25 (69%)	0,062	10.17	[0.88; 116.6]

Results (4)

Table 4- Clinical and biological parameters

Parameters	Sample size (n=36)	p-value	Odds- ratio	IC à 95%
Severity assessment				
SCORAD	Mean SCORAD= 52.9	-	-	-
Moderate	13 (36%)			
Severe	23 (64%)			
EASI	Mean EASI= 21.67	-	-	-
Mild	2 (6%)			
Moderate	17 (47%)			
Severe	16 (44%)			
Very Severe	1 (3%)			
BSA				
Moderate	12 (33%)	**0.011**	**7.6**	**[1.724; 33.5]**
Severe	24 (67%)			
Itch assessment by NRS				
Mild	2 (6%)	0.133	-	-
Moderate	15 (42%)			
Severe	14 (39%)			
Very severe	5 (14%)			
Quality of life by DLQI				
Small effect	10 (28%)	0.565	-	-
Moderate effect	11 (37%)			
Large effect	15 (42%)			
Eosinophilia				
Eosinophil count>500/mm3	13 (36%)	0.292	-	-

Photo 3: lichenified lesions on the lower limbed, mostly involvement of skinfolds

Photo 4: Hertoge sign, periocular hyperpigmentation

Discussion (1)

Study	Anamnestic parameters
Salava et al (Finland, 2022) [6]	502 participants, factors associated with severity (EASI and Rajka –Langeland) Male sex, history of smoking ,overweight
Zhang et al (Netherlands, 2022) [7]	56 896 participants, association between severity (POEM)and modifiable lifestyle factors Smoking habit; alcohol consumption, chronic stress, obesity, sleep duration
Atadokpede et al (Benin, 2021) [8]	107 children (Age<17years), association between severity (SCORAD) and environmental factors Dry season; foods consummation (eggs, sorgho, corn,…); use of traditional cream (“Sinza”) Not associated: exposure to charcoal and firewood; exposure to pets; crowded living condition
Our study (Madagascar, 2025)	36 participants, a pilot study aimed to identify risk factors od AD severity (SCORAD) Male patients had an eightfold higher risk of developing a severe AD, Trend without statistical significance: age under 65 and suburban origin Trend without statistical significance: household exposure to charcoal smoke, and presence of pets No association: smoking and alcohol consummation

- Gender differences: sex hormones may modulate immune response [9]
- Poor lifestyle factors may result in an altered immune response
- Importance of environmental factors and local practices in prediction of AD severity

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Discussion (2)

Study	Clinicals parameters
Salava et al (Finland, 2022) [6]	502 participants, clinicals factors associated with severity (EASI and Rajka -Langeland) Early onset, concomitant asthma, Palmar hyperlinearity, hand dermatitis, contact allergy, BMI High IgE level No association : allergic rhinitis; allergic conjunctivitis; food allergy;
Maintz et al (Germany, 2021) [9]	367 participants (aged >12 years); deep phenotyping and identification of severity (EASI) associated factors with AD , using machine learning-gradient boosting approach Adult onset Stigmata of AD (cheilitis; white dermographism; Hertoghe sign; nipple eczema) Eosinophilia (greater than 6.8%) , high IgE level
Simpson et al (US, 2023) [10]	2862 participants, identified historical and clinical features , biomarkers associated with AD severity (Rajka-Langeland) Skin infections, excoriations, staphylococcus aureus colonization; stigmata of AD, Serum IgE, eosinophilia
Our study (Madagascar, 2025)	Trend without statistical significance: asthma trend No association with other atopy comorbidities Higher BSA index were associated with severe form No association with eosinophilia

Th2-shifted systemic inflammation: as a factor for development of multiple atopic comorbidities in severe AD

Levels of IgE and eosinophil values are key mediators for allergic sensitization and inflammation

6. Salava et al . « Factors Associated with Severity of Atopic Dermatitis – a Finnish Cross-Sectional Study ». *Journal of the European Academy of Dermatology and Venereology* 36, nº 11 (2022): 2130-39.
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Conclusion

- Male gender was identified as a potential risk factor for severe AD among Malagasy adults
- Environmental factors, social habits, and lifestyle patterns may also contribute to disease severity
- Clinical stigmata of AD and biological markers may further indicate severe forms
- Study limitations: selection bias (only moderate and severe AD), small sample size, limited representativeness
- A nationwide, large-scale study is needed to better characterize the Malagasy phenotype and confirm these findings
- Identifying these predictive risk factors can help to anticipate flares and develop personalized management strategies


Thank you