

Research Article

Treatment Adherence Among Malagasy Patients with Atopic Dermatitis Seen at the Department of Dermatology, Antananarivo, Madagascar

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Abstract

Atopic dermatitis (AD) is a chronic inflammatory skin disorder characterized by intense pruritic eczematous lesions. Poor adherence to treatment is a major factor limiting treatment outcomes in patients with AD. This study aimed to assess treatment adherence in Malagasy patients with AD. It was conducted over one year in children and adult patients with AD seen at the Department of Dermatology University Hospital Joseph Raseta Befelatanana, Antananarivo, Madagascar. Morisky Medication Adherence Scale-8 (MMAS-8) was used to assess patients' treatment adherence. We included 44 children and 21 adults. The mean age was 4.29 ± 4.13 years and 35.28 ± 16.88 years, respectively. All of our patients receive topical treatment and no specific oral treatment such as biotherapy or immunosuppressant. A low adherence rate was observed in 61.90% of adult patients and the mean MMAS-8 score was 2.56 ± 1.6 . In children, the mean MMAS-8 score was 5.9 ± 1.53 and poor adherence was seen in 45.45%. The adherence level was significantly associated with age, educational status, and marital status ($p < 0.05$). Low treatment adherence is preponderant among Malagasy patients with AD. We did not find significant correlations between adherence levels and monthly income, frequency of follow-up, severity of AD, or insurance coverage.

Keywords

Age, Atopic Dermatitis, Educational Status, Low Adherence, Malagasy, Married

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1. Introduction

Atopic dermatitis (AD) is a chronic inflammatory skin disorder characterized by fluctuations in relapsing-remitting eczematous lesions. It is a leading nonfatal burden attributable to skin diseases [1, 2]. Its prevalence is high, affecting up to 13% of children and 4% to 10% of adults in the United States [3]. In Sub-Saharan Africa (SSA), the prevalence of AD is lower than in most developed countries, but has shown an upward trend in recent years ranging from 5% to 16% [4]. It is a major public health concern. Two of the most common issues in SSA are a lack of access to medication and an unmanageable financial load [5]. Previous studies in Antananarivo found an incidence of AD of 5.6% in children [6] and 0.5% in adults [7].

In 2003, the WHO estimated an adherence rate of only 50% among patients with chronic diseases [8]. In dermatology, poor adherence to treatment is observed among patients with chronic skin diseases [9]; and in atopic dermatitis, non-adherence leads to treatment failure and poor clinical outcomes [10, 11]. In Madagascar, an overall compliance rate of 35% was observed among patients with chronic skin diseases in 2016 [12]. However, treatment adherence in patients with AD has not yet been studied. Therefore, we aimed to assess treatment adherence among Malagasy patients with atopic dermatitis.

2. Methods

This prospective, cross-sectional study was conducted at the Department of Dermatology of the University Hospital Joseph Raseta Befelatanana, Antananarivo from September 2020 to August 2021. We included adults and children dermatology outpatients with lesions diagnosed as atopic dermatitis by a dermatologist, according to the United Kingdom Working Party's Diagnostic Criteria for Atopic Dermatitis [13]. Patients with missing data or those lost to follow-up were excluded from the study.

Sociodemographic, clinical and therapeutic parameters were assessed. These included age, sex, educational status or mother's educational status for children, household monthly income, marital status, employment status, smoking habits, alcohol consumption, frequency of follow-up visits, access to insurance coverage, severity of atopic dermatitis according to the scoring atopic dermatitis (SCORAD) index, type of medication (oral or topical), experience of effectiveness, experience of adverse events and overall satisfaction with treatment.

Treatment adherence among our patients was assessed using the Morisky Medical Adherence Scale [14] with eight items (MMAS-8) which ranges from 0 (least) to 8 (highest).

Low adherence was defined as an MMAS-8 score of < 6, mild adherence as a score between 6 and < 8, and high adherence as a score of 8. For children, parents completed MMAS-8 questionnaire.

Data were collected from the patients' medical records and from a survey during individual interviews.

Statistical analysis was performed using IBM Statistical Package for the Social Sciences (IBM SPSS®) version 20. The comparison between treatment adherence levels and various studied variables was conducted using Chi-square or Fisher's exact tests and regression tests, with a significance threshold set at $p < 0.05$. The reliability of the MMAS-8 questionnaire in assessing treatment adherence in our patients was evaluated by calculating Cronbach's alpha coefficient. The questionnaire is considered acceptable if the alpha coefficient is equal to 0.70, and reliable if the coefficient falls between 0.90 and 0.95. [15]

Prior consent was obtained from patients or their parents (for children). The collected data underwent strict confidential processing.

3. Results

Among the 71 patients recruited during the study period, 65 were included, comprising 44 children and 21 adults. The mean age \pm standard deviation of children was $4,29 \pm 4,13$ years, and mean age of adults was $35,28 \pm 16,88$ years. All our patients received topical treatment, and none of them received specific oral treatments such as biotherapy or immunosuppressants. The mean score of the MMAS-8 \pm standard deviation was 5.9 ± 1.53 among children, with a low adherence level observed in 45.45% of patients (Figure 1). In adults, the mean score of MMAS-8 \pm standard deviation was 2.56 ± 1.6 , where low adherence level was preponderant, observed in 61.90% of patients (Figure 2).

In children, there was no significant association between adherence levels and all the parameters studied (sociodemographic, clinical and therapeutic) (Table 1, 2).

In adults, low adherence was significantly associated with age; young people were more adherent than older people ($p=.0003$). Patients with low educational status (not graduated) were less adherent than those with a high educational status ($p=.01$); and married people were less adherent than unmarried people ($p=.0001$) (Table 3). There was no significant association between adherence levels and other parameters among adult patients (Table 4).

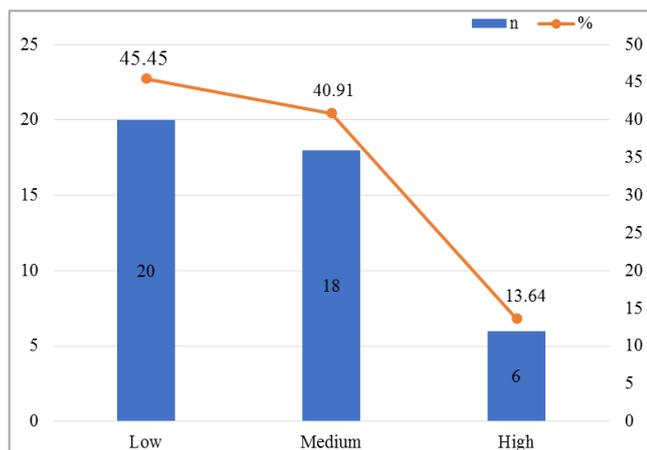


Figure 1. Treatment adherence level among children.

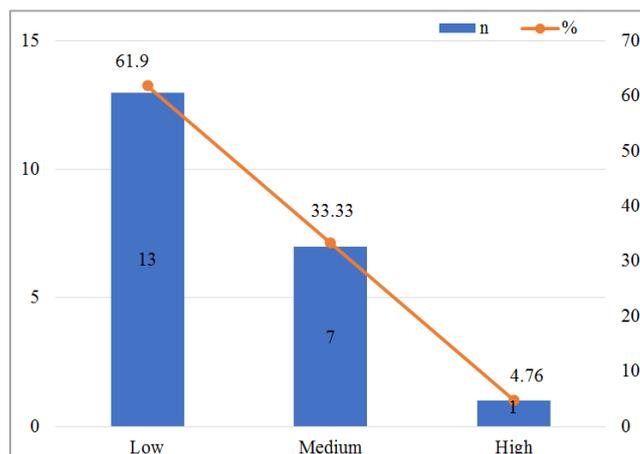


Figure 2. Treatment adherence level among adults.

Table 1. Sociodemographic characteristic of children.

Variables	Adherence level		OR	CI 95%	P-value
	Non-adherent (%)	Adherent (%)			
Gender					
Female	25	18.18	2.44	[0.71-8.30]	0.14
Male	20.45	36.36			
Age					
[0-2]	20.45	25			0.34
[2-5]	4.54	13.63			
[5-16]	20.45	15.9			
Educational status (mother)					
Non-Graduated	27.27	27.27	1.55	[0.45-4.98]	0.55
Graduated	18.18	27.27			
Monthly income (ar) (*)					
< 200k	0	0			0.68
200k to 1M	36.36	47.72			
≥ 1M	9.09	6.81			
Insurance coverage					
Yes	9.09	25	0.29	[0.07-1.14]	0.07
No	36.36	2.95			

(*) ar = Ariary, which is the Malagasy currency unit; Malagasy minimum wage was 200 000 ariary (200k); 1M = 1 million

Table 2. Clinical and therapeutic characteristics of children.

Variables	Adherence level		OR	CI 95%	P-value
	Non- adherent (%)	Adherent (%)			
Frequency of follow-up visits					
≤ 1/6mths	4.54	6.81	0.77	[0.11-1.18]	1
> 1/6mths	40.90	47.72			
Severity of AD					
Mild	4.54	9.09			0.78
Moderate	34.09	36.36			
Severe	6.8	9.09			
Topical medication					
Yes	40.9	54.54			0.20
No	4.54	0			
Oral medication					
Yes	0	0			
No	0	0			
Experience of drug effectiveness					
Yes	45.45	54.54			
No	0	0			
Experience of adverse event					
Yes	0	0			
No	45.45	54.54			
Overall satisfaction of treatment					
Satisfied	40.9	45.45			0.67
Unsatisfied	4.54	9.09			

Cronbach's alpha for topical medication = 0.78

Table 3. Sociodemographic characteristic of adults.

Variables	Adherence level		OR	CI 95%	P-value
	Non- adherent (%)	Adherent (%)			
Gender					
Female	42.85	14.28	3.75	[0.42-35.60]	0.20
Male	19.04	23.8			
Age					
[16-18]	9.52	14.28	1.11	[1.01-1.23]	0.0003
[18-65]	42.85	23.80			
≥ 65	9.52	0			

Variables	Adherence level		OR	CI 95%	P-value
	Non- adherent (%)	Adherent (%)			
<i>Educational status</i>					
Non-Graduated	42.85	9.52	6.74	[0.92-49.23]	0.04
Graduated	19.04	28.57			
<i>Marital status</i>					
Married	52.38	4.76	7191632	[0,00->1,0 ^E 12]	0,0001
Unmarried	0	42.8			
<i>Employment status</i>					
Employed	38.09	23.8	0.53	[0,04-6,65]	1
Unemployed	14.28	4.76			
<i>Monthly income (ar) (*)</i>					
<200k	4.76	0			0.17
[200k- 1M]	47.61	19.04			
≥ 1M	9.52	19.04			
<i>Insurance coverage</i>					
Yes	19.04	14.28	0,74	[0,11-4,72]	0.75
No	42.85	23.8			
<i>Alcohol consumption</i>					
≤ 1/month	4.76	14.28	0.13	[0.01-1.67]	0.25
> &/month	57.14	23.8			
<i>Smoking habits</i>					
Smoker	0	4.76			0.38
Non smoker	61.9	33.33			

(*) ar = Ariary, which is the Malagasy currency unit; Malagasy minimum wage was 200 000 ariary (200k); 1M = 1 million

Table 4. Clinical and therapeutic characteristic of adults.

Variables	Adherence level		OR	CI 95%	P-value
	Non- adherent (%)	Adherent (%)			
<i>Frequency of follow-up visits</i>					
≤ 1/6mths	9.52	4.76	1.27	[0.09-16.8]	1
> 1/6mths	52.38	33.33			
<i>Severity of AD</i>					
Mild	4.76	4.76			1
Moderate	38.09	23.80			
Severe	19.04	9.52			
<i>Topical medication</i>					
					1

Variables	Adherence level		OR	CI 95%	P-value
	Non-adherent (%)	Adherent (%)			
Yes	57.14	38.09			
No	4.76	0			
<i>Oral medication</i>					
Yes	0	0			
No	0	0			
<i>Experience of drug effectiveness</i>					
Yes	31.9	33.33			0.38
No	0	0			
<i>Experience of adverse event</i>					
Yes	0	0	1.80	[0.29-11.03]	1
No	61.9	38.09			
<i>Overall satisfaction of treatment</i>					
Satisfied	57.14	33.33	1.71	[0.09-31.92]	0.67
Unsatisfied	4.76	4.76			

Cronbach's alpha for topical medication = 0.8

4. Discussion

Our study reports treatment adherence among Malagasy patients with atopic dermatitis over a period of one year from 2020 to 2021. So far, it's the first study about this topic in Madagascar. However, the COVID-19 pandemic during study period, affected the dermatology department's activities, thereby limiting the number of outpatients seen and limiting our study population. We used the *Morisky Medication Adherence Scale* to assess treatment adherence in our patients. The MMAS-8 questionnaire is a self-report questionnaire used in many chronic diseases, including dermatology [14,

16]. Our evaluation was limited to therapeutic adherence to topical treatments because none of our patients received specific oral treatment. Access to immunosuppressants such as azathioprin and cyclosporin [17] is still limited in Madagascar due to their costs, and biotherapies such as dupilumab [18] are not yet available in our country.

In our study, the mean MMAS-8 score was 5.9 in the children and 2.56 in adults. We found a low adherence level in 45.45% of the children and 61.9% of the adults. Our findings are consistent with those of other authors from the United States [19, 20], Spain [21], Japan [22], and Saudi Arabia [23] who also reported poor adherence to therapy (Table 5).

Table 5. Comparison of our results with those of other authors.

Study	Results
Krejci-Manwaring and al. (USA, 2007) [18]	Poor adherence to topical medication in children with AD
Feldman and al. (USA, 2007) [19]	Level adherence to topical medication in AD is lower than in other chronic skin diseases
Torello and al. (Spain, 2013) [20]	Low adherence to topical medication in AD: Adherent: 42.6% children, 27% in adults
Furue M and al (Japan, 2015) [21]	Low adherence to treatment in AD than in other chronic skin diseases (Psoriasis, urticaria, tinea)

Study	Results
<i>Alsubeeh et al</i> (Saudi Arabia, 2019) [22]	Low adherence in AD than in alopecia, and vitiligo
<i>Our study</i> (Madagascar, 2021)	Low adherence to topical medication in AD Non-adherent: 45.45% children, 61.9% adults

In children, we did not find significant correlations between sociodemographic characteristics such as gender ($p=.14$), age ($p=.34$), parental education level ($p=.55$), monthly household income ($p=.68$), access to insurance coverage ($p=.07$), and levels of therapeutic adherence.

Among adults, poor adherence was significantly associated with older age ($p=.003$), low level of education ($p=.04$) and being married ($p=.0001$). We found no significant association between adherence levels and other parameters, such as gender ($p=.20$), monthly household income ($p=.17$), employment status ($p=1$) and insurance coverage ($p=.75$).

Murota et al [24] found that male sex and employed patients were significantly associated with high adherence to topical medications (p value = .002 and .026). *Alsubeeh et al* [23] found that women were more adherents than man ($p=.0001$); and singles were more adherents than married people, which is consistent with our results. Studies on other chronic skin diseases like Psoriasis found that marriage, employment, non-smoking, and non-drinking were associated with higher adherence to treatment [9]. In Madagascar, a developing country with a poverty rate of 81% after the COVID-19 pandemic [25], most of all household needs are met by one spouse (usually the husband); this means neglecting the purchase of medicines for non-life-threatening condition in favor of other daily needs. This may explain our results.

With regard to age, our results in adults are not consistent with those of *Wilke et al.* who concluded that being young with a chronic disease is a factor in nonadherence to treatment [26].

Low education level as a factor of poor treatment adherence in our study is consistent with the factors influencing therapeutic adherence according to the WHO [7]. Factors associated with high adherence include patient-related factors such as health literacy. This concept is defined as the extent to which individuals have the ability to obtain, process, and understand basic health information that enables them to make appropriate decisions regarding their health. It refers to skills in reading, writing, arithmetic, oral expression, comprehension, and conceptual and cultural knowledge [27]. This explains the significant association between poor adherence and low educational levels in our study.

Close follow-up, access to insurance coverage, perception of drug efficacy, and adverse events affect treatment adherence in dermatology [20, 28], although we did not find significant associations between adherence levels and these parameters in our study.

5. Conclusion

Treatment adherence in atopic dermatitis is a major contributor to clinical outcomes. Our study found poor adherence to topical treatments in both pediatric and adult Malagasy patients. In adults, poor adherence is associated with sociodemographic factors, such as age, education level and marital status.

In light of these findings, interventions to improve adherence are therefore necessary, particularly the strengthening of therapeutic education, focusing mainly on the patient's or parents' knowledge of atopic dermatitis, and the appropriate and correct use of the treatment prescribed by the dermatologist. However, our study is limited by its monocentric nature. Therefore, a national study on treatment adherence in Malagasy patients with atopic dermatitis, including data from other dermatology departments of Madagascar, would be desirable to complement our results and thus better represent the Malagasy population.

Abbreviations

AD: Atopic Dermatitis
 MMAS: Morisky Medication Adherence Scale
 SCORAD: Scoring Atopic Dermatitis
 SPSS: Statistical Package for the Social Sciences
 SSA: Sub-Saharan Africa
 WHO: World Health Organization

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Langan SM, Irvine AD, Weidinger S. Atopic dermatitis. *Lancet*. 2020; 396: 345-60.
- [2] Weidinger S, Novak N. Atopic dermatitis. *Lancet*. 2016; 387(10023): 1109-1122.
- [3] Feldman SR, Cox LS, Strowd LC, Gerber RA, Faulkner S, Sierka D et al. The Challenge of Managing Atopic Dermatitis in the United States. *Am Health Drug Benefits*. 2019; 12(2): 83-93.

- [4] Schmid-Grendelmeier P, Takaoka R, Ahogo KC, Belachew WA, Brown SJ, Rapelanoro Rabenja F, et al. Position Statement on Atopic Dermatitis in Sub-Saharan Africa: current status and roadmap. *J Eur Acad Dermatol Venereol*. 2019; 33: 2019-28.
- [5] Schmid-Grendelmeier P, Rapelanoro Rabenja F, Beshah AM, Ball MD, Dlova N, Faye O et al. *J Eur Acad Dermatol Venereol*. 2023 Apr 5. <https://doi.org/10.1111/jdv.19096>
- [6] Sendrasoa FA, Ranaivo IM, Razanakoto NH, Andrianarison M, Raharolahy O, Ratovonjanahary VT, et al. Epidemiology and associated factors of atopic dermatitis in Malagasy children. *Allergy Asthma Clin Immunol*. 2020; 16: 4.
- [7] Sendrasoa FA, Ramily SL, Razafimaharo TI, Ranaivo IM, Andrianarison M, Raharolahy O, et al. Atopic dermatitis in adults: A cross-sectional study in the department of dermatology, Antananarivo, Madagascar. *JAAD Int*. 2021; 4: 28-31.
- [8] Sabate E. Adherence to long-term therapies: evidence for action. Geneva: World Health Organization, 2003. [Consulté le 07 Janvier 2022]. Consultable à l'URL: <http://whqlibdoc.who.int/publications/2003/9241545992.pdf>
- [9] Ahn CS, Culp L, Huang WW, Davis SA, Feldman SR. Adherence in dermatology. *Journal of Dermatological Treatment*; <https://doi.org/10.1080/09546634.2016.1181256>
- [10] Hodari KT, Nanton JR, Carrol CL, Feldman SR, Blakrishnan. Adherence in dermatology: A review of the last 20 years. 2006; <https://doi.org/10.1080/09546630600688515>
- [11] Nolan BV, Feldman SR. Dermatologic Medication Adherence. *Dermatol Clin*. 2009; 113-120.
- [12] Ranaivo IM, Sendrasoa FA, Raharolahy O, Andrianarison M, Ramarozatovo LS, Rapelanoro Rabenja F et al. Observance thérapeutique au cours des dermatoses chroniques à l'hôpital universitaire de Befelatanana. *International Journal of Progressive Sciences and Technologies (IJPSAT)*. 2019; 17: 104-10.
- [13] Williams HC, Jburney PG, Strachan D, Hay RJ. The U.K. Working Party's Diagnostic Criteria for Atopic Dermatitis II. *Br J Dermatol*. 1994; 1313: 397-405.
- [14] Morisky DE, Ang A, Krousel-Wood M, Ward HJ. Predictive validity of a medication adherence measure in an outpatient setting. *J Clin Hypertens (Greenwich)* 2008; 10: 348-354.
- [15] Bland JM, Altman DG. Cronbach's alpha. *BMJ*. 1997; 314(7080): 572. <https://doi.org/10.1136/bmj.314.7080.572>
- [16] Kaneko S, Masuda K, Hiragun T, Inomata N, Furue M, Onozuka D. Transient improvement of urticaria induces poor adherence as assessed by Morisky Medication Adherence Scale-8. *Journal of Dermatology*. 2015; 1078- 82.
- [17] DiLucca-Chrisment J, Gilliet M. Traitements systémiques émergents de la dermatite atopique. *Rev Med Suisse*. 2018; 685-9.
- [18] Mazaud C, Staumont D, Beauchet A, Catteau B, Lasek A, Puzenat E, et al. Dupilumab dans la dermatite atopique modérée à sévère de l'enfant. *Ann Dermatol Venereol*. 2019; 146: 107-8.
- [19] Krejci-Manwaring J, Tusa MG, Carroll C, Camacho F, Kaur M, Carr D, et al., Stealth monitoring of adherence to topical medication: adherence is very poor in children with atopic dermatitis. *J. Am. Acad. Dermatol*. 2007; (56) 211-6.
- [20] S. R. Feldman, F. T. Camacho, J. Krejci-Manwaring, C. L. Carroll, R. Balkrishnan, Adherence to topical therapy increases around the time of office visits, *J. Am. Acad. Dermatol*. 57(2007) 81-83.
- [21] Torrelo A, Ortiz J, Alomar A, Ros S, Pedrosa E, Cuervo J. Health-related quality of life, patient satisfaction, and adherence to treatment in patients with moderate or severe atopic dermatitis on maintenance therapy: the CONDA-SAT study. *Actas Dermosifiliogr* 2013; 104: 409-417.
- [22] Furue M, Onozuka D, Takeuchi S et al. Poor adherence to oral and topical medication in 3096 dermatological patients as assessed by Morisky Medication Adherence Scale-8. *Br J Dermatol* 2015; 172: 272-275.
- [23] Alsubeeh NA, Alsharafi AA, Alaijlan A. Treatment adherence among patients with five Dermatological diseases and four treatment types- a cross-sectional study. *Patient Preference and Adherence*. 2019.
- [24] Murota H, Takeuchi S, Sugaya M, Tanioka M, Onozuka D, Hagihara A, et al. Characterization of socioeconomic status of Japanese patients with atopic dermatitis showing poor medical adherence and reasons for drug discontinuation. *J Dermatol Sci*. 2015; 79: 279-87.
- [25] La Banque mondiale. Madagascar-vue d'ensemble. [Consulté le 06 Février 2022]. Consultable à l'URL: <https://www.banquemondiale.org/fr/country/madagascar/overview>
- [26] Wilke T, Muller S, Morisky DE. Toward identifying the causes and combinations of causes increasing the risks of nonadherence to medical regimens: combined results of two German self-report surveys. *Value Health* 14 (2011) 1092-1100.
- [27] Zenklusen S, Bischoff T, Panese F, Bodenmann P. Compétences en santé déficientes: obstacle à une prise en charge optimale. *Revue Médicale Suisse*. 2012; 1016-21.
- [28] Schaarschmidt ML, Umar N, Schmieder A, et al. Patient preferences for psoriasis treatments: impact of treatment experience. *J Eur Acad Dermatol Venereol*. 2013; 27: 187-98.