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Research Article

Profile of Comorbidities Associated with Atopic Dermatitis at the Department of Dermatology of Antananarivo, Madagascar

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Abstract

Atopic dermatitis is a chronic inflammatory skin disorder which develops in flare-ups. It is a global public health problem, and in Madagascar, its prevalence is 5.6% in children and 0.5% in adults people. Atopic dermatitis is often associated with various comorbidities. The aim of this study is to describe the profile of comorbidities associated with atopic dermatitis. A cross-sectional and analytical study was conducted over a five-year period from January 2019 to March 2023, involving pediatric and adult patients with atopic dermatitis seen at the department of Dermatology at Joseph Raseta Befelatanana Hospital, Antananarivo. Cases with incomplete and unusable medical records were excluded. Out of 6,495 consultations, 93 cases of atopic dermatitis were observed, with a prevalence of 1.43%, a female predominance with a sex ratio of 0.83, and the average age was 10 years. We found 13 comorbidities, with personal atopy being the most common (55.91%), followed by smoking (55.91%). A significant correlation was found between passive smoking and the occurrence of atopic dermatitis ($p = 0.002$). A significant association was also observed between personal atopy and flare-ups of atopic dermatitis ($p < 0.05$). These comorbidities have an impact on the quality of life and psychiatric status of patients. Additionally, several factors (environmental, dietary, climatic) were identified as potential triggers for atopic dermatitis in our study. Our study confirms the presence of comorbidities in patients with atopic dermatitis. Atopic dermatitis has implications for quality of life and psychological well-being.

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Keywords

Antananarivo, Atopy, Comorbidities, Atopic Dermatitis, Madagascar

1. Introduction

Atopic dermatitis (AD) is a chronic inflammatory dermatosis characterized by recurrent itching episodes. It significantly impacts the quality of life of patients and their families [1]. Globally, atopic dermatitis is a major public health concern [1]. It affects 10 to 15% of children and 4% of adults in Europe [2]. In Africa, the prevalence ranges from 4.7 to 23% [3]. In Madagascar, the prevalence is 5.6% among children under 15 years old in 2020 [4] and 0.5% among adults in 2021 [5]. Several comorbidities can be associated with atopic dermatitis, some appearing during childhood, while others occur in adulthood, especially in patients with chronic diseases [6, 7]. The aim of our study is to describe the profile of comorbidities associated with atopic dermatitis in patients seen at the department of Dermatology of Joseph Raseta Befelatanana Hospital.

2. Materials and Methods

A cross-sectional, and analytical monocentric study was conducted at the department of Dermatology of Joseph Raseta Befelatanana Hospital, Antananarivo, from January 2019 to March 2023. All patients with pruritic dermatosis diagnosed as atopic dermatitis by a dermatologist were included, while patients with missing data or lost to follow-up were excluded. Data were collected from the medical records of patients attending the outpatient clinic. Demographic and clinical parameters of the patients were analyzed.

They included age, gender, geographical origin, duration of the disease defined as the time between the onset of the first symptom and the date of consultation, reason for consultation, comorbidities, family history, triggers of flare-ups, type of dermatological manifestations, and their location. Statistical analysis was performed using Epi Info® 7 software. The Chi-square test was used for the comparison of qualitative variables, with a significance level set at $p < 0.05$. Our study was conducted in compliance with patient confidentiality.

3. Results

During the study period, 118 cases of atopic dermatitis were recruited, and 93 patients were included, resulting in a prevalence of 1.43%. There was a female predominance with a sex ratio of 0.89. The average age of the patients was 10 years, and the most represented age group was 0 to 10 years (61.3%). Skin eruptions were the most frequent reason for consultation in 80 patients (86.02%), with itching associated in 73 patients (78.49%). The average disease duration was 2.6 years.

Regarding comorbidities, 13 types of comorbidities (Figure 1) were observed in 92 patients. Personal atopy and smoking (patient self-report) were the most common comorbidities, present in 52 patients (55.91%) (Table 1). A significant correlation ($p = 0.002$) was found between passive smoking and the occurrence of atopic dermatitis. Patients exposed had approximately 4.2 times higher risk of developing atopic dermatitis compared with non-exposed patients (Table 2). Regarding atopy, a significant difference ($p < 0.05$) was observed in the correlation between the presence of atopy and a flare-up of atopic dermatitis. Patients with a history of atopy had about 7.9 times risk of experiencing an atopic dermatitis flare compared with those without atopy (Table 3). However, no significant correlation was found between personal atopy and the occurrence of atopic dermatitis ($p = 0.15$).

Table 1. *Proportion of patients with personal atopy and smoking.*

Comorbidities	Frequency n = 93 (100%)
Personal atopy	52 (55.91)
Asthma	22 (42.3)
Allergic conjunctivitis	28 (53.84)
Hay fever	0 (0)
Allergic rhinitis	42 (80.76)
Smoking	52 (55.91)
Active smoking	6 (11.53)
Passive smoking	46 (88.46)

Table 2. *Correlation of these comorbidities with the occurrence of atopic dermatitis.*

Variables	OR	CI (95%)	*p-value*
Passive smoking	4.2	[2.74-215.98]	*0.002*
Cardiovascular pathology	24.3	[2.74-215.98]	*0.0003*
Arterial hypertension	10.3	[1.01-105.03]	*0.02*

Food allergy was reported by 34 patients (36.55%), and 29 patients (31.18%) experienced a flare-up of underlying atopic dermatitis. A significant correlation was found between food allergy and the occurrence of atopic dermatitis flare-up ($p < 0.05$) (Table 3). Cardiovascular pathologies were observed in 7 patients (7.52%), and a significant difference was found between them and the frequency of atopic dermatitis occurrence ($p < 0.05$) (Table 3). And one patient had a history of uterine cancer.

Table 3. *Correlation of comorbidities with atopic dermatitis flare-up.*

Variables	OR	CI (95%)	*p-value*
Personal atopy	7.9	[2.46-25.46]	*< 0.05*
Asthma	4.1	[1.5-11.29]	*0.003*
Allergic conjunctivitis	3.5	[1.38-9.22]	*0.004*
Allergic rhinitis	6.2	[2.3-17.1]	*< 0.05*
Food allergy	3.4	[1.38-8.77]	*0.004*
Smoking	2.04	[0.8-5.19]	*0.06*

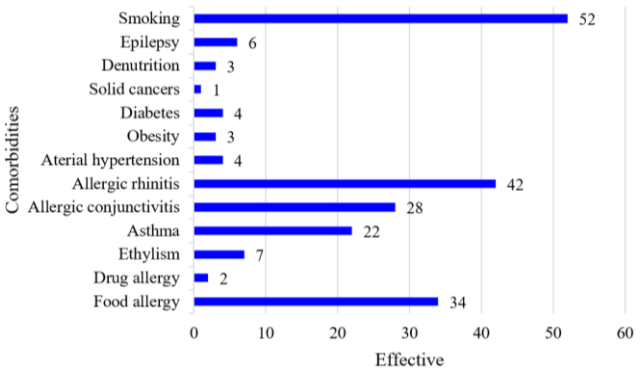

Figure 1. *Comorbidities.*

Atopic dermatitis had consequences on the quality of life of patients. Sleep disorders were observed in 36.55% of patients ($p = 0.01$), impairment of daily activities ($p = 0.001$) and absenteeism ($p = 0.000001$) were observed in 35.48% of cases. Additionally, 12.9% of cases experienced stress and anxiety caused by atopic dermatitis ($p = 0.00006$) (Table 4).

Table 4. *Impairment of quality of life.*

Consequences	OR	CI (95%)	*p-value*
Sleep disorder	0.28	[0.08-0,91]	*0.01*
Alteration of activities	4.73	[1.83-12,18]	*0.001*
Absenteeism	12.15	[3.89-37,88]	*< 0.05*
Stress and anxiety	14.14	[3.39-58,99]	*< 0.05*

Fifty-nine patients (63.44%) had a family history, as shown in Table 5. A correlation was found between the exacerbation of atopic dermatitis and the family history of atopic dermatitis ($p = 0.002$).

Table 5. *Family history.*

Family history	Frequency n = 93 (100%)
History of familial atopy	54 (58.06)
Familial asthma	26 (27.95)
Familial eczema	21 (21.5)
Familial atopic dermatitis	24 (25.8)

Regarding triggering factors, domestic animals, the environment, and heat were the most observed in our study (Figure 2).

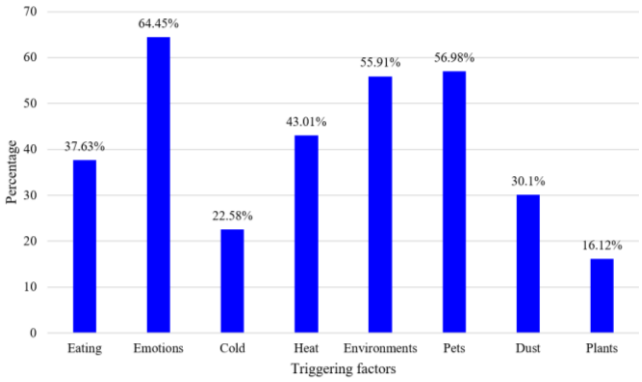

Figure 2. *Distribution of triggering factors.*

On the skin level, erythemato-vesicular lesions were observed in 77 patients (82.79%), followed by cutaneous xerosis present in 46 patients (49.46%). Seventeen patients (18.27%) presented with impetiginized lesions, 15 patients (16.12%) were seen with lichenified lesions, 11 patients (11.82%) with weeping lesions, and 2 patients (2.15%) presented with infected lesions. Among the 93 patients, 3 patients (3.22%) had a generalized form. Ninety patients (96.77%) presented with localized forms, among them, 75 patients (80.64%) showed involvement of the limbs, followed by involvement of the face

in 50 patients (53.76%), the head and neck region in 29 patients (31.18%), and the trunk region in 42 patients (45.16%), including the back, chest, and abdomen (Table 6).

Table 6. *Cutaneous manifestations.*

Cutaneous manifestations	Number of patients n = 93 (100%)
Erythemato-vesicular lesions	77 (82.79)
Weeping lesions	11 (11.82)
Cutaneous xerosis	46 (49.46)
Local superinfections	20 (21.5)
Post-inflammatory hyperpigmentation	10 (10.75)
Lichenified lesions	15 (16.12)

The region of the external genital organs was the least affected area in our study, with 11 patients (11.82%) experiencing involvement in this region (Table 7).

Table 7. *Localization of cutaneous lesions.*

Location	Number of patients n = 93 (100%)
Members	75 (80.64)
Face	50 (53.76)
head and neck	29 (31.18)
Trunk	42 (45.16)
External genitals	11 (11.82)

4. Discussion

Our study aims to describe the profile of comorbidities associated with atopic dermatitis and has allowed us to identify the frequent comorbidities associated with atopic dermatitis in Antananarivo, Madagascar. A prevalence of 1.43% was observed, which is close to a Malagasy study in 2000 that found a prevalence of 1.02% [8].

A multicenter study conducted by Barbarot and colleagues showed higher figures compared to our study, with prevalence's of 2.2% in Germany, 3.5% in Canada, and 4.9% in the United States [9]. Among the patients, 55.91% (52 cases) had a personal history of atopy, dominated by allergic rhinitis, accounting for 80.76%. Atopic manifestations are especially associated with early-onset atopic dermatitis that persists into adulthood [10, 11]. Brazilian and Italian studies have found a frequency of allergic rhinitis that is consistent with our results [12, 13].

According to the literature, active or passive smoking is associated with an increased prevalence of atopic dermatitis in both adults and children [14]. Exposure to tobacco smoke is linked to an increased risk of developing atopic dermatitis for both smokers and individuals exposed to passive smoking [15, 16]. In our study, six patients were active smokers, and 46 patients had a history of passive smoking, with a significant difference in their correlation with the occurrence of atopic dermatitis ($p < 0.05$). This finding is consistent with that of Kantor et al., who also demonstrated a significant association between smoking and atopic dermatitis [15].

A correlation between food allergy and exacerbation of atopic dermatitis was observed in our study, although its interpretation is difficult because the specific food allergens involved have not been determined. Indeed, the presence of food allergy can be a predisposing and aggravating factor for atopic dermatitis, as it can trigger immediate cutaneous reactions, itching with scratch lesions, or promote delayed inflammatory reactions a few hours after ingestion [17].

The literature has shown no positive association between atopic dermatitis and cardiovascular disorders [18]. However, in an Israeli study, Shalom et al. demonstrated a link between the severity of atopic dermatitis and cardiovascular risk [19]. In our study, three obese patients were identified with a significant correlation between the occurrence of atopic dermatitis and obesity. An American study showed an association between increased Body Mass Index (BMI) and atopic dermatitis [20]. Zhang et al. identified a higher risk of atopic dermatitis in overweight and obese patients, which could be explained by a decreased immunological tolerance associated with obesity, leading to the exacerbation or onset of atopic dermatitis [21]. Regarding diabetes, a correlation between diabetes and atopic dermatitis was observed in our study. According to the literature, there is no association between atopic dermatitis and type 2 diabetes, but a Taiwanese study by Lin in 2016 showed an increased risk of atopic dermatitis in individuals with type 1 diabetes [22, 23].

One patient with uterine cancer was identified in our study. According to the literature, there is no association between solid cancer and atopic dermatitis. However, studies have reported an inverse association between atopic dermatitis and certain solid tumors (such as brain, bladder, and pancreatic cancers) [24-26].

Six patients had a history of epilepsy. A Taiwanese study by Chen et al. in 2014 found an increased risk of developing epilepsy in patients with atopic dermatitis later on [27]. The literature suggests that epilepsy is considered a chronic inflammatory disease, similar to atopic dermatitis [28].

5. Conclusion

Atopic dermatitis is a complex inflammatory skin disease. Our study revealed the presence of comorbidities associated with atopic dermatitis, with personal atopy and smoking being the most common. However, this study has limitations, such

as the small sample size, which may not reflect the exact number of atopic dermatitis cases in Antananarivo despite the study duration, as well as missing data.

Abbreviations

AD Atopic Dermatitis

Author Contributions

Fenohasina Rakotonandrasana: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Writing – review & editing

Fandresena Arilala Sendrasoa: Conceptualization, Data curation, Visualization, Writing – review & editing

Onivola Raharolahy: Data curation, Visualization, Writing – review & editing

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Voahanginirina Nathalie Ralimalala: Data curation

Tsiory Iarintsoa Razafimaharo: Data curation

Volatantely Tobiniaina Ratovonjanahary: Data curation

Moril Sata: Visualization, Data curation

Mendrika Fifaliana Rakotoarisaona: Visualization, Data curation, Supervision

Naina Harinjara Razanakoto: Visualization, Data curation, Supervision

Malalaniaina Andrianarison: Data curation, Supervision, Visualization

Irina Mamisoa Ranaivo: Data curation, Supervision, Validation, Visualization, Writing – review & editing

Lala Soavina Ramarozatovo: Supervision, Validation, Visualization, Writing – review & editing

Fahafahantsoa Rabenja Rapelanoro: Supervision, Validation, Visualization, Writing – review & editing

Conflicts of Interest

The authors declare no conflicts of interest.

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