Our Dermatology Online

Original Article

Atopic dermatitis: Epidemiological and clinical aspects and the associated factors in Yaoundé, Cameroon

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ABSTRACT

Background: Atopic dermatitis (AD) or atopic eczema is a chronic inflammatory dermatosis characterized by intense pruritus and skin xerosis. Its prevalence is increasing in low-income countries and it has a major socio-economic impact. However, very few studies have included all age groups, and knowledge of factors associated with AD remains limited in our context. We, therefore, conducted a study to assess the epidemiological aspects and factors associated with AD in hospitals in Yaoundé, Cameroon. **Methods:** This was a cross-sectional, analytical study conducted from December 2020 to July 2021 in four health facilities in Yaoundé. All patients consulting at dermatology departments with signs of AD and freely consenting were included. Sociodemographic, environmental, and clinical data was studied and analyzed with SPSS, version 26, with a significance level of $p < 0.05$. **Results:** Among the 248 patients enrolled, 84 suffered from AD. These were mainly children (64.3%) and female (sex ratio: 0.4). The mother's occupation (housewife, retired, private sector employee), the participant's and father's level of education, a history of asthma in siblings, and a history of flexural fold lesions were associated with AD. **Conclusion:** AD is more common in children and is strongly related to socio-demographic factors.

Key words: Atopic dermatitis; Sociodemographic factors; Associated factors; Yaoundé, Cameroon

INTRODUCTION

Atopic dermatitis (AD) is a chronic inflammatory dermatosis evolving in flare-ups characterized by intense pruritus and xerosis [1-4]. AD is the most common chronic inflammatory pathology of the skin and represents the first element of the atopic process [3,5-10]. AD occurs in a family and personal context of atopy associated with abnormalities of the skin barrier and environmental factors [8,11-14]. It mainly affects pediatric and female populations yet may be seen during adulthood [3-5,10,14,15]. The worldwide prevalence of AD ranges from 15% to 20% in children and from 1% to 3% in adults; it is 3% in sub-Saharan Africa [1,5-7,15]. In Cameroon, Kouotou et al. found a prevalence of 14.8% in the general population [16,17]. Being on the rise worldwide, including in low-income countries, AD represents a real public health problem [1,3,8,9,18,19]. In addition, there are difficulties in its diagnosis and management due to the inappropriate level of knowledge of the nursing staff, problems in acceptance by patients and difficulties in accessing treatment [2,7-9,16,20-23]. In addition, it has a major socio-economic impact on the lives of patients due to the cost of treatment, stigmatization, sleep disorders, and the inconvenience in professional and personal activities (impaired quality of life in 93.5% of individuals affected in

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Cameroon) [1,15,21,24]. Thus, beyond the studies conducted, very few have focused on all age groups and knowledge of the factors associated with AD.

MATERIALS AND METHODS

We conducted an analytical, cross-sectional, prospective study for the period of eight months (February to June 2021) at four health facilities in Yaoundé, Cameroon, namely, University Teaching Hospital of Yaoundé (UTHY), Gyneco-Obstetrics and Pediatric Hospital of Yaoundé (GOPY), District Hospital of Biyem-Assi (DHBA), and District Medical Center of Elig-Essono (DMCEE). We included patients who freely gave their consent and showed signs of AD. Those without signs of AD or refusing to participate in the study were excluded. The sampling was non-probabilistic and exhaustive with a sample size of 224 patients (74 patients and 150 non-patients) calculated according to the Whitley–Ball formula.

The patients were classified according to the criteria of the United Kingdom Working Party (UKWP). Matching was conducted according to the sex and age of the patients. Three groups of variables were collected by the examiner with a validated questionnaire; these were socio-demographic variables (sex, age, occupation, standard of living and education), environmental variables (clothing, presence of pets, carpets, fans), and clinical variables (history of atopy, early events of life, age of onset and type of lesions).

The data was analyzed with Microsoft Excel and SPSS, version 26. Tables were produced with Microsoft Excel and Word. Quantitative data was expressed as means and standard deviations. Qualitative data was expressed as numbers and percentages. Measures of association were performed using the chi-squared test and the calculation of odds ratio with its 95% confidence interval (CI). A p value less than 5% was considered statistically significant.

Patient and Public Involvement

The patients were not involved in the design, conduct, reporting, or plan dissemination of our research.

Ethics Statement

This study was carried out in compliance with the principles of ethics and medical deontology. We obtained ethical clearance from the Ethics and Deontology Committee of Université des Montagnes, administrative authorizations from the heads of various health facilities, and informed consent from all patients and the parents of the minor patients.

RESULTS

Sociodemographic Data

In total, we recruited 248 participants, including 84 patients. They were mostly female (70.2%), with a male-to-female ratio of 0.4. The population consisted mainly of children (64.3%), with a predominance of infants (22/54). The median age was 10.25 years (2.70–25). The patients were mostly students (46.4%) and preschool children (29.8%) (Table 1). Regarding the level of education, the primary level was the most represented among the participants, while the university level was predominant among the parents (Table 1). The most recurrent sectors of activity among the parents were the public and private sectors, with 40.5% of the mothers and 38.1% of the fathers in the public sector and 29.8% of the mothers and 35.7% of the fathers in the private sector (Table 1).

Environmental Data

Clothes with cotton were the most worn (100%), followed by synthetics (84.5%) (Table 2). Most of our participants did not have pets, air conditioners, or fans (70.2% and 53.6%) yet owned a carpet (61.9%) (Table 2). Regarding their houses, they were mostly built with concrete blocks and tiles surrounded by gardens or fields in 56% of the cases (Table 2). Cleaning was performed on average 6 ± 1.8 times per week.

Clinical Data

A personal history of atopy was allergic conjunctivitis (33.3%), allergic rhinitis (21.4%), AD (16.7%), food allergies (10.8%), and asthma (7.1%) (Table 3). At the family level, we mainly found: asthma in second-degree relatives (21.4%), allergic rhinitis in siblings and in second-degree relatives (17.8%), and allergic conjunctivitis in siblings (11.9%) (Table 4).

Among the 84 patients, 79 (94%) received breastfeeding for a median duration of 10 months (6–12). Food diversification began at an unknown age in 42.9% and before four months in 26.2% (Table 5). The first food introduced was artificial milk (AL) in most of the cases

Table 1: Socio-demographics characteristic of the participants.

Variable	AD		OR	CI 95%	*p* value
	No (%)	Yes (%)			
Age (yrs.)					
≤ 2	32 (12.9)	22 (8.9)	0.70	0.35–1.41	0.323
3 – 12	53 (21.4)	21 (8.5)	1.22	0.63–2.38	0.557
13 – 18	17 (6.9)	11 (4.4)	0.75	0.31–1.79	0.515
≥ 19	62 (25)	30 (12.1)	-	-	-
Residence					
Peri-urban	7 (2.8)	1 (0.4)	3.70	0.45–30.59	0.194
Urban	157 (63.3)	83 (33.5)	-	-	-
Mother's occupation					
Dead	10 (4)	5 (2)	1.89	0.58–6.09	0.287
Student	7 (2.8)	7 (2.8)	0.94	0.30–2.98	0.922
Housewife	26 (10.5)	8 (3.2)	3.07	1.22–7.71	0.017
Retired	16 (6.5)	3 (1.2)	58.04	1.35–18.84	0.016
Informal sector	7 (2.8)	2 (0.8)	3.30	0.64–17.04	0.153
Private sector	54 (21.8)	25 (10.1)	2.04	1.05–3.97	0.036
Public sector	36 (14.5)	34 (13.7)	-	-	-
Participant's education level					
Not applicable	38 (15.3)	25 (10.1)	0.64	0.31–1.34	0.002
Not educated	1 (0.4)	1 (0.4)	0.42	0.02–7.11	0.549
Primary	51 (20.6)	20 (8.1)	1.08	0.51–2.27	0.846
Secondary	29 (11.7)	19 (7.7)	0.64	0.29–1.42	0.275
University	45 (18.1)	19 (7.7)	-	-	-
Father's education level					
Unknown	30 (12.1)	10 (4)	1.36	0.61–3.03	0.450
Not educated	3 (1.2)	3 (1.2)	0.45	0.09–2.34	0.345
Primary	15 (6)	4 (1.6)	1.70	0.53–5.42	0.369
Secondary	19 (7.7)	23 (9.3)	0.37	0.18–0.76	0.006
University	97 (39.1)	44 (17.7)	-	-	-

Table 2: Environmental characteristics.

Variable	AD		OR	CI 95%	*p* value
	No (%)	Yes (%)			
Cotton clothes					
No	1 (0.4)	0	-	-	-
Yes	163 (65.7)	84 (33.9)	-	-	-
Woolen clothes					
No	101 (40.7)	48 (19.4)	1.202	0.705–2.052	0.499
Yes	63 (25.4)	36 (14.5)	-	-	-
Synthetic clothes					
No	26 (10.5)	13 (5.2)	1.029	0.499–2.124	0.938
Yes	138 (55.6)	71 (28.6)	-	-	-
Silk clothes					
No	117 (47.2)	58 (23.4)	1.116	0.629–1.980	0.708
Yes	47 (19)	26 (10.5)	-	-	-
Pets					
No	112 (45.2)	59 (23.8)	0.913	0.515–1.617	0.754
Yes	52 (21)	25 (10.1)	-	-	-
Carpet					
No	72 (29)	32 (12.9)	1.272	0.743–2.177	0.380
Yes	92 (37.1)	52 (21)	-	-	-
Air conditioner or fan					
No	76 (30.6)	29 (15.7)	0.997	0.588–1.688	0.990
Yes	88 (35.5)	45 (18.1)	-	-	-
Garden or field					
No	59 (23.8)	37 (14.9)	0.714	0.418–1.220	0.217
Yes	105 (42.3)	47 (19)	-	-	-

Table 3: Personal history of atopy.

Variable	AD		OR	CI 95%	*p* value
	No (%)	Yes (%)			
Asthma					
No	153 (61.7)	78 (31.5)	1.070	0.381–3.001	0.898
Yes	11 (4.4)	6 (2.4)	-	-	-
Allergic rhinitis					
No	116 (46.8)	66 (26.6)	0.659	0.354–1.226	0.186
Yes	48 (19.4)	18 (7.3)	-	-	-
Allergic conjunctivitis					
No	128 (51.6)	56 (22.6)	1.778	0.990–3.192	0.053
Yes	36 (14.5)	28 (11.3)	-	-	-
Atopic dermatitis					
No	154 (62.1)	70 (28.2)	3.080	1.304–7.273	0. 008
Yes	10 (4)	14 (5.6)	-	-	-
Food allergy					
No	153 (61.7)	75 (30.2)	1.669	0.663–4.202	0.273
Yes	11 (4.4)	9 (3.6)	-	-	-

(40.5%) (Table 5). While the majority of our patients had not been to nursery (85.8%), most had had early infections (54.8%), taken antibiotics (54.8%), and were vaccinated (95.2%) during the first months of life (Table 5). AD occurred mainly after the age of two years (58.33%) for a median duration of the symptoms

Table 4: Family history of atopy.

Variable	AD		OR	CI 95%	*p* value
	No (%)	Yes (%)			
Asthma in the siblings					
No	148 (59.7)	82 (33.1)	0.226	0.051–1.006	0.034
Yes	16 (6.5)	2 (0.8)	-	-	-
Allergic rhinitis in the children					
No	157 (63.3)	75 (30.2)	2.691	0.965–7.504	0.051
Yes	7 (2.8)	9 (3.6)	-	-	-
Allergic conjunctivitis in the mother					
No	141 (56.9)	77 (31)	0.557	0.229–1.358	0.193
Yes	23 (9.3)	7 (2.8)	-	-	-
Allergic conjunctivitis in the grandparents					
No	149 (60.1)	82 (33.1)	0.242	0.054–1.086	0.046
Yes	15 (6)	2 (0.8)	-	-	-
Food allergy in the mother					
No	163 (65.7)	80 (32.3)	8.150	0.896–74.114	0.028
Yes	1 (0.4)	4 (1.6)	-	-	-
Food allergy in the siblings					
No	146 (58.9)	80 (32.3)	0.406	0.133–1.239	0.103
Yes	18 (7.3)	4 (1.6)	-	-	-

Table 5: Life first events.

Variable	AD		OR	CI 95%	*p* value
	No (%)	Yes (%)			
Breastfeeding					
Yes	147 (59.3)	79 (31.9)	1.83	0.65–5.14	0.247
No	17 (6.9)	5 (2)	-	-	-
Nursery					
No	143 (57.7)	72 (29)	1.13	0.53–2.44	0.745
Yes	21 (8.5)	12 (4.8)	-	-	-
Early infections					
No	66 (26.6)	38 (15.3)	0.81	0.48–1.39	0.451
Yes	98 (39.5)	46 (18.5)	-	-	-
Early use of antibiotics					
No	71 (28.6)	38 (15.3)	0.92	0.54–1.57	0.770
Yes	93 (37.5)	46 (18.5)	-	-	-
Vaccination					
No	14 (5.6)	4 (1.6)	1.87	0.59–5.86	0.278
Yes	150 (60.5)	80 (32.3)	-	-	-
Age of AD (yrs.)					
Before 2	100 (40.3)	49 (19.8)	1.12	0.65–1.91	0.688
After 2	64 (25.8)	35 (14.1)	-	-	-
History of lesions on the flexion folds and/or cheeks					
No	130 (52.4)	39 (15.7)	4.41	2.49–7.81	< 0.01
Yes	34 (13.7)	45 (18.1)	-	-	-

of 5 months (1–24). A history of flexion fold lesions was found in 53.6% of the patients (Table 5).

Complaints in patients with AD were mainly pruritus in all and sleep disorders in 45.2% (Fig. 1). The areas most affected were the flexion folds (60.1%), trunk (56%), and neck (52.4%) (Table 6). Regarding physical signs, we mainly found xerosis and palmoplantar hyperlinearity in 98.8%, followed by papules and the

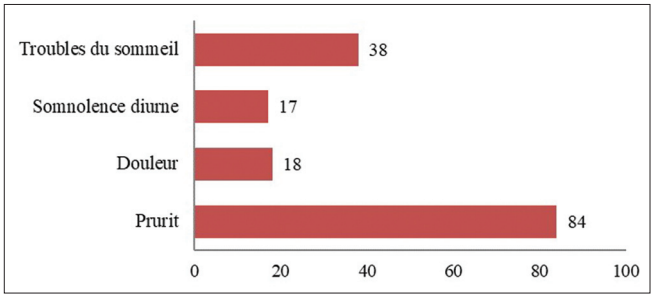

Figure 1: Signs of atopic dermatitis.

Dennie–Morgan sign (84.6%), classic eczema plaques (81%), erythema (65.5%), keratosis pilaris (64.3%), and lichenification (60.7%) (Fig. 2).

Associated Factors

In univariate analyses, the factors associated with AD were the mother's occupation, more specifically, housewife (OR = 3.069; 95% CI = 1.22–7.71; $p = 0.017$), retired (OR = 58.037; 95% CI = 1.35–18.84; $p = 0.016$), and private sector agent (OR = 2.040; 95% CI = 1.05–3.97; $p = 0.036$), which increased the risk (Table 1). On the other hand, children of preschool age (OR = 0.642; 95% CI = 0.31–1.34; $p = 0.002$) and the father's secondary school level (OR = 0.375; 95% CI = 0.18–0.76; $p = 0.006$) reduced the risk (Table 1). While the presence of asthma in siblings (OR = 0.226; 95% CI = 0.05–1.00; $p = 0.034$) and allergic conjunctivitis in second-degree relatives (OR = 0.242; 95% CI = 0.05–1.09; $p = 0.046$) protected against AD, the presence of personal AD (OR = 3.080; 95% CI = 1.30–7.27; $p = 0.008$;) and

maternal food allergies (OR = 8.150; $p = 0.028$) favored it (Tables 3 and 4). Regarding early events in the lives of the patients, a history of lesions on the flexion folds and/or cheeks increased the risk of AD (OR = 4.41; 95% CI = 2.49–7.81; $p < 0.01$) (Table 5).

After multiple regressions, the factors associated with AD were: the mother's occupation: housewife (aOR = 3.35; 95% CI = 1.05–10.66; $p = 0.041$), retired (aOR = 10.07 95% CI = 1.87–54.28; $p = 0.007$), private sector agent (aOR = 2.47; 95% CI = 1.08–5.67; $p = 0.033$); primary school level of the participant (aOR = 4.2; 95% CI = 1.53–11.55; $p = 0.005$) and secondary of the father (aOR = 0.24; 95% CI = 0.09–0.60; $p = 0.003$), a history of asthma in the siblings: (aOR = 0.16; 95% CI = 0.029–0.87; $p = 0.034$) and lesions on the flexion folds and/or cheeks (aOR = 5, 61; 95% CI = 2.58–12.18; $p < 0.01$) (Table 7).

DISCUSSION

The aim of our study was to study epidemiological and clinical aspects and factors associated with atopic dermatitis at a hospital in Yaoundé, Cameroon.

Our population consisted mainly of female patients, with a sex ratio of 0.4. Indeed, in urban areas, women are more sensitive to their appearance and are, therefore, more likely to be seen in dermatological consultations. These results are similar to those obtained by Faye et al. in 2020 in sub-Saharan Africa in adults and children (female predominance in 56.4% and 61.6%) [25,26].

We found more children (64.3%), with a predominance of infants (22/54). This could be explained by the fact that AD flare-ups generally begin in the first months of life, during which the immune system is set up by adapting to environmental stimuli. This is close to the results obtained by Pefura-Yone et al., who found a predominance of infants (52.2%) in sub-Saharan Africa in 2020 [7,17].

In terms of the standard of living and education, the parents were mostly upper-level working in the public and private sectors. Indeed, our results highlight the role of the parents' high level of education in the physiopathology of AD by falling within the framework of the hygienist theory, according to which the more the parents have high-level education, the less the children will be exposed to infectious agents and the more they will be at risk of developing allergic

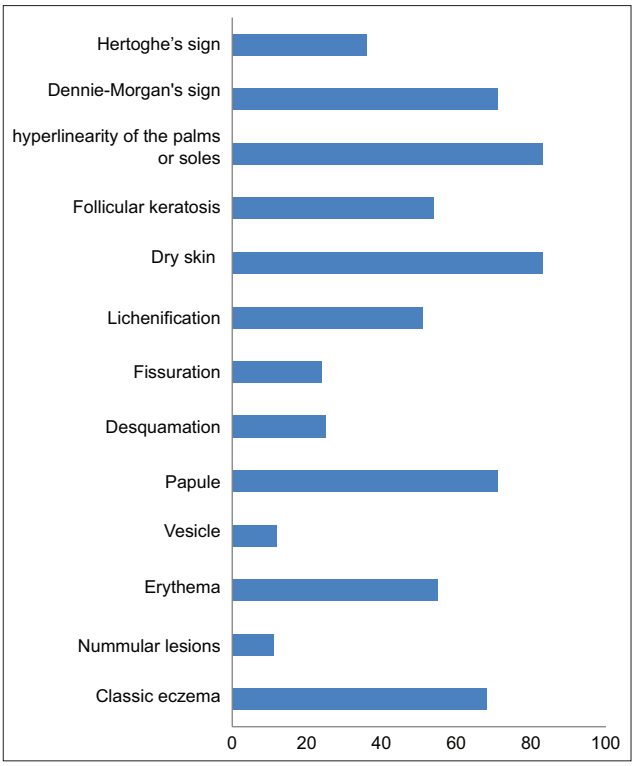

Figure 2: Clinical manifestations of atopic dermatitis.

Table 6: Sites of the lesions.

Variables	Absence of AD (%)	Presence of AD (%)
Scalp	11 (4.4)	12 (4.8)
Convexity of face	32 (12.9)	21 (8.5)
Neck	24 (9.7)	44 (17.7)
Flexion fold	31 (12.5)	53 (21.4)
Extension surface	19 (7.7)	26 (10.5)
Trunk	69 (27.8)	47 (19)

Table 7: Factors associated to AD after logistic regression.

Variable	OR	aOR	CI 95%	*p* value
Mother's profession				
Housewife	3.069	3.35	1.05–10.66	0.041
Retirement	58.037	10.07	1.87–54.28	0.007
Private sector	2.040	2.47	1.08–5.67	0.033
Participant's education level				
N/A	0.642	1.01	0.40–2.53	0.981
Primary	1.077	4.2	1.53–11.55	0.005
Father's secondary education level	0.644	0.24	0.09–0.6	0.003
Asthma in the siblings	0.226	0.16	0.029–0.87	0.034
Allergic conjunctivitis in the grandparents	0.242	0.21	0.04–1.11	0.066
Personal atopic dermatitis	3.080	1.85	0.64–5.34	0.252
Food allergy in the mother	8.150	18.11	0.41–793.93	0.133
History of lesions on the flexion folds	4.41	5.61	2.58–12.18	< 0.01

pathologies including AD. In Ethiopia, Kelbore et al. in 2015 mainly found university-level parents, civil servants, and housewives, while Haileamlak et al. found more farmers [13,27]. This could be explained

by the fact that Cameroon has a higher economic level than Ethiopia (GDP per capita 1324 vs. 755€ for Ethiopia) [28].

From an environmental point of view, the most popular material was cotton (in 100% of the cases), followed by synthetics in 84.5%. This could be explained by the ignorance of the real composition of clothes by the patients. Also, this high synthetic content, because of its irritant effect, may contribute to the triggering or aggravation of AD flare-ups. These results differ from those by Kouotou et al. obtained in 2017, in which cotton was worn by 31.4% of the patients. This difference could be due to the smaller sample size in this study (35 patients) [29].

While the majority of sufferers owned carpets, most did not own pets. Among those who had one, it was mostly cats (52%) and dogs (44%). This could be explained by the fact that carpets retain allergenic elements that may act in triggering AD flare-ups, such as dust and dust mites. Also, early exposure to pets has been described by some authors as protective in AD [30]. These results are similar to those obtained by Kouotou et al. in 2017 and Bagdaban et al. in 2018, who mentioned a rate of 54.3% of carpets as well as the absence of pets in 81.9% [4,19,29].

Residential areas were surrounded by gardens and/or fields in 56% of cases. Indeed, the presence of these causes an increase in the amount of pollen, as well as mosquitoes and other insects, whose bites may be allergenic and, therefore, participate in the triggering of AD. Our results differ from those by Kelbore et al. obtained in 2015 in Ethiopia, in which they were present in 36% and 33% of cases, respectively [13]. This difference could be explained by the fact that these two elements were sought simultaneously in our study.

The personal history of atopy was allergic conjunctivitis (33.3%), allergic rhinitis (21.4%), AD (16.7%), food allergies (10.7%), and asthma (7.1%). This data was partly similar to that obtained by Pefura-Yone et al. and Kouotou et al., who found 26.1% of allergic conjunctivitis, 11.6% of food allergies, and 8.7% of asthma among adults in Cameroon in 2021 [7,15].

We found little family history of AD, while Thorsteinsdottir et al. in 2019 found higher rates in the pediatric population, suggesting a link between these two elements [4]. This difference could stem from the ignorance of the existence of these diseases by the patients questioned in our study.

Among the 84 patients, 79 received breastfeeding, a majority for less than twelve months with an unknown age of diversification. These results were similar to those by Kelbore et al., who found a history of breastfeeding in all patients, with a majority for less than twelve months [13]. These results could highlight the relationship between the duration of breastfeeding and its protective role in the occurrence of AD [13].

While the majority of patients did not attend a daycare unit (85.7%), most took antibiotics (54.8%) and were vaccinated (95.2%) during the first months of life. Indeed, these results were in line with the hygienist theory due to the increase in measures taken to avoid infections (vaccination, antibiotics, the absence of nursery). This data corroborated that obtained by Kelbore et al. and Yemaneberhan et al., who determined the rates of vaccination, early use of antibiotics, and vaccination to be 96.6%, 54.7%, and 77.5%, respectively [13,31].

Complaints by patients with AD were mainly pruritus in all and sleep disturbances in 38 (45.2%). Indeed, pruritus is the major element in the diagnosis of AD and, when it is important, it may have an impact on the quality and duration of sleep of the patient. These results were in agreement with those by Kouassi et al. obtained in 2019 in Ivory Coast in children, determining 100% of pruritus and 90% of sleep disorders [32]. On the other hand, Nakamura et al. in England found pruritus rates of 32% and 37% in the MAAS and Ashford cohorts, respectively [33]. This difference could be explained by the diversity of the clinical presentations of AD depending on the phototype and geographical area.

The areas most affected were the flexion folds (60.1%), trunk (56%), and neck (52.4%). This data was in line with that drawn from a study by Pefura-Yone et al. in 2019, who found 89.9% of limb damage, followed by 65.2% of the trunk, as well as that by Yew et al. in 2018, who found a predominance of flexion zone damage (58.2%) in Africa [7,34].

Also, we mainly found xerosis and palmoplantar hyperlinearity (98.8%), followed by papules and the Dennie–Morgan sign (84.5%) and lichenification (60.7%). These results agreed with those by Yew et al. obtained in 2019 as well as by Kaufman et al. in 2018, who mentioned higher rates of xerosis, papular lesions, lichenified lesions, palmoplantar hyperlinearity, and the Dennie–Morgan sign in Africa [34,35]. This highlights

the existence of clinical characteristics specific to each breed.

Following multiple analyses, we obtained the factors associated with AD: the mother's occupation (housewife (aOR = 3.68; 95% CI = 1.11–12.28; $p = 0.034$), retired (aOR = 10, 21; 95% CI = 1.92–54.38; $p = 0.006$), private sector workers (aOR = 2.92; 95% CI = 1.22–6.96; $p = 0.016$), primary level of education for the participants (aOR = 3.50; 95% CI = 1.22–10.02; $p = 0.02$) and secondary level of education of the fathers (aOR = 0.24; 95% CI = 0.09–0.62; $p = 0.003$), a personal history of conjunctivitis (aOR = 2.20; 95% CI = 1.01–4.81; $p = 0.047$), asthma in the siblings (aOR = 0.14; 95% CI % = 0.02–0.83; $p = 0.030$) and lesions on the flexion folds and/or cheeks (aOR = 5.57; 95% CI = 2.50–12.39; $p < 0.01$). These results were in line with those obtained by Thorsteinsdottir et al. in 2019, who found an association with high social circumstances (parents' income and level of education) (OR = 1.6; 95% CI = 1–2.5; $p = 0.05$), yet not with a family history of atopy or early life events [4,13]. However, they differed from those by Kelbore et al., who found an association with personal atopy (aOR = 10.5; 95% CI = 1.3–85.6). These results could be explained by the difference in environmental and genetic interactions between individuals. These results also corroborate the hygienist theory in the occurrence of AD [10,12]. Indeed, parents with a high standard of living and education are supposed to have more knowledge and, therefore, pay more attention to the hygiene of children, who would be less subject to infections, thus modifying the different microbiota and increasing sensitivity to environmental allergens, which is also true for housewives or retired mothers who, because of their availability, have more time to devote to their children.

Limitations

Working only in Yaoundé and in a hospital-based study represented the limits of our work. Also, the non-probabilistic mode of selection and the absence of patch tests constituted an obstacle to the generalization of our study.

CONCLUSION

In our study, AD was more common in children and females whose parents had a university level of education. Most had a history of taking early antibiotics and vaccinations and had gardens/fields yet no pets. The factors associated with AD were the mother's profession (housewife, retired, private sector agent), a family history of asthma in the siblings, and a personal history of allergic conjunctivitis as well as lesions on the flexion folds and cheeks in childhood.

Author Contributions

EAK conceived the study. IBB and GAN collected and entered the data. ANM and IBB analyzed the data. EAK, DNT, GAN, and IBB drafted the manuscript. EAK, DNT, IBB, and GAN proofread and corrected the manuscript. All authors agreed with the final manuscript to be submitted for publication.

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Statement of Human and Animal Rights

All the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the 2008 revision of the Declaration of Helsinki of 1975.

Statement of Informed Consent

Informed consent for participation in this study was obtained from all patients.

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