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**Original Research Article**

# Prevalence of atopic dermatitis in children in the city of Goma (Democratic Republic of Congo)

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## ABSTRACT

**Background:** Currently, atopic dermatitis is one of the most common chronic inflammatory dermatoses. However, studies concerning its prevalence in children are rare in the Democratic Republic of Congo (DRC). Thus, we proposed to determine the prevalence and sociodemographic factors associated with atopic dermatitis in children.
**Methods:** We conducted a descriptive cross-sectional study over a 6-month period from June 1 to December 31, 2022. It focused on children aged 0 to 18 years who were brought to the dermatology services of the North Kivu Provincial Hospital (HPNK) for atopic dermatitis. Data were entered and analyzed using SPSS 20 and Epi info 3.5.3 software.
**Results:** The hospital prevalence of atopic dermatitis in children aged 0-18 years was 12.4%. The 0 to 4 age group was the most affected with 54.4%. Males were the most represented (56.7%). The sex ratio M/F was 1.3. The majority of our patients were from the urban area (72.8%). Atopy (personal or familial) was found in 68.9% of patients and was dominated by asthma (23.9%) and allergic rhinitis (21.1%). The most common trigger was food (30.7%) followed by cosmetics (20.5%). Mean age of symptom onset was 7±2 months. The most represented clinical form was the common or vulgar form with 69.4% of cases. Atopic dermatitis was associated with sleep disorder in 77.8% of cases.
**Conclusions:** The data presented in our study are also consistent with the literature which states that the prevalence of atopic dermatitis in children ranged from 10 to 20% and was higher in children under 5 years of age living in urban areas.

**Keywords:** Prevalence, Atopic dermatitis, City of Goma

## INTRODUCTION

AD (AD) is a chronic and recurrent inflammatory dermatosis characterized by pruritic flares of acute eczema. In general, AD begins in childhood, before the age of 5 in 85% of cases and in the first year of life in 55% of cases. In 10 to 15% of cases, AD occurs after the age of 15 years and in 5% after 40 years. The average age of onset of symptoms is 8 months.[1] The origin of this complex disease is still only partially understood, but it is most likely based on a complex interaction of genetic predisposition, skin barrier dysfunction, and environmental factors.[2]

AD affects about the same number of girls and boys. Some research indicates that boys are more likely than girls to develop AD in early childhood, and this pattern changes during adolescence.[3-5]

The prevalence of AD varies considerably around the world. Changes in human behavior and lifestyle over the past century have led to a dramatic increase in the incidence of this disease. It has increased by a factor of 2 to 3 in industrialized countries, affecting approximately 10% to 20% of children in the world.[6,7] In the United States, numerous prevalence studies have been conducted among children and adults. In the pediatric population, three AD prevalence studies were published during 2013, 2015 and 2019.[8] In these studies, the rates of AD in children aged 5 to 15 years were 15%, 15.1% and 14.5%, respectively.[8] The overall pediatric prevalence of AD ranged from 15.1% in Canada to 20.1% in Brazil. Among European countries, Germany had the lowest prevalence (8.4%), and the Southern European countries, Spain (18.6%) and Italy (17.6%), had the highest prevalence. In East Asia, the pediatric prevalence of AD was almost similar in Japan (10.7%) and Taiwan (11.3%).[9,10] In Africa, the prevalence of AD ranged from 4.7% to 23%.[11] A study was conducted in 12 Sub-Saharan African countries among urban children aged 13 to 14 years.[12] In this study, AD rates ranged from 4.7% in Sudan to 19% in Ethiopia, with an average of 14.5%. In the DRC, the prevalence of AD is said to be constantly increasing. According to a study conducted at the Cliniques Universitaires de Kinshasa, the prevalence of AD in children aged 0 to 18 years was 13.75%.[13] To complete this study in the DRC, we proposed to determine the prevalence and socioeconomic factors associated with AD in the city of Goma.

## METHODS

This was a descriptive cross-sectional study that took place in the dermatology and venereology departments of the North Kivu provincial hospital over a 6-month period (1 June to 31 December 2022). All the patients received in the services for AD and whose age varied from 0 to 18 years were included. The diagnosis of AD was made on the basis of questioning and clinical examination, according to the criteria of Hanifin and Rajka.

We did not include patients with pruritic dermatosis whose clinical features were not those of AD. The following data were collected with the help of a questionnaire: sociodemographic (age, sex, level of education, ethnicity, area of residence, season) and clinical (notion of personal or family atopy, mode of delivery, birth weight, exclusive breastfeeding, triggering factors, date of onset of AD, number of flare-ups per month, clinical form, associated pathologies). This questionnaire was addressed to the patients' parents by direct and confidential interview with the consulting dermatologist and after a dermatological examination. The data collected were recorded and processed with the Statistical Package for Social Sciences (SPSS) version 20.0 and epi info 3.5.3. Pearson's Chi$^2$ statistical tests were used for proportions; statistical differences were considered significant when $p<0.05$.

## RESULTS

### *Prevalence*

One hundred and eighty (180) cases of AD were identified out of a total of 1450 patients aged 0 to 18 years, a hospital prevalence of 12.4%.

**Table 1: Distribution of patients according to sociodemographic factors associated with AD in the survey on the prevalence of AD in children in the city of Goma.**

| Parameters | Respondent n=180 | Percentage (%) |
|---|---|---|
| **Age range (years)** | | |
| 0-4 | 98 | 54.4 |
| 5-9 | 47 | 26.1 |
| 10-14 | 25 | 13.9 |
| 15-18 | 10 | 5.6 |
| **Sex** | | |
| Male | 102 | 56.7 |
| Female | 78 | 43.3 |
| **Residence area** | | |
| Urban | 131 | 72.8 |
| Rural | 32 | 17.8 |
| Others( Bukavu, Beni, Bunia,...) | 17 | 9.4 |
| **Ethnicity** | | |
| **Hutu** | 51 | 28.3 |
| Nande | 42 | 23.3 |
| Shi | 25 | 13.9 |
| Hunde | 22 | 12.2 |
| Léga | 14 | 7,8 |
| Others( Bembe, Hema, Luba,...) | 26 | 14.4 |

### *Sociodemographic factors associated with AD*

In our study, the 0 to 4 age group was the most affected with 54.4% followed by the 6 to 10 age group (26.1%). Males represented 56.7% of the cases (102/180), the sex ratio M/F was 1.3. More than one third of our patients were not in school (44.4%). The majority (72.8%) of patients came from the urban area.

More than half of our patients had consulted during the dry season (66.1%). Hutus et al were the most represented ethnic groups in our study with 28.3% and 23.3% respectively.

### *Personal and family history of patients*

The notion of personal or family atopy was found in 68.9% of our patients, including 23.9% with asthma, 21.1% with allergic rhinitis, 12.8% with sinusitis and 11.1% with allergic conjunctivitis. The majority of our patients (71.7%) were born by vaginal delivery, without complications and without additional medical

intervention, with a weight of more than 3.5 kgs in 54.4% of cases. Breastfeeding was exclusive up to 6 months in 55.6% of our patients. There was no significant relationship between the mode of delivery, birth weight and the occurrence of AD (p>0.005).

**Table 2: Distribution of patients according to history in the survey on the prevalence of AD in children in the city of Goma.**

| Parameters | Respondent n=180 | Percentage (%) |
|---|---|---|
| **Notion of personal or family atopy** | | |
| Absente | 56 | 31.1 |
| Asthma | 43 | 23,9 |
| Allergic rhinitis | 38 | 21.1 |
| Sinusite | 23 | 12.8 |
| Allergic conjunctivitis | 20 | 11.1 |
| **Mode of delivery** | | |
| Eutocic | 129 | 71.7 |
| Dystocic | 51 | 28.3 |
| **Exclusive breastfeeding** | | |
| The first 6 months | 100 | 55.6 |
| While breastfeeding | 38 | 21.1 |
| Less than 6 months | 33 | 18.3 |
| Not breastfed | 9 | 5.0 |

***Clinical aspects***

Triggering factors were known in 47.8% of cases and the most reported was food with 13.3% followed by cosmetics with 8.9% of cases. The mean age of disease onset was 7±2 months. More than ¾ of our patients had eczema flare-ups at least 3 times a month (78.8%). Common eczema was the most represented clinical form (69.4%) followed by the impetiginized form (13.3%). Sleep disorder was present in more than ¾ of our patients (77.8).

## DISCUSSION

***Prevalence***

The hospital prevalence of AD among pediatric dermatoses was 12.4%. Our results were therefore in agreement with the literature which states that the prevalence of AD in children is between 10 and 20%.[6,7] The age group most affected in the study was 0 to 5 years. This could be explained by the fact that, AD often starts during the first year of life (the newborn) and gradually decreases around the age of 5. Our results were in agreement with those of Ballouk et al in Morocco where more than half of their patients were less than 5 years old, 70.4% (51.1%: less than 2 years and 19.3% between 2 years and 4 years).[14] The male gender was the most represented with 56.7% of cases. Almost similar results were found in the study by Ahogo et al in Côte d'Ivoire (52.9%).[15] The majority of patients were from the urban area. The hypotheses most often put forward to explain this increased prevalence of AD concerning the urbanization of populations are the so-called Western lifestyle, the Western housing style (better insulated and less well ventilated favors exposure to indoor atopens such as dust mites, pets), dietary and hygienic habits (early introduction of trophallergens, often excessive washing of the skin), exposure to irritants such as tobacco and to automotive or industrial pollutants. Our results were in agreement with those of other studies.[16] The most affected ethnic groups were the Hutus and Nandes. This predominance could be explained by the fact that, our study was conducted in a city where Hutus and Nandes were in the majority compared to other ethnicities, although more recent studies on genomic associations in Asian, Hispanic, and African populations and growing collaborations between researchers worldwide have allowed the identification of genes associated with the development of AD in various ethnic groups.[17] More than half of our patients had consulted during the dry season. This could be explained by the fact that the dry season is accompanied by the sun, which in turn leads to heat and excessive sweating. One of the roles of perspiration was to evacuate this excess heat produced in the body. In people with AD, some of the sweat produced by the sweat glands is not discharged externally, but diffused into the subcutaneous tissue, promoting inflammation and eczema flares.[18,19] Asthma and allergic rhinitis were the most reported antecedents in most of our patients. This constant had also been done by other authors.[20] We found no significant association between mode of delivery, birth weight and the occurrence of AD, contrary to other studies that stipulate that low birth weight and eutocic delivery were the protective factors for AD.[21,22] More than ¾ of our patients had received exclusive breastfeeding for the first 6 months. Our study supported the hypothesis that, prolonging exclusive breastfeeding for 6 months or more did not contribute to the prevention of atopy, on the contrary, this breastfeeding was associated with an increase in AD and food hypersensitivity symptoms in childhood.[23] The mean age of onset was 7±2 months. Our results were rather lower than those of Mahfoudh et al in Tunisia where the mean age of onset was 14 months.[24] In our study, the most notified trigger of AD flares was feeding (more than 3 flares per month). Contrary to Ahogo et al who found that dust was the most incriminating factor in the triggering of AD.[15] Eczema vulgaris was the most represented clinical form (69.4%). This prevalence was close to that of Atadokpèdé et al who found a prevalence of 67.7%, but lower than the 84.5% found in the study by Tay et al in Singapore.[20,25,26] Sleep disturbance was present in most patients. This constant was also done by Ahogo et al in Ivory Coast.[15]

***Limitations***

Our study was based only on patients who consulted at the North Kivu Provincial Hospital, which was not

representative of the population of the city of Goma. In addition, the diagnosis of AD was based on the criteria proposed by Hanifin and Rajka. The application of these criteria in infants presents enormous diagnostic difficulties because infants are often unable to describe the pruritic nature of the rash (which was one of the major criteria in establishing the diagnosis of AD), which had led to the elimination of a significant number of potential cases of AD due to adherence to the criteria of Hanifin and Rajka.

## CONCLUSION

The data presented in our study are also consistent with the literature which states that the prevalence of AD in children ranged from 10 to 20% and was higher in children under 5 years of age living in urban areas.

In contrast, there is discordance in studies regarding AD in relation to breastfeeding, world of delivery, and birth weight. Further epidemiological investigations to identify causal relationships are therefore needed in the future.

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