

## Cutaneous leishmaniasis in the Thiès Region in Senegal

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### Abstract

Cutaneous leishmaniasis (CL) is a parasitic disease that constitutes several countries' real public health problems. The manifestations and clinical forms vary depending on the species involved. This study aimed to analyze the epidemiological, clinical profile of CL in the Dermatology services of the Thiès region in Senegal.

**Material and Methods:** From January 1, 2007, to December 31, 2019, i.e., 12 years, a retrospective descriptive study was carried out in the Dermatology departments of the Thiès Region. It included 43 patient files received in outpatient consultation. The diagnosis was made at the clinic and/or confirmed by histology. The data was entered and analyzed using a computer with epi info 7 software version 3.5.4.

**Results:** Our results showed that out of the 41,838 patients seen in consultation, 43 patients presented with leishmaniasis, i.e., 4 cases per year and a hospital prevalence of 0.1%. Most patients consulted during June 16.3% (n = 7). The average age was 32.4 years +/- 22.4 [1 year and 83 years]. Men were the most affected 60.5% (n = 26) with a sex ratio of 1.53. The most affected students were 27.9% (n = 1). ). The average consultation time was 4.8 months. Pain was noted in 44.2% (n = 19). They were ulcerated in 64.4% (n = 29), crusted in 58.1% (n = 25), nodular in 39.5% (n = 17) and with an average of 7.2 lesions per patient. The ulcerative crusty form was the most common in 83.7% of cases (n = 36). 44.2% (n = 19) of our patients had done the biopsy. Retroviral serology was negative in all patients. Meglumine antimonate was used 47.6% of the time. The outcome was favorable in all of our patients with scarring of the lesions. However, some patients had presented complications such as bacterial superinfection.

**Conclusion:** Our study revealed a low hospital prevalence of leishmaniasis with a predominance of the ulcerative crusty form. Because of this fact, it would be necessary to conduct other multicenter prospective studies to highlight the current prevalence of CL and rule on the species present in humans in Senegal.

**Keywords:** Leishmaniasis; Protozoa; Senegal

## Introduction

Leishmaniasis is a parasitic anthroponotic disease caused by a flagellated protozoan of the genus *Leishmania*, transmitted by the bite of a female hematophagous sandfly [1]. A distinction is made between visceral leishmaniasis (LV), cutaneous-mucous leishmaniasis (LCM), and cutaneous leishmaniasis (CL). The cutaneous form achieves the classic Oriental Button in a dry, crusty, and indolent form or a wet and ulcerated form. The lesions are usually localized on exposed parts of the body leaving permanent scars [2,3].

According to the World Health Organization (WHO), leishmaniasis is a neglected tropical disease with an estimated global prevalence of 12 million cases and an annual incidence of 1-1.5 million for CL. It continues to pose a severe public health problem and is often associated with poverty, malnutrition, and immunosuppression [2].

In Africa, CL is endemic, particularly in the North and East (Reference: World Health Organization Weekly epidemiological record. 2020; Num 25.95: 265–280). In West Africa, the various CL studies have made it possible to define an endemic zone in sub-Saharan Africa ranging from Senegal to Cameroon [4, 5].

In Senegal, leishmaniasis is rampant in an endemo-epidemic mode [4]. Several studies have been carried out, and the series by DIOP et al. reports a hospital prevalence of 0.07% [6]. A clinical polymorphism was noted with a predominance of the Eastern Button [5-10].

The region of Thiès is a hotbed of cutaneous leishmaniasis in Keur Moussa and Mont Rolland, the climate is Sudano-Saharan with shrub savannah-type vegetation and average annual rainfall between 400 to 600 mm of water per year (Statistics and demography, Thiès 2013). Parasitological studies have revealed a high prevalence of canine leishmaniasis caused by *Leishmania* (45%) with a risk of human transmission in humans (Reference Faye et al. Trans. R Soc Trop Med Hyg. 2011 105; 333-340). However, the situation of CL remains unknown in the region at present. In this context, we conducted this study to determine the epidemiological and clinical profile of CL in the Thiès region.

## Methodology

Type and period of study: this was a descriptive study on retrospective data collected from January 01, 2007, to December 31, 2019 (12 years)

Study framework: from the clinical records of patients received in outpatient and/or hospitalized in the hospital center's dermatology department of Thiès for the management of a CL.

Inclusion criteria: The diagnosis of CL being retained in front of any nodular, firm, rounded, or oval lesion covered with very adherent and/or ulcerated scales-crusts, single or multiple of chronic evolution healing leaving an indelible scar, associated or not with a paraclinical certainty by the demonstration of leishmanias in amastigote form on smear and/or by pseudo-epitheliomatous hyperplasia, an inflammatory granuloma made up of lymphocytes, histiocytes and plasma cells with cutaneous histopathology.

Non-inclusion criteria: incomplete files were not retained. Variables studied were: The demographic aspects: the number of cases per year, the distribution by month, age, sex, profession, Clinical background aspects: the average duration of consultation, functional signs, general signs, physical signs, number of lesions, lesions topography and their clinical forms Paraclinical aspects: histology, retroviral serology Therapeutic aspects: the molecules used Evolutionary aspects: the average duration of follow-up, complications, and the future

Data analysis: Data were entered and analyzed using a computer with Epi info7 software version 3.5.4. Univariate analyses were performed by calculating proportions for qualitative variables, means, and standard deviations.

Limitations of the study: During the study, the difficulties encountered were related to: -The absence of systematic smears to demonstrate the parasite. -The absence of PCR to type the species.- The lack of notification of recurrence.

Ethical considerations: From an ethical standpoint, we have respected anonymity for each file consulted during the processing, analysis, and dissemination of results. We do not declare any conflict of interest.

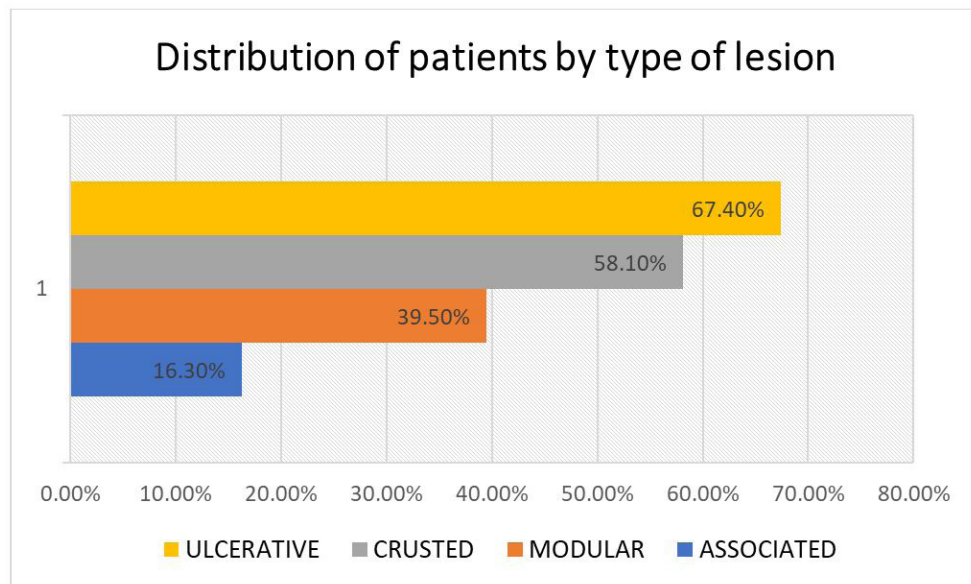
## Results

Epidemiologically, Forty-one thousand eight hundred and thirty-eight (41,838) patients were seen in consultation during the study period. Among these, we identified 43 files of patients with leishmaniasis, i.e., a hospital prevalence of 0.10%. The frequency was 4 cases / year [1-7], the number of cases was higher in the months of June 16.3% (n = 7), February 11, 6% (n = 5) and September 11.6% (n = 5). The average age was 32.4 years +/- 22.4 [1 year and 83 years]. The median was 25 years. The 11

to 20 years age group was the most affected and accounted for 30.2% of cases ( $n = 13$ ). Men were the most affected 60.5% ( $n = 26$ ). The sex ratio is 1.53. Students were the most affected, i.e. 27.9% ( $n = 12$ ) followed by housewives with 14% ( $n = 6$ ) and unemployed with 11.6% ( $n = 5$ ). More than half of the patients were under self-medication with antibiotics 58.1% ( $n = 25$ ) before their consultation or hospitalization in the department. Herbal medicine was used in 51.2% ( $n = 22$ ).

Clinically, the mean consultation time was 4.8 months [1-12 months], functional signs were represented by pain in 44.2% of cases ( $n = 19$ ) and pruritus in 20.9% of cases ( $n = 9$ ), the two combined in 11.6% of cases ( $n = 5$ ). Fever was noted in 14% of cases ( $n = 6$ ). Lesions were 67.4% ulcerative ( $n = 29$ ), 58.1% crusted ( $n = 25$ ), 39.5% nodular ( $n = 17$ ) and associated 16.3% ( $n = 7$ ).

The mean lesions per patient were 7.2 [1 to 9]. They were found in the upper limbs in 74.42% of cases ( $n = 32$ ) and the lower limbs in 32.56 cases ( $n = 14$ ).



**Figure 1:** Distribution of patients by type of lesion

**Table 1:** Distribution of patients according to the topography of the lesions to be translated

Seats	Seat	Number (of injuries (N	Percentage (%)
Head [ $N_1=2$ ; 4,65%]	Front	1	50
	Cheek	1	50
	<b>Sub-total lesions</b>	<b>2</b>	<b>100</b>
Upper limbs [ $N_2=32$ ; 74,42%]	Arm	17	40,48
	Elbow	4	9,52
	Av Forearm	13	30,95
	Wrist	1	2,38
	Hand	7	16,67
	<b>Sous-total lésions</b>	<b>42</b>	<b>100</b>
Lowes limbs [ $N_3=14$ ; 32,56%]	Thigh	3	18,75
	Knee	2	12,50
	Leg	5	31,25
	Foot	6	37,50
	<b>Sous-total lésions</b>	<b>16</b>	<b>100</b>
Torso [ $N_4=2$ ; 4,65%]	Front side	1	50
	Back	1	50
	<b>Sous-total lésions</b>	<b>2</b>	<b>100</b>
(Total lesions ( $N=N_1+N_2+N_3+N_4$		62	-

The ulcerative crusty form was the most frequent with 83.7% ( $n = 36$ ). The pseudo-sporotrichosis (staged) form represented 16.3% ( $n = 7$ )

The ulcerative crusty form was the most frequent with 83.7% (n = 36). The pseudo-sporotrichosis (staged) form represented 16.3% (n = 7).

Paraclinical, histology was performed in 44.2% (n = 19); she found an epithelial and plasma cell granuloma in 94.7% (18 of the 19 cases). The retroviral serology was negative in all of our patients.

From a therapeutic standpoint, local infiltration based on Glucanthime was performed in 52.4% of cases (n = 22). Antibiotic therapy was started in 81% of cases (n = 34), dominated by metronidazole in 69% of cases (n = 29). Three (3) patients received topical corticosteroid therapy, and four (4) received antihistamines.



**Figure 2:** Ulcerative crusty lesion of the back of the foot with a halo of Faye



**Figure 3:** Crusty ulcerative lesions on the back of the hand





**Figure 4:** Pseudo-sporotrichosis (stepped) form of the forearm

The average duration of progression was 63 days, with extremities ranging from 30 to 180 days. Bacterial superinfection was found in 46.5% of cases ( $n = 20$ ), and an schematization in 9.5% ( $n = 3$ ). One (2.3%) patient presented side effects such as headache, myalgia, and increased serum creatinine after local injection with Glucanthime. All lesions were healed, leaving an indelible scar in 100% of cases.

## Discussion

We report a retrospective study carried out over a period of 12 years (01, 2007, to December 31, 2019) in the region of Thiès. We collected 43 cases and studied the epidemiological, paraclinical, therapeutic, and evolutionary aspects of CL in all cases.

### Epidemiological

In our study, the hospital frequency was 4 cases/year. This rate is lower than that found by A Diop et al. (7.25 cases/year) [6] and by M.T Dieng et al. (7.8 cases/year [10] of 7.8 cases in the national reference services in Dakar. In Africa, the prevalence is higher in desert areas. Bamba et al. [11] in Ouagadougou found a frequency of 54 cases/year in northern Mali, and Masmoudi et al. [12] in Tunisia found a frequency of 51 cases/year.

Global warming plays an important role in the proliferation of vectors due to changes in the vector's ecosystems bringing forth the increase in CL [13]. According to the WHO, urbanization is also a growing risk factor for leishmaniasis by transforming the environment, whether natural or human activity [14] could explain the increase in cases in our series. In

the Thiès region, surveillance of the CL outbreak in Keur Moussa was carried out in 1988-1989 and in 1991-1992. The species *Phlebotomus duboscqi*, whose vector role for this leishmaniasis has been demonstrated in Senegal by Dedet et al. in 1980 [15], was the species most represented, behind *Sergentomyia schwetzi*, with respectively 32.3 and 28.5% of the population during these periods. It is twice as abundant and more frequent in the domain of the Keur Moussa monastery because of the more favorable micro-climatic and phytogeographic conditions, the abundance of rodents, and the more constant presence of man. With the decrease in precipitation, which significantly influences the activity of *Phlebotomus duboscqi*, the density of sandflies tends to gradually increase at the same time as the temperature and humidity to reach two maxima (in April-May and July-August) [16].

In our study, the age group of 11 to 20 years was more representative, with 30.2% of cases ( $n = 13$ ), and the mean age was 32.4 years. These results are comparable to those reported by de Diop et al. [6]. Belazzoug et al. in Algeria had a higher percentage of children under 10 years [17]. The study carried out by El-Safi in Sudan instead found a predominance of leishmaniasis in people over 20 years old [18].

The sex ratio in our series was 1.53. The same is true for Diop A [6], who found a sex ratio of 1.6. Many authors have also noted this male predominance [7-11], probably since the men take care of the fieldwork.

Students were the most affected, i.e., 27.9% ( $n = 12$ ) in our study. At the same time, Konaté in Burkina Faso noted farmers 35.2% and traders 33.3% (Ref: Issouf Konate, Ibrahim Sangare, Jacques Zoungrana et al. Description of a new epidemic

focus of cutaneous leishmaniasis caused by *Leishmania major* in western Burkina Faso. *pamj*.2020.35.65.20825 ).

History of herbal medicine ... ?? not found

## Clinique

The average time for consultation in our series was 4.8 months. It was 2 months in the Traoré et al. study in Burkina Faso [1]. Lower times have been observed in Tunisia by Masmoudi et al., who found an average consultation time of 2.67 months [12]. This could be explained by the delay in referral to the dermatological center or the clinical picture's neglect due to spontaneous healing after a few months but leaving room for indelible scars [20].

In our study, we recorded 44.2% of patients with pain and 20.9% with pruritus. In Diop A et al.'s study, this symptomatology was found in a proportion of 12% [6]. In Sudan, the authors found pruritus in 61% of cases and pain in 38% of cases [18].

Ulcerative lesions were the most frequent in our series, with a proportion of 67.4% of cases followed by crusty ulcerative lesions (58.1%). The ulcerative crusty forms were predominant in Senegalese [6,7, 12, 21] and sub-Saharan studies. Its were considered characteristic of cutaneous leishmaniasis *L. major*. [1, 4, 10]

In our series, 7% of the cases presented 4 and 5 lesions, while in that of Diop A et al., 20% had more than 6 lesions [6]. Furthermore, Keita et al. [21] in Mali reported that 80.1% of patients in their study presented with multiple lesions. Regardless of the number of lesions, their appearance determines clinical forms, depending on the host's immune status and the host-parasite relationship [2, 3].

The upper limbs were the topography most affected in our series with 74.42%, followed by lower limbs at 32.56%. These are parts that are uncovered, accessible, and exposed to sandfly bites. Similar results have been found in several Senegalese [6-9] and African [11-13, 19, 21] studies.

The pseudo-sporotrichosis form, reputed to be rare, described for the first time in Senegal by Dieng [22], was found in 16.3% in our series and 18% in that of Diop et al. [6]. It is a disseminated lymphatic CL found in varying proportions in different African studies: 6.7% by Traoré et al. in Burkina, 8% by Keita et al. in Mali [19, 21]. This form could probably be related to the variation in the individual's immunity.

## Paraclinique

Our study performed the histological examination in 44.2% (n = 19); she found an epithelial and plasma cell granuloma in 94.7% (18 of the 19 cases). In our study (55.8% of cases), as in most of the studies carried out in Senegal and in the rest of Africa, the parasitological diagnosis of leishmaniasis was confirmed by a smear on direct examination more than by histology, which was poorly performed [6, 19, 21]. In our study, culture and/or PCR could not be performed. However, the absence of parasitological confirmation does not exclude the diagnosis of cutaneous leishmaniasis in endemic epidemic areas [1,20].

In Senegalese studies, the species *L. major* was the most described [6-9]. The first observation of a child infected with HIV and the *L. Infantum* species was reported by Diatta et al. in Dakar [23]. M. Senghor et al. found a high prevalence of canine leishmaniasis caused by *L. Infantum* (45%) in the region of Thiès (Mont Rolland) with a risk of emergence in humans. Hence the importance of PCR to determine the species in the next Senegalese studies [24].

The retroviral serology was negative in all of our patients. A study conducted in 2002 in Ouagadougou found a prevalence of 13% for HIV co-infection integumentary leishmaniasis [19].

## Therapeutic

In our study, meglumine antimonate was prescribed in 52.4% of cases by local injection, antibiotic therapy in 81% of cases, and 69% of patients had received treatment with metronidazole. In contrast, in the study conducted by Diop A et al., an Intralesional injection of meglumine antimonate was prescribed as a first-line treatment in 38% of cases [6]. This therapeutic attitude has also been adopted by Bamba et al. in Burkina [11] and Keita in Mali [21]. Current anti-leishman chemotherapy protocols have significant drawbacks (route of administration (parenteral), toxicity, and cost), limiting their use in endemic areas. As for our study, meglumine antimonate is only available in the capital Dakar.

## Evolution

We noted recovery in all of our patients marked by scarring. However, in one patient, the course was marked by complications under treatment with meglumine antimonates such as headache, myalgia, and increased creatinine, leading to the discontinuation of the treatment 46.5% presented bacterial superin-

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fection. At Diop A et al. [6], the outcome was specified in 38% (n = 19) and was favorable in 94.7%, with a mean duration of 3.22 weeks. In most studies, the outcome under treatment is generally favorable. [6-9, 12, 19, 21].

## Conclusion

Our study revealed a low hospital prevalence with a predominance of the ulcerative crusty form of leishmaniasis in the Thiès region. Given this fact, it would be necessary to conduct other multicenter prospective studies to highlight the current prevalence of CL and rule on the species present in humans in Senegal.

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