

Research Article

Cutaneous Leishmaniasis: Report of Cases from 2006 to 2012 in Ouagadougou, Burkina Faso

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Abstract

To determine the annual incidence rate, the clinical features and parasitological characteristics of cutaneous leishmaniasis from 2006 to 2012 in the city of Ouagadougou. In total, 2608 clinically diagnosed cases of cutaneous leishmaniasis were recorded with an annual average of 372.5 ± 21.2 . The sex ratio M/F was 1.17. The average age was 22.08 ± 12.66 years. Patients more than 15 year-old accounted for 75.4%. A decrease in the cases of the disease was noted during the months of January (215 cases or 8.2%), February (217 cases or 8.3%), August (272 cases or 10.4%), September (478 cases or 18.3 %), October (365 or 14 %). The peak was recorded in September. Out of the 102 cases referred for parasitological diagnosis, 98 were positive (96.1%) and all slides contained parasites morphologically compatible with *Leishmania major*. Furthermore, adults under 30 year-old were the most represented. Many clinical features of skin lesions were registered including 24.7% of ulcero crustous lesion with an average of 5 lesions. The lesions were more frequently located on the upper and lower limbs. Elsewhere, the most patients were treated with inappropriate medicines. The most prescribed products were antiseptics and antibiotics. A nationwide prospective study would allow an estimate of the national incidence and the implementation of actions to better cope with the disease in our various localities.

ABBREVIATIONS

CL: Cutaneous Leishmaniasis; HIV: Human Immunodeficiency Virus

INTRODUCTION

Leishmaniasis is a disease caused by protozoan parasites of the *Leishmania* genus. The parasite enters the human host with the bite of an insect, known as sand-fly and is pulled into macrophages by ingestion [1]. Leishmaniasis is endemic in 88 countries throughout Africa, Asia, Europe, and North and South Americas [2-6]. The disease has different clinical forms, ranging from a skin ulcer, which can heal spontaneously, to the most severe form of leishmaniasis, the visceral form, which can lead to patient's death when untreated [7,8]. There are an estimated 12 million cases worldwide, with 1.5 to 2 million new cases each year [9]. Due to its frequency and lethality, mainly in untreated patients, it is currently among the six endemic diseases considered as priorities worldwide [6,8]. In Burkina Faso, the

cutaneous leishmaniasis (CL) is a major public health problem. The first cases were reported in 1960 by Oddou [9]. Since 1996, there has been an increase in reporting cases of cutaneous leishmaniasis in the city of Ouagadougou [10-12]. *Leishmania major* is the causative agent of cutaneous leishmaniasis in Burkina Faso [10]. Traoré et al., identified 1847 cases between 1996 and 1998 and mapped the distribution of the disease in the city of Ouagadougou [11]. Guiguemdé et al., assessed at 13% prevalence rate of Human immunodeficiency virus (HIV) co-infection-cutaneous leishmaniasis in the city of Ouagadougou in 2002 [12]. In addition, Bamba et al., identified 7744 cases between January 1999 and December 2005 in the same city of Ouagadougou [13]. From these studies, recommendations were made for effective strategies to control the disease [11,12], but what about the epidemiological situation today? The purpose of the present article is to study the evolution of cutaneous leishmaniasis in the town of Ouagadougou from cases reported between 2006 and 2012 in public and confessional health centers.

MATERIALS AND METHODS

Study site

The present study was a retrospective review of medical records of cutaneous leishmaniasis notified to curative consultations of 33 public health centers in Ouagadougou, Capital of Burkina Faso, with 1. 906.004 inhabitants [14]. Ouagadougou with three university hospitals and 4 health districts [15]. The city has problems among which the steep increase of its population and anarchic buildings with health consequences (sewage, garbage accumulation, lack of drinking water, proliferation of disease vectors, such as mosquitoes, sand flies).

Data collection

Data collection was conducted from January 2006 to December 2012. The patients with skin lesions, suspected of CL. Among 45 public and Confessional health centers in Ouagadougou that have existed since at least 2006, 33 health centers whose health records indicated a fairly large number of cutaneous leishmaniasis were included in current study.

The diagnosis of CL was based on clinical presentations and / or a positive parasitic smear. The clinical features of Cutaneous leishmaniasis (CL) tend to vary from one region to another and within a region, due to differences in the type of zoonotic cycle involved, variability in the host immune response, the virulence of parasitic species. In general, CL is characterized by inflammatory lesion such as nodular, ulcerative or nodoulcerative. Most often, these lesions slowly evolving and can heal spontaneously in 3 to 12 months with unattractive scars.

In current study, according to clinical diagnostic, CL was suspected in front of a papule or nodule at the point of inoculation; often associated with a crustous skin lesions at the center sometimes progressing to ulceration after detachment of the crust of about 5 cm in diameter with raised edges, the ulceration was often surrounded by a variable in duration. These were cases of dry and painless ulceration of the skin, often multiple. These ulcerations were generally healed spontaneously in 3 to 12 months or sometimes more with unattractive scars. Moreover, the presence of satellite nodules bordering lesions was common.

A total of 93 patients were referred and confirmed for CL by parasitological examination. For each patient referred, skin scrapings from the edge of the lesion were obtained. On a slide, the remaining skin scraping portion was smeared for staining with Giemsa and examined microscopically for presence of amastigotes. A questionnaire was completed to record the necessary information for each case of cutaneous lesions (ulcers or scars) clinically diagnosed, such as sex, age, sites of ulcer on the body, period of the consultation and treatment.

Data were tabulated and analyzed through descriptive statistics in Epi Data version 3.1.

RESULTS AND DISCUSSION

Regarding the temporal distribution of reported cases, during the period of January 2006 and December 2012, a total of 2608 cases of cutaneous leishmaniasis clinically diagnosed were reported. The annual average was 372.5 ± 21.2 cases and the

largest number was notified in 2008 (554 or 21.2% of all cases) (Table 1).

According to the period, we noted an increase of disease during the months of March, April, May, June, July, and December. However, a decrease in cases of the disease was observed during the months of January (215 cases or 8.2%), February (217 cases or 8.3%), August (272 cases or 10.4%), September (478 cases or 18.3 %), October (365 or 14 %). The peak was recorded in September and October (Figure 1).

The monthly distribution of clinically diagnosed CL cases showed the high levels during the months of January (8.2%), February (8.3%), August (10.4%), September (18.3%) and October (14%). The peaks were noted in September during the 7 years (2006 to 2012). These results corroborate those obtained by Traoré et al. [11], and those already noted by Bamba et al., in Ouagadougou [13]. In addition, Koné et al., in Mali found a peak of cases in September and October [16]. These findings may be due to the fact that humidity would promote the development of sandfly. True enough, the months of July, August, and September are the months when it rains most in Burkina Faso. Keita et al. in Mali showed a predominance of cases between July and September [17].

Table 1: Evolution of the number and the annual incidence rate of cutaneous leishmaniasis from 2006 to 2012 in Ouagadougou.

Years	Population (inhabitants)	No of cutaneous leishmaniasis cases	Incidence rate 0/00
2006	1.475.223	478	0.32
2007	1.521.086	491	0.32
2008	1.593.569	554	0.35
2009	1.668.469	389	0.23
2010	1.745.565	332	0.19
2011	1.824.680	207	0.11
2012	1.906.004	157	0.08

Sources: Central Census Bureau. Available at http://www.insd.bf/en/IMG/pdf/Theme16-Projections_demographiques.pdf

Abbreviations: No: Number

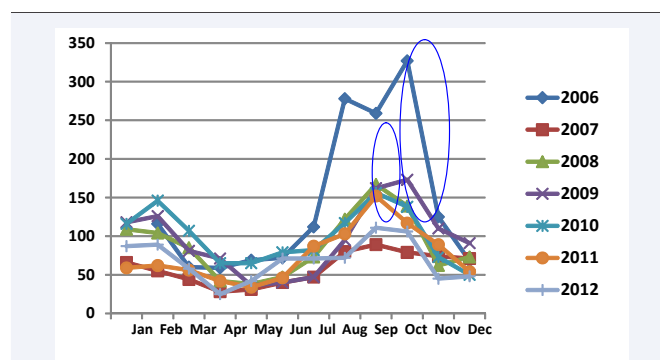


Figure 1 Representation of the comparative evolution of the monthly distribution of suspected cutaneous leishmaniasis during seven years. The peak was recorded in September and October during the seven years.

Moreover, the highest incidence rate was recorded in 2008 with 0.350 / 00. Details on the evolution of the number of cases and incidence of CL are presented in Table (1). During these seven years, the mean incidence rate was $0.22 \pm 0.100 / 00$. This result is different from that noted by Bamba et al., which recorded an incidence rate of $1 \pm 0.40 / 00$ [13]. This decrease in incidence would reflect a regression of the disease, but its decline would not reflect the actual incidence since our study involved only 33 health centers in the city of Ouagadougou and some patients would practice self-medication. Furthermore, given the retrospective aspect of the study, the loss of some patient records and this may have contributed to underestimating the incidence in our survey. Thereby a prospective study would allow better estimation of the evolution of the incidence rate in our context.

Regarding the socio-demographic characteristics of suspected CL, the male sex had the highest rate of CL infection, with 51.9% (n=1353). Table (2) shows the socio-demographic characteristics of the 2608 case of CL clinically diagnosed. The sex ratio was H / F = 1.07. The same trend was noted in previous studies conducted in Tunisia by Abda et al. (M / F = 1.02) [18]; In Iraq by Alsamarai et al. (M / F = 1.32) [19]. A clear male predominance was noted (70%) in Morocco [20]. However, our trends differ from those noted by Traoré et al., (M / F = 0.99) [11] and Bamba et al., (M / F = 0.89) [13]; in Burkina Faso, Fenniches et al., in Tunisia (M / F = 0.93) [21] and by Sucakli et al., in Turkey (M / F = 0.81) [22] which noted predominance at female. Furthermore, Issamin south-eastern Morocco found that more women were affected than men and that all age groups were represented [23].

However, we would expect a female predominance explained by a high frequentation of health centers by women (antenatal and infant consultations, etc.). Our results may be explained by the fact that the male population of Ouagadougou is higher than the female population according to the population census in 2012 (INDS, 2012).

According to age group, it was ranged from 1 year to 70 years and the average age of 22.08 ± 12.66 years. Patients aged between 16 and 30 years accounted for 55.3% (1442/2608) (Table 2). This predominant age reported in our affected patients are corroborated by Bamba et al., which found an average age of 22.78 ± 13.46 years in Ouagadougou [13]. However, Traoré et al., found an average of 26.7 ± 14.4 years in the same city in Burkina Faso [11].

In contrast, a rate higher than our findings was noted by Masmoudi et al., (an average age of 38.7 years) in Tunisia [2]. The predominance of young people aged between 16 and 30 years in this study is related to the epidemiology of leishmaniasis. Indeed, sand flies have a nocturnal activity [1,24]. Young people would tend to be more exposed to sandfly bites by their night out (frequentation of places of leisure, night professional activity).

Regarding the parasitological diagnosis, almost all 2608 cases of CL were clinically diagnosed by health centers or hospitals, but 102(3.9%) cases were referred and parasitologically confirmed (Table 2). The parasitological examination was performed in all patients and was positive in 96.1% (98/102) of cases. The slides prepared by scraping the edges of ulcers of all positive cases contained parasites morphologically compatible with *Leishmania*

major (cytoplasm with a large vacuole) (Figure 2). The negative cases may be due to the small quantity of protozoa, making it difficult to histopathological visualization in hematoxylin and eosin. In this way immunohistochemical reaction can be indicated, it is less expensive than PCR.

Elsewhere, Issam observed the parasitologically confirmed in 303 among 5250 cases of CL (5.4%) clinically diagnosed in south-eastern Morocco [23]. However it would be interesting to confirm the diagnosis of the disease by microscopy for all cases. This would allow a better estimate of the prevalence and incidence of LC in Ouagadougou. Indeed the diagnosis of CL is evoked clinically; the confirmation is based on the detection of the parasite. Direct examination of the smear or colored puncture at the MGG appears to be the best diagnosis because it is economical, easy, fast and safe. However, it lacks sensitivity. Nevertheless, the culture on special medium (NNN) allows about 15% improvement in the sensitivity of the parasitological examination [25,26]. The pathological examination also contributes to the diagnosis. Enzymatic species identification is a reference technique, reserved for specialized laboratories, as well as for PCR, the results of which seem very promising (98% sensitivity versus 80% with conventional diagnostic assays) [2,27,28]. This

Table 2: Distribution of 2608 cases of cutaneous leishmaniasis in Ouagadougou between 2006 and 2012 according to age group, gender and diagnosis confirmation.

Age group (Years)	Total	%
	Cases	
[0-15].	602	23.1
[16-30].	1442	55.3
[31-45].	446	17.1
[46-60].	87	3.3
>60.	31	1.2
Gender		
Male	1353	51.9
Female	1255	48.1
Diagnosis confirmation		
Clinical	2506	96.1
Laboratory	102	3.9

Abbreviations: No: Number; %: Percentage

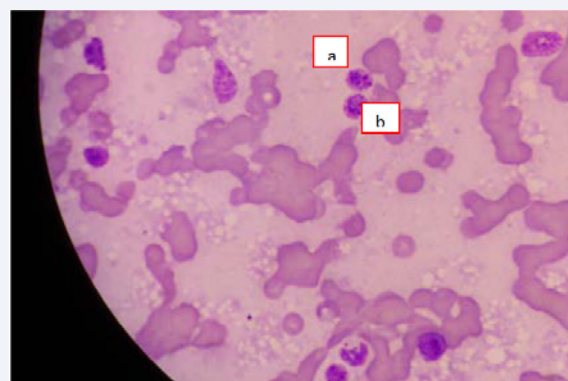


Figure 2 The amastigote forms (a, b) of *Leishmania major* after May Grunwald Giemsa staining X Objective 100.

underlines the interest of this new method in our context without isolation of the parasite by using the usual techniques (culture on special medium, pathological examination). In our experience other arguments have been taken into account: the notion of stay in an endemic area, the slow evolution of disease and the non-response to other therapies (antiseptics, antimycotics, and antibiotics).

According to clinical forms of CL, clinical characteristics were mentioned in 93 cases on patient records. The ulcero crustous forms (21.5%) and diffuse form (11.8%) were the most represented (Table 3). The same trend was noted by Traoré et al. [11], and Bamba et al., in Burkina Faso [13] for the same city of Ouagadougou. In contrast, Koné et al., in Mali observed ulcerative lesions at 78.6% and 7.2% respectively on the lower and the upper limbs [16]. Furthermore, our finding is comparable with rates noted by Keita et al., in Mali [17], Fenniches et al., in Tunisia [21], Fathy et al., in Libya [4] and Naoufal in Morocco [20]. On the clinical side, our results are superimposed on those of the literature. The predominance of the ulcero crustous form in our series, also noted in other studies in North Africa, is explained by the frequency of CL to *L. Major* [30-32], which is characterized by multiple lesions, localization at the regions discovered especially at the limbs associated with the short duration of evolution of disease [33]. The prevalence of these clinical forms in this study conforms to the published data where *Leishmania major* species most encountered in Burkina Faso [1,10], causes typical lesions [3,4,11].

However many clinical presentations are possible during CL, verrucous, vegetative impetigoid, pseudotumoral, lupoid, psoriasiform, ulcerative, ecthymatous, nodular forms, sporotrichoides etc [31]. This clinical polymorphism depends not only on the genetic characteristics of the parasite, but also on the immunological status of the host. Indeed, the rate of phenotypes functional CD4 T lymphocytes plays an important role in the determinism of this disease. Schematically the Th1 type response corresponds to a benign localized lesion, the response Th2 Involves an extensive severe lesion [32].

Furthermore, we found that the average was 5.3 ± 7.5 lesions (Figure 3,4). These results are comparable to those noted by Bamba et al., and Traoré et al., in Ouagadougou, which found 5.3 ± 4.8 and 6.1 ± 5 lesions per patient respectively [11,13]. Elsewhere, Abda et al., during their study in Tunisia found an average lesion number of 1.9 ± 1.8 per patient [18]. However, there is therefore a disparity in the number of lesions according to the geographical locality. This is probably due to the number of bites per phlebotomus, in addition to the predominance of the vector according to the geographical areas; or to the variability of the susceptibility of the inhabitants to the disease.

Moreover, the single lesions were observed in 14% of patients, double lesion in 62.4% and 23.6% of patients showed multiple lesions (3 to 51) (Table 4). Elsewhere, Naoufal et al., noted, multiple lesions in 48.5% with an average of 3.25 lesions per patient in Morocco [20]. Our results are explained by the clothing habits of the population in Ouagadougou which are characterized by low coverage of the upper and lower limbs. Sand flies preferentially bite on the exposed parts of the body; lesions will be mainly localized on the limbs. Ignorance of the mode of

Table 3: Distribution of 2608 cases of cutaneous leishmaniasis in Ouagadougou between 2006 and 2012 according to age group, gender and diagnosis confirmation.

Clinical forms	Number	%
Crustous ulcerative	23	24.7
diffuse cutaneous	11	11.8
Papulo-ulcerated	10	10.7
Pseudo lepromatous	9	9.7
Ultero-nodular	9	9.7
Generalized cutaneous	7	7.5
Exulcero crustous	5	5.4
Papulo-nodular	4	4.3
Papulo-exulcerated	3	3.2
Papulo- crustous	3	3.2
Papulo-erythematous	3	3.2
Nodulo- crustous	1	1.1
Nodulo-excoriated	1	1.1
Papular-infiltrated	1	1.1
Ultero-nodular	1	1.1
Ulcerative-nodular Inflammatory	1	1.1
Ultero-oozing	1	1.1
Total	93	100

Abbreviations: %: percentage

Table 4: Number of lesions and clinical location among 93 cases mentioned of cutaneous leishmaniasis.

Characteristica	Cases with cutaneous lesions	%
Number of lesions		
Single lesion	13	14%
Double lesions	58	62.4%
Multiple lesions	22	23.6%
Locations		
Head	16	17.2%
Trunk	11	11.8%
Upper limbs	46	49.5%
Lower limbs	20	21.5%

Abbreviations: No: Number, %: Percentage



Figure 3 Multiple lesions of CL on the hand of the patient from Burkina Faso in consultation at the Department of Infectious Diseases of the Tenon hospital (Paris, France) where she is followed for HIV infection and she is under antivirals (Lesions of cutaneous leishmaniasis are noted (16 lesions) diagnosed in Ouagadougou (Burkina Faso).

puncture and preventive measures against leishmaniasis are also added.

Concerning the clinical locations of CL, lesions were mainly located on the upper limbs (49.5%) followed by lower limbs (21.5%), head (17.2%) and trunk location (11.8%). Detailed distribution of number and clinical locations of CL were shown in Table (4). These results corroborate those obtained in Burkina Faso [3,11,13] in Libya [4]. These locations are exposed parts of the body exhibited at bites of sand flies. Our results are explained by the clothing habits of the population in Ouagadougou which are characterized by low coverage of the upper and lower limbs.

In contrast, elsewhere, Fenniches et al., obtained 65% of ulcerative lesions on the face [21] while Abda et al., found 44.9% of the lesions on the face and 58% on the limbs in Tunisia [18]. Elsewhere, Naoufal et al., noted that lesions were located on the face in 29.6% of cases, on the upper limbs in 44.4%, on lower limbs in 18.5% and trunk in 7.4% of cases in Morocco [20].

Regarding the treatment of 2608 cases of CL clinically diagnosed by health centers or hospitals, the different prescriptions were divided into eight groups (Table 5). The main prescriptions were antiseptics (26.8%); antibiotics (25.7%); anti-parasites (21.6%), and Glucantime® (21.5%). Traoré et al. found 70.3% of antibiotic treatment by systemic administration and 3.5% prescription of Glucantime® [11] while Bamba et al noted 28.5% of antiseptic prescriptions [13] in the same city, Ouagadougou. However, Fenniches et al., in Tunisia found 70% prescription of Glucantime® [21]. Moreover, among 3352 patients which received a treatment, 2789 were not treated with glucantime or 78.5% inadequate prescription (Table 5). Our findings could be explained by the greater physical and financial accessibility of antiseptics, antibiotics and antiparasitic agents compared to Glucantime®, the WHO reference medicine for the treatment of cutaneous leishmaniasis WHO, 2012). In addition, the administration of Glucantime® requires not only the assistance of a health worker but also that the patient returns several times to the health center; which could be fairly restrictive for him.

WHO recommends in fact two first-line drugs antimonite derivatives (Glucantime®) systemically or peri-lesional infiltration and pentamidine (Pentacarinat®) systemically (WHO, 2012). The meglumine antimonate (Glucantime) was used with success in the current study by intramuscular injection 20 mg per kg of body weight per day until healing or parasite clearance. Other studies in Burkina Faso noted the efficacy of meglumine antimonate (Glucantime®) [3,34]. The same molecule was notified by other studies in Ethiopia [35] in Tunisia [2] and Morocco by Qasmis [36]. However, this treatment exposes too many side effects, and resistances are increasingly reported in several countries. For single or few lesions, intralesional infiltration proved its effectiveness with 100% success in our series.

On the other hand, many drugs have been tested in the literature (amphotericin B, rifampicin, fluconazole, disulone), as well as laser, bleomycin intra-lesion. Currently, much hope is placed in allopurinol, Triazoles, aminosidine sulfate (paromomycin) or hydroxynaphthoquinones such as atovaquone.



Figure 4 Multiple lesions of CL on the ankle of the patient from Burkina Faso in consultation at the Department of Infectious Diseases of the Tenon hospital (Paris, France) where she is followed for HIV infection and she is under antivirals (. Lesions of cutaneous leishmaniasis are noted (16 lesions) diagnosed at Ouagadougou (Burkina Faso).

Table 5: Different groups of drugs prescribed by health agents.

Drugs prescribed	No	%
Antiseptics	952	26.8
Antibiotics:	911	25.6
Antiparasitic:	768	21.6
Glucantime	763	21.5
Anti-inflammatory	133	3.7
Anti-histamines	14	0.4
Antifungal agents	8	0.3
Anti-pyretic	3	0.1
Total	3552	100

Abbreviations: No: Number, %: Percentage

Furthermore, immunostimulation by interferon has been the subject of convincing clinical trials unfortunately without a follow-up [37,38]. However, in our series, only 21.5 % of patients received conventional therapy, these findings may be due to the high cost of this molecule slowing his financial accessibility.

CONCLUSION

In 1996, the city of Ouagadougou had an epidemic of leishmaniasis reaching its paroxysm in 1999. Has the epidemiological situation of the disease changed today? At the end of our retrospective study on cutaneous leishmaniasis in the city of Ouagadougou from 2006 to 2012 we can retain that the disease continues to pose a real public health problem in Burkina Faso. The emergence of severe and resistant forms throughout the world should encourage the multiplication and strengthening of prophylactic measures through the fight against the reservoirs and vectors of the parasite. A therapeutic optimization, followed by standardized protocols and a consensus reference system follow up are still needed.

Moreover, cutaneous leishmaniasis is in general a none handicapping disease, and it's spontaneous healing, although often late, is due to the fact that many patients do not consult health centers. In Burkina Faso, a nationwide prospective study would allow an estimate of the national incidence and the implementation of actions to better fight the disease in our country.

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