

*Original Article*

## Cutaneous Leishmaniasis in Al-Jabal Al-Gharbi, Libya: Incidence and Epidemiology

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### ABSTRACT

This study was conducted to evaluate the epidemiological aspects of cutaneous leishmaniasis (CL) in patients who were presented to dermatology clinic of main referral hospital in Al-Harab, Al-Jabal Al-Gharbi, and to assess its distribution in relation to age, sex, season, and residency. In this case series study, all patients with CL, who were referred or presented to dermatology outpatient clinic of Al-Haraba Hospital in the period from Aug to Dec 2019, were enrolled, and were clinically examined. Slit skin smear and/or skin biopsy for microscopic confirmation were performed whenever the diagnosis was suspicious. The information about age, gender, address of patient, date of presentation, and the number of ulcers were collected and analyzed using SPSS. About 110 patients were found to have CL, majority of them 67(60.9%) were females, while 43(39.1%) were males. The ages of patients were ranged from (1 to 84 years). The current findings reported marked increase of cases of CL in December especially in Al-Haraba district compared to other months. Further studies are required to recognize the vector, parasite species and the animal reservoir, which would enable national and local health authorities, in order to implement an effective control program.

**Keywords:** Cutaneous Leishmaniasis, Al-Jabal Al-Gharbi, Libya.

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### INTRODUCTION

Leishmaniasis is a disease caused by parasites of the Leishmania type. It is spread by the bite of certain types of sandflies. The disease can be manifested in three ways: cutaneously, mucocutaneously, or visceraally [1]. Skin ulcers are present in the cutaneous form, while ulcers of the skin, mouth, and nose are present in the mucocutaneous form, and the visceral form begins with skin ulcers and progresses to fever, low red blood cells, and an enlarged spleen and liver [2].

More than 20 species of Leishmania cause infections in humans. Poverty, malnutrition, deforestation, and urbanization are all risk factors. Microscopy can be

used to diagnose all three types of parasites [1]. Liposomal amphotericin B, a combination of pentavalent antimonial and paromomycin, and miltefosine are some of the medications that may be used to treat visceral disease [1].

CL is found in over 70 countries across Africa, Asia, South Europe, and North and South America [3]. Algeria, Brazil, Iran, Syria, Afghanistan, Pakistan, Tunisia, and Peru have the highest number of reported cases [4]. CL is endemic in all countries surrounding the Mediterranean Sea, including North Africa from Morocco to Egypt [4], where CL transmission has been increasing since the 1980s and thousands of cases are reported each year [5].

However, CL underreporting is a major issue in many endemic countries [3].

In Libya, the first case of CL caused by *L. tropica* was reported in 2006 in a 10-month-old baby in the Beni Walid district of Libya [6]. Molecular identifications studies have revealed that *L. tropica* cases are common in many North-Western districts, including Nalut, Misrata, Jabal El Gharbi, and Tarhouna [7]. The majority of published reports in Libya concern Zoonotic CL (ZCL), which is the most common form in the country. The main ZCL foci are in the country's northwestern regions of Tripoli, Yafran, Al-Jabal Al-Gharbi, and Nalut [8,9]. Moreover, spread to the central province of Syrte was also reported [10]. Furthermore, Leishmaniasis has been studied extensively in endemic northern African countries such as Morocco, Algeria, Tunisia, Egypt, and Libya [11].

Al-jabal Al-gharbi district is one of Libya's established endemic leishmaniasis provinces, where CL is a major parasitic health problem [12]. Thus, the current study was conducted to evaluate the epidemiological aspects of CL in patients who were presented to dermatology clinic of in Al-Hraba hospital, and to assess its distribution in relation to age, sex and residency.

## METHODS

### Area of study

Al-Jabal Al-Gharbi is a northern area in Libya, about 90 to 250 Kilometer southwest of Tripoli (Fig. 1). The majority of patients came from Al-Hraba and its suburban and the minority from neighboring cities.



**Fig 1. Geographical location of Al-Hraba hospital**

### Data collection

All patients presented to dermatology outpatient clinic of Al-Hraba hospital during the period from 1st August 2019 to 27 December 2019, and diagnosed with CL were included in the study. The dermatology outpatient clinic of Al-Hraba hospital is the only referral clinic for diagnosis and treatment of all suspected cases of CL in Al-Jabal Al-Gharbi area. The only clinic in the region supplied with Pentostam (Sodium Stibogluconate) for treatment of CL. This clinic receives referral from primary and secondary health centers as well as from private clinics in Al-Hraba. Data was collected includes; information about age, gender, address of patient, number of lesions and type of applied treatment. The diagnoses were based on clinical findings, in addition, laboratory tests, such as slit smear and / or skin biopsy were done when necessary and the diagnosis were suspicious.

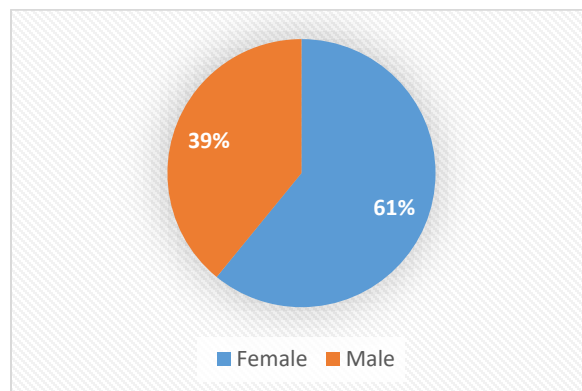
### Statistical analysis

The statistical package for social sciences, version 22, was used to analyze the data (SPSS-22). When necessary, frequency distribution, descriptive statistics, chi-square, and the T-test were used.

## RESULTS

### Relationship of disease to patients

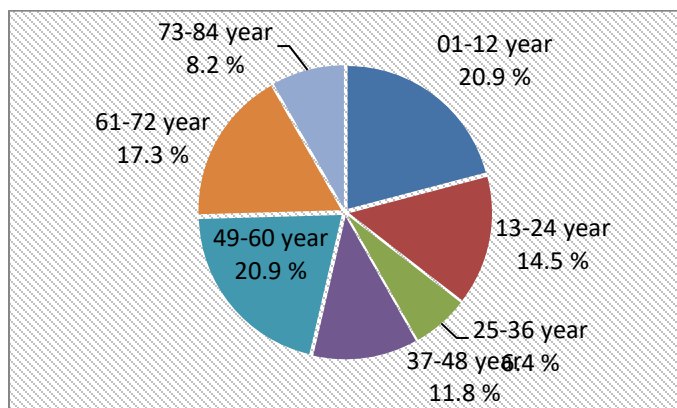
The total number of cases, which were identified to have CL, were 110 patients, majority of them 67(60.9%) were females, while 43(39.1%) were males (Fig 2).



**Fig 2. Distribution of patients based on their gender**

### Relationship of disease to age

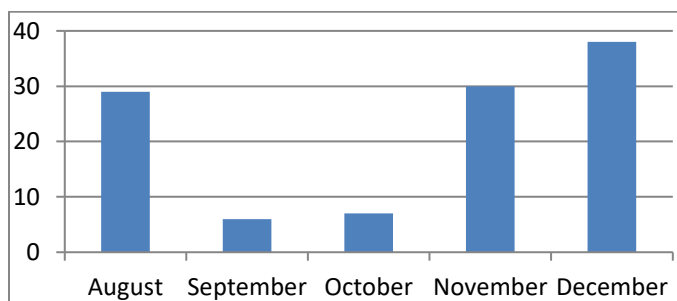
The most affected age group were from 1 to 12 years and from 49 to 60 years, with their percentage about 20.9 %.



**Fig 3. The age group of patients in the study. \*P-value of patients with their age = 0.533**

### Monthly variations

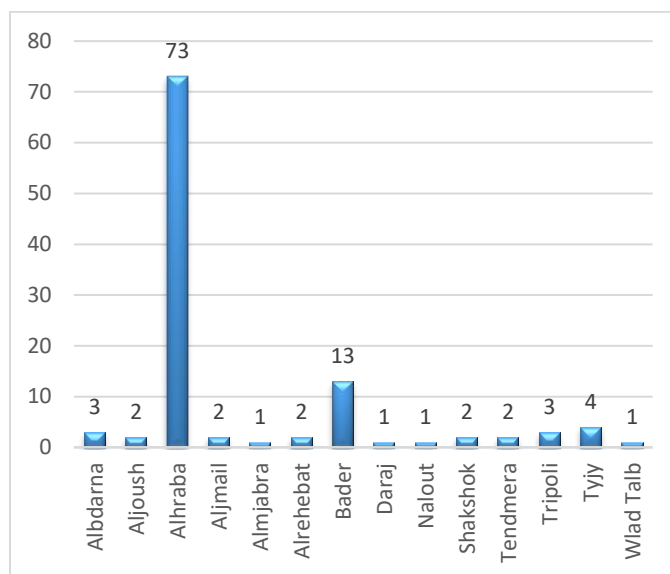
Most of the cases were recorded in December and the least cases were recorded in September.



**Fig 4. Percentage of monthly variations of patients in the study**

### Relationship of disease to city:

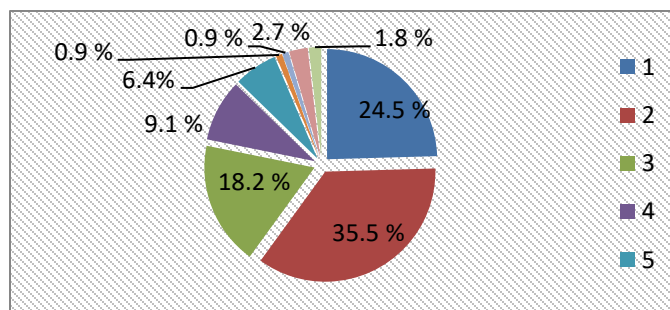
Viewing the geographical distribution according to residency, the largest number of patients, 73(66.4%), were from Al-Hraba city, while 13 patients (11.83%) came from Bader city. As most of the patient was lived in the city of Al-Hraba, and some of them were from its suburbs.



**Fig 5. Percentage of patients of the study in cities. \*P-value of date of infection with their cities = 0.367**

### Relationship of disease to number of lesions

Where the number of infected people with the largest number of skin lesions was about 2(1.8%), and the least of them was about 27 (24.5 %).



**Fig 6. Percentage of number of lesions in study**

## DISCUSSION

CL is a common and major public health problem worldwide, affects 1.5–2 million people annually [13]. In Libya, CL is endemic in northwestern part of Libya since 1910. Then, many cases have been reported from different localities [14]. Most published studies from Libya revealed that CL, is the oldest most significant leishmaniasis form in this country. It is caused by *L. major*, zymodeme MON-25 and transmitted mainly by *Phlebotomus (P.) papatasi*. *Psammomys obesus* and

*Meriones libycus* were found to be the main reservoirs for *L. major* in Libya [7,15].

In the current study, females were more at risk to develop CL, this finding was not in line with other reported studies from Libya [8,12,16,17]. CL were more to affect younger age groups as well as older age group, this was almost similar to results of studies conducted in NW of Libya, which found that, the average age of patients to be at 30 years [3,9]. Climate changes, represented in maximum and minimum temperature, have great effect on survival, maturity, and fertility of sandflies, and their ability to transmit CL. In North Africa, the minimum temperature was assumed to show marked increase as well as reduction of rainfall. These climate changes have the potential to increase both, the incidence of CL and affected geographical area [3,14].

In the northwest of Libya, plenty of halophyte plants, *zizyphus lotus* L. (*Rhamnaceae*) and *Halocnemum strobilaceum* were found in Taurgha, which is located 260 Kilometer east of Tripoli, these plants are suitable for living of *Psammomys obesus* and *Meriones libycus* [14,18]. It has been reported previously that *Phlebotomus papatasi*, the vector of *L. major*, was active and widely spread in Al-Hraba, and in Ejhawat in the northwest of Libya, especially in the period of August and October. The activity in this period of the year seemed to be similar to the activity reported by our study, which is up to date still unknown, and need to be recognized [19,20]. Similarly, another study conducted in Taurgha city, which is coastal city, located east of Misrata, showed that *Phlebotomus papatasi* and *Phlebotomus longicuspis* were the main species of sandfly vectors captured in this endemic area [18]. The increase and spreading of the disease in Al-Jabal Al-Gharbi could be due to climatic and environmental changes affecting the geographic distribution of vector and reservoir, and also by lack of the control measures following violent conflicts [3]. Furthermore, other factors such as socio-economic status, lifestyle, people behavior during the disease transmission months in summer, presence of new agriculture

projects, construction work, and garbage collection may also have a role in spread of CL [4,21].

Given that the incubation period for *L. major* is between 2 weeks and less than 4 months, and that there is clear seasonality of disease appearance in our studied area, it is reasonable to conclude that CL in Al-Jabal Al-Gharbi is a zoonotic type of CL caused primarily by *L. major* [14]. The identification of the *Leishmania* infecting agent will aid in the selection of the best treatment options and will influence the efficacy of the chosen therapy, necessitating the use of molecular diagnostic methods [1].

## CONCLUSION

CL in Al-Jabal Al-Gharbi, an endemic area in northwest part of Libya, had ZCL-like characteristics, and recently had an increasing rate of infected people, as well as more geographical areas becoming CL endemic. More research is needed to identify vector, reservoir, and infecting *Leishmania* species, and ongoing disease monitoring would allow for effective control of this infectious skin disease.

## Competing interests

Authors have declared that no competing interests exist.

## Authors' Contributions

This work was carried out in collaboration between authors.

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