

PREVALENCE OF CUTANEOUS LEISHMANIASIS IN WESTERN REGION OF LIBYA

Saleha Alarabi Algusbi^{1*}, Abdul Aleem Mohamed Alesawei², Ali Abdul Qqasim Ehtewish³, Mohamed Nagy Abuziad⁴, Mohamed Khaled Sadaa⁵, and Miraj Abdul Hamid Ahnish⁶

^{1,2,3,4,5,6} Department of Medical Laboratory Technology, Faculty of Medical Technology-Surman.

* saleha.algusbi@sabu.edu.ly

Abstract

Cutaneous leishmaniasis is an endemic parasitic infection in the Mediterranean region, including Libya. This study was to determine the epidemiological changes of cutaneous leishmaniasis about incidence, age of patients, sex, season and residency from May 2020 to February 2022 at Zwaga Health centre in Sabratha city. The samples studied were from different cities in the Western part of Libya. 294 samples of which 180 were males and 114 were females, and whose age was 20-80 years.

The results showed that, most of the infected cases (48.6%) were less than 20 years old. It was also noticed that males are more likely to be infected (61.2%) than females (38.8%). Moreover, Sabratha was the most affected city (62.6%).

The results also showed that most of the infected cases were in the leg, hand and foot (42.5%). The highest incidence was in the winter (81.0%).

Knowing the prevalence and epidemiology of the disease can help reduce and prevent cutaneous leishmaniasis. Hence, further studies are needed to identify vector, reservoir and species of leishmania can help control this endemic infectious disease.

Keywords: Cutaneous leishmaniasis (CL); Visceral Leishmaniasis (VL); Mucocutaneous Leishmaniasis (MCL); Sabratha.

Introduction

Leishmaniasis is a parasitic disease caused by multiple species of *Leishmania* of phylum Mastigophora (Ryan *et al.*, 2004; Myler *et al.*, 2008; Ansari *et al.*, 2015). It is found in tropics, subtropics, southern Europe, Africa, Asia, and America (Alvar *et al.*, 2012; Murray *et al.*, 2005). Infections begin when a sand fly vector (female phlebotomine in the old world leishmaniasis and *Lutzomyia* in the new world leishmania) inserts *Leishmania* parasites into the host skin. Maroli *et al.*, (2013) have been described over 90 species of the genera *Phlebotomus* and *Lutzomyia* as a vector for human leishmaniasis. Some factors such as rodents (Coller *et al.*, 1998), sand flies

(carrier), waste dumps and animal husbandry can play an important role in transmitting the infection. Cutaneous leishmaniasis, visceral leishmaniasis and mucocutaneous leishmaniasis are of the main forms of leishmaniasis. Cutaneous leishmaniasis includes a localized or diffuses the papular lesion that develops into ulceration. Mucocutaneous leishmaniasis leads to injuries of mucous membrane of nose and mouth. Cutaneous leishmaniasis or Aleppo boil or Oriental sore is the most common form of the *Leishmania* that affects humans (Sacks and Kamhawi, 2001). It causes skin lesions usually within several weeks or months and develops into ulcers on the exposed parts of the body, which are susceptible to secondary bacterial infection. The lesions may last for months or years, leaving life-long scars and, in some cases, disability (James and Berger, 2006).

“Between 600 000 to 1 million new cases occur worldwide annually” (<https://www.britannica.com/science/leishmaniasis>). The disease is caused by three species: *L. major*, *L. tropica* and less frequently *L. infantum* (Rioux *et al.*, 1986; Marty *et al.*, 1989; Rha *et al.*, 2007). In Libya, the disease is caused by *L. major* and *L. tropica* (Rha *et al.*, 2007; Herwaldt, (1999); Reithinger *et al.*, 2007).

Visceral leishmaniasis (VL) or kala-azar affects spleen, liver, and bone marrow, and it is fatal if left untreated. It is characterized by irregular fever, weight loss, enlargement of the spleen and liver and anaemia. This disease is common in Brazil, East Africa and in India. About 50 000 to 90 000 new cases of VL occur worldwide annually. In 2020, more than 90% of new cases reported to WHO occurred in 10 countries: Brazil, China, Ethiopia, Eritrea, India, Kenya, Somalia, South Sudan, Sudan and Yemen (www.britannica.com). The causative agent is *Leishmania donovani* Herwaldt, (1999).

Mucocutaneous leishmaniasis (MCL), which affects mucus membrane of mouth, nose, and throat, leads to partial or total destruction. “Over 90% of mucocutaneous leishmaniasis cases occur in Bolivia (the Plurinational State of), Brazil, Ethiopia and Peru” (www.britannica.com). In Brazil, the disease is caused by *L. braziliensis* and *L. amazonensis* (Reithinger *et al.*, 2007). In Libya, CL is an endemic in the north-western region since 1910. The first case of CL was recorded in 1930, and then another 40 cases were recorded in 1971 in Nalut city and the Tunisian border (El-Buni *et al.*, 2000; Ashford *et al.*, 1976; Ashford *et al.*, 1977). After several years, CL cases were reported in the west and south-west of Tripoli (El-Buni and Ben-Darif, 1996) and Yafran areas (El-Buni *et al.*, 1997).

El-Badry *et al.*, (2017) pointed that *L. major* and *L. tropica* are the frequent species in the north-western regions of Libya. The peak of infection was documented between November and February for the infections with *L. major* with less marked for infections by *L. tropica* (Amro *et al.*, 2012; Belal *et al.*, 2012) while the seasonal activity of sand fly vector was noticed from May to October (Jacobson, L. 2003; Killick, R., 1999). A marked increase of reported cases of CL in 2016 especially in

East area of Zliten and the disease was mainly observed in the winter (Arshah *et al.*, 2017).

Involvement in agricultural activities and outdoor occupations increase the risk of infection. It is believed that the risk factors of CL might have increased because of armed and political conflicts since 2011, which led of the interruption of the leishmania national control program. This increase of infected people has been reported within recent studies of CL in Libya (Fathy *et al.*, 2009; Amro *et al.*, 2017).

The objective of this study is to determine the epidemiological changes of CL about incidence, age of patients, sex, season, and residency in 2020 to 2022 at Zwaga Health center of Sabratha city.

Methodology

From the archive of Zwaga Health Centre at Sabratha city, data between May 2020 and February 2022 were collected. The cases referred to Zwaga Health Centre with skin lesions typical for CL were 294 patients (180 male and 114 female) aged between 20-80 years. The patients came from several cities of Western of Libya such as Sabratha, Regdalin, El-Ajeelat, Zawia, Aljmil and Tripoli.

Data Entry and Analysis

All of the responses to the questionnaires were loaded into Microsoft Excel® 2007 (Microsoft Corporation, USA) then to SPSS Version 21 (SPSS, Inc., Chicago, IL, USA). Data with quantitative variables were expressed as mean, standard deviation and range, whereas qualitative variables were estimated and presented as frequencies and percentages.

Results

The results showed that 48.6% (143/294) of the cases are under 20 years old, 18.7% (55/294) are between 20 and 39 years old, 22.8% (67/294) are between 40 and 59 years old, 9.2% (27/294) are between 60 and 79 years old, and 0.7% (2/294) are 80 years or older. It appears that most of the infected cases are less than 20 years Figure (1). 61.2% (180/294) of cases are males, while 38.8% (114/294) are females Figure (2).

The results also show that 3.7% (11/294) are from Regdalin, 17.7% (52/294) from Al-Jamil, 13.9% (41/294) from Al-Ajailat, 62.6% (84/294) from Sabratha, 1.4% (4/294) from Zawia, and 0.7% (2/294) from Tripoli, Figure (3). The data collected, show that 42.5% (125/294) of the cases were infected in the leg, 2.4% (7/294) were infected in the hand, and 0.7% (2/294) were infected in the foot. Moreover 19.7% (58/294) were infected in the leg and hand, 0.7% (2/294) were infected in the hand and foot, 12.6% (37/294) were infected in the leg and foot, and 21.4% (63/294) were infected in the leg, foot and hand. The leg was the most of affected places, Figure (4).

Based on the seasonal distribution, the results show that, 81.0% (238/294) of cases were in winter, 1.4% (4/294) in summer, 3.7% (11/294) in spring and 13.9% (41/294) in fall. As it turns out that most of the infected cases were in winter Figure (5).

Based on city and year of infection, data show that the 6.8% of disease prevalence was in 2020, 58.2% in 2021 and 35.0% in 2022. Among these years, Sabratha was of the highest rate 2.7%, 37.8% and 22.8% respectively Figure (6).

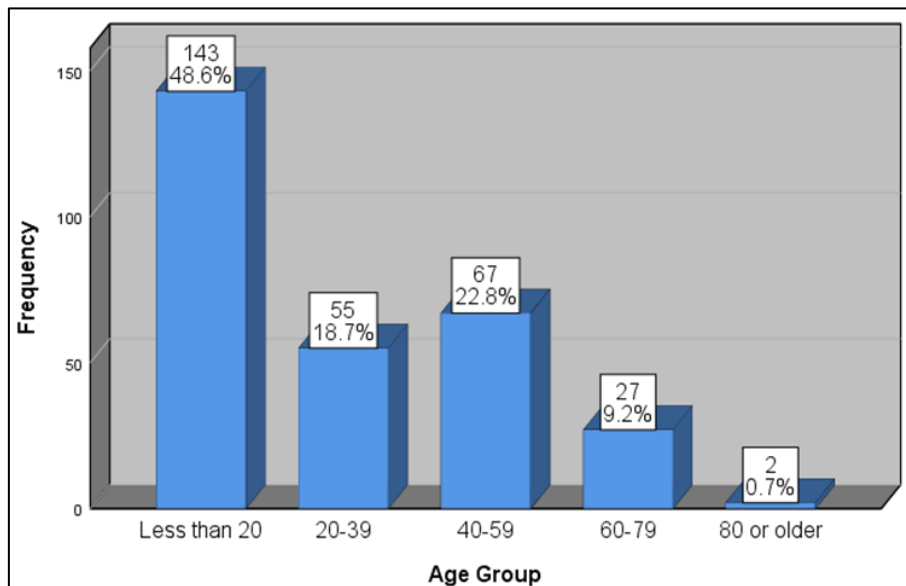


Figure (1): Frequency of Age Group.

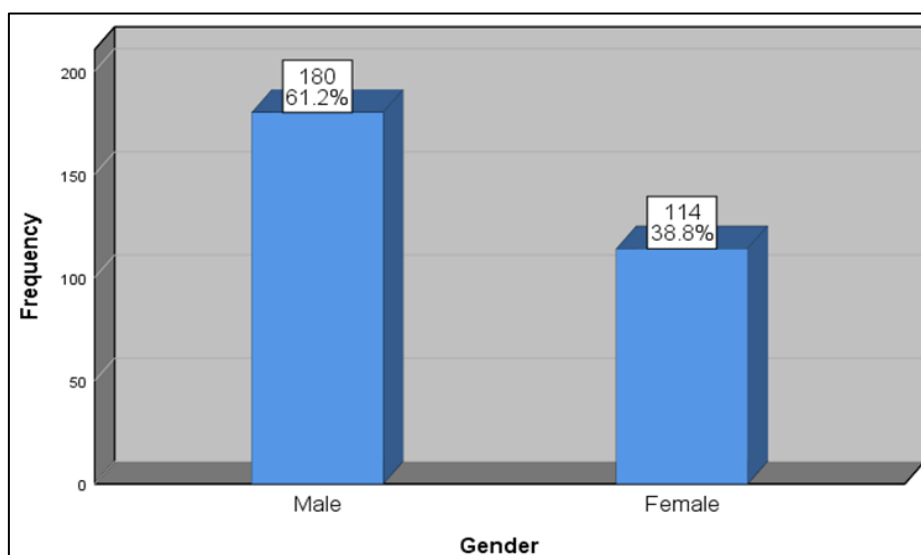


Figure (2): Frequency of Gender.

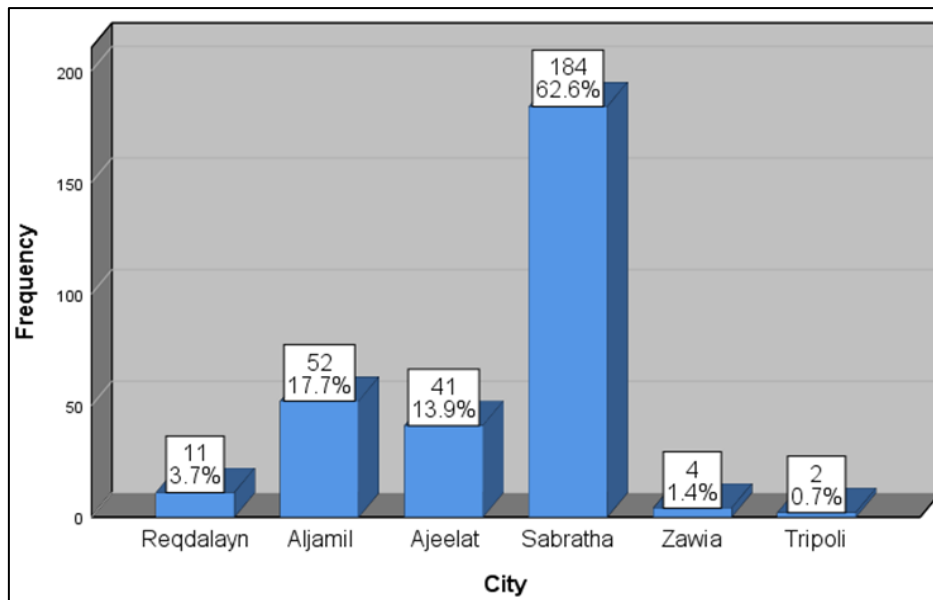


Figure (3): Frequency of City.

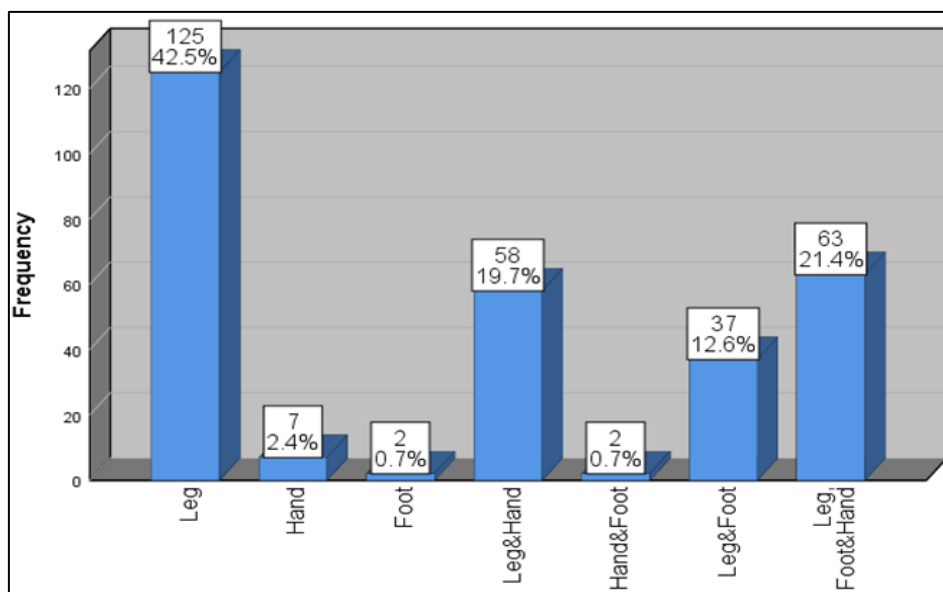


Figure (4): Frequency of Place of Infection.

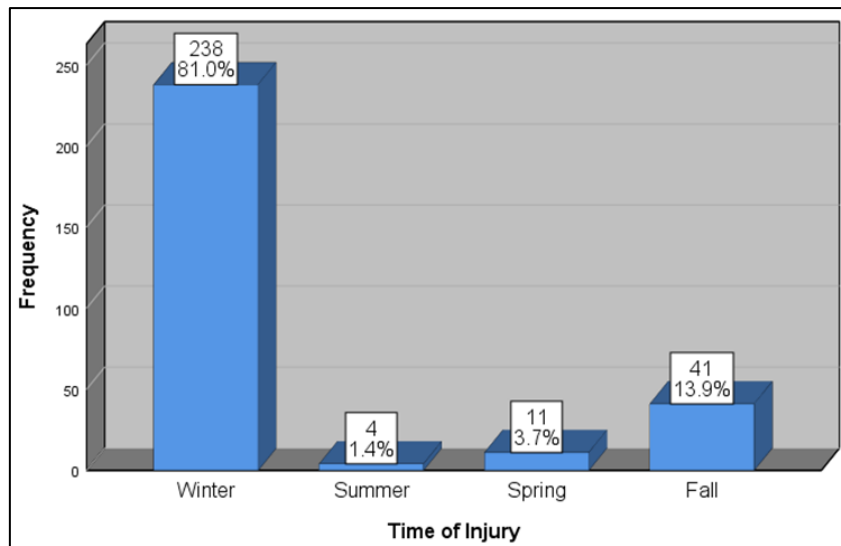


Figure (5): Frequency of Season of Infection.

Table (1): Distributed Sample Based on City and Year of Infection.

City	Year of Infection						Total	
	2020		2021		2022			
	Count	%	Count	%	Count	%	Count	%
Reqdalayn	0	0.0%	8	2.7%	2	0.7%	10	3.4%
Aljamil	6	2.0%	29	9.9%	17	5.8%	52	17.7%
Ajeelat	6	2.0%	17	5.8%	17	5.8%	40	13.6%
Sabratha	8	2.7%	111	37.8%	67	22.8%	185	63.3%
Zawia	0	0.0%	4	1.4%	0	0.0%	4	1.4%
Tripoli	0	0.0%	2	0.7%	0	0.0%	2	0.7%
Total	20	6.8%	167	58.2%	103	35.0%	294	100.0%

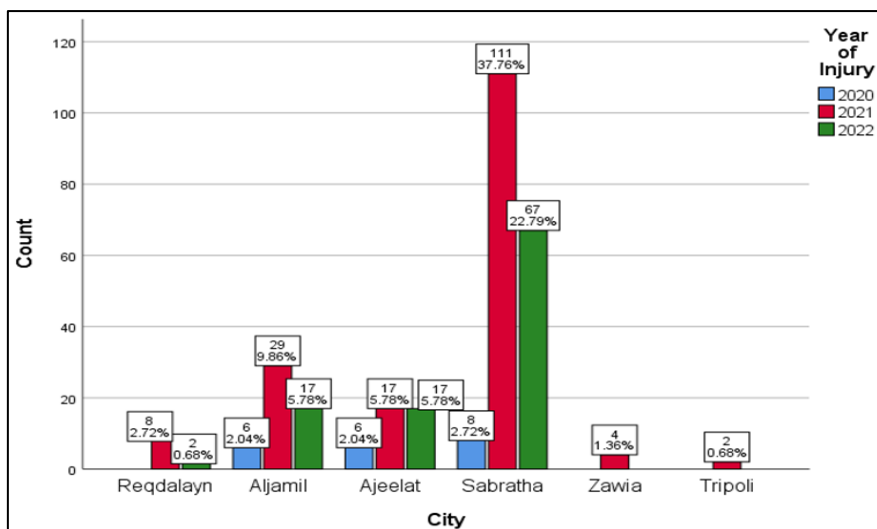


Figure (6): Frequency of City and Year of Infection.

Discussion

The objective of this study was to determine epidemiological changes of Cutaneous leishmaniasis (CL) about incidence, age of patients, sex, season, and residency over several years in Western region of Libya.

The current study showed that, the highest rate (48.6%) of infection was found among people who less than 20 years of age. El-Buni and Ben-Darif, 1996; and: El-Buni *et al.*, 1997 showed that the age group 1-20 years was the most affected. The results can be explained by the risk of exposure to bites while outdoor activities.

The study also showed that the rate of infection among males was higher than that of females, as there were (61.2%) and females (38.8%) out of 294 cases; these results are in line with a study carried out in Zliten by Arshah *et al.*, 2017. The higher incidence of infection in Sabratha (62.6%) may be due to location of the Health Centre and the presence of rural areas that could be another reason for the increase in infection. On the other hand, the least cases (about 0.7%) in Tripoli may be due to the distance.

The current study also showed that the most lesions were on exposed body parts such as leg, hand and foot (42.5%). A study by Maniscalco *et al.*, 2007 investigated a single and multiple lesions located on exposed areas, in particular the face, upper and lower limbs. The highest prevalence of infection (81%) in winter, can be attributed to the appropriate environmental conditions. Arshah *et al.*, (2017) noticed that the disease was mainly in winter.

Finally, the high level of cases in 2021 (58.2%), and low level of cases (only 6.8%) in 2020 could be due to control activities and protective immunity.

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