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## **Cutaneous Leishmaniasis: A Ten-Year Study of the Epidemiology and Clinical Features in Salfit District (2001-2010)**

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### **ABSTRACT**

**Aim:** This study was conducted in order to provide information and evaluate the epidemiology of cutaneous leishmaniasis, incidence, geographical distribution and clinical spectrum of the disease for the period 2001- 2010 in Salfit district (Northwestern West Bank).

**Study Design:** A retrospective study.

**Methods:** Fifty patients with positive cutaneous leishmaniasis (23 males and 27 females) in Salfit district were recorded in Salfit Primary Health Care Center from 2001 to 2010.

**Results:** The results show that the incidence of disease increased from 0.2 in 2001 to 2.5 per 10000 person in 2010 and the disease distributed in 13 localities in Salfit district with more prevalence in Der ballut locality (24%). According to the history of CL medical reports which consist of time of the emersion of signs, the time of seeking of medical care taking in to consideration the incubation period for the *leishmania* parasite in cases, the results show that the frequency of main infection period took place during March. The disease affects both males and females in different age groups with more prevalence of cases occurred in patients ages 6-21 years (36.0%). The lesions were commonly single and nodules (60.5%), (54%) respectively and more prevalence in upper limbs (48%) especially in females (30.2%) and the duration of treatment of CL infection with sodium stibogluconate (pentostam) took mainly form 1-20 days.

**Limitations of Study:** This was a retrospective study to evaluate the epidemiology of 50 positive CL cases in Salfit district recorded at Salfit Primary Health Care center (SPHC) for the period 2001 to 2010 and The data recorded at (SPHC) did not include the Suspected CL cases or species of *Leishmania* parasite and possible species of vector and reservoir.

**Conclusion:** The results show that CL is increasing in number year by year and spread over the localities in Salfit district and become endemic area, so more studies are needed to determine the vectors and reservoirs as well as species of *Leishmania* to help the decision makers put suitable strategies to control the disease.

*Keywords:* Leishmaniasis; Salfit district; epidemiology; distribution.

## 1. INTRODUCTION

Leishmaniasis represents one important health problem in the world, about 12 million people are infected world wide and 350 millions are considered at risk (WHO, 1996). Currently, the *Leishmania*-endemic regions have expanded significantly and that is most likely due to development and massive rural-urban migration in many developing countries (WHO, 2007). Moreover, man-made projects with environmental impact, like dams contribute to the spread of leishmaniasis by increasing human exposure to the sand fly vectors (WHO, 2007).

In Palestine the disease represents a major health problem in the country and spreads over a wide area. During the last two decades leishmaniasis became recognized as a public health problem in the West Bank (Palestine) (Arda, 1983; Baneth et al., 1998). CL is endemic in the West Bank (Greenblatt et al., 1985; Sawalha, 2001).

The cutaneous leishmaniasis, also known as Jericho Boil in Palestine, normally produces skin ulcer on the exposed parts of the body. Atypical ulcer starts as a nodule on the exposed part of the body; a crust develops in the middle of the Boil when it falls away shows the ulcer (WHO, 2007).

Many studies discussed the epidemiology and distribution of CL in Palestine and neighboring countries or other countries like Jordan, Lebanon, Egypt, Saudi Arabia and Sudan and found that the disease affected all sex and ages, with different sites of infection, different types of lesions as well as an increase in incidence of the disease during the year and the studies also discussed the vector and reservoir (Huntemuller, 1914; Khalil et al., 2002; Orshan et al., 2010; Maroli et al., 2009; Chelbi et al., 2007; Kubeyinje et al., 1997; Khoury et al., 1996).

The Palestinian Ministry of Health (MOH) reported an increase in leishmaniasis incidence in West Bank districts like: Jenin, Jericho, Tubas, Nablus, Bethlehem, and Salfit (MOH, 2009). The incidence rate in Salfit district estimated from a previous studies during an epidemic of CL from 1972-1980 was 50.4 per 10,000 person (Arada and Kamal, 1989).

Seven species of *Phlebotomus* have been reported to be suspected or found to be vectors for CL in the West Bank (Sawalha, 2001, 2000). The most important species is the sand fly *Phlebotomus papatasi*, which is the principal vector of *Leishmania tropica* and *L. major* which cause zoonotic Cutaneous Leishmaniasis (Klus et al., 1994). The *L. major* parasite is harbored by *Psammomys obesus* and *Meriones crassus* (Schlein et al., 1984). The reservoir hosts and sand fly vector for *Leishmania tropica* parasite have not been identified in the northern parts of the West Bank (Klus et al., 1994). The Rocky hyrax (*Procavia capensis*) is suspected to be a host for *L. major* with *P. sergenti* as the probable vector.

In Salfit district little information is available about the sand fly vectors and the *Leishmania* parasite

Since 2001 no studies were conducted in Salfit district, so little information is available about the epidemiology and distribution of CL disease, . In order to assess the epidemiology of CL leishmaniasis in the Salfit district and to provide information on the incidence of the disease and clinical features of disease, these results will help health authorities to implement suitable control and prevention measures against the disease.

## **2. MATERIALS AND METHODS**

### **2.1 Study Area**

Salfit district located at 32° 7' 5.5" N, 35° 5' 25" E (figure. 1) with total area is almost 202 sq km. It is one of 17 districts of the Palestinian National Authority, it is located in the northwestern West Bank, bordered by the district of Ramallah and al-Bireh to the South, Nablus to the East, and Qalqilya to the North as well as Israel to the West. According to the Palestinian Central Bureau of Statistics (PCBS), 2007 the governorate has a population of 59,570 inhabitants most of whom work in agriculture and trade. Economic activity depends on agriculture, where olives, almonds, figs, grapes, and apples are the main crops.

It has a hot climate, dry summers and rainy winters, and has the average maximum temperature 29 degrees Celsius, while the average minimum temperature amounts to 6 degrees Celsius. The average humidity in the region is 62% that may rise up to 67. Rainfall concentrates in winter and the average rainfall is 660 mm per year. In some years the rainfall can reach 1000 mm, as reported in 1981.

### **2.2 Methods**

A retrospective study of the epidemiology of positive CL in the Salfit primary health care center (SPHC) which provides medical care for 62000 person (the entire population of the Salfit district)

### **2.3 Data Collection**

Epidemiological data of positive CL for the years 2000 to 2010 were collected from the communicable disease reporting system at (SPHC). The data have been systematically collected and computerized since 2000 (all reports of CL were initiated by primary health care physicians (dermatologist) and/or laboratory technicians). The data included the demographic information (gender, sex, and age), and clinical manifestation and treatment. But data of suspected CL did not recorded at SPHC so it's not included in the study.

#### **2.3.1 Diagnosis method used**

According to the data recorded at SPHC the diagnosis methods used to confirm of CL parasite infection were clinical picture and microscopic examination. The data were recorded in the (SPHC) didn't include the species of *Leishmania* parasite or isolation for the parasite.

### 2.3.2 Data management and analysis

Data were entered in SPSS software 16 and analyzed using. Simple descriptive statistics, frequency, Mean, Median and percentage

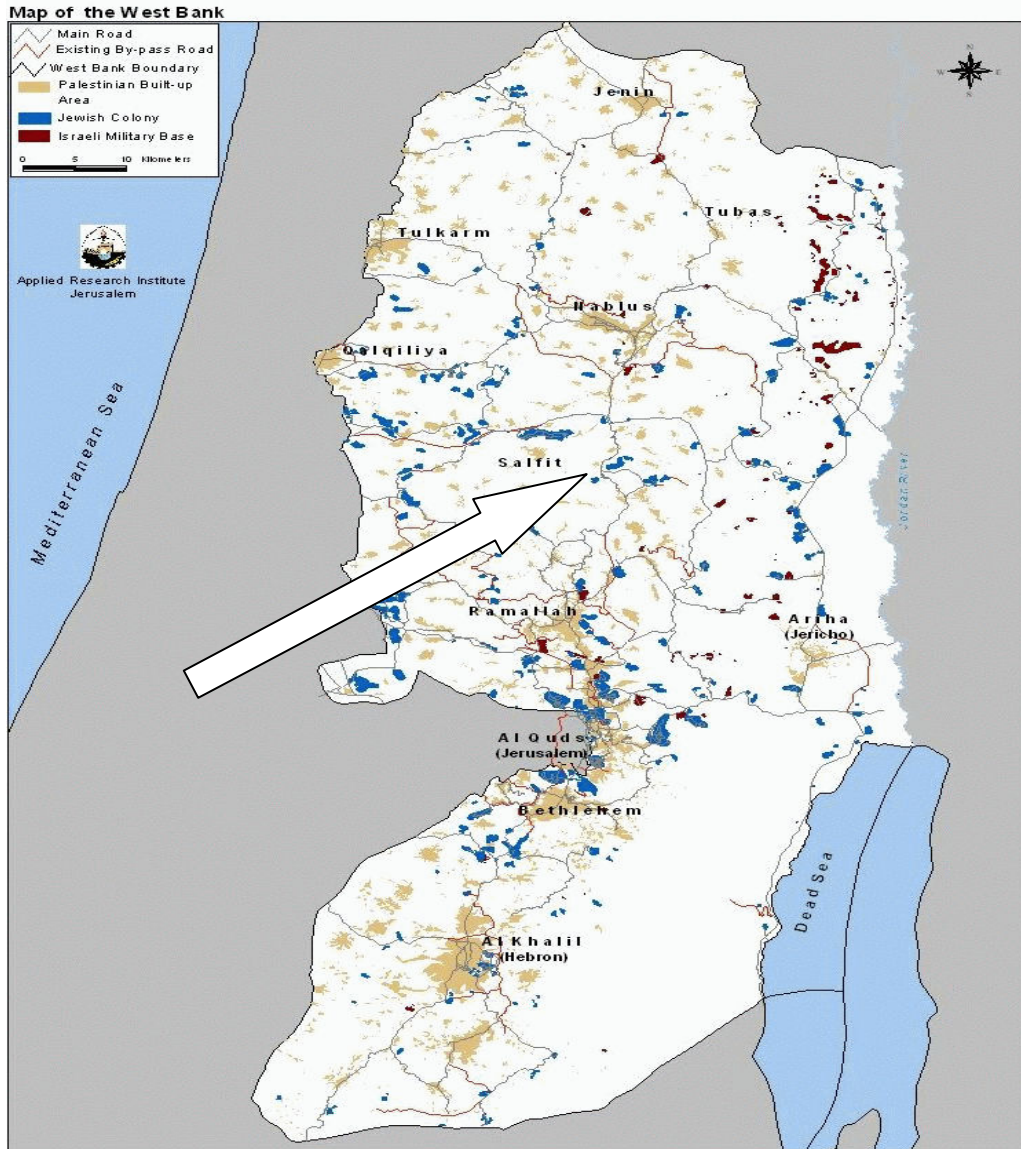


Figure 1. The location of Salfit district in the West Bank (Palestine Central Bureau of Statistics, 2007)

### **3. RESULTS**

#### **3.1 Number of Cases, Geographical Location and Seasonal Distribution in Salfit District**

The results show that 50 cases of CL were reported at (SPHC), the number of CL cases and incidence of disease markedly increased during the period of 2001 to 2010 (4 cases between 2001-2004, to 11 cases between 2005-2007, to 35 cases between 2008-2010 and from 0.2 in 2001 to 3.2 in 2009 and 2.5 per 10000 person in 2010) respectively (table1). The disease distributed in 13 localities and the highest number of cases were in Der ballut locality (12,(24%) cases, as shown in table 2. According to history reports for each cases recorded by SPHC, first time of signs and symptoms appearance, first time for cases seeking medical care and incubation period of parasite in patients, results show that the monthly distribution of cases notification frequency indicates that the main infection period took place during March as shown in figure 2.

#### **3.2 Gender and Age Distribution of the CL in Salfit District from 2001 to 2010**

The results show that the disease affected both sex (23 males/ 27 females) in the endemic localities and affected the women in Der ballut locality more than other localities (table 2). Patients' age ranged from one year to 70 year the median age was 21 years and the mean was 26 years. The result shows that CL infected all age groups, the number was high with more prevalence in the groups 6-21(36%) (table 3).

#### **3.3 Clinical Presentations of CL Cases in Salfit District from 2001 to 2010**

All data was recorded in the medical reports at (SPHC), after the patients were presented to dermatologist. Data about the number and site of lesions from medical reports were available for 43 patients and missing data were 7 patients.

Upper limbs lesions were the most common 48% and facial lesions were 39% (table 4). The result show that the upper limbs lesions within females were more prevalence 32.2% (table 4). The single lesions and nodules per patient were very common in patients 60.5% , 54% respectively as shown in (tables 5, 6).

#### **3.4 Treatment of CL Cases in Salfit Primary Health Care Center for the Period 2001 to 2010**

50 patients of positive CL received their treatment at Salfit Primary Health care center and they all received pentostam (sodium stibugluconate 10-20mg/Kg/day Glaxo SmithKline manufactory) intramuscular. The treatment was a daily single course of intramuscular sodium stibugluconate for 20 days, the results show that 56% from the CL cases were cured from the disease within 20 days (table 7).

**Table 1. Shows the total annual number and the incidence of CL cases reported in Salfit district from 2001 to 2010**

Year of infection	Number of cases	%	Incidence of CL/y/10000
2010	13	26.0	2.5
2009	17	34.0	3.2
2008	5	10.0	0.1
2007	2	4.0	0.4
2006	5	10.0	0.1
2005	4	8.0	0.8
2004	1	2.0	0.2
2003	2	4.0	0.4
2002	0	0	0
2001	1	2.0	0.2
Total	50	100.0	

*the average number of population in Salfit District was 52542;  
zero refer to no cases of CL leishmaniasis were recorded in SPHC*

**Table 2. Distribution of CL cases according to sex (male/female) in different localities of Salfit district from 2001 to 2010**

Sex	Locality													Total
	Der ballut	Rafat	Krawa	Zawia	Salfit	Sarta	Farkha	Kafr aldeek	Brokeen	Mas-ha	Bedia	Marda	Keera	
Male	3	4	0	3	2	3	1	2	0	1	2	1	1	23
Female	9	3	1	3	2	0	0	5	4	0	0	0	0	27
Total	12	7	1	6	4	3	1	7	4	1	2	1	1	50
%	24	14	2	12	8	6	2	14	8	2	4	2	2	100

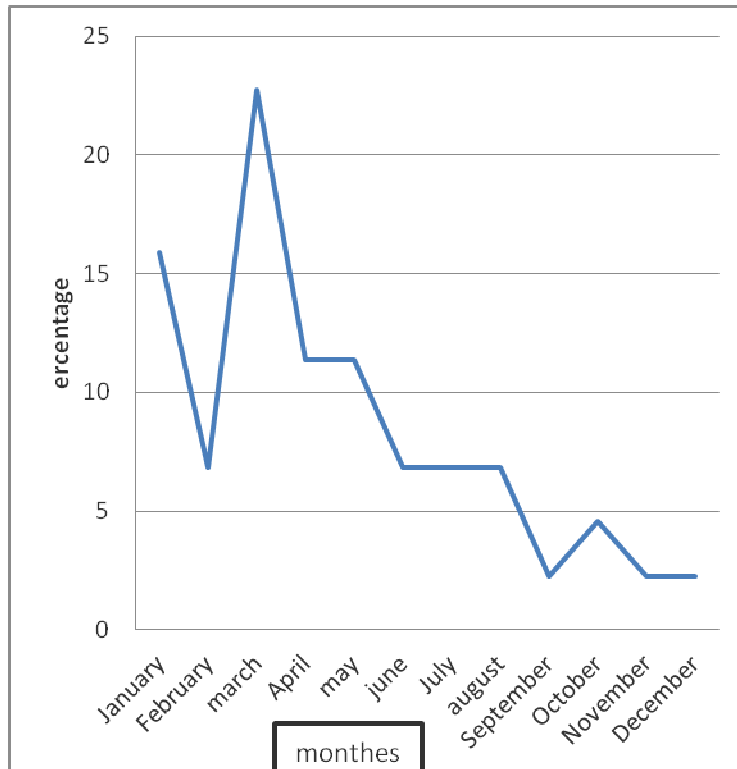


Figure 2. The percentage of CL cases month- by – month in Salfit district from 2001 to 2010

Table 3. Distribution of CL cases according to different age group (2001-2010) and rate per 10,000

Age group	Number of cases	Percent
1-5	8	16.0
6-21	18	36.0
22-32	8	16.0
33-43	6	12.0
More than 43	10	20.0
Total	50	100.0

Table 4. Site and number of CL infection in both sexes (males/ females) in Salfit district from 2001-2010

Site of lesions	No. of patients	%	Males	%	Females	%
Face	17	39.5	8	18.6	9	20.9
Upper limbs	21	48.8	8	18.6	13	30.2
Face and upper limbs	4	9.3	1	2.3	3	7
Others	1	2.3	1	2.3	0	0

Others ( lower limbs, Trunk, Buttocks).

**Table 5. The number of lesions per patients cases in Salfit district from 2001 to 2010**

Number of lesions	Number of patients	Valid percent %
Single	26	60.5
Multiple	17	39.5

**Table 6. The clinical presentation CL infection for positive cases in Salfit district from 2001 to 2010**

Clinical presentation	Frequency	%
Ulcers	15	30.0
Nodules	27	54.
NA	8	16

NA : data not recorded in the medical reports at (SPHC).

**Table 7. Duration of treatment of CL infection in Salfit district from 2001 to 2010**

Days	Frequency	%
1-20	28	56.0
More than 20	12	24.0
NA	10	20.0

NA: data didn't recorded in the medical reports at (SPHC)

#### 4. DISCUSSION

Cutaneous Leishmaniasis is endemic in the West Bank and becomes more common in several areas throughout the West Bank, it becomes an important public health problem (Arda, 1983; Baneth et al., 1998; Sawalha, 2001). The creation of new CL foci is enhanced by the increasing of mans activities, agriculture and irrigation, which help greatly in creating favorable conditions for both reservoir host and sand fly vector (Greenblatt et al., 1985).

CL has been poorly studied in all districts of the West Bank especially in Salfit district, since 2001 until 2010 there has been no studies that discussed the epidemiology of disease, the vector, the reservoir and *leishmania parasites*. This study was conducted to evaluate the epidemiology of CL in Salfit district in addition to the clinical spectrum of the disease which was evaluated.

The study shows that the incidence of CL has increased during the last two years ( table 1) the reason for such an increase may be related to early detection, awareness and environmental changes, similar finding were reported that the incidence of CL increased in the last ten years (WHO, 2000; Sawalha, 2001; Vinitsky et al., 2010).

Several reasons may be contributed to the increase the CL disease in Salfit district some of them are: its considered agricultural area, more buildings were constructed in peripheral area, the construction of Israelian separation wall which changed the environment around the localities especially in Der ballut locality. These factors led to make the environment more favorable for suspected sand fly vector as *P. sergenti* and *P. papatasi* and for the presence of possible reservoir of *Leishmania parasites*, as wild animal (dogs, rats and rock hyrax) which found close to residential homes and increase the possibility of infection. On reviewing the medical reports of CL patients, the results show that most of CL cases live in



peripheral area in the endemic villages and near irrigation areas, also the medical reports show that the most common animal found near CL cases are dogs, rats and rock hyraxes. These possible factors agreed with different studies in other districts and neighboring countries (Sawalha, 2001, 2000; Al-Jawabreh et al., 2004; Charles et al., 2004; Chelbi et al., 2007; Maroli et al., 2009; Orshan et al., 2010), which found that *P. sergenti* and *P. papatasi* were the suspected vectors in endemic area and environmental changing increase the possibility of infection and wild animal (dogs, rats and rock hyrax) were the possible and main reservoirs of *Leishmania parasite*.

The results show that CL affected both sex (Males, Females) and distributed in thirteen locality in the Salfit district, this data confirmed by other studies done in other districts in West Bank and in neighboring countries (Blum, 1978; Sawalha, 2001; Al-Jawabreh et al., 2004; Vinitsky et al., 2010), which reported that CL affected both sex and spread to other localities in the West Bank with different percentages. This study shows that the higher percentage was in Der ballut locality (24%) (table 2), The higher percentage of CL among females in Der ballut locality might have cultural and social background, its agricultural area planting annual crops during the year especially the summer plants. And most women work in farming activities, they start the farming work before sunrise and stay at work until sunset; this time increased the exposure to sand fly vector which starts its activity at this period, but the other localities are planted with olive trees and the time of harvesting the fruits start in the middle of October until November, meanwhile in this time the sand fly vector is not active, also little annual plants found and few women work in agriculture. For these possible reasons the possibility of infection with CL is lower than Der ballut locality. Similar findings were reported that the CL were more prevalence in agricultural area (Sawalha, 2001; Grotto et al., 2003; Vinitsky et al., 2010)

Results show the majority of cases were tending to appear over the year and reach its peak from January to May. These results are in agreement with other studies in near districts and neighboring countries (Oumish et al., 1982; Arada and Kamal, 1989; Sawalha, 2001).

The data shows that all age groups are susceptible to infection with CL with more frequently in groups 6-21 years old (36%) that's may be due to that this age group are more extensive activity and mobility in the foci of CL at the time of active vector. Same results reported by other studies (Khoury et al., 1996; Sawalha, 2001; Al-Tawfiq and AbuKhamsin, 2004).

The seasonal pattern of the disease correlates with the known activity of the vector (Al-Taqi and Behbehani, 1980; Al-Gindan et al., 1984). But in Salfit district no data available about the seasonality of vector and its activity.

The lesions were mostly in the exposed parts of the body, face and with more prevalence in upper limbs 48.8%. This may be due to clothing and covering during sleeping habits at night or because of their work especially in Der ballut locality which started the agricultural activity during the activity of sand fly vector. Same results confirmed that most of cases infected in upper limbs and face especially in agricultural area (Khoury et al., 1996; Kubeyinje et al., 1997; Sawalha, 2001; Al-Jawabreh et al., 2004).

In this study, most patients with CL had single lesions and nodules 60.5% and 54% respectively these results founded may be due to the immunity of infected cases or because of *Leishmania species parasites* (Al-Gindan et al., 1984). Similar finding to previous reports (Al-Jawabreh et al., 2003; Al-Taqi and Behbehani, 1980; Maroli et al., 2009), which have indicated that most patients had single and nodules lesions.

Treatment of CL may include heat, cryotherapy, surgical excision and chemotherapy with antimonial compound (Al-Banese et al., 1989; Al-Fouzan et al., 1991). In Salfit district 100% of CL received the standard treatment for CL with pentostam (sodium stibogluconate 10-20mg/Kg/day GlaxoSmithKline manufactory).

## 5. CONCLUSION

Salfit district is endemic with CL and the incidence of the disease has been increased as it also affects all ages and both sex with more prevalence in females especially in Der Ballut locality. The disease lesions were more as a single lesion with nodules and located in the upper limbs and in the face.

More studies are needed to understand the epidemiology of disease in Salfit district, the species of *leishmania* parasite and the identification of the possible vectors for *leishmania* parasite and possible reservoirs.

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## COMPETING INTERESTS

Author has declared that no competing interests exist.

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