



## Revisiting leishmaniasis in the time of war: the Syrian conflict and the Lebanese outbreak



Ali Alawieh<sup>a,b</sup>, Umayya Musharrafieh<sup>b,c</sup>, Amani Jaber<sup>d</sup>, Atika Berry<sup>e</sup>, Nada Ghosn<sup>f</sup>, Abdul Rahman Bizri<sup>b,\*</sup>

<sup>a</sup> Department of Neurosciences, Medical University of South Carolina, Charleston, South Carolina, USA

<sup>b</sup> Division of Infectious Diseases, Department of Internal Medicine, American University of Beirut Medical Center, Beirut, Lebanon

<sup>c</sup> Department of Family Medicine, American University of Beirut Medical Center, Beirut, Lebanon

<sup>d</sup> Faculty of Medicine, Lebanese American University, Jbeil, Lebanon

<sup>e</sup> Communicable Diseases Department, Ministry of Public Health, Beirut, Lebanon

<sup>f</sup> Epidemiological Surveillance Department, Ministry of Public Health, Beirut, Lebanon

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### SUMMARY

**Background:** Leishmaniasis is a neglected tropical disease, endemic in many worldwide foci including the Middle East. Several outbreaks have occurred in the Middle East over the past decades, mostly related to war-associated population migration. With the start of the Syrian war, the frequency and magnitude of these outbreaks increased alarmingly. We describe the epidemiology of Leishmania infection in Lebanon and the most recent outbreak relevant to the Syrian war.

**Methods:** We reviewed all leishmaniasis cases reported to the Epidemiological Surveillance Department at the Lebanese Ministry of Public Health between 2001 and the first quarter of 2014. The demographics and distribution of Syrian refugees in Lebanon were linked to reports of new Leishmania cases.

**Results:** In total, 1033 new cases of leishmaniasis were reported in 2013 compared to a previous annual number in the range of 0–6 cases. The majority of cases reported in 2013 involved Syrian refugees and their relevant areas of concentration.

**Conclusions:** This new outbreak of leishmaniasis in Lebanon is the first of its kind for more than a decade. The sudden increase in Leishmania cases in Lebanon in 2013 is attributed to the increasing numbers and wide distribution of Syrian refugees in Lebanon. This serves as an example of the risks associated with military conflicts and the ability of communicable diseases to cross borders.

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## 1. Introduction

Leishmaniasis is caused by the obligate intracellular parasites of *Leishmania* species and is transmitted by the female phlebotomine sandfly. Classified as a neglected tropical disease, leishmaniasis has focal areas of prevalence in tropical and subtropical regions and the Mediterranean Basin.<sup>1</sup> Depending on the endemic species of *Leishmania*, human and/or animal reservoirs maintain the propagation of the parasite. Some species like *Leishmania tropica* are anthroponotic, having solely human hosts. Other species like *Leishmania major* are zoonotic, exhibiting animal reservoirs.<sup>2</sup>

The clinical manifestations of leishmaniasis tend to occur months after exposure and can be one of three presentations

depending on host and parasite characteristics.<sup>1</sup> Cutaneous leishmaniasis (CL) is characterized merely by skin manifestations including papules and nodules that may ulcerate. Although these skin lesions tend to heal spontaneously, they may result in disfiguring and stigmatizing scars with a considerable impact on quality of life. Mucocutaneous leishmaniasis (ML) is a consequence of an untreated cutaneous infection that spreads into adjacent mucosal surfaces, and these tend not to heal spontaneously. The most severe and potentially fatal form is visceral leishmaniasis (VL), which affects internal organs including the bone marrow, liver, and spleen, and may exhibit a latent form reviving during states of immunodeficiency.<sup>1,3,4</sup>

No vaccine is available for *Leishmania* and the only preventative method is to limit exposure to the vector through vector control, insect repellents, insecticide-impregnated bed nets, and other modalities. The traditional approach to the treatment of leishmaniasis includes amphotericin B or its lipid formulations for visceral

\* Corresponding author. Tel.: +961 1 375375.

E-mail addresses: [ab00@aub.edu.lb](mailto:ab00@aub.edu.lb), [ama114@aub.edu.lb](mailto:ama114@aub.edu.lb) (A.R. Bizri).

forms, and sodium stibogluconate for cutaneous forms; however, several other treatment modalities have been proposed.<sup>4,5</sup>

According to the World Health Organization (WHO), around two million cases of Leishmania are reported annually from 88 countries.<sup>6</sup> This figure is believed to be an underestimate of the true numbers by five to eight times, since reporting of the disease is obligatory in only 32 of the 88 endemic countries.<sup>6,7</sup> Over the past decade, the global burden of Leishmania has nearly reduced by half,<sup>8</sup> but its incidence is still on the rise in several regions, mainly the Middle East and South America.<sup>9</sup>

Leishmania is the most important protozoan infection in the Middle East and North Africa (MENA) region,<sup>10,11</sup> where several risk factors contribute to an increased frequency of infection. The most significant are those associated with wars and population clustering and relocation, resulting in the exposure of unimmunized individuals to the parasite.<sup>6</sup> Among the different countries of the MENA region, Syria is known to have the highest prevalence of CL,<sup>10</sup> which is often referred to in the area as 'Aleppo boil' after Aleppo, the Syrian city. Recently, owing to different war-related factors, new outbreaks have been reported by the mass media from different areas bordering Syria, including Turkey and Iraq.<sup>11,12</sup> Leishmaniasis is a mandatory reportable disease in Lebanon, and the Lebanese Ministry of Public Health (LMOPH) has implemented active surveillance for leishmaniasis since the beginning of the Syrian conflict.<sup>13</sup>

In this study, we evaluated the current leishmaniasis situation in Lebanon in light of the increasing numbers of Syrian refugees in the country, the fact that Lebanon has adopted an open border policy with Syria allowing the free flow of refugees, and the decrease in United Nations (UN) allocated resources coupled with the limited assets available to the Lebanese government to control the situation.<sup>14</sup> We also revisited the association between war and Leishmania, and the main challenges faced in the control of this infection in Lebanon are discussed herein.

## 2. Methods

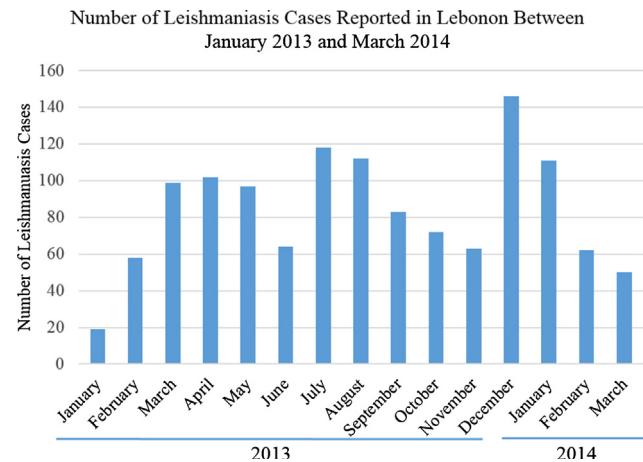
Records from the Epidemiological Surveillance Department, Lebanese Ministry of Public Health (ESDMOH) were reviewed for cases of leishmaniasis in Lebanon reported between January 2001 and March 2014. All cases reported were reviewed in terms of area of residence, age and gender, clinical presentation, treatment, and outcome. As per the LMOPH recommendations, all cases were diagnosed by the traditional diagnostic techniques of smear, parasite culture, and histological analysis of skin biopsies obtained by qualified physicians assigned to various districts. A case is classified as 'probable' if the person is showing only clinical signs without parasitological confirmation, or as 'confirmed' after punch biopsy and parasitological confirmation by a positive smear or culture.<sup>15</sup>

Cases affecting Lebanese nationals were also distinguished from those of Syrian refugees, and the locations of Syrian refugee tented settlements were reviewed in terms of their distribution across various Lebanese districts. The number of Syrian refugees and their distribution all over Lebanon was obtained from the United Nations Refugee Agency (UNHCR).<sup>16</sup>

Cases obtained from ESDMOH records were used to draw an epidemiological map eliciting the distribution of new leishmaniasis cases across various Lebanese districts, along with the locations of concentrations of Syrian refugees.

## 3. Results

Over the 12 years of 2000–2012, an annual number ranging between 0 and 6 cases of Leishmania infection were reported to the ESDMOH. In 2013, 1033 cases of Leishmania were reported; 998 cases



**Figure 1.** Reported cases of Leishmania in Lebanon per month from January 2013 through March 2014. The graph shows that cases have continued to occur in 2014 at a high rate relative to the previous years (2001–2012); however, the number of cases has started to decrease since a peak in December 2013.

(96.6%) were identified among Syrian refugees and the remaining cases (3.4%) involved both Lebanese nationals and Palestinian refugees. An additional 217 cases were reported this year (January through March 2014), of which 208 involved Syrian refugees. As illustrated in Figure 1, the distribution of leishmaniasis cases per month showed a peak number in December 2013 (146 cases), with numbers appearing to decrease thereafter (January through March 2014). Only two nonfatal cases of VL were reported and the remaining cases were of the cutaneous form. All cases reported to the ESDMOH were confirmed by biopsy and parasitological examination (smear and/or culture). The two VL cases were treated successfully with liposomal amphotericin B, while cases of CL were treated with intralesional or systemic meglumine antimonate (Glucantime), both provided free of charge by the LMOPH.

Children and adolescents (less than 20 years of age) were the most affected age group. Table 1 shows the age distribution of leishmaniasis cases reported. Less than 10% of cases occurred in people over 40 years of age. Of note, the distribution of the Syrian refugee population across the different age groups was not skewed towards the younger age groups (Figure 2).

The cases were reported from several Lebanese districts, but Bekaa district had the highest percentage of cases (726 cases, 70.3%), as well as highest incidence among Syrian refugees (38 cases/100 000). Figure 3 shows two epidemiological maps representing the distribution of Leishmania infection among the

**Table 1**

Distribution of Leishmania cases reported to the Lebanese Ministry of Public Health, by age group and gender (modified from <http://www.moph.gov.lb>).

	Number of cases	Percentage
Age group, years		
0–4	239	24%
5–9	245	25%
10–19	210	21%
20–39	189	19%
40–59	62	6%
60+	18	2%
Unknown	34	3%
Gender		
Male	505	48.9%
Female	527	51%
Unknown	1	0.1%
Nationality		
Syrian	998	96.6%
Others	35	3.4%
Total	1033	100%

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