Original Article

Prevalence Of Cutaneous Leishmaniasis In Muzaffargarh, Punjab, Pakistan

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Abstract

Leishmaniasis is a the third most prevalent vector borne disease. The current study showed the prevalence of this disease according to gender, age, body parts and number of lesions. This study also reveals the major cause and symptoms of leishmaniasis *in* Muzaffargarh, Punjab. This was the first study to observe the leishmaniasis patients in the district Muzaffargarh of Punjab, Pakistan; also, might helpful in studying disease in other parts of Pakistan. Parasitic disease, leishmaniasis is caused by an obligate intercellular parasite belonging to genus *Leishmania*. The study was conducted from January to August 2021 to determine the prevalence of leishmaniasis in Muzaffargarh, Punjab. A total 141 reports were studied. Infected people with cutaneous leishmaniasis were 41 (87%). Highest prevalence was observed in July (n=10, 24%). The highest affected age was more than 16 years, of 21 (45%) individuals. There were 18 (44%) individuals having cutaneous lesions on their hands, arms, ear, legs and feet, while 23 (56%) individuals were having cutaneous lesions on their face. Male to female ratio was 3:4, respectively. Patients were treated with intralesional injections of sodium stibogluconate. Analysis revealed that it is more prevalent in female as compared to male; moreover, adults were more frequently affected than children.

Keywords: *Leishmaniasis,* protozoan parasite, syndromes, lesions,

INTRODUCTION

Leishmaniasis disease is caused by an obligate intercellular parasite *Leishmania* genus. In the whole world after malaria and filariasis, leishmaniasis is regarded as the third-most-prevalent vector borne disease (Pourahonad *et al*., 2009; De Vries and Schallig, 2022). Except Antarctica and Australia, leishmaniasis is found in every continent of the world. Leishmaniasis is carried by the sand fly; affecting the health of human (in more than 90 countries) in tropics, subtropics, and Mediterranean Europe (Desjeux, 2000; Kayani et al., 2021). It is mostly reported from rural regions as compared to urban localities. Leishmaniasis is mostly found in adult males (Terefe *et al*., 2015). Bite of infected female phlebotomine sandflies, which feed on blood to produce eggs, transmits the *leishmania* parasite. The parasite and sandfly species, the local ecological features of the transmission sites, the human population's past and present exposure to the parasite, and human behaviour all have an impact on leishmaniasis epidemiology. *Leishmania* parasites have been discovered in the natural habitats of approximately 70 animal species, including humans (Kayani et al., 2021).

Leishmaniasis can be classified into three types depending upon the clinical conditions developed in man: cutaneous leishmaniasis *(*CL) is characterized by soreness at the bite side and usually takes months to year in healing. Visceral leishmaniasis (VL) which affects the organs like spleen, liver and bone marrow if untreated it may be fatal depending upon the severity. Muco-cutaneous leishmaniasis (MCL) appears with sores on skin, responsible for causing tissue damage mainly to lips, nose, and ears. Diffuse CL (DCL) bear a resemblance to leprosy and is often untreatable (Akhoundi et al., 2016; De Vries and Schallig, 2022). More than 20 species of *leishmania* are responsible for causing leishmaniasis (Seaman, Mercer, Sondorp, & Herwaldt, 1996). In Pakistan, anthroponotic CL is caused by *Leishmania tropica* (*L.tropica*) whereas *Leishmania* major (*L. major*) causes zoonotic cutaneous leishmaniasis (Postigo, 2010). *L. tropica* is widely studied at urban areas whereas in the rural areas of the country, *L. major* is more common (Firdous *et al*., 2009).

The common form of leishmaniasis, the cutaneous leishmaniasis (Herwaldt, 1999) caused by *L. major* is an important health concern mostly in the Mediterranean and Middle-East countries (Shehata *et al.,* 2009; Postigo, 2010). It was first identified in the 9th century (Balakh Sore and Hepburn, 2003). It is a well-documented disease in Egypt (Hamadto *et al*., 2010). About 90% of the cases of cutaneous leishmaniasis are reported from Iran, Iraq, Algeria, Saudi Arabia, Afghanistan, Peru and Brazil (Desjeux, 2004; Khan et al., 2016). In Pakistan, co-existence of both anthroponotic (ACL) and zoonotic (ZCL) forms of CL are reported from all provinces with the incidence rate of 21,000–35,000 (Alvar et al., 2012). Mostly cases are reported from urban regions of Baluchistan, Punjab, Azad Jammu Kashmir (AJK) and Khyber Pakhtunkhwa (KP), but the endemic severity is high in FATA (Federally Administrated Tribal Areas), also known as the

tribal belt of Pakistan (Alvar et al., 2012). The epidemiology of leishmania is changing with the revelation of the diseases in different parts of the world. The main reasons of variations in the epidemic situations are migration of peoples and man-made environment (Kolaczinki *et al*., 2004; De Vries and Schallig, 2022).

MATERIALS AND METHODS

Study design

A cross-sectional descriptive study was directed at DHQ Hospital, Muzaffargarh, Punjab. A total of 141 patients with clinically suspected cutaneous leishmaniasis visiting the hospital from January to August 2021 were scrutinized in the study. Clinical characteristics comprising gender, age, occupation, tribe, month of disease onset, site and number of the lesions, were recorded. Microsoft Excel 2016 was used to manage and analyze the data (Microsoft, Redmond, WA, USA). *Leishmania amastigotes* were identified by Giemsa staining (Organization, 1991). The current study was totally based on prepared slides that were collected from DHQ Hospital Muzaffargarh, Punjab.

RESULTS

A descriptive cross-sectional study was conducted in Muzaffargarh, Punjab for studying the prevalence of *cutaneous Leishmaniasis*. During this study, 141 patients with cutaneous leishmaniasis were referred to DHQ Hospital. Of these, people infected with CL were 123 (87%) and the rest 18 (13%) were negative (Table 1, Figure 1) having no parasite of *Leishmania* in Giemsa-stained slides (Figure 2). Moreover, out of the total number of patients, 60 (43%) and 81 cases (57%) were male and female, respectively. The infected males were 54 (44%) and the infected females were 69 (56%) showing male to female ratio as 3:4, respectively (Table 2, Figure 3).

The age of the 33 (23%) patients infected with Cutaneous Leishmaniasis were less than 5 years, 45 (32%) patients were school aged children within the range of 6-15 years; while 63 (45%) were adults of the age above16 years (Table 3 /Figure 4). Highest disease prevalence was observed in the month of July (n=30, 24%), followed by May (n=21, 17%), February (n=18, 15%) and August (n=15, 12%). The least disease prevalence was observed in the month of June (n=6, 5%), followed by January (n=9, 7%), March and April (n=12, 10%) (Table 4, Figure 5).

Based on lesion place on the body, most patients have lesions of cutaneous leishmaniasis on exposed parts of the body. There were 54 (44%) individuals having cutaneous lesions on their hands, arms, ear, legs and feet, while 69 (56%) individuals were having cutaneous lesions on their face (Table 5, Figure 6).

In terms of number of lesions, 102 (83%) had one or two lesions while 21 (17%) cases had multiple lesions on their body (Table 6, Figure 7).

Table 1: Cutaneous Leishmaniasis prevalence and its different regions (n=141).

Category	Number	Percentage (%)
No. of positive cases	123	87
No. of negative cases	18	13

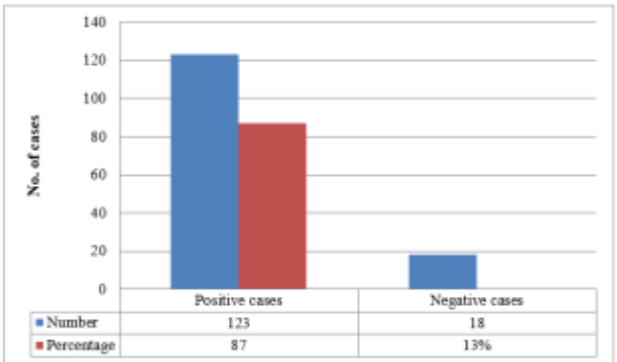

Figure 1: Prevalence of Cutaneous Leishmaniasis in Muzaffargarh, Punjab.

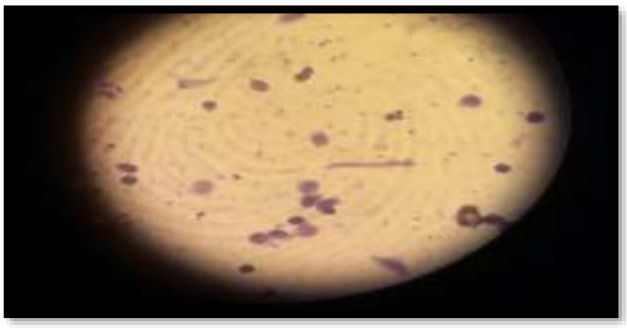

Figure 2: Amastigotes observed in Giemsa-stained smear of patients.

Table 2: Frequency distribution of CL cases by gender.

Gender	Total cases	No. of infected cases
Male	60 (43%)	54 (44%)
Female	81 (57%)	69 (56%)

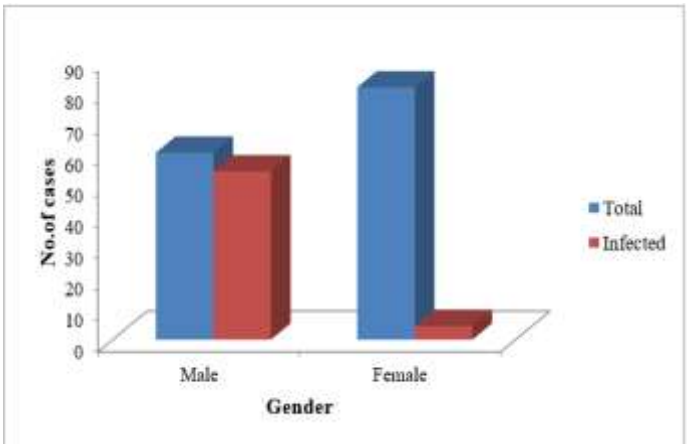

Figure 3: Gender wise Prevalence of Cutaneous Leishmaniasis in Muzaffargarh, Punjab.

Table 3: Frequency distribution of Cutaneous Leishmaniasis by age groups (years) in Muzaffargarh, Punjab (n=141)

Age group (years)	No. of cases	Percentage (%)
≤5	33	23
6-15	45	32
≥16	63	45

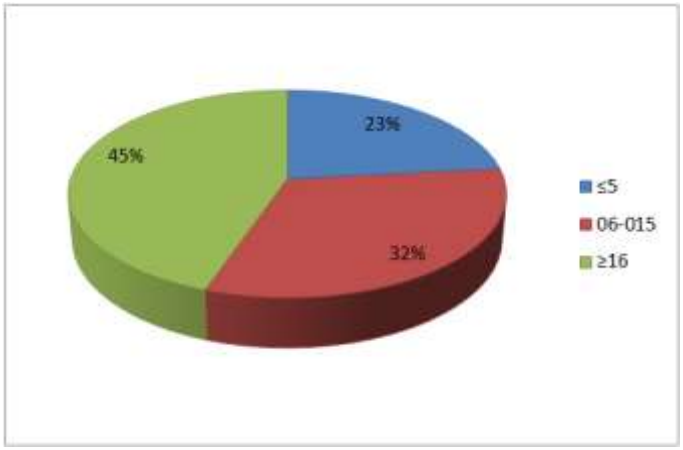

Figure 4: Age-wise prevalence of Cutaneous Leishmaniasis in Muzaffargarh, Punjab.

Table 4: Frequency distribution of Cutaneous Leishmaniasis cases by months in Muzaffargarh, Punjab

Months	No. of cases	Percentage (%)
January	9	7
February	18	15
March	12	10
April	12	10
May	21	17
June	06	5
July	30	24
August	15	12

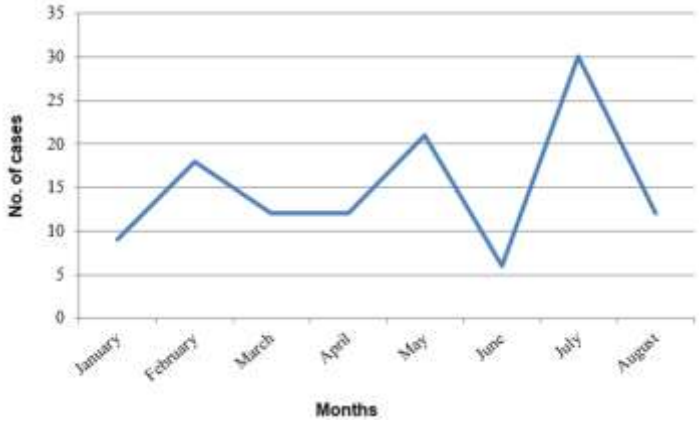

Figure 5: Month-wise prevalence of Cutaneous Leishmaniasis.

Table 5: Frequency distribution of cutaneous lesions on different body parts.

Lesion site	No. of cases	Percentage (%)
Face	69	56
Other body parts	54	44

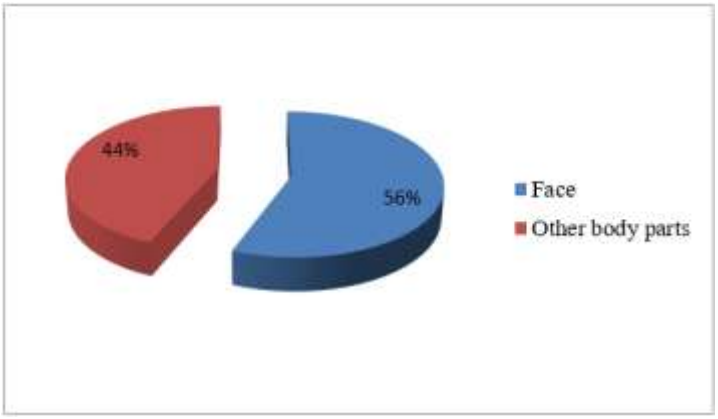

Figure 6: Lesions on different body parts

Table 6: Frequency distribution of number of lesions on the body.

No. of lesion	No. of cases	Percentage (%)
Two lesions	102	83
>2	21	17

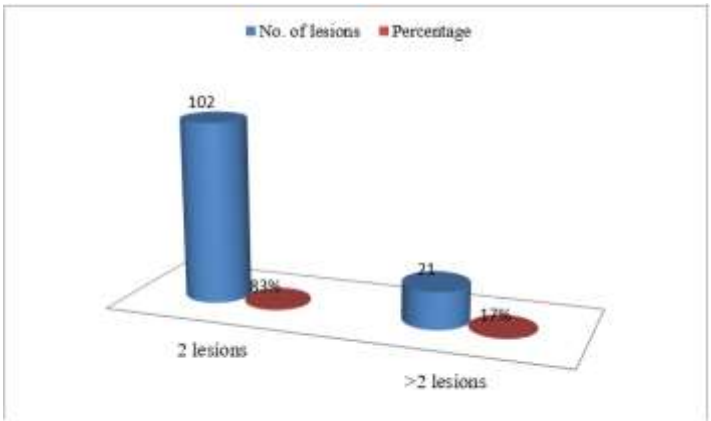

Figure 7: Numbers of lesions on infected individuals.

DISCUSSION

Leishmaniasis is not only a single entity but it is consisting of a variety of syndromes. Different population is being affected by Leishmaniasis and it is primarily related to different vectors and animal reservoirs. There are different types of *Leishmania* parasites, which are endemic in 88 countries in different parts of the world. Moreover, it is mostly found in the developing countries almost everywhere, except Australia and Antarctica (Kayani et al., 2021). According to an

estimate by WHO, the leishmaniasis frequency is high globally. It is assessed by WHO that around 4, 00,000 cases of leishmaniasis is reported yearly and nearly 400 million people are at risk of acquiring the disease. The disease is transmitted by the fly bite (of the genera *Lutzomya* and *Phlebotomus*) from one individual to another (Ullah, Jan, Wazir, & Ali, 2009).

The main spreading parasite of Anthroponotic Cutaneous Leishmaniasis in Asia is *Leishmania tropica (*sand fly). CL, the common type of disease is transmitted by the bite of sand fly and appears as a sore on the bite site. The bite site of the skin is break out and lasts from weeks to months (Manan and Nadeem., 1979; Kayani et al., 2021).

Youssefi et al. (2011) carried out a study in which he says that the disease is more prevalent in male as compared to females. However, in our study, the disease is more prevalent in female (56%) than male (44%). The reason for increase prevalence in female is due to the economic activities of female (Kayani et al., 2021).

The age group with the highest prevalence of CL was 6-15 years. Numerous studies reported that the highly infected age groups with Cutaneous Leishmaniasis are ≤20. One reason is that the immunity against *Leishmania parasite* in adults is more than that in children because of the past exposure to the parasite (Sharma et al., 2005; De Vries and Schallig, 2022).

Cutaneous leishmaniasis is prevalent in different months of the year and that the highest rate was seen in January (Kassiri, Lotfi, Farajifard, & Kassiri, 2014). However, in the present study, the highest prevalence (24%) was observed in the month of July. The reason for this fact was related to the activity of the sand flies (Kassiri et al., 2014).

In the present study, in 69 (56%) patients the most commonly affected area of the body was face, and in about 54 (44%) patients affected the upper limb. The result of our study is consistent with some other studies that were about the affected areas of face and upper limbs. The reason for more lesions on face is because face is more frequently exposed to the bite of sand fly, it might be attributed to the fact that face is more sensitive to any type of stimuli as compared to other body parts; therefore, the bite of sand flies can be easily detected by the host and may showed positive response (Youssefi et al., 2011; De Vries and Schallig, 2022).

Kassiri et al. (2012) conducted a study in Iran in the province Ilam, showed that most of the patients had one or two lesions on their body. The present study showed that about 102 (83%) patients had two lesions at the same time on the body; however, few numbers 21 (17%) patients showed the presence of lesions exceeding the limit of two. The reason for the multiple lesions on patient's body is because of different feeding behavior of sand flies (Kassiri et al., 2012; Kayani et al., 2021).

Smear preparation for Leishman-Donovan (LD) bodies is the only way to verify the occurrence of diseases. Patients with unusual lesions with negative smear were sent to tertiary referral centers for diagnosis and treatment (Kayani et al., 2021). *Cutaneous Leishmaniasis* unusual variants have been recorded from other endemic regions. Due to inadequate facilities and absence of qualified staff, the infection is over-diagnosed and many skin diseases are falsely treated as leishmaniasis (De Vries and Schallig, 2022).

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