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Prevalence of Leishmaniasis in Patients Visiting Lady Reading Hospital Peshawar

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Abstract

Introduction Leishmaniasis is a neglected tropical disease caused by protozoan parasites of the genus Leishmania. This genus comprises 32 unicellular species infecting various vertebrate hosts, transmitted via sand-fly bites from *Phlebotomus* and *Lutzomyia*. Leishmaniasis affects the skin, mucous membranes, and internal organs, manifesting as cutaneous, mucocutaneous, or visceral leishmaniasis. Approximately 350 million people across 98 countries are at risk, with an annual global prevalence of 0.2-0.4 million cases of visceral leishmaniasis and 0.7-1.2 million cases of cutaneous and mucocutaneous leishmaniasis. In Pakistan, both anthroponotic cutaneous leishmaniasis (ACL) and zoonotic cutaneous leishmaniasis (ZCL) are reported, with significant cases in urban centers and rural areas.

Methodology This study aimed to obtain baseline data for leishmaniasis in the Khyber Pakhtunkhwa province of Pakistan, conducted at Lady Reading Hospital, Peshawar. Data from 684 patients (475 males and 208 females) over one year were analysed using SPSS version 20.0. The chi-square test was applied to assess the association between infection rates and demographic variables.

Result Results indicated the highest infection rate (46.7%) in the age group 1-15 years, followed by 16-30 years (19.8%), 31-45 years

(9.4%), 46-60 years (6.1%), and above 60 years (3.3%). Gender-wise, males had a higher prevalence rate (69.3%) compared to females (30.7%). Positive cases were more prevalent in males (83.9%) than females (84.8%), although the association between infection and gender was statistically non-significant (p = 0.784).
Discussion The discussion highlights that younger individuals have a higher infection rate due to a less developed immune system. Cultural practices in the region, such as males sleeping outside without adequate protection, contribute to higher infection rates in males. Diagnostic techniques for cutaneous leishmaniasis include slit skin smears and skin biopsies, with slit skin smears offering a more convenient yet less accurate alternative. The findings are consistent with previous studies, emphasizing the need for confirmatory skin biopsies in cases of negative slit skin smears but with high clinical suspicion.

Introduction

Leishmaniasis is a neglected tropical disease. Its causative agent is a protozoan trypanosomatid parasite of the genus *Leishmania* (1,2).
Leishmania is a population of 32 unicellular species, obligatory parasite in a variety of vertebrate hosts that spread in the Old and New World through sand-fly bite by species *Phlebotomus* and *Lutzomyia* from host to host (11). In the host macrophages, parasites increase, affecting the skin (cutaneous), mucous layers (mucocutaneous), and body organs (visceral) (1,2). It arises clinically at the inoculation spot as a thin, well-marked papule, it can then progress into a nodule or plaque and ulcerate or wart (12,13).
In 98 countries on five continents, approximately 350 million population are at risk of leishmaniasis (3,4). Global estimated prevalence of Visceral Leishmaniasis (VL) has an average annual rate of 0.2-0.4 million cases along with 0.7–1.2 million cases of cutaneous leishmaniasis (CL) and mucocutaneous leishmaniasis (MCL). The global dispersal of cutaneous leishmaniasis (CL) is widespread in parts of Asia, Africa, the Mediterranean basin, and South America (5). Every year, between 226,200 and 416,400 cases of CL were reported in a region that included Central Asia and the Middle East.

In Pakistan, there are between 21,000–35,000 documented instances of zoonotic (ZCL) and anthroponotic (ACL) cutaneous leishmaniasis (CL) types (5). *Leishmania tropica* has been linked to ACL in the nation, and it appears that the condition is sporadic (6,7). Most reports come from the cities of Khyber Pakhtunkhwa (KP), Punjab, Baluchistan, Azad Jammu Kashmir (AJK), and the adjacent tribal zone known as Newly Merged Districts the Ex- Federally Administered Tribal Areas (Ex-FATA) (5,9).
Periodic outbreaks caused by Leishmania tropica in KP, the northwest region of Pakistan, are what set leishmaniasis apart (6,8). Further south, in rural and semi-urban parts of the provinces of Punjab, Baluchistan, and Sindh, is where the kind of ZCL associated with L. major infection is more common. Here, its transmission may be aided by reservoir populations in wild animals, particularly gerbils like *Rhombomys opimus* (9,10).
Leishmania spreads from August to September and March to April every year, and no baseline data is available for leishmaniasis. This study was organized to find out the prevalence of leishmaniasis.

Methodology

▪ Ethical statement

Ethical approval was obtained from the ethical committee of Lady Reading Hospital Peshawar.

▪ Study Area

This study was carried out in Lady Reading Hospital of Peshawar in Khyber Pakhtunkhwa province of Pakistan

▪ Data Collection

Data for one year from hospital Records was obtained. Total patients during this period were 684 of which 475 were male and 208 were female. The youngest patient was 1 year and the oldest was 87 years. 424 patient data with age and gender was known and 259 patient age was not found.

▪ **Statistical Analysis**

The chi-square test was applied using SPSS version 20.0. p-value of 0.5 was considered statistically significant.

Results

Association between Infection and Age

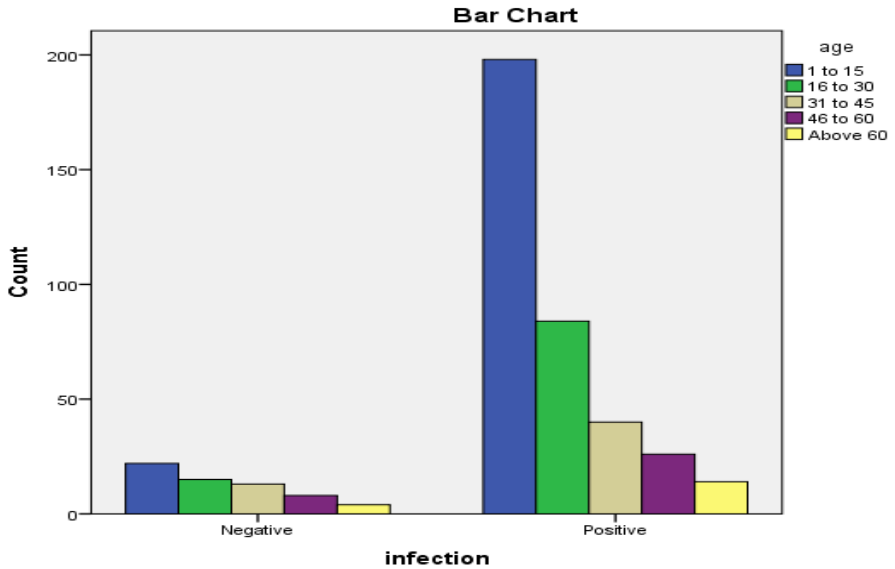
Statistics for positive cases of the infection are shown below. The age group of 1 to 15 accounted for the largest proportion of all reported cases, at 46.7%. The age group of 16 to 30 accounted for the second-highest percentage of all reported cases, at 19.8%, according to figures from other groups. 9.4% of the cases represented the third-highest percentage of all reported cases observed in the age group of 31 to 45, 6.1% of the cases represented the fourth-highest percentage of all reported cases observed in the age group of 46 to 60, and 3.3% of the cases represented the lowest percentage of all reported cases in the age group of over 60 (Table 1, Figure 1).

Table 1

Variable	Total n(%)	Positive n(%)	% of Total	Negative n(%)	% of Total	$\chi 2$	P value
Age (Years)						10.947	0.027
1 to 15	220(51.9%)	198 (90%)	46.7 %	22 (10 %)	5.2 %		
16 to 30	99(23.3%)	84 (84.8%)	19.8 %	15 (15.2 %)	3.5 %		
31 to 45	53(12.5%)	40 (75.5 %)	9.4 %	13 (24.5 %)	3.1 %		
46 to 60	34 (8.0%)	26 (76.5 %)	6.1 %	8 (23.5 %)	1.9 %		
Above 60	18 (4.2%)	14 (77.8 %)	3.3 %	4 (22.2 %)	0.9 %		
Total	424 (100%)	362(85.4 %)	85.4 %	62 (14.6 %)	14.6 %		

examining the ratio of negative cases 5.2% of all reported cases were negative in the age group 1 to 15, 3.5% of all reported cases were negative in the age group 16 to 30, 3.1% of all reported cases were negative in the age group 31 to 45, 1.9% of all reported cases were negative in the age group 46 to 60, and the lowest percentage was observed in the age group Over 60, where 0.9% of all reported cases were negative.

Figure.1



Association between Infection and Gender

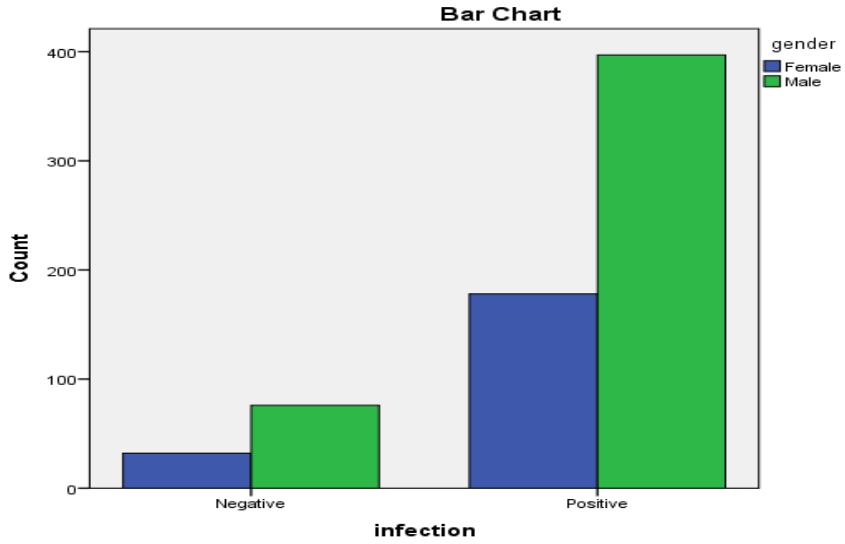
A total of 683 individuals from Lady Reading Hospital were included. Among them 473/683 (69.3 %) were male and 210/683 (30.7 %) were female. Gender wise prevalence rate was higher in males than females.

In these, 397/473 males were positive, accounting for 69.3% of all male cases reported, or 58.1% of all cases (male and female). In contrast, 76/473 males were negative, accounting for 16.1% of all male cases reported, or 11.1% of all cases (male and female). Among the 210 females, 178/210 were positive, accounting for 84.8% of all female cases reported, or 26.1% of all cases reported, and 32 were negative, accounting for 15.2% of all female cases reported, or 4.7% of all cases reported. P =.784 for this suggests that there is no statistical significance, meaning that there is no association between infection and gender (Table 2 Figure 2).

Table.2

Variable	Total n (%)	Positive (%)	% of Total	Negative n (%)	% of Total	X2	P value
Gender						.075	.784
Male	473 (69.3 %)	397 (83.9 %)	58.1%	76 (16.1 %)	11.1%		
Female	210 (30.7 %)	178 (84.8 %)	26.1%	32 (15.2 %)	4.7%		
Infection	683 (100 %)	575		108			

Figure.2



Discussion

In the present study, we find out that leishmania was more prevalent in younger age which is because they have poorly developed immune systems. Similar results are also recorded by (Marri et al) (14) (Bosan et al) (15), Ajdary,2000 (16), and (Enami et al., 2009) (17)

The infection ratio of males was higher than that of females in the present study which is similar to the results observed by Sana-Ullah (18) Nisar (19) and Marri et al (14). The high ratio in males was due to the cultural habits of the area because females use well-covered dresses and hijabs, which reduces the chances of sand-fly bite, In addition, women stay at home most of the time, especially in the evening time, which is the most suitable time of sand-fly activity as observed by Al-Jawabreh et al (20) Male usually sleeps outside without wearing shirts this may be the cause of high prevalence in males. Similar results i.e. higher infection in males is also reported by (Enami et al., 2009) (17).

Cutaneous Leishmaniasis is the predominant manifestation of Leishmaniasis [21]. The diagnosis of this condition relies on the clinical presentation and the patient's history of visiting locations where the disease is

common. However, confirmation is obtained by demonstrating the presence of leishmania tropica bodies in the sores [21,22]. This can be accomplished by a variety of techniques, such as slit skin smears, saline aspirate smears, scalpel scraping using a dental broch, fine-needle aspiration, impression smears of skin biopsy materials, and skin biopsy [22].

The findings of our study align with those of Tareen et al., who similarly reported comparable rates of positive for slit skin smear (55.3%) and skin biopsy (72.4%) in individuals with similar conditions. In addition, they found that the accuracy rate for slit skin smear testing in diagnosing cutaneous leishmaniasis was identical to that of skin biopsy for histopathology, both at 50.0% [22]. Gazozai et al. (2010) found that the rate of positive results for slit skin smears was 54.33% and for skin biopsy was 72.34% in patients with cutaneous leishmaniasis at Bolan Medical College, Quetta [23]. In their study, Mashhood et al. (2014) found that slit skin smears had a diagnostic accuracy of 54.0%, which was comparable to that of skin biopsy for histopathology [24]. The findings of this study are consistent with prior research publications and demonstrate that slit skin smear has an accuracy rate of 52.0% in diagnosing cutaneous leishmaniasis, compared to skin biopsy for histopathology. Slit skin smears can serve as a substitute for skin biopsy, offering a more convenient and expedited method of diagnosis. Nevertheless, it is important to recognize that its accuracy is only 52.0%. Therefore, in situations where there is a negative slit skin smear but a high level of clinical suspicion, it is advisable to have a skin biopsy to provide further confirmation of the findings.

Conflict of Interest: No

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