

# Knowledge and Awareness about Leishmaniasis Disease in the General Public of Quetta, Pakistan

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## Abstract

**Aim:** This study attempted to assess knowledge and awareness about Leishmaniasis disease in Quetta city, Pakistan. **Materials and Methods:** This was a questionnaire-based cross-sectional survey where 387 study respondents were targeted using the non-probability convenience sampling method for data collection. SPSS v 22.0 was applied for data analysis and  $P \leq 0.05$  was considered statically significant. The Mann-Whitney and Kruskal-Wallis tests were performed to discover the relationship among variables. **Results:** Most respondents were from the age group 18-27 years 269 (69.5%) majority of whom were female 244 (64.0%). Most of the respondents had improved knowledge (73.6%), about the word Leishmaniasis, 50.6% of respondents were aware of the signs and symptoms, 54.8% of respondents were aware of the diagnosis, 64.3% of respondents had improved knowledge about treatment, 62.5% of the study population were aware of prevention and 40.8% of study respondents knew about the vaccination for leishmaniasis. **Conclusion:** This study exposed an overall better knowledge and awareness among the public about leishmaniasis disease and its causative agents, symptoms, diagnosis, treatment, prevention, and vaccination.

**Key words:** Knowledge, Awareness, Leishmaniasis disease, Public, Quetta, Pakistan.

## INTRODUCTION

Leishmaniasis is a subtropical and tropical disorder produced by an intracellular protozoan (*Leishmania*) transmitted into the human body through the bite of female Phlebotomus, *P. sergenti*, and *P. salengensis* sand flies in Asia, North America, and some regions of South America, the Middle East, Europe, and North Africa.<sup>[1]</sup> Leishmaniasis has complicated and diverse epidemiology. Leishmaniasis is amongst those essential tropical disorders which cause serious health problems. The World Health Organization suggested that over (147 million) humans in the South-East Asia area are prone to *Leishmania* parasites that cause (kala-azar), a life-threatening disorder.<sup>[2]</sup> According to WHO, every year, 300,000 new cases are reported 90% of which are from Ethiopia, Sudan, Bangladesh, India, and Brazil.<sup>[3]</sup> The life cycle of *Leishmania* consists of two hosts: *Leishmania* parasites exist as extracellular promastigotes in the sand fly, and as intracellular amastigotes in the host.<sup>[4]</sup> Almost 20 species of leishmania that cause infection in humans are recognized as leishmaniasis. Promastigotes development takes place in the intestines of sandflies which inject these into human skin. Promastigotes are long free flagellum. Inside the human skin, promastigotes are injected by way of the reticuloendothelial system, alternating into spherical shape i.e., amastigote and do not have visible flagella. Amastigote then multiplies to structure phagolysosomes and causes primary lesion at the bitten region. Infection is frequently spread through the lymphatic system and causes secondary dermal lesion with types and tissue tropisms in human beings.<sup>[5]</sup> The length of the sand-fly is about 3mm, with large and darkish eyes, lengthy antennae directed downward, and additionally have long and

delicate legs characterized as hopping flight.<sup>[6]</sup> Sandflies are sensitive to dehydration and are nocturnal. They stay in caves, tree holes, rocks, and human rooms. Female and male sandflies feed nectar from flowers, plant juices, and fruits. Carbohydrates are the source of energy. A blood meal is sucked by the female flies to complete the development of eggs.<sup>[7]</sup> The cutaneous leishmaniasis epidemic is related to that activity in which human beings interrupt the environment of the vector through road construction and deforestation. Travelling, army exercises, and immigration are likely to increase the spread of leishmaniasis around the globe.<sup>[8,9]</sup> In Pakistan, cutaneous leishmaniasis and visceral leishmaniasis, and the discovery of new foci have been often reported in different areas of Khyber Pakhtunkhwa, Azad Kashmir, and Baluchistan.<sup>[10,11]</sup> Many patients have been identified with cutaneous leishmaniasis in Somniani which is the coastal region of Balochistan about 70 km away from Karachi city.<sup>[12]</sup>

Patients were also reported from Chakwal, Dera Ghazi Khan, and the Multan region of Punjab province.<sup>[13]</sup> Cutaneous Leishmaniasis is frequent in Afghan refugee camps in Dir and Timergera district of Khyber Pakhtunkhwa province. Cutaneous Leishmaniasis is endemic in the Pak-Afghan border belt region. Cutaneous Leishmaniasis has been frequent among Afghans over the years. This disorder is recognized as “saal dana” in Afghanistan (saal means year and dana mean lesion).<sup>[14]</sup> During the Soviet-Afghan conflict, a massive number of Afghan human beings migrated to Kurram refugee camp placed near the border region (FATA) where they infected a large population<sup>[15]</sup> in the nearby areas as well.<sup>[16]</sup> The knowledge of vector biology and ecology is crucial in planning a positive method to manage leishmania

regions. These types of research work have been ignored in specific regions of Khyber Pakhtunkhwa. Eco-epidemiological research of leishmaniasis requires statistics about the abundance and variety of sand flies as well as their role as vectors in the concerned location.<sup>[17]</sup> Community input is the most vital requirement for successful control and prevention programs of any disease, and collaboration of the infected humans is critical for the application and use of control program actions.<sup>[18,19]</sup> Therefore, researchers want to understand the extent of recognition among the public about or their expertise on leishmaniasis and its associated signs and symptoms, diagnosis, treatment, and preventive practices because these are essential determinants of community participation. The existing study is therefore undertaken to check the knowledge and awareness about leishmaniasis in the public in this context.

## MATERIALS AND METHODS

A cross-sectional survey-based study was conducted at Quetta, Pakistan from May-2018 to October-2018.

### Sample size and technique selection criteria

A total number of 387 study respondents of more than 18 years of age were focused on the non-probability convenience sampling technique by a trained interviewer. Study respondents who had different medical problems or were incapable to reply to a shortlist of easy queries (socio-demographic information), such as an address, name, complications due to disease) were disqualified from the study.

### Data collection

A two-part interviewer-administered questionnaire was used for evaluating the knowledge and awareness about leishmaniasis in Quetta, Pakistan. Part I had a provision to accumulate demographic statistics as follows, age, gender, qualification, occupational status, and monthly income. Part II contained 21 questions in different sections about knowledge and awareness concerning leishmaniasis. A questionnaire with open questions was used in the pilot study for twenty-five individuals as pre-testing to validate the questions. The result of the pilot study was not considered. Based on their responses, the final questionnaire was formulated. The final questionnaire was organized and closed-ended. The interview was conducted, and responses were cited in the survey form.

### Management and statistical analysis

Throughout the data-collection procedure, statistics were checked for completeness, and all the incomplete or unfilled questionnaires were excluded from the study. The frequencies and percentages were considered. The Mann-Whitney and Kruskal-Wallis tests were carried out to discover the relationship amongst variables. The  $P \leq 0.05$  was considered statically significant. This data was assessed by using SPSS 22.

## RESULTS

### Demographic characteristics of the general public

A total of 387 study respondents were interviewed of which most were female 244 (64.0%). Most of the study respondents belonged to the age group 18-27 years 269 (69.5%). The qualification of most of the study respondents was intermediate 116 (30.0%), a lot of them were unemployed 189 (48.8%), and most preferred not to disclose their monthly income 206 (53.2%) as described in Table 1.

## Knowledge and awareness about leishmaniasis disease

Different questions had been asked about; signs, symptoms, diagnosis, treatment, prevention, and vaccination as described in Table 2, as follows.

### General knowledge and awareness

Most of the study respondents had improved knowledge. When asked; (1) have you ever heard about leishmaniasis? 73.6% of the study respondents agreed, 22.0% disagreed, and the remaining 4.4% replied: "I don't know". When asked (2) "Sand flies cause leishmaniasis disease?" 66.9% agreed, about 19.4% replied "I don't know" and 13.7% disagreed. Most of the respondents agreed up to 63.8% while responding to the declaration (3) "Leishmaniasis cause wound on the face or lower limb "The remaining 21.2% were unaware and 15.0% disagreed.

### Sign and symptoms

Queries were made about signs and symptoms: (1) "Fever, weight loss, and loss of appetite are the symptoms of leishmaniasis" 50.6% agreed, about 27.9% were unaware and 21.4% disagreed; (2) "Having a wound on site of the fly bite is a symptom" 58.1% of respondents agreed, 22.7% responded "I don't know" and 19.1% disagreed; (3) "Normally, the sand-fly bites in the morning or in the evening time" 49.4% of respondents agreed, 31.5% were unaware and 19.1% disagreed.

### Diagnosis

These questions were asked about the analysis of leishmaniasis: (1). "Analysis of a sample taken from a wound diagnosed with leishmaniasis" Only 54.8% of respondents agreed, 26.9% answered "I don't know", and 18.3%

**Table 1: Demographic characteristics of the general public.**

Description	N (%)
<b>Gender</b>	
Male	143 (37.0)
Female	244 (63.0)
<b>Age Group</b>	
18-27	269 (69.5)
28-37	70 (18.1)
38-47	27 (7.0)
48-57	5 (1.3)
58 and above	16 (4.1)
<b>Qualification</b>	
Illiterate	39 (7.5)
Religious only	22 (5.7)
Primary	23 (5.9)
Matric	66 (17.1)
Intermediate	116 (30.0)
Graduate	58 (15.0)
Others	73 (18.9)
<b>Occupation</b>	
Unemployed	189 (48.8)
Government Servant	38 (9.8)
Private Servant	42 (10.9)
Self Employed	92 (23.8)
Housewife	26 (6.7)
<b>Income in (PKR)</b>	
<10000	53 (13.7)
10001-20000	33 (8.5)
20001-30000	29 (7.5)
30001 &>	66 (17.1)
Not want to tell	206 (53.2)
PKR=Pakistan Rupees	

disagreed; (2). “Blood test is necessary for the diagnosis of leishmaniasis”, 58.9% of respondents agreed, 23.8% responded “I don’t know”, and 17.3% disagreed.

### Treatment

Questions asked about the cure of leishmaniasis were: (1) “Treatment of Leishmaniasis is available” 64.3% of respondents agreed, 21.4% replied “I don’t know”, and 14.2% disagreed; (2) “Treatment of leishmaniasis is available in our city” 62.3% of the respondents agreed, 22.5% responded “I

don’t know”, and 15.2% disagreed; (3) “Injection at the wound site one of the treatments of Leishmaniasis” 62.0% of the respondents agreed, 22.5% responded “I don’t know”, and 15.5% disagreed.

### Prevention

Multiple questions were asked in this part: (1) “Flypapers can be used to control sand flies” 61.8% of the respondents agreed, 20.4% replied “I don’t know”, and 17.8% disagreed; (2) “Insecticides sprays can be used to control sand flies” 62.5% of the respondents agreed, 20.7% answered “I don’t know”, and 16.8% disagreed. (3) “Insect repellents can be used to control sandflies” 58.9% of the respondents agreed, 23.0% answered “I don’t know”, and 18.1% disagreed.

### Vaccination

To the query, “Is there any vaccination available?”, 40.8% of the respondents agreed, 29.7% replied “I don’t know”, and the remaining 29.5% disagreed, as described in Table 2.

**Table 2: Knowledge and awareness about leishmaniasis.**

Questions	Agree N (%)	Disagree N (%)	I do not Know N (%)
<b>I. General knowledge and awareness</b>			
Have you ever heard about leishmaniasis?	285 (73.6)	85 (22.0)	17 (4.4)
Mosquitoes bite is the main cause of leishmaniasis disease	236 (61.0)	88 (22.7)	63 (16.3)
Sandflies cause of leishmaniasis disease?	259 (66.9)	53 (13.7)	75 (19.4)
Can you differentiate between sand flies and common house flies or mosquitoes?	181 (46.8)	141 (36.4)	65 (16.8)
Leishmaniasis can be caused by skin only	238 (61.5)	74 (19.1)	75 (19.4)
Leishmaniasis affects other parts of the body	208 (53.7)	88 (22.7)	91 (23.5)
Leishmaniasis cause wound on the face or lower limb	247 (63.8)	58 (15.0)	82 (21.2)
Leishmaniasis can harm internal organs like the Liver	184 (47.5)	111 (28.7)	92 (23.8)
<b>II. Sign and symptoms</b>			
Fever, weight loss, and loss of appetite are the symptoms of leishmaniasis	194 (50.6)	83 (21.4)	108 (27.9)
Having a wound on site of the fly bite is a symptom	225 (58.1)	74 (19.1)	88 (22.7)
Normally, the sand-fly bites in the morning or in the evening time	191 (49.4)	74 (19.1)	122 (31.5)
<b>III. Diagnosis</b>			
Analysis of a sample taken from a wound diagnosed with leishmaniasis	212 (54.8)	71 (18.3)	104 (26.9)
The blood test is necessary for the diagnosis of leishmaniasis	228 (58.9)	67 (17.3)	92 (23.8)
<b>IV. Treatment</b>			
Treatment of leishmaniasis is available	249 (64.3)	55 (14.2)	83 (21.4)
Treatment of leishmaniasis is available in our city	241 (62.3)	59 (15.2)	87 (22.5)
Injection at the wound site one of the treatments for Leishmaniasis	240 (62.0)	60 (15.5)	87 (22.5)
<b>V. Prevention</b>			
Flypapers can be used to control sand flies	239 (61.8)	69 (17.8)	79 (20.4)
Insecticides sprays can be used to control sand flies	242 (62.5)	65 (16.8)	80 (20.7)
Insect repellents can be used to control sandflies	228 (58.9)	70 (18.1)	89 (23.0)
<b>VI. Vaccination</b>			
Is there any vaccination available?	158 (40.8)	114 (29.5)	115 (29.7)

### Source of information

Most of the study respondents said that they heard about leishmaniasis from their friends, family, and relatives 39.8%, followed by newspapers, tv, radio, 33.6%, doctors 26.4%, and others 0.3% as described in Figure 1.

### Association among study variables and survey objects

The association between the questionnaire and demographics were calculated. Mann-Whitney, and Kruskal-Wallis tests were performed to check the static significance using SPSS 22, as Table 3.

### DISCUSSION

Understanding the stage of common knowledge and awareness about any communicable or non-communicable disease is a primary step in enforcing

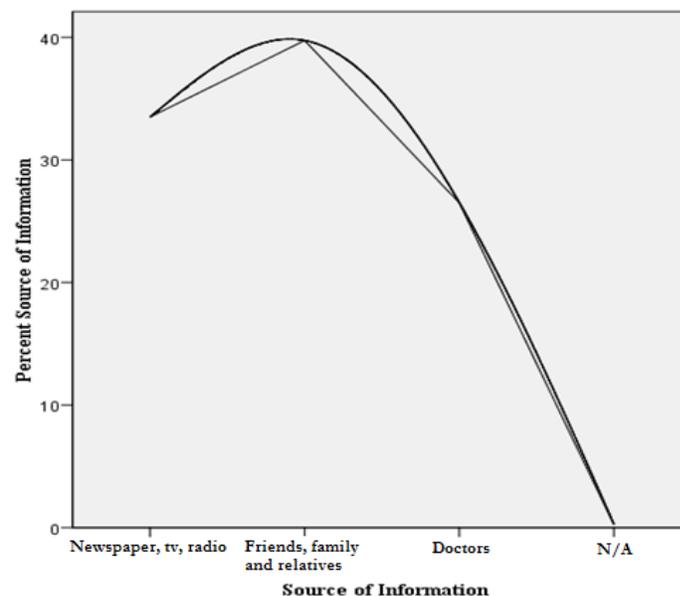


Figure 1: Source of information; the percentage of newspapers, tv, radio (33.5%), friends, family, relatives (39.8%), doctors (26.5%), and N/A (0.3%) are shown in interpolation line.

inhibition programs positively. The primary objective of this study was to verify the knowledge of leishmaniasis disease signs and symptoms, diagnosis, treatment, prevention, and vaccination status among the public and to identify the gaps in their expertise to improve future health education programs. The majority of the study respondents had improved knowledge about phrase Leishmaniasis reason for Leishmaniasis disease and Leishmaniasis can be triggered on the skin only.<sup>[20,21]</sup> The existing study shows equal results. But the study was carried out in the manner of Mebrahtu *et al.* who cited that all the study respondents were aware of the leishmaniasis disease.<sup>[22]</sup> But in the present study, most of the study respondents were aware, not all. Most respondents answered “no” to the query, “can you differentiate between sand flies and common houseflies or mosquitoes?”. Most were unaware when asked, “Do you understand the biting time of sand flies?”, “do you know symptoms of the disease?” and “do you understand the control methods of sand flies?”.<sup>[23]</sup> But in the present study, most respondents responded positively to these against the pattern seen in Ayesha *et al.* A study NA Siddiqui *et al.* was asked its respondents about signs and symptoms. The majority recognized “fever” as a sign and a symptom, and only 13.5% were aware of “loss of appetite” as a symptom.<sup>[18]</sup> But in the existing study, to the query, “fever, weight loss and loss of appetite are signs or symptoms of leishmaniasis?”, the majority was aware of the signs and symptoms, and

27.9% was unaware. NA Siddiqui *et al.* also asked if “complete treatment of the disease is possible?”. The majority was aware, 4.6% answered “no”, and only 0.4% replied “I don’t know”.<sup>[18]</sup> In contrast, the present study asked, “is the treatment of leishmaniasis available?”. The majority was aware, 21.4% answered “I don’t know”, and 14.2% were unaware. In the same context, it was asked, “Is the treatment of leishmaniasis is available in our city?” The majority answered “yes”, 22.5% replied “I don’t know”, and only 15.2% responded “no”. The results of NA Siddiqui *et al.* and the present study almost had similar results because improved knowledge and awareness were recorded in both. However, there are some dissimilarities as well.

In a study conducted in Nepal, the researcher observed that no one knew how the disease could be prevented.<sup>[24,25]</sup> However, NA Siddiqui discovered that the majority of respondents did not know about prevention measures, and only 20% used mosquito nets as a prevention measure.<sup>[18]</sup> But in the current study, different questions were asked about preventive measurements which include: (1) can flypapers be used to control sand flies? The majority (61.8%) was aware and only 20.4% did not know; (2). “Insecticide sprays are used to control sand flies” A majority had improved knowledge about prevention, and only 20.7% of respondents were unaware: (3). Can insect repellents be used to manipulate sandflies? Majority was aware and only 23.0% were unaware.

**Table 3: Association among study variables and survey objects.**

Questions	Age <sup>a</sup>	Gender <sup>a,b</sup>	Education <sup>a</sup>	Occupation <sup>a</sup>	Income <sup>a</sup> PKR
Mean ±Standard Deviation	27.64±11.34	1.64±.48	4.76±1.74	2.28±1.43	3.87±1.47
<b>I. General knowledge and awareness</b>					
Have you ever heard about leishmaniasis?	.128*	.189*	.298*	.327*	.400*
Mosquitoes bite is a main cause of leishmaniasis disease	.004**	.208*	.000**	.364*	.059*
Sandflies cause of leishmaniasis disease?	.004**	.339*	.345*	.145*	.563*
Can you differentiate between sand flies and common house flies or mosquitoes?	0.0**	.209*	.048*	.014*	.644*
Leishmaniasis can be caused by skin only	.213*	.745*	.002**	.690*	.582*
Leishmaniasis affect other parts of the body	.197*	.285*	.116*	.405*	.752*
Leishmaniasis cause wound on the face or lower limb	.011**	.696*	.090*	.303*	.824*
Leishmaniasis can harm internal organs like the Liver	.339*	.041**	.002**	.027*	.795*
<b>II. Sign and symptoms</b>					
Fever, weight loss, and loss of appetite are the symptoms of leishmaniasis	.461*	.305*	.155*	.291*	.977*
Having a wound on site of the fly bite is a symptom	.571*	.223*	.000**	.397*	.322*
Normally, the sand-fly bites in the morning or in the evening time	.263*	.774*	.048*	.417*	.705*
<b>III. Diagnosis</b>					
Analysis of a sample taken from a wound diagnosed with leishmaniasis	.885*	.795*	.003**	.167*	.963*
Blood test is necessary for the diagnosis of leishmaniasis	.331*	.945*	.004**	.511*	.670*
<b>IV. Treatment</b>					
Treatment of leishmaniasis is available	.716*	.966*	.006**	.158*	.566*
Treatment of leishmaniasis is available in our city	.528*	.608*	.008**	.067*	.123*
Injection at the wound site one of the treatments of Leishmaniasis	.962*	.838*	.057*	.862*	.880*
<b>V. Prevention</b>					
Flypapers can be used to control sand flies	.461*	.112*	.018*	.332*	.787*
Insecticides sprays can be used to control sand flies	.680*	.364*	.026*	.193*	.568*
Insect repellents can be used to control sandflies	.510*	.369*	.060*	.686*	.730*
<b>VI. Vaccination</b>					
Is there any vaccination available?	.859*	.079*	.002**	.151*	.821*

<sup>a</sup>Kruskal-Wallis test, <sup>b</sup>Mann-Whitney test, \*  $p \geq 0.05$ , \*\*  $P < 0.05$ , PKR=Pakistan Rupees

In the present study, sources of facts were mostly friends, family, and relatives, while the role of newspapers, tv, radio, and that of doctors in this regard was found to be limited. This effect is not consistent with the findings of other studies conducted on dengue and malaria.

## Recommendation

Increase outreach programs must be introduced for health training related to leishmaniasis, particularly in rural areas of Pakistan. Distinctive attention must be given to the role of sand-fly as a vector and the recognition/identification of sand-flies. The role of animal reservoirs in the spread of leishmaniasis must be highlighted.

## Limitations

The present study had various limitations. Since the study was performed only in one town Quetta, Pakistan, and covered 387 respondents using a convenient sampling method, the results may not be accurately illustrative of all the endemic areas in Pakistan. Due to the lack of time and funds, it was infeasible to include the entire Pakistani community in the study. Still, it was a cross-sectional study so it might not, therefore, be compared with the non-prevalent areas.

## CONCLUSION

The findings of the existing survey discovered improved knowledge amongst the public about sandflies, leishmania disease, causative agents of infection, signs, symptoms, diagnosis, treatment, prevention, and vaccination. Possibly, this was due to the sample being from an urban area. The above observations may also be applicable only for the study population of one town because of a convenience pattern and cannot be comprehensive to other people belonging to different cultural or socio-economic settings.

## CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

## ACKNOWLEDGEMENT

We acknowledge the study respondents for their contribution.

## Ethical approval

Informed written consent was obtained from all the respondents after a full clarification of the nature, purpose, and techniques of the study.

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