National Journal of Life and Health Sciences
Vol: 2(2), 2023
Research Article
ISSN: 3006-5852 & ISSN: 3006-5844

Prevalence Of Cutaneous Leishmaniasis in Northern West Districts of Khyber Pakhtunkhwa

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ABSTRACT
Background: Leishmania parasites are the causative agent of leishmaniasis, and remain a significant public health concern in various regions of the world including Pakistan. A group of protozoan diseases transmitted to mammals including humans by female phlebotomine sandfly. This study was conducted to determine the prevalence of cutaneous leishmaniasis in the residents of northern west districts of KP Pakistan.
Material and Method: Between July and October 2023, a total of three hundred and nineteen patients were recruited. A cross-sectional study was where suspected individuals were screened for the disease. Positive cases were identified based on the presence of characteristic skin lesions, and samples were examined by smear microscope.
Results: Among total 319, 302 (94.7 %) participants out of 319 were found to have cutaneous leishmaniasis, including 158 participant males and 144 females. Their age range was from (1 to 75). The highest frequency of Cutaneous leishmaniasis was noted as 128 cases in the age group (1-15 years). Among all tehsil in Bajaur district the greatest frequency was observed in Tehsil Mamond with 120 cases. The most Common lesion sites were the face (29.5%) Follow by nose (14.4%). This Results underscores the need for targeted interventions and public awareness.
Conclusion: Pakistan have seen epidemics recent years in northwestern Khyber Pakhtunkhwa like malaria and cutaneous leishmaniasis. Over a short period this report focuses on the current status of cutaneous leishmaniasis. Lack of essential knowledge among most participants regarding the disease, its prevention, transmission, and risk factors like socioeconomic and environmental factors, poses a serious threat of infection within local communities. This study emphasizes the need for regulations, prevention efforts, public health education, awareness campaigns, and effective disease management to control future outbreaks.
Keyword: Cutaneous Leishmaniasis, Northern West, Khyber Pakhtunkhwa

HOW TO CITE: Mohammad Arshad, Luqman Khan, Gulalai Nazeef, Hira Ali, Nasir Ali, Hidayat Khan. Prevalence Of Cutaneous Leishmaniasis in Northern West Districts of Khyber Pakhtunkhwa. National Journal of Life and Health Sciences. 2023, 2(2), 65-70.
DOI: https://doi.org/10.62746/njlhs.v2n2.35
Date of Submission: 01/11/2023 Date of Revision: 17/12/2023 Date of Acceptance: 28/02/2023

INTRODUCTION

Lieshmania parasites are causative agent of lieshmaniasis, pose a major public health threat globally, including in Pakistan.[1,2] A group of protozoan disease transmitted to mammals including human by phlebotomine sandflies. this protozoan disease presents in three main types cutaneous, mucocutaneous, and visceral. The visceral type, the most severe can be fatal.[3] Cutaneous leishmaniasis, the most prevalent type exhibits diverse clinical appearances, from small skin nodules to significant mucosal tissue damage.[4] *Leishmania tropica* and *Leishmania mexicana* cause cutaneous leishmaniasis. *Leishmania tropica* is prevalent in the Old World, while *Leishmania mexicana* is found only in the Americas.[5] Old World Cutaneous leishmaniasis includes Anthroponotic Cutaneous Leishmaniasis and Zoonotic Cutaneous Leishmaniasis. Anthroponotic type infection mainly from *Leishmania tropica*, shows dry lesions in urban areas, while Zoonotic type infection mainly from Leishmania major, exhibits wet lesions in rural regions. *Leishmania tropica* cases are identified in Pakistan's NWFP, Punjab, Sindh, and Balochistan provinces.[6]

Each year, 1.5-2 million new cases of leishmaniasis are reported globally, causing around 70,000 deaths. About 350 million people worldwide are at risk.[1,7] Leishmaniasis is among the top 10 overlooked tropical diseases, present in 99 countries. Cutaneous leishmaniasis affects 89 countries, while visceral leishmaniasis affects 80. Both Cutaneous leishmaniasis and visceral leishmaniasis are prevalent in 71 countries, impacting four global regions: the Americas, East Africa, North Africa, and Western/Southeast Asia.[8] Out of 25 studied countries, Cutaneous Leishmaniasis peaks in Afghanistan, Algeria, Colombia, Iran, Morocco, Pakistan, Peru, Saudi Arabia, Syrian Arab

Research Article
ISSN: 3006-5852 & ISSN: 3006-5844

Republic, Tunisia, and Turkey.[9] In Pakistan, there are approximately 19,361 active Cutaneous Leishmaniasis cases with an incidence rate of 0.33 per 10,000 population.[10] The recent epidemic in Khyber Pakhtunkhwa province alone estimated nearly 28,000 cases.[11] Leishmaniasis likely originated in Afghanistan, spreading to Pakistan during conflicts, especially impacting refugee settlements near the border.[12,13] In Pakistan, Cutaneous leishmaniasis is prevalent in northern regions, Sindh, Southern Punjab, and Khyber Pakhtunkhwa, particularly affecting impoverished communities with limited healthcare access.[14] Financial constraints often lead patients to seek treatment from unlicensed practitioner delaying proper care.[15]

Rural living conditions, overcrowding, and outdoor sleeping increase exposure to sand flies, the disease vectors.[16-19] While the National Malaria Control Program in Pakistan includes leishmaniasis, Cutaneous leishmaniasis often receives less attention compared to other vector-borne diseases. Organizations like Médecins Sans Frontières (MSF) and WHO support CL treatment and prevention efforts in Pakistan.[20] Afghanistan, with a history of war, exhibits high CL cases, potentially linked to migration to neighboring countries like Pakistan.[21] The parasite, traced back to ancient times, has various species transmitted by sandflies, with environmental changes influencing its spread.[22–24] Factors like poverty, immune deficiencies, migration, gender inequality, and housing conditions significantly affect transmission and prevalence.[25–35] Deforestation further exacerbates the disease's spread by altering vector behavior and disease pattern a cross regions.[35] Further research is needed in Khyber Pakhtunkhwa to understand Cutaneous leishmaniasis prevalence and affected demographics for effective policy planning.[36] The aim of this study was to determine the prevalence of cutaneous leishmaniasis Northern West Districts of Khyber Pakhtunkhwa.

MATERIALS AND METHODS

This study presents a comprehensive examination of cutaneous leishmaniasis within the Northern West districts of Khyber Pakhtunkhwa, conducted at the leishmaniasis center in Khar district Bajaur. Over a span of four months, 319 residents using openAPI calculator, a non-probability convenience sampling technique. Both male and female individuals of all ages suspected of having cutaneous leishmaniasis from the specified districts were included. Exclusions comprised repeated samples from the same individual, travelers from other districts, and individuals with other forms of leishmaniasis or unrelated skin diseases. This study provides a focused and timely insight into the prevalence of cutaneous leishmaniasis in this region, contributing to our understanding of the disease's epidemiology and informing targeted intervention strategies.

Ethical approval for this study was obtained from the Leishmaniasis Center at Headquarters Hospital Khar District Bajaur, Khyber Pakhtunkhwa. Prior to sample collection, participants or their guardians received a detailed explanation of the study's objectives, and written informed consent was obtained, ensuring the confidentiality of their information. The study adhered to relevant guidelines and regulations. A comprehensive proforma was designed based on a thorough literature review to collect essential data, including demographics, lesion details, and contact information, through direct patient interviews. Samples were collected from suspected patient lesion, the affected area cleaned with normal saline and sterilized before collection. Sample were collected from skin lesion via biopsy or aspirate, preparing samples for examination, and conducting microscopic analysis to detect amastigotes the intracellular form of the parasite. To visualize these amastigotes Giemsa staining was used which helps to highlight the parasites for easier identification. Statistical analysis was conducted using Microsoft Office Excel Package 2013 and IBM SPSS v22, ensuring robust analysis of the collected data. This meticulous approach ensures the reliability and validity of the study's findings, contributing to our understanding of cutaneous leishmaniasis in the northern west districts.

RESULTS

This study was conducted from July 2023 to October 2023 to determine the prevalence of cutaneous leishmaniasis amongst 319 residents of northern west districts of KP Pakistan. 302 (94.7 %) out of 319 were found to have cutaneous leishmaniasis, including 158 participant males and 144 females, (Table 1 & 2).

Table 1: Status frequency wise distribution

Status	Frequency	Percent
Positive	302	94.7 %
Negative	17	5.3 %
Total	319	100 %

Table 2. Gender and status wise distribution

Status	Gender		Total
	Male	Female	
Positive	158	144	302
Negative	13	4	17
Total	171	148	319

Age range was from 1 to 75 years. The highest frequency of Cutaneous leishmaniasis was noted as 128 cases in the age group (1-15 years), followed by 88 cases (16-30 years), 61 cases (31-45 years), 24 cases (46-60 years) and the lowest prevalence rate was recorded as 1 case in the age group of (61-75 years) (Table 3).

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ISSN: 3006-5852 & ISSN: 3006-5844

Table 3. Age and status wise distribution

Age (year)	Status		Total
	Positive	negative	
1-15	128	3	131
16-30	88	8	96
31-45	61	6	67
46-60	24	0	24
61-75	1	0	1
Total	302	17	319

Regarding the regional incidence of Cutaneous Leishmaniasis, samples from the Bajaur district indicated the highest prevalence with 284 cases. Among these, the greatest frequency was observed in Tehsil Mamond with 120 cases, followed by Tehsil Charmang with 50 cases, Tehsil Salarzo with 47 cases, Tehsil Khar with 34 cases, and Tehsil Uthman Khel with 27 cases and lowest prevalence was recorded in Tehsil Nawagai with 6 cases. In Mohmand district, Tehsil Ambar reported 17 cases, and in Dir Lower district, Tehsil Samar Bagh reported 1 case (Table 4).

Table 4: Districts, Tehsil and status wise distribution

Districts	Tehsil	Status		Total
		Positive	Negative	
Bajaur	Salarzo	47	3	50
	Mamond	120	6	126
	Charmang	50	3	53
	Nawagai	6	0	6
	Khar	34	1	35
	Uthman Khel	27	1	28
	Total	284	14	298
Mohmand	Ambar	17	3	20
Dir lower	Samar Bagh	1	0	1
Total		302	17	319

Table no 5. Lesion wise distribution

Lesion	Frequency	Percent
Face	94	29.5 %
Ear	5	1.6 %
Eye	1	0.3 %
Neck	2	0.6 %
Forehead	3	0.9 %
Shoulder	1	0.3 %
Finger	2	0.6 %
Foot	15	4.7 %
Multiple	47	14.7 %
Leg	20	6.3 %
Lip	23	7.2 %
Arm	28	8.8 %
Hand	25	7.8 %
Chin	7	2.2 %
Nose	46	14.4 %
Total	319	100 %

DISCUSSION

Each year, globally, around 1.5-2 million new cases of leishmaniasis are reported, leading to approximately 70,000 deaths, and approximately 350 million people worldwide are at risk of contracting this disease.[1,7] Cutaneous leishmaniasis is the most prevalent type and is widespread and endemic across continents such as Asia, Africa, the Americas, and the Mediterranean region. In Pakistan, many vector-borne and zoonotic diseases, including leishmaniasis, are predominantly existing.[37-40] Particularly, in Khyber Pakhtunkhwa province, leishmaniasis is a burning health issue, with nearly 28,000 cases estimated in a recent epidemic.[41] The infection, caused by *Leishmania tropica* and Leishmania major, is prevalent in settled districts of Khyber Pakhtunkhwa, including Kohat, Karak, Dir, Swat, Charsadda.[42–47]

A study conducted in Khyber Pakhtunkhwa, Pakistan, aimed to understand cutaneous leishmaniasis (CL) and assess epidemic risks. Data from 3188 patients in 2021 health facilities were analyzed, revealing that males and those under 20 were more affected, with single lesions predominantly on the face. CL prevailed in the southern region during winter [48]. In a March-April 2010 study during a CL epidemic in three Karak villages, Pakistan, PCR confirmed 78.17% of suspected cases with CL, while microscopy identified 43.06%. Females were mainly affected, with lesion distribution showing a majority of single lesions.[43]

An epidemiological and molecular study carried out in Kohat District, Pakistan, from April 2015 to May 2016, examined CL in local residents and internally displaced persons (IDPs). Across 13 villages, 1359 cases were found among locals and 140 among IDPs. The highest CL prevalence among IDPs occurred in specific villages, correlating with local CL rates, with the highest prevalence observed among children aged 1-15.[42] Data from 2014-2018 in Upper and Lower Dir Districts, Khyber Pakhtunkhwa, Pakistan, showed CL cases peaking between 2014 and 2016, with a decline in 2017-2018. Those under 20, regardless of gender, were most vulnerable, with single lesions observed on facial areas.[44]

The first documented use of photodynamic therapy (PDT) for treating CL occurred in Khyber Pakhtunkhwa, Pakistan. During the 2019 Charsadda district epidemic, 150 suspected leishmaniasis cases were examined, with males being more affected than females, and infections being most common in specific age groups. Infections were predominantly found in hand, leg, and cheek regions.[46] A study conducted at the Leishmaniasis Center of Headquarters Hospital Khar, Bajaur District, Pakistan, enrolled 646 patients, with 73.8% testing positive for CL. The face was the most affected site, and most patients had a single lesion,

with higher positivity among those under 15 years. Tehsil Mamund had the highest positivity rate.[47,48]

Leishmaniasis remains a major skin disease in Khyber Pakhtunkhwa, particularly in the northern western districts. It's recommended to use non-conventional pesticides for vector control, focusing on spraying from late August to December when adult flies are abundant at breeding sites. Urgent implementation of regulations, preventive measures, public health education, awareness campaigns, and effective disease management strategies is crucial to curb future outbreak.

CONCLUSIONS

Recent years have seen multiple epidemics in the northwestern districts of Khyber Pakhtunkhwa, Pakistan, including the significant health issue of cutaneous leishmaniasis. This report outlines the current status of cutaneous leishmaniasis over a brief period. Effective control relies on managing its primary vector. However, a lack of essential knowledge among most participants regarding the disease, its prevention, transmission, and risk factors, poses a serious threat of infection within local communities. Urgent implementation of regulations, preventive measures, public health education, awareness campaigns, and effective disease management strategies is crucial to curb future outbreak.

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