

Original Article

Cutaneous leishmaniasis–Awareness, knowledge and practices among general population in rural and urban areas in Malakand region, Pakistan

Leishmaniose cutânea - conscientização, conhecimentos e práticas entre a população em geral nas áreas rurais e urbanas da região de Malakand, Paquistão

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Abstract

Malakand region is an endemic area for cutaneous leishmaniasis (CL). However, there are limited number of studies of this disease in Pakistan. Therefore, a study was conducted to understand the level of awareness attitude and practice among the residents of Makaland towards CL and the disease vectors. This study adopted a cross-sectional approach with a total of 400 respondents (n=93 rural and n= 307 urban). Overall, the population in Malakand region (61.2%) were well-informed in the role of sand fly in transmitting diseases, but most lack knowledge on the vector's behavior and almost a quarter (24.5%) were unable to provide knowledge on proper control measures. Alarmingly, the practice and attitudes of the general population was not satisfactory as close to half (49.8%) of the population did adopt any control method. This study calls for increase in awareness through health education campaign to reduce the risk of cutaneous leishmaniasis outbreaks in the future.

Keywords: oriental sore, local knowledge, leishmaniasis, sand flies, preventive measurement.

Resumo

A região de Malakand é uma área endêmica para leishmaniose cutânea (CL). No entanto, há um número limitado de estudos sobre esta doença no Paquistão. Portanto, foi realizado um estudo para entender o nível de atitude e prática de conscientização entre os residentes de Makaland em relação aos CL e os vetores da doença. Este estudo adotou uma abordagem transversal com um total de 400 entrevistados (n = 93 rural e n = 307 urbano). No geral, a população da região de Malakand (61,2%) estava bem informada sobre o papel da mosca na transmissão de doenças, mas a maioria não possui conhecimento sobre o comportamento do vetor e quase um quarto (24,5%) foi incapaz de fornecer conhecimento sobre medidas de controle adequadas. De maneira alarmante, a prática e as atitudes da população em geral não foram satisfatórias, pois cerca da metade (49,8%) da população adotou algum método de controle. Este estudo apela ao aumento da conscientização por meio de campanhas de educação em saúde para reduzir o risco de surtos de leishmaniose cutânea no futuro.

Palavras-chave: ferida oriental, conhecimento local, leishmaniose, moscas da areia, medição preventiva.

1. Introduction

Cutaneous leishmaniasis (CL) is reported in more than 80 countries including Pakistan, America, Saudia Arabia, Syria, Iran and Afghanistan. World Health Organization

reports the annual incidence of 1.5 million cases of CL per year (Sharma et al., 2003). An estimated 350 million people are at risk, including 12 million that are infected.

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Pakistan records most numbers of cutaneous and visceral leishmaniasis globally with incidence up to 2.7% in the northwestern part of Pakistan. More than 4.6 cases/1000 persons/year have been reported over the last twenty years (Magill, 1995).

The high incidences of CL have been linked to deforestation, road construction or other human activity associated with sand fly habitat (Magill, 1995). Cutaneous Leishmaniasis have also become more prevalent throughout the world due to increase in international travel, immigration, cross-borders military exercises, and co-infection with HIV. Over the last two decades, the health problems related to CL has increased particularly from the endemic regions in Pakistan (Rahman and Bari, 2003).

The world's largest outbreak of cutaneous leishmaniasis occurred in Kabul (Afghanistan) which affected about 9% of the population (Anbareen, 2014). However, historically, the emergence of CL in the region began after an earthquake in Quetta in 1935, a town located in northern Balochistan near the Pakistan-Afghanistan border (Anbareen, 2014). Subsequently, more cases were detected after the Soviet invasion in Afghanistan, when approximately 3.5 million Afghan refugees migrated to Pakistan, through the west border of Khyber Pakhtunkhwa (Brooker et al., 2004) and settled in Jalala camp in Mardan; one of the largest camps which conceded this infection to local population. This disease is known by local people as "Da Kabalyano Bemari" (disease of Afghan people) while in Afghanistan it is known as 'Saldana' (Anbareen, 2014). Large movements of a number of internal displaced people (IDPs) is concerning as Malakand region is a part of Khyber Pakhtunkhwa Pakistan, a known area endemic for cutaneous leishmaniasis where health facilities are lacking. To date, only sporadic cases have been reported. The first outbreak in Pakistan was reported in Sindh in 1960 (Munir et al., 1989).

Therefore, this study is the first to determine the level of awareness and attitude of residents of Malakand region, Pakistan concerning CL in the region. The study aims at highlighting the concern to policymakers and to formulate strategies in disease control.

2. Materials and Methods

2.1. Study area

This study was conducted in the rural and urban areas of Malakand district, in northwestern part of Pakistan (Latitude: 34.5030413 longitude: 71.9045649 with 454.23 m elevation). The district and its surrounding areas has an average rainfall of 743mm, and temperature of 19.9 °C. The warm and humid climate provides a favorable habitat for breeding of sandflies.

2.2. Ethical approval and informed consent

The research was approved by the ethical review committee of the University of Malakand A consent letter was issued to the parents/guardians of pupils aged less than 18 years.

2.3. Data collection

The questionnaire was structured to gather socio-demographic information, knowledge related to sand flies and cutaneous leishmaniasis and finally attitude and practices towards the CL. Knowledge related to sand flies was measured through questions on the disease spread, breeding sites, biting time and control methods. Knowledge of leishmaniasis was assessed through questions related to symptoms and vector, peak incidence time, transmission and treatment for disease. However, attitudes and practices of respondents were evaluated through knowledge on severity of the disease, patient care, and control methods.

2.4. Statistical analysis

The data was analyzed descriptively using Graph Pad version 5. The p-values less than or equal to 0.05 were considered significant (at 95% CI).

3. Results and Discussion

The present study was able to gather information from 400 respondents (rural n=93 rural; urban n=307 urban) with almost equal representation of females (49%) and males (51%). Most respondents were above 18 years of age (84.2%), while majority were literate (85.2%). Number of households with less than 10 members was higher (73.2%) (Table 1). Respondents were subdivided as rural and urban however, none of the characteristics were significantly different.

3.1. Knowledge in relation to the vector and control measures

Results of the current study as shown in Table 2 indicate that majority of the local population (61.2%) were able to differentiate sandflies from other flies. Slightly more than half (53.5%) understood that sandflies transmit cutaneous leishmaniasis. The finding differ from that of Akram et al. (2015), which revealed that only 1/5 of respondents were able to differentiate sandflies from common house flies and mosquitoes and only a small proportion (9.2%) knew that sandflies transmit leishmaniasis.

Regarding knowledge on breeding sites for sandflies, slightly more than a third of the respondents noted dirty environment as breeding sites for the vector. However, both the urban and rural population were unable to give accurate description of breeding sites and only listed moist habitat, and fresh water as some of the vector breeding sites. Akram et al., 2015 observed that majority of the respondents (59.6%) lacked knowledge of sand fly breeding site and listed unhygienic environment as one of the breeding grounds, followed with moist places, fresh water and hospitals waste disposal sites. Khan et al. (2017) identified mud houses, cattle sheds and plants belonging to the Cucurbitaceae family as potential breeding and resting microhabitats for sand flies in Dir district in Pakistan.

Regarding knowledge of the biting time of sand flies, mixed responses were recorded between the rural and urban dwellers, with respect to dusk and dawn (20.4%, 23.4%), daytime (22.5% and 15.9%), night (29% and 29.6%),

Table 1. Socio-demographic characteristics of respondents in Malakand region, Pakistan (n=400).

	Rural (N=93)	Urban (N=307)	Total (N=400)	(%)	P value
Sex					
Female	59 (63.4)	137 (44.6)	196 (49)	49	0.0354
Male	34 (36.5)	170 (55.3)	204 (51)	51	
Age					
<18 years	25 (26.8)	39 (12.7)	63 (15.7)	15.7	0.4553
>18 years	68 (73.1)	268 (87.2)	337 (84.2)	84.2	
Education					
Literate	57 (61.2)	284 (92.5)	341 (85.2)	85.2	0.4996
Illiterate	36 (38.7)	23 (7.4)	59 (14.7)	14.7	
Occupation					
Teacher	9 (9.6)	15 (4.8)	24 (6)	6	0.5336
Others	84 (90)	292 (95.1)	376 (94)	94	
Number of household members					
<10	59 (63.4)	234 (76.2)	293 (73.2)	73.2	0.3195
>10	34 (36.5)	73 (23.7)	107 (26.7)	26.7	

Table 2. The level of Knowledge on vectors of cutaneous leishmaniasis among residents of Malakand region Pakistan (n=400).

Characteristics	Rural (N=93)	Urban (N=307)	P value	95%CI
Can you differentiate sand flies from other flies?				
Yes	49(52.6)	196(63.8)	0.7268	-216.7 to
No	44(47.3)	111(36.1)		179.7
Do sandflies transmit the disease?				
Yes	45 (48.3)	169 (63.8)	0.0248	-103.9 to
I don't know	48(51.6)	138(44.9)		-8.778
Do you know the breeding sites of sandflies?				
Dirty environment	29(31.1)	109 (35.5)	0.0431	-99.83 to
Fresh water	13 (13.9)	26 (8.4)		-2.175
Moist places	27(29)	68(22.1)		
I don't know	24(25)	104(33.8)		
Do you know biting time of sandflies?				
Day time	21 (22.5)	49 (15.9)	0.0012	-82.90 to
Night time	27(29)	91(29.6)		-41.10
During dusk and dawn	19 (20.4)	72 (23.4)		
I don't know	26 (27.9)	95 (30.9)		
Do you know how to control sandflies?				
Insecticide spray	22 (23.6)	102 (33.2)	0.0126	-76.37 to
Insect repellent	20 (21.5)	48 (15.6)		-12.43
Keeping area clean	12 (12.9)	53 (17.2)		
Install door and window mesh	15(16.1)	30 (9.7)		
I don't know	24 (25.8)	74 (24.1)		

while 27.9% and 30.9% respectively had no idea. Similarly, Akram et al., 2015 noted more than half (54.8%) were unaware of the biting time of sandflies, followed by mixed responses (dusk and dawn (14%), any time of the day (13.2%), daytime (10%) and midnight (8%). These similar responses were also highlighted by Singh et al. (2006) in India.

With regards to control measures, only a small number of respondents were of the opinion that sand flies can be controlled by the use of insect screens on doors and windows. Others listed the use of insect repellents, insecticide sprays, hygienic conditions as several control measure, however almost a quarter (24.5%) were unable to give any preventive methods.

Overall, the population in Malakand region were knowledgeable about sandflies however, they lack knowledge about the vector's behavior and proper control measures. Similarly, a study in India showed that majority of the people were aware of leishmaniasis and sand flies (Singh et al., 2006).

The findings of Iran Shiraz (Rakhshani et al., 2017) indicated that knowledge of participants in their study was below average. About half of the respondents implicated sandflies as vector of the disease in Afghanistan (Stewart and Brieger, 2009). The reason is that the disease is endemic to Afghanistan. On the other hand, shortage of knowledge was especially prominent in Isfahan regarding to sand fly identification and behavior, the ways of vector control and finally use of sand fly controlling methods such as use of insecticides and repellent-impregnated bed nets (Hejazi et al., 2013).

3.2. Knowledge in relation to the disease

In general, approximately half of respondents were aware of CL (Table 3). Similarly, only half of the respondents knew about the vector of the disease (rural: 52.6%; urban 50.1%:) while the rest were unaware or identified the wrong vector. Disease awareness were obtained primarily through

Table 3. Knowledge of Leishmaniasis among the population in Malakand region, Pakistan (n= 400).

Characteristics	Rural (N=93)	Urban (N=307)	P value	95%CI
Have you heard about leishmaniasis or oriental sore?				
Yes	49 (52.6)	159 (51.7)	0.0506	-129.8 to 0.2112
Radio/television	7 (7.5)	14 (4.5)		
Print media	18 (19.3)	63(20.5)		
Teacher/lecturer	24 (25.8)	82 (26.7)		
I don't know	44 (47.3)	148 (48.2)		
Do you know symptoms of cutaneous leishmaniasis?				
Skin infection	36 (38.7)	190 (61.8)	0.2216	-10.52 to 37.02
Painful	7 (7.5)	5 (1.6)		
Very itchy	8(8.6)	6 (1.9)		
I don't know	42(45.1)	106 (34.5)		
Do you know the vector of the disease?				
Housefly	2 (2.1)	3 (0.9)	0.2368	-153.1 to 46.13
Sand fly	35 (37.6)	134 (43.6)		
Mosquito	7 (7.5)	16 (5.2)		
I don't know	49 (52.6)	154 (50.1)		
Can leishmania be transmitted from human to human?				
Yes	59 (63.4)	215(70)	0.2303	-377.0 to 163.0
No	34 (36.5)	92(29.9)		
When does the disease incidence peak?				
Spring	0	0	0.2996	-131.8 to 46.20
Summer	31 (33.3)	123 (40)		
Winter	3 (3.2)	2 (0.6)		
Autumn	2 (2.1)	6 (1.9)		
I don't know	57 (61.2)	176 (57.3)		
Is leishmaniasis curable?				
Yes	60 (64.5)	21(50)	0.8170	-173.4 to 153.4
No	33 (35.4)	92 (29.9)		

Table 4. Attitude and practices related to Lishmaniasis among residents of Malakand region (n= 400).

Characteristics	Rural (N=93)	Urban (N=307)	P value	95%CI
Seriousness of the disease				
Leishmaniasis is more serious than malaria	64 (68.8)	205 (66.7)	0.1880	-341.0 to 127.0
Malaria is more serious than leishmaniasis	29 (31.1)	102 (33.2)		
Patient care				
Cleanliness	37 (39.7)	191(62.2)	0.1993	-200.2 to 57.57
Use of bed net	32 (34.4)	35(11.4)		
I don't know	24 (25.8)	81(26.3)		
Preventive measures for cutaneous leishmaniasis (oriental sore)				
Reduce outdoor activities			0.1588	-134.9 to 27.88
Use of bed net	37(39.7)	48 (15.6)		
Insect repellent	12(12.9)	37 (12)		
Health education	20 (21.5)	47 (15.3)		
I don't know	24 (25.8)	175(57)		

teachers/lecturers (rural: 28.5%; urban 26.7%) followed by print media (rural:19.3%; urban: 20.5%). Most of the respondents believed that this disease can be transmitted from human to human while, majority of the respondents had no knowledge when the disease incidence peaked and believed that this disease is curable disease.

This result showed moderate knowledge among respondents in relation to knowledge of the disease. In contrast, study conducted in Punjab was not showing satisfactory level of awareness by the respondents (Akram et al., 2015). While a study in India (Singh et al., 2006) showed a large proportion of the population were aware of this disease.

The results of the study showed that only half of the respondents were aware that sandflies is the vector of leishmania. The basic knowledge on leishmaniasis and sand flies is a matter of public health concern as this knowledge is the foundation for proper control measures and treatment (Khan et al., 2017). A cross sectional study of 300 households in Iran showed that knowledge of leishmaniasis and practices related to the disease were below average. However, the score for attitude was above average and concluded that knowledge and practices of people are pivotal step in the successful implementation of control strategies (Rakhshani et al., 2017). In Syria, insects were the most frequently mentioned as disease causing agents, suggesting insect bites as the cause of disease with nearly half of the respondents implicating sandflies, and approximately one-quarter implicated mosquitoes (Abazid et al., 2012). According to a cost-effective analyses study for the treatment of CL in Kabul, Afganistan, treatment may not be a viable option (Reithinger and Coleman, 2007) thus, educating the public of this disease is more important.

3.3. Attitudes and practices related to cutaneous leishmaniasis

More than 60% (rural: 68.8%; urban 66.7%) of the respondents noted that leishmaniasis is more serious

than malaria (Table 4). When asked about patient care, most respondents prioritized cleanliness (57%), followed by use of bed nets (26.3%). Similar to a study in Punjab province (Akram et al., 2015), the use of bed nets, insect repellent, health education were some control measures adopted. However, majority of the respondents (49.8%) did not adopt any control method. In Nepal, a study identified the use of bed nets as the strongest protective effect against CL (Bern et al., 2000). While, a study in Colombia demonstrated that the number of *Lutzomyia* sand flies caught with human bait was reduced by using untreated bed nets compared to no bed nets (Courtenay et al., 2007). Insecticide-treated bed nets are likely to have a stronger protective effect than that of untreated bed nets (Alexander and Maroli, 2003).

The overall result highlights the lack of preventive measures against the disease and vector. Current findings call for improvements in health education to improve attitude and practices related to leishmaniasis and sand flies among people of Malakand region Pakistan to reduce disease incidence.

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