

## Cover Page -

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### Title:

Outbreak investigation of Cutaneous Leishmania (CL) in Yanaha village, Amran governorate, Yemen 2016

### Brief description of the report

In December 2016 an outbreak of CL in Yanaha village, Amran governorate. We investigated to confirm the outbreak, verify the diagnosis, identify risk factors and recommend control measures.

We conduct descriptive investigation, active case-search and case-control study. Data entered and analysed by using Epi-info version 7.2.

### List findings:

There were 25 cases was found. Most infections have been acquired during the rainy season in the village (May to October).

Of cases (64%) were among males of them (79%) was less than 15 years old with attack rate (9%). The most lesion were on the face (64%). The lesions were dry in (76%) of cases.

Associations between some risk factors of having among cases live in favourite conditions for sand fly breeding in old houses with bad light and hygiene and presence of large tree trunks and animal barn in the houses.

(84%) of examined smear under microscope confirmed the presence of *Leishmania amastigotes* in skin lesions.

### Recommendations:

1. Activate surveillance of CL through community surveillance
2. Pesticide spraying in the places of breeding of flies in the seasons of transmission
3. Distribution of mosquito nets



educational campaign for village people about





## Executive summary:

Cutaneous leishmaniasis (CL) is a serious health problem in Yemen. The General directorate of surveillance at ministry of public health and population received a notification of the increased case of CL in Yanaha village of Amran governorate. A team from Yemen Field Epidemiology Training Program (YFETP) was sent to investigate. The aim were to confirm the existence of outbreak, verify the diagnosis, identify risk factors and recommend control measures.

We conducted a descriptive investigation, active case-search and an unmatched case-control Study. A case-patient was a person showing skin or skin lesions without parasitological confirmation of the diagnosis. Skin scrapings were taken for laboratory diagnosis. We performed bivariate analysis using Epi-info version 7.2

25 cases were found. Most infections were occurred during the rainy season in the village (May to October). 64% were males, 79% was children  $\leq 15$  years old. The attack rate was 9%. 84% of examined smear was confirmed by the presence of *amastigotes* of CL. There were associations between the infection with CL and bad light and poor hygiene, presence of large tree trunks and animal barn in the houses.

On conclusion, a wave of confirmed cases of CL was confirmed. Most of affected cases were males under 15 years old. Strengthen surveillance of CL through community surveillance, education of people and effective vector control with protective measures such as distribution of mosquito nets, pesticide spraying in the places of breeding of flies in the seasons of transmission, are mandatory in controlling the spread of disease.

## **Abbreviations**

Cutaneous leishmaniasis

CL

Ministry of Public Health and Population

MoPHP

World Health Organization

WHO

Yemen Field Epidemiology Training Program

YFETP

## Table of contents

Executive summary:.....	3
Introduction.....	6
Objectives .....	7
Methods.....	7
Study area.....	7
Study design .....	7
Lab diagnosis: .....	7
Analytical Study:.....	8
Data processing and analysis: .....	8
Results.....	9
Discussion .....	13
Action taken .....	14
References .....	15
Annex.....	18

## Introduction

Leishmaniasis is one of the neglected tropical diseases which still a major health problem in low income countries it is a vector borne diseases <sup>(1)</sup>, and zoonotic infection, which is caused by intracellular protozoa of the genus *Leishmania* which is transmitted by the bite of the female sand fly of the genus *Phlebotomus*<sup>(2)</sup>.

*Leishmania* parasites cause three forms of leishmaniasis: visceral leishmaniasis, cutaneous, and mucosal leishmaniasis. The outcome of infection depends on the species of *Leishmania* and the host's immune responses<sup>(3)</sup>

On a global scale, approximately 350 million people live in areas of active transmission of *Leishmania*, with 14 million people throughout Africa, Asia, Europe, and the Americas directly affected by this disease<sup>(4)</sup>.

Cutaneous leishmaniasis (CL) is the most frequent type of leishmaniasis, affecting 0.7–1.3 million persons each year around the globe<sup>(5, 6)</sup>. Its clinical features varied, ranging from a mild, self-healing, localized lesion to severe disseminated lesion. <sup>(7)</sup>

CL has been reported in many areas in Middle East where over two thirds of new CL cases occur in 6 countries: Afghanistan, Algeria, Brazil, Colombia, Iran and Syria<sup>(5)</sup>.

CL seems to be endemic in north-western Yemen, it was previously identified in Dhamran region in Taiz governorate and in Hajjah<sup>(8, 9)</sup>. last outbreak happened in Sana governorate Hamdan district , Wadi Daher in July 2016<sup>(10)</sup> .

On 18 December 2016, the surveillance officer of Amran governorate notified increased number of cases with suspected CL in Yanaha village to Ministry of Public Health and Population (MoPHP). On 20 December 2016, a team sent to investigate the problem. The team consisted of five members, three from Yemen FETP and one from National Leishmania program and one from National Central Public Health Laboratories.

## Objectives

1. To confirm the existence of cutaneous Leishmania outbreak in Yanaha village.
2. To make recommendation for control measures.

## Methods

### Study area

Yanaha is a poor village located in Kahref district, Amran governorate, in Yemen. It consist of 72 houses with a population of 782 person. (54%) of them is under 15 years old.

The majority of residents rise sheep or cattle as a work for living while the others have agricultural activities.

Most of the houses consist of one floor, with maximum of three rooms.

There is a barn in every home, which is located either in the first floor or next to house.

The village does not has a water source but the water stored during rainy season in the opened old tanks and used for the rest of year.

### Study design

#### Descriptive study used

A line List prepared by the team used for collecting data, Active house-to-house search was performed by using case definition of World Health Organization (WHO) :

- ***Probable case:*** a probable case of cutaneous leishmaniasis is a person showing clinical signs (skin or mucosal lesions) without parasitological confirmation of the diagnosis (positive smear or culture)
- ***Confirmed case:*** a confirmed case of cutaneous leishmaniasis is a person showing clinical signs (skin or mucosal lesions) with parasitological confirmation of the diagnosis (positive smear or culture).

### Lab diagnosis:

We collected small quantities of tissue by skin scrapings and directly smeared on glass slides, air-dried and fixed with methanol for a few seconds.

We used Giemsa stain and after 20 minutes of staining, the slides were washed with tap water and left to dry on air.

The stained smears were examined under the microscope with a 40 x and 100 x oil immersion lenses. The smear was declared as positive, if at least one amastigotes with a distinctive kinetoplast was found. The smear was declared as negative if the amastigotes was not seen after 15 minutes of inspection.

#### **Analytical Study:**

Case-control study was performed to determine the factors associated with the occurrence of disease

#### **Sample size :**

The total sample size was 50, determined by using Epi-info version 7.2. The cases were 25 and the control 25 with a ratio of 1:1, 95% confidence level and 80% power. The risk among control was 20%, and 58%, among cases, 5.5 odds rate.

#### **Selection criteria of control cases**

The same age of the infected cases  $\pm$  3 years, houses without any recorded new or old lesion among house members and living in the house at least one year were the criteria for the selection of control cases.

#### **Data processing and analysis:**

Data were entered into an Excel sheet and analyzed by Epi-info version 7.2



## Results

Twenty –five cases were found. The first case was in February 2016 and the highest peak was in October 2016

**Figure 1. Cutaneous Leishmania cases by time ,Yanaha,Amran ,Yemen , December 2016**

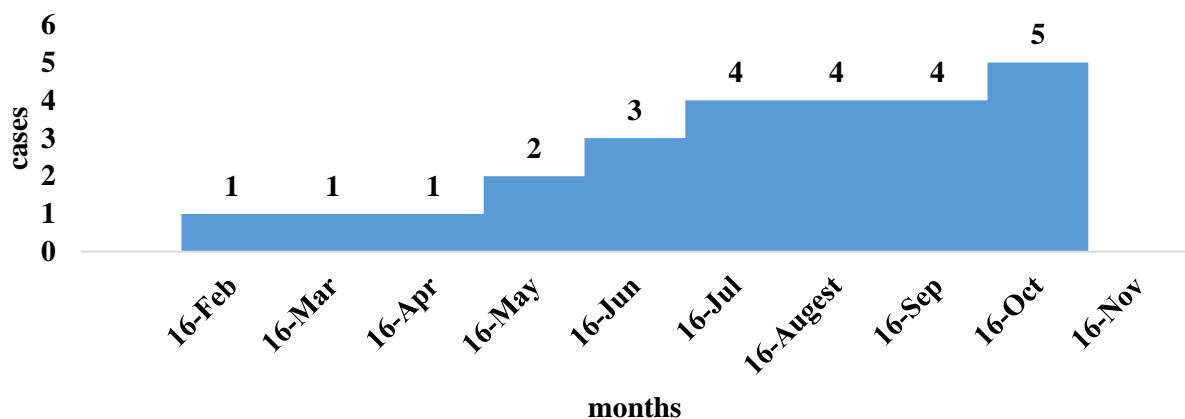


Figure 2 shows that (64%) of cases were males

**Figure 2. Distribution of Cutaneous Leishmaniacases by gender, Yanaha , Amran Yemen, December 2016**

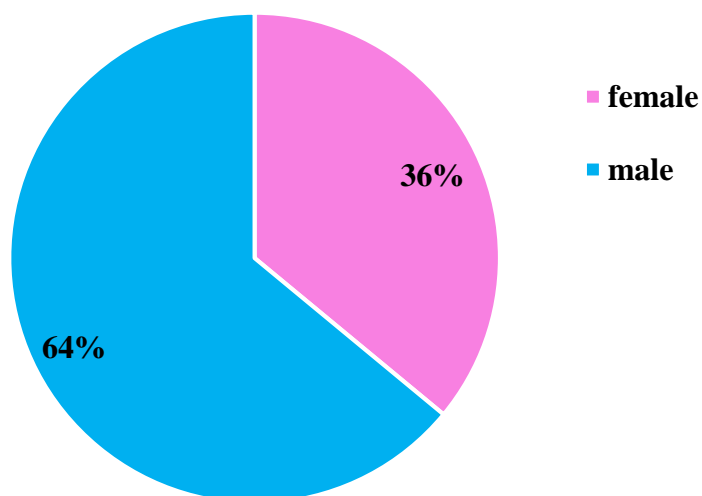


Figure 3 shows that the affected age group was among less than15 was 79%.

**Figure 3. Distribution of Cutaneous Leishmaniasis cases by age groups, Yanaha, Amran, Yemen, December 2016**

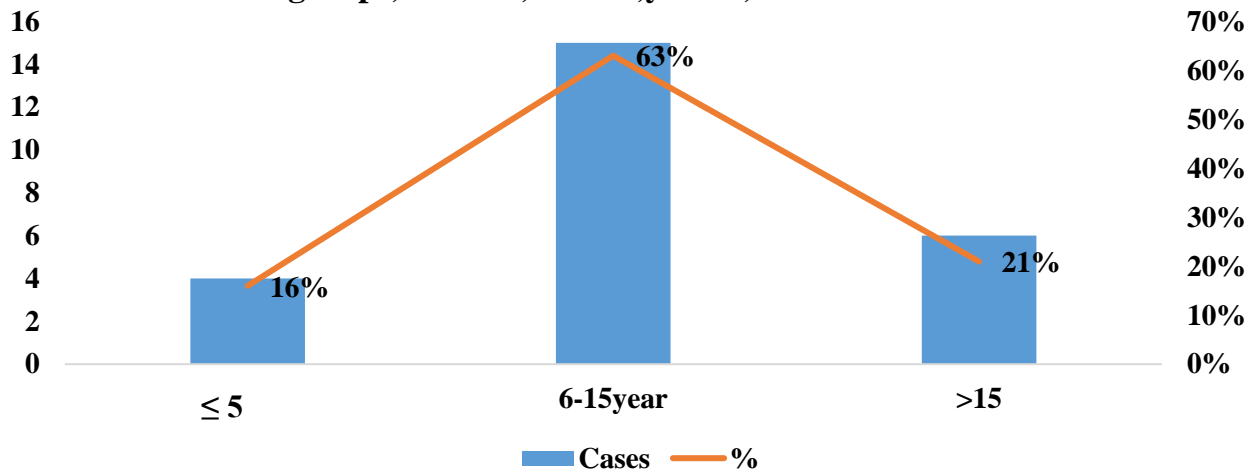
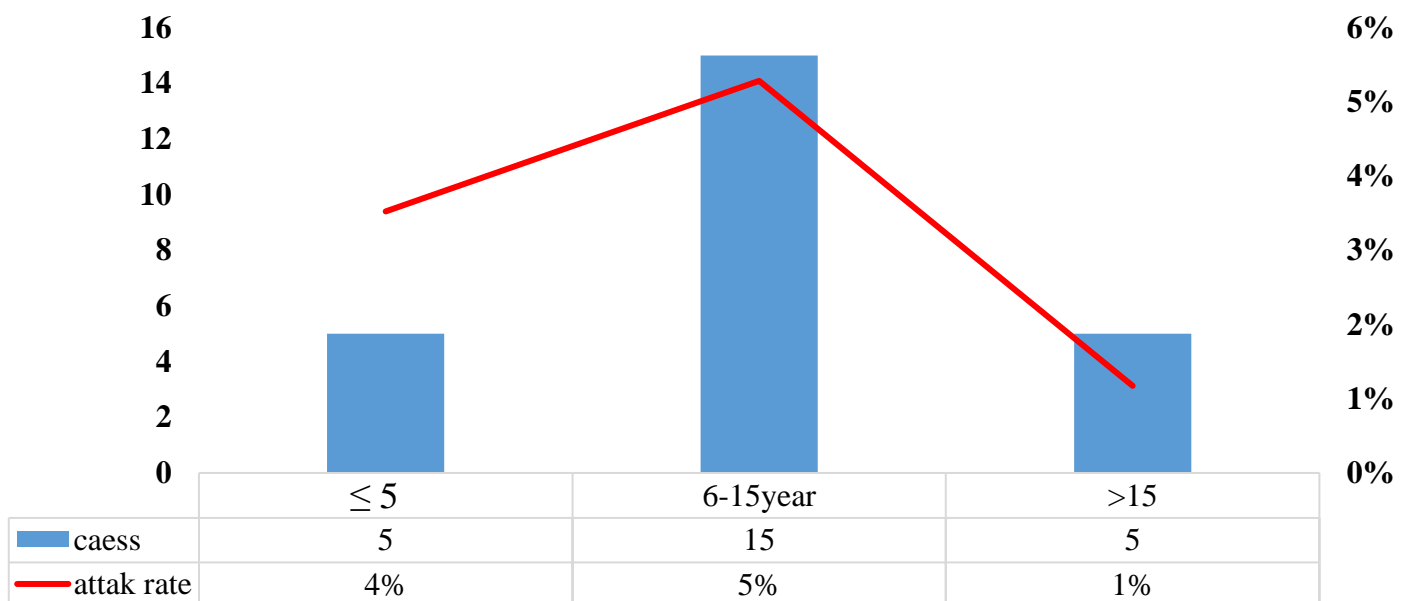


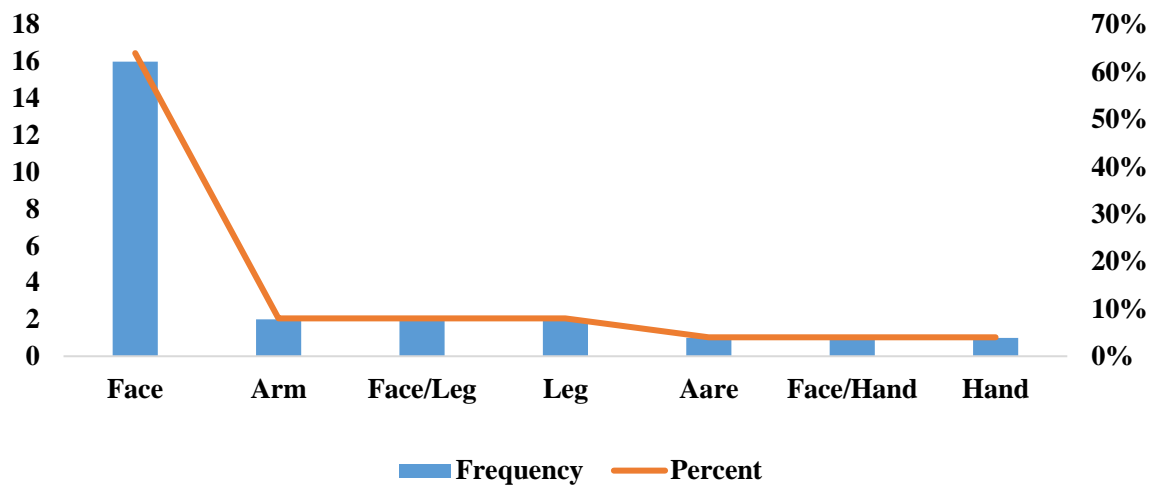
Figure 4 shows that the most affected age group less than15 with attack rate 9%.

**Figure 4. Incidence of cutaneous leishmania, Yanaha , Amran ,Yemen, December 2016**



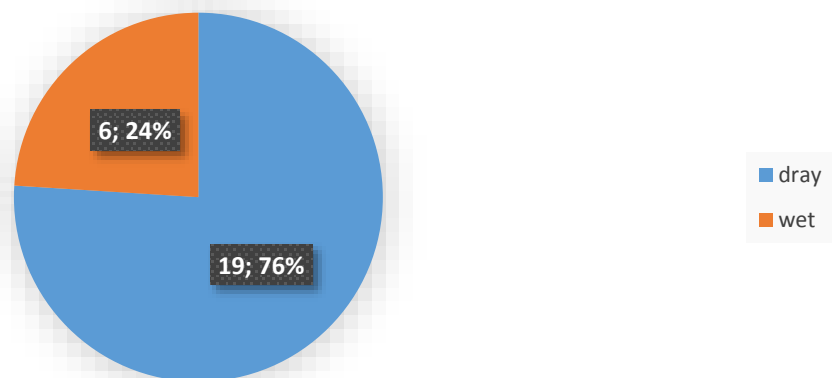
The lesions found to be in different parts of the body. The most affected is the face (16 cases, 64%) (Figure 5).

**Figure 5. Distribution of Cutaneous Leishmaniasis cases by lesion site, Yanaha, Amran, Yemen, December 2016**



There were two type of lesions 76% of them were dry, (figure 6)

**Figure 6. Type of lesion of Cutaneous Leishmaniasis cases, Yanaha, Amran, Yemen, December 2016**



The associated risk factors with CI are illustrated in table one, people lived in wet dark houses have 6 times the risk of those who did not live in wet dark house.

**Table 1. Risk factor of having cutaneous leishmaniasis, Yanaha, Amran, Yemen, December 2016**

Factor	Cases		Control		Odd	CI 95%
	No	%	No	%		
<i>Bad light</i>	18	72	7	30	6.0	1.9-19
<i>Bad hygiene</i>	19	76	10	40	4.7	1.5-15
<i>Large hollow trunks trees</i>	20	80	12	47	4.6	1.3-15
<i>Animals barn close to the house</i>	18	72	9	36	4.4	1.4-15
<i>Contact with dogs</i>	17	68	9	36	3.7	1.2-11
<i>Cattle and livestock</i>	8	32	3	10	3.4	0.8-15
<i>Owning dogs</i>	9	36	4	16	3.6	0.9-13
<i>Rodents in the house</i>	7	28	6	26	1.0	0.3-3.5

## Lab result

We collected tissue samples from all 25 patients. *Leishmania* amastigotes were found in 21 samples (84%) of examined smear (table 2).

**Table 2: Lab result of cutaneous leishmaniasis, Yanaha, Amran, Yemen, December 2016**

No of cases	No. of tested samples	Positive	
		No	%
25	25	21	84

## Discussion

CL is one of the neglected tropical diseases, which still an important health problem specially in low-income country like Yemen.

Twenty-five of CL cases started in February 2016 and increased on October 2016. 64% were males, 79% was on less than 15 years old. The attack rate was 9%. Dry lesions were in 76% of cases and 64% was in faces. 84% of examined smears showed the presence of amastigotes of *Leishmania*.

Climatic and environmental conditions enhance the activity of sand fly and transmission of *Leishmania* <sup>(10)</sup>, our findings shows most of lesion start in rainy seasons during this year, which is favorable time for Sand fly breeding.

In this study, the disease were more in male, that might be due to the outdoor activity of males, this result was similar to the results of other studies. <sup>(12, 13)</sup>

During outbreaks in non-endemic areas, children and adults infected equally while in endemic area, the outbreaks are common among children.<sup>22</sup> our finding constants with this phenomenon and shows majority of cases were among children less than 15 year old. <sup>(14)</sup>

Dry lesion type of leishmaniasis were more prevalent and the most affected part of the body were faces, which might be due to that, those parts are the most exposed part of the body. These results are in agreement with previous study conducted in \Lahj governorate <sup>(15)</sup>

Studies shows that dark houses with small amount of sun light, bad hygiene and presence of large tree trunk considered as a good atmosphere condition for breeding and spread of sand fly. <sup>(16)</sup> Our finding show association between those factors and infection with CL.

On conclusion, a wave of confirmed cases of CL had been confirmed in Yanaha village. Most of affected cases were males under 15 years old. Strengthen surveillance of CL through community surveillance, education of people and effective vector control with protective

measures such as distribution of mosquito nets, pesticide spraying in the places of breeding of flies in the seasons of transmission, are mandatory in controlling the spread of disease.

## **Action taken**

Distribution of Sodium gluconate to all all infected cases according to management strategy of National Leishmania program. The team gave the first dose to all cases and trained three health workers to complete and follow-up treatment. Sessions of Health eeducation on prevention measures conducted for the parents, teachers, and students at the school of the village.

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## Annex

Picture of the cases

### 1- Cases of CL with new lesions in Yanaha.



**Cases of CL with old lesions in Yanaha**

