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Study on Cutaneous Leishmaniasis among Clinically Suspected Patients in Taiz City, Taiz Governorate, Yemen

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Authors' contributions

This work was carried out in collaboration between all authors. Author TA carried out the study and the practical part of the study and the drafting of the manuscript. Author IA participated in the statistical analysis. Author NS coordinated and participated in the design of the research. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

Aims: To determine the prevalence of Cutaneous leishmaniasis (CL) among clinically suspected patients in Taiz city, Taiz governorate, Yemen and its correlation with age, sex, site and lesions sites and number.

Study Design: Cross-sectional study.

Place and Duration of Study: This study was conducted among clinically suspected patients in Taiz city, Taiz governorate, Yemen during March to August 2014.

Methodology: A Hundred of skin scraping were collected randomly from clinically suspected patients and stained with Giemsa stain for microscopic analysis. Furthermore, epidemiological data

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including sex, age, residences, place of lesion, and number of ulcer/s or scar/s had been collected using semi-structured questionnaires.

Results: Out of 100 patients, 87 were found positive. The majority of infected patients 69 (79.3%) were coming from rural areas. Males are more infected (57.5%) than females (42.5%). The prevalence of CL was highest in the 1-15 years group (62.1%) than the older age group. The most lesions were recorded on the face (48.3%) than the other sites of the body. The majority (78.2%) had single lesion, 17.2% had two lesions, while three lesions were developed in 4.6% of patients.

Conclusion: Prompt and effective measures will be required to prevent CL.

Keywords: Cutaneous leishmaniasis; Taiz; Yemen; prevalence.

ABBREVIATION

CL: Cutaneous Leishmaniasis

1. INTRODUCTION

Cutaneous leishmaniasis (CL) is a chronic protozoan disease, endemic in many regions of the Old World. The disease is found in over 70 countries and 90% of cases occur in Afghanistan, Algeria, Brazil, Pakistan, Peru, Saudi Arabia, and Syria. Moreover, the disease is endemic in 18 out of 23 Middle Eastern countries [1,2]. There are over one million new cases of cutaneous leishmaniasis occurring worldwide annually [3,4]. It is caused by different dermatropic *Leishmania species* (*Leishmania tropica*, *Leishmania major*, and *Leishmania aethiopica*).

In Yemen, Leishmaniasis is the most prevalent skin infectious disease [5]. It is responsible for 60% of DALYs lost due to tropical-cluster diseases prevalent in Yemen [6]. CL is the common form of leishmaniasis in Yemen, causing disfiguring and sometimes disabling in the case of multiple lesions. The clinical pattern of the disease showed variation in the severity and duration and low response to treatment in some cases [7].

There are few reports on leishmaniasis in Yemen in the international literature. Even though it is not well documented, CL has first been reported in Sana'a as early as 1933 [8]. Later, Rioux et al identified *Leishmania tropica* in the lesions of 18 patients with CL in Naghdi Dhamran and Quadi Dhamran in Yemen [9]. Furthermore, Khatri published a preliminary study of 42 cases from Hajjah and adjacent regions in 1999 [10]. In 2006 additional prospective study was carried out on 136 cases, most of them were resident of the

Hajjah governorate, revealed that 94% of those had a positive CL [7]. In 2009, molecular study has been done by Khatri and his colleagues reported that CL is endemic in the northwestern region of Yemen and the predominant causative agent is *Leishmania tropica* (85.8%) [11].

In Taiz, the published literature on CL is seems to be neglected compared to the magnitude of the problem. To our knowledge, this is the first report conducted to determine the prevalence of CL among clinically suspected patients in Taiz city and its correlation with age, sex, site involvement etc.

2. MATERIALS AND METHODS

2.1 Study Area and Study Population

This cross-sectional study was conducted among clinically suspected patients in Taiz city during March to August 2014. Taiz is located in the southwestern of Yemen at the geographical coordinates of 13°34'46" N 44°01'15" E (Fig. 1). It lies in the foothills and middle heights, which range from 200-2000m elevation from sea level. The climate has many subtropical features, the mean annual temperature between 20-30°C with little seasonal variation and relative humidity ranging between 40-60%. The annual rainfall is approximately 800-1200mm, and most of this fall is in March, May, August and September. The majority of the population is working in agriculture, which is the primary source of income. The protocol of the study was approved by the Research Ethics Committee of the Faculty of Medicine and Health Sciences, Taiz University, Yemen. Participation of Patients was voluntary after explaining the aim of the study and obtaining informed consent from them and/or their guardians before data and sample collection.

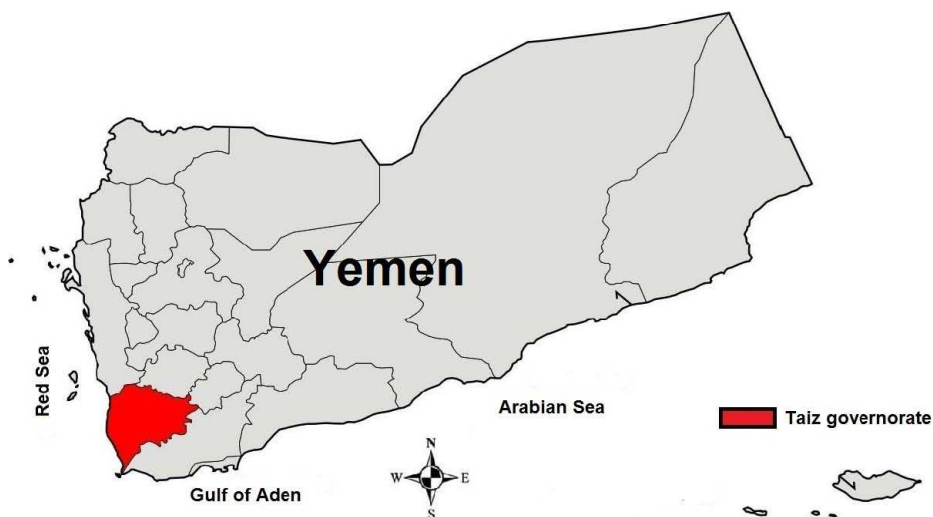


Fig. 1. Map of Yemen showing Taiz governorate

2.2 Specimen Collection and Processing

Small quantities of tissue obtained by skin scrapings were smeared on glass slides, air dried and fixed with methanol for a few seconds. The smears were stained with Giemsa stain. After 20 minutes of staining, the slides were washed with tap water and air dried. The stained smears were examined under the microscope with a 40 x lens and with a 100 x oil immersion lens. If at least one amastigote with a distinctive kinetoplast was found, the smear was declared positive. At least 100 microscopic fields with $\times 1000$ magnifications under a light microscope were observed for the detection of *Leishmania* amastigotes before considering the samples as negative. Many of the patient smears were double checked.

2.3 Statistical Analysis

Statistical analysis was done using SPSS version 20, Chi square test was applied and P value ≤ 0.05 was taken as significant.

3. RESULTS

In Yemen, the diagnosis of CL is based primarily on clinical symptoms, microscopic observation of parasites in stained smears. Of the 100 patients examined, 87% were found having CL. From Table 1, Lesions were recorded in different age groups, with the highest infection rate (62.1%) in the 1-15 years group and lowest (5.7%) in >45 years group. As presented in Table 1, the higher infection rate was found among males (57.5%)

comparing to females (42.5%) with statistically significance difference ($X^2= 5.371$, d.f.=1, $P= 0.020$). Moreover, CL has more infection rate among infected patients who resided in rural area (79.3%) than those who resided in urban (20.7%). The results showed that there was statistically significant difference between the two localities ($X^2= 6.631$, d.f. = 1, $P= 0.01$).

The lesions were recorded from different parts of the body. The most ulcers were recorded on the face of 42 patients (48.3%), in the arms of 22 patients (25.3%), and in the legs of 7 patients (8%).

It is clear from the Table 1 that a single lesion was observed in the majority of subjects 78.2%, while 17.2% had 2 lesions and 4.6% had 3 lesions.

4. DISCUSSION

Yemen is one of the poorest countries in the world, and Leishmaniasis considered one of the neglected parasitic disease affecting the poorest people in Yemen. A national control program with goals to eliminate leishmaniasis has yet to be launched due to the current upheaval and social unrest in the country.

The present study was performed to investigate the prevalence of CL among clinically suspected patients in Taiz city, southwestern Yemen and its correlation with age, sex, site involvement etc. 87% of the patients in our study have Cutaneous Leishmaniasis. These findings were quite similar

to previous studies in Alsawalehare area, Lahj governorate, Yemen (91%) [12]. The high prevalence in our study can be attributed to that only clinically suspected patients were included as well as the small sample size which considered one of the limitation of our study.

Table 1. Demographic data of the study subjects (n= 87)

Subject	N	(%)	P value
Residence area			0.01
Urban	18	(20.7)	
Rural	69	(79.3)	
Sex			0.02
Males	50	(57.5)	
Females	37	(42.5)	
Age groups (years)			0.92
1-15	54	(62.1)	
16-30	22	(25.3)	
31-45	6	(6.9)	
>45	5	(5.7)	
Sites involved			0.466
Face	42	(48.3)	
Arms	22	(25.3)	
Legs	7	(8)	
Mixed	16	(18.4)	
Number of lesions			0.12
One	68	(78.2)	
Double	15	(17.2)	
Three	4	(4.6)	

Sand flies seem more prevalent in rural areas due to perfect breeding sites. The present study shows the high prevalence rate was among patients who lived in the rural area. Muqbil and her colleague [12] reported that, most Yemeni people, mainly in rural area live in houses where the lower part of the house is used for Cows. This cow is especially used in the fields which provide a ready warm blood meal for the sand flies and their dung may also form an ideal breeding site for the flies to lay eggs [13,14].

The reason of higher prevalence rate in younger age in the present study is probably due to the fact that they have poorly developed immune system. Similar rates are also recorded by [15,16]. In contrast, the older age (>45 years group) shows lower prevalence rate, this is may be related to the fact that they were infected during early ages and they acquired long term immunity during childhood.

Our study recorded that males were more infected than females with statistically significant difference. Most of Yemeni males engaged in

outdoor activities and night duties that exposes them to sand fly bites more than females, which is also noticed by others [17,18]. Also, the dressing pattern among Yemeni women may play role in less exposing females to infection. In addition, women are obliged to be home before evening, the onset of the period of sand fly activity as observed by Al-Jawabreh et al. [19].

In the present study all the lesions were present on the exposed parts of the body, i.e. the sites available for Sand fly bites. Similar observations have been reported by others [20,21]. In this study, single lesion is the most common while multiple lesions are rare. This finding is in agreement with recent study carried out in other localities in Yemen [12]. The single lesions are usually detected in *Leishmania tropica* infection, while multiple lesions are seen in *Leishmania major* infection [22].

5. CONCLUSION

It was concluded that CL in this region considered a major health problem. The younger age group is the most affected. Consequently, there is a need to make the general public aware about the life cycle and control of the disease. Government should take interest in controlling the disease. Prompt and effective measures will be required to prevent CL.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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