Prevalence of Cutaneous Leishmaniasis in Alert Center, Retrospective Analysis, Addis Ababa

Sebsib NEWAY[1]

Biruk YESHITILA[1]

Binyam MEBRAT[1]

Gizealew AYALEW[2]

ABSTRACT

Cutaneous leishmaniasis is gradually becoming an increasing public health concern. Therefore, it is essential to generate knowledge on the epidemiological determinants of the infection to develop effective control strategies on the transmission of the disease. Environmental changes, the immune status of the host, and treatment failure are the three most important risk factors associated with cutaneous leishmaniasis. The aim of this study was the prevalence of cutaneous leishmaniasis at the ALERT center, over a five-year (2014-2018). A total of 2329 study participants comprising 1174 (50.4%) males and 1155 (49.6%,) females participated. The data was collected retrospectively from ALERT center clinical laboratory records within the study period (2014-2018).

[1]Armauer Hansen Research Institute, Addis Ababa, Ethiopia
[2]All Africa Leprosy, Tuberculosis and Rehabilitation Training Center, Addis Ababa, Ethiopia
*Corresponding author: S. NEWAY, sebsibneway2152@gmail.com

The overall prevalence of cutaneous leishmaniasis among the study participants was 33%. Of this, the prevalence of cutaneous leishmaniasis among male and female study participants was 34.9% and 31.1%, respectively. The prevalence in the age group less than 18, 19-28, 29-38, and greater than 39 years was 37.0%, 26.6%, 13.3%, and 23.1%, respectively.

Generally, this study showed that cutaneous leishmaniasis, prevalent in the study area, is still a public health problem associated with many risk factors. Hence, there is a need to implement a sound control program, strengthened behavioral change, communication, and social mobilization-related activities.

Keywords: Leishmaniasis, Cutaneous Leishmaniasis, Trend

INTRODUCTION

Leishmaniasis is a collective name of diseases caused by different species of the intracellular protozoa of the genus Leishmania (Claborn, 2010) and transmitted by the bite of female phlebotomine sandflies of the genera Phlebotomus or Lutzomyia (Goto and Lindoso, 2010). The different clinical forms of leishmaniasis constitute severe public health problems: Visceral leishmaniasis (VL) is usually fatal when untreated, Mucocutaneous leishmaniasis (MCL) is mutilating disease, diffuse cutaneous leishmaniasis (DCL) and Cutaneous leishmaniasis (CL) is disabling when lesions are multiple (Bari et al., 2012).

It is endemic in many parts of the world; it has re-emerged in a number of endemic countries. The increase in leishmaniasis incidence worldwide is mainly attributed to the increase of several risk factors, including massive migration, deforestation, urbanization, immune suppression, malnutrition, and treatment failures (Goto and Lindoso, 2010). It is prevalent in tropical and subtropical areas. Still, due to the increase in international travel, it also appears to be an important disease in people living in no endemic areas (Negera et al., 2008). In terms of the

global burden of the disease, leishmaniasis represents the third most important vector-borne disease (Bsrat et al., 2015). World Health Organization estimates an incidence of 1 million cases of CL in the past 5 (2008-2013) years. However, this number is probably underestimated because of misdiagnosis and inconsistent reporting guidelines (Sunyoto et al., 2018).

In Ethiopia, it is not unique in this perspective as the case is testified by its poor health outcomes even by sub-Saharan Africa's standards. The serious environmental problems of the country such as deforestation, overgrazing, soil erosion, desertification, and high vulnerability to a changing climate. Such changes are undoubtedly influencing the profile of vector-borne diseases (Bsrat et al., 2015). Another study indicated on a systematic review and meta-analysis shows in Ethiopia shows that: prevalence of leishmaniasis in animals and humans, CL has been well known since 1913 and is endemic in most regions; however, it is one of the neglected diseases in the country (Valero and Uriarte, 2020). A study of the epidemiology of CL in three areas of Ethiopia was initiated in 1969 by a group of investigators. Those areas were Kutaber (North West of Dessie) in 1969, Aleku (in the Wollega province) in 1970, and Ochollo (southwest Ethiopia) in 1971. Studies in Ochollo in 1971 and 1981 reported a prevalence of active cutaneous leishmaniasis of 10.7% and 3.8%, and of healed lesions of 30.4% and 32.8%, respectively (Bugssa, 2014).

Therefore, this study was to assess the prevalence of CL cases diagnosed in one of the known dermatology specialized hospitals in Addis Ababa, ALERT Center, between January 2014 and December 2018.

METHODOLOGY

Study Area Description

The study was conducted by extracting information from laboratory and individual clinical history reports for patients visiting the ALERT Center. Addis Ababa is the capital city of Ethiopia, with a population of 3,435,028 according to the 2017 population census conducted by the Central Statistical Agency (CSA) with an annual growth rate of 4.36%. ALERT center was established in 1934 by Sudan Interior Mission as a Leprosarium and named after the daughter of His Majesty Emperor Haile Selassie I as Prince Zenebework Memorial Hospital (PZWMH). It is one of the specialized tertiary referral hospitals in the country, located in Addis Ababa at 7 km southwest on the way to Jimma.

Study Population and Design

A retrospective hospital-based study was utilized of patient medical records to assess the prevalence of cutaneous leishmaniasis in the period 2014-2018 in patients presenting to ALERT center.

Eligibility Criteria and Inclusion Criteria

All individuals' records were those had Leishmania parasite and prescribed by the physicians for laboratory diagnosis were included.

Exclusion Criteria

 Any individual's record who was previously treated for Leishmaniasis was excluded (anyone on follow-up for treatment outcome according to request paper indicated).

Data Collection

The data was collected retrospectively from ALERT center clinical laboratory records (laboratory information system) within the study period (2014-2018). Age, Sex, and geographical location of the patient were used for variables of interest.

Data Collection Tools and Approaches

Data were collected by trained personnel or by group members. The group leader is the principal investigator and collected data during the study period from 1st January 2014-Dec 30, 2018 from a computer-based information system and patients' medical records.

Data Quality Assurance

The data was collected carefully and entered manually into SPSS software version 20.0. It was checked to ensure the completeness of all the required variables before analysis by frequencies and percentages.

Statistical Analysis

The collected data was checked by the principal investigator and group leader on a daily basis for any incompleteness and/or inconsistency. Any incompleteness and/or inconsistency appeared; corrections were made by re-checking data back against the records. Data entry and statistical analysis were done by using SPSS software version 20.0. A frequency was used to calculate the prevalence rate, and a Chi-squared test for linear trend was used to verify the statistical significance of the trend. Best fits the nature of the trend was fixed, and future predictions were made accordingly.

RESULTS

Socio-Demographic Characteristics of Study Participants

A total of 2329 study participants were enrolled in this study. 1174 (50.4%) of the study participants were males. The mean and median age of the participants was 28 and 24 years, respectively. The majority of the study participants were within the age group of less than or equal to18 (34.9 %) as shown (Table 1).

Table 1: Socio-demographic characteristics of study participants at ALERT center

Variable	Frequency (N=2329)	Percentage
Sex		
Male	1174	50.4%
Female	1155	49.6%
Age group		
≤18	813	34.9%
19-28	648	27.8%
29-38	270	11.6%
≥39	598	25.7%

Prevalence of Cutaneous Leishmaniasis and its Association with Socio-Demographic Characteristics

Prevalence of Cutaneous Leishmaniasis and its Association with Socio-Demographic Characteristics

The total prevalence of cutaneous leishmaniasis in this study was 33% (768/2329). The prevalence of cutaneous leishmaniasis in males and females is 34.9% 410 (34.9) and 31.1% 359 (31.1) respectively. It indicates that there is a slight difference in the prevalence of cutaneous leishmaniasis between the two sexes, but there is no statistically significant association ($p > 0.05$). This study shows the prevalence of cutaneous leishmaniasis predominance at the age group 29-38. However, there is no statistically significant association between the stated age groups ($p > 0.05$) (Table 2).

Table 2: Disease Status of Cutaneous Leishmania with socio-demographic characteristics using chi square(X^2).

Variable	Total	Prevalence of Cutaneous leishmaniasis		p-value
		No. of Positive (%)	No. of Negative (%)	
Sex				
Male	1174	410(34.9)	764(65.1)	0.421
Female	1155	359(31.1)	796(68.9)	
Age group				
≤18	813	284(35.0)	529(65.0)	0.134
19-28	648	204(31.5)	444(68.5)	
29-38	270	102(37.6)	168(62.4)	
≥39	598	178(29.8)	420(70.2)	

Prevalence of Cutaneous Leishmaniasis Associated with Geographical Location

In this study, about 2329 cutaneous leishmaniasis suspected patients attended ALERT center and were enrolled. Out of 2329 subjects, cutaneous leishmaniasis was diagnosed and confirmed in 768(33%) subjects. According to this study majority of confirmed cutaneous leishmaniasis cases were in the Oromia region 323(42%); followed by Amhara 200 (26%) (Table 3).

Table 3: Frequency of cutaneous leishmaniasis associated with geographical location (region)

Geographical location (region)	Prevalence	Percent (%)
Oromia	323	42
Amhara	200	26
Southern Nation Nationality Peoples (SNNP)	92	12
Addis Ababa	129	16.8

|		
Tigray	17	2.2
Afar	3	0.4
Benshangul Gumze	4	0.6
Total	768	100%

Trends of Cutaneous Leishmaniasis over the Past Four Years (2014-2018) in the Study Area

Health records of CL kept between December 2014 – December 2018 obtained from the ALERT center was analyzed. Based on these records, we determine the trend of cutaneous leishmaniasis over the past four years (2014-2018). The trend of cutaneous leishmaniasis cases decreased consecutively from 2014-2018, but in 2018 the case increased randomly (Table 4 and Figure 1). The following figure also showed us the trend of cutaneous leishmaniasis cases decreased consecutively from 2014-2018, but in 2018 the cases increased randomly.

Table 4: Trend of cutaneous leishmaniasis from 2014-2018.

Year	Frequency	Prevalence of CL		Percent (%)
		No positive (%)	No Negative (%)	
2014	330	109(33%)	221(67%)	15.9
2015	350	106(30.2)	244(69.8)	4.2
2016	371	106(28.6)	265(71.4)	15.5
2017	454	122(26.9)	332(73.1)	17.8
2018	824	319(38.7)	505(61.3)	46.6
Total	2329	768	1561	100.00
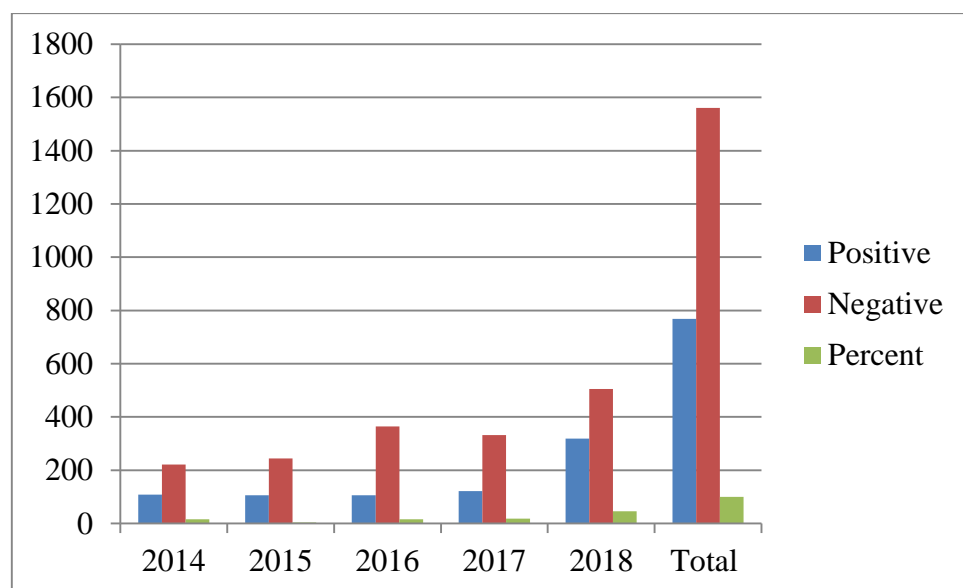
Figure 1: Trend of cutaneous leishmaniasis cases.

DISCUSSION AND CONCLUSIONS

Direct skin smear microscopic approach was employed to determine the prevalence of cutaneous leishmaniasis at the ALERT center from 2014 to 2018. A total of 2329 study participants were enrolled. The total prevalence of cutaneous leishmaniasis in this study was 33%. It had a greater prevalence than those areas were in 1970 (30.4%) and Ochollo (32.8%) in 1971 (Bugssa, 2014). The prevalence of cutaneous leishmaniasis in males and females is 34.9% and 31.1% respectively and compared with the study conducted in Isfahan, Iran indicated similar prevalent of cutaneous leishmaniasis in both men and women, it had a higher incidence in men (61.8%) (Karami et al., 2013). Similar to study our study conducted in Addis Ababa, Ethiopia, and Ramshir, Iran showed that the prevalence of cutaneous leishmaniasis in males was 53.7% (Valero and Uriarte, 2020; Bekele et al., 2016). But the study findings reported at Ochollo in Silte woreda (South Ethiopia) show females seemed to be at a higher risk of acquiring cutaneous leishmaniasis than males (Bsrat et al., 2015). The reason why females showed a higher infection rate than males is unclear. Still, it could be due to various environmental and behavioral factors or other genetic or immunological characteristics

(Tilahun, 2014). According to global Findings in 2013, Nine countries had significantly greater DALYs from cutaneous leishmaniasis than the mean: Afghanistan (87·0), Sudan (20·2), Syria (9·2), Yemen (6·2), Iraq (6·0), Burkina Faso (4·8), Bolivia (4·6), Haiti (4·1), and Peru (4·0). Similar proportions of males and females had cutaneous leishmaniasis in most countries with a high incidence (Karimkhani et al., 2017). It indicated that the prevalence of cutaneous leishmaniasis was higher in males than females; however, the incidence rate is significantly higher as compared to this finding.

According to this finding, cutaneous leishmaniasis infection was observed in all age groups; however, the highest prevalence was recorded in the age group of 29-38 years followed by the age group less than or equal to 18 years (35%), putting the former age group at higher risk of contracting the disease. However, the difference was not statistically significant (p > 0.05). While some studies also reported a high prevalence of cutaneous leishmaniasis in the age group of 20-34 (Goto and Lindoso, 2010; Bekele et al., 2016).

Hence it can be concluded that rates of infection in different age groups depend upon the study location. According to our study majority of confirmed cutaneous leishmaniasis cases were in the Oromia region 323 (42%); this may be the location of the study area is more nearby to the Oromia region, and most patients are referred to the center. While the remaining 26%, 16.8%, 12%, 2.2%, 0.4%, and 0.6% were in Amhara, Addis Ababa, SNNPR, Tigray, Afar, and Benshangul Gumz region respectively, this is in line with previous reports by

(Bekele et al., 2016). The increase in the number of tests from 2014 to 2018 may be due to the treatment and testing capacity of the Hospital. The trend of cutaneous leishmaniasis cases was decreased consecutively from 2014-2017. It may be due to the presence of good leishmaniasis intervention in the past few years, however in 2018, the cases increased randomly, this may be due to increasing the detection rate and diagnosis.

The finding in this study in relation to the presence of cutaneous leishmaniasis revealed that the prevalence of cutaneous leishmaniasis in the study area was 33% which was too high relative to the study conducted yet. Most males and farmers are groups to have relatively higher exposure for cutaneous leishmaniasis with respect to the female, and the majority of the study participants were within the age group of less than or equal to 18 years. Based on the findings of this study, the prevalence of cutaneous leishmaniasis in an ALERT center increase from 2014 to 2018. It is advisable that strengthening the capacity of hospitals and health facilities to ensure the availability of early, accurate diagnostic testing followed by appropriate anti-leishmaniasis treatment. Taking the burden of cutaneous leishmaniasis and the distribution of the disease into consideration, immediate interventions are needed. It is also advisable if it is integrated with other control programs aimed against vector-borne diseases. The prevention and control of leishmaniasis expanded the country as a whole in order to contribute to policymakers on leishmaniasis control.

REFERENCES

Bari, A., Yusuf, R., Bangash, T., Ejaz, A. (2012). Mucocutaneous leishmaniasis in central Punjab and Azad Kashmir regions of Pakistan. Journal of Pakistan Association of Dermatologists, 22,191-196.

Bekele, S., Bekele, Y., Mulatu, F., Lemma, T., Tilahun, H., Bizuneh, E., Negussie, S., Yamuah, L., Wassie, L., Abebeb, M., Aseffa, A. (2014). Recent trends of cutaneous leishmaniasis in Alert Hospital, Addis Ababa. Ethiopia Medical Journal, 1,37-41.

Bugssa, G., Hailu, A., Demtsu, B. (2014). The current status of cutaneous leishmaniasis and the pattern of lesions in Ochollo primary school students, Ochollo, Southwestern Ethiopia. Science Journal of Clinical Medicine, 3,111-116.

Bsrat, A., Berhe, N., Balkew, M., Yohannes, M., Teklu, T., Gadisa, E., Medhin, G., Abera, A. (2015). Epidemiological study of cutaneous leishmaniasis in Saesie Tsaeda-emba district, eastern Tigray, northern Ethiopia. Parasites and Vectors, 8,1-9.

Claborn, D. M. (2010). The biology and control of leishmaniasis vectors. Journal of Global Infectious Diseases, 2,127-134.

Goto, H., Lindoso, J. A. L. (2010). Current diagnosis and treatment of cutaneous and mucocutaneous leishmaniasis. Expert Review of Anti-infective Therapy, 8,419-433.

Handman, E. (1999). Cell biology of leishmania. Advances in Parasitology, 44,1-39.

Karami, M., Doudi, M., Setorki, M. (2013). Assessing epidemiology of cutaneous leishmaniasis in Isfahan, Iran. Journal of Vector Borne Diseases, 50,30-37.

Karimkhani, C., Wanga, V., Naghavi, P., Dellavalle, R. P., Naghavi, M. (2017). Global burden of cutaneous leishmaniasis. The Lancet Infectious Diseases, 17,264.

Negera E., Gadisa E., Yamuah L., Engers H., Hussein J., Kuru T., Hailu, A., Gedamu, L., Aseffa, A. (2008). Outbreak of cutaneous leishmaniasis in Silti woreda, Ethiopia: Risk factor assessment and causative agent identification. Transactions of the Royal Society of Tropical Medicine and Hygiene, 102,883-890.

Sunyoto, T., Verdonck, K., El Safi, S., Potet, J., Picado, A., Boelaert, M. (2018). Uncharted territory of the epidemiological burden of cutaneous leishmaniasis in sub-Saharan Africa—A systematic review. Plos Neglected Tropical Diseases, 12, 6914.

Tilahun, F., Alemu, W., Mulatu, G. (2014). Magnitude and associated factors of cutaneous leishmaniasis; in Mekelle city, Ayder Referral Hospital, Tigray, Northern Ethiopia, 2014. Clinical Medicine Research, 3,189-199.

Valero, N. N. H., Uriarte, M. (2020). Environmental and socioeconomic risk factors associated with visceral and cutaneous leishmaniasis: a systematic review. Parasitology Research, 119,365-384.