

The Trends of Cutaneous Leishmaniasis Increment in Northeast Ethiopia, a Five Year Retrospective Study

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Abstract: Leishmaniasis is a vector born disease that mostly affects people found in low socio-economic status. It is prevalent in more than 98 countries of the world and about 1.3 million new cases were occurred annually. Globally, it was estimated that over 1.7 billion peoples live in areas where the risk of Leishmaniasis transmission is high. Thus, this study was aimed to assess the trends of Cutaneous Leishmaniasis in Northeast Ethiopia. A five-year (2014-2018) institutional based retrospective study was conducted from May to June 2019 at Dermatologic clinics of Borumeda Hospital, Northeast Ethiopia. Data was collected from the Hospital database of dermatology clinic using a structured checklist. Data was entered using “Epi info version 7” and exported to SPSS version 20 software for further statistical analysis. Finally, the trend of Cutaneous Leishmaniasis was presented using line graph and the annual incidence rate was also determined. A total of 559 cases of Leishmaniasis were recorded in the Hospital database and 452, 76 and 31 were confirmed cases of Cutaneous, Muco-Cutaneous and Mucosal Leishmaniasis, respectively. The mean (\pm SD) age of patients was 24 ± 17 years and specifically to Cutaneous Leishmaniasis; 57.7% were males and majority of cases (34.5%) were lived in Dessie town and almost half of patients affected with Cutaneous Leishmaniasis were children and Adolescents. In about two-third of patients (74.8%), Cutaneous Leishmaniasis was manifested in their faces and about 10.8% of cases had other co-morbidities. Moreover, Scabies and Impetigo was the major skin problem associated with CL. Generally, the trend and the annual incidence rate of the disease were increased significantly in the last five years. Our study revealed that, the trends of Cutaneous Leishmaniasis was increased in the year from 2014-2018 and continued as a public health problem in Northeast Ethiopia. Primary prevention and control programs of Leishmaniasis have to be implemented in Northeast Ethiopia and South Wollo Zone in particular.

Key words: Cutaneous Leishmaniasis • Trends • Northeast Ethiopia • 2019

INTRODUCTION

Neglected Tropical Diseases (NTDs) causes devastating illness for more than one billion people worldwide [1]. Many of NTDs affect people living with poverty and socio-economically deprived group of peoples [2, 3]. Ethiopia is among the top listed countries suffered from NTD where the highest burden of Leishmaniasis and trachoma were existed [4]. Leishmaniasis is one of the top NTD and vector born disease that mostly affect people with low socio-economic status [5]. It is prevalent in over 98 countries of the world and about 1.3 million new cases were occurred annually [6]. Globally, about 1.7 billion peoples were estimated to

live in areas where the risk of transmission of leishmaniasis is high [7]. It is also known to cause significant morbidity and mortality in developing countries [8]. East Africa is the region mostly affected with Leishmaniasis; Somalia, Sudan, Ethiopia, Kenya and Uganda were among the highly burdened countries in the region [9]. The type of Leishmania species, ecological characteristics, HIV co-infection, drug resistance, exposure of the human population to the parasite and human’s behavior were determinant factors for the spread of Leishmaniasis worldwide [10, 11]. In addition; cultural, environmental, socio-demographic factors as well as migration and disasters are contributing factors to the spread of the disease [12, 13].

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Cutaneous Leishmaniasis (CL) is the mild form of Leishmaniasis that involves the skin with the formation of localized lesion and it is usually found in the face, forearm and lower legs [14, 15]. *L. major*, *L. tropica* and *L. aethiopica* are the most common Leishmania species causing CL and rarely can be caused by *L. infantum* and *L. donovani* [16, 17]. Afghanistan, Iran, Syria, Algeria, Ethiopia, North Sudan, Colombia, Brazil, Costa Rica and Peru were accounted about 75% of the global burden of CL [18]. In Ethiopia, CL is mainly caused by *Leishmania aethiopica* with a typical presentation of localized lesion [19, 20]. In the country, CL was highly prevalent in the Northern and southern part of Ethiopia including Addis Ababa [21]. Moreover, in the country, areas having altitude of 810-3563 meter above mean sea level and environmental temperature of 10.6-23.8°C are at risk for Leishmaniasis and the central, northern and the southern highlands of Ethiopia were among the endemic areas of CL [22]. The true burden of CL was not well known in Ethiopia. However, over 170 districts were suspected to be endemic for CL in the country [23]. Moreover, it was estimated that about 22.5% of the total area of the country is a high risk area and more than 28 million people are at risk of the disease [22]. New Outbreak of CL has been also observed in the country that was not known endemic previously [24].

A study reported from ALERT (All African Leprosy Rehabilitation and Training center) Hospital in Ethiopia revealed that CL was the third most common cause of skin disease and the leading among infectious causes of skin disease [25]. CL could affect all individuals exposed to sand fly bite. However, children were the most vulnerable age group to have the higher proportion of the disease [26, 27]. Sleeping outside of house and outdoor activities are the most behavioral risk factors for the acquisition of infection in highland areas of Ethiopia [27].

Cross sectional studies in Ethiopia at different study period revealed that the prevalence of CL ranged from 4.8-65.8% across different regions and geographical locations [28-31]. CL is the most common form of Leishmaniasis and it is mainly observed on the face [29, 32, 33]. However, multiple lesions has been detected at higher rate than single lesions in Ethiopia [24]. Moreover, CL has a significant psychological impact and social stigma particularly in young individuals and children due to the remnant scar in their body [34-36].

Many peoples in Ethiopia had lack of awareness about Leishmaniasis and significant proportion of individuals primarily use herbal medications as a treatment [37]. Prevention and control of the disease can be

maintained by environmental management, personal protection and elimination of sand flies [38]. Related to this, the national Leishmaniasis control program of Ethiopia was established in 2005 [23]. Studies also revealed that the disease had considerable financial impact on the clients and Health Care System [39, 40]. In Ethiopia, Health care facilities providing Leishmaniasis diagnosis and treatment service are limited [41]. Although, new outbreak of CL has been observed in some parts of Ethiopia which was not known endemic previously [24]. It is usually endemic in many highland areas [23, 42]. Kutaber district is one of highland area in Amhara region where CL was prevalent [24]. However, the trends of CL and its epidemiological distribution are not yet known in this area. Hence, this study was aimed at determining the trends of CL in Northeast Ethiopia.

MATERIALS AND METHODS

Study Design and Settings: A five-year institutional based retrospective study (2014-2018) was conducted from May to June 2019 at Dermatologic clinics of Borumeda Hospital, Northeast Ethiopia. Borumeda Hospital was established in 1955 and found in Dessie town of Amhara regional state, which is located 411 km northeast of the capital Addis Ababa, Ethiopia. The hospital has a long history in diagnosing and treating patients presented with dermatological problems including CL.

Giemsa stain and Histopathology tests have been used in this hospital to diagnose patients presented with symptoms and signs suggestive of Leishmaniasis and pentavalent antimony compounds were used to treat the disease.

Study Population and Selection Criteria: All patient records with confirmed diagnosis of Cutaneous Leishmaniasis at Borumeda Hospital, database of dermatology clinic were included in the study. All patient records without confirmation of CL and being diagnosed before 2014 and in the year 2019 were excluded in the study.

Data Collection Method: One supervisor and four trained data collectors were involved in the data collection. All cases with confirmed diagnosis of CL were selected from the Hospital database of dermatology clinic and the relevant information was collected using a prepared work sheets or checklist. Socio demographic variables; sex, age and residence and clinical data like

location and type of the disease, duration of lesion, year and month of diagnosis and other co-morbidities were included in the checklist.

Operational Definition

Cutaneous Leishmaniasis: A protozoan infection and vector born diseases of human beings caused by *Leishmania specious* that affects the skin primarily. Depending on the number of lesion, it could be classified as localized and diffused form.

Trends of Cutaneous Leishmaniasis: The occurrence and distribution of the disease in the population at a given period of time.

Statistical Analysis: Data was entered in to Epi info version 7 and exported to SPSS (Statistical package software for social science) version 20 for further statistical analysis. Data were reported using mean±standard deviation (SD) for continuous variables and proportions and tables were used to describe categorical variables. Finally, the trend of CL was presented using line graph and the annual incidence rate was also determined.

Ethical Consideration: Ethical clearance was obtained from ethical review committee of department of Nursing, College of Medicine and Health Sciences, Wollo University. Communication with Borumeda Hospital administrators and case team managers was held through formal letter and the purpose and importance of the study were explained. Confidentiality of patients' information was maintained throughout the study by excluding their name from the checklist.

RESULTS

Socio Demographic and Clinical Characteristics of Patients:

A total of 559 cases of Leishmaniasis were records in the hospital database and 452, 76 and 31 were confirmed cases of Cutaneous, Muco-Cutaneous and Mucosal Leishmaniasis, respectively. The mean (\pm SD) age of patients was 24 ± 17 years. Of the total cases with cutaneous Leishmaniasis, about 57.7% were males, majority of cases (34.5%) were from Dessie town and almost half of the patients affected by CL were children and adolescents (Table 1).

Furthermore, a significant proportion of patients (75.2%) had localized form of the disease (Single lesion) and in about two-third of patients (74.8%), the disease was manifested in their faces followed by ear which accounted 15.5%. Furthermore, nearly half (49.1%) of the cases had persistent lesions for less than six months before seeking medical care and about 10.8% of cases had other co-morbidities and Scabies was the major skin problem associated with CL cases in the study area (Table 1).

Trends and Incidence Rate of Cutaneous Leishmaniasis in Borumeda Hospital:

This study showed that the number of CL cases was increased significantly from year to year and the annual incidence rate of the disease was also increased in the last five years (Table 2). The total number of CL cases was 50, 61, 72, 118 and 151 from 2014 to 2018, respectively (Fig. 1). In addition, the cumulative monthly distribution of the disease revealed that CL was observed primarily in July (20.6%), June (14.2%) and January (11.7%) (Fig. 2).

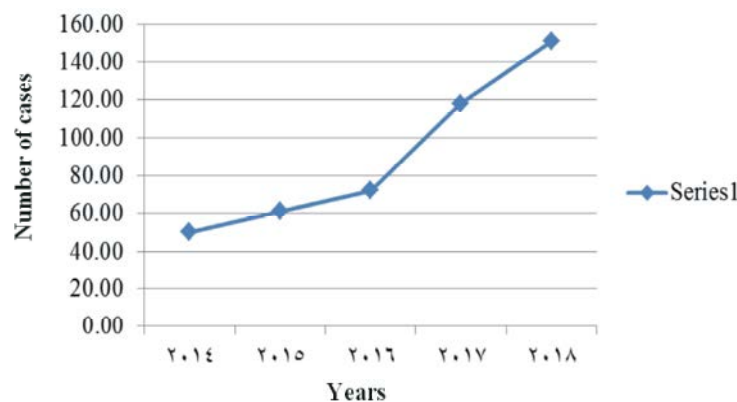


Fig. 1: Line graph showing the Trends of Cutaneous Leishmaniasis in Borumeda Hospital, Northeast Ethiopia, 2019

Table 1: Socio demographic and clinical characteristics of patients with Cutaneous Leishmaniasis in Borumeda Hospital, Northeast Ethiopia, 2019 (n = 452)

Variables		Frequency	Percent
Sex	Male	261	57.7
	Female	191	42.3
Age(in years)	<=19	228	50.4
	20-39	133	29.5
	40-59	69	15.3
	>=60	22	4.9
Residence	Dessie	156	34.5
	Kutaber	104	23.0
	Tewldhere	43	9.5
	Delanta	32	6.8
	Ambasel	30	6.6
	Woreilu	25	5.5
	Kombolca	20	4.4
	Legambo	20	4.4
	Others*	22	4.9
Site of CL	Face	338	74.8
	Ear	70	15.5
	Upper extremity	23	5.1
	Lower extremity	21	4.6
Types of CL	Localized	340	75.2
	Diffused	112	24.8
Duration of lesion before seeking	< 6 month	222	49.1
	6 month- 12 month	165	36.5
	> 12 month	65	14.4
Other co-morbidities	No	403	89.2
	Scabies	23	5.0
	Impetigo	17	3.7
	Leprosy	9	2.1

*Borena, Wadla

Table 2: The annual incidence rate of Cutaneous Leishmaniasis cases in Borumeda Hospital, Northeast Ethiopia, 2019 (n = 452)

Years	Population in south Wollo Zone	Number of Cutaneous Leishmaniasis cases	Annual Incidence Rate (1/10000)
2014	2, 518, 862	50	0.19850234
2015	2, 518, 862	61	0.24217285
2016	2, 518, 862	72	0.28584337
2017	2, 518, 862	118	0.46846552
2018	2, 518, 862	151	0.59947707

Source: Total population of South Wollo Zone (2, 518, 862);Central Statistical Agency of Ethiopia, 2007 [43]

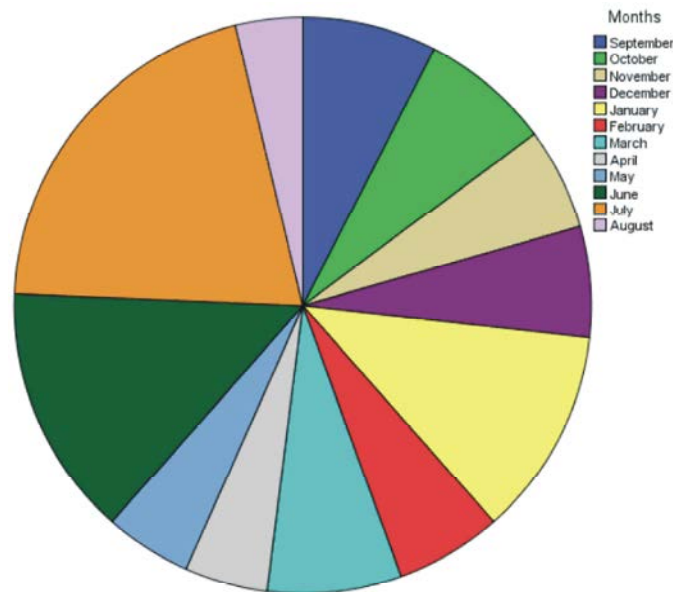


Fig. 2: The cumulative monthly distribution of Cutaneous Leishmaniasis in Borumeda Hospital, northeast Ethiopia, 2019

DISCUSSION

Our study revealed that the Trend of Cutaneous Leishmaniasis in Borumeda Hospital was increasing significantly which is comparable with a four years trend analyses report in ALERT Hospital [32] and in Ochollo, Southwestern Ethiopia [37] and Eastern Mediterranean Region [44]. It is also comparable to the trend analyses report of CL in Morocco [45] and Syria [46] where the trend of CL was increased significantly. However, in two settings of Saudi Arabia previously known to be endemic for CL, the trend was significantly reduced in the past decades [33, 46].

In this study, the main groups of population affected by CL were children and adolescents. It is similar with study reported from cross sectional studies in different setting of Ethiopia [21, 22, 24, 25]. However, our finding is contradicted as compared to study reported in Saudi Arabia where majority of cases were observed in adults between the age of 15-45 years [33]. This variation could be due to difference in socio demographic and economic characteristics of the populations. Our study also revealed that males were the main segments of the population affected by CL than females which is in agreement with different cross sectional studies done in northern Ethiopia, in the two settings of Saudi Arabia and Pakistan [38, 46, 59, 63]. This could be due to the highly engagement of males in outdoor activity like farming and other agricultural works compared to females. However, this finding is contradicted with study reported from Morocco that excess case occurrence of CL was observed in females than males [47]. In contrast to the gender discrepancy of cases, cross sectional studies reported in the two setting of Ethiopia; Siltiworeda, Addis Ababa and Nigeria revealed no gender difference in the distribution of the disease [28, 48, 49].

In our study, about one-third of clients with CL were from Dessie town (34.5%) and higher proportion of the disease was also distributed in Kutaber and Tewldhere Districts. This could be due to the higher prevalence of the disease in highland areas than low land areas of Ethiopia [23, 42]. Similarly, study reported from ALERT Hospital revealed the higher distribution of the disease was from residents of Addis Ababa and Oromia Region [32]. It is also supported by studies done in southwest Iran and Saudi Arabia that higher CL cases were detected among urban residents [33, 50]. However, studies in Morocco and Ethiopia revealed that rural residents were the main segment of the population highly affected with CL [32, 47]. But in our study, significant proportion

of patients was detected from rural areas like Kutaber, Tewladhere and Delanta districts. Moreover, of the total patients suffered from CL, in about two-third of patients, the lesions of the disease were observed in their face. This is in line with other studies reported in Ethiopia and Saud Arabia [24, 28, 29, 32, 33, 48, 50, 51]. As a limitation, other pertinent socio-demographic and economic characteristics and behavioral factors were not assessed due to absence of recording in the database.

CONCLUSIONS

Our study revealed that, the Trend of Cutaneous Leishmaniasis was increased for the last five consecutive years (2014-2018) in the study area and continued as a public health problem in northeast Ethiopia. Primary prevention and control programs of Leishmaniasis have to be implemented in northeast Ethiopia and South Wollo Zone in particular. Furthermore, Health care workers need to provide health education targeted at increasing the awareness of the population about the prevention and controlling mechanisms of Leishmaniasis.

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