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Research Article

Prevalence and Knowledge of Cutaneous Leishmaniasis in Aleku Area of Sayo District, Western Ethiopia: Community-Based Cross-Sectional Study

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Abstract

Background: Cutaneous Leishmaniasis (CL) causes skin lesions, mainly ulcers, on exposed parts of the body and leave life-long scars that cause serious disability or stigma. The disease is a neglected tropical disease that has worldwide public health problem in many developing countries including Ethiopia. This study aimed to assess the prevalence of CL, and community knowledge of cutaneous leishmaniasis in Aleku areas of Sayo district, western Ethiopia.

Method: A community-based cross-sectional study was conducted in three kebeles of Aleku areas from June 8-22, 2017. House-to house survey was conducted. Two hundred eleven households with 1074 family members were assessed for CL. A structured questionnaire was used to collect sociodemographic and clinical data. Active lesions and scars of CL were physically examined among study participants. Diagnosis of leishmania from skin lesions was established by microscopic demonstration of the parasite by skin slit smear and lesion scraping for parasite culture using Novy-MacNeal-Nicolle (NNN) media. Descriptive Data analysis was performed using SPSS 20.0 for Windows.

Results: The overall prevalence of CL in the study areas was 6.98% (2.05% for active lesions and 4.93% for scars) (95% CI=60% to 80 %). During active case detection, 33 CL- suspected lesions were found, of which 22 were confirmed as CL. Active lesions of CL in the Aleku area were clinically characterized as Single (83.36%), local Cutaneous leishmaniasis (86.4%) and ulcerative (50%). Nose was the frequently affected part as 45.5% of individuals had the lesion on their nose, followed by the Cheek (31.8%) and the lips involvement (13.6%). Almost all local community of the Aleku area consider CL as if the disease were transmitted while in contact with the urine of bats and named it "Dhukkuba Simbira" In Afan Oromo to mean the disease of bats. In addition, all individuals with CL did not go to local health facilities to seek treatment as they were considering the disease have no any therapeutics.

Conclusion: The prevalence of CL in Aleku was 6.98% which was lower than the 16.4% reported in 1969 in the area. Although CL in Aleku areas was reported 50 years ago, knowledge and practice of the local community on transmission, control and treatment of CL was low. Strengthening access to diagnosis and anti-leishmania treatment with cases with active lesions and emphasizing in awareness creation to community on the transmission and control of the disease are suggested.

Keywords: Assessment of active lesions and scars of cutaneous leishmaniasis; Knowledge and practice of cutaneous leishmaniasis; Aleku area

Abbreviations

CL: Cutaneous Leishmaniasis; EPHI: Ethiopian Public Health Institute; NNN: Novy-MacNeal-Nicolle

Introduction

Leishmaniasis is a neglected tropical disease caused by obligate intracellular protozoa of the genus Leishmania and transmitted by the bite of female sandflies. It shows a wider geographic distribution and increased global incidence [1]. Clinical manifestations of leishmaniasis include cutaneous, mucosal, and visceral syndromes [2]. Cutaneous Leishmaniasis is the most common form of leishmaniasis and causes skin lesions, mainly ulcers, on exposed parts of the body. These can leave life-long scars and cause serious disability or stigma [3]. For cutaneous leishmaniasis, estimates of the number of new cases per year have ranged from approximately 700,000 to 1.2 million or more [4].

Cutaneous leishmaniasis is a worldwide public health and social problem in many developing countries [1,5]. East African region remains one of the most impacted regions globally for leishmaniasis, which impacts significantly on the health, well-being and livelihoods of affected communities and for which a lack of reporting and control interventions hinder progress toward elimination of this neglected tropical disease [6]. Leishmaniasis is endemic to Ethiopia; Both Cutaneous and Visceral Leishmaniasis are growing health problems in the country with endemic areas that are continually spreading, with an annual incidence of 20,00 to 40,000 cases of CL, predominantly caused by Leishmania aethiopica [7,8].

Phlebotomus longipes and *Phlebotomus pedifer* were identified as the most dominant sand fly species which accounted for CL in different parts of Ethiopia [9-11]. Bush hyraxes (*Heterohyrax brucei*) and rock hyraxes (*Procavia capensis*) are the known reservoir hosts of

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Cutaneous Leishmaniasis (CL) due to Leishmania aethiopica in the highlands of Ethiopia. They are also believed to be the reservoir hosts of Leishmania tropica and Leishmania killicki [10,12].

The pooled prevalence of CL in Ethiopia was 20.4% [13]. The overall prevalence of CL was 14.0% (6.7% for active lesions and 7.3% for scar) in the Saesie Tsaeda-emba district, eastern Tigray [14], 14.02% in the Kutaber District [9], 1.5% north-central Ethiopia [15]. The presence of cutaneous leishmaniasis in western parts of Ethiopia was reported in Wollega Province in 1966 [16], and Aleku area in 1969 [17]. Then, few studies were conducted in western parts of Ethiopia including a recent study done in the Dembidollo area [18].

This study aimed to determine the prevalence of active lesions and scars of CL and also assess knowledge and practices of CL among the local community of Aleku area, Oromia, western Ethiopia.

Materials and Methods

Study settings and period

Aleku area is part of Sayo district and is located 11 Km to the west of Dembidollo city. Aleku Dorgomme Health Center was located at 8°39'32"N latitude and 34°45'42"E longitude and the area is at an altitude of 1935 m. Aleku areas comprise 6 kebeles with 5126 households with a total population of 26,840. The study was conducted from June 8-22, 2017.

Study design

A community-based cross-sectional study was conducted.

Populations

All individuals who were living in Aleku area, Sayo district were the source populations. The study pollution was all individuals who were the residents of selected three kebleles of Aleku area, Sayo district, whereas the study unit was all individuals who ware participated in study during the study period.

Sample size and Sampling technique

The sample size was determined using a single population formula, using the prevalence of CL 16.4% previously reported in Aleku areas [17], 5% margin of error, and 95 % confidence of certainty. Accordingly, 211 houses were reached randomly. Three kebeles (Aleku Dorgomme, Aleku Kusaaye and Aleku Sooxii) were randomly selected (using the lottery method) from the six kebeles of the Aleku area. Then, three villages were selected from each kebeles for door-to-door sampling (Figure 1). Number of Households (HH) included in the study was proportional to the total number of households found in each kebeles.

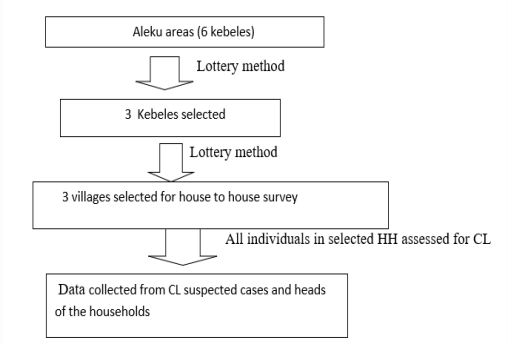

Figure 1: Schematic overview of sampling methods and study participants recruitments in Aleku area of Sayo district, Western Ethiopia, 2017.

Inclusion and exclusion criteria

Residents in the Aleku area who lived in the area for more than three months were included in the study. Persons who were unable to communicate and mentally handicapped were excluded.

Data collection

A house-to-house survey was conducted among each village. Two hundred eleven houses with a total population of 1074 were surveyed. A team of health professionals including one medical parasitologist from Wollega University, one senior laboratory technologist from the Ethiopian Public Health Institute (EPHI) leishmaniasis laboratory and two public health specialists from Aleku Health Center were involved in the survey. A structured questionnaire was used to collect sociodemographic and clinical data of CL suspected patients. Furthermore, Heads of the households were interviewed to assess knowledge and practice on cutaneous leishmaniasis.

Active lesions and scars of cutaneous leishmaniasis were physically examined among study participants. Clinically CL suspected individuals, with active lesions was requested to come to Aleku Dorgomme Health Center to give samples for laboratory confirmation of leishmania. Then, a skin slit smear was collected by experienced laboratory technologist from individuals who were clinically suspected of having active lesions of CL. Approximately 3 mm in length and 3 mm in depth slit was made at the base of the lesions with a sterile blade (Swann Morton, England). The dermal tissue was scraped from the wall of the slit and smeared on to clean and alcohol-free microscopic slide (2 slides for each lesion) which was left to be dried for staining. Additional lesions scraping was obtained for parasite culture. The scrapped fluid was placed in a sterile cryotube which contains complete media and was transported to the EPHI leishmaniasis laboratory from the field site within cold chain.

Parasitological examination

The scrapped fluid was inoculated in NNN medium and Locke's overlay solution in duplicate and parallel inside biosafety cabinet under sterile conditions. The inoculated culture flasks were incubated at 25°C to 26°C and amastigote transformation was examined under the inverted microscope every three days.

Direct amastigote detection: Air-dried skin slit smears were fixed with methanol, and stained with 10% Giemsa for 25 minutes. Slides were examined under a light microscope with a 100x objective for the detection of amastigotes. All slides were examined prior to the knowledge of the culture results to avoid subjective interpretation of results.

Ethical consideration/clearance

Prior to the study, ethical clearance was obtained from the Wollega University research Ethics Review Committee. Written informed consent was obtained from adult study participants and a parent or guardian of a child. Written informed assent was also taken from children.

Data analysis

Data were cleaned, coded, and checked for missing data and outliers. Data analysis was done using SPSS version 20.0 software package for Windows. Descriptive statistics were employed to relate the socio-demographic characteristics and clinical characteristics of CL.

Results

Sociodemographic characteristics of CL cases

A total of 211 houses with a population of 1074 were surveyed. In 71 houses, 75 persons were identified as CL cases (22 with active lesions and 53 with scars of CL). Most CL cases were identified in Aleku Dorgomme and 61.3 % of persons with CL were male. The mean age for the CL cases was 24.6 years+15.8 SE. The minimum age and maximum age of CL cases were 4 years and 60 years respectively. 34.7 % of study participants with CL were found in the age categories of 11-20. Sixty four out of 75 individuals with CL were students and farmers (Table 1).

Table 1: Sociodemographic characteristics of persons with CL in the Aleku area, Kellem Wollega, Ethiopia (n=75), June 8-22, 2017.

Variables		Number	Percent (%)
Residence	Aleku Dorgomme	50	66.6
	Aleku Kusaaye	19	25.3
	Aleku Sooxii	6	8
Sex	Male	46	61.3
	Female	29	38.7
Age	<10 years	15	20
	10-20	26	34.7
	21-30	9	12
	31-40	15	20
	41-50	6	8
	51-60	4	5.3
Duty	Students	34	45.3
	Farmer	30	40
	House wife	3	4
	Government worker	2	2
	Children not enrolled in school	6	8

Prevalence of CL in Aleku areas

The overall prevalence of active or healed lesions of CL in the study population was 6.98% (75/1074) (95% CI=60% to 80%). Prevalence of active and healed lesions of CL were 2.05% (22/1074) and 4.93 (53/1074) respectively.

Prevalence of active lesion of CL: During active case detection, 33 suspected lesions were found, of which 22 were confirmed CL by Culture and microscopy. 19 out of the 22 confirmed CL cases were identified in Aleku Dorgomme. Active lesions of CL were found among 59.1% (13/22) of those under the age of 20 years. Students had more active lesions of CL as compared with other study participants (Table 2).

Out of the 22 active lesions of CL identified among study participants, 19 of them had a single lesion in their exposed body parts. 19 of the 22 cases were Local Cutaneous Leishmaniasis (LCL). Similarly, three of the patients with active lesions of CL were identified as Mucocutaneous Leishmaniasis (MCL) cases. Characteristics of the active lesions of CL in the Aleku area include, 50% (11/22) of them being ulcerative, 68.2% (15/22) non-painful and 41% (9/22) of the lesion's onset occurred within 6 months to 1 year. The distribution of lesions over the body of the study participants showed that the nose was the most commonly affected part as 45.5% (10/22) of individuals had the lesion in their nose followed by the Cheek 31.8% (7/22) and the lips involvement (13.6 %) (Table 3).

Knowledge and practice of persons with an active lesion of CL

In the study area, CL transmission was related to contact with the urine of bats. Almost all local communities in the Aleku area considered the transmission of the disease while in contact with the urine of bats and named CL "dhukkuba Simbira" In Afan Oromo to mean the disease of bats. In addition, the community assumes CL does not have any treatment and as a result, the identified CL cases did not go to local health facilities to seek treatment. Most of the CL cases in the study area are traditional burns (using hot metals or injera (common food item in Ethiopia) or the use of traditional drugs to cure the CL lesion/s (Table 4).

Table 2: Sociodemographic characteristics of persons with an active lesion of CL in the Aleku area, Kellem Wollega, Ethiopia (n=22), June 8-22, 2017.

Variables		Number	Percent (%)
Residence	Aleku Dorgomme	19	86.45
	Aleku Kusaaye	2	9
	Aleku Sooxii	1	4.5
Sex	Male	10	45.5
	Female	12	54.5
Age	< 10 years	8	36.4
	Oct-20	5	22.7
	21-30	1	4.5
	31-40	4	18.2
	41-50	1	4.5
	51-60	3	13.6
Duty	Students	9	41
	Farmer	5	22.7
	House wife	4	18.2
	Government worker	3	13.6
	Children not enrolled in school	1	4.5

Table 3: Clinical features of confirmed active lesions of CL in Aleku area of Sayo Worda, Kellem Wollega (n=22) June 8-22,2017.

Variables		Frequency	Percent
Number of lesions	Single	19	86.4
	Two	3	13.6
Type of CL	LCL	19	86.4
	MCL	3	13.6
Lesion Type	Ulcerative	11	50
	Nodular	8	36.4
	Papule	2	9.1
	Recidivine	1	4.54
Pain of the lesion	Painful	7	0.318
	Non- Painful	15	0.682
Lesion onset	Less than 6 months	1	4.54
	6 months- 1year	9	41
	1-2 year	6	27.3
	>2 years	6	27.3
Location of lesion/s	Nose	7	31.8
	Cheek	5	22.7
	Lip	2	9.1
	Hand	3	13.6
	Chin	1	4.54
	Ear	1	4.54
	Cheek and nose	1	4.54
	Nose and forehead	1	4.54
	Cheek, lip and nose	1	4.54

Discussion

Although the presence of CL in the Aleku area was reported in 1969 [17], recent prevalence, knowledge and practice of the community towards CL was not assessed yet. To effectively tackle the disease, it was important to improve community knowledge and attitude because these attributes play an important role in the prevention and control of the disease.

This study indicated the ongoing transmission of CL in the Aleku area. The overall prevalence of active and healed lesions of CL was 6.89%. Hence, this study indicated a decrease in the prevalence of

Table 4: Knowledge and practice of CL among individuals with CL in the Aleku area (n=75).

Variables		frequency	percentage
Transmission	Drinking contaminated water	1	1.3
	Eating contaminated food	0	0
	Insect bite	0	0
	In contact with the urine of bats	68	90.7
	Did not know	6	8
Treatment for the lesions	Local Health facilities	1	1.3
	Traditional treatment	74	98.7
Traditional treatment Types	Traditional Burning	36	48.6
	Traditional drugs	30	40.5
	Traditional burning and drugs	8	10.8

the disease in the study area compared with 50 years ago [17]. This decrease in the prevalence might be correlated with deforestation in the study area which might decrease the number of the reservoir host (hyrax) which can minimize the chance of Leishmania transmission to humans as *H. brucei* was living in trees around the Aleku area [19].

The prevalence of CL reported in this study was comparable to a recent finding from the Dembidolo district, western Ethiopia [18]. However, the prevalence was lower than the finding reported in Yemen [20] and Ethiopia [21,22]. The difference might relate to suitable environmental habitat for vectors and reservoirs that may affect human exposure to the disease [23]. The prevalence of active lesion of CL in this study was 2.04 %. From the three kebeles of Aleku areas (Aleku Dorgomme, Aleku Kusaaye and Aleku Sooxii), majority of the patients with active lesions were reported from Aleku Dorgomme. This indicated presence of active transmission of CL and the site should be prioritized to control the disease.

Prevalence of CL in males and females was 61.3% and 38.7% respectively. An increase in the prevalence of CL in males in this finding goes in agreement with studies conducted in Ethiopia [14]. In addition, in the Aleku area CL was identified among all age groups; however, the highest rate of active and scar was observed in the age group of less than 20 years (54.7%) putting the age group at higher risk of contracting the disease. This finding was in agreement with some studies conducted in Ethiopia; Dembidolo district [18], Saesie Tsaeda-emba [14], Ochollo [22], and Addis Ababa [10]. Children and young adults were at risk for CL as they frequently visit the gorges and escarpments (containing the hyrax shelters) during the evenings for leisure and recreation or for fetching water and firewood. Many individuals from this age group keep crops from wild animals mainly during the rainy season near the escarpments and gorges.

Most of the individuals with active CL lesions were students. In the Aleku area students acquire more CL than farmers, housewife and government workers. This finding was in contrast to a study done in Mekelle City as most of active CL lesion reported in hospital was from farms [24]. Students can play outdoors more; and move a longer distance in the morning and evening in scarce forests for school which might increase the chance of their exposure to sandflies than farms.

The majority of active lesions of CL in the Aleku area were clinically characterized as single (83.36%), local Cutaneous leishmaniasis (86.4%), ulcerative (50%), non-painfully (68%) and on set occurred in 6 months-1 year. This clinical presentation of CL was similar to findings reported from Dembidolo district [18] and Ochollo [22].

In most of the cases with active lesions of CL, the skin lesions were found above the neck region while the majority of the lesions (80%) were found on the nose and cheek. This distribution of CL lesions on the body of the individuals was in line with a study done in Ocholo, Southern Ethiopia [22]. Body parts above the neck region are the exposed body parts that are accessible for sand fly bite; mostly exposed body parts during outdoor activities and uncovered part during sleeping as the community in the Aleku area did not use insecticide-treated bed nets.

Although CL in the Aleku area was reported in 1969, the knowledge and practice of the local community on transmission and control of CL were low. Almost all local communities of the Aleku area consider CL as if the disease were transmitted while in contact with the urine of bats and named it “dhukkuba Simbira” In Afan Oromo to relate the disease with bats. In addition, individuals with active lesions CL did not seek treatment in nearby health facilities as they assumed the disease had no treatment. Nevertheless, those individuals use traditional drugs and burn the lesions with hot materials to cure the CL lesion/s. In the study area, knowledge and practice of the local community towards CL is low as compared with study done in Saesie Tsaeda-emba district [14] and Kutaber District [9]. Thus, the community in the Aleku area had poor knowledge and practice about CL transmission, control and treatment, implying the need to raise CL awareness through health information dissemination.

Conclusion

In this study, the prevalence of CL was 6.98% which was lower than reported in 1969. Although CL in Aleku areas was reported 50 years ago, knowledge and practice of the local community on transmission, control and treatment of CL was low.

Recommendations

Although CL in Aleku areas was reported 50 years ago, little attention was given to control, treatment and awareness of the community about the disease. Therefore, health information dissemination should be given to community on the transmission and control of the disease. In addition, cases with active lesions should have access to diagnosis and anti-leishmania treatment.

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References

1. Dawit G, Girma Z, Simenew K. A review on biology Epidemiology and public health significance of leishmaniasis. J Bacteriol Parasitol. 2013;4(2):1000166.
2. Murray HW, Berman JD, Davies CR, Saravia NG. Advances in leishmaniasis. Lancet. 2005;366(9496):1561-77.
3. WHO. Leishmaniasis. 2023.
4. CDC. Leishmaniasis: Epidemiology & Risk Factors. 2020.
5. Gonzalez U, Pinart M, Reveiz L, Alvar J. Interventions for Old World cutaneous leishmaniasis. Cochrane Database of Syst rev. 2008:1(4):CD005067.
6. Wamai RG, Kahn J, McGloin J, Ziaggi G. Visceral leishmaniasis: a global overview. J Glob Health Sci. 2020;2(1):e3.
7. WHO. WHO Intervenes to Control Cutaneous Leishmaniasis Outbreak in Somali Region Through Health Worker Capacity Building. 2023.
8. Henten SV, Adriaensen W, Fikre H, Akuffo H, Diro E, Hailu A, et al. Cutaneous leishmaniasis due to Leishmania aethiopica. EClinicalMedicine. 2019;6:69-81.
9. Berhanu A, Dugassa S, Maru M, Animut A, Erko B, Hailu A, et al. Cutaneous leishmaniasis in Kutaber District, Ethiopia: Prevalence, sand fly fauna and community

knowledge, attitude and practices. Heliyon. 2023;9(8):e18286.

10. Lemma W, Erenso G, Gadisa E, Balkew M, Gebre-Michae T, Hailu A. A zoonotic focus of cutaneous leishmaniasis in Addis Ababa, Ethiopia. Parasit Vectors. 2009;2(1);60.

11. Pareyn M, Bosch VE, Girma N, Houtte N, Dongen S, van der Auwera G, et al. Ecology and seasonality of sandflies and potential reservoirs of cutaneous leishmaniasis in Ochollo, a hotspot in southern Ethiopia. PLoS Negl Trop Dis. 2019;13(8):e0007667.

12. Lemma W. Hyraxes and Leishmaniasis in Ethiopia. Ethiop J Health Biomed Sci. 2008;1(1):63-9.

13. Shita EY, Nibret E, Munshea A, Gashaw B. Burden and risk factors of cutaneous leishmaniasis in Ethiopia: a systematic review and meta-analysis. Int J Dermatol. 2022;61(11):1336-45.

14. Bsrat A, Berhe N, Balkew M, Yohannes M, Teklu T, Gadisa E, et al. Epidemiological study of cutaneous leishmaniasis in Saesie Tsaeda-emba district, eastern Tigray, northern Ethiopia. Parasit Vectors. 2015;8:149.

15. Eshetu B, Mamo H. Cutaneous leishmaniasis in north-central Ethiopia: trend, clinical forms, geographic distribution, and determinants. Trop Med Health. 2020;48:39.

16. Bryceson A, Nichol TW. Cutaneous leishmaniasis in Wollega Province. Ethiop Med J. 1966;5(1):35-42.

17. Lemma A, Foster WA, Gemechu T, Preston PM, Bryceson A, Minter DM. Studies on leishmaniasis in Ethiopia: I.-preliminary investigations into the epidemiology of cutaneous leishmaniasis in the highlands. Ann Trop Med Parasitol. 1969;63(4):455-72.

18. Beyene H, Alemu M, Degife M. Prevalence and clinical features of cutaneous leishmaniasis in Dembidolo District, Western Ethiopia: A cross-sectional study. Int J Infect Trop Dis. 2015;2(1):31-8.

19. Gebre-Michael T, Balkew M, Ali A, Ludovisi A, Gramiccia M. The isolation of Leishmania tropica and L. aethiopica from Phlebotomus (Paraphlebotomus) species (Diptera: Psychodidae) in the Awash Valley, northeastern Ethiopia. Trans R Soc Trop Med Hyg. 2004;98(1):64-70.

20. Alkulaibi MM, Suleiman AM, Khalil EA, Al-Garadi MA. Prevalence of cutaneous leishmaniasis in Western Highlands in Yemen. J Trop Med. 2019;2019:8248916.

21. Ali A, Gebre-Michael T, Mengistu G, Balcha F. A survey on leishmaniasis and the leishmanin skin test profile in Lower Awash Valley, northeast Ethiopia. Ethiop J Health Dev. 2004;18(3):131-212.

22. Bugssa G, Hailu A, Demtsu B. The current status of cutaneous leishmaniasis and the pattern of lesions in Ochollo primary school students, Ochollo, Southwestern Ethiopia. Sci J Clin Med. 2014;3(6):111-6.

23. Oryan A, Akbari M. Worldwide risk factors in leishmaniasis. Asian Pac J Trop Med. 2016;9(10):925-32.

24. Tilahun F, Alemu W, Mulatu G. Magnitude and associated factors of cutaneous leishmaniasis; in Mekelle city, Ayder referral hospital, Tigray, Northern Ethiopia. Clin Med Res. 2014;3(6):189-99.