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Knowledge, Attitude and Practices Related to Cutaneous Leishmaniasis in Endemic Communities in the Volta Region of Ghana

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Abstract: The Ho Municipality of the Volta Region is one of the most endemic areas for the neglected tropical disease (NTD), cutaneous leishmaniasis (CL), in Ghana. The knowledge on the perception of the disease by the inhabitants and its vector is essential to design effective prevention and management strategies. Such studies are limited in respect of CL in the Volta region of Ghana. This investigation was designed to administer a structured questionnaire to randomly selected individuals living in the endemic communities, based on previous reports on endemicity of cutaneous leishmaniasis, in the Ho Municipality; Klefe, Taviefe, Matse, Lume Atsyiame, Dodome Dogblome and Dodome Awuiasu. The results revealed that most (88.3%) of the respondents had a reasonable knowledge of the disease but not of the vector. Most of the respondents believed the disease is mainly cured with a particular type of herbs (*Hyptis suaveolens* (L) Poit) identified by the botanist. Others thought that the use of bed nets (9.0%), weeding and spraying (23.4%) could be helpful in preventing bites from the vectors. Poor knowledge of the vector in the study population emphasize the need to initiate health education and awareness campaigns to minimize the risks of cutaneous leishmaniasis in the future.

Keywords: Cutaneous Leishmaniasis, Knowledge, Attitude, Barriers, Experience, Practice.

I. INTRODUCTION

Leishmaniasis is documented as one of the twenty neglected tropical diseases (NTDs) by the World Health Organization (WHO), occurring mostly in the tropics and sub-tropical regions of the world [1]. It is found on all continents except Oceania [2]. The disease has received minimal attention and little is known about it outside its endemic areas. Poor socio-economic conditions, malnutrition, population displacement, poor housing, weak immune system and lack of financial resources are among the risk factors associated with the disease [3, 4]. Various surveys carried out demonstrate that cases of leishmaniasis are increasing worldwide, mainly due to environmental changes [5], international travel and military interventions [6]. Leishmaniasis has demonstrated geographical expansion, invading many places where it was previously not endemic [7]. It causes disability nearly in 98 endemic countries and 3 territories where 350 million individuals are living at risk of infection [8]. However, over 90% of the new cases occur mostly in just 13 countries: Afghanistan, Algeria, Bangladesh, Bolivia, Brazil, Columbia, Ethiopia, India, Iran, Peru, South Sudan, Sudan and Syria [9]. There are three main clinical manifestation of the disease; cutaneous, muco-cutaneous and visceral leishmaniasis.

Cutaneous leishmaniasis incidence is mostly reported from 10 countries, Afghanistan, Algeria, Colombia, Brazil, Iran, Syria, Ethiopia, North Sudan, Costa Rica and Peru [8]. It is endemic in 22 Latin American countries [10]. Whereas for Africa, [11] reports that a global burden analysis listed 19 countries in Sub-Saharan Africa in the top 50 high burden countries. Information is available from the following Northern Africa countries; Algeria, Libya, Morocco, Tunisia, Egypt [12].

In Ghana, cutaneous leishmaniasis is the identified form of the disease. It was first reported in the Ho Municipality of the Volta Region [13, 14] and has since remained endemic in the same region. The Ho municipality is a moist semi deciduous forest ecosystem [15] which is not a typical climatic condition known to enhance the transmission and endemicity of the

disease. *Leishmania major* [14] and uncharacterized species [15] have been identified as the causative agents of cutaneous leishmaniasis during an outbreak of the disease at Ho. Although Boakye *et al.*, (2005) reports that leishmaniasis is transmitted mainly by sandfly *Phlebotomus duboscqi* and *Phlebotomus rhodaini*, majority of the vectors caught (to-date) in Ghana have been various *Sergentomyia spp.*, which were not generally regarded as likely vectors for transmitting leishmaniasis to humans [16].

The disease is locally known as ‘agbamekanu’ meaning “gifts brought on return from a journey” in the endemic communities of the Volta region and it is characterized with painful skin lesions at the site of sandfly (vector) bites, mainly on face, arms and legs [17]. These lesions heal in a few months to a year, and results in disfiguring the affected part of body [18]. No evidence for the existence of a reservoir hosts has been published from Ghana [19].

For the success of prevention and control programs of any disease, the most important prerequisite is community participation [20]. Health education for high risk population has a critical role in disease prevention. Afore this is the utmost need for the evaluation of the level of knowledge, attitude, and practice of persons living in such endemic communities. Knowing the impact of leishmaniasis and human behaviour surrounding cutaneous leishmaniasis is very important to improve its control and treatment [21]. However, there are limited studies regarding knowledge, attitude and practice (KAP) of the affected population in respect of cutaneous leishmaniasis in the endemic areas in Ghana. Focusing on these aspects, this current study was designed with the focus to assess the level of knowledge, attitude and practices (KAP) among residents of selected cutaneous leishmaniasis endemic communities of the Ho municipality, Volta region, Ghana.

II. METHODOLOGY

Ethic Statement

Ethical clearance was obtained from the University of Cape Coast Institutional Review Board (UCCIRB/CHAS/2017/32). Only individuals who showed willingness to participate in the study were recruited. All participants who gave informed consent were included in the study and responded to the question of the study questionnaires.

Study Site and Population

The study was carried out following purposively selected endemic communities in the Ho municipality of the Volta region of Ghana. The communities include Klefe Atsatime (6.618294 °N, 0.444726°E), Klefe Dome (6.621197°N, 0.443164°E), Klefe Demete (6.61678°N,0.437906 °E), Taviefe-Dzefe (6.660296°N, 0.471817°E), Taviefe Avenya (6.664015°N, 0.473331°E), Matse Havi (6.688649°N, 0.482185°E), Dodome Dogblome (6.760774°N, 0.51546°E), Lume Atsyiame (6.619918°N, 0.464762°E), Dodome Awuiasu (6.767553°N, 0.514789°E) as shown in Fig. 1. The main occupation of the residents in the community was farming , for which cultivation of plantain, banana and rearing livestock are the main activities in the community. These communities were engaged by initially contacting the regional office of the Ghana Health Service, whose Assemblymen of the communities were reached after a discussion of the project objectives. They then arranged for the project team to meet and engage with the management of and Matrons of the Health Centres in the community. After discussion regarding the project, their willingness was requested and permission was obtained from the Matrons of the Community Health Centres.

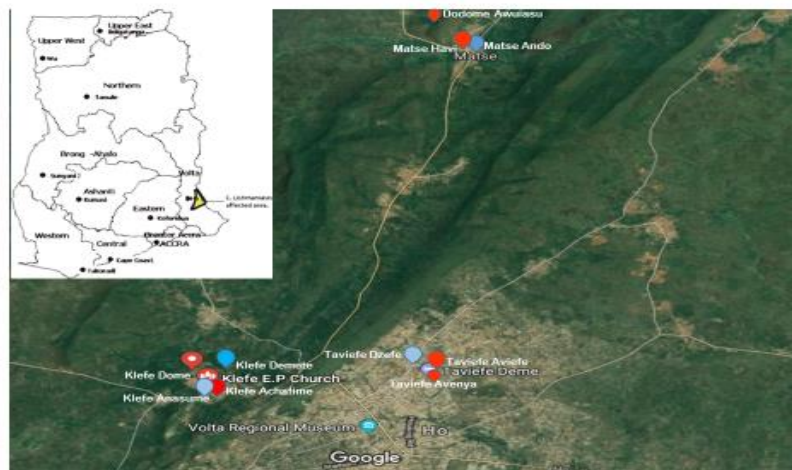


Fig. 1: Google earth imagery showing the study area.

Study design and sample size determination

A community based cross-sectional study was conducted in the communities between November 2017 and March 2018 to investigate the knowledge, attitude and practices of the residents regarding cutaneous leishmaniasis, using a questionnaire. The sample size for the study was calculated using the simple random formulae (equations 1 and 2). Assuming 55% of the population have knowledge of cutaneous leishmaniasis based on the Ghana Ministry of Health Annual Report (2004) choosing a confidence level of 95%, and a degree of accuracy 5%, the minimum number of samples was calculated to be 95. However, because this population in the communities was not large as assumed by the random sample formula (Pop. Size >10,000), the sample size was adjusted for by equation 2. Additionally, since the sampling employed was not by simple random approach, the design effect was adjusted by a factor of 1.2. A sample size of 110 was achieved.

$$N = \frac{Z^2p(1-p)}{d^2} \text{----- (1)}$$

$$S = \frac{N}{1 + \frac{N}{Population}} \text{----- (2)}$$

Data collection

The questionnaire was developed following Frary’s guidelines on questionnaire construction [22]. The questionnaire consisted of six main parts: demographic information of the participants, knowledge of sand flies vector and leishmaniasis, experience with the disease, attitude, practices and barriers related to leishmaniasis. The participants were selected based on convenience sampling and their willingness to participate.

Data Analysis

Data collected was entered into SPSS version 25, cleaned, validated and analysed. Frequency and percentage was used to express the level of community member’s KAP.

III. RESULTS

Demographic Information

A total of 111 individuals participated in the study. Of these, 70 (63.1%) were females and 41 (36.9%) were males. Most of the participants were in the age range of 31-40 (23.4%) with the youngest age being 10 and the oldest age being 76. The mean age was 38.0 ±SD years and the median age was 37. Majority of the participants (87.4%) were engaged in one form of work or the other. Of these, 29.7% (33) were engaged in farming, and students made up 19.8% of the participants. Additionally, 91.0% had obtained formal education, more than half of them (n = 62, 55.9%) were married and 95.5% (106) of the participants were Christians. Detail of the distribution of the demographic information are provided in Table 1.

Knowledge on cutaneous leishmaniasis

Among the 111 participants, 82.0% (91) had knowledge about the disease and 88.3% (98) knew the local name of cutaneous leishmaniasis to be ‘agbamekanu’. Most of the participants (95.5%) that had heard of the disease, had first-hand knowledge from the community in which they lived. As little as, 19.8% of the participants knew that a fly (insect vector) -transmit the agent causing the disease, however, they could not confirm this to be the sandfly. On the other hand, as many 80.2% of the participants had no idea about the mode of transmission of the disease. With regards to the symptoms associated with leishmaniasis, 48.7% reported that it was associated with itching and painful swelling sore, 34.2% reported only deep painful sore and 17.1% reported they had no idea.

Table 1: Demographic Information of study participants

Variable	Categories	Frequency, n = 111	Percentage
Gender	Female	70	63.1
	Male	41	36.9
Age group	<21	17	15.3
	21-30	21	18.9
	31-40	26	23.4
	41-50	23	20.7
	>50	24	21.6

Occupation	Unemployed	14	12.6
	Student	22	19.8
	Artisan	9	8.11
	Farmer	33	29.7
	Trading	23	20.7
	Formal employment	10	9.0
Formal education	No Formal Education	10	9.0
	Primary	24	21.6
	Junior Secondary	31	27.9
	Senior Secondary	37	33.3
	Tertiary	9	8.1
Marital Status	Single	29	26.1
	Cohabiting	10	9.0
	Married	62	55.9
	Divorced	10	9.0
Religion	Christian	106	95.5
	No response	5	4.5

When the participants were asked how cutaneous leishmaniasis may be prevented, 26.1% stated the use of repellent, 17.1% said by sleeping in bed net, 39.6% of the participants indicated they had no idea. Furthermore, 17.1% indicated it may be by spraying and weeding around houses, wearing protective clothing and using herbal medicine. As many as 97.3% of the participant reported that they had never had any formal education on leishmaniasis in the community (Table 2).

Table 2: Knowledge on cutaneous leishmaniasis among study participants

<i>Variable</i>	<i>Categories</i>	<i>Frequency, (n = 111)</i>	<i>Percentage</i>
Local Name	Agbamekanu	98	88.3
	Do not know	13	11.7
Symptoms	Itching, painful swelling sore	54	48.7
	Deep painful sore	38	34.2
	Do not know	19	17.1
Mode of Transmission	Bite from fly	22	19.8
	Do not know	89	80.2
Prevention measure	Use repellent	29	26.1
	Use bed net	19	17.1
	Do not know	44	39.6
	Others	19	17.1
Source of Knowledge	Community	106	95.5
	Do not know	4	3.6
	Accra	1	0.9
Had Education on Leishmaniasis	Received	3	2.7
	Have not received	108	97.3
Seen disease before	Seen	91	82.0
	Not seen	20	18.0

Experience of cutaneous leishmaniasis

Although only 44.1% of the participants had experienced the disease, as many as 59.5% had family members who had had the disease at one stage or the other. Again, 71.2% of the participants knew people who were not related to them and who had experienced the disease, (Table 3). Interestingly, 28 of the participants had neither had a past experience of the disease, had no family member who had experienced the disease nor knew anybody who had experienced the disease.

Table 3: Experience with cutaneous leishmaniasis among study participants

<i>Variable</i>	<i>Categories</i>	<i>Frequency, n = 111</i>	<i>Percentage</i>
<i>Past experience</i>	Have had	49	44.1
	Have not had	62	55.9
<i>Family experience</i>	Have had	66	59.5
	Have not had	45	40.5
<i>Other Person's experience</i>	Know someone	79	71.2
	Do not know someone	32	28.8
<i>No Experience</i>	Yes	28	25.4
	<i>Those infected</i>		
	Elderly	2	1.8
	Children	3	2.7
	Everybody	52	46.8
	Some people	1	0.9
	Cannot tell	53	47.8

Attitude related to cutaneous leishmaniasis

Regarding the problems associated with cutaneous leishmaniasis, 17.1% indicated low productivity and stigmatization, whilst 55.86% indicated severe pain, big sore and swelling as being the major problems they have encountered in association with the disease. Although, 47.8% did not indicate which section of the population was most affected by leishmaniasis, 46.8% reported that everybody was equally affected. A section of the participants (65.5%) indicated that the disease was not associated with spiritualities. Additionally, of the participants, 67.6% stated that the disease was worrying (Table 4).

Table 4: Attitude related to cutaneous leishmaniasis among study participants

<i>Variable</i>	<i>Categories</i>	<i>Frequency, n = 111</i>	<i>Percentage</i>
<i>Associated problems</i>	Low productivity, stigmatization	19	17.1
	Severe pain, big sore, swelling	62	55.9
	Do not know	28	25.2
	Others	2	1.8
<i>Impression of Disease</i>	Worrying	75	67.6
	Not worrying	23	20.7
	Cannot tell	13	11.7
<i>Spiritualities</i>	Spiritual	8	7.2
	Not Spiritual	73	65.8
	Cannot tell	30	27

Practices in relation to cutaneous leishmaniasis

With regards to prevention of cutaneous leishmaniasis in the endemic communities, 39.6% of the participants stated that they always use bed net they acquired from the open market in their homes and 23.4% indicated they had never used bed net at all. Additionally, 87.4% never entertained dogs, a potential reservoir, in their communities, because it is revered in their community as a god. However, 2.7% always entertained dogs, 6.3% sometimes did and 3.6% often did entertain dogs in their communities. Furthermore, most of the participant stated wearing protective clothes and using repellent (18.0%), spraying and weeding (23.4%) round their homes and sleeping under bed net (9.0%) as their ways of prevention. Despite these, 49.6% of the participants did not know the mode of prevention of the disease (Table 5).

In respect of treatment, the victims sought for the topical application of extracts obtained from *Hyptis suaveolens* (L) Poit to the sore (open lesion). The 28 participants who had neither experienced the disease, nor known a family member nor any other person who had experienced the disease were not included in this analysis.

Table 5: Prevention practice toward cutaneous leishmaniasis among study participants

Variable	Categories	Frequency, n = 111	Percentage
Bite Prevention	Protective clothing/Repellent	20	18.0
	Spraying and Weeding	26	23.4
	Sleeping under bed net	10	9.0
	Do not know actions	55	49.6
Bed net usage	Always	44	39.6
	Sometimes	36	32.4
	Often	5	4.5
	Not at all	26	23.4
Dog Interaction	Always	3	2.7
	Sometimes	7	6.3
	Not at all	97	87.4
	Often	4	3.6

Among the 83 participants, 45.8% did not know at what stage of the disease treatment was sought for, but 49.4% of the participants indicated that treatment was sought for when the symptoms of disease appeared. Furthermore, as many as 41.0% (34) could not tell how long it took to seek treatment for the disease, but 31.3% sought treatment within months of bearing the pain from the sore. Only 10.8% could not tell whether they completed the treatment they started (Table 6).

Barriers to treatment of cutaneous leishmaniasis

As many as 55.4% could not tell the side effect of the herbal treatment for cutaneous leishmaniasis. However, 30.1% reported intense pain when the herbal extract was applied to their sore (lesion). Cost and availability were not mentioned as barriers because the wild herbs grew in the community, therefore it was freely obtained (54.2%) and easily accessible. However, in respect of orthodox treatment, which was not stated as treatment option sought for, 45.8% of the participants did not report the disease at the health centre because of financial constraints and ignorance, 38.6% because of the use of the herbs (Table 7).

Table 6: Treatment practice toward cutaneous leishmaniasis among study participants

Variable	Categories	Frequency, n = 83	Percentage
Sought Herbal Treatment	When symptoms appear	41	49.4
	Sometimes	4	4.8
	Do not know	38	45.8
Herbal Treatment duration	Often don't	3	3.6
	Within days	3	3.6
	Within weeks	17	20.5
	Within months	26	31.3
	Cannot tell	34	41.0

<i>Course of Herbal Treatment</i>		
Completed	29	34.9
Did not complete	9	10.8
Cannot remember	15	18.1
No response	28	33.7

Table 7: Barriers/facilitators of treatment of leishmaniasis among study participants

Variable	Categories	Frequency, n = 83	Percentage
<i>Side Effect of herbal treatment</i>	Cannot tell	46	55.4
	Do not know	12	14.5
	Know	25	30.1
<i>Affordability of Herbal Treatment</i>	Free	45	54.2
	No response	38	45.8
<i>Why not orthodox treatment</i>	Use of herbs	32	38.6
	Poverty/Ignorance	38	45.8
	Cannot tell	13	15.7

IV. DISCUSSION

One of the most effective ways of reducing the prevalence of cutaneous leishmaniasis is to teach the people living in the endemic areas how to prevent the disease. In order to achieve this goal, the awareness, the attitude and the performance of the risk group or the group that plays a major role in training and educating the community should be improved [23]. Given the importance of cutaneous leishmaniasis, and despite the efforts of the World Health Organization for the prevention of the disease, the therapeutic approach to the disease is dominant and there is no awareness about the importance of the health education and the health promotion for the prevention of leishmaniasis [24]. Studies in KAP have revealed a direct relationship between awareness of the population at risk and adoption of preventive measures. Such studies helped the health education policy makers to implement effective disease control programs in Pakistan [25]. Thus, understanding local knowledge of the communities with respect to health issues can be an important tool [26]. Studies on KAP are a prerequisite for implementing interventional strategies towards active community participation in controlling the disease [27].

It is clear that understanding the beliefs and practices of people is a pivotal step in the successful implementation of cutaneous leishmaniasis control activities in endemic areas [28]. It is also important to know the level of knowledge and attitude of a community towards a disease, in this case cutaneous leishmaniasis in order to be able to improve it to a satisfactory level prior to introducing any disease control program; this will ensure support from most members of the community. According to the recommendations of World Health Organization, the implementation of knowledge, attitude and practice surveys is basic for health promotion campaigns, as the surveys help programs adjust health education messages to build public knowledge and awareness [29]. Amin *et al.*, [30] reports that one of the priorities for control of cutaneous leishmaniasis is to investigate socio-demographical factors to develop rational prevention and control strategies and one of the first steps in this direction is the assessment of baseline knowledge and practices of endemic population. KAP study in relation to cutaneous leishmaniasis infection varies among regions and is heavily influenced by socio-cultural settings. To these ends, this study provides analyses of KAP on cutaneous leishmaniasis of most of the endemic communities in the Ho Municipality, Volta Region of Ghana.

The representativeness and generalizability of the findings of this study are considered high. Although the distributions of the demographic characteristics were not statistically compared to the distribution of same, based on the Ghana demographic and health survey data for the municipality, the distribution of the demographics were largely as expected for such community implying the sampling procedure or though not completely random result in a highly likely representative sample. That is, the females to males ratio was 1.7 as expected and the distribution of the age groups showed a higher proportion of mid-age adults (Table 1). Furthermore, there was a good representation of the occupations and educational levels known to be present in such rural communities in Ghana. Internal validity was considered high since there was a high rate of concordance (90.9%) recorded in the responses of the participants to two questions; whether

they had ever seen a cutaneous leishmaniasis and from where and whether they, their family members or other persons they know have experienced cutaneous leishmaniasis. Moreover, about 82.0% of the participants have seen cutaneous leishmaniasis (Table 2) within the community and 44.1%, an indication that either they, their family member (59.5%) or another person they knew (71.2%) had experienced the cutaneous leishmaniasis (Table 3) confirms that the disease was endemic in the communities selected for this study and the respondent are likely to provide responses that will be useful information for the control of cutaneous leishmaniasis.

The general knowledge of participants of this study regarding cutaneous leishmaniasis would be initially considered satisfactory since majority of respondents (88.3%) could identify with the disease with its local name “agbamekanu” and also since slightly more than 80.0% of the participants knew, at least, one of the major symptom of cutaneous leishmaniasis (Table 2). However, the findings further indicates that knowledge on transmission was unacceptably low (< 20%) and that this knowledge was non-specific, since these participants could not identify by name, the vector that transmits the parasite. Additionally, more than half of the participants did not know a preventive measure (Table 2). These findings are to be expected, since the findings show that only a few of the participants (<3.0%) had education on leishmaniasis from the health service and some knowledge from the community. This is suggesting that local knowledge, such as the name of the disease and the observed symptoms would be well known by most of the participants (Table 2). Lack of information about cutaneous leishmaniasis vector is a matter of concern for implementation of preventive measures against the disease [31] because if people do not perceive sandfly to be the vector, they usually do not take proper action to protect themselves from sandfly biting.

An interaction with the participants indicated they had either experience a bite or a relation had experienced a bite that led to the disease. The resulting painful sore the participants experienced resulted in big scars which was the major reason they were stigmatized by friends and family. Such attitudes toward affected individuals prevented them from working, which could lead to low productivity (Table 4). Additionally, most of the participants (67.6%) perceived the disease as a source of worry, however, as many did not consider the disease to have a spiritual cause. These are perceptions most likely to discourage individuals from seeking orthodox treatment, although herbal treatment where sought as discussed earlier.

In respect of practices, particularly towards the prevention of transmission, approximately half of the participants stated actions which were appropriate for the avoidance of bites from insect vector (Table 5). Although 49.6% of them indicated they did not know the action to take in relation to avoiding bites, they were sleeping under bed nets, probably as a malaria preventive intervention. The stated frequency of use of bed net was appreciable although the fact that 23.4% were not using bed net, is not good for the prevention of the disease in the community. In relation to reservoirs, several species of wild and domestic mammals have been recorded as hosts and/or reservoirs of *Leishmania* species in different parts of the world [32]. Among domesticated animals, dogs are the most important animal reservoir in the epidemiology of this disease [33]. However, the findings of this study showed that most of the participants 87.4% did not have interactions with dogs in the communities. This, reiterating the fact that dogs could not possibly be the reservoirs for the cutaneous leishmaniasis in these communities.

Although CL is self-healing after about 6 to 12 months [34], clearly, the practices toward treatment are unacceptable and will very much increase the morbidity, in other words, these practices (Table 6) may not contribute to managing cutaneous leishmaniasis. This is so, because, the findings show that about half of the participants treated cutaneous leishmaniasis by using herbs (identified by the botanist as *Hyptis suaveolens* (L) Poit) as topical application, particularly at the initial stages of the infection (Table 6) and that more than half of victims sought this herbal treatment within a week or month after the appearance of symptoms, with most of them not completing their treatments.

There seem to be no major barriers to the herbal treatment since only 30.1% of the participants indicated that they knew of a side effect associated with the use of the herbs. However, the affordability and availability of the herbs was a major facilitator of its use for treatment (Table 7). The finding that poverty and ignorance was the leading reason for not seeking orthodox treatment indicated that the consciousness on the usage of orthodox treatment from health centres is low and the participants attributed to ignorance.

Generally, the outcome of this study on cutaneous leishmaniasis highlights the needs for intense health education to enhance the knowledge and awareness of people about cutaneous leishmaniasis, which form the basis for the formation of good attitudes and acceptable practises toward the prevention and management of the disease.

V. CONCLUSION

This current study indicates that the level of knowledge on the cutaneous leishmaniasis and its vector host among inhabitants of Ho Municipality, the endemic focus, was poor. However, the attitudes of the inhabitants towards cutaneous leishmaniasis were mostly constructive. The practices towards prevention and treatment were mostly discouraging and were likely to impact on morbidity of cutaneous leishmaniasis.

These emphasize the need for the Disease Control Unit of the Municipal Health Directorate to intensify its health education and awareness campaigns, particularly providing more education on the vector and the disease management practices, in order to minimize the incidence of cutaneous leishmaniasis and reduce the risks of cutaneous leishmaniasis outbreaks.

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