

Preference and treatment practices of traditional medicines for cutaneous leishmaniasis in Northeast Ethiopia

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Abstract

Cutaneous leishmaniasis (CL) is one of the neglected tropical diseases (NTDs), which is a significant public health problem that disproportionately affects the poorest populations and those living in rural and conflict areas. Kalu is a rural district known for its high co-endemicity for cutaneous leishmaniasis (CL) with severe consequences. This study was set to explore the preference and practices of traditional medicines for cutaneous Leishmaniasis in Kalu district, south Wollo, Amhara region. A qualitative research method, particularly an ethnographic design, was used. In-depth interviews (IDIs), key informant interviews (KIIs), and focus group discussions (FGDs) were used as data collection methods. Individuals with cutaneous Leishmaniasis, traditional healers, religious and kebeles leaders, high school teachers, youth members, and elder groups were taken as study participants. In order to select these participants, purposive and snowball sampling techniques were employed. Analysis was made by recording, verbatim transcribing to Amharic, and then translating into English. The translated data were coded, categorized, and sorted in accordance with their themes, and sources. Despite the fact that some educated individuals and youth groups with individuals with cutaneous leishmaniasis have preferred the modern medicines, the wider communities have primarily preferred the traditional medicines for cutaneous leishmaniasis (CL) disease. The issue of access in terms of treatment services, geographical distributions, treatment costs, and meeting patients' expectations, as well as perceived effectiveness and educational status are determinative factors that can influence the communities with cutaneous leishmaniasis (CL) to prefer traditional treatments. Cutaneous leishmaniasis has been treated using different traditional medicines in the study area, such as herbal, animal, material, mineral, and spiritual medicines.

Keywords: Preferences of Treatments, Treatments Practices, Traditional Medicines, Cutaneous Leishmaniasis, Kalu District, Rural Ethiopia

1. Introduction

Leishmaniasis is a collective name of diseases caused by different species of the intracellular protozoa of the genus *Leishmania* and transmitted by the bite of female phlebotomine sandflies of the genera *Phlebotomus* or *Lutzomyia* [1]. Leishmaniasis is endemic to many tropical and subtropical regions in large areas of South Asia, the Middle East, north, and eastern Africa, the Mediterranean basin and Latin America [2]. Human Leishmaniasis is manifested in three distinct clinical forms ranging from mild self-healing cutaneous lesions or nodules termed cutaneous Leishmaniasis (CL) to a fatal systemic illness called visceral leishmaniasis (VL) and the third one is mucosal leishmaniasis (ML) [1]. Worldwide, cutaneous leishmaniasis (CL) is one of the chronic Neglected Tropical Diseases (NTDs), and the most common form of Leishmaniasis [3]. Cutaneous leishmaniasis (CL) has significant public health problems affecting the world's most vulnerable and poorest populations [4]. CL affects more than 12 million people worldwide. There are an estimated 1.5–2 million

new cases of CL each year, of which 90% originate in ten countries: Afghanistan, Iran, Iraq, Saudi Arabia, Algeria, Ethiopia, Sudan, Syria, Brazil, and Peru [5]. CL is estimated that 14 000–40 000 deaths from the disease each year, worldwide [4]. In Ethiopia, cutaneous leishmaniasis (CL) is a vector borne disease and endemic, mainly occurring in the highland areas with an elevation of 1400–3175 m above sea level, involving rock hyraxes as reservoirs [3,6]. Ethiopia was one of the six countries in 2010 in which more than 90% of global CL was found [7]. The current study shows that an estimated 20,000 to 50, 000 new cases of CL have been annually reported in Ethiopia, of which 99% are thought to be due to *Leishmania aethiopica*, and rare cases due to *Leishmaniasis tropical* [8,9]. A recent study estimated almost 30 million Ethiopians to be at risk of CL [6]. With several hotspots of skin NTDs in Ethiopia, the Amhara region is known for its high co-endemicity of cutaneous leishmaniasis (CL), with little experience or poor management systems of disease control programs and treatment services [1,10,11]. Despite cutaneous leishmaniasis (CL) has physical,

social, psychological, and economic impacts, there are low managements and treatments [12]. To date, there is a general agreement that skin NTDs are considered a public health issue, particularly in developing countries where their management and treatment services are subject to several challenges [6,13]. The major challenge is not only in the case management of individual patients with skin NTDs, but also in understanding the true epidemiology and disease burden in endemic areas [14]. Furthermore, many developing countries completely lack a dermatology specialist or have dermatologists who live only in urban areas, leaving remote populations without access to care [15]. In Ethiopia, the guideline for the management of CL was produced and reported in 2013. However, only a few health care facilities provide the treatment services [16]. In Ethiopia, only a few health facilities located in the city center have provided treatment services for Cutaneous Leishmaniasis [3]. Hence, the prevention, diagnosis, and treatment efforts of CL remain unfocused with clear knowledge gaps, poor access to health care, a low practice of insecticide-treated nets, and limited financial and human resources. Thus, many affected individuals commonly undergo traditional treatments in Ethiopia [9]. Studies showed that the vast majority of Ethiopia's population lives in rural areas where health care coverage is low, forcing the rural communities to turn to traditional medicines [17]. Individual with Cutaneous Leishmaniasis and the wider community have preferred traditional treatments in Kalu district [3]. Individuals with CL received traditional medicines, which were considered the best treatment options because of their easy accessibility compared to modern medicines and treatments [3,18]. On the other hand, perceived effectiveness, cultural acceptability, availability, adequacy, physical accessibility, affordability, economic problems, knowledge gaps, socio-demographic, and religious belief have been mentioned as the major

determinants that influence people to prefer the traditional treatments [14,19,20]. Traditional treatments have been used in Ethiopia at home and in religious institutions. They are still the community's first choice for treating cutaneous leishmaniasis (CL) and other health issues [9]. These traditional medicines play essential roles in the delivery of primary health care to the local people. Therefore, this study assessed the treatments preferences and practices for cutaneous leishmaniasis in northern Ethiopia.

1.1. Theoretical Framework

1.1.2. The Pathway and Right to Health Models

In this study, the authors used a combination of the pathway and right to health models to explore the preference and treatment practices of traditional medicines for cutaneous Leishmaniasis (CL). The pathway model was identified by Kroege, a more anthropological approach used to describe the steps of the health preference processes, from recognition of the symptoms to the use of a particular health service. The right to health model was also widely used by qualitative health researchers emphasizes the dimensions of access to care includes the accessibility, availability, affordability, adequacy, and acceptability of the health services, that influence the course of treatment preferences [21]. These models were used to assess, the belief about health and illness, which may affect people's decisions regarding their choice of treatments. According to these models, the cultural norms and health beliefs in the form of personal philosophies, desire to be part of the healing process, illness perceptions and aetiology, the healing approaches, and perceptions on quality of care are key steps that determining the course of treatment preferences. In line with this, the study aimed at to explore the reason behind their preferences of traditional medicines, and treatment practices for cutaneous Leishmaniasis in Kalu district, northeast Ethiopia.

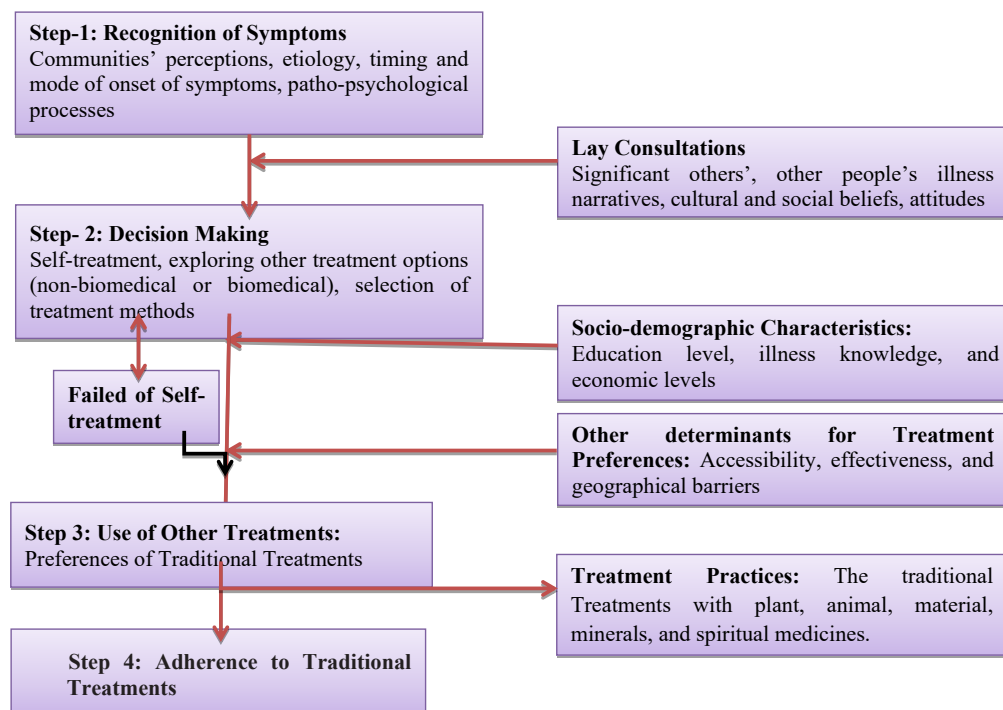


Figure 1: The Pathway and Right to Health Models on Preferences and Practices of Treatments

2. Methods and Materials

2.1. Study Setting

The research was carried out in Kalu district, South Wollo, northeast Ethiopia. Dessie is the capital city of South Wollo located in the northern part of Ethiopia, about 400 km northeast of Addis Ababa [22]. South Wollo Zone is largely a rural zone and one of 13 administrative zones encompassing 22 districts in the Amhara region [16]. Kalu is also one of the 22 districts in the South Wollo zone and has a total population of 227,488, out of whom 108,887 (47.86%) are women and 118,601 are men, of whom 38,351 (16.86%) are urban inhabitants, and 189,137 (83.14%) are rural dwellers. Kalu district covers a total area of 851.54 km², out of which 34% is covered by crop, while 56% is covered with bushes and shrubs. The predominant (90%) source of livelihood for the majority of the population is a mixed farming system, crop production and livestock rearing [23]. South Wollo Zone

has 10 district public hospitals, 1 referral hospital, 4 private hospitals, 128 health centers, and 632 health posts. It has 9 public health centers, and 35 public health posts [24]. Kalu District was purposefully selected as one of the endemic areas for CL in Ethiopia, and no prior studies on this topic had been conducted in the area. Boru Meda Hospital (BMH) is one of the centers for neglected tropical diseases (NTDs) in Ethiopia, located in the South Wollo Zone [1]. However, Kalu district is a rural area distant more than 81 kilometers from Boru Meda hospital, that the communities are unable to cover their treatment and related costs. In the contrary of this, the traditional medicines are easily accessible adjacent to their villages, cheap in costs, perceived effective, cultural acceptable, and affordability with minimum side effects which are the importance of parts of health services in Ethiopia [19].

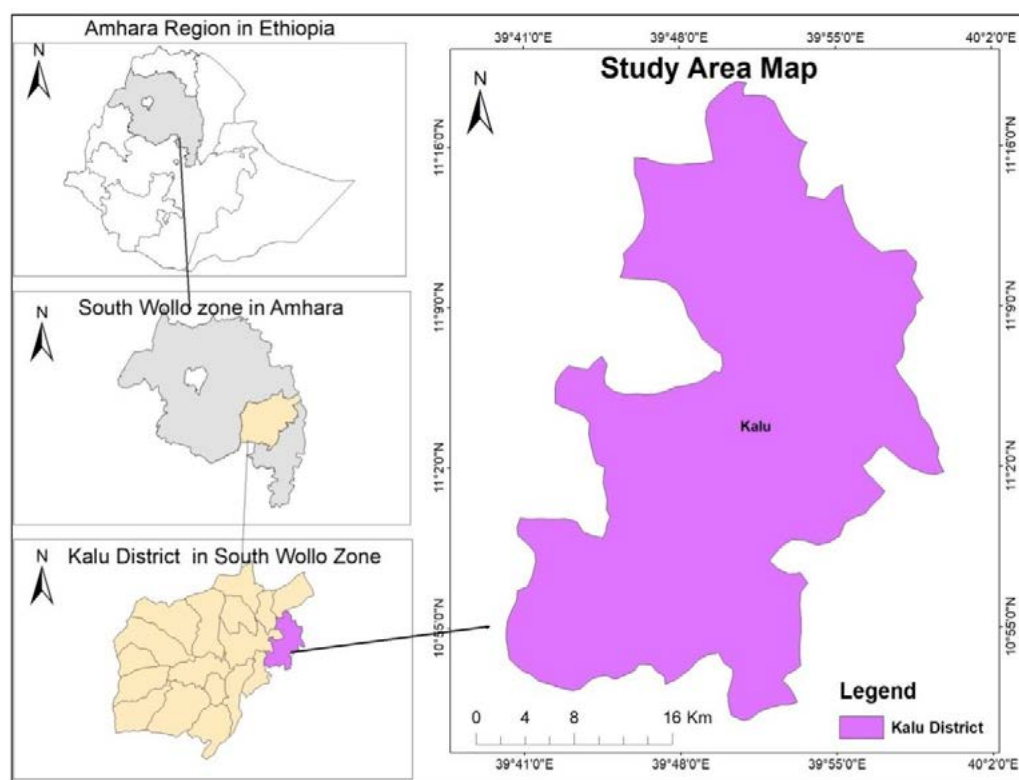


Figure 2: Level of Co-Endemicity of Cutaneous Leishmaniasis at Kālū District in South Wollo

2.2. Study Design

This study was aimed at exploring preference and treatment practices of traditional medicines for cutaneous leishmaniasis in Northeast Ethiopia. It is a community based qualitative research conducted in Kalu District, South Wollo Zone of Amhara Region, Ethiopia. The study was employed a qualitative research method, particularly ethnography design was used. Data collection methods were in-depth interviews (IDIs), key-informant interviews (KIIs), and focus group discussions (FGDs). It was based on the data found from different categories of the group of people with different ages and sex compositions participants for this study were

identified through snowball and purposive sampling, among different categories of people with different age and sex compositions. These included individuals with cutaneous leishmaniasis, traditional healers, religious leaders, kebeles leaders, high school teachers, youth members, and elder groups.

2.3. Study Participants and Recruitments Procedure

Individuals with cutaneous leishmaniasis, traditional healers, religious leaders, kebeles leaders, and community members were taken as participants in the study. Individuals with cutaneous leishmaniasis were interviewed to know

about their treatment preferences and why they chose one over the others. The traditional healers were also taking part in exploring the types of treatments provided for individuals with cutaneous leishmaniasis (CL) in the local area. Furthermore, religious and kebele leaders were chosen as participants because they have knowledge of the community through their established networks of relationships and can provide critical insights into the community's preferences for CL treatments. In addition, the community members were chosen to know their shared views, attitudes, and ideas about the treatment preferences and the major reasons for preferring one treatment to the others. All participants were selected using purposive and snowball sampling techniques. Firstly, religious and kebele leaders were purposefully chosen. Because they have strong relationships, have accepted by society, and have influence in the larger community. Then, individuals with CL and traditional healers were selected using snowball sampling procedures on behalf of the religious and kebele leaders. After interviewing them, these individuals identified others who met the set criteria and the process was continued until saturation points were reached.

2.4. Methods of Data Collection and Tools

Data for this study were gathered using various data collection methods and techniques. In-depth interviews (IDIs), key-informant interviews (KIIs), and focus group discussions (FGDs) were used to collect data. The interview guides with lists of questions were prepared in line with the study objectives. These interview guides included topics to be covered with open-ended interview questions and aided in gathering detailed information about preferences and treatment practices for cutaneous leishmaniasis. The guides contain limit the number of questions with probes, which enable the participant to have time to talk about the topic at length without feeling rushed. All interviews were made in the local language (Amharic). Furthermore, all interviews were audio-recorded and detailed notes were taken during and after the interviews. The tape-recorded interviews and the notes taken were transcribed verbatim in to Amharic text and translated to English for data coding, analysis and report writing.

2.5. Data Analysis

The data were recorded, verbatim transcribed, translated, coded, categorized and sorted in accordance with their themes, source and issues. The qualitative data analysis software called MAXQDA 2020 plus was used to reduce these data. The software has its own coding key themes, sub-themes, description, category, memos and explanatory notes, and sample quote sections, which were helpful to reduce and analysis of the complex data. Data were assured using the following methods: Firstly, it was emphasized for the quality of the items that were administered via preparing in line with the research objectives and enhancing the quality of the tools through careful design and commented by different expertise to produce data that are true and accurate. Secondly, data were also enhanced using different data collection methods and techniques, such as in-depth

interviews, key informant interview, and focus group discussions (FGDs). Furthermore, the interview guides were prepared in English and properly transcribing to the local (Amharic) language as appropriate. While conducting the interviews, detail notes were taken and audio-recorder was used based on consent of the participants. Finally, the Amharic audios were changed to texts, transcribed verbatim to Amharic texts and then translating to English, preparing a codebook, and coded using the software called MAXQDA 2020 plus, and then thematically analyzed.

3. Results

In this section, the primary preferences for treatments for cutaneous leishmaniasis were presented. Furthermore, the primarily preferences of individuals with cutaneous leishmaniasis one health institution to the other (traditional to modern) were explained. Finally, the main traditional treatments for cutaneous leishmaniasis were depicted. For this study, 12 individuals with CL, (7 males and 5 females) were taken for in-depth interviews (IDIs). 2 children are aged 12–18 years, five youths aged form 19–36 years, three adults are aged 37–50 years, and two elders are over 50 years old were taken. In addition, four male traditional healers between the ages of 40 and 65 were interviewed in depth. Furthermore, 5 kebele leaders (4 males and 1 female), who are aged from 35 to 45 years, as well as 4 religious leaders aged from 45-70 were employed as key-informants (KIs). Besides, 2 high school teachers (1 male and 1 female group), 2 male youth members and 4 elder groups (2 from male and 2 from male members) were taken as the focus group discussions (FGDs).

3.1. Preference of Treatments for Cutaneous Leishmaniasis

In this study, treatment preference is the whole process of thoughts, actions, and behaviors of people in terms of their final choices of treatment for cutaneous leishmaniasis in Kalu district. Based on the data found from individuals with cutaneous leishmaniasis, traditional healers, and wider community members, traditional treatments have been their primarily preferences for cutaneous leishmaniasis (CL) in Kalu district. Participants from the community shared that "until now, whether male or female, adults or children, we all have preferred the traditional treatments for cutaneous leishmaniasis. No one goes to health facilities"(FGD: Male Community Member). The other FGD discussants said that: Even if some get modern treatments, it does not heal them, and they just go back to the traditional ones. From what I've practically seen, a woman with CL went to the clinic, but it didn't heal; instead, it got transmitted to three, four, five places, and then she went to the traditional healers and cured (FGD: High School Teachers). "No one goes to a health facility, but they are treated traditionally (FGD: Female Community Members). The key informants also shared the above community's views regarding the treatment preferences for cutaneous leishmaniasis (CL). "The community prefers the traditional medicines to the modern medicines. They do not believe that modern medicines can cure CL disease" (KII: Kebele Leader). In this regard, individuals with cutaneous

leishmaniasis (CL) shared their preferences of treatments for CL. "First and foremost, I have preferred traditional medicine and have been struggling with this for almost 4 months, but now I am getting better" (IDI: Male Individual with CL). Likewise, another individual with CL also stated that "my elders advised me to go to traditional medicines. They told me that the modern treatments could not help me, so I went to the traditional healers (IDI: Female Individual with CL).

3.2. Preferences of Traditional Medicines for Cutaneous Leishmaniasis

As mentioned above, individuals with cutaneous leishmaniasis and the wider community have preferred the traditional medicines for cutaneous leishmaniasis disease. As the result showed, many motives can influence the community to prefer traditional treatment practices. The major reasons that have positive reinforcement for the preference of traditional medicines are issues of accessibility, perceived effectiveness, financial reasons, educational status, and geographical barriers.

3.3. Accessibility

For this study, accessibility to health services includes the availability, affordability, adequacy, and acceptability of the health services for cutaneous leishmaniasis (CL). Participants in the community, including CL patients and traditional healers, argued that traditional treatments are easily available and accessible in their villages. The two FGD participants described that: "to be honest, there is no treatment for CL in health centers. No one goes to health facilities; however, traditional medicines are accessible in our community" (FGD: Female Community Member). "Many people get traditional medicine in their villages" (FGD: youth members). The KII- informant participant also forwarded his observations on the accessibility of health services as, "the communities are looking for the traditional medicines for CL, because they are adequate in the area" (KII: Kebele Leader). One of the individuals with CL described the availability of traditional medicines, as "I have never seen anyone healed by medical treatments. Hence, I went to a traditional healer and got cured"(IDI: Female Individuals with CL). The other male individuals with CL are also described, as "traditional treatments are accessible and affordable in our surrounding. Because of that, my family took me to traditional healing center, and I treated by using traditional medicines" (IDI: Male Individuals with CL).

3.4. Perceived Effectiveness

As the result revealed, the local community widely believed that the traditional medicines are more effective to treat and curing cutaneous leishmaniasis (CL) than modern medicines. The communities have greater faith and confidence in the effectiveness of traditional medicines in order to cure CL permanently. In this regard, the community members forwarded their ideas as "the children as well as the adults with CL have been effectively cured by traditional medicines" (FGD: Female Community Members). Likewise, the other of the FGD participants described as

Individuals with CL went to traditional healers, and cured. In our village, of six boys, five were cured by using traditional medicines. I known a man, who was treated in Boru, but it, got worse, and he went to traditional healers, and his condition improved (FGD: Male Youth Members). Individuals with cutaneous leishmaniasis (CL) his experiences on the effectiveness of the traditional medicines for CL disease as, "I trust I can be cured by traditional medicine. I went to a traditional healer at Ardibo and brought herbal medicines. After 3 days, the wound dried up and completely absorbed gradually"(IDI: Male Individual with CL). Another female Individual with for cutaneous Leishmaniasis (CL) stated that I got hair loss. It also infects my lip and clinicians advised me to remove the infected lip. Then, I went to Ababa Ergoye. He told me that it is CL and can be healed there. Then, I started and cured by tying leaves. Many people, including me in this area, were cured by traditional medicines (IDI: Female Individual with CL). One of the traditional healers also confirmed the effectiveness of their medicines to cure s cutaneous leishmaniasis (CL) as: For 18 years, I have provided treatments for individuals with cutaneous leishmaniasis (CL). Without exaggerating, I have treated and cured CL effectively, and I treated CL very well. For some, CL is removed within a day, and the other can be taken three times in three days. The other can take a lot of time. I have good knowledge and experience of CL (IDI: Traditional Healer).

3.5. Financial Reason

The result showed that the economic status and income level of the community could influence their treatment preferences. The participants explained that they incur high expenses at the biomedical treatment facilities, and this tends them to the traditional treatments. Although there are some certified traditional healers who ask for a large amount of money, many of the traditional healers have provided the treatments freely or with small amounts of money. The participants from community members shared their views in this regard: One of the major reasons for preferring traditional treatments is that the traditional treatments are very cheap. However, they spend a lot of money on modern treatments. For instance, it may need 400 to 1000 Ethiopian Birr (ETB) in order to buy modern medicine. A person does not spend more than 10, 30, 40 and 50 ETB to take any traditional medicine in this area (FGD: Youth Members). The other focus group discussants from high school teachers explained that Individuals with cutaneous leishmaniasis are expected to travel to Boru Meda hospital to get treatment services. This requires transportation, medical and other related fees. They do not get there in a single day, exposing them to further costs, such as bedroom and food (FGD: Male High School Teachers). An individual with cutaneous leishmaniasis also shared his practical experience of the price of the traditional treatments as "I have paid 30.00 ETH to a traditional healer. If I go to Boru Meda Hospital, or Dessie Hospital, or private health facilities, it could cost 3000.00 or 4000.00 ETB" (IDI: Male Individual with CL). In the same manner, a female individual with cutaneous leishmaniasis stated as: I am not able to go to Boru Meda hospital. Although

the medical service is given free of charge, I need money for transport costs, food and medicine. I go to traditional for medicine. The traditional healer does not take money ... he works without money.... He said Allah would consider it as a sin if I take money from you; I will help people with the wisdom of God (IDI: Female Individual with CL).

In this regard, the traditional healer shared his practical experiences: Individuals with cutaneous leishmaniasis have not received any money or paid only 'Eriassa' (a respectful gift usually paid for traditional medicines). Eriassa' is a kind of gift, such as, Birr, Sugar, 'Khat, Biscuit, Merinda..., which is given for the medicine to work and to cure the disease (IDI: Traditional Healer).

3.6. Educational Status

As the data revealed, being educated or not has affected the community's treatment preferences. The youth community members said that, "the illiterates choose to be treated with traditional medicine" (FGD: Male Youth Community Members). The other participants FGDs shared their views on this: The majority of the community in this area is farmers, and they use the locally available remedies are modern medicine. Older people and illiterate people use traditional medicine. Those who are educated, and young people, prefer to use modern medicine (FGD: High School Teachers). On this regard, the religious leader explained, "those who know or are educated and young people prefer to use the modern treatments" (KII: Religious Leader). An individual with cutaneous leishmaniasis is her practical experience, "I needed to go to the health center, but elders advised me as the health care will not help me" (IDI: Female Individuals with CL). The other individual with cutaneous leishmaniasis is also said that I am a farmer, and I desire to go to traditional medicine found in my village. . I went to Ababa Eregoye.... He treats CL effectively, because he is blessed by Allah. I applied it to the lesion and cured it.... He does not want to take a single birr... everybody is cured of the CL there (IDI-Male Individual with CL).

3.7. Geographical Barriers

The residential locations are other determinants that can influence the preferences of traditional treatments. Kalu district is a remote area and far away from the hospitals. Treatments for individuals with cutaneous leishmaniasis are given at Boru Meda and Dessie hospitals. These hospitals are 81 kilometers away from Kalu district. The FGDs participants presented their idea as "Boru Media hospital is far from here and individuals with CL have a long queue, and they would suffer there" (FGD: Male High School Teachers). Other FGD participants stated that "rural people fear going to Boru Meda hospital, especially they fear possible costs they could be asked there and other challenges"(FGD: Community Members). The kebele leader shared the community treatment preferences of individuals with cutaneous leishmaniasis: Kalu district is a remote location. It can take a long time for a person to go to Boru Meda hospital. However, if they have to be treated here by the traditional healers, they can get treatment in the short term (KII: Kebele Leader). Individuals with cutaneous leishmaniasis have

explained how the geographical barriers can affect their treatment preferences as "Boru Meda hospital is far away from here, hence, I cannot be able to go there due to financial limitations"(IDI: Male Individual with CL). In the same manner, other individuals with cutaneous leishmaniasis said that "I have no money to go to Boru, I apply the leaves from the traditional healer near my village" (IDI: Female Individual with CL).

3.8. Traditional Treatments for Cutaneous Leishmaniasis

Households, faith-based institutions and traditional healing institutions are the major centers of local treatments for cutaneous leishmaniasis disease in Kalu district. Actors within the treatment practices are people depending on the inherited knowledge from their parents, their exposure and/or experience with the disease, and religious belief. Accordingly, the traditional medicines used to treat cutaneous leishmaniasis disease can be categorized based on the sources extracted, such as herbals, animal, material, minerals, and spiritual medicines.

3.9. Herbal Treatments

Herbal medicines can be different leaves and plant products that can be tied to the wound or lesions as well as smeared on the ulcerated area by mixing with butter after they are ground, and drunk after being squeezed. The herbal treatments are the highly accepted types of medicine used to treat cutaneous leishmaniasis disease in Kalu district. Garlic, different plant leaves and blood of cactus are some of the plants used as medicine for cutaneous leishmaniasis (CL) in Kalu district.

3.10. Garlic

The community perceived that garlic is one of the effective home medicines to cure cutaneous leishmaniasis (CL) disease. One of the FGD participants described the treatment practices and experiences using garlic as "individuals with cutaneous leishmaniasis (CL) are treated with garlic at home. After peeling the garlic, it is heated on the fire, and mixed with black cumin, salt, and the wound" (FGD: Male Youth Members). The other FGD discussants from high school teachers explained that: "Society is aware and applies garlic immediately before going to traditional healers. Some people do not go to any treatment institutions for CL. The people tell you to tie garlic with a black flavor. It is important to treat CL"(FGD: Female High School Teachers). The KII participant also shared the above ideas on the treatment practices using garlic by saying that "at this time, the community applies garlic immediately before going to any treatment centers. Garlic hot on the fire and burns the wound" (KII: Religious Leaders). In the same vein, one of the individuals with cutaneous leishmaniasis (CL) also shared her practical experiences on how to treat CL skin disease at home using garlic:"Garlic, combined with cummin, and 'feto' are important. I cured it by applying garlic after making it hot on the fire. First, I peel and pound it and, then, I make it hot on the fire and tie it to the wound for about 2 to 3 days. Then, the wound dried and crumbled, finally it healed. Not only I, but also both of my sister and my niece were treated

using garlic "(IDI: Female Individual with CL)



Figure 3: Garlics used to Treat Cutaneous Leishmaniasis at Home (Taken from Google, 2023)

3.11. Plants Leaves

As the participants mentioned, the plants' leaves are the top list of treatments for individuals with cutaneous leishmaniasis (CL). These plant medicines can be different leaves that can be tied to the lesions as well as smeared on the ulcerated area by mixing with butter; after they are grinded, and drunk after being squeezed. The FGD participants described the treatment practices as "most of the time, the traditional healers give medicines to individuals with CL medicines prepared from leaves" (FGD: Youth Members). Likewise, the other said, "there are leaves that we apply on the wound and tie to a piece of cloth on the affected part. If it is on the nose or around the eye, we smear it on the wound by squeezing it" (FGD: High School Teachers). Similarly, the religious leader shared his observations about the treatment practices of CL with different plants' leaves "one of the traditional medicines is the use of plants' leaves; they have applied using cotton over the lesions, and stayed for about 24 hours" (KII: Kebele Leader). Individuals with cutaneous leishmaniasis (CL) shared their practical experiences on how to treat CL disease using different leaves: I went to a traditional healer, then the healer gave me plants' leaves and

I smeared the lesion when I slept and washed with soap and water in the morning. I rubbed it with a chicken feather, and then smeared repeatedly. I repeated the same process and on the fifth day, the wound fully disappeared (IDI: Female Individual with CL). I hold the leaves on the wound for up to 3 or 4 days. I scratched the wound in the morning, some white and small particles were discharged from the wound (IDI: Male Individual with CL). The traditional healers explained that they can treat cutaneous leishmaniasis (CL) effectively using different plants leaves and plant products. One of the traditional healers said that "If I observe an individual with skin disease, I can find out it directly, as it is CL. Then I crush plants' leaves and tie on the lesion, and it can cure after five consecutive days" (IDI- Traditional Healer). The other know traditional shared his practical treatment experience of CL as: I cut and collect the leaves for medicine. First, I show individuals with CL how to use them and the amount of the medicine that can be applied; and then, they take the herbal medicines and apply, as I show them here. When they tie the medicines to the wound, it washes the wound, which causes oozing, and finally dries to the normal skin (IDI-Traditional Healer)



Figure 4: The Health Service Processes For Cutaneous Leishmaniasis by Traditional Healer (Directly Taken From the Traditional Healer's Home, 2023)

3.12. Blood of Cactus

The third type of plant used to treat cutaneous leishmaniasis (CL) in Kalu district is cactus. Cactus is a type of plant

mostly found in the low land area of Ethiopia. Many people use the blood of a cactus for cutaneous leishmaniasis (CL). In support of this, one of the religious leaders shared his

critical observations and understandings on how CL disease is treated by the blood of cactus, as “many people advised to apply this kind of plant and individuals with CL apply the blood of cactus” (KII: Kebele leader). Likewise, the FGD participants also shared explaining, “there were three kids who all had CL, and they were given blood of cactus as a remedy” (FGD: Male Community Members). In this regard, individuals with cutaneous leishmaniasis shared their treatment experiences with the blood of the cactus: I used a cactus to treat CL. First, I kick it with a stone and when it is bleeding, I receive it kicked by a basin, and I smear the

wound with feathers. Sometimes, the wound may bleed, but after I repeat more and more, it starts to crumble and heal (IDI: Male Individual with CL). The other individuals with CL said that I cured myself of CL by applying blood of cactus. I applied for it because the elder complied with me. I inserted a swab of cotton in the blood of the cactus and smeared the wound. Then, it started to rot and fall off, and it went on repetitively for three months. That is how I cured myself with cactus, and I know how effective blood is cactus (IDI: Male Individual with CL).



Figure 5: Picture of Cactus Taken from the Surrounding of Traditional Healer's Home (2023)

3.13. Organic Substance

3.13.1. Honey

Honey is a fluid produced from plants' nectar by bees, and used for treatment of cutaneous leishmaniasis (CL) in Kalu district. Individuals with cutaneous leishmaniasis use honey as a remedy for CL disease in their homes. The FGD participants shared their communal views on treatment of CL with honey: CL disease can be healed by putting and eating honey. The communities with cutaneous leishmaniasis eat honey to be healed, and they smear it on the watery swelling that appeared and got relief from the pain. Because the honey can help bring discomfort from the inside to the outside (FGD: Male Community Members). In this regard, individuals with cutaneous leishmaniasis (CL) interviewee said, “the

honey will make the wound dry and stitch it together” (IDI: Female Individual with CL). Other individuals with CL shared his practical treatment experiences: “I smeared the wounded areas with honey, and this helped the wound not to have a foul odor. I also eat fresh honey, because honey can produce heat and energy. The heat from inside my body and the heated medicinal plant leaves from outside helped me to heal faster. I put the honey on the wound at night and clean with soap and water in the morning. When I scratch the wound in the morning, some white and small particles are discharged from the wound. The wound was healed after I used the honey for some time” (IDI: Male Individual with CL).



Figure 6: Honey Used to Treat Cutaneous Leishmaniasis at Home (Taken from CL Patient's Home, 2023)

3.14. Animal

3.14.1. Bat

The Bat is a mammal of the order Chiroptera (Latin for “handwing”), making it the only mammal naturally capable

of true and sustained flight. The community in Kalu district perceived that the major cause of cutaneous leishmaniasis (CL) is the bat's urine. At the same time, they believed that the bat itself is taken as the medicine for CL. The community

members with cutaneous leishmaniasis (CL) explained that CL disease could be cured using bat on the lesion. The two FGDs participants from the community members shared their understanding on how to treat CL by using bats as: "the medicine is said to be the bat's meat. After the bat is killed, the bat and its meat can be used as a medicine for CL" (FGD: Community Members). The youth members said, "The major cause of CL is the bat, and the treatment is herself

too... It is said that the bat has to be killed, dried, mashed and sprinkled on the wound" (FGD: Youth Members). Likewise, the individuals with cutaneous leishmaniasis explained as "I killed the bat and make her holy, and used as medicine" (IDI: Male Individual with CL). "I killed the bat and dry the bodies of the dead bat, then crushed and applied it over the affected area and the wound has healed" (IDI: Male Individual with CL).



Figure 7: Bat Used as Medicine of Cutaneous Leishmaniasis (Taken from Ethiopian Animal Website, 2023)

3.15. Material

3.15.1. Heat Application

The other methods of traditional treatment for CL are using heated materials, which included the irons such as the nails and sickle as well as with the heated sticks. One of the FGDs participants shared their understanding as: Heat application included the treatments that are applied using heated irons, such as the nails and sickle. A sickle that is stirred in butter and when it heat, it putt on the wound. This method is intensive that rattle the stomach, and this inhibits the disease from spreading (FGD: Male Community Members). In the same vein, individual with cutaneous leishmaniasis (CL) shared their practical procedures and treatments experience via this method:

I went to traditional healer who lives in 'Bistima' where the healer prescribed to heat the wound using iron. After returning to my home, my brother put the nails in the fire for a while, it becomes hot. Then, he pierced on the wound... He put eight nails, then after a week, he used another 24 nails after making it hot in the fire; this has made me irritable, I was not conscious. However, after a month, the wound was dried (IDI: Female Individual with CL). In the same manner, the other individual with cutaneous leishmaniasis (CL) shared as: A person who was ill with CL told me that he was cured by a heated stick. I did the same thing. I took a sickle and heated it until it got hot and put it on my body where I saw the sign. While I do that, I am burning my own body. When the burning areas dry slowly, CL was disappeared, however, there have scars left on my body (IDI-4: Male Individual with CL).

3.16. Spiritual

3.16.1. 'Tufita'

The other traditional treatment used for cutaneous leishmaniasis (CL) is 'Tufita'. 'Tufita' is a type of spiritual treatment. This is the most common method of traditional

treatment in Kalu district, whereby a drop of saliva is spit on something such as water, sugar, Khat.... after prays by religious leaders and give to individuals with CL. The community has accepted it as effective means of treatment of any health problems. In support of this, the FGD participants shared their observations as "in the place called Ababa Ergoye both CL and other NTDs are treated using 'Tufita' " (FGD: Community Members). The other FGD participants explained as: "We believe that people can cure by spitting their saliva on the spot. These people are from a well-known clan who are take as blessed by GOD and just spiting their saliva, called 'Tufita' and individuals can be treated from CL" (FGD: Female Community Members). The religious leader shared his understandings about of the traditional treatments using 'Tufita': "Everybody with different diseases certainly can cure if they believed on this and come without any sin to the place. Those individuals with CL and other NTDs come here to get heal through 'Tufita'. The communities respect, trust to these religious leaders, and spend the whole day with them" (KII: Religious Leader). In line with this, the traditional healer shared his practical experience on how they treated CL using 'Tufita' "after I pray and put my spit of saliva, individuals with CL use 'Tufita' and many of them have cured" (IDI: Traditional Healer). Likewise, individual CL explained as:

I was affected with CL, and then I went to 'Ababa Ergoye' repeatedly and stay there for two-three days, then after praying 'Ababa Ergoye' gave me the benedictions by saying 'Tufi' on a highland of water. By this, I cured from CL within three weeks (IDI-Female Individual with CL).

4. Discussion

In this section, the major findings on the preference and treatment practices of traditional medicines for cutaneous leishmaniasis with the reference to existing literature were discussed. As the literature showed, there seems to be no villages, or town, where traditional medicine are not involved

in the delivery of healthcare services in Ethiopia [20]. As data found from the individuals with cutaneous Leishmaniasis, religious leaders, kebele leaders, and the wider community members, the primary treatment preferences for cutaneous leishmaniasis disease are the traditional medicines. There are many motives that can affect the community to prefer the traditional treatments. These include the issue of access (accessibility, availability, affordability, adequacy, and acceptability of traditional medicines). Furthermore, the cultural acceptance of traditional medicines, psychological comfort, the geographical distribution, treatment costs, and meeting patients' expectations are influence the community to prefer traditional medicines. Besides, the perceived effectiveness and educational status are also the other determinate factors that can influence the treatment preferences of the communities for cutaneous leishmaniasis (CL). The traditional medicines are available and accessible nearby the area in terms of health services, the geographical distribution in relation to the living areas of users, treatment costs, health care to meet patients' expectations, and the clients' social values. Likewise, many developing countries completely lack a dermatology specialist or have a few dermatologists that live only in urban areas, leaving remote populations without access to care, resulting in positive preference for the traditional medicines [15]. Ethiopian people rely on traditional medicine to meet their healthcare needs, which could be attributed to physical accessibility, and affordability as compared to modern medicine. These have positive reinforcement for individuals with CL to choose the traditional medicines in the rural parts of Ethiopia [3,19]. The local communities have greater trust in the effective traditional treatments to cure cutaneous leishmaniasis (CL). They believe that the true or real nature of the disease is hidden when it is treated with modern medicine [24,25]. However, the communities have greater faith and confidence in the traditional medicines that can cure CL permanently. This implies that the perceived thoughts of effectiveness forced them to choose the traditional healing practices. In support of this, studies show that the traditional medicines are cheap with minimal side effects, and helpful to cure diseases [26]. Kebede and his colleagues explained that individuals with cutaneous leishmaniasis have the attitude that treatments from traditional healers are more effective than western medicines, and prefer traditional medicines. South Wollo is a rural area where the population has continued their lives with subsistence farming [17]. As individuals with cutaneous leishmaniasis (CL) and the community members explained, the treatment services for CL are available at Boru hospital, which is far away, about 81 kilometers from their residence and unable to go there due to financial and other problems. They require a lot of money for transport, food, bedroom, medication, accommodation and other related costs. Hence, the community wants to treat traditionally due to the geographical distances. Similarly, the long distances of modern treatments have reinforced a positive experimental attitude towards traditional medicine in the area [3,9]. The other reasons that have forced individuals with cutaneous leishmaniasis (CL) and the wider community to prefer the traditional medicines are their attitudes, knowledge,

educational levels and ages. As the data revealed, the illiterates, and elder have treated with traditional medicines, whereas the educated and youth people preferred the modern medicines in Kalu district. Literatures showed that beliefs regarding treatment practices greatly vary between communities according to culture, educational background and socio-economic factors [12]. According a study conducted by Ramdas, a higher education level has contributed to seeking treatment at dermatology services [21]. Many people choose the traditional healing practices which are widely available in many African countries and throughout India, particularly in the rural communities [15]. Furthermore, the payment of contracts between patients and traditional healers may be an added incentive to seek treatment through traditional medicine. The results showed that economic status and income levels are burdened when they incur the expenses associated with long geographical distances between the remote areas and the city, which influences the preference of treatments. Despite the fact that some traditional healers charge a high amount of money, many traditional healers have provided cost-free treatments for cutaneous leishmaniasis (CL) disease in Kalu district. It is not necessary to pay for transportation, food, bed, treatment and medication. Instead, the patients can give a volunteer gift called 'Eriassa' or do not pay at all for traditional treatments. A person who is suffering from skin diseases costs a lot of money for their cure when use modern medicines. Traditional medicines are cheap with minimum side effects, helpful curing CL [14,21,26]. In Ethiopia, the high cost of modern treatments, forced the community's traditional medicines [3].

Cutaneous leishmaniasis (CL) has been treated using different traditional medicines in Kalu district. Traditional medicines incorporate plant, animal, mineral-based medicines, spiritual therapies, manual techniques and exercises, applied singularly or in combination to treat, and maintain well-being [24]. Likewise, the traditional treatments are applied using herbals, animals, materials, minerals, and spiritual medicines, singularly or in combination to treat cutaneous leishmaniasis in Kalu area. The findings revealed that medicinal plants are the most common and utilized traditional treatments for cutaneous leishmaniasis in Kalu area. These herbal medicines could be different plants' leaves and plant products. One of the herbal treatments for cutaneous leishmaniasis is garlic. The community prepares garlic at the home to treat CL cases, before going to any treatment institutions. Even though it can affect the body parts, it is garlic that the traditional healers prescribe for them to apply. The other herbal medicines for cutaneous leishmaniasis disease are different leaves and leaf products. These leaves can be tied, drunk, and smeared on the unclear after they are grounded. The third herbal medicine used to treat CL is the blood of a cactus. Cactus is a type of plant that is found in low land areas used to treat CL by making it bleeding. Sometimes, the cactus has injuries to the body parts, it makes bleeding and widened the wound while smearing it. In the same vein, 80% of the population relies on traditional medicines in the emerging world, and 90% of the

population in Ethiopia use herbal remedies for their primary healthcare [23]. Medicinal plants play key role in the field of medical science, it may be safe and secure than modern treatment [25,26]. According to Passero and his colleagues, it was verified that at least 292 plants might be employed as the traditional treatment for Leishmaniasis in different communities around the world [28]. The other treatment practice for cutaneous leishmaniasis is using honey. Honey is an organic natural substance that is produced from the nectar of flowers by *Apis mellifera* and is a sweet, flavorful liquid used as medicines for different diseases [28]. Hence, honey is one of the traditional medicines used for treatment of cutaneous leishmaniasis in Kalu district. The community uses honey in two ways-they smear it on the wound in order to not have a foul odor. Furthermore, they eat fresh honey, because the honey produces heat and energy, the heat from inside the body helps to heal faster. In Kalu district, cutaneous leishmaniasis (CL) disease has also been treated using heated objects, such as nails and sickle. The iron is heated on the fire, stirred in butter, and when it heats, it puts on the wound. Despite treatment by the heated iron objectives have irritability, unconscious feelings and sometimes damage their body, many of the community members with CL used this very 'peculiar' and 'puzzling' types of treatment practice. The other traditional medicine used for CL is the bat. The community perceived that the major cause of cutaneous leishmaniasis is the bat. At the same time, the bat itself is taken as the medicine for CL. Accordingly, the bat has to be killed and made dry and crushed, and then it sprinkled on over the affected area to treat CL. Spiritual treatments are the other traditional treatment for cutaneous leishmaniasis (CL) disease in Kalu district. 'Tufita' is one of the most common spiritual treatments that is given by religious persons and by individuals who come from respected clans. It is given by putting a drop of saliva in water or by saying 'Tuft' on something after praying by religious leaders. These people are considered respected clans who are blessed by super-natural power. Traditional healers discover the sources of knowledge, be it from the Bible or the Quran. The community also believes that this knowledge is a gift from God/Allah to cure individuals with health problems. In the same vein, religious and cultural beliefs have commonly been associated with sin, impurity, genetic and rejection incurred from God as a punishment [28]. Traditions in China, India, Japan, and African countries have similar traditional conceptions in associating skin NTDs with sin, and isolation which need spiritual treatments [15,28].

5. Conclusion

The findings of the study showed that community members, including individuals with cutaneous leishmaniasis (CL) have the primary preference for traditional treatments. The major factors that can influence the community to prefer traditional treatments for cutaneous leishmaniasis are accessibility, perceived effectiveness, financial reasons, educational status, the geographical barriers and other cultural perceptions. These are the major factors that influence the community to prefer the traditional healing practices for CL in Kalu district. Traditional medicines are easily accessible in terms of health

services, the geographical distribution in relation to the living areas of users, treatment costs, health care to meet patients' expectations, and those of clients' social values. Cutaneous leishmaniasis (CL) disease has been commonly treated using different traditional medicines in Kalu district, such as plants, animal, material, minerals, and spiritual medicines. Traditional treatments typically incorporate home remedies, herbal medicines, which can be drunk after being squeezed, tied and smeared on the ulcerated area by mixing the plants' leaves with butter, animal and mineral-based medicines, spiritual therapies, and manual techniques. The local and federal government as well as the stakeholders working on cutaneous leishmaniasis should give attention equally to other health problems. Furthermore, the Ethiopian Federal Ministry of Health should integrate the CL with other programs, and the modern health system with indigenous treatments to have an inclusive and organized health system.

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Getachew Kebebew Abate have written the whole parts of the manuscript, including conceptualization, methodology, investigation, data curation, formal analysis, validation, writing-original draft, writing-review & editing, supervision, and visualization.

Declaration of Competing Interest

The author declares that there no known competing interests.

Data Availability Declaration

Data are available based on rational demand. Data including raw data and analysis thesis are available based on rational demand. The datasets analyzed during the current study are available from the corresponding author on reasonable request. The data used in the study belongs to the author and if someone can request the data, the author will share the de-identified one. All data generated or analyzed during this study are included in this published article and its supplementary information files. The datasets generated and/or analyzed during the current study are not publicly available due to the sensitive nature of the data and the need to protect participants' confidentiality but are available from the corresponding author on reasonable request.

Ethical Approval and Consent to Participate

This study involving human participants was reviewed and approved by the Institutional Review Board (IRB) of Addis Ababa University. Because I was attended my masters at Addis Ababa University and this article was parts of my master's research. The approval was granted after careful evaluation of the study protocol to ensure that it met ethical standards for research involving human subjects. All procedures performed in this study were conducted in accordance with the ethical principles outlined in the guiding principles of Addis Ababa University and the National Ethical Review Committee of Ethiopia. Furthermore, the MRC Guidelines for Good Clinical Practice (GCP) in Clinical Trials were employed for this study. Prior to participation, the purpose, procedures, potential risks, and benefits of the study were clearly explained to all participants. Based on the supported letter written form Addis Ababa University, written informed consent was obtained from each participant before data collection. For participants under the age of 18 years, informed consent was obtained from their parents and legal guardians. To do so, the researcher employed the following ethical procedures and informed consents: First, the researcher explained carefully to the participants about the aim and methods, as well as the intended and possible outcomes of the research. Second, permission was asked from the participants of the study through a support letters that were written from Addis Ababa University and Kallu Woreda Health Office. Third, the informants' rights and interests were considered. Fourth, the following ethical standards related to COVID-19 were applied: during data collection processes, personal protective equipment like face shields/ facemasks, sanitizer, and maintain physical distancing were used to reduce the possibility risky for both researcher and participants. Additionally, both English and local (Amharic) languages were used to communicate easily with study participants. Therefore, the trust and confidentiality, anonymity, and respectful were established through the informed consent. Investigators took all safeguards to avoid coercion of participants by applying voluntary informed consent. Hence, the consent procedure followed the protocol, and the required ethical standards were employed to get the intended information. **Correspondence** and requests for materials should be addressed to G.K.A

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