

Leishmaniasis Increase and Causes in Kabul City

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ABSTRACT

Parasites of the genus *Leishmania* are pathogenic for humans and animals and cause leishmaniasis. This disease can be seen in three forms: cutaneous, cutaneous-mucous, and visceral. Identification of *Leishmania* species in clinical infections is very important for advancing awareness, control, and prevention of the disease. Kabul province in Afghanistan is one of the important places infected with *Leishmania* parasites. In this study, the prevalence of cutaneous leishmaniasis and its treatment methods in traditional medicine were studied in areas of Kabul province, Afghanistan. The population investigated in this study was primarily patients with cutaneous leishmaniasis who were referred to health centers (Leishmaniasis Hospitals) in endemic areas of the disease in the capital Kabul province. In addition to the capital of Kabul province, information on patients was also collected from different districts like Kart e now, Arzanqimat, Darlman, Desabz, Sarobi. Data collection of leishmaniasis patients was done using a questionnaire. After the statistical analysis of the obtained data, it was observed that women are significantly more affected by cutaneous leishmaniasis than men. It was also observed that gender, income, health facilities, travel, level of education, etc are effective in people suffering from this disease. Based on the collected information, the people of Kabul province use medicinal plants such as milk thistle, Asterberg, alkaloid plant, and Bolag oti to control leishmaniasis or Salak.

Keywords- Leishmania, Kabul, milk thistle (*Silybum marianum*), Calotrope (*Calotropis procera*), watercress (*Nasturtium officinale*).

I. INTRODUCTION

Genus *leishmania* belongs to with Trypanosomatidae family and Kinetoplastida order. The *leishmania* relating parasite divide into two categories new world, and old-world types. The old form finds in Europe, Africa, and Asia. The new world was found in America. In different areas of the world, about 53 forms were known. 31 of these are infected in the mammals and 20 of the above mention are infected humans (Alemayehu, 2017). diseases of *leishmania* were transferred by the female infected phlebotomus (Hide et al., 2007). The difficult life cycle of *leishmania* is a locality in outer and inner cellular. This parasite has two steps in its life cycle, which include of them is outer cells in the un vertebrata (Phlebotomus) and other steps

in inner cells in the Vertebrata (Banuls and Prugnolle, 2007). Leishmaniasis includes a group of diseases caused by *Leishmania* species. It is estimated that 1.5 to 2 million new people are diagnosed with this disease each year, of which up to 500,000 are neurological and 1,500,000 are cutaneous (Den Boer and Alvar, 2011). Worldwide, the largest epicenter of cutaneous leishmaniasis is in Kabul, Afghanistan; The agent of this disease, *Leishmania tropica*, is transmitted by the mosquito *Phlebotomus sergenti*. The estimated number of cases has ranged from 67,500 to 200,000 patients annually in the last decade. Due to limited resources during and after the Afghan civil war, treatment of patients with cutaneous leishmaniasis by the Afghan Ministry of Health and by non-governmental organizations is the only strategy to control this

epidemic (Reithinger et al., 2005). It has been reported from 98 countries in the tropical and subtropical regions of the world. Currently, more than 350 million people live at risk of developing SALK, and there are an estimated 12 million cases worldwide (Srinivasan et al., 2016). Most cases of cutaneous leishmaniasis occur in Afghanistan, Algeria, Brazil, Colombia, Iran, Pakistan, Peru, Saudi Arabia, and Syria (Chávez-Fumagalli et al., 2018). Leishmaniasis is a protozoan disease that is continuously spreading in Afghanistan and Pakistan (Kakarsulemankhel, 2011).

1.1 History of leishmaniasis in Afghanistan

Although cutaneous leishmaniasis has been known in some parts of Afghanistan for many years, no systematic study had been done on this disease until 1962. conducted an epidemiological study of the disease in different regions of the country and reported the presence of cutaneous leishmaniasis in the northern regions of Afghanistan (Saini, et al 2020).

Atonic leishmaniasis cases have been reported in Kabul city since 1947, the number of cases recorded in this city between 1947 and 1963 was very low; But it increased to a very significant level from 1964 to 1967 (Nadim and Rostami, 1974). More than 90% of cases of cutaneous leishmaniasis and mucus cutaneous leishmaniasis are reported from Afghanistan, Pakistan, Syria, Saudi Arabia, Iran, Brazil, Algeria, and Peru (Pacheco and Kamboh, 2020). Kabul is currently the largest center of anthroponotic cutaneous leishmaniasis worldwide. Kabul is known as the main center of psoriasis in the world.

Therefore, cutaneous leishmaniasis is a major public health problem in Afghanistan (Reithinger et al., 2003). In Herat province, Leishmania tropica accounts for 96-98% of cutaneous leishmaniasis patients (Rahman et al., 2014). There are more than 30 species of *Leishmania* that can infect humans (Adegboye and Adegboye, 2017). Anthroponotic cutaneous leishmaniasis prevails in most provinces except Kunduz and Balkh. The endemic foci of cutaneous leishmaniasis in western Afghanistan are distributed in different regions of Herat province (Fakhar et al., 2017).

Intestinal tuberculosis infects 0.2-0.4 million people in the world every year. The total number of deaths from visceral leishmaniasis varies between 20,000 and 30,000 annually. Due to the increase in frequency in remote areas and lack of surveillance, it is difficult to estimate the exact number of disease cases and the resulting deaths (Papoutsi et al., 2008).

1.2 Symptoms

Symptoms of this disease include anemia, weight loss, intermittent fever, hepatomegaly, and splenomegaly. The incubation period varies from 2 weeks to 18 months for the parasite depending on the immune status of the patient with the appearance of the initial skin lesion that leads to severe inflammation of the viscera (liver and spleen) (Zulfiqar, 2017).

II. MATERIAL AND METHODS

The present study was conducted with the aim of studying cutaneous leishmaniasis and its treatment methods in traditional native medicine in Afghanistan, which was applied research and was conducted by questionnaire.

The population investigated in this study was primarily patients with cutaneous leishmaniasis who were referred to health-treatment centers (hospitals) in endemic areas of the disease in Kabul province. The information of 96 patients with files in Kabul Hospital was used to collect data. Also, the designed questionnaires were completed in the Districts of arzan gemat (35 patients), Kart e now (27 patients), Qarabagh (23 patients), Desabz (10 patients), and Darlaman (8 patients) in Kabul province.

In order to obtain information about the traditional medicinal plants used for the treatment of leishmaniasis, local doctors, who prepared the drug from Medicinal plants and patients with leishmaniasis were questioned.

2.1 Data collection method and tools

This research is a field survey in terms of the data collection method. In this type of study, the most important data collection tool is the questionnaire.

2.2 Data analysis method

The collected data was analyzed using SPSS version 26 software. Descriptive and analytical methods were used in data analysis.

2.3 Methods

2.3.1 Correlation of nominal variables

The correlation between the gender of people with leishmaniasis and the travel of the patient ($p = 0.0005$, $\Phi = 0.302$) was significant; But with side effects caused by malnutrition ($p = 0.151$, $\Phi = 2.067$) and going to medical centers for disease treatment ($p = 0.940$, $\Phi = 0.006$) and patients who go to a doctor for treatment. ($p = 0.547$, $\Phi = 0.363$) and patients who had the ability to buy medicine ($p = 0.538$, $\Phi = 0.380$) and use traditional medicine treatment methods ($p = 0.562$, $\Phi = 0.335$) and the type of treatment method of traditional medicine ($p = 0.372$, $\Phi = 3.127$) are not significant.

The correlation of occupation of affected people living in a city or village ($p = 0.009$, $\Phi = 0.308$) and ability to buy medicine ($p = 0.013$, $\Phi = 0.276$) and visiting a traditional healer ($p = 0.021$, $\Phi = 0.273$) was significant, but with traveling ($p = 0.352$, $\Phi = 0.183$) and having proper nutrition ($p = 0.581$, $\Phi = 0.145$) and unsafe area (0.083). = $p = 0.236$, $\Phi = 0.236$) and visits to and from medical centers ($p = 0.183$, $\Phi = 0.210$) and the presence of a medical center in the patient's place of residence ($p = 0.789$, $\Phi = 0.126$) And traditional medicine methods ($p = 0.171$, $\Phi = 0.214$) and the nature of traditional medicine methods ($p = 0.367$, $\Phi = 0.312$) are not significant.

The correlation of travel of people with leishmaniosis with visits to health centers ($p = 0.0005$, $\Phi = 0.315$) and the ability to buy medicine ($p = 0.0005$, $\Phi = 0.268$) was significant; But with the presence of proper nutrition ($p = 0.076$, $\Phi = 0.126$) and unsafe area ($p = 0.230$, $\Phi = 0.085$) and the use of traditional medicine methods ($p = 0.582$, $\Phi = 0.039$) $\Phi = 0$) and the type of traditional medicine methods ($p = 0.668$, $\Phi = 0.088$) are not significant.

The correlation of proper nutrition of leishmaniosis patients with traditional medicine treatment methods ($p = 0.002$, $\Phi = 0.223$) was significant, but with the unsafe area ($p = 0.538$, $\Phi = 0.044$) and commuting to medical centers ($p = 0.056$, $\Phi = 0.135$) and the existence of a medical center in the patient's place of residence ($p = 0.975$, $\Phi = 0.002$) traditional medicine treatment method ($p = 0.017$, $\Phi = 0$) and the type of traditional medicine treatment method ($p = 0.250$, $\Phi = 0.143$) is not significant.

The correlation of the unsafe area of people with leishmaniosis with the treatment methods of traditional medicine ($p = 0.0005$, $\Phi = 0.995$) was significant; But it is not significant with the ability to buy medicine ($p = 0.086$, $\Phi = 0.122$) and visiting a traditional doctor ($p = 0.617$, $\Phi = 0.035$).

The correlation of side effects caused by malnutrition of people with leishmaniosis with M ($P = 0.302$, $p = 0.0005$) and ability to buy medicine ($p = 0.003$, $\Phi = 0.286$) is significant, but by referring to the center Therapy ($p = 0.020$, $p = 0.020$) and traditional medicine method $p = 0.068$, $\Phi = 0.189$ are not significant.

The correlation between commuting to the treatment center for leishmaniosis patients with the ability to buy medicine ($p = 0.0005$, $\Phi = 0.330$) was significant, but with the visit to the local doctor ($p = 0.182$, $\Phi = 0.094$) and the use of traditional Medical treatment methods ($p = 0.207$, $\Phi = 0.090$) and the nature of the traditional medicine method ($p = 0.109$, $\Phi = 0.174$) and the use of plants ($p = 0.249$, $\Phi = 0.118$) is not significant.

The correlation between living in a city or village of people suffering from leishmaniosis with the ability to buy medicine ($p = 0.0005$, $\Phi = 0.348$) was significant, but with referring to a traditional healer ($p = 0.243$, $\Phi = 0.082$) and from The treatment method of traditional medicine ($p = 0.722$, $\Phi = 0.025$) and the nature of traditional medicine method ($p = 0.083$, $\Phi = 0.183$) are not significant.

The correlation between contracting the disease in the place of residence of leishmania people with the ability to buy medicine ($p = 0.054$, $\Phi = 0.138$) is significant, but with referring to a traditional healer ($p = 0.066$, $\Phi = 0.130$) and using from Russian traditional medicine ($p = 0.616$, $\Phi = 0.036$) and the nature of

traditional medicine method ($p = 0.893$, $\Phi = 0.092$) are not significant.

2.3.2 Investigating factors affecting cutaneous leishmaniosis

By performing chi-square analysis (χ^2), it was observed that the frequency of people with cutaneous leishmaniosis disease in terms of gender ($p = 0.013$, $df = 1$, $\chi^2 = 82.000$; men more than women) and those who have proper nutrition ($p > 0.0005$, $df = 1$, $\chi^2 = 142.00$) and had the ability to buy medicine ($p > 0.0005$, $df = 1$, $\chi^2 = 118.000$) and go to a traditional healer for treatment ($p > 0.0005$, $df = 1$, $\chi^2 = 145.00$) and the treatment method of traditional medicine ($p > 0.0005$, $df = 1$, $\chi^2 = 142.000$) have a significant difference; But in terms of traveling ($p = 0.000$, $df = 1$, $\chi^2 = 45.061$) and in terms of malnutrition ($p = 1.000$, $df = 1$, $\chi^2 = 0.00$) and travel facilities, he came to Treatment centers ($p = 0.056$, $df = 1$, $\chi^2 = 1.909$) have no significant difference.

III. MEDICINAL PLANTS USED TO TREAT CUTANEOUS LEISHMANIOSIS IN AFGHANISTAN

Zakhte (Pashto), Mary's thistle (*Silybum marianum*): is a kind of thorny annual plant (Figure 1-5) that exists in the plains and deserts of Afghanistan. In the root part, there is a protrusion that looks like an onion. The root of this plant is used to cure leishmaniosis. The root of this plant is boiled and then closed with a cloth on the leishmaniosis wound.



Figures 3-1: *Silybum marianum*

Another plant that is used in the treatment of leishmaniosis is *Calotropis procera*. In Pashto, this plant is called Khamzoreh or Khpiyange. Estrabrag is a one-year plant (Figures 3-2 to 3-4). The seeds of this plant are used to treat leishmaniasis. The ripe seeds of this plant are mixed with soap and gore (sugar cane) and placed on the wound of the seeker.



Figure 3-2: Astbarq plant



Figure 3-3: The flower of the ostrich plant



Figure 3-4: The seed of the ostrich plant

4- Cheshme grass plant or water leek or Bolag oti (*Nasturtium officinale*) (in the Pashto language) (Figure 5-3) is also used to treat leishmaniasis. Many people use the leaves of this plant to prepare food; In addition, they are also used to control leishmaniasis. A fresh leaf of spring grass after being pounded and mixed with salt is placed on the wound of the seeker.



Figure 3-5: Spring grass

Some use potash or green dye to treat the ulcer of Salk's disease. Potash is in the form of powder and after mixing with water, it is applied to the wound (Figure 3-6).



Figure 3-6: Potash or green dye, used on leishmaniasis wound.

IV. DISCUSSION

Afghanistan is one of the most disease-prone countries in the world. Many diseases, especially infectious diseases such as leishmaniasis, are common in this country. Kabul, the capital of Afghanistan, is one of the most important endemic areas of cutaneous leishmaniasis (Reithinger et al., 2003). Kunduz, Parwan, Balkh, and Herat provinces are also considered leishmaniasis endemic areas. In addition, visceral leishmaniasis is prevalent in almost all regions of Afghanistan and this disease is one of the most important causes of death in Afghan children (Rahman, 2014). Although there are no accurate statistics on the incidence of leishmaniasis in Afghanistan, according to the report of the World Health Organization in 2002, there were nearly 200 thousand cases of cutaneous leishmaniasis in Kabul alone (Reithinger et al., 2003).

The results of this research showed that there is a significant difference between men and women in terms of cutaneous leishmaniasis and women are more affected by this disease than men. It seems that the reason for this is the greater participation of women in agricultural and farming activities in rural areas. These activities increase contact with leishmaniasis-carrying mosquitoes and increase the rate of contracting the disease. This result is consistent with the study of Jafari et al. (2014).

Some people with leishmaniasis have contracted this disease while traveling. In Afghanistan, many people are traveling and moving or traveling to neighboring countries; This situation causes various diseases, including leishmaniasis, to be transferred from one region to another. Such a result was also obtained in the study of Di Muccio (2015).

Most of the people with the leishmaniasis disease in this study were also suffering from malnutrition and many of the respondents were suffering from economic poverty. Most of the people with leishmaniasis lived in rural areas and did not benefit from health facilities; Therefore, economic poverty and the lack or absence of health facilities have led to the creation of favorable conditions for the spread of leishmaniasis in rural areas. These results are consistent with the results of Floreani et al. (2016) and Walters et al. (2018) are consistent.

The results of the investigations in this research showed that among different occupational groups, students had the highest percentage of leishmaniasis. After that, the workers, housewives, teachers, and engineers were ranked next to suffer from this disease. Due to the fact that Afghanistan is very weak in terms of health indicators, many residential areas are still the place of growth and living of rodents, which are considered the reservoir of this disease. In addition, after closing schools, students are active and playing around residential areas, and therefore they are more exposed to leishmaniasis-carrying mosquitoes, and in general, the percentage of infection has increased in this group. Ebadi and Hijazi (2012) also concluded that the prevalence of the disease among the students of the Barkhor area of Isfahan was higher than in other classes.

Comparing two groups of respondents who live in safe areas with people who live in unsafe areas, showed that there is no significant difference between the two groups in terms of contracting cutaneous leishmaniasis. This finding shows that both groups were exposed to the disease and insecurity did not have a significant effect on the rate of infection. Khobdel et al. (2012) also obtained similar results in their study.

Examining the economic status of people with leishmaniasis showed that people who are in unfavorable economic conditions are more susceptible to this disease than other people. People with poor economic conditions have limited financial ability and less access to health and treatment facilities. These people are more exposed

to the effects of diseases than others. The components of respondents' access to healthcare services based on access to medical centers in their residence, distance from these centers, access to doctors, ability to buy medicine, etc., were investigated in this research. Tashti (2018) and Mohammadzadeh et al. (2016) also found in their research that income inequality and economic poverty decrease public health and increase the share of individuals in healthcare payments. Tarkiainen et al. (2013) also obtained similar results in their studies.

In this research, it was observed that in rural areas, the rate of seeker disease is higher than in urban areas. This means that villagers are more susceptible to leishmaniasis than others. Afghanistan is in a very unfavorable situation in terms of health conditions and facilities. These facilities are more acute in rural areas; In other words, lack of proper infrastructure in villages such as a lack of proper access roads, lack of medical centers, lack of access to the doctor, lack of proper waste disposal system, accumulation of garbage and as a result, lack of hygiene, make the conditions for presence and reproduction. Ground mosquitoes have created disease carriers, which together have turned rural areas into a focus for the disease over time. For this reason, villagers are more susceptible to this disease. Tayeh et al. (1997) and Ahmadi et al. (2012) also found in their research that this disease exists in most cases in areas outside the city and villages, which is directly related to the unsanitary disposal of waste and the accumulation of construction waste materials. Sofizadeh et al. (2012) also found out that most of the leishmaniasis sufferers live in rural areas in Gonbadkavus city.

V. CONCLUSION

This research was conducted to study medicinal plants for the treatment of cutaneous leishmaniasis in Afghanistan, Kabul city. By conducting the current research, it was observed that the people of Afghanistan are suffering from economic poverty and do not have proper health facilities, as a result, leishmaniasis is widespread. Some people use shoe polish to treat calluses. The people of Kart e now, Arzanqimat, and Qarabagh cities use salt to treat leishmaniasis. A plant called an alkaloid is used in Darlman city. In Bagrami city, the medicinal plants of Cheshme grass, Astbarq, and Zakhte are used to treat the wound of Salk disease.

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