TheGMS
The Gazette of Medical Sciences
https://www.thegms.co ISSN 2692-4374 DOI https://www.doi.org/10.46766/thegms

Public Health | Research

Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran

Fatima Ibrahim ABDULSALAM[1], Tabarak Malik[2*]

[1]Department of Microbiology, Faculty of Science, Kano University of Science and Technology, Wudil, P.M.B. 3244 Kano-Nigeria. https://orcid.org/0000-0003-3226-3246

[2]Department of Biochemistry, School of Medicine, College of Medicine and Health Sciences, University of Gondar, Ethiopia. https://orcid.org/0000-0002-8332-7927

Submitted: 16 November 2021
Approved: 13 January 2022
Published: 14 January 2022

Address for correspondence:
Dr Tabarak Malik, Department of Biochemistry, School of Medicine, College of Medicine and Health Sciences, University of Gondar, Ethiopia. https://orcid.org/0000-0002-8332-7927

How to cite this article: Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014. https://www.doi.org/10.46766/thegms.pubheal.21111602

Abstract

Background: Knowledge, Attitudes and Practices (KAP) surveys precede an awareness or intervention program, it addresses a felt need in a population in which that need exists. In an endemic region of cutaneous leishmaniasis disease occurrence, public enlightenment on its preventive and control measures is highly important. Ilam province of Iran is a provincial border town transited annually by pilgrims was reported to have the most cases of cutaneous leishmaniasis ranking highest since 2010 yet no report on KAP survey has been previously conducted.

Objective: The objective was to determine the knowledge, attitude and practices of people towards cutaneous leishmaniasis and its related risk factors.

Method: The study was conducted among 178 participants living in Mehran city, located at the border of Iran and Iraq from July to September 2017. Public members were randomly selected as study participants from whom data was collected using semi-structured questionnaire. The questionnaire consisted of four parts: (i) Socio-demographic variables, (ii) knowledge regarding CL transmission and prevention, (iii) attitude towards CL prevention and treatment and (iv), practices related to CL prevention and control. Multiple Linear Regressions was used to analyse data using Statistical Package for Social Sciences (SPSS) version 20.

Result: The mean scores of knowledge, attitude, and practices were 28.17 (±SD =4.33), 30.57 (±SD =3.87), and 4.94 (±SD =1.94), respectively. Disease awareness (ß = -4.79, 95% Confidence Interval (CI) -6.905, -2.665; p<0.001) was significantly associated with knowledge level. Educational status (ß = -0.328, 95% CI (-0.608, -0.048); p = 0.01) and marital status (ß = -0.635, 95% CI (-1.145, -0.125); p = 0.023) were significantly associated with practices. Disease awareness was significantly associated with knowledge, while middle school and high school were significantly associated with disease prevention practices.

Conclusion: Awareness creation and programs targeted towards improving attitude and practices regarding CL and its preventive measures are important in the area; and intervention that targets those of lower socioeconomic class, those unaware of the disease and unmarried population is vital to control the incidence of the disease. Also, further studies are needed to clarify imported from autochthonous cases as these could be a related factor.

Keywords: KAP Survey, Cutaneous Leishmaniasis, Ilam province, Knowledge, Attitude, Practices, Border province, Awareness.

Introduction

The parasitic infection, Cutaneous *Leishmaniasis* can be caused by a variety of Leishmania species and it has become a public health problem affecting more than 60 countries located in both tropical and subtropical regions of the world, and for many years, the public health impact of Leishmaniasis has been grossly underestimated mainly due to lack of its awareness on health. According to WHO, the disease affects some of the poorest people on earth and is associated with malnutrition, population displacement, poor housing, a weak immune system and lack of financial resources. Leishmaniasis has also been linked to environmental changes such as deforestation, building of dams, irrigation schemes, and urbanization [1]. *Leishmania* parasite belongs to the family *Trypanosomatidae* and the genus *Leishmania* includes more than 20 species that can cause Leishmaniasis in humans [2]. According to reports, in Iran, Anthroponotic Cutaneous Leishmaniasis (ACL) caused by *Leishmania tropica* and transmitted by *Phlebotomus sergenti*, and Zoonotic Cutaneous Leishmaniasis (ZCL) caused by *Leishmania major* and transmitted by *Phlebotomus papatasi* are the two infection occurring types of CL; and gerbils (*Rodentia: Gerbillidae*) have been reported to serve as main reservoir hosts of the etiological agent [3]. Being vector-borne and the fact that ZCL variant has non-human sources, certain weather conditions such as specific temperature, humidity and rain, are crucial factors in developing transmission [4]. According to CDC (2017), about 0.7 to 1.2 million newly infected CL cases were reported from 2010 to 2016. CL caused by *L. tropica* and *L. major* are similar on clinical bases as the skin lesions of both appear the same in size, ranging from a few millimetres to 4 centimetres or more. Individuals infected often have lesions on their skin without having any other symptoms [5, 6]. In most patients, the skin lesion begins as a small reddish and inflamed papule after inoculation of about 2 to 6 weeks, this papule enlarges slowly and a crust-like substance develops at the center; with time the crust-like substance falls off and a shallow ulcer is observed [7]. The skin lesions usually develop within several weeks or months after the exposure but occasionally first appear years later (for example, in the context of trauma or immune suppression). Usually, the lesions are painless but can be painful, especially if ulcerative lesions become infected with bacteria or if the lesions are near a joint [8]. The healing process typically results in atrophic scarring. The type of CL is indicated by the site and number of lesion(s). *L. major* which accounts for more than 70% of the cases has preferred infection sites like the cheeks, arms and legs, while the preferred sites for *L. tropica* are cheeks and arms having over 50% [9]. The prevalence rate of CL caused by *L. major* is 2.6 times higher than *L. tropica* and mixed infections of both species have also been reported. This could be a reason why the disease is difficult to control as it is important to differentiate each species.

The increase in Leishmaniasis incidence worldwide is mainly attributed to the increase of several risk factors including massive migration, deforestation, urbanization, immunosuppression, malnutrition and treatment failures. Humans making changes to the environment, as well as the population movements, may lead to changes in the range and density of the vectors and reservoirs and these, in turn, may increase human exposure to infected sandflies (being the vectors) [10]. In the Eastern Mediterranean Region (EMR), Cutaneous and Visceral Leishmaniasis is reported from 14 of the 22 countries of the region, namely Afghanistan, Egypt, Iran (Islamic Republic of), Iraq, Jordan, Libyan Arab Jamahiriya, Morocco, Pakistan, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia and Yemen [11]. In these countries, outbreaks of *Leishmaniasis* tend to occur every 10 years; In 2008, about 100,000 new cases of CL were reported from some of the EMR countries including Palestine [11]. According to Hotez *et al*, the estimated number of cases of CL caused by *L. tropica* in the Middle East and North Africa countries is reported to be 40,000 [12]. The reported annual incidence of CL in Aleppo, Syria decreased in the 1950s, possibly due to insecticide spraying against malaria, but started to increase again in the late 1980s [13], from a few hundred during most of the 1980s to thousands since 1988 and to more than 10,000 since 2003 [14].

In Iran, the epidemiological situation suggests that the actual rate is estimated to be five times higher though only about 20,000 annual disease cases are being reported from different areas of the country [15, 16]. In both urban and rural areas, CL can appear as either wet or dry lesions. The urban type of CL is observed in almost all of the country's urban areas whereas the rural type is prevalent in 15 provinces [17]. A higher incidence in the rural plateaus of the country was indicated in a study conducted in 2014 [18]. From the period of 1983 to date, it has been noted that the highest incidence of the disease CL was observed in the provinces of Isfahan, Golestan, Fars, and Ilam respectively; whereas provinces with a lower burden of the disease infection were found to be Kermanshah, Homozgan and Kerman provinces [19]. Interestingly, a study suggested that the Ilam province was reported to have the most cases of CL ranking highest since 2010 [6]. This could be as a result of an inverse relationship between the altitude and incidence, i.e. the higher the altitude, the lower the incidence of CL [18, 20, 21]. Also, due to the earthquake in 2003, a city in Kerman province have reported up to an eightfold increase in the number of new cases [22].

Leishmaniasis is currently one of the most important neglected tropical diseases (NTD) and yet it poses a significant health problem in many countries of the world. Disease causes are either preventable or treatable with appropriate diagnosis and treatment; however, the delay often results in debilitating outcomes which include stigma in certain parts of the world. The knowledge of

Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014. https://www.doi.org/10.46766/thegms.pubheal.21111602

how the population perceives the disease is essential to propose successful prevention and control strategies for the target group.

KAP of Cutaneous Leishmaniasis

Originating over half a century ago, knowledge, attitudes, and practices (KAP) surveys are popular in the field of health sciences; as in the context of specific illnesses or treatments, such surveys help to assess health-related beliefs or practices. They provide useful information perceived by a target population. This information, usually collected using semi-structured or structured questionnaires portrays what is known, believed and done in the context of a specific topic. There are few KAP surveys on cutaneous leishmaniasis in Iran. A thesis report by Mazloumi [23] showed that only 21% of the study population had good knowledge about the sandfly vector of leishmaniasis. In a study conducted amongst female students in Kashan city of Esfahan province where the disease-related knowledge was tested, only 59.8% of the respondents scored good knowledge even though about 73.2% of the respondents have a history of the disease infection [24]. Another study conducted amongst high school students in a hyperendemic region in the central part of Iran showed that although majority of the participants (90%) had a good level of knowledge about the disease symptoms, only about 28.6% of them were able to identify the sandfly vector. In a house-to-house survey that was done amongst the residents of Lapui district of Fars province in Iran, majority of the study population (83%) had heard about 'Salak' (which is the local name for CL). More than half of the respondents knew it was a microbial infection but only 1.2% named the parasite correctly as the causative agent. Their attitude towards the disease was not satisfactory, as some of the participants believed that the disease eventually cures itself and the correlation of this belief with their educational level was significant. The most practised preventive measure was the use of bednets by 41% of the respondents [25].

In other regions, a study in Turkey that analysed the knowledge and risk factors of the disease discovered that young people of age 5–19 years were the most vulnerable group of the study population, and sleeping without bed nets or ownership of a dog or cattle were significantly associated with increased risk of Leishmania infection [26]. In another study carried out in Syria, majority of the respondents believed that the disease could affect the same individual more than once, while the rest either believed that the disease never reoccurs or are unaware of the possibility of reinfections [27]. A report from a forest tribal settlement in India suggests that only a few of the respondents could recognize the disease and did not have common knowledge about it [28]. There was sheer unawareness of the disease vector, transmission, risk factors and control measures. This precluded them from taking preventive measures which in turn poses a risk in the spread of infection within the settlements and other areas. Another study conducted in India revealed that only 20% of the respondents were able to differentiate the sandfly vector from mosquitoes and other flies as the transmitting agent; majority were unaware of the biting time of the sandfly. Majority of the respondents believed that the disease was a less serious infection and was unaware of the preventive measures for leishmaniasis [29].

This study aimed to know the KAP of cutaneous leishmaniasis and its related factors in the border province of Ilam. No report on KAP survey has been previously conducted in that area. The reasons were to identify the baseline knowledge, beliefs, attitudes, misconceptions and behaviours towards the disease which is endemic in that province being a border town. This could provide local information on the issue and the barriers related to the effective planning, development and resource allocation of relevant public health interventions.

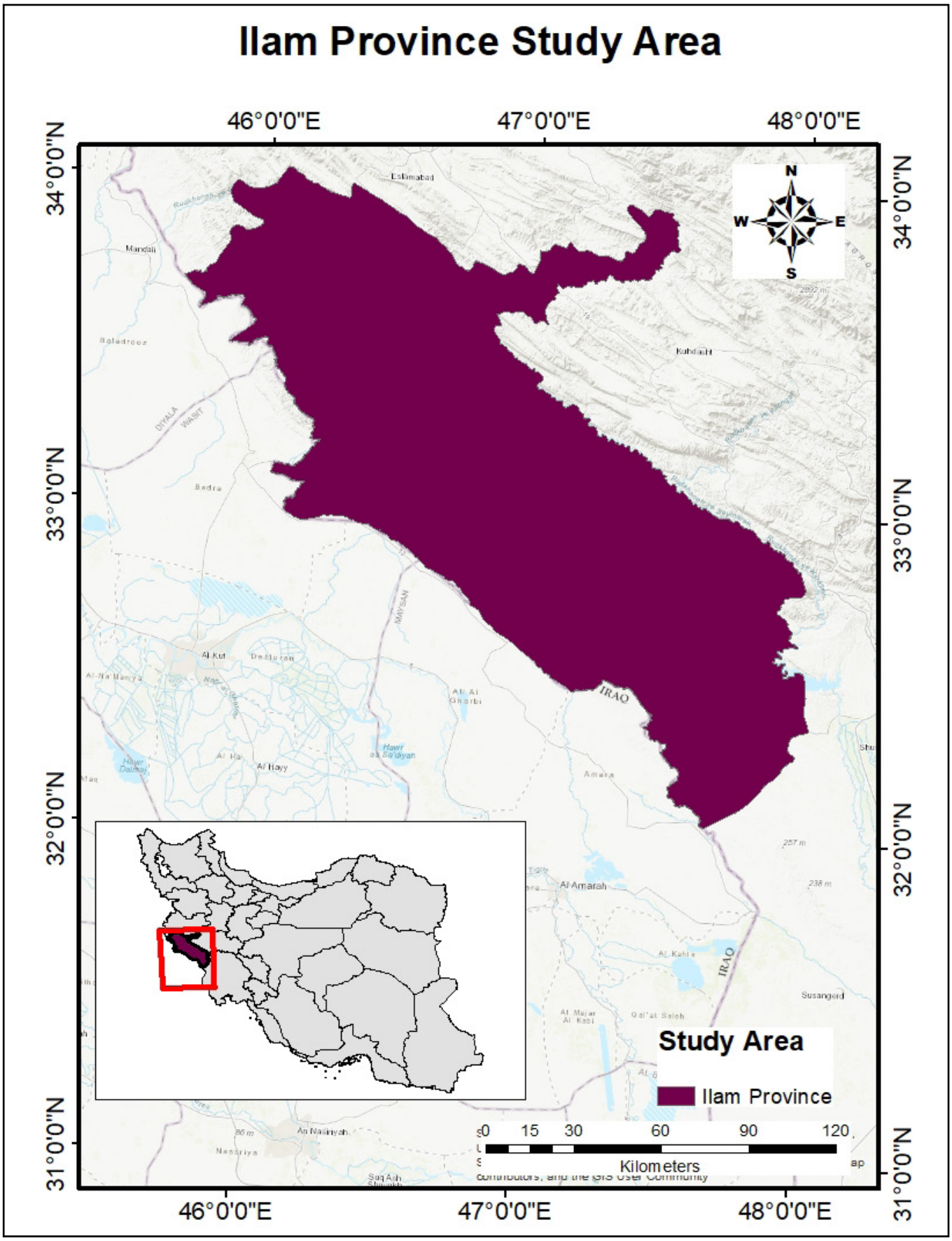
Methodology

Study area, sampling and sample size

The study area Ilam province, borders Iraq to the east mostly harbouring *L. major* as CL aetiology, is located in the western part of Iran at the border of Iraq (Figure 1). The province had a population of 580,158 in 2016 [30] covering an area of 19,086km^2 and it includes Ilam, Mehran, Dehloran, Darreh Shahr, Sarable, Eyvan, Abdanan and Arkwaz towns. This province is known to be the main route for millions of pilgrims travelling annually to Iraq and so there is likely to be shared genotypes of the aetiological agent between eastern Iraq and western Iran. It is an endemic region of Cutaneous Leishmaniasis (CL) disease occurrence . As for the sampling and sampling size, a total of 178 participants were determined using one sample population proportion, and the true proportion in the study area was determined by a pilot study which was 27% with a precision level of 0.7. A simple random sampling technique was used to select individual participants using residency registration number as a sampling frame. The inclusion criteria were being above age 16 years and being a permanent resident of the study area. However, participants who were above 90 years old or unwilling to participate were excluded.

Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014. https://www.doi.org/10.46766/thegms.pubheal.21111602

Figure 1: Ilam Province - The study area



Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014. https://www.doi.org/10.46766/thegms.pubheal.21111602

Data Collection and Analysis

The cross-sectional study was conducted among the people living in Mehran city from July to September 2017. A simple random sampling technique was used to select participants and data was collected using a semi-structured questionnaire consisting of four parts: (i) Socio-demographic variables, (ii) knowledge regarding CL transmission and prevention, (iii) attitude towards CL prevention and treatment and (iv), practices related to CL prevention and control. The questionnaire was validated to examine what it is intended to do and appropriately framed to include all necessary aspects. Ten questions were used to collect data on socio-demographic characteristics such as age, gender, occupation, education level, marital status, number of people in a household, type of home and history of disease contraction. The response of correct answers was recorded as 1 and wrong responses as 0 (per unit score). Knowledge on CL transmission, control and prevention was assessed with 21 questions. The minimum score each participant could score was 0 and the maximum possible score was 33. Attitude towards prevention and treatment-seeking was assessed with eight questions. The response of each positive question was recorded with a five-level Likert's scale which ranges from strongly disagree to strongly agree. However, for the negative questions, the response was vice-versa. The minimum attitude score the participants could score was eight and the maximum was 40. Practices on the prevention and control of CL was assessed with five questions, and the response was recorded as yes, no and don't know. The minimum score the participants could score was zero and the maximum was eight. However, some questions in knowledge and practices sections had more than one correct answer in their options. Using a reference [31], Good knowledge, attitudes and practices were considered if a participant scored ≥75% of the total score correctly, while moderate knowledge, attitudes and practices were considered if a participant scored 60 – 74% of the total score correctly. Also, participants who were scored less than 60% out of the total score were considered as poor knowledge, attitudes and practices. The reliability of the questionnaire was checked by conducting a pilot study. The value of Cronbach's alpha coefficient for the knowledge and attitude questions was 0.75 and 0.7 for practice. To compare the mean score across subgroups, analysis of variance was used for Knowledge, Attitudes and Practices. Also, to estimate the effect of knowledge, attitudes and other related factors on prevention and control practice regarding CL, an adjusted linear regression model was used. Using SPSS v22, all data analyses were performed at a 5% significance level ($P < 0.05$).

Ethical consideration

Ethical approval for the study protocol was obtained from the Ethics Committee of Tehran University of Medical Sciences with the approved number IR.TUMS.SPH.REC.1396.3843. All the information obtained was guaranteed anonymous. Participants' privacy, ethical consent, and confidentiality during and following completion of the study were duly ensured.

Results

With a total sample size of 216, the response rate was 82.4% (n=178). Out of all 178 respondents, more than half were female and majority of the respondent were between 29 to 40 years of age (Table 1). Most of the respondents were government employees and university graduates, the average monthly expenditure for most of the respondents was more than US$250. The respondents were mostly married and for most of them, the household size was not more than 4 people per household. Close to half of the respondents were liviing in houses made of brick and cement, and more than half of them have never contracted the disease. Since the area is an endemic region, almost all of the respondents are aware of the disease.

Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014. https://www.doi.org/10.46766/thegms.pubheal.21111602

Table 1. Demographic distribution of respondents, history and awareness of Cutaneous Leishmaniasis (total number of respondents, n=178).

	Variable	Frequency n (%)
Age group in years		
	16 - 28	74 (41.6)
	29 - 40	81 (45.5)
	41 and above	23(12.9)
Gender		
	Female	102 (57.3)
	Male	76 (42.7)
Occupation		
	Student	17 (9.6)
	Self-employed	43 (24.2)
	Farmer	4 (2.2)
	Government-employed	50 (28.1)
	Housekeeper	46 (25.8)
	Others	18 (10.1)
Last educational achievement		
	Elementary school or less	11 (6.1)
	Middle-school	34 (19.1)
	High-school	58 (32.6)
	University	75 (42.1)
Average monthly expenses		
	Less than $125	33 (18.5)
	$125 to $250	46 (25.8)
	More than $250	84 (47.2)
	I don't know	15(8.4)
Marital status		
	Single	59 (33.1)
	Married	114 (64)
	Divorced/Widow/Widower	5 (2.8)
Total number of people in the household		
	1 – 4	120 (67.4)
	5 and above	58 (32.6)
Type of construction materials used for their home		
	Concrete skeleton (i.e. cement, iron bars and sand)	68 (38.2)
	Metal Skeleton	23 (12.9)
	Brick/cement blocks	78 (43.8)
	I don't know	9 (5.1)
History of disease contraction		
	Had it in the past but recovered	43 (24.2)
	Currently have the disease	12 (6.7)
	Never contracted the disease	123 (69.1)
Ever heard of the disease "Cutaneous Leishmaniasis"		
	Yes	162 (91)
	No/I don't remember	16 (9)

Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014. https://www.doi.org/10.46766/thegms.pubheal.21111602

For the univariate analysis (as shown in Table 2), majority of the participants were scored good knowledge, while the rest had moderate and low scores. Most of the respondents have a good attitude score but majority of them had a moderate practice score. The total mean scores of knowledge, attitude, and practices were 28.17, 30.57, and 4.94 respectively. This means that on average, respondents have good knowledge of CL, good attitude towards prevention and treatment-seeking, but a moderate prevention and control practices.

In the knowledge section, 91% of our respondents have heard of the disease and 96% of them have seen someone with the disease. 89.3% mentioned fly as the disease vector, 5.6% mentioned animal reservoirs like dogs and rodents and the rest did not know. 64.6% correctly mentioned the female sandfly and 72.5% knew that the aetiologic agent is parasitic. On disease symptoms, 77.5% said it looks like a papule-like lesion. 71.4% of our respondents say that CL infections cannot be transmitted by direct contact with the skin lesion of CL patients; but as for its treatment, 93.8% agreed that it could be cured by drug therapy.

For the attitude section, 95% of them agreed or highly agreed to care about the disease according to recommendations of healthcare personnel. When stated that CL isn't an important disease and no prevention measure is necessary, 87% of the respondents disagreed or highly disagreed with this notion. 71.9% of the participants agreed or highly agreed that CL patients should cover their skin lesions to prevent transmission. For treatment-seeking behaviour, 64% of the respondents did not believe in the use of herbal medicine.

For self-reported practice, 78.1% of our respondents reported 'yes' to installed nets on their doors and window frames at home.

Table 2. Univariate analysis of KAP of respondents regarding CL and its related factors in Mehran city

Variable	Frequency	
	n	%
Knowledge (28.17 ±4.33, Min = 15, Max = 38)		
Good knowledge	88	49
Moderate knowledge	72	41
Low knowledge	18	10
Attitudes (30.57 ±3.87, Min = 20, Max = 40)		
Good attitude	84	47
Moderate attitude	81	46
Low attitude	13	7
Practices (4.94 ± 1.94, Min = 0, Max = 8)		
Good practice	42	23
Moderate practice	69	39
Low practice	67	38

Factors Associated with KAP

ANOVA results indicated that occupation, education level and disease awareness were significantly associated with knowledge score. This means that differences in the level of education will result in a difference in the level of knowledge. It is expected those who are literate will be able to read and understand easily messages communicated via various public awareness channels.

Only average monthly expenditure was significantly associated with attitude score. The monthly expenses reflect the standard of living and the different levels of living standard will be associated with a different attitude to the disease. Education level and disease awareness were associated with practice score [Table 3]. This means that respondents with different level of education have different prevention and control practices.

Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014. https://www.doi.org/10.46766/thegms.pubheal.21111602

Table 3. The mean scores of knowledge, attitudes, and practices of the participants regarding CL and its related factors by demographic characteristics using the analysis of variance method

Variables	n	Knowledge score (mean ± SD)	95% CI		p-value	Attitude score (mean ± SD)	95% CI		p-value	Practice score (mean ± SD)	95% CI		p-value
			lower	upper			lower	upper			lower	upper	
Age (years)													
< 27	61	28.23 ± 4.59	27.05	29.41	0.932	30.85 ±4.30	29.75	31.95	0.725	4.49 ± 2.05	3.97	5.02	0.079
28 – 40	94	28.07 ± 4.22	27.21	28.94		30.35 ± 3.75	29.58	31.12		5.17 ± 1.90	4.78	5.56	
41 and above	23	28.43 ± 4.23	26.61	30.26		30.70 ± 3.23	29.30	32.09		5.22 ± 1.65	4.50	5.93	
Sex													
Male	76	28.34 ± 4.57	27.30	29.39	0.652	30.29 ± 3.26	29.54	31.03	0.41	5.25 ± 1.82	4.83	5.67	0.069
Female	102	28.05 ± 4.16	27.23	28.87		30.77 ± 4.28	29.93	31.61		4.72 ± 2.00	4.32	5.11	
Occupation													
Student	17	29.24 ± 5.33	26.49	31.98	0.039	30.35 ± 3.06	28.78	31.93	0.671	5.24 ± 2.31	4.05	6.42	0.185
Self employed	43	27.65 ± 4.89	26.15	29.16		30.70 ± 4.17	29.41	31.98		4.74 ± 1.62	4.25	5.24	
Farmer	4	28.75 ± 4.50	21.59	35.91		31.75 ± 1.26	29.75	33.75		5.25 ± 2.12	3.73	6.77	
Govt employed	50	28.28 ± 3.25	27.36	29.20		30.52 ± 4.08	29.36	31.68		4.98 ± 1.77	4.38	5.58	
House-keeper	46	27.07 ± 4.12	25.84	28.29		30.00 ± 4.06	28.80	31.20		4.57 ± 1.77	4.04	5.09	
Others	18	30.83 ± 4.19	28.75	32.92		31.78 ± 3.14	30.22	33.34		5.94 ± 2.13	4.89	7.00	
Expenditure													
Less than $125	33	29.33 ± 5.06	27.54	31.13	0.145	28.91 ± 4.25	27.40	30.42	0.043	5.27 ± 2.07	4.54	6.01	0.116
$125 to $250	46	27.22 ± 4.79	25.79	28.64		31.33 ± 4.09	30.11	32.54		4.43 ± 2.18	3.79	5.08	
More than $250	84	28.39 ± 3.63	27.60	29.18		30.77 ± 3.67	29.98	31.57		5.17 ± 1.80	4.78	5.56	
I don't know	15	28.17 ± 4.33	24.92	29.74		30.73 ± 2.49	29.35	32.11		4.53 ± 1.30	3.81	5.25	
Educational level													
Elementary school or less	11	27.18 ± 5.47	23.50	30.86	0.034	29.82 ± 3.57	27.42	32.22	0.618	5.00 ± 1.73	3.84	6.16	0.005
Middle school	34	29.29 ± 3.90	27.93	30.66		30.24 ± 3.87	29.12	31.35		5.59 ± 1.71	4.99	6.18	
High school	58	28.97 ± 4.02	27.91	30.02		31.09 ±4.21	30.07	32.10		5.31 ± 1.96	4.80	5.83	
University	75	27.20 ± 4.40	26.19	28.21		30.43 ± 3.87	29.46	31.39		4.36 ±1.92	3.92	4.80	
Marital status													
Single	59	28.68 ± 4.83	27.42	29.94	0.545	30.66 ± 4.15	29.54	31.74	0.842	4.68 ± 2.04	4.15	5.21	0.242
Married	114	27.94 ± 4.08	27.18	28.70		30.56 ± 3.74	29.87	31.25		5.04 ± 1.90	4.68	5.39	
Divorced/Widowed	5	27.60 ± 3.65	23.07	32.13		29.60 ± 4.28	24.29	34.91		6.00 ± 1.23	4.48	7.52	
Household number													
1 – 4 people	120	27.82 ± 4.55	26.99	28.64	0.113	30.83 ± 3.66	30.17	31.50	0.188	4.93 ± 2.05	4.56	5.30	0.918
5 and above	58	28.91 ± 3.76	27.93	29.90		30.02 ± 4.26	28.90	31.14		4.97 ± 1.72	4.51	5.42	
Type of construction materials used for their home													
Concrete	68	27.97 ±3.85	27.04	28.90	0.836	31.09 ±3.73	30.19	31.99	0.072	5.12 ±1.95	4.65	5.59	0.622
Metal skeleton	23	28.30 ±4.18	26.50	30.11		31.00 ±4.12	29.22	32.78		5.17 ±1.99	4.31	6.04	
Brick/Cement blocks	78	28.42 ±4.74	27.35	29.49		29.77 ±3.77	28.92	30.62		4.76 ±1.87	4.34	5.18	
I don't know	9	27.22 ±4.92	23.44	31.00		32.44 ±4.33	29.11	35.78		4.67 ±2.45	2.78	6.55	
History of disease contraction													
In the past	43	27.74 ±4.25	0.069	26.44	29.05	29.70 ±4.21	28.40	30.99	0.189	5.12 ±2.22	4.43	5.80	0.568
Currently have it	12	30.92 ±3.78		28.52	33.32	31.58 ±1.98	30.33	32.84		5.33 ±1.78	4.21	6.46	
Never had it	123	28.06 ±4.34		27.28	28.83	30.77 ±3.86	30.08	31.46		4.85 ±1.86	4.51	5.18	
Ever heard of the disease "Cutaneous Leishmaniasis"													
Yes	162	28.62 ±4.12	0.000	27.98	29.26	30.53 ±3.85	29.93	31.13	0.690	5.07±1.83	4.78	5.35	0.006
No/Don't remember	16	23.69 ±3.91		21.60	25.77	30.94 ±4.23	28.68	33.19		3.69 ±2.58	2.32	5.06	

Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014.
https://www.doi.org/10.46766/thegms.pubheal.21111602

Multiple linear regression model results showed that those unaware of the disease were negatively associated with knowledge. Attitude score was positively associated with those with an average monthly expenditure of '$125 to $250' (Table 4). Also, an average monthly expenditure of '$125 to $250', the self-employed, housekeepers, those unaware of the disease, university education level, and married respondents were significantly associated with practice score. However, age and sex were not significantly associated with practice score (Table 4).

Table 4. An adjusted Linear Regression analysis assessing the effect of related factors on Cutaneous Leishmaniasis

Variables	n	Knowledge Co-efficient(ß ± SE)	95% CI		p-value	Attitude Co-efficient(ß ± SE)	95% CI		p-value	Practice Co-efficient(ß ± SE)	95% CI		p-value
			lower	upper			lower	upper			lower		
Age (years)													
< 27	61	-	-	-	-	-	-	-	-	ref	-	-	-
28 – 40	94	-	-	-		-	-	-		0.62 ± 0.36	-0.077		0.081
41 and above	23	-	-	-		-	-	-		0.038 ± 0.51	-0.97		0.941
Sex													
Male	76	-	-	-	-	-	-	-	-	ref	-	-	-
Female	102	-	-	-		-	-	-		-0.36 ± 0.34	-1.02		0.294
Occupation													
Student	17	ref	-	-	-	-	-	-	-	ref	-	-	-
Self employed	43	-1.06 ±1.22)	-3.48		0.385	-	-	-		-1.27 ± 0.59	-2.43		0.033
Farmer	4	-0.88 ± 2.28	-5.38		0.701	-	-	-		-1.11± 1.04	-3.17		0.29
Govt. employed	50	-0.048 ± 1.29	-2.60		0.971	-	-	-		-0.83± 0.63	-2.07		0.19
House-keeper	46	-1.58 ± 1.26	-4.07		0.212	-	-	-		-1.44 ± 0.65	-2.71		0.029
Others	18	2.24 ± 1.43	-0.61		0.121	-	-	-		0.52 ± 0.69	-0.84		0.454
Expenditure													
Less than $125	33	ref	-	-	-	ref	-	-	-	ref	-	-	-
$125 to $250	46	-1.51 ± 1.04	-3.56	0.54	0.147	1.84 ± 0.93	0.01	3.67	0.049	-1.14 ± 0.49	-2.12		0.023
More than $250	84	-0.96 ± 0.94	-2.81	0.89	0.310	1.49 ± 0.84	-0.16	3.14	0.077	-0.63± 0.47	-1.56		0.178
I don't know	15	-1.21 ± 1.27	-3.72	1.29	0.341	1.29 ± 1.21	-1.11	3.68	0.29	-0.58± 0.61	-1.79		0.339
Educational level													
Elementary school or less	11	ref	-	-		-	-	-	-	ref	-	-	
Middle school	34	-	-	-		-	-	-		-	-	-	
High school	58	-	-	-		-	-	-		-	-	-	
University	75	-0.806 ± 0.35	-1.49	-0.12	0.022	-	-	-		-0.43 ± 0.16	-2.09		0.01
Marital status													
Single	59	-	-	-	-	-	-	-	-	ref	-	-	-
Married	114	-	-	-		-	-	-		0.87 ± 0.40	0.72		0.033
Divorced/Widowed	5	-	-	-		-	-	-		1.50 ± 0.87	-0.23		0.088
Household number													
1 – 4 people	120	ref	-	-	0.268	Ref	-	-	-	-	-	-	-
5 and above	58	0.75 ±0.67	-0.58	2.08		-0.24 ± 0.65	-1.51	1.03	0.710	-	-	-	
Type of construction materials used for their home													
Concrete	68	-	-	-	-	Ref	-	-	-	-	-	-	-
Metal skeleton	23	-	-	-		-0.41 ±0.9	-2.25	1.4	0.66	-	-	-	
Brick/Cement blocks	78	-	-	-		-1.04 ±0.64	-2.31	0.23	0.108	-	-	-	
I don't know	9	-	-	-		1.44 ±1.4	-1.30	4.17	0.301	-	-	-	
History of disease contraction													
In the past	43	ref	-	-	-	Ref	-	-		-	-	-	-
Currently have it	12	2.33 ±1.37	-0.38	5.05	0.091	1.66 ±1.26	-0.83	4.14	0.19	-	-	-	
Never had it	123	0.83 ±0.73	-0.62	2.28	0.258	1.02 ±0.69	-0.33	2.38	0.14	-	-	-	
Ever heard of the disease "Cutaneous Leishmaniasis"													
Yes	162	ref	-	-		-	-	-	-	ref	-	-	
No/Don't remember	16	-4.34 ±1.09	-6.48	-2.19	0.000	-	-	-		-1.12 ±0.49	-2.09		0.023

Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014.
https://www.doi.org/10.46766/thegms.pubheal.21111602

Discussion

Forty-nine percent of the participants were scored good knowledge and 47% of the participants showed good attitude towards CL prevention. Only 23% of the participants were scored good practices. The mean scores of knowledge and practice were highest amongst currently living with the disease and those divorced or widowed respectively, this may suggest that in this case, being afflicted with the disease makes people more aware or precautious. Those unaware of the disease were negatively associated with knowledge score while average monthly expenditure was significantly associated with attitude score. Similarly, average monthly expenditure, the self-employed, housekeepers, university education level and those unaware of the disease were negatively associated with practice score; only married respondents were positively associated with practice score. No significant effect was found in gender, number of people living in a household and type of construction materials used for home; this is similar to another study [26].

Although Ilam province is amongst the provinces with the highest prevalence in Iran, there were no sufficient or similar studies to compare the results on the related factors associated with KAP of the disease. A study suggested that there was a statistically significant association between literacy and disease awareness [25] which is similar to these findings. Also, in the same study, the perception of treatment behaviour of the disease was not satisfactory as the respondents believed that eventually, the disease disappears by itself. In this study, education level was significant suggesting that educational program should target those across all levels of education (especially higher levels) and those unaware of the disease.

The general awareness of participants in this study area regarding cutaneous Leishmaniasis was good since more than 90% of respondents have either heard of or seen someone with the disease. For the knowledge of the disease vector, majority knew it was a fly and some mentioned correctly the animal reservoirs like dogs and rodents but the rest did not know about the disease vectors, this is unlike the results of a study in Brazil [32] that suggests only 23% of the respondents were able to describe sandfly as the disease vector. Also, more than 60% correctly mentioned the female sandfly and knew that the aetiologic agent was parasitic; this means respondents had good knowledge of the disease vector. This result is in contrast with other studies [25, 29, 33]. A study carried out in Esfahan province by Hejazi et al. also suggests that the majority had poor knowledge regarding cutaneous leishmaniasis [34]. When asked about the appearance of the skin lesions of cutaneous leishmaniasis, 77.5% knew what it looks like. Also for the difference in the appearance of cutaneous leishmaniasis infections from other skin infections, more than 75% mentioned that it lasts longer than 2weeks and some said it was painless. This shows a satisfactory response regarding skin lesions of the infection. This is important as studies in Afghanistan on the social impact of CL suggests that the disease is often considered stigmatizing as in Kabul, girls with skin lesions are seen unsuitable for marriage and also inappropriate for women with active lesions to raise children, cook or wash for the family [35, 36]; perhaps improved public enlightenment may put a stop to such stigmatization. Knowing about the disease signs and symptoms can help the respondents and their family members to take precautionary measures. Similar to a study in which more than half of the respondents said that the disease was not contagious by direct person-to-person transmission [37], majority of respondents in this case study knew that direct contact with CL skin lesion is non-transmissible. For the multiple response question "what time of the day are people most susceptible to the bite of the fly vector?" the majority agreed to sunset then sunrise. This agrees with Singh et al. [38] where most of the participants were aware of the biting time of sand flies, but in contrast to another [29], a majority (54.8%) of the respondents did not know. When asked about the different measures that could be done in prevalent areas to prevent or control CL, more than half of the participants suggested spraying insecticides on garbage dumps, in patients' home and that of their neighbours. Almost all our respondents agreed to the disease having a cure. A report made on Kani tribes of India suggest that the study population know that the disease has a cure but it is by self-treatment using herbs as topical application; when asked about the type and names of herbs, the respondents refused to divulge the information on the superstitious belief that, the healing power of herbs may be lost on sharing medicinal knowledge to others [28, 29]. When asked if the control of stray dogs and rodents is effective to curb CL, the majority (83.7%) answered yes and the others either answered no or do not know. This could mean that they are aware that diseases can be transmitted by such animals. When this question was asked in another study [28], the possibility of dogs being involved in disease transmission of CL was just laughed away as silly by majority of them. They responded that dogs are harmless and the question even posed a suspicion to some of them as to whether this disease could be a result of the 'licking' action of dogs.

As for the results on the responses of participants on attitude and perceptions towards CL, almost every respondent agreed or highly agreed to care according to recommendations of healthcare personnel while others had no comments, disagreed or highly disagreed. Also, the majority feel that CL patients should cover their skin lesions to prevent transmission especially during its prevalent time of the year. In another study conducted amongst students at an airbase of Esfahan province in Iran [40], about 47% of the study participants believed that in having the infection of CL, fate is involved as a factor. Hence, they

Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014. https://www.doi.org/10.46766/thegms.pubheal.21111602

may not agree with the above recommendation. More so, a report [41] mentioned that CL is a health problem amongst teenagers and young adults for whom the aesthetic effects are considered very seriously, which could lead to patients being stigmatized. More than half of respondents did not believe in the use of herbal medicine to cure the ailment; others had no comments or agreed. This is unlike the Kani forest tribe settlement of Kerala district, India [28] whose treatment-seeking behaviour is mostly by the use of traditional/herbal medicine or witchcraft for which trained personnel available in those settlements appease the supernatural forces. However, in another study [42], the public health centres were the first choice of treatment for the study population probably because it was of good quality and free of charge to the people [43]. This shows that if CL treatment is of good quality and free to patients in need, it could positively influence peoples' treatment-seeking behaviour.

To the responses of participants on self-reported practices towards CL, the majority have installed nets on their doors and window frames at home. In a report carried out in another endemic area situated in the southwest of Iran [44], majority of the study participants (69.1%) did not have installed nets on their door and window frames. As for the question "if they had ever treated their door/window nets in the home with insecticides", only 42.7% of our respondents said yes, majority said no. In a study conducted in communities of Amhara State of Northwest Ethiopia, a majority (more than 90%) of the households had been sprayed with insecticides both indoors and outdoors as a preventive measure. However, this excellent level of practices could be directly associated with the malaria prevention and control campaign done in the study area in the year 2009/2010 [42]. There was the distribution of bed-nets and spraying during the campaign which explains the significant increase of owning a bed-net and spraying of households; however, its acceptability as a preventive measure against Leishmaniasis wasn't confirmed as only a few of the respondents knew it could be [42].

Generally, the study participants showed adequate knowledge of CL, however, there is an urgent need for a public campaign to improve attitude and practices towards disease prevention and control. A good proportion of the subjects were not aware that dogs and rats are also vectors of the Leishmania parasite and not only the sandfly vector. They also did not know about the biting time of the sandfly. Middle school and high school students were more knowledgeable about the disease than university students. A large number of them do not use nets when sleeping or relaxing outdoors during dusk and dawn. Also, since opening the Iraq-Iran border, there is much freedom of movement of people across the border and this could play a role in CL spread and transmission making this study of particular importance to border areas highly endemic to CL infection. Very little research has been done in the areas of factors associated with the knowledge, attitudes and practices regarding Cutaneous Leishmaniasis and this study is one of them, hence we recommend that more studies be conducted especially in areas of disease surveillance and phylogeny. To successfully plan and implement Cutaneous Leishmaniasis disease control activities in endemic areas, knowing the beliefs and practices of the people is important to formulate effective campaign programs acceptable to the society by obtaining information on the level of knowledge, attitudes and practices. This study was carried out to evaluate the disease-related KAP of people in an endemic area where CL is highly prevalent (Ilam Province of Iran).

Study Limitations and Recommendation

Not many such studies have been conducted in the study area to compare the study findings so generalization of the study findings is difficult. Ilam is a border province of Iran and Iraq and our questions did not differentiate between localized and imported CL cases; hence, we recommend that further studies be conducted on disease phylogeny and surveillance.

Conclusion

As the study seeks to identify the peoples' awareness, perception and self-reported practices; and how it contributes to the high burden of the disease in the area, the study population can be said to have ample knowledge of the disease but the attitude and practices towards the disease needs further improvement as the area is an endemic region for disease occurrence. Our results showed that providing more information on the disease and its preventive measures in such an endemic area is necessary to avert or check the disease incidence. Based on our findings we would like to recommend that (i) Awareness creation and programs targeted towards improving attitudes and practices regarding CL and its preventive measures are important in the area and (ii) Intervention that targets those of lower socioeconomic class, those unaware of the disease and unmarried population is vital to control the incidence of the disease. Also, further studies are needed to clarify imported from autochthonous cases as these could be a related factor.

Ideally, since KAP surveys precede an awareness or intervention program, it addresses a felt need in a population in which that need exists, as the results provide baseline data for the design, implementation and future evaluation of the program's success. To achieve the targets of action plans and to create awareness for the improvement of the level of KAP amongst participants regarding CL in the study area, some strategies can be implemented and these include:

Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014. https://www.doi.org/10.46766/thegms.pubheal.21111602

- Inter-sectorial coordination with local stakeholders such as the head of the community, politicians, religious leaders, teachers, landlords, health workers, and physicians in the catchment area encouraging smooth running of the activities.
- Targeting large scale communication campaign (i.e communication for behavioural impact COMBI via media campaign, social media, etc). For example use of pictorial leaflet, posters, video films, folklore songs, radio dramas and puppet shows designed with essential information regarding CL and distributed amongst the common population of the study area.
- Comprehensive enlightening training sessions for willing participants conducted with target subjects regarding CL according to WHO guideline.

Acknowledgements

The study is subject to a Public Health student thesis (Fatima Ibrahim Abdulsalam). We wish to thank Tehran University of Medical Sciences, International Campus. Authors' gratitude also goes to Professor Mehdi Mohebali of Tehran University of Medical Sciences for general support, Professor Ali Delphisheh of Ilam University of Medical Sciences for material support and Dr Habteyes Hailu Tola of Ethiopian Public Health Institute, TB/HIV Research Directorate, Addis Ababa, Ethiopia for technical support rendered throughout the study.

Declarations

Ethical Approval

Ethical approval for the study protocol was obtained from the Ethics Committee of Tehran University of Medical Sciences with the approved number IR.TUMS.SPH.REC.1396.3843. All the information obtained was guaranteed anonymous. Participants' privacy, ethical consent, and confidentiality during and following completion of the study were duly ensured.

Availability of data materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Authors' Contribution

FIA conceived and designed the study. FIA performed data collection, analysis and result interpretation of the study. FIA wrote the first draft of the manuscript and TM contributed to further drafts. All authors read and approved the final manuscript.

References

1. Organization WH. Leishmaniasis and facts: World Health Organization; 2017 [updated April, 2017. Available from: http://who.int/mediacentre/factsheets/fs375/en/ Accessed April, 2017.
2. Alexander J, Satoskar AR, Russell DG. Leishmania species: models of intracellular parasitism. J Cell Sci. 1999;112 Pt 18:2993-3002.
3. Gholamrezaei M, Mohebali M, Hanafi-Bojd AA, Sedaghat MM, Shirzadi MR. Ecological Niche Modeling of main reservoir hosts of zoonotic cutaneous leishmaniasis in Iran. Acta Tropica. 2016;160(Supplement C):44-52.
4. Mohebali M. Visceral leishmaniasis in Iran: review of the epidemiological and clinical features. Iranian journal of parasitology. 2013;8(3):348.
5. WHO. Manual for case management of cutaneous leishmaniasis in the WHO Eastern Mediterranean Region. 2014.
6. Holakouie-Naieni K, Mostafavi E, Boloorani AD, Mohebali M, Pakzad R. Spatial modeling of cutaneous leishmaniasis in Iran from 1983 to 2013. Acta Trop. 2017;166:67-73.
7. Klaus SN, Frankenburg S, Ingber A. Epidemiology of cutaneous leishmaniasis. Clinics in dermatology. 1999;17(3):257-60.
8. CDC. Parasites - Leishmaniasis USA.gov: U.S. Department of Health & Human Services; 2017 [Available from: https://www.cdc.gov/parasites/Leishmaniasis/health_professionals/.
9. Al-Jawabreh A, Barghuthy F, Schnur LF, Jacobson RL, Schonian G, Abdeen Z. Epidemiology of cutaneous leishmaniasis in the endemic area of Jericho, Palestine. East Mediterr Health J. 2003;9(4):805-15.
10. Chappuis F, Sundar S, Hailu A, Ghalib H, Rijal S, Peeling RW, et al. Visceral leishmaniasis: what are the needs for diagnosis, treatment and control? Nat Rev Microbiol. 2007;5(11):873-82.
11. Postigo JA. Leishmaniasis in the World Health

Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014. https://www.doi.org/10.46766/thegms.pubheal.21111602

Organization Eastern Mediterranean Region. Int J Antimicrob Agents. 2010;36 Suppl 1:S62-5.

12. Hotez PJ, Savioli L, Fenwick A. Neglected tropical diseases of the Middle East and North Africa: review of their prevalence, distribution, and opportunities for control. PLoS Negl Trop Dis. 2012;6(2):e1475.

13. Jalouk L, Al Ahmed M, Gradoni L, Maroli M. Insecticide-treated bednets to prevent anthroponotic cutaneous leishmaniasis in Aleppo Governorate, Syria: results from two trials. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2007;101(4):360-7.

14. Organization WH. Cutaneous leishmaniasis: Why are you neglecting me. A WHO initiative to control cutaneous leishmaniasis in selected Old World areas. 2007.

15. Doudi M, Hejazi SH, Razavi MR, Narimani M, Khanjani S, Eslami G. Comparative molecular epidemiology of Leishmania major and Leishmania tropica by PCR-RFLP technique in hyper endemic cities of Isfahan and Bam, Iran. Medical Science Monitor. 2010;16(11):CR530-CR5.

16. Sharifi I, Zamani F, Aflatoonian M, Fekri A. Reported an epidemic of cutaneous leishmaniasis, and factors that many cause the city of Bam in Kerman province. Iranian J Epidemiol. 2008;1:53-8.

17. Shirzadi M, Gouya M. National Guidelines for cutaneous leishmaniasis surveillance in Iran. Ministry of Health and Medical Education (MOH) Zoonoses Control Department, Tehran Iran pp. 2012:1-78.

18. Salahi-Moghaddam A, Khoshdel A, Hanafi-Bojd A-A, Sedaghat M-M. Mapping and review of leishmaniasis, its vectors and main reservoirs in Iran. Journal of Kerman University of Medical Sciences. 2014;21(1):83-104.

19. Sabzevari S, Teshnizi SH, Shokri A, Bahrami F, Kouhestani F. Cutaneous leishmaniasis in Iran: A systematic review and meta-analysis. Microbial pathogenesis. 2021:104721.

20. Ali-Akbarpour M, Mohammadbeigi A, Tabatabaee SHR, Hatam G. Spatial analysis of eco-environmental risk factors of cutaneous leishmaniasis in southern Iran. Journal of cutaneous and aesthetic surgery. 2012;5(1):30.

21. Badirzadeh A, Asadgol Z, Spotin A, Mokhayeri Y, Shirzadi M, Zeinali M, et al. The burden of leishmaniasis in Iran: findings from the global burden of disease from 1990 to 2010. Tropical Medicine & International Health. 2015;20:212.

22. Abedi-Astaneh F, Hajjaran H, Yaghoobi-Ershadi MR, Hanafi-Bojd AA, Mohebali M, Shirzadi MR, et al. Risk mapping and situational analysis of cutaneous leishmaniasis in an endemic area of Central Iran: a GIS-based survey. PLoS One. 2016;11(8):e0161317.

23. Mazloumi S. Knowledge, attitude and performance of mothers toward cutaneous leishmaniasisin in Yazd endemic areas: Thesis]. Tehran, Iran: Tarbiat Modares Uinversity; 2008.

24. Dehghani R, Moosavi G, Abbasi F, Novrozi S, Farahani M, Hooshyar H. Study of status and knowledge of female student about cutaneous Leishmaniasis in Abuzid abad, Kashan, in 2007. Journal of Urmia Nursing & Midwifery Faculty. 2011;9(4).

25. Sarkari B, Qasem A, Shafaf MR. Knowledge, attitude, and practices related to cutaneous leishmaniasis in an endemic focus of cutaneous leishmaniasis, Southern Iran. Asian Pacific Journal of Tropical Biomedicine. 2014;4(7):566-9.

26. Votýpka J, Kasap OE, Volf P, Kodym P, Alten B. Risk factors for cutaneous leishmaniasis in Cukurova region, Turkey. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2012;106(3):186-90.

27. Abazid N, Jones C, Davies C. Knowledge, attitudes and practices about leishmaniasis among cutaneous leishmaniasis patients in Aleppo, Syrian Arab Republic. EMHJ-Eastern Mediterranean Health Journal, 18 (1), 7-14, 2012. 2012.

28. Nandha B, Srinivasan R, Jambulingam P. Cutaneous leishmaniasis: knowledge, attitude and practices of the inhabitants of the Kani forest

Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014. https://www.doi.org/10.46766/thegms.pubheal.21111602

tribal settlements of Tiruvananthapuram district, Kerala, India. Health education research. 2014;29(6):1049-57.

29. Akram A, Khan HAA, Qadir A, Sabir AM. A cross-sectional survey of knowledge, attitude and practices related to cutaneous leishmaniasis and sand flies in Punjab, Pakistan. PloS one. 2015;10(6):e0130929.

30. Iran SCo. National Census: Statistical Center of Iran: Statistical Center of Iran; 2017 [Available from: https://www.amar.org.ir/english.

31. Cheraghi Z, Okhovat B, Doosti Irani A, Talaei M, Ahmadnezhad E, Gooya MM, et al. Knowledge, attitude, and practice regarding food, and waterborne outbreak after massive diarrhea outbreak in Yazd province, Iran, summer 2013. International scholarly research notices. 2014;2014.

32. Alexander B, Oliveria EBd, Haigh E, Almeida LLd. Transmission of Leishmania in coffee plantations of Minas Gerais, Brazil. Memórias do Instituto Oswaldo Cruz. 2002;97(5):627-30.

33. Amin T, Kaliyadan F, Al-Ajyan M, Al-Arfaj A, Al-mujhim M, Al-Harbi S, et al. Public awareness and attitudes towards cutaneous leishmaniasis in an endemic region in Saudi Arabia. Journal of the European Academy of Dermatology and Venereology. 2012;26(12):1544-51.

34. Hejazi S, Hazavei S, Bidabadi LS, Shademani A, Siadat A, Zolfaghari-baghbaderani A, et al. Evaluation of knowledge, attitude and performance of the mothers of children affected by cutaneous leishmaniasis. Infectious Diseases: Research and Treatment. 2010;3:35.

35. Reithinger R, Mohsen M, Aadil K, Sidiqi M, Erasmus P, Coleman PG. Anthroponotic cutaneous leishmaniasis, Kabul, Afghanistan. Emerging infectious diseases. 2003;9(6):727.

36. Reyburn H, Rowland M, Mohsen M, Khan B, Davies C. The prolonged epidemic of anthroponotic cutaneous leishmaniasis in Kabul, Afghanistan:'bringing down the neighbourhood'. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2003;97(2):170-6.

37. Abazid N, Jones C, Davies C. Knowledge, attitudes and practices about leishmaniasis among cutaneous leishmaniasis patients in Aleppo, Syrian Arab Republic. Eastern Mediterranean Health Journal. 2012;18(1):7.

38. Singh SP, Reddy DC, Mishra RN, Sundar S. Knowledge, attitude, and practices related to Kala-azar in a rural area of Bihar state, India. The American journal of tropical medicine and hygiene. 2006;75(3):505-8.

39. Prakash J, Raja R, Anderson NA, Williams C, Regini G, Bensar K, et al. Ethnomed+icinal plants used by Kani tribes of Agasthiyarmalai biosphere reserve, southern Western Ghats. 2008.

40. Saberi S, Zamani A, Motamedi N, Nilforoushzadeh MA, Jaffary F, Rahimi E, et al. The knowledge, attitude, and prevention practices of students regarding cutaneous leishmaniasis in the hyperendemic region of the Shahid Babaie Airbase. Vector-Borne and Zoonotic Diseases. 2012;12(4):306-9.

41. Ashford R, Rioux J-A, Jalouk L, Khiami A, Dye C. Evidence for a long-term increase in the incidence of Leishmania tropica in Aleppo, Syria. Transactions of the Royal Society of Tropical Medicine and Hygiene. 1993;87(3):247-9.

42. López-Perea N, Sordo L, Gadisa E, Cruz I, Hailu T, Moreno J, et al. Knowledge, attitudes and practices related to visceral leishmaniasis in rural communities of Amhara State: a longitudinal study in northwest Ethiopia. PLoS Negl Trop Dis. 2014;8(4):e2799.

43. Alemu A, Alemu A, Esmael N, Dessie Y, Hamdu K, Mathewos B, et al. Knowledge, attitude and practices related to visceral leishmaniasis among residents in Addis Zemen town, South Gondar, Northwest Ethiopia. BMC public health. 2013;13(1):382.

44. Vahabi A, Rassi Y, Oshaghi MA, Vahabi B, Rafizadeh S, Sayyad S. First survey on knowledge, attitude and practice about cutaneous leishmaniasis among dwellers of Musian district, Dehloran County, southwestern of Iran, 2011. Life Sci J. 2013;10(12):864-8.

Abdulsalam FI, Malik T. Knowledge, Attitudes, Practices and its associated risk factors related to Cutaneous Leishmaniasis in Ilam province of Iran. G Med Sci. 2022; 3(1): 001-014. https://www.doi.org/10.46766/thegms.pubheal.21111602