



(RESEARCH ARTICLE)



Knowledge, attitude and practice regarding the cutaneous leishmaniasis among infected patients and their families in Al-Madinah Al-Munawarah

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Abstract

Cutaneous leishmaniasis (CL) is an important public health problem in different parts of the Kingdom of Saudi Arabia. The knowledge, attitude and practice (KAP) on disease has not been studied in AlMadinah. Across-sectional descriptive study was carried out among 86 patient and 177 contemporaneous community cohort of individuals in AlMadinah. A questioner was prepared to evaluate the KAP of the respondents about CL. The patient cohort survey 86 patients of these mean (S.D) age was 33.1(13.4) and large proportion (83.7%) were males, 54.7% Saudi nationality, and a large proportion (64%) were residing in urban areas. The community survey study included 177 participants. [Mean (SD) age was 33.7(11.5 and a large proportion were males (66.1%).

In the patient cohort, median knowledge score was 54% whereas in community was 36% reflecting a poor knowledge in both participants. Median attitude score in the patient cohort was 76%, and in the community participants was low (48%).

A large proportion approximately (70%) of participants in the patient cohort indicated that they are exposed to insect bites while approximately (79.7%) of community respondents indicated that they are exposed to insect bites. Most of the patients practiced preventive CL disease with a high percent of them used bed nets (69%) and pesticide spraying (67%). whereas in the community cohort practice of these preventive was 66.1% and 75.1%; respectively followed by personal hygiene and window screen (46.3%)

In these two patient and community cohorts KAP regarding CL was sub-optimal. Appropriate measures to underlying causes should be implemented.

Keywords: Kaps; Leishmaniasis; Almadinah; KSA

1. Introduction

Leishmaniasis is a parasitic infection caused by intracellular protozoan of Leishmania. It is transmitted through the bite of an infected Sandfly insect from infected human or animal to other human [1].

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The disease can be manifested in three forms, it may be restricted to the skin and called Cutaneous leishmaniasis (CL), whereas the lesion would appear as a skin ulcer, and if untreated can be transformed to a scar. Patients may present with lesions in the mucus membrane especially in the mouth and nose. Furthermore, some types of Leishmania species targets different parts of the human body. In this case, these parasites penetrate into the internal organs of the human (such as spleen and liver), causing serious damage to their cells. This form of the disease is called Visceral leishmaniasis (VL) [2].

Leishmaniasis is a devastating disease. It negatively affects both communities and economies of countries. It affects mostly vulnerable and poor individuals who are migrating or living in poor housing conditions. Malnutrition and weak immune system can also play a major role in transmitting the CL disease. Incidence of Leishmaniasis is normally associated with environmental and climate variations [3].

CL is the commonest type of Leishmaniasis in the world. However, it is recognized as the most neglected disease owing to the fact that it is a rare cause of death [4]. CL is widely distributed in many Middle East countries including Saudi Arabia. It causes disfiguring scars and, therefore, infected individuals tend to live in remote areas, and prefer to be isolated from the rest of the community properly due to the social stigma associated with the disease. This fact makes it difficult to estimate the exact burden of the disease [5].

According to World Health Organization (WHO) report in 2013, this disease is endemic in more than 88 countries that is consider tropical and subtropical during the past 10 years. The incidence is estimated to be around 1.3 million new cases per year, three quarters of the cases are of CL and the remaining cases are of visceral Leishmaniasis. In addition, about 20 000 to 30 000 deaths occur annually and about 350 million at risk .At present, the estimated number of currently infected individuals approaches 12 million people [5].

Increased incidence of CL in this part of the world in the last three years is very worrying and caused concerns for the Ministry of Health in Saudi Arabia. Therefore, preventive programs are urgently needed to reverse the course of the disease. These plans should involve local with communities because their participation in such programs is very important for the success of any prevention program. However, for efficient implementation of such programs, it is important to first assess the knowledge, attitude and practices regarding the CL disease in these communities; and this was the overall aim of this study.

1.1. Study Aim and objectives

To assess the knowledge of patients with Cutaneous Leishmaniasis and their family about signs and symptoms and mode of transmission, breeding of vectors.

To assess the attitude of patients with Cutaneous Leishmaniasis and their family about disease seriousness, effectiveness of treatment and healing and relation of work condition to disease occurrence.

To determine the practice of patients with Cutaneous Leishmaniasis and their family about preventive measure and delay time to seek medical care.

2. Methods

This was a descriptive cross-sectional study conducted from December to April 2015 in AL Madinah Almunwrah, which is located in the western region of Saudi Arabia. The study followed a quantitative approach, and participants completed interviewed questionnaire.

Total numbers of patients of CL, who visited clinical Meqat hospital during the study period, were 93 patients, total agreed to participate in our study were 86 and only 75 patients agreed to visit them at home to interview their families.

The age of the participant selected in this study was ≥ 15 years; because any persons ≥ 15 years are usually capable of expressing clearly their own ideas.

Interview questionnaire was designed in English language and translated to Arabic language for data collection. A back and forth checks was applied to ensure its face validity. Also, validation of the questionnaire was achieved before starting the data collection through a pilot study. Interviews were conducted with CL patients in Almeqat hospital (Dermatology clinic) and data collection was obtained by 4 trained staff (health workers) from community using interviewing questionnaire.

First section of the questionnaire covered participants demographic data, including age, gender, nationality, occupational, level of education and place of residence.

Second section includes questions to assess the knowledge, previous information about disease, popular name, source of information, signs and symptoms of disease, transmission of disease and it's vector, times of bites, breeding sites and susceptible people.

Third section to identify the attitudes, believe about healing, seriousness of disease, impact on personal, social, and working life.

From the questions respondents had to choose one of the options: strongly agree, agree, do not know, disagree, and strongly disagree.

The fourth section questions regarding the practice of the person to prevent CL includes; sleeping outdoors, using treatment, side effect of disease, period between appearance the signs of disease and visiting to health facility.

Data entry and analysis were conducted using the Statistical Package for Social Sciences (IBM SPSS version 19, SPSS Inc., Chicago Illinois).

3. Results

3.1. Socio-demographic and clinical characteristics

This study includes a total of 86 patients and 177 community participants. The socio-demographic profile of these patients was that they were relatively of young age [mean (SD) =33.1(13.4), median (IQR) 32(23-42)], predominantly males (83.7%) where 54.7% were Saudi nationality, and a large proportion (64%) were residing in urban areas. Also the study included a total of 177 community participants their socio-demographic data revealed that ; they were relatively of young age [mean (SD) =33.7(11.5), median (IQR) 33(24.5-41)], a large proportion were males (66.1%) and 66.7 % were of Saudi nationality. The socio-demographic characteristic data of respondents are detailed in Table 1.

Table 1 Socio-demographic characteristics of study participants

Characteristic	Patients	Community
	N (%)	N (%)
Age (years)		
Range (Minimum, Maximum)	15-80	15-65
Mean(standard deviation)	33.1(±13.4)	33.7(±11.5)
Median(Inter quartile range)	31(23.5-42)	33(24.5-41)
Sex		
Male	72(83.7)	117(66.1)
Female	14(16.3)	60(33.9)
Nationality		
Saudi	47(54.7)	118(66.7)
Non-Saudi	39(45.3)	59(33.3)
Level of education		
Illiterate	15(17.4)	18(10.2)
Elementary	12(14)	19(10.7)
Intermediate	20(23.3)	26(14.7)
Secondary	16(18.6)	51(28.8)

University and above	23(26.7)	63(35.6)
Occupational status		
Agricultural workers	24(27.9)	29(16.4)
Student	23(26.7)	36(20.3)
Governmental employee	14(16.3)	52(29.4)
Shepherd	3(3.5)	3(1.7)
Professional or occupational	5(5.8)	22(12.4)
Housewife	5(5.8)	20(11.3)
Other	12(14)	15(8.5)
Place of residence		
Rural	31(36)	91(51.4)
Urban	55(64)	86(48.6)
Site of injury asked only patients		
Face	33(38.4)	
Neck	13(15.1)	
Hands & arms	63(73.3)	
Feet & legs	47(54.7)	

3.2. Knowledge of study participants regarding Leishmaniasis

3.2.1. Patients knowledge

Knowledge of patients respondents regarding transmission of disease was poor. Only 46.5% of the study participants correctly indicated Sand fly as the transmitting vector, and approximately 59% wrongly indicated that the disease is transmitted by mosquitoes. The larger proportion (65%) of the respondents were aware that insect bites occur at night but only 31% were aware that this could also occur at dusk. One third indicated that insect bites occur all times. Farms (65%) and contaminated water (40%) and were the vector's breeding sites that the study respondents were familiar with. Garbage, crevices and burrows, and animal's corrals were also mentioned but with far less frequency. Respondents indicated that the occupational category at increased hazard of the disease to be farmers (88.4%) and herdsman 67%.

3.3. Community Knowledge

Knowledge of community respondents' regarding transmission of disease was poor. Only 45.2% of the study participants correctly indicated Sandfly as the transmitting vector, and approximately 58% wrongly indicated that the disease is transmitted by mosquitoes. The larger proportion (71%) of the respondents were aware that insect bites occur at night but only 37.3% were aware that this could also occur at dusk. Approximately 22% indicated that insect bites occur all times. Farms (66%), animal's Corrals (54.8%) and contaminated water (40%) and were the vector's breeding sites that the study respondents were most familiar with. Garbage and crevices and burrows were also mentioned but with far less frequency.

With regard to susceptibility to the disease, respondents indicated that the occupational category at increased hazard of the disease to be farmers (81.4%) and herdsman (66.1%). More details about patient and community knowledge were found in table 2.

Table 2 Knowledge of study participants regarding Leishmaniasis

Characteristic	Patients	Community
	N (%)	N (%)
Heard or have previous knowledge about Cutaneous Leishmaniasis	64(74.4)	121(68.4)
Source of the knowledge about the Leishmaniasis		
TV & radio	5(5.8)	56(31.6)
Newspapers & magazines	4(4.7)	56(31.6)
Relatives & friends	35(40.7)	55(31.1)
Previous case in house	43(50)	56(31.6)
Health center	8(9.3)	56(31.6)
School	2(2.3)	55(31.1)
Cutaneous Leishmaniasis transmitted through:		
Water pollution	20(23.3)	41(23.2)
Mosquito bite	51(59.3)	102(57.6)
Sand fly bite	40(46.5)	80(45.2)
Contact with infected person	5(5.8)	9(5.1)
Air pollution	4(4.7)	9(5.1)
Flies bites	1(1.2)	3(1.7)
Times of insect bites:		
Day	11(12.8)	23(13)
Night	56(65.1)	125(70.6)
Dusk	34(39.5)	66(37.3)
All time	23(26.7)	38(21.5)
Breeding sites for insect :		
Contaminated water	38(44.2)	95(53.7)
Garbage	26(32.6)	66(37.3)
Crevices & burrows	20(23.3)	59(33.3)
Corrales animals	42(18.8)	97(54.8)
Farms	56(65.1)	116(65.5)
people most susceptible to Cutaneous leishmaniasis:		
Farmer	76(88.4)	144(81.4)
Office employee	4(4.7)	6(3.4)
Shepherd or herdsman	58(67.4)	117(66.1)
Butcher	9(10.5)	35(19.8)
Mechanic	4(4.7)	8(4.5)
Housewife	21(14.7)	26(14.7)

Miners	10(11.6)	22(12.4)
Teachers	4(4.7)	4(2.3)
Health worker	7(8.1)	20(11.3)
Children	37(43)	67(37.9)
Another	4(4.7)	-
Popular name or a common name for Cutaneous Leishmaniasis		
Alaklh		17(9.6)
Almestaklh		37(20.9)
Almestakwyh		7(4.0)
Habat halab		1(0.6)
Leishmania		59(33.3)
The most exposed organs to cutaneous: (only asked community)		
Face		1(.6)
Neck		72(40.7)
Hands & Arms		128(72.3)
Feet & legs		111(62.7)
What are the symptoms of Cutaneous Leishmaniasis : (only asked community)		
Scare		111(62.7)
Ulcer		96(54.2)
Swell		37(20.9)

In patient, overall, median (IQR) knowledge was 54% (25%-62%), whereas in community was 36% (27% -55%); reflecting a poor knowledge in both participants, Table 3.

Table 3 Percentiles of knowledge score

Percentile	Patient	Community
25 th percentile	38	27.00
50 th percentile	54	36.00
75 th percentile	62	55.00

In patients participants, no significant difference found between males and female in the knowledge score; Mann-Whitney test p-value 0.828. However, in community participants, knowledge score was significantly higher in males compared with females; Mann-Whitney test p-value 0.006.

In the patients participants, knowledge score in Saudi nationals and expatriates did not differ significantly; Mann-Whitney test p-value 0.411. However, in the community participants, Saudi respondents had a significantly lower knowledge compared with expatriates; Mann-Whitney test p-value 0.001. Although knowledge score did not significantly differ by the level of education (Kruskal-Wallis test p-value 0.563), further comparisons reveals that, counter intuitively, illiterates had the highest knowledge score. Next highest score was calculated in those with a university/and above level of education. In the community participants, however, the Kruskal-Wallis test indicated that overall knowledge score did not differ significantly across levels of education; p-value = 0.391. Surprisingly, however, illiterates achieved the highest knowledge.

3.4. Factors associated with poor Knowledge

3.4.1. Patients

In the patients participants, in the stepwise logistic regression conducted to determine factors associated with poor knowledge (knowledge score < 43), only poor practice (practice score < 43) was independently associated with poor knowledge; Table 4-A.

Table 4-A Stepwise logistic regression model for factors associated with poor knowledge

Factor	B	S.E.	Wald	P	OR	OR 95% CI	
						Lower	Upper
Poor practice	1.517	.719	4.451	.035	4.560	1.114	18.674

OR: Odds ratio. P: Wald test p-value. CI: Confidence Interval

3.4.2. Community participants

In the community participants, in a stepwise regression conducted to determine factors associated with poor knowledge (knowledge score < 27), only poor practice (practice score < 22) was independently associated with poor knowledge Table 4-B.

Table 4-B Stepwise regression for factors associated with poor knowledge (score < 27)

Factor	B	S.E.	Wald	p-value	OR	OR 95% CI	
						Lower	Upper
Practice score < 22	2.191	.408	28.874	.000	8.944	4.022	19.890

OR: Odds ratio. P: Wald test p-value. CI: Confidence Interval

3.4.3. Attitudes of study participants towards Leishmaniasis

Attitude of participants was broadly assessed through two major sub-scales pertaining their attitude towards treatment and risk of the disease; Table 5.

3.4.4. Patients participants

With regard to existence of treatment, approximately 90% of the respondents strongly agreed or agreed that a treatment exist for their disease. Approximately 95% strongly agreed or agreed that this disease is curable.

A large majority (73%) of the respondents did not know, disagreed or strongly disagreed that CL is actually an infectious disease and approximately 27% of the respondents strongly agreed or agreed. Slightly more than 88% of the respondents believed that the disease might affect them. About a third of those who strongly agreed or agreed that CL is a serious disease mentioned effects of scare as their major concern. Far less proportions were concerned by the long treatment period (19%) and the psychological effects of the disease (7%). Slightly less than half of the patients believed that their job predispose them for acquiring the disease.

3.4.5. Community participants

In terms of existence of treatment, 86.4% of the respondents strongly agreed or agreed that a treatment exist for their disease. Approximately 75.4% strongly agreed or agreed that this disease is curable.

A large majority (approximately 81%) of the respondents did not know, disagreed or strongly disagreed that CL is actually an infectious disease and approximately 19% of the respondents strongly agreed or agreed. Slightly more than 76% of the respondents believed that the disease might affect them. About 24.3% of those who strongly agreed or agreed that CL is a serious disease mentioned effects of scare as their major concern. Far proportions were concerned by the long treatment period (20.3%) and the psychological effects of the disease (8.5%). Approximately a third of the respondents less than half of the patients believed that their job predispose them for acquiring the disease.

Table 5 Attitudes of study participants towards Leishmaniasis

Characteristic	Patients	Community
	N (%)	N (%)
Do you think there is medical treatment for Cutaneous leishmaniasis		
Strongly agree	28(32.6)	63(35.6)
Agree	50(58.1)	90(50.8)
Don't know	7(8.1)	22(12.4)
Strongly disagree	1(1.2)	2(1.1)
Do you think that Cutaneous leishmaniasis is infectious disease		
Strongly agree	8(9.3)	10(5.6)
Agree	15(17.4)	24(13.6)
Don't know	36(41.9)	87(49.2)
Disagree	19(22.1)	43(24.3)
Strongly disagree	8(9.3)	13(7.3)
Do you think that Cutaneous leishmaniasis is curable?		
Strongly agree	23(26.7)	47(26.6)
Agree	59(68.6)	104(58.8)
Don't know	4(4.7)	23(13)
Strongly disagree	-	3(1.7)
Do you think that Cutaneous leishmaniasis is serious illness and may affect you?		
Strongly agree	19(22.1)	32(18.1)
Agree	57(66.3)	102(57.6)
Don't know	4(4.7)	27(15.3)
Disagree	4(4.7)	14(7.9)
Strongly disagree	2(2.3)	2(1.1)
If you agree or strongly agree Cutaneous leishmaniasis is a serious why do you think CL is serious disease?		
The effects of scars	26(30.2)	43(24.3)
Long treatment period	16(18.6)	36(20.3)
Psychological burden	6(7)	15(8.5)
All of above	28(32.6)	40(22.6)
No response	10(11.6)	43(24.3)
Did you think your work puts you at risk of Cutaneous leishmaniasis infection?		
Strongly agree	22(25.6)	26(14.7)
Agree	16(18.6)	29(16.4)
Don't know	27(31.4)	62(35)
Disagree	19(22.1)	49(27.7)
Strongly disagree	2(2.3)	11(6.2)

In the patients participants, overall median (IQR) attitude score was 76% (68%-80), and in the community participants was low; amounting to 48% (40%-56%); Table 6.

Table 6 Percentiles of attitude score

	Patients	Community
25 th percentile	68	40.00
50 th percentile	76	48.00
75 th percentile	80	56.00

In the patients participants, attitude score in males did not differ significantly from females' score; Mann-Whitney test p-value 0.259; however in the community participants Females had a significantly higher attitude score compared with males; Mann-Whitney p-value < 0.0001.

Attitude score in Saudi nationals was significantly low than attitude score, Mann-Whitney test p-value 0.016; Contrarily in the community participants Saudi nationals had a significantly higher attitude score compared with expatriates; Mann-Whitney p-value 0.001.

In the patients participants, across the different levels of education, attitude score ranged from a high median score of 80 calculated for illiterates to a lowest score calculated for both secondary and university/and above level of education. However the difference in scores across all levels of education was not significant, Kruskal-Wallis test p-value 0.173.

In the community participants, however, Attitude score differed significantly by level of education; Kruskal-Wallis test p-value 0.001; with illiterates achieving the highest score, followed by those with secondary and university/and above level of education.

3.5. Factors associated with inappropriate attitude

3.5.1. Patients participants

In the stepwise logistic regression analysis conducted to determine factors associated with inappropriate attitude, no variable was identified to be independently associated with inappropriate attitude.

3.6. Community participants

Stepwise logistic regression analysis for factors associated with poor attitude (attitude score < 40), only male sex was independently significantly associated with poor attitude; male sex had 5.16 times the likelihood to have poor attitude compared with female sex.

Table 7 Stepwise regression for factors associated with poor attitude (score <40)

Factor	B	S.E.	Wald	p-value	OR	OR 95% CI	
						Lower	Upper
Male sex	1.642	.634	6.707	.010	5.16	1.49	17.88

3.7. Practices of preventive measure by study participants with regards to Leishmaniasis

Appropriateness of practices of respondents of measures to prevent exposure and acquisition of disease were assessed as well as use of treatment before seeking medical care and healthcare seeking behavior; Table 8.

3.7.1. Patient participants

A large proportion (approximately 70%) of the study respondents indicated that they are exposed to insect bites as they reported that they sleep outside the house or spend night in open area or in the desert.

Most of the patients reported measures respondent apply to prevent CL disease were use of nets (69%) and pesticide spraying (67%). These measures were followed by window screen (44%), wearing protective clothing (43%) and personal hygiene (42%). The least reported measures were electric detonator, cream repellent and vaccination.

3.7.2. Community participants

A large proportion (approximately 79.7%) of the study respondents indicated that they are exposed to insect bites as they reported that they sleep outside the house or spend night in open area or in the desert.

In the community participants, the most reported measures respondent apply to prevent CL disease were use of pesticide spraying (75.1%) and nets (66.1%). These measures were followed by personal hygiene and window screen (46.3%), then wearing protective clothing (43.5%). The least reported measures were electric detonator, cream repellent and vaccination.

Table 8 Practices of preventive measure by study participants with regards to Leishmaniasis

Characteristic	Patients	Community
	n(%)	n(%)
Do you sleep outside the house or spend night in open area or in desert?		
Yes	25(29.1)	36(20.3)
What are the preventive measure you do apply to prevent Cutaneous Leishmaniasis disease?		
Pesticide spraying	58(67.4)	133(75.1)
Wear protective clothing	37(43)	77(43.5)
Electric detonator	16(18.6)	36(20.3)
Cream repellent	30(34.9)	65(36.7)
Nets	59(68.6)	117(66.1)
Window screen	38(44.2)	82(46.3)
Vaccination	22(25.6)	44(24.9)
Personal hygiene	36(41.9)	82(46.3)
Another	8(9.3)	12(6.8)
Use of other treatment method before seeking medical care at hospital (asked only patients)	35(40.7)	
What is the time interval between appearance of disease symptoms and seeking medical care? (asked only patients)		
< 1 month	44(51.2)	
>1 to 3 months	32(37.2)	
>3 to 6 months	7(8.1)	
> 6 months	3(3.5)	

Table 9 Percentiles of practice score

Percentile	Patients	Community
25 th percentile	43	22
50 th percentile	57	33
75 th percentile	71	56

In the patients participants, the overall median (IQR) practice score was as low as 57% (43%-71); Table 9. However, in the community participants the overall practice score was very low. Median (IQR) score was calculated at only 33% (22%-56%)

3.8. Factors associated with low practice score were explored in following analyses

In the community participants, Saudi nationals achieved a lower practice score compared with expatriates. The difference was statistically significant; Mann-Whitney Test p-value < 0.0001 while there was no significant difference among the patients.

In the patients participants, as expected, median practice score differed significantly by level of education (Kruskal-Wallis test p-value 0.044); with respondents with highest level of education (University/and above) achieving highest score and illiterates the lowest. In the community participants; respondents with intermediate level of education or those who are illiterates achieved the highest practice score. However, practice score did not differ by education level; Kruskal-Wallis test p-value =0.656.

Interestingly, respondents from urban areas had significantly higher score compared with those living in rural areas ; Mann-Whitney test p-value 0.01. However, in the community participants urban dwellers achieved a higher practice score compared with those living in rural areas. This difference was statistically significant; Mann-Whitney Test p-value <0.0001.

3.9. Factors associated with poor practice

3.9.1. Patients participants

In the patients participants, in the stepwise logistic regression conducted to determine factors associated with poor practice (practice score < 43), only poor knowledge (knowledge score < 38) was independently associated with poor practice; Table 10-A

Table 10-A Stepwise logistic regression model for factors associated with poor practice

Factor	B	S.E.	Wald	P	OR	OR 95% CI	
						Lower	Upper
Poor knowledge	1.380	.678	4.142	0.042	3.974	1.052	15.011

OR: Odds ratio. P: Wald test p-value. CI: Confidence Interval

3.10. Community participants

In the stepwise logistic regression analysis conducted to determine factors associated with poor practice (practice score < 22), only poor knowledge (knowledge score < 27) was independently associated with poor practice; Table 10-B.

Table 10-B Stepwise regression for factors associated with poor practice (score <22)

Factor	B	S.E.	Wald	p-value	OR	OR 95% CI	
						Lower	Upper
Knowledge score < 27	2.191	.408	28.874	.000	8.944	4.022	19.890

4. Discussion

This study was designed to assess the knowledge, attitude and practice of patients and their families about three subscales of knowledge, attitudes and practices regarding CL disease.

Overall, scores calculated in the three subscales of knowledge, attitude and practice for both cohorts were poor, and poorest in the community cohort across all sub-scales. In the patients cohort, median (IQR) attitude score (76) was higher than both knowledge score (54) and practice score (57). Interestingly, the community cohort mirrored the same trend; median (IQR) attitude score (48) was higher than both knowledge score (36) and practice score (33).

Although it is difficult to establish a clear reason for this difference, however, the increased score estimates for the three subscales registered for the patients cohort compared with the community cohort could arguably be explained on the grounds of increased access to counseling at the healthcare. It is likely that their disease status prompted them to acquire more knowledge about their disease, adopt more proper attitudes and appropriate practices regarding their disease. Further, although the socio-demographic makeup of the two cohorts in terms of age, sex, nationality and level of education was not markedly different, however, some of the observed differences in other variables might partially explain differences in the three measured subscales. First, the proportion of urbanites (64%) in the patient cohort was much more than that of the community cohort (48.6%). In Brazil, a large-scale urban CL epidemic emerged [6], where more transmission of the disease occur in fully urbanized areas in larger cities than rural CL cases. Indeed, in the Arab world, historically the only known form of CL was the urbanized anthropologic CL form which has various names such as the “Baghdad boil”, “Aleppo boil”, “Balkh sore” [7]. In this part of the world the disease is characterized by large outbreaks in densely populated cities. In Syria, especially Aleppo, a marked increase to more than 15,000 cases per year was documented during the 1990s, with only a temporary decline when insecticide spray programs were instituted in 1991[8]. In the other parts of the Middle East, it was observed that a large CL epidemic has recently occurred in Afghanistan, with estimates of 200,000 cases in Kabul alone [9]. The annual CL incidence reaches 12% in 1996, and averaged 3% per year from 1992 to 2002 [2, 10]. In a review of literature by Bern *et al.* surrounding the increased urbanization of CL in this part of the world, with particular reference to Afghanistan, the authors postulated that “the association between migration and CL transmission may be more complex than originally postulated. Transmission occurred within the household, even up to second floor apartments, and often resulted in facial lesions, especially in women and children [10]. Second, proportion of individuals with increased risk-taking behaviors was largely more in the patient cohort. The proportion of shepherds (3.5% vs 1.7%) and agricultural workers (27.9% vs 14.4%) in the patient cohort was much larger than in the community cohort. It is a well-known fact that these two categories are most at increased risk of contracting the disease. Based upon these two observations it is possible to hypothesize that the increased scores across all of the three sub-scales among the patient cohort compared with the community cohort could be largely attributed to differential exposures to factors that predispose to acquiring more knowledge, attitude and practice regarding the disease.

A close scrutiny of the responses to the questions pertaining knowledge of the CL disease in both cohorts reveals that, at large, knowledge was acquired through a previous case in the house or through relatives and friends. In this regard, other means of knowledge acquisition, particularly health education programs, were almost non-existent. Lack of adequate knowledge in both cohorts was also apparent in the response to the question pertaining identification of the vector transmitting the disease. In both cohorts, the larger proportion (59.3% and 57.6% in the patient and community cohorts; respectively) identified mosquito as the vector of the disease. Those correctly citing the Sandfly as the vector transmitting the disease were only 46.5% and 45.2% of the patients and community cohorts; respectively. These two observations are indicative of absence of adequate knowledge regarding the basic facts of the CL disease. Of concern, though, ignorance of the etiology of the disease mean few people with CL seek medical help for diagnosis and treatment.

Those living in endemic communities could also be better informed on transmission by sandflies, prevention methods, personal risk, how to identify a skin lesion and where and when to seek treatment. Although respondents in both cohorts were well conversant with existence of treatment for CL and the fact that CL is curable, however, at large, they exhibited improper attitudes towards the CL disease. Approximately 70-80 % of the responds in the two cohort were not agreeable that CL was an infectious disease. In both surveys, those who believed that CL is a serious disease, cited effects of scar as their major concern. This properly reflect one of the psychological effects of the disease on patients with CL disease and underscore issues surrounding stigmatization. Because a scar is a sign of overt disease, in the extreme, in Afghanistan, women with lesions were considered unfit to marry, have children, or breastfeed, and children with lesions were sometimes ostracized by playmates [10].

In regard to risky practices that may increase the likelihood of acquiring the disease, approximately 70%-80% indicated that they might be exposed to insect bites as they reported that they sleep outside the house or spend night in open area or in the desert, and 30%-35% do not use bednets. Studies conducted elsewhere indicate that consistent use of insecticide treated bednets and curtains provide some personal protection against Sandfly bites and transmission of the disease [11,12]. In a study conducted in the Paraguay, despite considerable prevalence of risk factors, regular use of bednets was low among both patient and community respondents; 16% and 7% respectively. Authors of the study argued that the low use of bednets may be due to lack of knowledge on their relevance to prevention of leishmaniasis as well as the concept of prevention is not always prioritized by people in Paraguay. Further, they also argued that those in peri-urban areas with increased income were less likely to use bednets as an intervention. It has been shown that bednets are very attractive because they can be effective, relatively cheap and sustainable. In addition, the pyrethroid insecticides used to treat the nets have relatively low mammalian toxicity and good insecticidal activity [13].

The other most popular preventive measure indicated was pesticide spraying; 67% and 75% respondents in the patients and community cohorts; respectively. However, vector control remains a key component of the anti-leishmaniasis programs. Therefore, prevention campaigns similar to those used for control of mosquitoes, such as residual sprays and insecticide-treated nets will reduce the density of sand flies. One of the most recent novel measure is the use of *Bacillus sphaericus* for Sandfly larval control [14].

Approximately only half of the respondents indicated that they would seek medical care less than one month from appearance of disease symptoms, and the other remaining half indicated they would do so in periods greater than one month. This could be due to low awareness of the nature of CL as discussed above. Ignorance of the etiology of the disease mean few people with CL seek medical help for diagnosis and treatment. Further, patients do not feel ill would usually be reluctant to spend extended time on treatment. One complications of the CL disease is that a proportion of infected individuals, perhaps as many as 30%, never have any symptoms at all.

This study have several limitations that need to be acknowledged. First, the knowledge, attitude and practice of nurses were based on self-report using a questionnaire form. In questionnaire-based surveys, participants typically tend to overstate their awareness and actual practices and select what they perceive to be an ideal response [15]. Second, the inclusion of one city and one healthcare centre is an obvious limitation. However, findings of this study concur with findings of similar local and regional previous studies. Interestingly, a study conducted in Al Qaseem city, similar findings were observed; 43% of the respondents did not had adequate knowledge regarding the disease; areas with least knowledge were those pertaining transmission and prevention of the disease; presence of a case in the family was one of predictors of knowledge [16]. In another study conducted in Al-Ahssa, 30% of the respondents could not recognized the infectious nature of CL and awareness regarding the vector, transmission, risk factors and preventive methods were very poor. In addition, that study also document a significantly higher correlation between knowledge and male gender, higher family income, age and a previous history of CL. However, some of these variables were not measured in this study [17]. In a study conducted in Aleppo, Syria, respondents showed a better knowledge and awareness of the disease [18]. Most respondents referred to the disease as “one-year sore”, linked it to insect bites and believed it was not contagious. Most believed it was preventable by the use of bednets and insecticides and knew the treatment mode. However, these differential results could be explained by the fact that, Aleppo is the historical centre of the disease in the Middle East, and therefore, patients had rich experience regarding the nature and consequences of the disease. One of the shortcomings of that study, though, is that only (37%) respondents completed the second part of the questionnaire after treatment. Therefore it is not possible to contrast the practice sub- scale performance with this study. In a study conducted in Iran, only 47.9% of the studied population were aware about the disease. Less than 40% of the cases revealed that Sandfly is the vector of the disease. Almost, 47% of them had used drugs, insecticide sprays, repellents and bed net to protect themselves. With regards to preventive practices, only 7.4% of respondents had used bednets. In addition, 16.1%, 14.8%, 3.7% and 12.3% of the population had used drug, insecticide sprays, repellents and bednets, respectively. The rest of respondents had used nothing for their prevention [19].

5. Conclusion

Overall knowledge, attitude and practice regarding the CL disease among patient or community levels were poor. In this study, certain psycho- behavioral issues contributing to this finding has been identified. In addition, the findings of this study indicate that individuals at increased likelihood for acquiring the disease could be identified using simple screening tools such as the socio- demographic characteristics of individuals managed at hospitals or living in the local community. Owing to the rapid spreading of the CL disease, health education programs remain the corner stone in any efforts to reverse the course of this disease.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no competing interests and contribute equally.

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