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Research article

Knowledge, attitude and practices of the resident community about visceral leishmaniasis in West Armachiho district, Northwest Ethiopia

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ABSTRACT

Visceral leishmaniasis (VL) or kala-azar is a tropical disease, which is caused by an obligate intracellular parasite of the genus *Leishmania*. It is transmitted by the bite of an infected phlebotomine sand fly. The disease is endemic in northwest part of Ethiopia particularly in areas bordering Sudan. Assessing the knowledge, attitude and practices (KAP) of the community is helpful to design and implement appropriate control and prevention strategies. A cross-sectional study was conducted to assess the KAP of the resident community on VL in West Armachiho district, northwest Ethiopia. Data were collected by using pretested and well-structured questionnaire. Two villages (Abderafi and Abrehajira) were selected randomly. Households engaged in the study were selected by systematic random sampling method and then finally, simple random sampling was used to engage a maximum of two individuals per household. A total of 422 participants were engaged in the study. Almost all participants heard about VL. The source of information was mainly from friends (80.8%). The highest proportion (88.2%) of participants thought that persistent enlargement of liver and spleen (enlargement of the abdomen) was the main symptom of VL. Of all participants, only 52.1% knew sand fly as the vector of the disease. The overall assessment of participants indicated that 21.1% were knowledgeable, 53.6% had positive attitudes and 14.9% had optimal practices on VL. In conclusion, the survey indicated that participants had better attitude about VL. However, there were a large gap in knowledge and practices. The misunderstanding and incorrect practices may remain serious concerns in the control and prevention of the disease. It is recommended that health education program should be strengthened to increase peoples' awareness and improve their practices on VL in the district and further studies are strongly suggested for better understanding of the dynamics of the disease in the area.

1. Introduction

Visceral Leishmaniasis (VL), commonly known as kala-azar, is a tropical disease, caused by a protozoal parasite that belongs to the genus *Leishmania.* The disease is endemic in 88 countries, approximately 50,000 to 90,000 new cases are recorded per annum and more than 350 million people are at risk in the world (Gomes et al., 2008; WHO, 2019). Human infection occurs when *Leishmania* parasites are injected into the dermis as the metacyclic promastigote life stage following the bite of an infected female phlebotomine sand fly. Then, the parasite enters the macrophages, where it multiplies and establishes the infection. Once in the blood, the parasite induces a systemic illness which is characterized by fever, hepatomegaly, splenomegaly, lymphadenopathy, pancytopenia, weight loss, weakness and death (if untreated) (Chappuis et al., 2007). In addition to human, the parasite also infects wild and domestic animals like dogs, that can act as a potential source for human infection (Chappuis et al., 2007; Lemma, 2018; WHO, 2019).

East Africa is one of the most important foci of VL in the world, characterized by sustained endemic transmission in several geographic sites, and intermittent epidemics often associated with population displacement and conflicts (Al-salem et al., 2016). VL has also been linked to the existence of poor housing, suitable environmental habitats for the vector, immunosuppression, and lack of personal protective measures (Alvar et al., 2006). Environmental changes can also alter the dynamics of vectors and reservoirs which may increase human exposure to the disease (Oryan and Akbari, 2016).

Ethiopia is one of the endemic areas for VL (Wasunna et al., 2016). In the country, over 3.2 million people are at risk and up to 4000 new cases are estimated per year. Historically, VL was known as the disease of the lowland agroecological zones in the country. Among the nine regions and

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two city administrations in the country, the highest prevalence occurs in Amhara Regional State followed by Tigray and Southern Nations Nationalities Peoples Regional State (Assefa, 2018). The disease is also highly prevalent in northwest part of Ethiopia, particularly in areas bordering Sudan (Gadisa et al., 2015). VL incidence is rising with the migration of people for labour, climatic and environmental changes, and the impairment of immunity due to HIV/AIDS or malnutrition (Leta et al., 2014; Mulat et al., 2014; Alemayehu et al., 2017).

To apply successful prevention and control programs, it is essential to assess the knowledge, attitudes and practices (KAP) of the community regarding the disease (Lopez-Perea et al., 2014). Notably, studying the community's KAP allow exploring the possibility of misconceptions or misunderstandings or malpractices about the disease that may create obstacles on the control and prevention activities. Prior to planning any intervention activities, it is crucial to assess the KAP of the community. Lack of information about VL is a significant shortcoming and hindering factor for the prevention and treatment practices in the West Armachiho district of North Gondar, Amhara regional state, since the district is one of the most remote areas in the country where no research has been conducted so far on the issue. Therefore, this study was designed to assess the KAPs of the resident community regarding VL in the West Armachiho district, Amhara Regional State, northwest Ethiopia.

2. Materials and methods

2.1. Study area

The study was conducted from February to May 2015, in the West Armachiho district of the Amhara Regional State in the northwest part of Ethiopia (Figure 1). The district is found in North Gondar zone, bordering on the South by Metema, on the West by Sudan, on the North by Tegede, and on the East by Tach Armachiho. The average minimum and maximum temperature of the area are about 22.1–36.3 °C, respectively, with daily highest temperature in March, April and May. The area receives its main rainfall in July and August with precipitation ranges from 900 to 1800 mmHg. The total population of the district was about 40,991 (CSA, 2013).

2.2. Inclusion and exclusion criteria

Individuals aged 18 years and above, living in the West Armachiho district for more than or equal to six months were included in the study whereas individuals who were less than 18 years old, living in the area for less than 6 months, seriously ill or unable to respond were excluded from the study.

2.3. Study design, sample size and sampling techniques

A cross-sectional study was conducted in the district. The sample size was calculated by using a formula stated by Thrusfield (2007), assuming 50% of individuals had knowledge about disease, at 95% confidence level and 0.05 margins of error. Hence, the calculated sample size was 384 and by considering a 10% non-response rate and to increase precision, the final sample size was increased to 422. The number of individuals in each selected village was calculated using the statistical formula stated in Thrusfield (2007) by accepting a 5% error for the questionnaire-based survey.

A three-stage sampling strategy was employed to collect the required data. First, from the nine villages in the district, two villages (Abderafi and Abrehajira) were selected by a simple random sampling technique. Households were selected by systematic random sampling method within selected villages, and then finally, individuals engaged in the study were selected by simple random sampling technique from the selected household (maximum of 2 individuals per household).

2.4. Data collection

The data were collected by using a well-structured, pretested and evaluated questionnaire. The questionnaire addressed demographic characteristics, the level of knowledge, the source of information where people had learned about VL, knowledge on symptom of VL, mode of transmission, attitude and practices. Two data collectors were trained on the study objectives, questions in the questionnaire, extent of explanations and also how to keep confidentiality.

2.5. Scoring

The knowledge, attitude and practice of participants were scored based on the techniques described by Alemu et al. (2013) and Berhe et al. (2018). Briefly, each correct response was given a score of one, while a wrong or unsure response was scored zero. The *knowledge scores* were ranged from zero to eight. Knowledge scores between zero and four were considered as "*Not knowledgeable*", while scores between five and eight

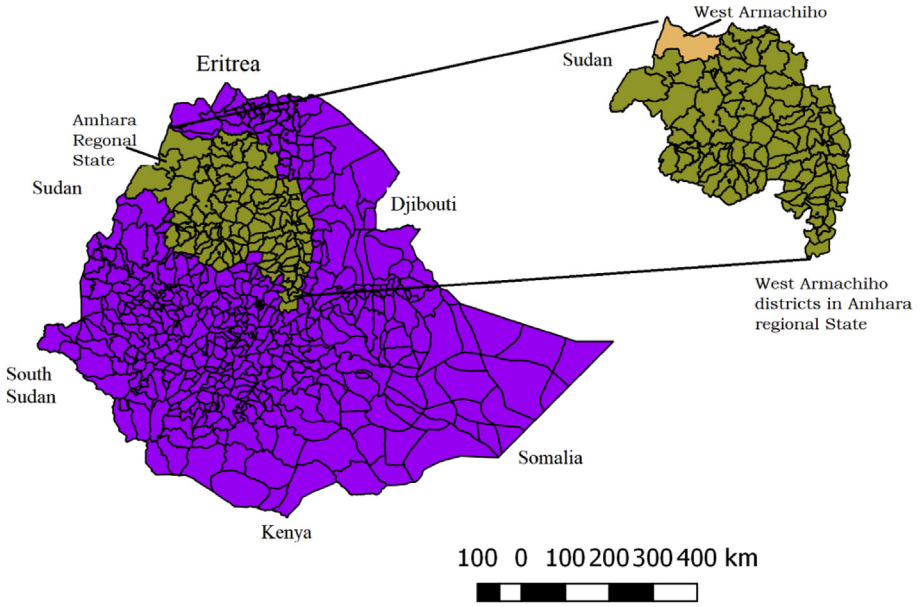

Figure 1. Map of Ethiopia, Amhara Regional State and West Armachiho district.

were considered as *"Knowledgeable"*. Similarly, the attitude towards VL was scored from zero to six. Attitude scores between zero and three was considered as *"Unfavourable"*, whereas scores from four to six were considered as *"Favourable"*. Finally, the practice was assessed using a five-item questionnaire and participants scoring more than two were considered as having *"Optimal"* practices regarding VL.

2.6. Quality control

The structured questionnaires were pre-tested in the district on 10% of the subjects and checked for completeness, clarity, sensitiveness and consistency of questions in the questionnaire. Finally, corrections were done accordingly before commencing the actual data collection. The principal investigator had also checked the completeness of the collected data.

2.7. Data analysis

The data entry, editing, and cleaning were carried out using Microsoft software. The data were subsequently transferred into EPI-INFO and SPSS statistical softwares for analysis. Then, frequencies were used to check for outliers and clean the data. The data were then analysed using descriptive statistics and bivariate logistic regressions. The latter was employed to identify the potentially important explanatory variables.

2.8. Ethical consideration

Ethical clearance was obtained from the ethical review board of the University of Gondar. A formal supporting letter explaining objectives, rationale and expected outcomes of the study was then written and presented to the West Armachiho district administration from the Institute of Public Health, at the University of Gondar. Officials were contacted and permission was secured at all levels. Before the interview, the study was explained to them and were asked for verbal consent. Those individuals, who agreed to participate were interviewed about their knowledge, attitude and practices towards VL. To assure confidentiality, the information was kept anonymous.

3. Results

3.1. Demographic characteristics of the participants

A total of 422 participants were included in the study. Table 1 shows the demographic characteristics of the participants. Age ranges from 34 to 41 years (30.3%), married (50.0%), Orthodox Christian (74.4%), farmer (37.4%) and grade 9–12 (35.8%) were the dominant demographic features. Most of the participants did not possess television (85.1%) or radio (86. 5%).

Table 1. Socio-economic demographic characteristics of participants.

Variables	Participants		
	Male (n = 228)	Female (n = 194)	Total (n = 422)
Age (years)			
18–25	26 (11.4%)	16 (8.2%)	42 (10.0%)
26–33	62 (27.2%)	53 (27.3%)	115 (27.3%)
34–41	58 (25.4%)	70 (36.1%)	128 (30.3%)
42–49	62 (27.2%)	41 (21.1%)	103 (24.4%)
≥50	20 (8.8%)	14 (7.2%)	34 (8.1%)
Marital Status			
Unmarried/single	64 (28.1%)	51 (26.3%)	115 (27.3%)
Married	124 (54.4%)	87 (44.8%)	211 (50.0%)
Divorced	25 (6.6%)	40 (20.6%)	65 (15.4%)
Widowed	15 (6.6%)	16 (8.2%)	31 (7.3%)
Religion			
Orthodox Christian	171 (75.0%)	143 (73.7%)	314 (74.4%)
Islam	40 (17.5%)	43 (22.2%)	83 (19.7%)
Protestant Christian	17 (7.5%)	8 (4.1%)	25 (5.9%)
Occupation			
Unemployed	9 (3.9%)	16 (8.2%)	25 (5.9%)
Student	19 (8.3%)	22 (11.3%)	41 (9.7%)
Civil servant	63 (27.6%)	47 (24.2%)	110 (26.1%)
House wife	0 (0.0%)	33 (17.0%)	33 (7.8%)
Farmer	89 (39.0%)	69 (35.6%)	158 (37.4%)
Pensioner	0 (0.0%)	0 (0.0%)	0 (0%)
Private worker	48 (21.1%)	7 (3.6%)	55 (13.0%)
Education			
Illiterate	46 (20.2%)	9 (4.6%)	55 (13.0%)
No formal education but can read & write	28 (12.3%)	27 (13.9%)	55 (13.0%)
Grade 1-8	50 (21.9%)	58 (29.9%)	108 (25.6%)
Grade 9-12	69 (30.3%)	82 (42.3%)	151 (35.8%)
Above grade 12	35 (15.4%)	18 (9.3%)	53 (12.6%)
Possession of television			
Yes	45 (19.7%)	18 (9.3%)	63 (14.9%)
No	183 (80.3%)	176 (90.7%)	359 (85.1%)
Possession of radio			
Yes	28 (12.3%)	29 (14.9%)	57 (13.5%)
No	200 (87.7%)	165 (85.1%)	365 (86.5%)

3.2. Knowledge of the community

All participants had heard about VL. The most frequent source of information was friends (80.8%), followed by pamphlet (34.1%) and health care providers (33.2%) (Figure 2).

Most of the participants (88.2%) recognized persistent enlargement of liver and spleen (expressed as an enlarged abdomen) as the symptom of VL; the next most reported VL symptoms were fever (48.3%) and loss of weight (37.7%). The survey also indicated that 52.1 and 37.0% of participants knew sand fly and mosquito as means of transmission of VL infection, respectively. About 24.9% of participants considered sharing needles and tooth brush as potential transmitter of the infection. About half (53.6%) of the participants put avoiding sand fly bite could prevent the VL infection (Table 2).

Regarding the knowledge of participants about the breeding site of sand flies, 61.1% of the participants believed that sand flies breed in muddy and dirty areas, about a quarter (26.5%) of participants didn't know the breeding place of the vector. For the biting time of the sandy flies, 54.3% of participants thought that the fly bites at midnight, whereas 27.0% and 14.0% of participants believed that biting took place during dusk and daytime, respectively (Table 3).

Table 4 describes the overall knowledge of participants towards VL infection. Only 21.1% of the participants were knowledgeable about VL. It was found that males (26.7%) were significantly ($P < 0.05$) more knowledgeable than females (14.4%). Bivariate analyses indicated that two variables (sex and residence) were significantly associated with the overall knowledge (Table 4).

3.3. Attitude of participants

Table 5 shows the attitude of participants towards VL. Their responses were organized under three categories (Agree, Disagree and Don't Know).

The attitudes of the participants in different categories towards VL are presented in Table 6. In general, 53.6% of participants have positive attitude about VL. Bivariate analysis suggested that the three variables

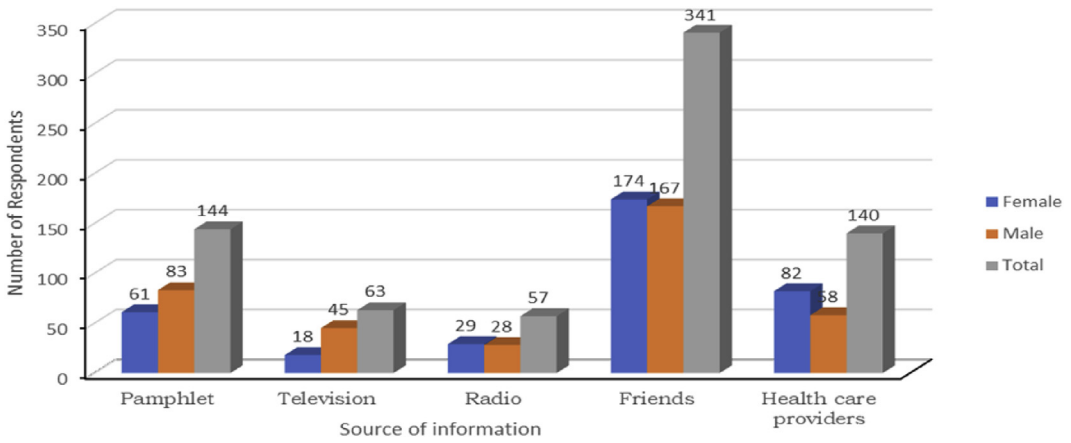

Figure 2. Number of participants by source of information about visceral leishmaniasis.

Table 2. Knowledge of resident community about visceral leishmaniasis.

Variables	Sex of the Participants		Total (n = 422)
	Male (n = 228)	Female (n = 194)	
Perception on signs and symptoms of VL			
Enlargement of spleen and liver	200 (87.7%)	172 (88.7%)	372 (88.2%)
Fever	114 (50.0%)	90 (46.4%)	204 (48.3%)
Loss of weight	90 (39.5%)	69 (35.5%)	159 (37.7%)
Epistaxis/phlebitis	23 (10.1%)	19 (9.8%)	42 (10.0%)
Loss of appetite	51 (22.4%)	49 (25.3%)	100 (23.7%)
Abdomen pain	50 (21.9%)	34 (17.5%)	84 (19.9%)
Shortness of breath	22 (9.6%)	15 (7.7%)	37 (8.8%)
Coughing	36 (15.8%)	13 (6.7%)	49 (11.6%)
Transmission of VL by:			
Sand fly bites	115 (50.4%)	105 (54.1%)	220 (52.1%)
Mosquito bites	83 (36.4%)	73 (37.6%)	156 (37.0%)
Coughing	46 (20.2%)	42 (21.6%)	88 (20.9%)
Sharing needles and tooth brush	68 (29.8%)	37 (19.1%)	105 (24.9%)
Sharing utensils	121 (53.0%)	111 (57.2%)	232 (55.0%)
Contact to infected dogs	0 (0.0%)	0 (0.0%)	0 (0.0%
Prevention of VL transmission avoiding			
Sand fly bites	125 (54.8%)	101 (52.1%)	226 (53.6%)
Mosquito bites	98 (43.0%)	65 (33.5%)	163 (38.6%)
Sharing utensils	83 (36.4%)	58 (29.9%)	141 (33.4%)
Sharing needles and tooth brush	40 (17.5%)	24 (12.4%)	64 (15.2%)

(sex, education and residence) were more associated with favourable attitude. Females (58.8%), people who didn't attend formal education but can read and write (70.9%) and residents from Abderafi (58.4%) had more favourable attitude than other categories.

Table 3. Knowledge of participants about the vector.

Variables	Sex of Participants		Total (n = 422)
	Male (n = 228)	Female (n = 194)	
Sandy flies breed in			
Muddy and dirty areas	140 (61.4%)	118 (60.8%)	258 (61.1%)
Field area around villages	31 (13.6%)	21 (10.8%)	52 (12.3%)
I don't know	57 (25.0%)	55 (28.3%)	112 (26.5%)
Biting time of sand flies			
At dusk	64 (28.1%)	50 (25.8%)	114 (27.0%)
At midnight	126 (55.2%)	103 (53.1%)	229 (54.3%)
During the daytime	28 (12.3%)	31 (16.0%)	59 (14.0%)
At anytime	10 (4.4%)	10 (5.1%)	20 (4.7%)

Table 4. Overall knowledge of the participants towards visceral leishmaniasis.

Variables	Total number (n = 422)	Knowledgeable (%)	Not knowledgeable (%)	Crude Odds Ratio (95% CI)
Sex				
Male	228	61 (26.7)	167 (73.3)	2.1 (1.3–3.5)
Female	194	28 (14.4)	166 (85.6)	1
Age (years)				
18–25	42	8 (19.0)	34 (81.0)	0.9 (0.2–2.8)
26–33	115	30 (26.1)	85 (74.9)	1.3 (0.5–3.4)
34–41	128	24 (18.7)	104 (81.3)	0.8 (0.3–2.2)
42–49	103	20 (19.4)	83 (80.6)	0.9 (0.3–2.4)
≥50	34	7 (20.6)	27 (79.4)	1
Education				
Illiterate	55	13 (23.6)	42 (76.4)	1.7 (0.6–4.6)
No formal education but can read & write	55	12 (21.8)	43 (78.2)	1.5 (0.5–4.2)
Grade 1-8	108	35 (32.4)	73 (67.6)	2.6 (1.1–6.3)
Grade 9-12	151	21 (13.9)	130 (86.1)	0.9 (0.3–2.1)
Above grade 12	53	8 (15.1)	45 (84.9)	1
Residence (village)				
Abderafi	315	75 (23.8)	240 (86.2)	1
Abrehajira	107	14 (13.1)	93 (86.9)	0.4 (0.2–0.8)
Occupation				
Unemployed	25	7 (28)	18 (72)	1.2 (0.4–3.6)
Student	41	8 (19.5)	33 (80.5)	0.7 (0.2–2.1)
Civil servant	110	22 (20)	88 (80)	0.8 (0.3–1.7)
House wife	33	0 (0.00)	33 (100)	0.9 (0.4–2.0)
Farmer	158	39 (24.7)	119 (75.3)	1.0 (0.5–2.1)
Private worker	55	13 (23.6)	42 (76.4)	1

3.4. Practice of participants

Table 7 shows the descriptive analysis of the practices. The study participants were asked about what they would do regarding VL infection; specifically, they were asked about their health care seeking practices, preventive actions and where they went for treatment. The survey indicated that most of the participants (62.3%) have a practice of seeking the health care service as soon as they got sick, avoiding sand fly bite (59.0%) to prevent VL infection and preferring government institutions (82.9%) for treatment.

The overall practices of participants towards VL infection were also assessed (Table 8). Of all participants, only 14.9% had optimal practices.

Table 5. Attitude of participants towards visceral leishmaniasis.

Variables	Frequency (n = 422)	Percent (%)
All *visceral leishmaniasis* patients have HIV/AIDS?		
Agree	52	12.3
Disagree	295	69.9
Don't know	75	17.8
I don't mind if others know that I am infected with *visceral leishmaniasis?*		
Agree	296	70.1
Disagree	86	20.4
Don't know	40	9.5
If you found that you have *visceral leishmaniasis* would you tell to others?		
Agree	255	60.4
Disagree	124	29.4
Not sure	43	10.2
Do you feel something unusual when you see *visceral leishmaniasis* patients?		
Agree	207	49.1
Disagree	199	47.2
Not sure	16	3.8
Are you afraid of *visceral leishmaniasis* patients because of their illness?		
Agree	149	35.3
Disagree	258	61.1
Not sure	15	3.6
Visceral leishmaniasis affects the daily activities?		
Agree	276	65.4
Disagree	136	32.2
Don't know	10	2.4
Visceral leishmaniasis affects marital relationship?		
Agree	246	58.3
Disagree	159	37.7
Don't know	17	4.0
Visceral leishmaniasis affects the family responsibilities?		
Agree	273	64.7
Disagree	134	31.8
Don't know	15	3.6
Visceral leishmaniasis affects relationship with friends and other community members?		
Agree	194	46.0
Disagree	213	50.5
Don't know	15	3.6

Bivariate analysis identified two variables (sex and residence) were significantly associated with overall practice.

4. Discussion

This research was conducted to assess the knowledge, attitude and practices of the resident community towards VL in West Armachiho district, northwest Ethiopia. The results of the study indicate that VL was familiar to the community, as almost all of the study participants responded that they had heard about the disease, with various sources of information. Friends (80.8%), pamphlet (34.1%) and health care providers (33.2%) were the three most important source of information. In line with this finding, Yared et al. (2014) reported that friends (46.6%) and health personnel (45.6%) were major sources of information in Western Tigray, Ethiopia. Friends and neighbours as the main source of information were also reported by Mondal et al. (2009) and Siddiqui et al. (2010) in India, Nepal and Bangladesh.

Most participants (88.2%) recognized persistent enlargement of spleen or liver as symptoms of VL. Other reported symptoms were fever (48.3%), loss of weight (37.7%), loss of appetite (23.7%), abdominal pain (19.9%). These results were comparable with those from previous studies conducted in India (Siddiqui et al., 2010; Singh et al., 2006). About half of participants (52.1%) knew that the disease could be transmitted by sand fly. This indicated that more has to be done to increase the awareness of the community. This agreed with previous study which was conducted in India (Siddiqui et al., 2010).

Table 6. The attitude of participants in different categories towards visceral leishmaniasis.

Variables	Total number (n = 422)	Favourable attitude (%)	Unfavourable attitude (%)	Crude Odds Ratio (95%CI)
Sex				
Male	228	112 (49.1)	116 (50.9)	0.6 (0.4–0.9)
Female	194	114 (58.8)	80 (41.2)	1
Age (years)				
18–25	42	25 (59.5)	17 (40.5)	1.0 (0.4–2.5)
26–33	115	60 (52.2)	55 (47.8)	0.7 (0.3–1.6)
34–41	128	74 (57.8)	54 (42.2)	0.9 (0.4–2.0)
42–49	103	47 (45.6)	56 (54.4)	0.5 (0.2–1.2)
≥50	34	20 (58.8)	14 (41.2)	1
Marital status				
Unmarried/single	115	64 (55.7)	51 (44.3)	0.5 (0.2–1.2)
Married	211	122 (57.8)	89 (42.2)	0.5 (0.2–1.3)
Divorced/separated	65	25 (38.5)	40 (61.5)	0.7 (0.3–1.9)
Widowed	31	15 (48.4)	16 (51.6)	1
Education				
Illiterate	55	22 (40.0)	33 (60.0)	1.2 (0.5–2.8)
No formal education but can read & write	55	39 (70.9)	16 (29.1)	4.7 (2.1–10.6)
Grade 1-8	108	55 (50.9)	53 (49.1)	2.0 (1.0–3.9)
Grade 9-12	151	92 (60.9)	59 (39.1)	3.0 (1.5–5.8)
Above grade 12	53	18 (34.0)	35 (66.0)	1
Residence				
Abderafi	315	184 (58.4)	131 (31.6)	1
Abrehajira	107	42 (39.2)	65 (60.8)	0.4 (0.2–0.7)
Occupation				
Unemployed	25	12 (48.0)	13 (52.0)	0.8 (0.3–2.2)
Student	41	22 (53.6)	19 (46.4)	1.1 (0.4–2.5)
Civil Servant	110	58 (52.7)	52 (47.3)	1.0 (0.5–2.0)
House Wife	33	21 (63.6)	12 (36.4)	1.6 (0.6–4.0)
Farmer	158	85 (53.8)	73 (46.2)	1.1 (0.6–2.0)
Private Worker	55	28 (50.9)	27 (49.1)	1

Participants who lived in Abderafi were more knowledgeable (23.8%) than those residents who lived in Abrehajira (13.1%). This difference might be related to the health workers in Abderafi who might create suitable situations to upgrade the community knowledge. Considerable number of the participants (53.6%) suggested that avoiding sand fly bites was helpful to prevent VL infection. However, the result of this study disagreed with the result of previous studies conducted in India which showed that VL was thought to be a preventable disease by 95% of the participants (Rijal et al., 2006).

Most of the participants had a perception that all VL patients were not necessarily HIV/AIDS positive (69.9%) and they did not mind if others knew that they were infected with VL (70.1%). This could be the reason why more than half of the participants (60.4%) answered that if they were infected with VL they would tell to others. This would be important status for health education programs by making patients less prone to potential stigma. It was also supported by the result (61.1%) of the participants who said that they would not afraid VL patients because of their illness. Most of the participants perceived that VL could affect income generating activities, the marital relationship and the family responsibilities. A considerable proportion participant also perceived that VL could affect the relationship with friends and other community members.

Table 7. Descriptive analysis on prevention practice of participants.

Variables	Frequency*	Percent (%)
How often do you seek health care?		
Less than once a year	34	8.1
Once a year	21	5.0
Twice a year	98	23.2
As soon as I get sick	263	62.3
Not at all	6	1.4
What do you do to prevent from getting *VL* infection?		
Good hygiene	135	32.0
Good nutrition	141	33.4
Avoid from mosquito bites	137	32.5
Avoid from sand fly bites	249	59.0
Avoid sharing utensils	27	6.4
What do you do to prevent the spread of *VL* infection from patients?		
Avoid sand fly bites	226	53.6
Avoid mosquito bites	195	46.2
Avoid sharing utensils	156	37.0
Avoid sharing needles and tooth brush	130	30.8
Avoid hand shaking	25	5.9
Where do you prefer to seek *VL* treatment?		
Government health institutions	350	82.9
Private health institutions	57	13.5
Pharmacy	1	0.2
Traditional healers	0	0.0
Holly water	6	1.4

* The cumulative frequency for a given variable may be equal or greater than the total sample size (422), since one participant may mention one or more than one preventive practices.

Table 8. Overall practice of the participants towards visceral leishmaniasis.

Variables	Total number (n = 422)	Optimal practice (%)	Crude Odds Ratio (95%CI)
Sex			
Male	228	43 (18.9)	2.0 (1.1–3.5)
Female	194	20 (10.3)	1
Age (years)			
18–25	42	9 (21.4)	2.8 (0.6–11.3)
26–33	115	15 (13.0)	1.5 (0.4–5.7)
34–41	128	17 (13.3)	1.5 (0.4–5.7)
42–49	103	19 (18.4)	2.3 (0.6–8.4)
≥50	34	3 (8.8)	1
Marital status			
Unmarried/single	115	17 (14.8)	1
Married	211	34 (16.1)	0.7 (0.4–1.4)
Separated/divorced	65	8 (12.3)	0.4 (0.1–1.3)
Widowed	31	4 (12.9)	0.1 (0.01–1.0)
Education			
Illiterate	55	20 (36.4)	7.0 (2.1–22.2)
No formal education but can read & write	55	9 (16.4)	2.3 (0.6–8.3)
Grade 1-8	108	18 (16.7)	2.4 (0.7–7.6)
Grade 9-12	151	12 (7.9)	1.0 (0.3–3.4)
Above grade 12	53	4 (7.5)	1
Residence			
Abderafi	315	33 (10.5)	1
Abrehajira	107	30 (28.0)	3.3 (1.9–5.7)
Occupation			
Unemployed	25	6 (24.0)	1
Student	41	9 (21.9)	0.8 (0.2–2.8)
Civil servant	110	16 (14.5)	0.5 (0.1–1.5)
House wife	33	2 (6.0)	0.2 (0.03–1.1)
Farmer	158	23 (14.5)	0.5 (0.1–1.4)
Private worker	55	7 (12.7)	0.4 (0.1–1.5)

The study participants had an appreciable health seeking behaviour as more than half of them (62.3%) sought medical care as soon as they felt sick and about quarter of them (23.2%) of them visited medical care settings twice a year. Only a small proportion (1.4%) of the participants did not seek medical care at all. Most (82.9%) of participants preferred government health institutions for VL treatment, and none of the participants visited traditional healers. Similarly, a previous study conducted in Sudan showed that 76.8% of participants preferred VL treatment centres (Hassan et al., 2012).

Nearly equal proportions of participants reported that good hygiene, good nutrition and avoiding mosquito were helpful to prevent VL. This agrees with the concern that malnutrition could increase the risk of developing VL symptoms (Alvar et al., 2006). Participants of this study suggested that avoiding sand fly bites (53.6%) and mosquito bites (46.2%) with bed nets, insecticide and repellents and avoiding sharing needles and tooth brush (30.8%), and avoiding sharing utensils (37.0%) might prevent the disease. A study conducted in India showed that there was statistically significant relationship between VL knowledge and practices to prevent VL (Singh et al., 2006).

Our study indicated that 21.1% of the study participants in Armachiho district were knowledgeable, 53.6% had positive attitudes and 14.9% had optimal practices on VL. The attitude of the participants was relatively better than both their knowledge and practices. Better attitude (95%) of the participants towards VL were also reported by Berhe et al. (2018) Welkait district, Ethiopia. On the other hand, the status of the knowledge and practice of the community of this study didn't agree with that of Berhe et al. (2018) in Welkait district, Ethiopia where 59% of the community were knowledgeable and 53% had optimal practices. The difference may be related to the demographic characteristics of participants in these two studies.

5. Conclusions

Inadequate knowledge and incorrect practices regarding VL were reported in this study. The control and prevention of VL in the district remains a subject of interest because the disease is threatening the health of the population. The success of the disease control and prevention program depends on improving the KAP of the resident community. The community should be encouraged to share the responsibility and participate actively in health education programs. More studies have to be conducted for better understanding of the dynamics of the disease in the area.

Declarations

Author contribution statement

Habtamu Tamrat Melkamu: Performed the experiments; Wrote the paper.

Achenef Melaku Beyene: Conceived and designed the experiments; Wrote the paper.

Desalegn Tigabu Zegeye: Analyzed and interpreted the data.

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Competing interest statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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