East African Medical Journal Vol: 94 No. 2 February 2017
ATTITUDE AND PRACTICES OF HOUSEHOLD HEADS TOWARDS LEISHMANIASES INFECTIONS IN MARIGAT SUB-COUNTY, BARINGO COUNTY, KENYA
E. G. Okindo, BSc, H. L. Kutima, B.Ed, Msc, PhD, Jomo Kenyatta University of Agriculture and Technology P.O. Box 62000-00200, Nairobi, Kenya, J. Mutai, BA, MA, PhD, Kenya Medical Research Institute, Centre for Public Health Research, P.O Box 20752-00202, Nairobi, Kenya and S. Kasili, BSc. MSc, PhD, South Eastern Kenya University, P.O Box 170-90200 Kitui, Kenya

Request for reprints to: E. G. Okindo, Jomo Kenyatta University of Agriculture and Technology, P. O. Box 62000-00200 Nairobi, Kenya.

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E. G. OKINDO, H. L. KUTIMA, J. MUTAI and S. KASILI

ABSTRACT

***Objective*: To assess the attitude and practices of household heads towards leishmaniases in Marigat division.**
***Design*: A cross-sectional study.**
***Setting*: Marigat Sub-County, Baringo County, Kenya.**
***Subjects*: Four hundred and twenty two participants were enrolled into the study.**
***Results*: The belief that Kalaazar is more serious than malaria was reported to be (82.1%) by the household respondents. Majority (92.6%) of respondents reported that they will seek medical advice if they realize they are infected. The fear of death was the major reason for seeking treatment (68.4%). There were various leishmaniases preventive practices that were employed by the respondents' households to prevent them from being infected with kalaazar. The preventive practices included use of bed nets which were being used by (88%) of respondents, spraying their houses with insecticides (16%), observing personal hygiene (46%), practising proper waste disposal (34%), installed window mesh in the households (5%), use sterilised water (19%) and applying sand fly repellents (14%). The households using bed nets (χ^2 =7.397, df = 1, P= 0.007), households spraying their houses with insecticides (χ^2= 7.813, df = 1, P =0.005), households observing personal hygiene (χ^2 = 10.144, df = 1, P =0.001), and households that were using sterilised water (χ^2 = 7.151, df = 1, P =0.007) had significant partial effects to the occurrence of kalaazar disease.**
***Conclusion*: There was a strong evidence of association between the isolation of patients and occurrence of kalaazar disease (χ= 12.908, df =1, P<0.001). The study also showed that there was strong evidence of relationship on risk of contracting leishmaniases in young boys (χ = 19.038, df = 1, P<0.001) followed by young girls (χ = 10.623, df = 1, P = 0.001). The isolation of patients with leishmaniases infections, fear of death and the negative impacts of the disease are the major issues associated with leishmaniases. The use of bed nets and spraying houses with insecticides are among the preferred methods to prevent the sand fly bites.**

INTRODUCTION

Leishmaniases are zoonotic infections caused by protozoa of the genus *Leishmania* (1). The infections are transmitted to humans by infected female sand flies of the genera *Phlebotomus* and *Lutzomyia* (2). The leishmaniases are endemic in 88 countries in the world with 350 million people considered at risk (3). An estimated 900 000–1.3 million new cases and 20 000 to 30 000 deaths occur annually. The global burden of leishmaniases has remained stable for some years, causing a morbidity and mortality loss of 2.4 million disability adjusted life-years (DALYs) and approximately 70,000 deaths, a significantly high rank among communicable diseases (4).

There are 4 main forms of the leishmaniases diseases: visceral leishmaniasis (VL, also known as kalaazar); post-kalaazar dermal leishmaniasis (PKDL); cutaneous leishmaniasis (CL); and mucocutaneous leishmaniasis (MCL). While cutaneous leishmaniasis is the most common form of the disease, visceral leishmaniasis is the most serious and can be fatal if

untreated.

Visceral Leishmaniasis is found in the arid and semi-arid regions of Kenya and is endemic in the Rift Valley and Eastern Provinces, with small foci in North Eastern Kenya. In Rift valley, the disease is commonly found in Baringo, Pokot, Turkana, Samburu, Kajiado and Laikipia Districts. It is estimated that about 4,000 cases occur annually in Kenya with the majority of the affected being children aged below 5 years (15)

Cutaneous leishmaniasis (CL) normally produces skin ulcers on the exposed parts of the body such as the face, arms and legs (16). In mucocutaneous forms of leishmaniases, lesions can lead to partial or total destruction of mucous membranes of the nose, mouth, throat cavities and surrounding tissues (16). This is considered with some people in the community as a bad omen by evil spirits and results in the discrimination and stigmatization of the members (3). Visceral leishmaniasis (VL) commonly known as Kalaazar (Hindu for black fever) ranges from asymptomatic infection to severe life-threatening infection (1). The most common symptoms of VL include prolonged fever, weight loss, substantial swelling of the liver and spleen, darkening of the skin and anaemia (16). It is a systemic disease, most severe form of leishmaniases infections and is usually fatal within 2 years if left untreated (1). The leishmaniases are not only associated with poverty but also propagates poverty, because treatment is expensive and either unaffordable or it imposes a substantial economic burden, including loss of wages (3). Kalaazar the common name used to refer to leishmaniases by the community, is a major public health problem in Marigat Sub-County and its prevention and control should be given priority

Leishmaniases have been endemic in Kenya for a long time (12). The most prevalent forms of leishmaniases are the cutaneous and visceral forms (12). Leishmaniases affects communities in 22 out of the 47 counties in the country (13). Visceral leishmaniasis is endemic in the Baringo, Koibatek, Turkana, West Pokot, Kitui, Meru, Keiyo, Marakwet, Mwingi and Machakos Counties (13). It is estimated that about 4,000 cases occurs annually while 5 million people are at risk of infection (13). The disease mainly affects children above two years and young adults but older people are also occasionally infected (www.ntdkenya.or.ke). Baringo County is the only foci where both VL and CL are known to occur in Kenya (14).

MATERIALS AND METHODS

Setting: The study was carried out in Marigat Sub-County, in Baringo County. Baringo County measures 11,075.3 km2 with a population of 555,561 (2009 census), and its largest town is Kabarnet. Marigat division is one of the densely populated areas in Baringo County, where both cutaneous and visceral leishmaniases are found. Marigat sub- County is a semi-arid area situated at the altitude of 1067 metres above sea level and is approximately 250km west of Nairobi City County. The area has a mean temperature of about 32.80 C.±1.60 C with total amount of annual rainfall of 512mm occurring in two seasons: in March to August and November to December. Farming is the major activity which includes dairy farming, growing of maize, groundnuts, cotton and coffee. The remainder of the County is mainly rangelands with the rearing of goats, sheep, cattle and camels and bee keeping forming the major livestock activities. Baringo County has 89 health facilities distributed all over the County. Most of them are under-utilised due to lack of staff and equipment. The average distance to the nearest health facility is 15km.

***Design*:** This was a cross-sectional study which used both quantitative and qualitative methods of data collection techniques. The tables of random numbers, generated from the chiefs' records, were used to select the target population through random sampling, which comprised of household heads either the fathers or mothers and incase they were not there any adult person in charge of the household. Purposive sampling was used to select opinion leaders, Community health extension workers (CHEWs), Chiefs, and divisional health officers for focus group discussions.

Inclusion criteria: The household heads, fathers or mothers or an alternative household participant aged 18 years and above, voluntarily consenting to participate in the study, resident of Marigat Sub-County for at least one year and had had one of the family member or themselves affected with leishmaniases.

Exclusion criteria: The household heads under 18 years of age and people who were not residents of Marigat and had not lived there for more than one year.

Sample size determination: Fishers formula was used to calculate the sample size (14) based on assumption prevalence of 50% Ministry of Public Health and sanitation (MOPHS) (2011) and a standard error of 0.05.

A sample size of 384 was calculated as follows:

$$N = \frac{Z^2pq}{d^2} = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = 384$$

Where:

N = Sample size required

Z = Confidence level at 95% (standard value of 1.96)

p = Estimated Prevalence of leishmaniases infections (50%)

q = 1-p, proportion of those people without leishmaniasis infections (1-0.5 = 0.5)

d = Required error (0.05)

To account for non-response, refusals or bias 10% of 384 were added on the minimum sample size, bringing the sample size to a total of 422. Ninety percent (90%) of the respondents provided the responses to the questionnaire which totals to a minimum of 381 household heads respondents.

***Sampling procedure*:** The study employed both the probability and non-probability approaches of sampling. Simple random sampling involving the use of tables of random numbers generated from the chiefs' records was used to select household heads from the three locations (Marigat, Eldume and Loboi) in the Marigat Sub-County. The selected participants provided response to a structured questionnaire on socio-demographic characteristics, attitudes and practices, which constituted quantitative data. Purposive sampling procedures were employed to select the focus group participants.

***Data collection*:** The data extraction included focus group discussions and the administration of a structured questionnaire which was obtained using the qualitative and quantitative techniques. The quantitative techniques consisted of household surveys which utilised a structured questionnaire with both closed and open-ended questions. Closed questions were used to obtain demographic characteristics, attitudes and practices. Only household heads were interviewed; if a household head was absent, an adult household member was interviewed instead or an appointment to revisit was obtained. Trained research assistants helped in questionnaire administration and moderation because of their fluency in the local language. They were working under the supervision of the Principal investigator. Qualitative data were obtained using focus group discussions (FGDs). The FGDs per location was conducted with the opinion leaders including two church leaders (2), two village elders (2), two sub chiefs (2) and two community health extension workers (CHEWs) (2). The FGDs were of mixed gender (male and female) and each had between six and 12 participants. The FGDs were moderated by two trained interviewers, recommended by the chief and also evaluated by the principal investigator on fluency in the local language. Discussion themes included: perceptions of the problem of leishmaniases in the community, social impacts of leishmaniases, attitude and practices associated with the disease.
Sampled respondents were taken through the consent forms in the language they understood best. If they agreed to participate, they were requested to sign the consent forms in the presence of a witness either a church leader or village elder whom we were moving around with for them to voluntarily, participate in the research.

***Data Analysis*:** The data from the questionnaire was entered in the Ms Excel spread sheet and exported to SPSS data analysis software. Quantitative data were analyzed using SPSS 20.0 and Ms Excel. Chi-square test was used to establish the association between the dependent and independent variables and the level of statistical significance was set at p-value < 0.05. Multiple logistic regression analyses were performed to adjust for confounding. Adjusted Odds ratio (AOR) with corresponding 95% confidence interval was estimated.

Qualitative data collected from focus group discussions were sorted based on themes and manual analysis was done on the main themes regarding attitudes and practices associated with leishmaniases. The principal investigator transcribed the information from the FGDs and analyzed it in relation to themes and the objectives of the study.

***Ethical approval*:** The approval to carry on with the research was sought from KNH/UON-ERC (Appendix 1) and Baringo Director of Health (Appendix 2).

RESULTS

***Socio-Demographic Characteristics of Respondents*:** The study recruited 381 respondents of which (52.5%) were female and (47.5%) male, as shown in Table 1. In terms of marital status (63.8%) were married, (16.4%) were widowed, (11.0%) were single and (8.7%) were divorced. The household heads had various occupations which include; (78.5%) farmers, (3.1%) teachers, (1.8%) health workers and (15.4%) belonged to other occupations. Majority (29.1%) of the respondents had no formal education, followed by those who attended primary school but never completed that level (27.0%) and those who completed primary school (24.5%). Few household heads reached secondary level of education (15.8%) and with the least going past secondary education (3.1%).
The study also revealed that (44.4%) were spending between Kenya Shillings 1001- 5000($10-50) monthly, (26.9%) were spending between Kenya Shillings 5001- 10000($50-100) monthly, (10.0%) were spending between Kenya Shillings 10001- 15000 monthly ($100-150), 10% were spending over Kenya shillings 15 000($150) per month monthly and (8%) were spending below Kenya shillings 1000 per month ($10.3).

The distribution of the housing types showed that (36.5%) were made of corrugated iron sheet wall and roof, (29%) mud plastered and grass thatched, (17.7%) mud plastered and corrugated iron sheet roof, (11.1%) timber house and corrugated iron sheet roof, (4.1%) stick walled house and grass thatched and (2.1%) stoned walled house.

Table 1

socio-demographic characteristic

	n	n%	P Value
Sex:			
Male	181	47.5	P = 0.197
Female	200	52.5	
Marital Status:			
Married	249	63.8	P = 0.046
Widowed	64	16.4	
Single	43	11	
Divorced	34	8.7	
Occupation:			
Farmer	306	78.5	P < 0.001
Teacher	12	3.1	
Health Worker	7	1.8	
Others	60	15.4	
Education Level:			
None	114	29.1	P < 0.001
Primary Not Completed	106	27	
Primary Completed	96	24.5	
Secondary Education	62	15.8	
Post-Secondary Education	12	3.1	
Monthly Household Expenditure			
Below Ksh 1000	32	8.2	P =0.542
Ksh 1001 – 5000	174	44.4	
Ksh 5001 - 10 000	105	26.9	
Ksh 10001 – 15000	39	10.0	
Above Ksh 15000	40	10.3	
Type of House:			
Mud plastered and grass thatched	111	28.5	P < 0.001
Mud Plastered and corrugated iron roof	69	17.7	
Timber house and Corrugated iron roof	43	11.1	
Corrugated Iron sheet wall and roof	142	36.5	
Stick walled house and grass thatched	16	4.1	
Stoned walled House	8	2.1	

Chi Square analysis was performed to determine if there was an association between the social demographic characteristics of the respondents and the occurrence of leishmaniases. The relationship between marital status, occupation type of the respondents, level of education and type of the main house in the homestead and the occurrence of leishmaniases were statistically significant (P<0.05). However, there was a strong evidence of relationship between occupation, education level, type of the main house and the occurrence of leishmaniases (P<0.001).

Attitudes and Practices of Household heads towards Leishmaniases: Table 2 shows that (82.1%) of the respondents hold the belief that Kalaazar is more serious than malaria, (11.7%) believed that Malaria and Kalaazar are equally serious, (5.6%) believed that Malaria is more serious than Kalaazar and (0.5%) did not give their opinion. The respondents gave various answers on their reactions when asked what they would do if they realize they were infected with Kalaazar: (92.6%) would seek immediate doctor's advice, (3.3%) would look for herbal medicine, (2.8%)

would be scared, (1.3%) would pray to God and (0.5%) did not give their view on what they would do if infected with Kalaazar. The household heads gave their reasons why they would seek treatment for Kalaazar with majority (68.4%) reporting fear of death from the disease followed by knowledge of the negative impacts of the disease (20.7%), disability (6.1%), pain (2.8%), embarrassment (0.5%) and (1.5%) did not give their reasons for seeking kalaazar treatment. The study also revealed that the respondents had various views on how they would take care for patients suffering from Kalaazar with majority reporting that they would seek immediate doctor's advice (92.9%), some would look for herbal medicine (3.3%), would be scared (2.0%) and some pray to God (1.3%). However (0.5%) of the respondents did not give their response on how they would care the patients suffering from Kalaazar.

Table 2
Attitude of Household Heads towards Leishmaniases

	n	n%	P-Value
Kalaazar is more serious than malaria	322	82.1	P = 0.003
Malaria is more serious than Kalaazar	22	5.6	
Malaria and Kalaazar are equally serious	46	11.7	
Missing system (Do not know/ NO response)	2	0.5	
What would be your reaction if you realize that you are infected with Kalaazar?			
Seek immediate doctor's advice	361	92.6	P = 0.685
Look for herbal medicine	13	3.3	
I would be scared	11	2.8	
Pray to God	5	1.3	
Missing	2	0.5	
Reasons for seeking Kalaazar treatment			
Fear of death	268	68.4	P = 0.004
Knowledge of the negative impact of the disease	81	20.7	
Disability	24	6.1	
Pain	11	2.8	
Embarrassment	2	0.5	
Missing	6	1.5	
The population at risk of contracting Kalaazar			
Young Boys	294	76.2	P <0.001
Young Girls	182	47.2	P = 0.001
Female Youths	43	11.2	P = 0.006
Male Youths	80	20.4	P = 0.389
Adult Men	26	6.7	P = 0.167
Adult Female	21	5.4	P = 0.664
How would you care for patients suffering from Kalaazar			
Seek Immediate doctor's advice	364	92.9	P = 0.086
Look for herbal medicine	13	3.3	
I would be scared	8	2.0	
Pray to God	5	1.3	
Missing	2	0.5	
Does Patients suffering from Kalaazar need Isolation			
Yes	34	9.1	P <0.001
No	339	90.9	

The attitude of respondents on the seriousness of Kalaazar, reasons for seeking treatment by respondents and the isolation of patients suffering from Kalaazar were cross tabulated against the occurrence of Kalaazar and was statistically significant (P<0.05). There was a strong evidence of association between the isolation of patients and occurrence of Kalaazar disease (χ 12.908, df =1, P<0.001). The study also showed that there was strong evidence of relationship on risk of contracting leishmaniases in young boys (χ = 19.038, df = 1, P<0.001), young girls (χ = 10.623, df = 1, P = 0.001) and the occurrence of Kalaazar disease.

The qualitative results from the focus group discussion (FDGs) confirmed that the fear of death is the main reason why majority of residents seek treatment. They also have the same perception that leishmaniases infections are more serious than malaria. The use of herbal medicine was the most preferred method of treatment by the residents before Kimalel hospital came. Kimalel hospital managed by Kenya Medical Research Institute (KEMRI) was the most preferred in the treatment of leishmaniases. Leishmaniases are regarded as deadly diseases but treatable. Isolation was considered as a problem since some residents isolate the leishmaniases respondents in the fear of transmission. Use of bed nets is the most embraced method of prevention.

The Household heads Preventive Practices Employed towards Leishmaniases: Table 3 shows that there were various leishmaniases preventive practices that were employed by the respondents' households to prevent them from being infected with Kalaazar. These leishmaniases preventive practices included use of bed nets which were being used by (88%) of respondents, spraying their houses with insecticides (16%), observing personal hygiene (46%), practising proper waste disposal (34%), installed window mesh in the households (5%), use sterilised water (19%) and applying sand fly repellents (14%).

Table 3

Household Heads Practices towards Leishmaniases Prevention Practices in Marigat Sub-County

Preventive Practice	Yes n (%)	No n (%)
Use Bed nets	332(88)	46(12)
Spray House with Insecticides	62(16)	316(84)
Observe Personal Hygiene	174(46)	204(54)
Practise Proper waste Disposal	130(34)	248(66)
Installed Window Mesh	19(5)	359(95)
Use Sterilised Water	73(19)	305(81)
Apply Repellents	54(14)	324(86)

Logistic regression analysis was employed to predict the probability that a respondent living in Marigat division and employing the leishmaniases preventive practices would be infected with Kalaazar. The predictor variables were: households use of bed nets, households spraying their houses with insecticides, households observing personal hygiene, households practicing proper waste disposal, households that installed window mesh in their houses, households that were using sterilised water and households whose members were using sand fly repellents. A test of the full model versus a model with intercept only was statistically significant, χ^2 (7, N = 392) = 64.288, P< .001. The model correctly classified 62% of those who reported to have been infected with Kalaazar and 73% of those who were not infected, for an overall success rate of 68%.

Table 4 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors. Employing a 0.05 criterion of statistical significance; households using bed nets (χ2 =7.397, df = 1, P= 0.007), households spraying their houses with insecticides (χ2= 7.813, df = 1, P =0.005), households observing personal hygiene (χ2 = 10.144, df = 1, P =0.001), and households that were using sterilised water (χ2 = 7.151, df = 1, P =0.007) had significant partial effects to the occurrence of Kalaazar disease. The odds ratio indicates that when holding all other variables constant, respondents who were using bed nets were almost half less likely to be infected with Kalaazar 0.425 than those who didn't use bed nets, the respondents who were spraying their household with insecticides were 0.665 times less likely to be infected with Kalaazar than those who didn't spray their houses, those who observed personal hygiene were 2.628 more likely to be infected with Kalaazar than those who reported not to practice personal hygiene, the respondents who practised proper waste disposal were almost equally at same risk of being infected with Kalaazar 1.012 with those who didn't practice proper waste disposal, the respondents who installed window mesh in their households were 0.832

times less likely to be infected with Kalaazar and respondents who were using sterilised water were 2.791 times more likely to be infected with Kalaazar than those who didn't report to be using sterilised water as preventive practice in Kalaazar prevention. The last sentence is too long.

Table 4

Logistic Regression Predicting Kalaazar outcome from Preventive Practices employed by the respondents

Variable	B	SE	Wald X^2	P	OR
Constant	0.154	0.308	0.251	0.616	1.167
Use Bed nets					
Yes (Base = No)	-0.854	0.314	7.397	0.007	0.425
Spray House with Insecticides					
Yes (Base = No)	0.980	0.351	7.813	0.005	0.665
Observe Personal Hygiene					
Yes (Base = No)	0.966	0.303	10.144	0.001	2.628
Practise Proper waste Disposal					
Yes (Base = No)	0.012	0.330	0.001	0.971	1.012
Installed Window Mesh					
Yes (Base = No)	-0.184	0.568	0.105	0.746	0.832
Use Sterilised Water	1.027	0.384	7.151	0.007	2.791
Yes (Base = No)					
Apply Repellents	-0.422	0.333	1.607	0.205	0.656
Yes (Base = No)					

-2LL	443.280
$X^2 = 64.288$, df = 7, $p<0.001$	
Nagelkerke R^2	21%
Hosmer & Lemeshow test	P = 0.272
Classification accuracy	68%

DISCUSSION

In the 21st century the public health fraternity has laid down a lot of emphasis on the active participation of individuals and communities in successful disease prevention and control programmes. This is evident in some studies (5,6) that have been conducted to assess the knowledge, attitude and practices of communities towards diseases such as malaria and onchocercariasis. The current study showed that more than four fifths (82.1%) of the respondents held the belief that kalaazar was more serious than malaria. This attitude needs to be taken seriously in leishmaniases prevention and treatment since malaria is reported to cause high morbidity and mortality in Kenya. The belief by the residents that leishmaniases are more serious than malaria means that leishmaniases have a very negative effect in this community in terms of morbidity and mortality and should be given a lot of attention and more resources need to be channeled in the disease diagnosis, treatment and prevention.

Due to the perceived seriousness of leishmaniases, the residents of Marigat division employed various leishmaniases preventive practices. Most (88.0%) of the respondents in the study used bed nets as their preferred method of prevention and these results were in agreement with WHO report 2007 which indicates that one of the prevention methods of leishmaniases is use of treated and untreated nets. The other practices employed include: spraying of the houses with insecticides which was embraced by a small percentage. The respondents reported that spraying of insecticides was expensive compared to use of bed nets since the insecticides are costly. The installed window mesh in the households was another method employed. The use of window mesh cannot provide appropriate protection in the stick walled houses since the house has the gaps which allow sand fly entry. The application of the sand fly repellants seemed to be a good method but the repellants are not locally available unless obtained from the hospital during the hospital visits or travel to Marigat market centre. The overall findings show that knowledge on how leishmaniases are transmitted is poor since the respondents reported that observing personal

hygiene and use sterilised water are part of the practices to control the spread of kalaazar. The health education on control and transmission mechanisms of leishmaniases is needed, for the Marigat community to cap the spread of leishmaniases diseases. Although the household heads reported the use of different methods in preventing the spread of leishmaniases it was observed that it's not all members who were able to access these facilities due to the poverty status these leaves them exposed to the danger of leishmaniases. Logistic regression analysis on the various leishmaniases preventive practices used by respondents of Marigat Sub-County, to prevent them from being infected with Kalaazar; households using bed nets, households spraying their houses with insecticides, installed window mesh in the households, practice of proper waste disposal and applying the sand fly repellants had a significant partial impact on the occurrence or decreased the cases of Kalaazar disease.–Lack of knowledge of the sand fly, its behaviour and activities could be the reason why various preventive practices were not effective despite being utilised by community members. In this study, heads of the households were selected as the study subjects because they have the decision-making capacity for the household. In the traditional African social context, in most situations the eldest male member of the household holds this responsibility. To obtain household and community participation to make a disease control programme successful, understanding of such local customs and traditions is very important. Understanding of the level of awareness and its related attitude and practices about kalaazar of the community can be the key to the success of the prevention, control and elimination programmes. The current study results shows that Kalaazar control activities are presently restricted to vector control, in the form of households using bed nets, households spraying their houses with insecticides, households observing personal hygiene, using sterilised water, proper waste disposal, use of window mesh and treatment of kalaazar cases in health facilities. The vector borne disease control programmes primarily rely on controlling the vector; diagnosis and treatment that have often been overlooked have the importance for the target population (7). Irregular drug availability and less qualified staff to treat Kalaazar, compounded with financial burden on treatment at peripheral level have been reported (8,9).

In conclusion, the perception from the household heads that the leishmaniases patient be isolated and fear of death as the major reason of seeking for treatment should be taken seriously. There is need to educate the community on the disease prevention and importance of treatment to lessen fear among the people**.** There is need for intensive training of the community on the appropriate leishmaniases prevention practices and sand fly behaviours including appropriate use of insecticide treated bed nets. The use of repellants, spraying the houses with insecticides and use of bed nets was reported by the study participants to be effective prevention methods. The government and nongovernmental organizations should facilitate purchase, distribution and sustained use of impregnated bed nets.

ACKNOWLEDGEMENTS

To appreciate the support of Baringo County government for allowing us to access Marigat Sub-County. We are indebted to the Director, ITROMID-KEMRI for providing the logistical support for the study. Also i acknowledge Mr. Samuel Mongare (JKUAT) and Dr. Philip Ngumbi (KEMRI) for their encouragement and support when things seemed to be tough. I appreciate Rachael, my wife, and Michael, our son, for perseverance and moral support during the research period.

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