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Full Length Research Paper

Community's knowledge, attitude and practices toward malaria and mosquito behavior in Abeshige Woreda, Gurage Zone, Southern Ethiopia

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Community Knowledge about malaria and mosquito behavior is critical for successful malaria intervention, appropriate treatment, prevention and control measures. Thus, this study aimed to assess knowledge, attitude and practices of the community towards malaria and mosquito behavior in Abeshige Woreda, South west Ethiopia. A community-based cross-sectional study was conducted in Abeshige Woreda from February to March 2017. A total of 384 individuals were interviewed to assess their knowledge, attitude and practices about malaria. Systematic random sampling was used to select the individuals in the sample. Data were collected by an interview based on structured questionnaire after pre-tested. Data was entered and analyzed using SPSS version 16.0 soft ware. Most of the respondents (86.2%) believed that mosquito bite was responsible for malaria transmission. However, more than 14% of respondents mentioned hunger, exposure to cold weather, and sleeping with malaria patient as the causes of malaria. Feeling cold/shivering (76.8%), headache (70.1%), to be the most common signs and symptoms of malaria mentioned by respondents. All (100%) of the respondents mentioned that stagnant water as common breeding site of mosquito. About 81.5% of respondents reported that mosquito bite human during sleeping time. All of respondents claimed that they possessed at least one insecticide-treated nets (ITN), thus making the coverage of ITN, 100% in the area. Sleeping under ITN and using indoor residual spraying (IRS), cleaning environment are the most frequently applied methods for malaria prevention by respondents. All of respondents (100%) were believed that malaria is treatable disease and Chloroquine, Coartem, and Quinine were frequently mentioned anti-malarial drugs. A high level of knowledge about the cause, transmission and preventive methods of malaria was detected among the community in Abeshige woreda. However, a considerable proportion had misconception about transmission of malaria indicating the importance of health education to raise the community's awareness about the disease.

Key word: Knowledge, attitude, practice, malaria, mosquito behavior, Abeshige, Ethiopia.

INTRODUCTION

Malaria constitutes a major public health problem and impediment to socioeconomic development in Ethiopia. It is estimated that about 75% of the total area of the country (FMOH, 2007; Temam et al., 2017).

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According to WHO (2010) report, malaria is present everywhere in Ethiopia, except in the central highlands, and 56 million people are at risk. The disease is one of the country's leading health problems in terms of morbidity, mortality and impediment to socioeconomic development and top ranking in the list of common communicable diseases, consistently ranking in the top 10 causes of outpatient visits, admissions, and deaths at health centers and hospitals (FMOH, 2007).

According to Federal Ministry of Health of Ethiopia (2012), there are four major intervention strategies implemented to Prevent and control in the country. These are: early diagnosis and prompt treatment with the highly efficacious artemisinin-based combination therapies (ACTs), selective vector control (use of insecticide treated nets (ITNs)), indoor residual spraying (IRS) and environmental management. Though significant progress in the prevention and control for the last decades, malaria still one of the main public health issue in Ethiopia. Lack of public awareness on the cause, transmission and prevention methods and attitude and practice toward the use of ITNs have contributed to challenges of malaria prevention and control strategy in the country (Temam et al., 2017). Therefore, endorsing active community participation in malaria control and management through strengthening community based organizations and appropriate health education would be relevant to reduce the prevalence of malaria (Kimbi et al., 2014; Serengbe et al., 2015). Knowledge level of community is crucial for successful malaria intervention (FMOH, 2011).

In light this, several studies have conducted to assess communities knowledge, attitude and practices towards malaria among communities in different parts of the country (Zewdie and Molla, 2013; Andargie et al., 2013; Temam et al., 2015; Deresse et al., 2017). However, knowledge, attitude and practice of the community towards malaria is not investigated so far in the current study area. The feasibility of appropriately preventing occurrence of the disease is largely based on the available up dated data at each level. Gathering updated information have significant contribution in preventing and control of malarial. Hence, the current study gave emphasis to assess knowledge, attitude and practices of the community about malaria in Abeshige Woreda, Southwest Ethiopia, in order to provide up-to-date data for future management of the malaria in the study area.

MATERIALS AND METHODS

Study area

This study was conducted in Abeshige Woreda located in Gurage Zone, Southern Ethiopia. This woreda is located at 30 km from Wolkite Town, Administrative city of Gurage Zone, in the Southern Regional State, at an elevation of between 1910 to 1935 m above sea level. The annual rainfall and the annual mean temperature lies between 700 -1600 mm and 15-32°C, respectively. The agro-climate of the area consists of Dega, Weinadega and Kola, though weinadega covers the wider area in the Zone. Malaria transmission in Gurage Zone is unstable, seasonal and depends on altitude and rainfall. There are two main seasons for transmission of the disease; September to December, after the heavy summer rains, and March to May, after the light rains. The total population of the Woreda was estimated to be 72917 (37445 females and 35472 males) and 14881 households, with 5 family sizes on average. Most of the inhabitants practice agriculture based economy, particularly enset and chat are the main products.

Study design and population

A community-based cross-sectional study was conducted in Abeshige Woreda from February to March 2017. Study participants were heads of households, their spouses and adults whose age ≥15 years who had live in the study area as permanent resident for at least for six months.

Sample size calculation and sampling technique

Sample size of the study was estimated using statistical formula of sample size calculation $n=p(1-p)z^2/d^2$ (Daniel, 1995), where, n = required sample size, z=confidence level at 95% which is standard value of 1.96, p= estimated prevalence of intestinal parasite and d= marginal error at 5%, standard value of 0.05. Because there was no previous information on the level of the community awareness in the study areas, the expected population proportion (p) was taken to be is 50% and this gave the minimum sample size of 384.

Systematic random sampling was used to select the individuals in the sample by selecting one of the elements at random from sampling frame at the starting point, and then onward from this point, the rest sample was selected systematically by applying pre-determined interval of every fifth elements. Only one person per a household was included during the data collection.

Data collection

Information regarding socio-economic and Knowledge, Attitude and Practices about malaria was collected using standard structured questionnaire. The questionnaire was first written in English and translated into Amharic then native local language (Guragigna) of the study area. Ten percent of questionnaire were pre-tested via pilot study to check content validity, appropriateness, and question comprehensibility. Three health extension workers who had fluent in the local language were recruited from the study area to interview the study participants in their local languages. Data collectors were trained for two days regarding how to conduct interview, content of the questionnaire, and data quality. Completeness of the questionnaire was checked by the supervisor every day. Incomplete questionnaires was returned back to the data collector on the following day to revisiting the households and fulfill the remaining information.

Data analysis

Data were coded and entered in to SPSS-for windows version 16 for analysis. Frequency distribution tables were used to quantify socio-economic variables, knowledge, attitude and practices toward malaria prevention and control methods.

Ethical consideration

Informed written consents was obtained from all levels of the local

Table 1. Socio-demographic characteristics of the respondents in Abeshige Woreda, Southern Ethiopia, 2017.

Characteristics	Study Kebelles			
	Walga	Geraba	Gibe	Total
	No (%)	No (%)	No (%)	No (%)
Sex				
Male	44 (34.4)	41 (32.0)	39 (30.5)	124 (32.3)
Female	84 (65.6)	87 (68.0)	89 (69.5)	260 (67.7)
Age				
15-25	33 (25.8)	32 (25.0)	32 (25.0)	97 (25.3)
26-35	40 (31.3)	38 (29.7)	42 (32.8)	120 (31.3)
36-45	28 (21.9)	31 (24.2)	30 (23.4)	89 (23.2)
>45	27 (21.1)	27 (21.1)	24 (18.8)	78 (20.3)
Educational status				
Elementary	30 (23.4)	40 (31.3)	18 (29.7)	88 (22.9)
High school	19 (7.8)	16 (12.5)	22 (17.2)	57 (14.8)
College/University	13 (10.2)	8 (6.3)	17 (11.0)	38 (9.9)
Not learned	66 (51.6)	64 (50.0)	71 (55.5)	201 (52.3)
Occupation				
Farmer	87 (68.0)	89 (69.50	78 (60.9)	254 (66.2)
Trade	14 (10.9)	15 (11.7)	15 (11.7)	44 (11.5)
Government/NGO	17 (13.3)	12 (9.4)	19 (14.8)	48 (12.5)
Daily labor/other	10 (7.8)	12 (9.4)	16 (12.5)	38 (9.9)
Source of drinking water				
Tap water	116 (90.6)	119 (93.0)	111 (86.7)	346 (90.1)
River/Stream	12 (9.4)	9 (7.0)	17 (13.3)	38 (9.9)
Sanitary Facility				
Traditional pit latrine	109 (85.2)	105 (82.0)	114 (89.1)	328 (85.4)
No facility/bush/field	19 (14.8)	23 (18.0)	14 (10.9)	56 (14.6)

government before data collection, and from individual respondents during data collection. Meetings with the community health workers, leaders was held to create a good image on the objectives of the study. The respondents were given the right to refuse to take part in the study as well as to withdraw any time during the interview. Verbal consents was obtained from individual respondents during data collection. Privacy and confidentiality was maintained throughout the study.

RESULTS

Socio-demographic Characteristics

A total of 384 individual were participated in this study. Most of the respondents were females (67.7%), aged 26-35 years (31.3%), illiterate (52.3%). Majority of the respondents were farmers (66.2%) followed by Government/NGO employee (12.5%). Tap water (90.1%) was the major source of drinking water and traditional pit latrine coverage was 85.4% (Table 1).

Knowledge and attitude toward transmission and severity of malaria

Most of the respondents (86.2%) believed that mosquito bite was responsible for malaria transmission. However, about 23.2 and 15.6% of respondents associated the cause of malaria with hunger/empty stomach and exposure to cold respectively. About 91.9 and 78.9% of participants identified children and pregnant women as the most susceptible groups of the population in communities to malaria (Table 2).

Knowledge of sign and symptoms of malaria

Feeling cold/shivering (76.8%), headache (70.1%), thirsty

Table 2. Knowledge and Attitude of respondents towards transmission and Severity of malaria, Abeshige Woreda, Southern Ethiopia, 2017.

Variable	Frequency	Percentage
Transmission of malaria		
Mosquito bite	331	86.2
Staying/sleeping with malaria patient	13	3.4
Exposure to dirty swampy water	170	44.3
Hunger/empty stomach	89	23.2
Exposure to cold	60	15.6
Severity of malaria to different population group		
More serious to children	353	91.9
More serious to pregnant women	303	78.9
More serious to Adult/elderly	86	22.4
Equally serious to all	69	18

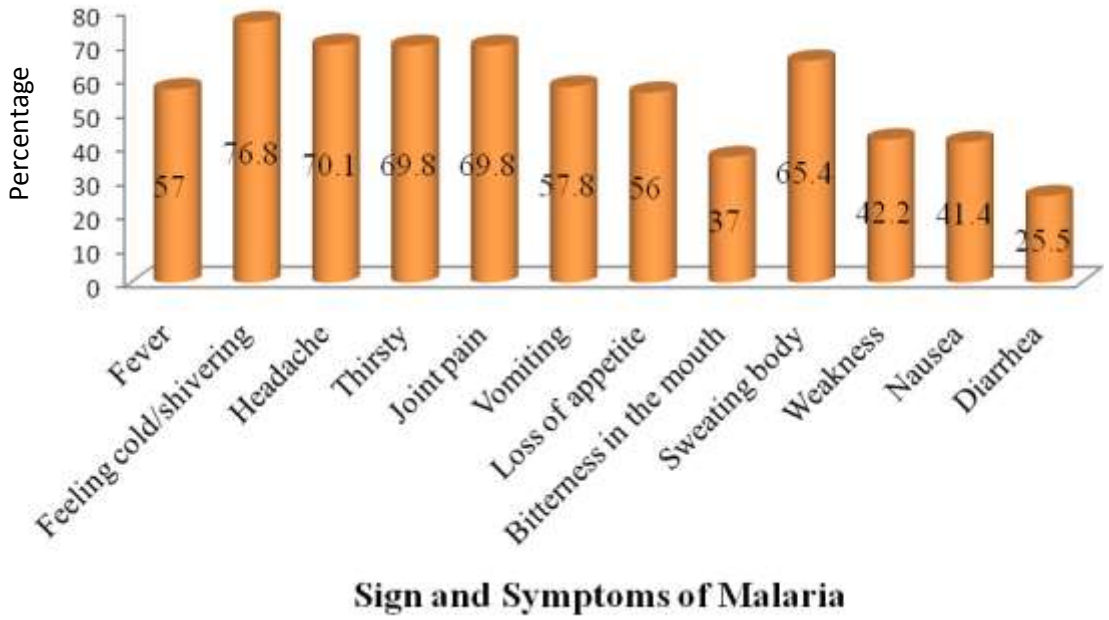

Figure 1. Knowledge of respondents towards Sign and Symptoms of malaria, Abeshige Woreda, Southern Ethiopia, 2017.

and joint pain (69.8%) were frequently mentioned manifestations of malaria by respondents (Figure 1).

Practices of respondents to protect from malaria and mosquito bite and limit mosquito population

Sleeping under ITN (100%) and using IRS (63.3%) are the two most frequently applied methods for malaria prevention by respondents. Using bednet (100%), cleaning environment (73.4%) and insecticide spraying (53.7%) were most frequently mentioned methods to protect from mosquito bite (Table 3). Removal of water collected in ditches (94.4%) is the most mentioned measurement taken by respondents to limit mosquito population (Figure 2). However, the study revealed that about 3.7% of the respondents do not take any measurement.

Knowledge of respondents toward mosquito behavior

Three hundred eighty four (100%) of the respondents

Table 3. Practices of respondents to prevent from malaria and Mosquito bite, Abeshige Woreda, Southern Ethiopia, 2017.

Variable	Frequency	Percentage
Protection from malaria		
Taking precaution to prevent mosquito bite	234	60.9
Sleeping under ITN	384	100
Breeding site avoidance	65	16.9
Using IRS	243	63.3
Eating garlic	66	17.2
Smoking in the house	71	18.5
Keeping personal hygiene	192	50
Protection from mosquito bite		
Using a bednet	384	100
Cleaning environment	282	73.4
Insecticide spraying	206	53.7
Plastering the wall/floor	95	24.7
Keeping away domestic animals/pets	195	50.8
Making smoke	98	25.5

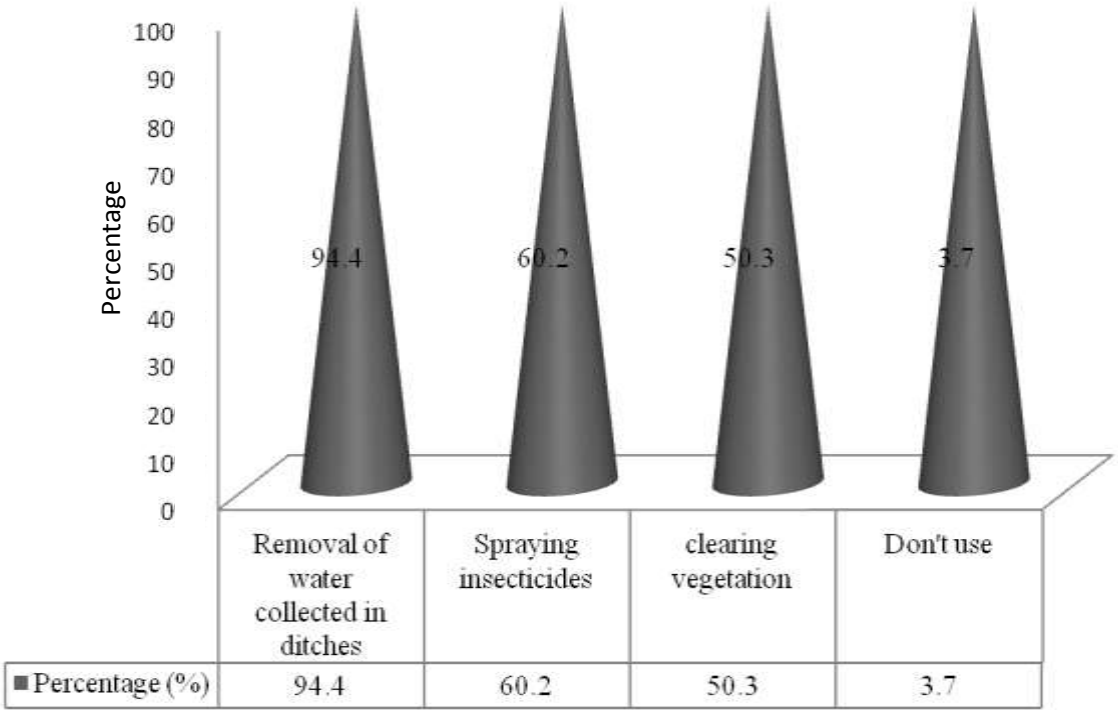

Figure 2. Measurement taken by respondents to limit Mosquito Population, Abeshige Woreda, Southern Ethiopia, 2017.

mentioned that stagnant water as common breeding site of mosquito. About 81.5% of respondents reported that mosquito bite human during sleeping time. However, none of the respondents mentioned that mosquito could bite human during the day time. Further, respondents knowledge on resting site of mosquito during day time

Table 4. Knowledge and Attitude of Respondents About Mosquito behavior, Abeshige Woreda, Southern Ethiopia, 2017.

Variable	Frequency	Percentage
Common breeding site of mosquito		
Animal Shed	245	63.8
Stagnant Water	384	100
Rotten things	74	19.3
Biting time of mosquito		
Night time/before sleeping	108	28.1
Morning	52	13.5
Dusk/when you are sleeping	313	81.5
Day time	0	0
Resting site of mosquito during day time		
Dark corner of the house	318	82.8
Inside the Bushes	268	69.8
In different materials of the house	88	22.9

were assessed. Accordingly, dark corner of the house (82.8%) is the most frequently reported resting site of the mosquito by respondents (Table 4).

ITN Possession and Utilization by the community

All of respondents claimed that they possessed at least one ITN, thus making the coverage of ITN, 100% in the area. Further inquiries revealed that in 51.0% of the households, one and 44.0%, two used ITN were observed. Health extension worker (96.1%) followed by Woreda Health office (70.6%) are frequently mentioned sources of ITN in the houses. Two hundred thirty (59.9%) of respondents reported that they ever washed their net. From those practiced washing the net, 33.0% washed when it was dirty and 30.4% every six month (Table 5). Further, the study assessed respondents' time of using, preferred shape and color of ITNs. Accordingly, most of respondents (66.9%) used ITN during the night. Conical (66.4%) and Blue (54.7%) are the most preferred shape and color of ITNs by respondents (Table 6).

Awareness of respondents about insecticide treated mosquito nets

All of the respondents have awareness about insecticide treated mosquito nets. The respondents further asked about the number of months ago the net was treated. About 43.2 and 26.8% of respondents replied that the net was last treated 1-2 and 3-4 number of months ago respectively. About 30.0% of them do not know/recall the number of months ago net was last treated. Kills mosquitoes (82.8%), children is more protected (77.1%), and works better against mosquitoes than untreated net (71.6%) are most frequently forwarded advantages of sleeping under treated mosquito net for children under five and pregnant women (Figure 3). Further, the study inquired the respondents about disadvantage of sleeping under treated mosquito net for children under five. Accordingly, the chemical of the net is danger (68.2%), child might chew/suck net (60.2%) and smell of net is bad were most frequently revealed disadvantages of sleeping under treated mosquito net (Figure 4).

Insecticide residual spraying (IRS) utilization in the community

From total respondents, 66.4% used IRS in their houses for prevention of malaria. The local government (100%) is the only source of the spraying in the households. Those respondents used IRS were further asked how many times they sprayed their houses. About 55.7 and 44.3% of them reported that they spray their houses one time per year and two-three times per year respectively. Among 129 (33.6%) respondents who did not utilized IRS, service unavailable in the area (36.4%) and householders not at home at the time of IRS program (63.6%) were the reasons for their houses not sprayed with IRS.

Treatment seeking behavior of the community to malaria

All of respondents (100%) were believed that malaria is treatable disease. About 96.4, 77.6, and 58.6% of respondents mentioned that Chloroquine, Coartem, and

Table 5. Respondents' response about source, number and washing frequency of ITNs in the house, Abeshige Woreda, Southern Ethiopia, 2017.

Variable	Frequency	Percentage
Source of ITN in the house		
Health extension worker	369	96.1
Woreda health office	271	70.6
Health center	64	16.7
Kebelle office	23	6
Number of ITN per household		
Household with at least one ITN	196	51
Household with at least two ITN	188	49
Household with no ITN	0	0
Number of total used ITNs observed in the households		
One	196	51
Two	169	44
Three	19	5
Net ever washed		
Yes	230	59.9
No	154	40.1
Net washing frequency		
About every six month	70	30.4
About every three month	26	11.3
About once a month	5	2.2
When it is dirty	76	33
Not at all	53	23

Quinine were the anti-malarial drugs, respectively. Despite this, about 3.6% did not know any kind of anti malaria drug.

DISCUSSION

In present study, most of the respondents (86.2%) reported that mosquito bite was responsible for malaria transmission. Comparable result was reported from study conducted in Gamo Gofa Zone (83.7%) (Temam et al., 2017). This awareness is lower than the level reported in Shewa Robit (95.6%), Northeastern Ethiopia (Andargie et al., 2013), India (97%) (Suhas et al., 2015). But higher than study reported from Areka Town (75.1%), Southern Ethiopia (Deresse et al., 2017), Amahara National regional state (32.3%), Northern Ethiopia (Zewdie and Moll, 2013), Bagamoyo district (63.2%), Tanzania (Deborah et al., 2016). The difference might be due to variation in accessibility of house-to-house health extension services focuses on information, education and communication or behavioral change communication in the study areas.

Though majority of the respondents associated the cause of malaria with mosquito bite, more than 14% of respondents mentioned hunger, exposure to cold weather, and sleeping with malaria patient as the causes of malaria. Such misunderstandings have also been reported by different studies (Yared et al, 2007; Safari et al., 2010; Andargie et al., 2013; Serengbe et al., 2015). Even though the belief of the community that exposure to cold weather and hunger as direct causes of malaria seem incorrect, the idea may stem from the occurrence of other related factors with stated condition which could be risk factors for malaria. For instance, cold and cloudy weather could be related to the presence of mosquito breeding sites (Andargie et al., 2013; Alemayehu et al., 2015).

Thus, malaria transmission could be accelerated in cold weather during winter seasons Kebede *et al*., 2005). In addition, hunger could also lead to poor nutritional status which might make individuals more susceptible to malaria (Ayele et al., 2012). These misperception of the study participants on direct causes of malaria could influence the actual prevention mechanism in the area. Hence, appropriate health education which could bring

Table 6. Respondents' response towards time of using, preferred shape and color of ITNs, Abeshige Woreda, Southern Ethiopia, 2017.

Variable	Frequency	Percentage
Time of using ITNs		
Night	257	66.9
Evening	154	40.1
Day time	81	21.1
Any time	153	39.8
Respondent's who preferred each shape of ITNs		
Rectangular	188	49
Conical	255	66.4
Rectangular/conical	209	54.4
Respondent's who preferred each color of ITNs		
White	53	13.8
Green	35	9.1
Blue	210	54.7
Any color	86	
ITNs hang at the time of interview		
Blue	281	73.2
White	103	26.8

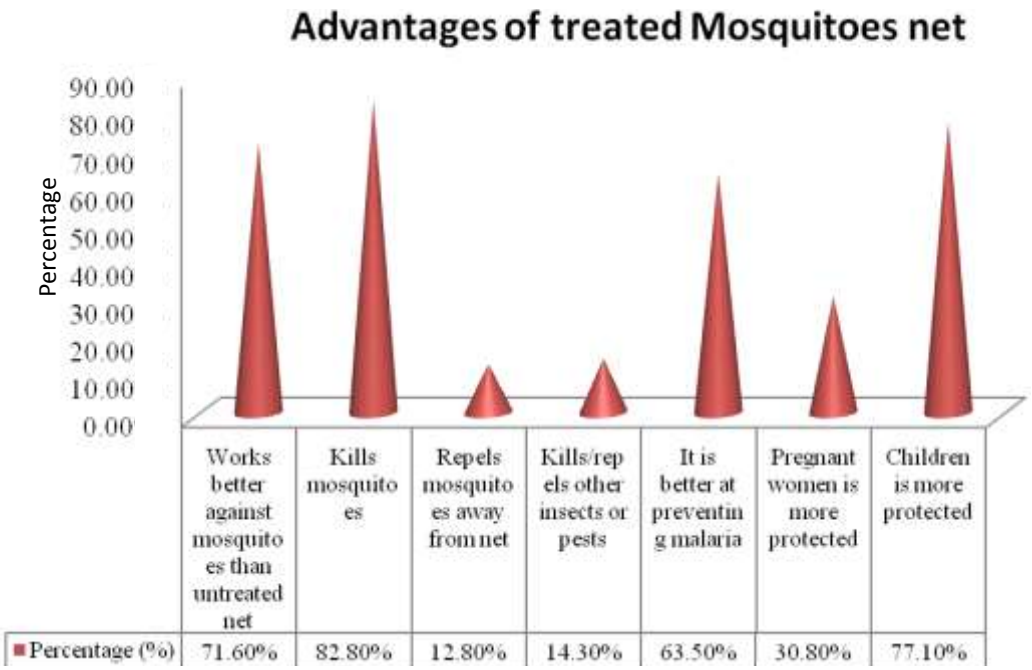

Figure 3. Advantages of sleeping under treated Mosquito net for child under five and pregnant women, Abeshige Woreda, Southern Ethiopia, 2017.

behavioral change in the community should be applied. In Ethiopia, regular practice of creating awareness in communities about health issues through health extension workers has started in recent years. Furthermore, Dickson et al. (2011) reported that health education brought better understanding and awareness on the

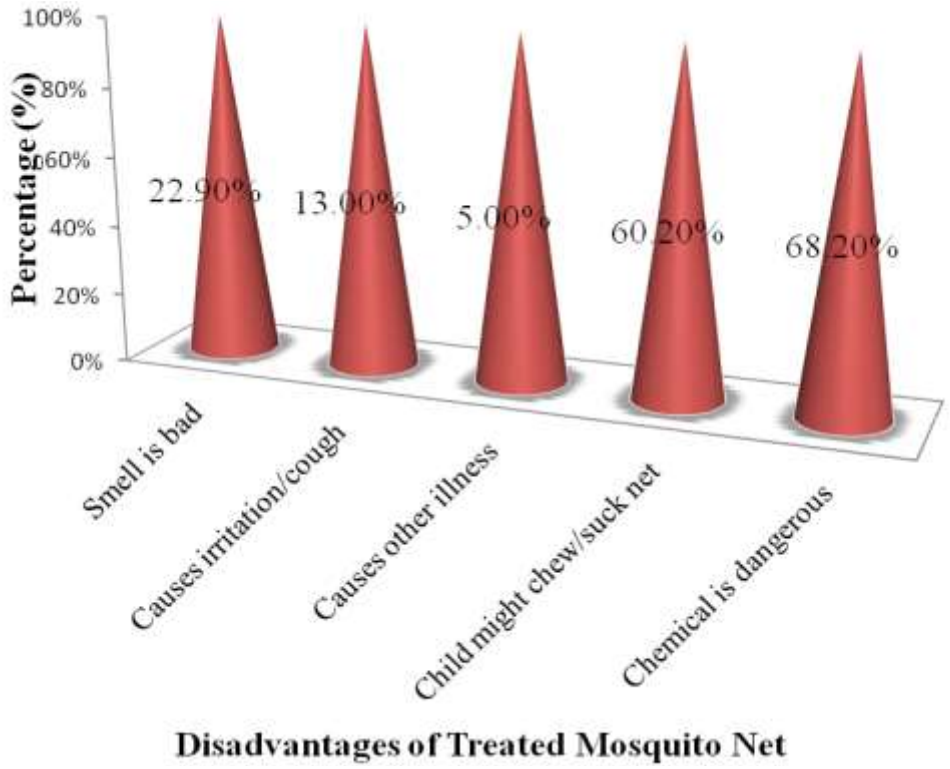

Figure 4. Disadvantage of sleeping under treated Mosquito net for child under five, Abeshige Woreda, Southern Ethiopia, 2017.

causes of malaria in communities.

In this study, feeling cold/shivering (76.8%), and headache (70.1%), to be the most common signs and symptoms of malaria. This finding is lower when compared to the finding from Areka Town where (93.6%) of the study participants identified fever, headache, chills, sweating and malaise to be the most common signs and symptoms of malaria (Deresse et al., 2017), in Pawe District, North West Ethiopia, in which 83% of the respondents stated headache as the most common symptoms associated with malaria (Beyene et al., 2015) and study from Shewa Robit town, Northwestern Ethiopia, where chills and headache were mentioned as symptoms of the disease by 93.3 and 84.5% of the respondents, respectively Andargie et al., 2013). This finding is higher when compared to the finding from Nigeria, where 65.2% of respondents mentioned fever with shivering as the common symptoms of malaria (Singh et al., 2014).

In the present study, about 81.5% of study participants responded that mosquitoes bite human during night/sleeping time. This finding was comparable with the study conducted in Shewa Robit (83.8%) (Andargie et al., 2013). However, this finding is higher than the study conducted in Gamo Gofa Zone (61.7%), Southern Ethiopia (Temam et al., 2017) and Amahara National regional state (48%), Northern Ethiopia (Zewdie and Molla, 2013). Therefore, this level of perception among respondents in this study is encouraging to take appropriate preventive measures and proper use of mosquito nets. Among breeding site, all of respondents (100%) mentioned that stagnant water as common breeding site of Mosquito which is higher than reported from Gamo Gofa Zone (34.0%), Southern Ethiopia (Temam et al., 2017), Shewa Robit (91.6%) (Andargie et al., 2013), and Amahara National regional state (72.6%), Northern Ethiopia (Zewdie and Molla, 2013). This awareness of the respondents in current study area, could help to the community to take measurements to avoid breeding of malaria vector. consequently, removal of water collected in ditches is the most mentioned measurement taken by respondents to limit mosquito population. Knowledge of mosquito behavior (resting, breeding places, and feeding time) is important to take appropriate malaria preventive actions and for the proper use of ITNs (Yared et al., 2007).

In current study, all of respondents claimed that they possessed at least one ITN, thus making the coverage of ITN, 100% in the area. Hence, sleeping under ITN is the most frequently applied methods for malaria prevention by respondents. This is comparable with the report from Kolla Tembien district (97.55%), Tigray, Northern Ethiopia (Zewdneh et al., 2011), and Shewa Robit Town (94.7%), Northeastern Ethiopia (Andargie et al., 2013) in

which respondents agreed on the fact that use of ITN can prevent malaria transmission, but higher when compared with studies from different parts of Ethiopia (Zewdie and Moll, 2013; Terefe et al., 2015).

The high possession of ITNs in this study area, might be that as the majority of the nets were obtained freely through the local health authorities, and the net owners might have been provided with appropriate health information regarding the use of ITNs during the provision of the nets. The presence of health extension workers in all the studied kebeles, could be another possible explanation. The study participants also practiced environmental management (drainage of mosquito breeding sites, clearing vegetables) and insecticide spraying activities as preventive measures for malaria. Similar community activities reported from Shewa Robit Town (Andargie et al., 2013), Gamo Gofa Zone (Temam et al., 2017), Areka Town (Deresse et al., 2017), Jimma Town (Alemayehu et al., 2015), India (Suhas et al., 2015).

Furthermore, the government of Ethiopia is undertaking control measures, including distribution of ITN and residual spraying of houses with insecticides in different regions of the country (FMOH, 2012). All of respondents (100%) were believed that malaria is treatable disease and Chloroquine, Coartem, and Quinine were frequently mentioned anti-malarial drugs. This result agrees with study conducted in Northern Ethiopia (Zewdie and Moll, 2013) and Areka Town, Southern Ethiopia (Deresse et al., 2017).

Despite this, about 3.6% of respondents didn't know any kind of anti malaria drug. This attitude of respondents in the current study area, could help the achievement of the national target to treat 100% of positive malaria diagnosis according to national guidelines. Ethiopia has a target of 100% access to effective and affordable malaria treatment by use of the highly efficacious artemisinin-based combination therapies (ACTs) that are accessible at health facilities across the country (FMOH, 2012).

Conclusion

In the current study area, the overall communities' knowledge about malaria was found to be high. Awareness on symptoms of malaria and use of mosquito net as protective measure against mosquito bite is also fair. But, there are still some misconceptions regarding on direct cause of malaria. Thus, it is recommended that the local Woreda health office as well as community health workers need to further strengthen public awareness creation about malaria and mosquito behavior.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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REFERENCES

Alemayehu G, Desta A, Kabaye K (2015). Assessment of Knowledge and practice of the community towards malaria and its treatment in Jiren Kebele, Jimma Town Oromia, Ethiopia. Advance Pharmacology and Pharmacy 3(2): 23-29.

Andargie A, Abraham D, Berhanu E (2013). Community knowledge, attitude and practice about malaria in a low endemic setting of Shewa Robit Town, Northeastern Ethiopia. BMC Public Health 13(312):1-8.

Ayele DG, Zewotir TT, Mwambi HG (2012). Prevalence and risk factors of malaria in Ethiopia. Malaria Journal 11(1):195.

Beyene HB, Telele NF, Mekuria AH (2015). Knowledge, attitude and practice on malaria and associated factors among residents in Pawe District, North West Ethiopia: A cross-sectional study. Science Journal of Public Health 3(3):303-309.

Daniel W (1995). Biostatistics a foundation for analysis in the health science. In: Statistical analysis (6th ed.), New York: John Willey and sons Inc, USA. P 155.

Deborah S, Angel D, Vitalis N, Joseph PM, Paul SG (2016). Knowledge, attitudes and practices on malaria in relation to its transmission among primary school children in Bagamoyo district, Tanzania. Malaria World Journal 7(2).

Deresse L, Desalegn T, Betelhem E, Fanuel B (2017). Knowledge, attitude and practice towards malaria and associated factors in Areka Town, Southern Ethiopia: Community-Based Cross-Sectional Study. Journal of Tropical Diseases 5(3):1-11.

Dickson SN, Anna LN, Henri LFK, Jules CNA, Charles SW, Sarah MN, Alfred KN (2011) Knowledge and practices relating to malaria in Ndu community of Cameroon: Signs and symptoms, causes and prevention. Journal of Public Health and Epidemiology 3(6):294-300.

Federal democratic Republic of Ethiopia Ministry of Health (FMOH) (2007). Entomological Profile of Malaria in Ethiopia.

Federal democratic Republic of Ethiopia Ministry of Health (FMOH) (2011). Ethiopia National Malaria Indicator Survey technical Summary, Ethiopia.

Federal Democratic Republic of Ethiopia Ministry of Health (FMOH) (2012) National Malaria Guidelines. Addis Ababa, Ethiopia.

Kebede A, Mccann JC, Kiszewski AE, Ye-ebiyo Y (2005). New evidence of the effects of agro-ecologic change on malaria transmission. The American Journal of Tropical Medicine and Hygiene 73(4):676-680.

Kimbi KH, Nkesa SB, Ndamukong-Nyanga JL, Sumbele IUN, Atashili J, Atanga MBS (2014). Knowledge and perceptions towards malaria prevention among vulnerable groups in the Buea Health District, Cameroon. BMC Public Health 14(1):883.

Safari MK, Fabian M, Joseph RM, Soori EN, Godfrey MK, Robert M, Coleman K, Stephen M, Leonard EGM (2010). Knowledge, attitudes and practices about malaria among communities: Comparing epidemic and non-epidemic prone communities of Muleba district, North-western Tanzania. BMC Public Health 10(1):395.

Serengbe GB, Moyen JM, Fioboy R, Beyam EN, Kango C, Bangue C, Manirakiza A (2015). Knowledge and perceptions about malaria in communities in four districts of the Central African Republic. BMC Research Notes 8(1):162.

Singh R, Musa J, Singh S, Ebere UV (2014). Knowledge, attitude and practices on malaria among the rural communities in Aliero, Northern

Nigeria. Journal of Family Medicine and Primary Care 3(1):39.
Suhas K, Ambadas A, Balu M, Shrikant K, Thirumugam M, Ravindra K, Sushil P (2015). knowledge, attitude and practices of people towards malaria in tribal communities of Jawhar, Maharashtra, India. International Journal of Current Research and Review 7(18):25.
Temam A, Nuredin N, Awel A (2017). Community knowledge, attitude and practice about malaria and mosquito biting behavior in Southern Ethiopia. American Journal of BioScience 5(5):80.
Terefe GF, Samuel YA, Fiseha LG (2015). Assessment of knowledge, attitude and practice about malaria and ITNs utilization among pregnant women in Shashogo District Southern Ethiopia. Malaria Journal 14(1):235.
World Health Organization (WHO) (2010). The world malaria report 2010. Switzerland, Geneva.
Yared L, Ayalew T, Tefera B, Kora T (2007). Knowledge, attitude and practice about malaria transmission and its preventive measures among households in urban areas of Assosa Zone, Western Ethiopia. Ethiopian Journal of Health Development 21(2):157-165.
Zewdie A, Molla G (2013). Knowledge, attitude and practice of the community towards malaria prevention and control options in anti-malaria association intervention zones of Amahara National Regional State, Ethiopia. Global Journal of Medical Research 13(5):12-34.
Zewdneh T, Tadesse D, Dawit K (2011). Knowledge, attitude and practice about insecticide treated net usage against malaria in Kolla Tembien District, Tigray, Ethiopia. Momona Ethiopian Journal of Science 3(2):64-77.

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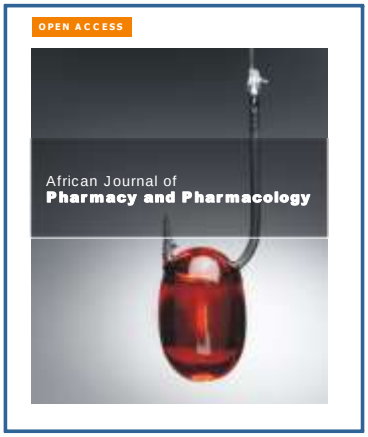

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