Knowledge of malaria prevention and control methods and associated factors among rural households in West Belesa district, North West Ethiopia, 2019.

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Research article

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Abstract

Introduction: In Ethiopia malaria is one of the top ten leading causes of morbidity and mortality. The two major malaria prevention services implemented in Ethiopia are targeted Indoor Residual Spray (IRS) with insecticides and distribution of Long Lasting Insecticidal Nets (LLIN). Community knowledge towards prevention and control methods had been proven to play important role for the implementation of effective and sustainable interventions against malaria. This information is limited in the study area regarding to knowledge and practice on malaria prevention and control. This study aimed to assess knowledge towards malaria prevention and control methods and its associated factors among households in West Bellessa district, 2019.

Methods: Community based cross-sectional mixed quantitative and qualitative study was conducted from April to June 2019 in West Bellessa district, Amhara region, North West Ethiopia. Multistage sampling was used to select an estimated sample size of 770. Pretested structured questionnaire was used for the quantitative component and semi-structured questionnaire for qualitative one. Quantitative data were coded and entered using Epi info software version 7 and exported to SPSS version 20 for analysis. Binary logistic regression model was fitted to identify the associated factors. Odds Ratio (OR) with 95 % Confidence Interval (CI) was used to assess the strength of association. The qualitative data transcribed manually in thematic approach.

Result: A total of 770 subjects were included in this study with 99.5% response rate. Of the total respondents 75.6% had good compressive knowledge about malaria prevention measures. Poorest wealth quintiles [AOR= 0.40, 95% CI: 0.23, 0.73], poor wealth quintiles [AOR= 0.38, 95% CI: 0.21, 0.70], and medium wealth quintiles [AOR= 0.41, 95% CI: 0.22, 0.75], living in Menti Kebele [AOR= 3.01, 95% CI 1.87, 5.15], living in Abay tera kebele [AOR= 2.03, 95% CI 1.23, 3.34] were significantly associated with compressive knowledge about malaria prevention control.

Conclusion: In overall there was relatively high knowledge of malaria prevention and control measures. There was decrement in the effect of LLIN and IRS as compared with the previous brands. Wealth index and respondents living kebele are predictors for malaria prevention knowledge of malaria.

Introduction

Malaria is one of the leading causes of morbidity and mortality in the world. In 2016, there were a total of 216 million reported cases and 445,000 deaths worldwide(1).

In Ethiopia malaria is one of the top ten leading causes of morbidity and mortality. (2) Approximately 60 percent of Ethiopia's population lives in malarious areas, and 68 percent of the country's landmass is favorable for malaria transmission.(3) Ethiopia has been reported 1,530,739 malaria cases and 356 malaria deaths in 2017.(4) Ethiopia had planned to achieve near zero malaria deaths and to eliminate malaria in selected low transmission areas by 2020. So as to eliminate malaria in the country by 2030.(5) To

achieve these goals the first option is vector monitoring and controlling through Entomological monitoring and insecticide resistance management.(5)

The recommended vector-control operations are effective coverage long lasting insecticide-treated bed nets, and targeted communication about their usage, and/or regular application of indoor residual spraying with insecticides.(6) Other vector control activities including larval control through environmental management and chemical larviciding, are also practiced in areas where such interventions are appropriate and expected to have significant impact.(7)

Knowledge of communities contributes immensely to sustainable control of endemic diseases such as malaria.(8) FMOH of Ethiopia targeted by 2020, all households living in malaria endemic areas will have the knowledge towards malaria prevention and control.(7, 21)

The Ethiopian national malaria indicator survey report shows that 63% and 77% of the respondents knew that LLIN as malaria prevention tool in 2011 and 2015 respectively.(7) In different literatures there are factors which can affect individual's knowledge towards malaria prevention and control methods. Among socio demographic variables individuals' resident, educational status and wealth quantile are associated factors with malaria prevention and control knowledge.(10-12)

Now a days, there is no effective vaccine or no effective drug for mass chemoprophylaxis against malaria. Thus, proper know-how of prevention methods is crucial. In Ethiopia, despite the intense activities pertaining to the distribution of LLINs, performing indoor residual spraying and provision of anti-malarial drugs free of charge, malaria is still major community problem and many questions about malaria remain unanswered. These includes, the extent to which people are aware of the benefit of LLINs and IRS the value they give them.(13) So this study was aimed to assess knowledge of malaria prevention and control methods and associated factors among rural households in west Belesa district 2018.

Methods And Materials

Study design and Setting

Community based cross-sectional mixed quantitative study and qualitative study was conducted from April to June 2019. This study was conducted in West Bellessa district which is found in Central Gondar Zone of Amhara Regional State, North West Ethiopia. West Belesa is, situated at altitude of 1501 to 3000 meters above sea level. High Rainfall is registered from June to August with shortage and heavy rain intermittently. The mean monthly temperature is 33.5⁰c. There are mountainous, lowlands and water bodies including a known river Mena. The district has 3 climatic zones which are kola (hot zones)

60%, dega(cold zones) 35%, and weyna dega (moderate zones) 5%. From the total district kebeles 92.9% are malarious. In 2019 the estimated total population of the district was 197,326.

Study population and sampling technique

The source population for this study were all households in 23 malarious kebeles of rural West Belesa district and the study population were all households in 5 selected malarious kebeles of the rural District. The sample size for the survey was determined using a single population formula. We used the proportion of knowledge towards malaria prevention methods (64.8%)(14), 95% CI, and margin of error of 0.05 Finally 350 has been calculated. By adding 10% non-response and design effect 2 the final sample size became 770. Kebeles were selected by simple random sampling. The sample size was distributed to each kebeles with proportional allocation of households. The households were selected for interview by systematic sampling method.

Data Collection Methods and data quality control

The questionnaire was adopted from the 2004 WHO/UNICEF guidelines for core population coverage survey(15) with some modification. Originally prepared in English and then translated in to local language (Amharic) then back to English to ensure reliable information. Twelve enumerators who had graduated from college were recruited and trained for one day, about purpose of the study, how to approach respondents and obtain oral consent as well as overview about malaria and its prevention methods. Completeness of questionnaires were checked every day. Incomplete questionnaires were returned to the data collectors on the following day for correction by re-visiting the households. Pre-testing was conducted in one of the malarious kebeles out of the study area.

A total of 4 focus group discussion were conducted in 4 kebeles (Abay tera, Kalay, Aswagari and Menti kebeles). Participants with full of information about malaria and its prevention were selected for the discussion by using health extension workers as key informant in each kebele. The focus group discussions had 6 to 10 participants in each group. The focus group discussions comprised 30 study participants. Focus group discussion was conducted by recording sounds and taking notes. Sound recording were used to recall some issues that was missed during note taking. The selected interviewees were expected to answers the semi-structured questionnaires which was containing about issues of knowledge and practices about malaria and its prevention and control methods one by one.

Variables of the study

Knowledge about malaria prevention and control was dependent variable of the study which was defined as **knowledge**: A study participant who scored above or equal to the

median score of knowledge questions were considered as having good knowledge and others considered as having poor knowledge.(16) Age; sex, marital status, occupation, religion, ethnicity, address, level of education, family size, educational status and wealth index, crowdedness are independent variables.

Data processing and Analysis

Quantitative data entered and coded using Epi info version 7 and exported to SPSS version 20. Variables were analysed using logistic regression in SPSS to determine the association between the variables determined by looking at the level of significance of 0.05 with a 95 % Confidence Interval (CI). Qualitative data was transcribed in the original language of interview first word by word from the audio tapes and field notes, then it was translated to English for analysis. Primary theme was produced through manual coding using pen of different colors, then it was pooled into broader concepts to form main themes. Finally, the result was supplemented with that of the quantitative one.

Ethical Consideration

Approval to carry out the study was sought and obtained from University of Gondar Ethics Review Board (ERB). Verbal consent was obtained from all study participants after a detailed explanation of the purpose of the study.

Results

Socio-demographic characteristics

A total of 766 households were participated in a study with response rate of 99.5%. Out of a total participants 419 (54.7%) were male, the mean age of the respondents was 40.6 (SD= $\pm$ 12.23) years. Almost all of the respondents 760 (99.2%) were orthodox Christian, and majority of the respondents 691(90.2%) were married. Concerning educational status majority 672 (87.7%) of the participants from the surveyed households were illiterate.

About half 373 (48.7%) of the respondents living houses had 2 sleeping places and the mean sleeping place per household was 1.64 (SD $\pm$ 0.75). Economic status of the respondents were assessed in wealth index showed, 18.8%, 20.5%, 18.9%, 19.1% and 22.7% of the respondents ranked as wealthiest, wealthy, medium, poor and poorest respectively.(Table 1)

Table 1: socio demographic characteristics of respondents for knowledge towards malaria prevention in West Belesa, Amhara region, Ethiopia, 2019.

Variable	N=766	Frequency	percent
Age	18-24	50	6.5
	25-34	199	26
	35-44	242	31.6
	45-54	173	22.6
	55-64	70	9.1
	>64	32	4.2
Sex	Male	419	54.7
	Female	347	45.3
Religion	Orthodox	760	99.2
	Others	6	0.8
Educational status	Illiterate	672	87.7
	Literate	49	6.4
	Formal education	45	5.9
Marital status	Married	691	90.2
	Divorced	26	3.4
	Not married	36	4.7
	Widowed	13	1.7
Number of sleeping spaces	1	373	48.7
	2	318	41.5
	≥3	75	9.8
Wealth index	Poorest	174	22.7
	Poor	146	19.1
	Medium	145	18.9
	Wealthy	157	20.5
	wealthiest	144	18.8

Knowledge of Malaria prevention and control

In this study majority (93.2%) of the study participants heard an information about malaria. Of those majority 48.1% got the information from health professionals. ([Fig 1](#))

According to the FGD discussion malaria was known as Weba or Nidad in West Belesa interchangeably. These were most commonly used terms in the study area. Majority of the respondents (94.6%) believe that malaria is preventable disease. Regarding to the specific type of malaria preventive measures most frequently mentioned prevention methods were

LLINs (84.7%) and IRS (83.7%) and the least frequently mentioned prevention methods was fumigation or smoking in the house (1.8%). With regard to the knowledge of mosquito breeding sites, most of (87.8%) the respondents mentioned stagnant water as breeding site for malaria. Most of the respondents (97.9%) mentioned that mosquito bites at night time and among the respondents about half (45.9%) of them mentioned that at day time mosquito rests in unclean vegetation. **(Table 2)**

Table 2: Malaria prevention knowledge of study participants in West Belesa, Amhara region, Ethiopia, 2019.

		Yes (%)	No (%)
Variable			
preventability of malaria		725(94.6)	41(5.4)
Methods of malaria prevention	IRS	641(83.7)	125(16.3)
	Using LLIN	649(84.7)	117(15.3)
	Source reduction	526(68.7)	240(31.3)
	Using drug prophylaxis	350(45.7)	416(54.3)
	Clear the vegetation	299(39.0)	467(61.0)
	Others prevention methods	60 (7.8)	706(92.8)
Mosquitoes breeding sites	stagnant water and swampy areas	673(87.9)	93(12.1)
	waste material	98(12.8)	668(87.2)
	running water	46(6.0)	720(94.0)
mosquitoes mostly bite	night time	750(97.9)	16(2.1)
mosquito resting during day time	unclean vegetation	349(45.6)	417(54.4)
	In the house	225(29.4)	541(70.6)

1. *Other malaria prevention methods are close door/window, window screening and aerosol spray*

In Overall of the total participants 579(75.6%) (With 95% CI, (72.6, 78.6)) had a good knowledge about malaria prevention and control measures, The median knowledge score for all respondents was 7 out of a possible 12 points (IQR= 7-8)

In the **FGD** about all of the participants in the discussion agreed that malaria is preventable disease. Majority of the discussant believed that Environmental managements such as compact, drainage and clearing the vegetation as malaria prevention methods. However,

some of the participants also mentioned hygiene conditions (self-hygiene, using toilet, and eating fresh food) as malaria prevention methods because they believe malaria is transmitted by flies, body contact and eating dirty foods. A 45 years old man in Kalay Kebele FGD quoted that **“using toilet and hygienic condition of the environment prevents all disease including malaria”**. Most of the people in the discussion mentioned insecticide bed net as major malaria prevention method and only few of them mentioned IRS as malaria prevention method. The FGD from Menti kebele the discussant mentioned **“unlike the previous time, now a days we are preventing from malaria by bed net and anti-malaria spry.”** In another FGD a female participant in Aswagari **“We can prevent malaria through cleaning our environment so as to using the bed net.”**

Some participants explained that IRS can poison the food if there is carelessness and can kill useful insects like honey bees. For example a male participant in Menti kebele explained **“It is real that the bee rests on the wall the chemical can kill the bee.”** Other malaria prevention methods are not mentioned by the discussant. Most of the discussants mentioned that both LLIN and IRS decreased their effect as compared from the previous brands.

Determinants of Knowledge towards malaria prevention and control

From the multivariable logistic regression model the odds of having good knowledge is decreased by 60% among respondents in a poorest wealth quintile as compared to the richest [AOR= 0.40, 95% CI: 0.23, 0.73]. Similarly the odds of having good knowledge is decreased by 62% among respondents in the poor wealth quintile as compared to the richest [AOR= 0.38, 95% CI: 0.21, 0.70]. Moreover the odds of good knowledge is decreased by 59% among respondents in the medium wealth quintile as compared to the richest [AOR= 0.41, 95% CI: 0.22, 0.75]. Respondents who live in Menti kebele and Abay tera kebele had 3 and 2 times increased odds having a good knowledge than Aswagari kebele with [AOR= 3.01, 95% CI 1.87, 5.15] and [AOR= 2.03, 95% CI 1.23, 3.34] respectively. (Table 4)

Table 3: determinants of malaria prevention and control knowledge in West Bellessa, 2019.

Variable	Response	Knowledge		COR(95%CI)	AOR(95%CI)	P-value
		Good (%)	Poor (%)			
Resident's Kebele	Kalay	85(11.1)	29(3.8)	1.49(0.89-2.50)	1.52(0.89-2.60)	0.13
	Abaytera	125(16.3)	33(4.3)	1.92(1.18-3.14)	2.03(1.23-3.34)	0.006
	Menti	189(24.7)	29(3.8)	3.31(2.02-5.43)	3.10(1.87-5.15)	<0.001
	Amstya	55(7.2)	33(4.3)	0.85(0.50-1.44)	0.83(0.48-1.43)	0.50
	Aswagari	124(16.2)	63(8.2)	1	1	
Sex	Female	246(32.1)	101(13.2)	0.63(0.45-0.88)	0.71(0.50-1.00)	0.053
	Male	333(43.5)	86(11.2)	1	1	
Educational status	Illiterate	504(65.8)	168(21.9)	1.09(0.55-2.16)	1.08(0.53-2.22)	0.83
	Literate	42(5.5)	7(0.9)	2.18(0.77-6.16)	1.84(0.62-5.40)	0.27
	Formal education	12(1.6)	33(4.3)	1	1	
Wealth index	Poorest	121(15.8)	53(6.9)	0.37(0.21-0.65)	0.40(0.23-0.73)	0.003
	Poor	104(13.6)	42(5.5)	0.40(0.22-0.72)	0.38(0.21-0.70)	0.002
	Medium	105(13.7)	40(5.2)	0.42(0.23-0.77)	0.41(0.22-0.75)	0.004
	Wealthy	125(16.3)	32(4.2)	0.63(0.34-1.16)	0.66(0.35-1.23)	0.19
	Wealthiest	124(16.2)	20(2.6)	1	1	

Discussion

This study mainly investigated the knowledge of malaria prevention and control methods and associated factors among rural household malarious areas of West Belesa.

In this study above three fourth(75.6%) of the respondents had compressive good malaria prevention knowledge which is higher than a study done in Amhara region (64.8%) and Areka(50.4%).(14,16). This could be due to study season difference because the compared studies were conducted in none malarious seasons whereas this study has been conducted in the malaria transmission season. In malarious seasons promotion of malaria prevention is conducted which could increase their awareness.

In specific manner in this study LLIN and IRS are well known where 84.3% and 83.7% of the respondents explained LLIN and IRS as prevention methods of malaria respectively.

This is higher comparing with studies done in Tanzania, Gini, Assosa and Zones of Amhara region.(10,14,17,18) similarly environmental managements like breeding site reduction and clearing were mentioned by 76.1% of respondents as malaria prevention methods which is higher the studies done Arba Minch and Gurage. (19,20) Despite of this closing windows and doors at early time in the evening and using aerosol are mentioned at lower rate where only 3.7% and 2.3% of the respondents mentioned these as malaria prevention methods respectively. This is lower comparing to a study done in Arba Minch. (19) The high knowledge level of IRS, LLIN and environment management could be attributed to the fact that these were frequently promoted and used by the community as the first options of malaria prevention methods in the district and low level of knowledge and of close door, using aerosol, and smoking could be attributed to the fact that these were not being promoted as a malaria control methods in the study area as confirmed in the FGD because none of the participants mentioned these as malaria prevention options.

In this survey poorest, poor and Medium wealth quintile respondents have about 60%, 62% and 59% less good knowledge respectively as compared with wealthiest wealth quintiles this is in line with a studies done in Malawi and Assosa.(21,22) Which could be due to the fact that individuals from high wealth index households have better information on access since they can buy radio and other information sources.

People who live in Menti kebele and Abay tera kebele have about 3 and 2 times good knowledge as compared with people who live in Aswagari the evidence could show the strength in health extension program and health education (23) for example in Menti kebele the health extension program was headed by three health extension workers as compared with other kebeles which was headed by one and two health extension workers.

Conclusions

In west Belesa. Even though there were good LLIN, IRS and environmental management knowledges. Other malaria prevention measures such as screening and closing at early time window door, use of aerosol spray etc. are also not known. Wealth index and respondents living kebele are predictors for malaria prevention knowledge of malaria. District health office should give health education regarding the use of easily accessible personal protection methods such as screening windows and doors as well as other malaria prevention methods such as using aerosol spray. Further research is needed for the efficacy of IRS and LLIN. Low socio-economic groups, low socio economic status respondents need attention in the health education and promotion.

Abbreviations

AOR: Adjusted Odds Ratio; CI: Confidence Interval; FGD: Focus Group Discussions; FMOH: Federal Ministry of Health; IQR: Inter Quartile Range; IRS: Indoor Residual Spray; LLIN: Long Lasting Insecticidal Nets; OR: Odds Ratio; SD: Standard Deviation; UNICEF: United Nations Children’s Fund; WHO: World Health Organization

Declarations

Ethical approval and consent to participate

Approval to carry out the study was sought and obtained from University of Gondar Ethics Review Board (ERB). Verbal consent was obtained from all study participants after a detailed explanation of the purpose of the study.

Availability of data and materials

The data could be accessed based on request

Funding

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Consent for publication

Not applicable

Competing Interests

There is no any competing interest.

Authors’ contribution

Tsigie were Conception and design, acquisition of data, or analysis and interpretation of data, drafting the article.

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Figures

Figure 1

source of information