



Preventing Malaria among Under Five Children in Damot Gale Woreda, Wolayta Zone, Ethiopia: The Role of Parents Knowledge and Treatment Seeking

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Abstract

Background: Malaria is the leading public health problem in Ethiopia. Lack of malaria-specific knowledge has been commonly assumed to be an important barrier to engagement in behaviors that prevent malaria and prompt health seeking behavior.

Objective: To assess parents' knowledge, practice of prevention, treatment seeking and factors associated with malaria prevention among under-five children in Damot Gale Woreda.

Methodology: A community based cross-sectional study was conducted among 419 households who had under five children. Data was collected from 4 rural kebeles (Smallest administrative villages). It was analyzed by using SPSS version 16.0. Logistic regression was used to identify the factors influencing the outcome. Odds ratios and the corresponding confidence intervals were used to identify potential predictors in logistic regression model.

Results: Around 85% of parents correctly associated malaria transmission with the bite of infective mosquito. Regarding practice of prevention, 83.7% mentioned source reduction and 63.1% used bed nets. The prevalence of malaria was 38/419 (9.1%). Health care facilities were accessible for more than 90% of study population with a walking distance of less than 30 min but only 15% of sick children started anti-malarial treatment within 24 h. Being biological mother (AOR 2.42, 95% CI 1.42-4.12, P=0.03), knowledge of method of malaria prevention (AOR 1.59, 95% CI 1.126-2.242, P=0.002) and treatment seeking within 24 h for malaria (AOR 2.69, 95% CI 1.56-4.62, P=0.000) were significantly associated with practice of malaria prevention.

Conclusion: Prevalence of malaria in children was 9.1%. Delay in treatment seeking within 24 h was high. So, health education on prevention methods and treatment seeking is required.

Keywords: Children; Damot Gale; Wolayta zone; Acceptance of health care; Malaria prevention and therapy

Introduction

According to the latest estimates of WHO, 214 million new cases and 438,000 deaths occurred globally in 2015 due to malaria in which 70 percent of whom were children under five and 90% of malaria deaths occurred in Sub-Saharan Africa [1].

Ethiopia was one of malaria endemic and the most malaria-epidemic prone countries in Africa with 75% of the country were malarious and malaria contributes up to 20% of under-five deaths. However, the number of new cases of malaria declined from 2.8 in 1990 to 621,345 in 2015 [2]. Despite a remarkable decline in morbidity and mortality, malaria is still a public health problem in Ethiopia. In 2013/2014 among under five children, there were 324,203 malaria outpatient visits, 5,103 inpatient malaria admissions and around 122 inpatient death reported [3].

It was recognized that early diagnosis and prompt treatment, within 24 h of onset of symptoms, was an essential element of malaria control [4]. Evidences showed that most malaria-related deaths in malaria-affected countries occur at home without receiving appropriate medical care, and when care is sought, it was often delayed [5-8].

Delayed malaria treatment-seeking behavior in under five children in Ethiopia has been reported to be associated with poor knowledge regarding the disease, socio-economic factors and traditional home management practices at home [9-12]. However, there were no known prior studies pertaining to knowledge practice of malaria prevention, treatment-seeking for under five children and associated factors at community level in South Ethiopia. Understanding the local context of malaria is vital to enhance community awareness of the problem as well as the importance

of early diagnosis and prompt treatment of malaria. Therefore, the aim of this study was to investigate Parents' knowledge about the disease, their practice of prevention and treatment seeking behavior.

Methods and Materials

Study design, area and period

Community based cross-sectional study was conducted among parents of under five children in Damot Gale woreda, Wolayta Zone, Southern Nations Nationalities and Peoples Region (SNNPR) from February 25 to April 25, 2014. The woreda had a total population of 302,994 with 154,527 were females [13]. According to the 2007 Ethiopian Population and Housing Census, the woreda was the 3rd most populated in Wolayta zone with a total population of 154,610 and of which 51% were women (CSA, 2007). It had an estimated population density of 726.1 people per square kilometer which was greater than the zonal average 156.5 people per square kilometer, and was also one with highest densities in Ethiopia. It has 31 kebele administrations (i.e., the smallest administrative segment in Ethiopia).

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Sample size determination

The sample size was calculated manually by using single population proportion formula at a precision of 5%, 95% confidence interval and $P1=0.857$, Malaria was thought to be preventable by 85.7% of the respondents in Butajira, SNNPR, $P2=0.403$ (40.3% under five children slept under ITN in the previous night before the survey day in Arba Minch Zuria study and $P3=0.442$ (44.2% of mothers delayed treatment of malaria for under five children due to misperception in East Shoa [14-16]. The largest sample size $n=419$ was taken after adding 10% nonresponse rate.

Sampling technique

Four kebeles (Sibaye Korke, Wandara Gale, Hagaza Doge and Fate) were selected among 31 kebeles by simple random sampling method. Then, total samples (419) were allocated from each selected kebele based on proportion to the total number of under five children in those kebeles (Figure 1). Finally, systematic random sampling technique was used to select the samples.

Inclusion criteria

All households with children less than five years, who were selected randomly and willing to participate in the study were included. Household heads especially mothers were taken as respondents for this study. In cases where the household heads were not available, main caretakers in households were interviewed. In case of more than one under five children with fever in the last two weeks in the selected households, one child was selected by lottery method. Axillary temperature was taken from every sick child in selected households that fulfill inclusion criteria. In case of body temperature greater than 37.5°C , blood test was done by using RDTs. All positive cases were managed by community health extension workers.

Data collection

Data were collected on a face-to-face interview using pre-tested questionnaire, measuring axillary temperature and blood tests by RDTs for plasmodium species. The questionnaire has four sections that assessed the socio-demographic characteristics of parents and under than five children, knowledge of parents towards malaria, practice of malaria prevention, and treatment seeking and Home management of malaria. Knowledge assessment part of the questionnaire tries to measure causes of malaria, means of transmission, mosquito breeding

sites, biting time, signs and symptoms of malaria, signs and symptoms of malaria, seasons of malaria infection, vulnerable groups to malaria, treatment modalities and prevention methods. Practice of prevention assesses how the parents prevent under five children from malaria like source reduction, long lasting net utilizations, using sprays and also locally available prevention techniques. Home management of malaria assessed the means of diagnosis and treatment occurred outside the clinical setting in or near the home/village either by parents themselves alone or with health extension workers. Axillary temperature was taken from every child in selected households that fulfill inclusion criteria. In case of body temperature greater than 37.5°C , blood test was done by using RDTs. All positive cases were managed by community health extension workers with recommended antimalarial drugs.

Data quality control

The English version of the structured questionnaire was adapted from the Carter Center survey questionnaire (TCC) and translated into the local language of the study area, Wolayta language [17].

House numbering was carried out 1 week prior to data collection to get sampling frame. Then, every kth house hold was considered for data collection. Pre-test was conducted in 5% of the sample size in unselected kebele (Gacheno kebele). Two days training was given to 8 data collectors by investigators. Close supervision was undertaken during data collection by a supervisor (Tables 1 and 2).

Statistical Analysis

Data were coded, cleared and entered in to Epi Info version 6 and exported to SPSS version 16 for analysis. Descriptive statistics was used

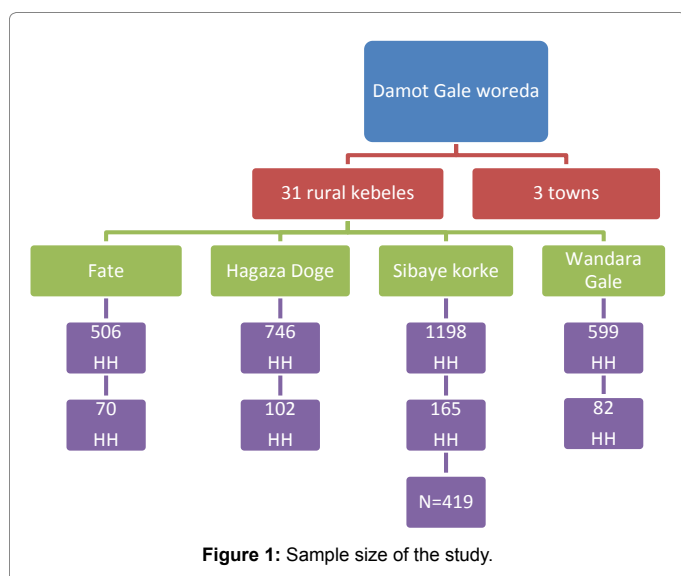


Figure 1: Sample size of the study.

S. No.	Parameters	No	Yes
1.	Signs and symptoms of malaria in children?	0	6
2.	Most vulnerable group to malaria in the family?	0	2
3.	Who should get priority for treatment?	0	2
4.	Causes malaria?	0	1
5.	Whether malaria can be transmitted from one person to another?	0	1
6.	Transmission methods	0	1
7.	Mosquito breeding sites	0	3
8.	Whether malaria is a preventable disease?	0	1
9.	Prevention methods	0	3
10.	Method of malaria treatment	0	3
11.	Anti-malarial drugs	0	3
12.	Season in which malaria is a big problem	0	2
13.	Knowledge about bed net	0	1
14.	Purpose of bed net utilization	0	1

Table 1: Criteria for malaria knowledge score. The overall knowledge score ranges between 0 and 30, then respondents were classified as poor level of knowledge (0-10), fair level of knowledge (11-20) and good level of knowledge (21-30)

S. No.	Parameters	No	Yes
1.	Owned ITN for your family?	0	1
2.	Owned ITN for under five children	0	1
3.	ITN hanged over under five children bed?	0	1
4.	Was the under-5 child slept under the bed net the night before the survey day	0	1
5.	Clearance of mosquito breeding site	0	2
6.	In-door and out-door anti-mosquito spray	0	2

Table 2: Criteria for malaria prevention score. The final scores were computed to give a composite scale with category (mean score or more=good or otherwise=poor) based on the cut-off point

to describe the frequency, mean and standard deviations of the study variables. Multiple logistic regressions (Bivariate and multi-variate analyses) was done to control for confounders, and odds ratios and corresponding confidence intervals were used to report the association between dependent and independent variables. P values of less than 0.05 were considered statistically significant.

Results

Socio-demographic characteristics of respondents

A total of 419 respondents were interviewed, and all of them responded for the questionnaire. Majority of the respondents 343 (81.9%) were biological mothers while 11.2% were female non-biological mothers and 5.7% were fathers. Majority of respondents, 330 (78.8%) were in age between 25 to 39 years with the mean age of 32.06 years (SD ± 8.688 years). Around half of the parents had no formal education, while 44% had attended a class up to grade eight. On the other hand, nearly 47% of respondents were house wives where farmers and merchants constitute 26% and 24% respectively. Almost all of the respondents belong to Wolayta ethnic group.

Prevalence of malaria

The prevalence of malaria among under five children in Damot Gale district was 38/419 (9.1%) children. *Plasmodium falciparum*, *Plasmodium vivax* and mixed infections constitute 17 (44.7%), 16 (42.1%) and 5 (13.2%), respectively. Majority of them were in the age group 13-36 months, with mean and median age of 32.8 and 35.5 months respectively (SD ± 14.8 months).

Knowledge about malaria

Malaria is locally known as “shekkeriyaa” or “uunnuwaa” in Wolaytta language. Out of 419 respondents, 396 (94.5%) had heard about Malaria with 376 (94.9%) correctly associated it with mosquitoes' bite, and more than three fourth responded that it could be transmitted from person to person (Table 3).

Variable(s)	Frequency	Percentage
Causes of malaria (n=396)		
Mosquito bite	376	94.9
Dirty stagnant water	321	81.1
Weather change	200	50.5
Contaminated drinking water	158	39.9
Dirty compound	125	31.6
Evil spirit	20	5.1
Method of transmission (n=301)		
Bite of infective mosquito	255	84.7
Close contact with malaria patients	103	34.3
Unsafe drinking water	36	12
Bad odor	46	15.3
Breeding site of mosquito (n=396)		
Stagnant water	314	79.3
River side	50	12.6
Others	32	8.1
Season in w/c malaria is a big problem (n=396)		
Spring (September-November)	63	15.9
Autumn (December-February)	17	4.3
Winter (March-May)	160	40.4
Summer (June-August)	156	39.4

Table 3: Knowledge of respondents to causes, breeding sites, transmissions and seasons in which malaria was a big problem in Damot Gale woreda, March 2014. n=total number of respondents who have been asked that question

Nearly half of the respondents 193 (48.7%) believed that malaria affects more under-five children; followed by pregnant women 80 (20.2%) and breast feeding mothers 47 (11.9%). Regarding malaria is whether preventable disease or not, 348 (88.1%) parents responded that malaria was a preventable disease. Majority of them, 322 (92%) mentioned mosquito breeding site clearance (source reduction) prevents malaria transmission while 321 (91.7%) expressed bed net utilization and 129 (36.9%) knew about indoor residual sprays.

With regard to mosquito breeding site, 202 (79.1%) mentioned stagnant water as a breeding site of mosquito, while 32 (12%) responded running water and 21 (7.9%) responded others like leaf of “enset” and poor environmental sanitations.

Regarding the knowledge of malaria sign and symptoms, the most frequently mentioned were chills and shivering, fever, headache and convulsion, respectively (Figure 2).

Majority of parents believe that children under five were more vulnerable to malaria and treatment priority should be given for them (Figure 3).

Regarding overall knowledge score of respondents, 3.5% of parents have poor knowledge, 75.8% had fair knowledge and 20.7 had good knowledge about malaria in Damot Gale woreda.

Practice of malaria prevention

The mean practice of malaria prevention score was 5.4 (SD=1.01). Above the mean was considered as good practice, and vice versa. Thus, 116 (50.4%) of parents had poor, and 114 (49.6%) had good practice of

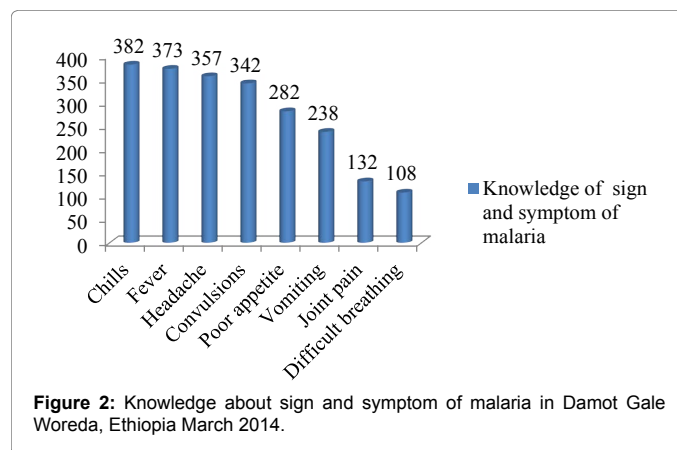


Figure 2: Knowledge about sign and symptom of malaria in Damot Gale Woreda, Ethiopia March 2014.

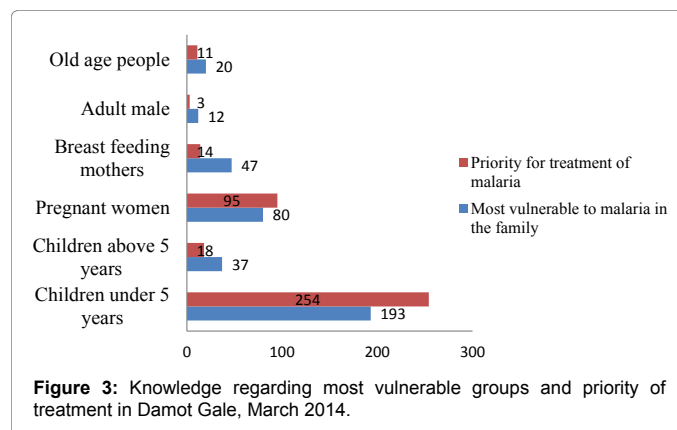


Figure 3: Knowledge regarding most vulnerable groups and priority of treatment in Damot Gale, March 2014.

malaria prevention. Regarding bed net possession and utilization, 378 (95.5%) of respondents heard about it and 230 (60.8%) had bed net in their home (Figure 4).

Out of those who reported having bed net, 174 (73.4%) possessed one, 51 (21.5%) had two and 12 (5%) had possessed three ITNs. Concerning purpose of utilization, 97(40.6%) were using it to prevent mosquito naissance/bite, 137 (57.3%) to prevent malaria, while the rest 5 (2.1%) to prevent other insects like house fly, bed bugs and fleas. During survey time, 209 (87.1%) children slept under a bed net in the prior night.

Knowledge about anti-malarial drugs

The survey team took locally available anti-malarial drugs with them during data collection. Coartem (Artemether/Lumefantrine) was the most commonly known anti-malarial drug by (375 (96.4%) parents while chloroquine 109 (28%) and quinine 69 (17.7%) were followed. Almost all of them 355 (92%) mentioned coartem as the most effective drug of choice. Regarding traditional medicines to treat malaria, more than three fourth of respondents mentioned herbal roots and leaves, while 17 (4.3%) named holly water, and others mentioned different traditionally used treatments other than leaves and roots like “manxxaa” (chyme).

Home management of malaria and treatment seeking behavior

Almost all parents 32 (91.4%) managed malaria at home with

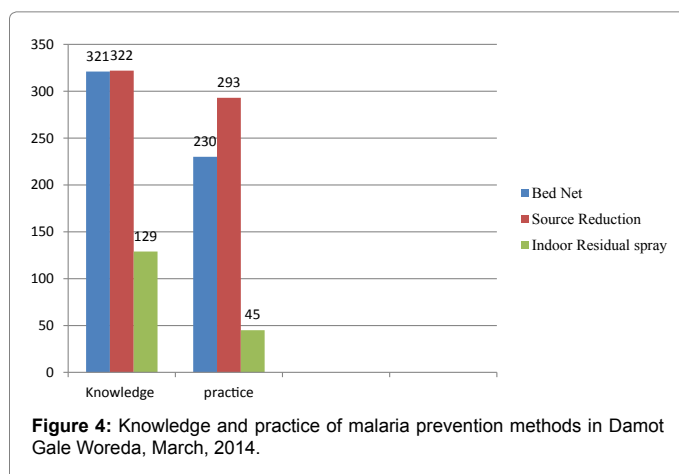


Figure 4: Knowledge and practice of malaria prevention methods in Damot Gale Woreda, March, 2014.

modern anti-malarial drugs in which 26 (81.2%) children were treated by Coartem and 6 (18.8) took Chloroquine. Majority of them, 23 (71.9%) got it from HEWs, 5 (15.6%) bought from private pharmacies and 4 (12.5%) got it from neighbors. Four children were managed by traditional methods by herbs (“Bulo Santtaa” and “Manxxaa”), while 2 children didn’t get treatment due to families complained lack of money.

Regarding a walking distance to the nearest health facilities, 34 (90.63%) of respondents mentioned they have access within 30 min, while 4 (9.37%) walk more than 30 min. Majority 27 (84.4%) of children started anti-malarial treatment after 24 h while only 5 (15.6%) started treatment within 24 h. From 27 (84.4%) children blood sample was taken to check for malaria in health institutions.

Factors associated with practice of malaria prevention

In multivariate analysis after adjusting for confounding variables, being biological mother (AOR 2.42, 95% CI 1.42-4.12, P=0.03), knowledge of method of malaria prevention (AOR 1.59, 95% CI 1.126-2.242, P=0.002) and treatment seeking within 24 h for malaria (AOR 2.69, 95% CI 1.56-4.62, P=0.00) were significantly associated with practice of malaria prevention.

Biologic mothers were 2.42 times more likely to use malaria prevention methods than other care givers. Similarly, those who knew malaria prevention methods were 1.59 times more likely to practice prevention of malaria. On the on the hand, respondents with good treatment seeking behavior were 1.56 times more likely to practice prevention methods when compared to those with poor treatment seeking behaviors (Table 4).

Discussion

In this study, 376 (94.9%) of parents correctly associated malaria with mosquitoes’ bite; this was similar with 94.5% of Gonder study, 88.2% of Jima study and 88.6% of Yaoundé study in Cameroon (88.6%) in Nigeria [18-22]. Knowledge of causes of malaria in this site was better than the study of Gilgel Gibe 70.1% and Sulu 49% [23]. This difference may be due to endemicity of malaria and related efforts to control it among vulnerable population in the region.

The knowledge of respondents regarding malaria is a preventable disease in this study was 88.1%. This was similar with Dembia’s study (85.8%) and Gondar town (94.3%) [18,24]. Majority of them, 322 (92%) responded for source reduction, 321 (91.7%) bed net utilization and the rest 129 (36.9%) knew indoor spray in this study. The knowledge of source reduction is similar but knowledge towards bed net as a

Characteristics		Practice of prevention		COR	AOR
		Poor	Good	(95% CI)	(95% CI)
Relation to child	Biological Moth	88	98	1.96 (0.99, 3.8)	2.42 (1.42-4.12)*
	Non-Biological	28	16	1	1
Marital status	Married	102	107	1.1 (1.1-14.2)*	1.96 (0.04-9.52)
	Others	14	7	1	1
Knowledge of vulnerable groups	Age above Five	55	31	1	1
	Under 5 and Pregnant mother	61	83	2.5 (1.4-4.3)*	0.74 (0.29-1.91)
Knowledge on method of transmission	Mosquito bite	27	44	2.1 (1.2-3.7)*	1.4 (0.52-4.8)
	Others	89	70	1	1
Knowledge of method of prevention	Yes	8	55	12.6 (5.6-28.2)*	14 (10.5-15.2)*
	No	108	59	1	1
Treatment seeking within 24 h	Poor	54	11	1	1
	Good	62	103	8.2 (3.9-16.8)*	2.69 (1.56-4.62)*

*significant at p-value<0.05

Table 4: Factors associated with practice of malaria prevention among parents’ of under five children in Damot Gale woreda, Wolayta Zone March 2014.

preventive method is much higher than from a study in Dembia [24]. Compared to the Ethiopian malaria indicator survey of 2011, the ITN possession in this site was (73.4% own at least one ITN) higher than the national average (in areas <2,000 m, 55.2% and >2,000 m, 37.9% own at least 1 ITN) and regional average (in SNNPR 57.2% have at least one and 28.4% had more than one ITN). And the number of under-five children who had slept under ITN the prior night during data collection in this site was 209 (87.1%) which was higher than national references (in areas <2000 m, 38.2% and >2000 m 19.4%) and also regional average (42.3%) in SNNPR [25].

Concerning prompt access to anti-malaria drugs in this site, only 15.6% started treatment within 24 h. This finding is in line with the findings of Jima zone, 19.8% but lower than that of Dembia 35.1%, Mandura District in West Ethiopia, 38.7% and Ghana 84% had prompt access within 24 h [26-28]. This lower health seeking behavior within 24 h may be due to lack of awareness towards prompt access to anti-malarial drugs.

Conclusion

Regarding prevalence of malaria, out of 419 households that have under-five children in this site, 38 (9.1%) developed malaria in the prior two weeks during data collection. This was slightly higher than 7.8% prevalence of Madagascar [29]. This was lower than a study conducted in East Shoa zone, 20.5%, Dembia in North West Ethiopia, 43.9%, Ghana 33.3% and Bungoma district in Kenya 64% [24,28,30,31]. This huge variation may be due to geographical difference of the study sites, the period of study conducted and/or current massive application of malaria prevention and control strategies by Ethiopian government (especially health extension program implemented by health extension workers) and international NGOs like Roll Back Malaria.

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