

Malaria related knowledge and child to parent communication regarding prevention and control of malaria among primary school students in Jimma zone, south west Ethiopia

Yamrot Debela¹, Zewdie Birhanu², Yohannes Kebede²

¹Department of environmental health, Mizan aman general hospital, Bench maji zone health office, SNNPR, Ethiopia

²Department of Health Education and Behavioral Sciences, College of Public Health and Medical Sciences, Jimma University, Jimma, Ethiopia

Email address:

yamri2010@yahoo.com (Y. Debela), zewdie.birhanu@ju.edu.et (Z. Birhanu), yohanneskbd@gmail.com (Y. Kebede)

To cite this article:

Yamrot Debela, Zewdie Birhanu, Yohannes Kebede. Malaria Related Knowledge and Child to Parent Communication Regarding Prevention and Control of Malaria among Primary School Students in Jimma Zone, South West Ethiopia. *American Journal of Health Research*. Vol. 2, No. 5, 2014, pp. 284-290. doi: 10.11648/j.ajhr.20140205.20

Abstract: *Background:* Malaria still imposes an enormous burden in terms of morbidity and loss of life. It is assumed that school based health education can help to promote community wide awareness and prevention of malaria. But, evidence is limited on the extent to which school children are equipped with appropriate and scientific information about malaria and communicate with their parents. *Objective:* To assess malaria related knowledge and child to parent communication regarding prevention and control of malaria among primary school students. *Methods:* Institution based cross sectional study was conducted in three selected Woredas of Jimma zone, south west Ethiopia from march, 15 to 30, 2014. The study recruited 432 samples of school children in 10 selected schools from the three woredas. A multi stage sampling method followed by simple random sampling was carried out to select the samples. The data were collected using pretested structured questionnaire adapted from similar studies. EPI-DATA version 3.1 was used to enter the data and data was exported to SPSS version 20.0 for further statistical analysis. Bivariate and multivariate analyses were used. Adjusted odds ratios and their corresponding 95% confidence intervals were used to assess the association between individual variables with the outcome variable in the multivariate analysis with a p-value of (< 0.05). *Result:* The mean score of students for comprehensive knowledge related to malaria was 6.13 ± 1.88 . The major source of information was radio (42.2%). Nearly half (49.5%) of students communicate with their family about malaria and the major areas of communication were concerning symptoms and prevention and control methods. Age [AOR, 95% CI, 1.18 (1.04, 1.34)], comprehensive knowledge [AOR, 95% CI, 1.34(1.19, 1.50)] and perceived parental readiness to learn from children [AOR, 95% CI, 2.09 (1.43, 3.06)] were independent predictors of child to parent communication. *Conclusion:* In this study comprehensive knowledge about malaria was found to be high among the students. However, knowledge gap about the cause and transmission were also observed among the students. Malaria health education should be strengthened in the schools to advance malaria knowledge and foster communication behavior of the students and health facilities should give attention for schools through equipping teachers with information about malaria prevention and control strategies so that such knowledge could be passed on to students.

Keywords: Child to Parent Communication, Knowledge, Malaria, Primary School Student

1. Background

Malaria, a disease caused by four species of parasites of the genus *Plasmodium* (*Plasmodium falciparum*, *P. vivax*, *P. ovale* and *P. malariae*) and transmitted to human beings by

infected female anopheline mosquitoes biting. It imposes an enormous burden on the world's population in terms of morbidity and loss of life. Malaria due to *P. falciparum*

causes the most severe and life-threatening form and it predominates in Africa; *P. vivax* is less dangerous but more widespread, and the other two species are found much less frequently. People who have little or no immunity to malaria, such as young children and pregnant women are more likely to become very sick and die [1,2].

Malaria contributes to 9% of the global disease burden and it is estimated that approximately 60% of deaths caused by malaria occur in the “poorest 20% of the world’s population [3,4]. In 2012, globally there were an estimated 300-500 million malaria cases and 1.5–3 million malaria-related deaths; of which 91% of them reside in Africa, mostly south of the Sahara [5]. Mortality and morbidity related to Malaria deters development of economic systems in many sub-Saharan countries accounts for approximately 40 percent of public health expenditures in some countries in Africa and causes an annual loss of \$12 billion, or 1.3 percent of the continent’s gross domestic product. Furthermore, high malaria rates place huge burdens on health care systems at all levels, as nurses and doctors spend a disproportionate amount of time attending to malaria patients, and scarce Ministry of Health (MOH) resources are poured into treating patients that contract this preventable and controllable disease [6–8].

Approximately 4-5 million cases of malaria are reported annually in Ethiopia and the disease is prevalent in 75% of the country, putting over 50 million people at risk [9].

Malaria continues to pose a serious threat in Oromia. Three quarters of the region, 242 of 261 Woredas and 3932 of 6107 kebeles, are considered malarious, accounting for over 17 million persons at risk of infection. In this region there are 1.5 to 2 million clinical cases reported per year, with accounting for 20-35% of outpatient consultations, and 16% of hospital admissions. At a rate of 18-30%, malaria is the leading cause of hospital deaths [10].

As schools provide the most effective and efficient way to reach large portions of the population, children of school-going age have been targeted for malaria control in some endemic countries of Africa [1,11]. As health change agents in schools, children collaborated with other students not only introduce and maintain changes in the school environment, but also communicated health messages and introduced relevant health practices through which their parents/guardians improved their knowledge and changed their behavior through their participation [6].

Equipping children with appropriate and scientific information about malaria offer a cost-effective system through which to control malaria amongst schoolchildren and the wider community [12,6,13,14]. However, there is lack of evidence to what extent primary school students have appropriate knowledge and information sharing practice with parents about malaria in our country. Therefore, the study is aimed to fill this evidence gap by assessing Malaria related Knowledge and child to Parent Communication regarding Prevention and Control of Malaria among primary school students in Jimma zone.

2. Methods and Materials

Study Setting: An institution based cross sectional study was conducted in three selected woredas of Jimma zone (Kersa, Mana and Goma) from March, 15 to 30, 2014. Jimma is one of the zones in the Oromia Region located 350km far from Addis Ababa. The Zone is divided in to 13 Woredas. Kersa, Mana and Goma are among those Woredas which located 17km, 18km, and 45km surrounding to Jimma respectively. There are 45, 28 and 51 primary schools in the three woredas with a total of 10,065, 9,897 and 16,808 second cycle (grade five to eight) students respectively.

Population: The study was conducted among four hundred thirty-two selected primary school second cycle students (grade 5th to 8th) in three Woredas (Kersa, Mana, Goma) who are registered and currently attending in the selected school during the study period. Students who were severely ill and unable to fill the questioner at the time of data collection were excluded from the study.

Sample Size: The sample size was calculated using single population proportion formula ($n = \frac{Z\alpha/2)^2 p (1-p)}{d^2}$) with the following assumptions. P= (85%) for knowledge related to Malaria, 5% margin of error, 95% confidence interval. The calculated sample size was 196. by applying 2 as a selected value for multiplication for design effect, the sample size will become 392 and the final sample size with 10% non-response was 432.

Sampling Technique: Multi-stage sampling procedure followed by simple random sampling was carried out. Number of students was allocated to each woreda proportional to total number of grade 5-8 students in each woreda then a total of 10 schools were selected randomly 3, 3 and 4 from Kersa, Mana and Goma respectively. For each selected primary schools, lists of grade five to eight students was obtained and from which a proportional allocation to the total number of students in each grade was made. Then respondents were selected by using simple random sampling technique from each grade using a complete list of students as sampling frame.

Measurements: Data was collected by face to face interview method using structured questionnaire which adapted after reading different literatures [23,35–37]. The questionnaire was prepared in English then translated to Afan Oromo and back translated to English again to ensure its consistency. Comprehensive Knowledge was measured by the total number of correct answers to 12 questions on knowledge related to malaria. After sum up the correct responses for the 12 items the score was treated as continues for further logistic regression analysis. Students with high score have high comprehensive knowledge.

For communication related Parenting style factor analysis was executed for 10 items with yes/ no option. By the process of principal component analysis two meaningful factors were emerged. The two factors emerged were perceived parental readiness to learn from children and perceived parental permission to talk. The amount of

variance explained by each factor was (31.1%) and (24.9%) for perceived parental readiness to learn from children and perceived parental permission to talk respectively and jointly they explained (56%) of variance.

3. Data Analysis Procedure

EPI-DATA version 3.1 was used to enter the data and was exported to SPSS version 20.0 for further statistical analysis. Frequency distribution was used to describe the study population. Mean score was computed for each emerged factor components during factor analysis after summing up all items and the score were used for further regression analysis. Bivariate and multivariate logistic regressions were applied to see the association of predictor variables with outcome variable, Adjusted odds ratios and their corresponding 95% confidence intervals were reported to assess the association between individual variables with the outcome variable with a p-value of (<0.05).

3.1. Ethical Consideration

Ethical clearance was obtained from college of public health and medical science. Formal letter was obtained from department of health education and behavioral science and from kersa, mana and goma Woreda health offices, written informed consent was obtained from the school principals and the students also asked for their willingness to participate in the study.

4. Result

4.1. Socio-Demographic Characteristics of the Study Subjects

Table 1. Back ground characteristics of students, Jimma Ethiopia, 2014 (n=432)

Variables	Frequency	percentages
Sex		
Female	229	53.0
Male	203	47.0
Age		
10-14	304	70.4
15-18	128	29.6
Residence		
Rural	219	50.7
Urban	213	49.3
Grade level		
5 th grade	121	28.0
6 th grade	127	29.4
7 th grade	104	24.1
8 th grade	80	18.5
Father's educational status		
Can't read and Write	91	21.1
Read and write but no formal education	88	20.4
Primary education	159	36.8
Secondary education and above	94	21.8
Mother's educational status		
Can't read and Write	159	36.8
Read and write	93	21.5
Primary education	129	29.9
Secondary education and above	51	11.8

Four hundred thirty two students were participated in the study giving response rate of 100%. As could be noted from table 1, accordingly more than half, 229 (53.0%) of the students were females. Most 304(70.4%) of the students were age 10-14(mean age of 13.62 (\pm 1.632 SD) years. 219 (50.7%) of the students were rural residents.

4.2. Communication Related Parenting Style

There were 10 items for communication related parenting style. Two weakly correlated items were excluded from any of the factor emerged and eight items were loaded under the two factors 4 for each. The mean score for perceived Parental readiness to learn from children was $3.73 \pm .75$ and mean score for perceived parental permission to talk was $3.56 \pm .88$ with possible range of value 0 to 4 and observed range of value 1 to 4 for each.

4.3. Exposure to Recall and Source of Information about Malaria

The study revealed that 232 (53.7%) of the students heard message about malaria during the past six month prior to the study. Electronic media, namely TV and radio were the main source of message for those who reported receiving the message; (TV 31.0% versus radio 42.2%). However, other sources of information such as school mini-media and peer/friends were limited source of information. Among those who reported receiving the message 179 (77.2%) of them were heard about sleeping under mosquito net while 120 (51.7%) of them had heard of about environmental sanitation. However, students had less exposure, perhaps less able to recall, other malaria prevention messages such as seeking treatment for fever, and indoor residual spray (table 2).

Table 2. Exposure to recall and source of malaria messages among students in Jimma zone Jimma, Ethiopia, 2014.

Variables	Frequency	Percentages
Have you heard or see any malaria message during the past six month? (n=432)		
yes	232	53.7
no	200	46.3
From where did you heard or see? (n=232)		
Radio	98	42.2
TV	77	33.2
Teachers	72	31.0
Text book	63	27.2
HEW	61	26.3
Family	47	20.3
School mini-media	20	8.6
friends	19	8.2
What malaria messages/information did you see or hear? (n=232)		
sleeping under net	179	77.2
Environmental sanitation activities	120	51.7
importance of spraying	59	25.4
seek treatment for fever	43	18.5
not plastering walls after spraying	20	8.6

4.4. Knowledge Related to Malaria

The majority of the students, 280(64.8%), associated malaria with stagnant water while 271(62.7%) of the students mentioned that mosquito cause malaria. Additionally (15.7%) believed that drinking dirty water/eating dirty food cause malaria. Concerning mode of transmission, 339(78.5%) mentioned mosquito bite. However there were also misconceptions related mode of transmission such as bodily contact with malaria patient breathing and flies.

Students differed greatly on their knowledge of malaria symptoms. Majority of them mentioned feeling cold (75.7%) and headache (44.4%) while fever was mentioned only by 1/3rd of the students. Concerning methods of prevention majority of the students, 307(71.1%) stated that sleeping under ITN prevents malaria. Additionally, large percentage of the students, 291(67.4%), mentioned that cleaning the environment prevents malaria. Other prevention methods such as: using mosquito repellent, taking preventive medication and spraying house with insecticide less frequently mentioned by the students. However, significant number of the students still believed that avoiding drinking dirty water prevents malaria. Concerning susceptible groups, there were good awareness as 353(81.7%) and 274(63.4%) students, were mentioned that under five children and pregnant women respectively as highly vulnerable groups to malaria infection (table 3). The mean score of comprehensive knowledge was 6.13+ 1.882 with expected range of value 0 to 12 and observed range of value 2 to 10.

Table 3. Knowledge related to malaria among students, in Jimma zone, Jimma Ethiopia, 2014.

Variables	Frequency	Percentage
What do you think the cause for malaria? (n=432)		
Stagnant water	280	64.8
Mosquito	271	62.7
Drinking dirty water/ Eating other dirty food	68	15.7
How is malaria transmitted from person to person? (n=432)		
Through mosquito bite	339	78.5
Through Breathing	59	13.7
Through flies	41	9.5
Through bodily contact with patients	27	6.3
Main signs or symptoms of malaria (n=432)		
Feeling cold	327	75.7
Headache	192	44.4
Loss of appetite	179	41.4
Fever	141	32.6
Nausea and Vomiting	124	28.7
Body ache or joint pain	56	13.0
How can someone protect themselves against malaria? (n=432)		
Sleep under a mosquito net	307	71.1
Clean the environment	291	67.4
Don't drink dirty water	130	30.1
Spray house with insecticide	70	16.2
Use mosquito repellent	48	11.1
Take preventive medication	33	7.6
Who is most likely to get a serious case of "malaria"? (n=432)		
Under five children	353	81.7
Pregnant women	274	63.4
Adult women	57	13.2
Adult men	55	12.7

The F-test/ANOVA indicated that, there was statistically significant mean difference in knowledge related to malaria among students in different grade level (F= 3.381, DF= 3, p= 0.018) mean score for grade five were (5.96), grade six (5.82), grade seven (6.38) and grade eight (6.54).

4.5. Child to Parent Communication Regarding Prevention and Control of Malaria

Nearly half (49.5%) of students, reported that they communicated about malaria with their family. Of which (165=76.7%) of the students discussed only with their mothers, (156=72.6%) discussed only with fathers and (117=54.4%) discussed with both mother and father. The communication was reported mostly to happen sometimes (197=91.6%). Nonetheless, the remaining, 18(8.4%) communicate most often. Regarding content of communication, overwhelming discussion points were about preventive methods. Sleeping under ITN (155=72.1%) and environmental sanitation activities (accounting for 135=62.8%). The next content of communication was about sign and symptoms (91=42.3%). In fact, prompt treatment seeking for fever was the least area of communication, accounting for 13 =6 % (table, 4).

Table 4. child to parent communication regarding prevention and control of malaria among students, in Jimma zone, Jimma Ethiopia, 2014

Variables	Frequency	Percentage
Have you ever discussed with your family about malaria (n=432)?		
No	217	50.2
Yes	215	49.8
with whom you had discussed (n= 215)		
mother	165	76.7
Father	156	72.6
Sister	74	34.4
brother	60	27.9
What did you tell them or talk to them? (n= 215)		
About sleeping under ITN	155	72.1
About environmental sanitation activities	135	62.8
About Sign and symptom	91	42.3
About importance of spraying	28	13
About not plastering walls after spraying	18	8.4
About seek treatment for fever	13	6.0
How frequently you discussed? (n= 215)		
sometimes	197	91.6
most of the days	12	5.6
every day	6	2.8

Note: Percentages do not add up to 100 because of multiple responses.

4.6. Independent Predictors of Child to Parent Communication

In the bivariate analysis it was found that from socio-demographic variables all of them: age, sex, resident and grade level were candidate for multiple logistic regression analysis with p-value < 0.25. From family related factors (father educational status and perceived parental readiness to learn) were candidate for multiple logistic regression while, mother education status and perceived parental

permission to talk were not significant as well as from individual factors (knowledge) were identified significantly associated with p-value of <0.25. After adjustment in multiple logistic regression analysis only age,

comprehensive knowledge and perceived parental readiness to learn from children were significantly associated and independent predictors of child to parent communication with p-value <0.05(table ,5).

Table 5. Independent predictors of child to parent communication regarding prevention and control of malaria among students, in Jimma zone, Jimma, Ethiopia, 2014.

Variables		COR,95%CI	AOR,95%CI	Beta
Age***		1.19[1.05 -1.34]	1.18[1.04-1.34]*	0.17
Grade level	5 th	0.81[0.48 - 1.34]	0.80[0.46- 1.39]	-0.22
	6 th	1.00	1.00	
	7 th	1.50[0.89 -2 .52]	1.18[0.66 -2.13]	0.17
	8 th	1.98[1.11- 3.51]	1.33[0.69 - 2.59]	0.29
Sex	Male	0.77[0.52 -1.12]	0.76[0.49 - 1.16]	-0.29
	Female	1.00	1.00	
Resident	Urban	0.74[0.50 - 0.08]	0.88[0.57- 1.35]	-0.04
	Rural	1.00	1.00	
Father educational status	Can't read and write	0.57[0.33- 0.96]	0.62[0.35- 1.09]	-0.47
	Read and write but no formal education	0.60[0.35- 1.02]	0.59[0.33- 1.03]	-0.52
	Primary education	1.00	1.00	
	Secondary education and above	1.40[0.83-2.35]	1.08[0.62 – 1.88]	0.08
Perceived parental readiness to learn from children***		2.03[1.41 -2.92]	2.09[1.43- 3.06]*	0.73
Comprehensive Knowledge about malaria***		1.68[1.35 -2.09]	1.34[1.19 -1.50]*	0.29

*** = continuous variables, *= significant variables p- value <0.05

A one year increase in age was associated to increase the likelihood of children to parent communication by the factor of 1.18 and it was statistically significant at [AOR, 95% CI, 1.18 (1.04, 1.34)]. Comprehensive Knowledge related to malaria were positively associated with child to parent communication and a unit increase in the total score of comprehensive knowledge was associated to increase the likelihood of child to parent communication about malaria by the factor of 1.34 and it was statistically significant at [AOR,95%CI,1.34(1.19,1.50)].

Perceived Parental readiness to learn from children were also positively associated with child to parent communication, a unit increase in the total score of perceived parental readiness to learn from children was associated to increase the likelihood of child to parent communication about malaria by the factor of 2.09 and it was statistically significant at [AOR, 95% CI, 2.09 (1.43, 3.06)].

5. Discussion

This study assess malaria related knowledge and child to parent communication regarding prevention and control of malaria. Majority (64.8%) of students associate malaria with stagnant water while (62.7%) of them mentioned that mosquito causes malaria. However, there were some misconception about the causes of malaria such as drinking dirty water/eating dirty food can cause malaria. Although the student's perception that stagnant water as direct cause of malaria seem incorrect but it could be risk factor for malaria as it is breeding site for mosquito. Despite this fact, this perception of the student as direct causes of malaria may influence the actual prevention method they may choose. Thus this perception should be corrected with appropriate health education. This result is high when compared with the study conducted in central India

reported only 8.6% of students were aware about the cause of malaria[15]. Even though there are some misconceptions, students in this study have relatively high knowledge about the cause of malaria than those from central India.

The majority (78.5%) of the students had knowledge that mosquito bite transmits malaria. However, there were also misconceptions related to modes of transmission such as bodily contact with malaria patient, breathing and flies. This finding is similar with study conducted in Tanzania and Cameroon and Nigeria [16,17,18]

Majority of students mentioned feeling cold (75.7%) and headache (44.4%) as malaria symptom while fever was mentioned only by 1/3rd of the students. However, in similar study conducted in central India, Nigeria and Cameroon [15,17,18] fever was the most sited symptoms of malaria. This discrepancy might be because of inadequate health education given to the students.

Regarding methods of prevention majority of the students, (71.1%) stated that sleeping under ITN prevents malaria. Additionally, large percentage of the students, (67.4%), mentioned that cleaning the environment prevents malaria. Other prevention methods such as: using mosquito repellent, taking preventive medication and spraying house with insecticide less frequently mentioned by the students. However, significant number of the students still believed that avoiding drinking dirty water prevents malaria. This finding is similar with the study carried out among school adolescent in Nigeria and Cameroon[17,18]

In this study about 53.7% of students heard message about malaria during the past six month prior to the study. The major sources of information about malaria in this study were radio 98 (42.2%) which is consistent with study in Nigeria and central India[19,16] while the finding of this study disagrees with another studies in Nigeria and Tanzania where health workers and teachers were the major

sources of malaria information respectively [18]. The possible reason for this inconsistency might be b/s of the difference in access of media among respondents, lack of knowledge about malaria among teachers and lack of health education program at school.

6. Limitation

There was a problem in attitude measurement in the data since the items were not enough to measure attitude and the reliability was poor which needs further validation.

7. Conclusion

In this study comprehensive knowledge about malaria was found to be high among the students. However, knowledge gap about the cause and transmission were also observed among the students. Electronic media, namely TV and radio were the main source of message to affect students' knowledge. However, teachers and health workers were less common sources needing attention to work over them. Nearly half 49.5% of students communicate with parents regarding prevention and control of malaria. The major points of communication were about prevention methods like sleeping under ITN and cleaning the environment. Comprehensive knowledge was high among respondents in grade seven and eight. Furthermore, age, knowledge and parental readiness to talk with children were independent predictors of child to parent communication. As schools are the place where future generation acquire knowledge and develop positive behavior providing school children with malaria information and equipping them how to communicate this information with parents is crucial for the prevention and control of malaria as children's are influential for changing the behavior of their parents. So malaria health education should be strengthened in the schools to advance malaria knowledge and foster communication behavior of the students in collaboration with health facilities and woreda health offices and health facilities should give attention for schools through equipping teachers with information about malaria prevention and control strategies so that such knowledge could be passed on to students.

Acknowledgements

We acknowledge Jimma University for funding this study. We are also thankful to the study participants for their voluntary participation.

Authors' Contributions

Yamrot Debela conceived and designed the study. Yamrot Debela, Zewdie Birhanu, and Yohannes Kebede were involved in the conduct, analysis, data interpretation, report writing and preparing the manuscript. In addition, Yamrot Debela drafted the manuscript. All authors have

reviewed, read and approved the final version of the manuscript.

References

- [1] Brooker Simon. Malaria Control in Schools: A toolkit on effective education sector responses to malaria in Africa. The World Bank; 2009.
- [2] World Health Organization. World Malaria Report: 2012. WHO; 2012.
- [3] African Red Cross & Red Crescent Health Initiative. No Title [Internet]. 2010. Available from: <http://www.ifrc.org/WHAT/health/archi/fact/fmalar.htm>. Date of access: January 20,2014.
- [4] Barat LM, Palmer N, Basu S, Worrall E, Hanson K MA Do. Malaria control interventions reach the poor? A view through the equity lens. *Am J Trop Med Hyg.* 2004; 71(2):174–8.
- [5] President's malaria initiative. Malaria protection in pregnancy: 2012;6–7.
- [6] Onyango-ouma W, Aagaard-hansen J, Jensen BB. The potential of schoolchildren as health change agents in rural western Kenya. *Journal of social science& medicine* 2005;61:1711–22.
- [7] President's malaria initiative. Indoor Residual Spraying (IRS) 2 for Malaria Control. 2013.
- [8] USAID. The President ' s Malaria Initiative Fifth Annual Report to Congress. 2011.
- [9] Adugna A. Malaria in Ethiopia [Internet]. Available from: www.EthioDemographyAndHealth.org
- [10] president's malaria initiative. Malaria operational plan(MOP),Ethiopia. 2008.
- [11] World Health Organization (WHO). Malaria Prevention and Control: An important responsibility of a Health-Promoting School. WHO information series on school health; document 13; 2007.
- [12] Irene Ayi , Daisuke Nonaka ,Josiah K Adjovu , higeikiHanafusa , Masamine Jimba, Kwabena M Bosompem ,Tetsuya Mizoue , Tsutomu Takeuchi , Daniel A Boakye , Jun Kobayashi. School-based participatory health education for malaria control in Ghana: engaging children as health messengers. *Malar. J.* 2010; 9(1):1-12.
- [13] Nonaka D, Kobayashi J, Jimba M, Vilaysouk B, Tsukamoto K, Kano S, Phommasack B, Singhasivanon P, Waikagul J, Tateno S, Takeuchi T. Malaria education from school to community in Oudomxay province, Lao PDR. *Parasitol Int.* 2008; 57:76–82.
- [14] Okabayashi H, Thongthien P, Singhasvanon P, Waikagul J, Looareesuwan S, Jimba M. Keys to success for a school-based malaria control program in primary schools in Thailand. *Parasitol Int.* 2006;55:121–6.
- [15] Dambhare DG, Nimgade SD, Dudhe JY. Knowledge , Attitude and Practice of Malaria Transmission and Its Prevention among the School Going Adolescents. *Glob. J. Health Sci.* 2012;4(4):76–82.

- [16] FEDSON and F.J. KAYOMBO. knowledge on malaria transmission and prevention among schoolchildren. Tanzania Heal. Reasearch Bull. 2007; 9(3):207-209.
- [17] Makoge V, Ndzi E, Mbah G, Nkengazong L, Moyou R, Makoge V. Status of malaria-related knowledge in school-going children. Arch. Appl. Sci. Res. 2013;5(1):105–11.
- [18] Eko Jimmy E., Osonwa Kalu O., Abeshi, S. E, Offiong Dominic A. Practices of Malaria Prevention among School Adolescent within Calabar Metropolis , Southern Nigeria. 2013;4(2):241-254.
- [19] Etokidem AJ. Malaria: Knowledge and prevention practices aMong school adolescents in a coastal coMMunity in calabar, nigeria. Afr J Prm Heal. Care Fam Med. 2010; 2(1):1-4.