



Published in final edited form as:

J Med Trop. 2015 ; 17(2): 65–70. doi:10.4103/2276-7096.162283.

Effect of health education on knowledge of malaria and long lasting insecticide-treated nets among clients accessing care in the out-patient Department of a Secondary Health Facility in Plateau State, Nigeria

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Abstract

Background: Malaria is a mosquito borne disease transmitted by female anopheles mosquito; it is life-threatening, preventable, and treatable. Approximately, 40% of the world's population is at risk of malaria. Most cases and deaths due to malaria are in sub Saharan Africa although Asia, Latin America, the Middle East and some parts of Europe are also affected.

Objective: To assess the knowledge of malaria and long lasting insecticide treated nets (LLITNs) among clients assessing out-patient services in Seventh day Adventist (SDA) Hospital.

Methodology: A quasi experimental study conducted in 2013 among client assessing care at the Out-Patient Department of SDA Hospital Jengre, Bassa Local Government Area of Plateau State to determine the knowledge of malaria and LLITNs. EPI info statistical software version 3.5.4 was used for data analysis and 95% confidence interval was used in this study with a $P < 0.05$ considered as statistically significant.

Result: The mean age of the respondents in this study was 36.04 ± 9.60 years. The level of knowledge on malaria improved significantly after the training ($P < 0.001$). Majority (98.8%) of the respondents had good knowledge of LLITNs after the training as against 77.4% who had same before the training ($X^2 = 17.93$; $P < 0.001$).

Conclusion: This study has demonstrated the effectiveness of health education as vital tool for improving the knowledge of malaria and LLITNs.

Keywords

Health education; long lasting insecticide treated nets; malaria

Introduction

Malaria is a mosquito borne disease transmitted by female anopheles mosquito; it is life-threatening, preventable and treatable.^[1] Approximately, 40% of the world's population are at risk of malaria.^[2] Every year, more than 500 million people become severely ill with malaria globally.^[2,3] Most cases and deaths due to malaria are in sub Saharan Africa although Asia, Latin America, the middle East and some parts of Europe are also affected.^[2] Thirty countries in Sub-Saharan Africa account for 90% of global malaria deaths.^[4] Malaria contributes about 25% of disease burden in Africa and an estimated \$12 billion lost a year in terms of health cost and productivity.^[5] Malaria is a major public health problem in Nigeria accounting for an estimated 100 million cases with over 300,000 deaths/year.^[4,6] Malaria prevention in Africa merits particular attention as the world strives towards a better life for everyone and it has been established that long lasting insecticide treated nets (LLITNs) represent a practical and effective means malaria prevention in Africa.^[7] This study was conducted to assess the knowledge of malaria and LLITNs among clients accessing care at the Out-Patient Department (OPD) of SDA Hospital Jengre Bassa Local Government Area (LGA), Plateau State.

Access this article online	
Quick Response Code:	Website: www.jmedtropics.org
	DOI: 10.4103/2276-7096.162283

Methodology

Study Area

This study was conducted in SDA Hospital Jengre, Bassa LGA of Plateau state. Plateau State is located in North Central Zone of Nigeria. With an area of 26,899 km², the state has an estimated population of 3.2 million.^[8,9] It is bounded by Bauchi State to the Northeast, Kaduna State in to the Northwest, Nassarawa State to the Southwest and Taraba State to the Southeast. Plateau State has 17 LGAs and three senatorial zones.^[8]

Seventh Day Adventist hospital is a mission hospital established in 1947 with bed capacity of 75 and staff strength of 70.^[10] It is a secondary health care institution, which offers specialist and general medical care. The service units in the hospital are the OPD, Emergency Unit and comprehensive HIV/AIDS care unit. The hospital has a wide network of clients particularly in the northern part of the country.^[10]

Study Population

This comprised of clients residents within Bassa LGA who accessed health care services in the OPD unit of SDA Hospital Jengre.

Study Design

This study was a quasi-experimental study with pre intervention and postintervention phases using quantitative method of data collection.

Inclusion And Exclusion Criteria

Individuals who were 18 years above, residing in Bassa LGA attending the OPD of SDA hospital for medical care with no history of use of anti-malaria medications within the last 1-month prior to the study were included in the study. Individuals <18 years of age and residing outside Bassa LGA with history of use of anti-malaria medications within the last one prior to the study were excluded from the study.

Sample Size Determination

The sample size was calculated using standard acceptable formula and 86%^[11] proportions of the respondents with knowledge of LLITNs from a previous study was used and a minimum sample size of 84 was obtained.

Sampling Technique

A multi-stage sampling technique was used in this study.

Stage I—From the list of seventeen LGAs in Plateau State, Bassa LGAs was selected by balloting using simple random sampling technique.

Stage II—Seventh Day Adventist Hospital was selected from the list of three secondary health facilities in Bassa LGA of Plateau State using simple random sampling technique by balloting.

Stage III—A list of 125 individuals who had met the inclusion criteria was drawn from the weekly booking clinic register of 194 clients who had attended the OPD within two consecutive weeks prior to the commencement of the study. The booking of these 194 clients was done by the attending physicians following the request of the principal researcher during the advocacy visit to the hospital requesting that all clients attended to in the OPD two consecutive weeks after the advocacy visit be booked for the study following the clients approval. The OPD attends to clients every day of the week except Saturday. A computer generated table of random numbers from WINPEPI statistical software was used to select 84 participants out of the 125 eligible participants for this study.

Preparation For Data Collection

Advocacy visit was paid to the Medical Director and the management of the SDA Hospital Jengre to solicit for the hospital's support. Four resident doctors from the department of Community Medicine Jos University Teaching Hospital (JUTH) were trained as research assistants to aid with the administration of questionnaires as well as participating in the health education. The tool of data collection was pretested in a secondary health in another LGA of the state. This helped in making appropriate corrections where necessary.

Ethical Consideration

Anonymity and confidentiality of the information obtained was assured and maintained. Ethical clearance was obtained from Ethical Review Committee of JUTH, Jos.

Data Collection Instrument

A semi-structured interviewer administered questionnaire was used to obtain information from the participants.

Data Collection

Four trained research assistants participated in the data collection prior to the intervention after a detailed explanation as to the purpose of the study was given to all the eligible respondents and verbal as well as written informed consent was obtained from each subject before the administration of the questionnaire.

Intervention

Health education intervention was provided to all the participants in a comfortable and conducive area in the hospital. The health education focused on the cause of malaria, ways of preventing malaria, types of mosquito nets, benefits of insecticide treated bed net and information on the importance of the consistent use of LLITNs and actions to be taken to prevent malaria. The sessions also had demonstration on the way the LLITNs should be mounted and used. Pamphlets and posters (IEC materials) providing relevant information on malaria and LLINs were also used as tools during the session and was given to all the participants to take home to serve as reminder tools. There were two health education sessions with 42 participants in each session lasting 1½ h and delivered by the same member of the research team who is proficient in Hausa language in order to ensure uniformity and quality of the content as well as method of delivery. All the participants had one health education session.

Post Intervention

Three months after the intervention, quantitative data were again collected with the same data collection instruments from the respondents.

Data Analysis

Data analysis was performed using Epi info™ statistical software package version 3.5.4 developed by CDC 1600 Clifton Rd. Atlanta, GA 30333 USA. A 95% confidence level was used for the study, and a $P = 0.05$ was considered statistically significant.

Scoring and Grading of Responses

Knowledge of malaria—There were six stem questions on knowledge of malaria with 26 possible responses and only 11 of these responses were correct. One mark was awarded for each correct response and no mark was awarded for wrong response or I don't know response. A total of 11 maximum attainable scores were used for the assessment of knowledge of malaria. A score of 0–5 marks out of 11 marks was graded as poor knowledge

of malaria and score of 6–11 mark out of 11 marks was graded as good knowledge of malaria.

Knowledge of long lasting insecticide treated nets: There were five stem questions on knowledge of LLITNs with 15 possible responses and only 6 of these responses were correct. One mark was awarded for each correct response and no mark was awarded for wrong response or I don't know response. A total of six maximum attainable scores were used for the assessment of knowledge of LLITNs. A score of 0–2 marks out of 6 marks was graded as poor knowledge of LLITNs and score of 3–6 mark out of 6 marks was graded as good knowledge of LLITNs.

Result

A total of 84 respondents participated at preintervention phase of the study while 82 were available at postintervention phase giving a response rate of 97.6% and an attrition rate of 2.4%. The age range of the respondents in this study was 18–67 years with mean age of 36.04 ± 9.60 years. Majority (71.4%) of the respondents were female. Christianity was the predominant religion of the respondents while 72 (85.7%) of the respondents were married. Only 5 (6.0%) of the respondents had tertiary education [Table 1].

The proportions of respondents who knew malaria as a preventable disease increased slightly from 78 (92.9%) preintervention to 79 (94.4%) postintervention ($P = 0.404$). The respondents' knowledge on the causes of malaria showed statistically significant improvement after the health education as majority (98.8%) mentioned bite by female anopheles mosquito as the cause of malaria as against 78.6% who mentioned same before the health education sessions ($P < 0.001$). Improvement in the level of misconceptions about the cause and transmission of malaria was observed postintervention as the proportion of the respondents who mentioned drinking of dirty reduced from 9 (10.7%) to 2 (2.4%) and eating of unripe mangoes from 11 (13.1%) to 3 (3.7%). Majority (98.8%) of the respondents following the intervention knew that the consistent use of LLITNs could be used to prevent malaria ($P < 0.001$). Furthermore, 77 (93.9%) of the respondents knew that cleaning of the environment could be a preventive measure against malaria after the training as against 43 (51.2%) before the training ($P < 0.001$). Use of insecticide sprays was mentioned as a method of prevention of malaria by 33 (39.3%) of the respondents at baseline and increased to 68 (82.9%) after the intervention ($P < 0.001$). The level of knowledge of malaria in this study was significantly influenced by the health education intervention as majority (98.8%) of the respondents had good knowledge postintervention as against 65.5% preintervention ($P < 0.001$). Similarly, the mean knowledge score on malaria showed statistically significant improvement from 6.13 ± 1.93 preintervention to 8.66 ± 1.51 out of 11 marks (t -test = 9.38; $P < 0.001$) [Table 2].

Statistically significant improvement in the knowledge of LLITNs was achieved in this study using health education as a tool as all the respondent became aware of LLITNs and its usefulness at the end of the study as against 60 (71.4%) with the same level of awareness at baseline ($\chi^2 = 27.39$; $P < 0.001$). The overall level of knowledge of LLITNs among the respondents also showed statistically significant improvement at postintervention with the

knowledge scores on LLITNs increasing from 4.10 ± 1.38 at preintervention to 5.58 ± 0.50 out of 6 marks (t -test = 9.09; $P < 0.001$) [Table 3].

Discussion

The age range of the respondents in this study was 18–67 years with mean age of 36.04 ± 9.60 years. Other studies carried out in Uganda, Mozambique, Nigeria and Cameroon were also in agreement with findings of this study.^[11–14]

This study had more female respondents which is in agreement with findings of studies done in Nigeria, Cameroon and Ethiopia which gave a predominantly female respondents.^[13–16] However, another Nigerian study had a contrary finding of more male respondents.^[17]

In this study, there was also statistically significant improvement in the knowledge of malaria being a preventable disease at the postintervention phase of the study. In an Indian study, it was found that 65% of the respondents considered malaria a serious but preventable disease which further supported the findings of this study.^[18] A study conducted in Uganda further buttressed this finding as majority of the respondents knew that malaria could be prevented. The awareness of mosquito bite as the cause of malaria was found to be high as it increased significantly after the intervention. A study done in India showed that 63% of the respondents knew that bites by female anopheles mosquito cause malaria.^[18] Other Nigeria and Ethiopian studies revealed that less than half of the respondents identified mosquito bite as the cause of malaria.^[19,20] While studies conducted in Nigeria, Ghana showed that respondent had good knowledge of the cause of malaria.^[21,22]

Also in this study the level of misconceptions of malaria being caused by eating of unripe mangoes reduced among the respondents following the intervention. Similar misconceptions were also expressed in other studies.^[20–23] These misconceptions expressed in this study and other studies could however be due to the socio cultural beliefs of the respondents.

Majority of the respondents after the intervention had overall good knowledge of malaria as compared to slightly above half who had overall good knowledge before the intervention which showed statistically significant improvement. The mean knowledge score on malaria also showed statistically significant improvement after the health education intervention. This significant improvement in knowledge on malaria brings to light the importance and significance of a well structure health education intervention as a tool for change.

There was statistically significant improvement in the awareness of use of LLITNs as a means of malaria prevention after the intervention. This finding is in tandem with findings of other studies.^[11,13,18,21,22] This may have been due to that fact that health education has been employed in most malaria endemic areas as a tool for marketing the use LLITNs as means of malaria prevention through the use of mass media and other relevant means. However, Contrary to the findings of this study, another Nigerian study reported low knowledge of LLITNs.^[19]

Conclusion

This study has demonstrated the effectiveness of health education as vital tool for improving the knowledge of malaria and LLITNs.

References

1. Kliegman MR, Stanton FB, Geme WJ St., Schor FN, Behrman ER. Malaria. In: Nelson Textbook of Paediatrics. 19th ed. Philadelphia: Elsevier Saunders; 2011. p. 1198–207.
2. Trinity College University of Dublin. Goal 6: HIV/AIDS, malaria and other diseases. html: file://F:/Goal6HIV-AIDS, malaria and other diseases-Topic and Resource-Development studies-Trinity College Dublin.mht! Available from: <http://www.tcd.ie/>. [Last accessed on 2013 Apr 04].
3. Ammann A, Burrowes S. Malaria and HIV: The impact on pregnant women and infants. Available from: <http://www.womenchildhiv.org>. [Last accessed on 2013 Dec 22].
4. United States Embassy in Nigeria. Nigeria Malaria Fact Sheet; 2011. Available from: <http://www.photos.state.gov>. [Last accessed on 2013 Apr 17].
5. Country Coordinating Mechanism (CCM). Nigeria on Malaria. Available from: <http://www.ccmnigeria.org/index.php>. [Last accessed on 2013 Feb 21].
6. Nzayirambaho M, Bizimana Jde D, Freund RJ, Millet P, Merrien FX, Potel G, et al. Impact of home-based management of malaria combined with other community-based interventions: What do we learn from Rwanda? *Pan Afr Med J* 2013;14:50. [PubMed: 23560133]
7. Killeen GF, Smith TA, Ferguson HM, Mshinda H, Abdulla S, Lengeler C, et al. Preventing childhood malaria in Africa by protecting adults from mosquitoes with insecticide-treated nets. *PLoS Med* 2007;4:e229. [PubMed: 17608562]
8. Plateau State: Background Information. Available from: <http://www.onlineNigeria.com>. [Last accessed on 2013 Jul 07].
9. National Bureau of Statistics Federal Republic of Nigeria: 2006 Population Census official Gazette FGP 71/52007/2,500(OL24); Legal Notice on Publication of the Details of the breakdown of the National and State Provisional Totals 2006 Census. Available from: <http://www.nigerianstat.gov.ng/connection/pop2006>. [Last accessed on 2013 Dec 23].
10. Seventh-Day Adventist Church. Healthcare institutions: Hospital and sanitarium. In: 2011 Year Book. Hagerstown, USA: Review and Herald Publishing Association; 2011. p. 660.
11. Uganda Population Service Commission. Malaria TRac Study Examining Insecticide Treated Net Use Among People Living with HIV/AIDS; 2005. p. 2–8.
12. Saracino A, Nacarapa EA, da Costa Massinga EA, Martinelli D, Scacchetti M, de Oliveira C, et al. Prevalence and clinical features of HIV and malaria co-infection in hospitalized adults in Beira, Mozambique. *Malar J* 2012;11:241. [PubMed: 22835018]
13. Wondimeneh Y, Ferede G, Atnafu A, Muluye D. HIV-malaria co-infection and their immunohematological profiles. *Eur J Exp Biol* 2013;3:497–502.
14. Njunda LA, Kanga HF, Nsagha DS, Assob JN, Kwenti TE. Low malaria prevalence in HIV-positive patients in Bamenda, Cameroon. *J Microbiol Res* 2012;2:56–9.
15. Uneke CJ, Ogbu O, Inyama PU, Anyanwu GI. Malaria infection in HIV-seropositive and HIV-seronegative individuals in Jos-Nigeria. *J Vector Borne Dis* 2005;42:15–4. [PubMed: 15999456]
16. Onyenekwe CC, Ukibe N, Meludu SC, Ilika A, Aboh N, Ofiaeli N, et al. Prevalence of malaria as co-infection in HIV-infected individuals in a malaria endemic area of southeastern Nigeria. *J Vector Borne Dis* 2007;44:250–4. [PubMed: 18092531]
17. Akinbo FO, Okala CE, Omoregie R, Mordi R, Igbinuwen O. Prevalence of Malaria and anaemia among HIV-infected patients in Benin City, Nigeria. *N Z J Med Sci* 2009;63:78–80.
18. Vijayakumar KN, Gunasekaran K, Sahu SS, Jambulingam P. Knowledge, attitude and practice on malaria: A study in a tribal belt of Orissa state, India with reference to use of long lasting treated mosquito nets. *Acta Trop* 2009;112:137–42. [PubMed: 19631184]
19. Ekwunife OI, Ukwe CV, Awanye AM. Knowledge and treatment seeking pattern of malaria infection in Abakaliki, Ebonyi State. *RJPBCS* 2010;1:317–23.

20. Dagne G, Deressa W. Knowledge and utilization of insecticide treated mosquito nets among freely supplied households in Wonago Woreda, Southern Ethiopia. *Ethiop J Health Dev* 2008;22:34–41.
21. Pettifor A, Taylor E, Nku D, Duvall S, Tabala M, Meshnick S, et al. Bed net ownership, use and perceptions among women seeking antenatal care in Kinshasa, Democratic Republic of the Congo (DRC): Opportunities for improved maternal and child health. *BMC Public Health* 2008;8:331. [PubMed: 18816373]
22. Udonwa NE, Gyuse AN, Etokidem AJ. Malaria: Knowledge and prevention practices among adolescents in a coastal community in Calabar, Nigeria. *Afr J Prim Health Care Fam Med* 2010;2:4.
23. Sande S, Jagals P, Mupeta B, Chadambuka A. An investigation of the use of rectangular insecticide-treated nets for malaria control in Chipinge District, Zimbabwe: A descriptive study. *Pan Afr Med J* 2012;13:5.

Table 1:

Sociodemographic characteristics of the respondents

Variables	<i>n</i> =84	
	Frequency	Percentage
Age (years)		
18–27	20	23.8
28–37	33	39.3
38–47	19	22.6
48–57	9	10.7
58–67	3	3.6
Mean age	36.04±9.60 years	
Sex		
Female	60	71.4
Male	24	28.6
Religion		
Christianity	72	85.7
Islam	12	14.3
Marital status		
Single	6	7.1
Married	72	85.7
Widowed	6	7.1
Level of education		
Nonformal	27	32.1
Primary	24	28.6
Secondary	28	33.3
Tertiary	5	6.0

Table 2:

Knowledge of malaria among the respondents

Variables	Frequency (%)		χ^2	df	P
	Preintervention (n=84)	Postintervention (n=82)			
Malaria as a preventable disease					
Yes	78 (92.9)	79 (94.4)		-	0.404**
No	3 (3.6)	3 (3.6)			
Don't know	3 (3.6)	0 (0.0)			
Causes of malaria *					
Mosquito bite	66 (78.6)	81 (98.8)	16.72	1	<0.001
Drinking of dirty water	9 (10.7)	2 (2.4)	12.05	1	0.001
Dirty environment	36 (42.9)	26 (31.0)	2.21	1	0.138
Eating of unripe mangoes	11 (13.1)	3 (3.7)	4.79	1	0.029
Methods of prevention of malaria *					
Use of LLINs	18 (21.4)	81 (98.8)	103.14	1	<0.001
Cleaning of environment	43 (51.2)	77 (93.9)	37.79	1	<0.001
Use of insecticide spray	33 (39.3)	68 (82.9)	33.17	1	<0.001
Drinking of cleaning water	9 (10.7)	2 (2.4)	4.59	1	0.032
Avoidance of eating of unripe mangoes	11 (13.1)	2 (2.4)	6.53	1	0.011
Level of knowledge on malaria					
Good	55 (65.5)	81 (98.8)	31.08	1	<0.001
Poor	29 (34.5)	1 (1.2)			
Mean knowledge on malaria scores	6.13±1.93	8.66±1.51	9.35	165	<0.001

* Multiple responses obtained,

** Fisher's exact. df - degree of freedom,

LLIN - Long-lasting insecticidal nets

Table 3:

Knowledge of LLITNs among the respondents

Variables	Frequency (%)		χ^2	df	P
	Preintervention (n=84)	Postintervention (n=82)			
Awareness of LLITNs					
Yes	60 (71.4)	82 (100.0)	27.39	1	<0.001
No	24 (28.6)	0 (0.0)			
knowledge of LLITNs					
Good	65 (77.4)	81 (98.8)	17.93	1	<0.001
Poor	19 (22.6)	1 (1.2)			
Mean knowledge of LLITNs scores	4.10±1.38	5.58±0.50	t-test	165	<0.001

LLITN - Long lasting insecticide treated nets, df - degree of freedom