

## Enhancing mothers' home management and prevention of malaria through community health nursing interventions

MOA Adeyemo<sup>1</sup>, OA Oluwatosin<sup>2</sup>, OK Amodu<sup>3</sup> and OT Yekinni<sup>4</sup>

*Department of Nursing<sup>1</sup>, Ladoke Akintola University of Technology, Ogbomosho, College of Health Sciences, Isale Osogbo and Departments of Nursing<sup>2</sup>, Institute of Child Health<sup>3</sup>, College of Medicine and Department of Agricultural Extension and Rural Development<sup>4</sup>, University of Ibadan, Nigeria*

### Abstract

**Background:** Malaria contributes significantly to under-five mortality in Nigeria. Home management and prevention of malaria are key interventions for its control. However, effectiveness of these interventions require mothers' adequate knowledge and appropriate skills. The 2011 Disease surveillance and notification report of Osun state showed that the under-five malaria burden in Egbedore Local Government Area (LGA) was more than one third of the total in the state for all age groups in 2008, 2009 and 2010. This study assessed effects of nurse-led health education and supportive supervision on knowledge and practice of home management and prevention of malaria by mothers of under-fives in the LGA.

**Materials and method:** The study utilised quasi-experimental design. Stratified sampling technique was used to select 837 mothers of under-fives in seven out of ten wards of the LGA. The mothers were randomly assigned into one Control Group (CG) and two intervention groups: Health Education Group (HEG) and Health Education and Supportive Supervision Group (HESSG). The study instruments were observation checklist and structured questionnaire. Data collection was at pre- (P1) and post-interventions at one month (P2), three months (P3) and six months (P4). Data were analysed using descriptive statistics, Chi square test and ANOVA at  $p = 0.05$ .

**Results:** There were significant improvements in overall knowledge scores of the intervention groups at post-intervention. These improvements appreciably translated to better practice of home management and prevention of malaria and this relationship was significant. The home environment, headship of family and family structure significantly influenced home management and prevention of malaria.

**Conclusion:** Nurse-led health education and supportive supervision improved knowledge and practice of home management and prevention of malaria in Egbedore LGA. These approaches are therefore recommended.

**Keywords:** Nurse-led health education, Nurse-led supportive supervision, Under-fives, Home management of malaria, Malaria prevention.

### Résumé

**Contexte:** Le paludisme contribue significativement à la mortalité des moins de cinq ans au Nigeria. La gestion et prévention à domicile du paludisme sont des interventions clés pour son contrôle. Cependant, l'efficacité de ces interventions nécessite des connaissances adéquates et des compétences appropriées des mères. Le rapport de surveillance et de notification des maladies, 2011, de l'état de Osun a montré que le fardeau du paludisme des moins de cinq ans dans la communauté d'Egbedore était plus d'un tiers du total de l'état pour tous les groupes d'âge en 2008, 2009 et 2010. Cette étude a évalué les effets de l'éducation sur la santé dirigée par les infirmières et la supervision de soutien sur la connaissance et la pratique de la gestion et prévention à domicile du paludisme par les mères des moins de cinq ans dans la communauté.

**Matériaux et méthode:** L'étude a utilisé un modèle quasi-expérimental. La technique d'échantillonnage stratifié a été utilisée pour sélectionner 837 mères de moins de cinq ans dans sept quartiers sur dix de la commune. Les mères ont été réparties au hasard dans un Groupe témoin (CG) et deux groupes d'intervention: Groupe d'Education Sanitaire (GES) et Groupe d'Education Sanitaire et de Supervision de Soutien (GESSS). Les instruments d'étude étaient une liste de contrôle d'observation et un questionnaire structuré. La collecte des données a été effectuée au pré (P1) et après les interventions à un mois (P2), trois mois (P3) et six mois (P4). Les données ont été analysées à l'aide de statistiques descriptives, du test du Chi-carré et de l'ANOVA à  $p = 0,05$ .

**Résultats:** Il y a eu des améliorations significatives dans les notes globales de connaissances des groupes d'intervention lors de la post-intervention. Ces améliorations se sont traduites sensiblement par une meilleure pratique de la gestion à domicile et de la prévention du paludisme et cette relation était significative. L'environnement familial, le leadership



familial et la structure familiale ont considérablement influencé la gestion et prévention à domicile du paludisme.

*Conclusion:* L'éducation à la santé et la supervision de la santé menées par les infirmières ont permis d'améliorer la connaissance et la pratique de la gestion et prévention à domicile du paludisme dans la communauté d'Egbedore. Ces approches sont donc recommandées.

**Mots-clés:** *Éducation à la santé dirigée par les infirmières, supervision de soutien menée par les infirmières, Moins de cinq ans, Gestion à domicile du paludisme, Prévention du paludisme.*

## Introduction

In malaria endemic zone of the world like Nigeria, fever is considered a symptom of malaria until proven otherwise. The fever is usually first treated at home by mothers and care givers, but this kind of treatment may not be effective because the caregivers lack appropriate knowledge of malaria treatment [1, 2]. Ineffective intervention usually results in deterioration of initial uncomplicated to complicated malaria, characterised by high fatality rates among under-five children [1-3]. For instance, the 2011 Disease surveillance and notification report of Osun state showed that the under-five malaria burden in Egbedore Local Government Area (LGA) of Osun state Nigeria was more than one third of the total in the state for all age groups in 2008, 2009 and 2010 [4].

Utilisation of preventive measures is also at low level in Nigeria. A survey on utilisation of insecticide-treated nets by under-five children in Nigeria revealed that household ownership of any net was 23.9% and 10.1% for ITNs while utilisation rate of any net by children under-five was 11.5% and 1.7% for ITNs [5]. This falls far below the Abuja target, which is based on the protection of 60.0% of all pregnant women and children by 2005. In fact, the nets were not available in large quantities in the study area. As at December 2011 Egbedore LGA received only 2450 [6], this figure is rather too low for a whole local government area with population of 73,969.

The inappropriate home treatment and prevention of malaria is currently a major concern in the treatment of the disease, hence the need to imbibe the concept of community-based initiatives in ameliorating the greatest challenge of malaria treatment by health educating or training caregivers (blood and surrogate mothers) in recognising malaria illness and instituting prompt and appropriate home management [7]. Health workers are loaded with this

responsibility, however, due to lack of human and material resources, health educating or training of mothers have been mere passing information to mothers without follow up or supervision. Often, health education or training alone may not be enough to enhance sustenance of community health consumers' knowledge and practice of prevention and management of diseases, nurses need to support them through supervision to ensure quality outcome [8]. Home visit is a form of supervision which is commonly utilised in implementation of primary health care (PHC) services [9]. However, the service is facing many challenges in Nigeria, one of such challenges as identified by Alenoghena *et al* is inadequate funding [9].

In view of this, there is need for a paradigm shift that will provide a forum for supportive supervision within the health centres where the health care providers and health care consumers can be opportune to meet regularly and jointly identify and solve problems and challenges related to treatment and prevention of diseases, so that only patients with very serious problem will be followed up to their homes with the few available resources. Supportive supervision is defined as "range of measures to ensure that personnel carry out their activities effectively through direct personal contact on a regular basis to guide, support and assist designated staff to become more competent in their work." [10] This type of supervision was adapted to guide, support and assist the health care consumers to develop self-efficiency in their self care with a view to promoting good health and preventing diseases, thus utilisation of two interventions (health education and supportive supervision) in this study to enhance and sustain mothers' home management and prevention of malaria in Egbedore LGA in Osun state Nigeria

## Materials and method

### *Study site and population*

This study was conducted in Egbedore local government area, Osun state Nigeria. The local government area is located at the North West of the state [11] with population of 73,969, consisting of 37,302 males and 36,667 females [12]. The inhabitants of Egbedore LGA are predominantly Yorubas of the Oyo extraction. There were 22 primary health care facilities owned by the LGA and one National Primary Health Care Centre in the LGA as at the period of this study [11]. The target population for this study were mothers of under-five children residing in Egbedore LGA in Osun State South West of Nigeria.



### The research design

The research design was quasi-experimental and it was conducted in three phases. There were two experimental groups: Health education and supportive supervision group (HESSG) and Health education group (HEG) and one control group. The first phase of the study included activities on community entry and collection of baseline data on the respondents' knowledge of malaria relating to causes, transmission, symptoms, its treatment and prevention including practices of home management and prevention of malaria.

At the second phase, the mothers in health education and supportive supervision group (HESSG) were exposed to health education programme and supportive supervision while health education group (HEG) were exposed to health education programme only. The manual for the programme consisted of five modules as thus: 1- causes, transmission and importance of malaria, symptoms of uncomplicated and complicated malaria, 2 - Medical treatment and home management of malaria, 3- preventive measures of malaria and health promotion, 4- environmental management for control of malaria and 5- misuse of drugs. Thereafter, the HESSG had six-month supportive supervision in form of monthly personal interaction meetings by these researchers and two other public health nurses who were research assistants. They collaborated with the mothers to jointly identify and solve problems and challenges that the mothers might be experiencing in the process of preventing and treating malaria among their under-five children.

The third phase was evaluation of the mothers' knowledge and practices of home management and prevention of malaria among their under-five children at one month, three months and six months post-intervention. The study was carried out over a period of one year in order to enable the participants to exhibit appreciable behavioural change.

### Sampling procedure and sample size

The sample size for the study was calculated using the formula\* below;

$$n = \frac{1}{1-f} \times \frac{2 \times (Z_{\alpha} + Z_{\beta})^2 \times P \times (1-P)}{(P_1 - P_2)^2}$$

Where  $Z_{\alpha}$  = standard normal deviation corresponding to 2-sided level of significance of 5% = 1.96

$Z_{\beta}$  = standard normal deviation corresponding to a power of 85% = 1.03

$P_1$  = baseline proportion of under-five children who slept under any net pre-intervention estimated using proportion of under-five children who slept under mosquito net the night before in the National Demographic Health Survey (NDHS) 2008 which was 11.9% (NPC and ICF International 2009). (Any net data was used to cover all preventive measures because not all other measures were documented in previous studies or surveys except insecticide treated nets (ITNs) which was 5.5% in this same survey)[13].

\* **Source of the formula:** Kasiulevičius, V., Šapoka, V., and Filipavičiūtė, R. (2006) Sample size calculation in epidemiological studies *Gerontologija* 2006; 7(4): 225–231

Outcome of the sample size calculation with this epidemiological formula was 279 respondents per research group. Hence, a total of 837 mothers of under-five children who fulfilled the inclusion criteria (i.e. having at least an under-five child and residency in the selected communities for the study for a minimum of one year) were selected for the three research groups (i.e. control, Health education group and health education and supportive supervision group).

Stratified random sampling procedure was used for selection of the mothers in seven wards of the LGA. At the first stage, Egbedore LGA was stratified into four geographical areas; (A), (B), (C) and (D), using major roads that pass through the LGA; A-West, B - North-East, C - West and D - South

At the second stage, simple randomization was used to pick and designate three of the strata into intervention and control groups. The third stage of the sampling procedure entailed selection of women in the communities. Based on the proportional sample calculated from the projected population figures of women of reproductive age, the ratios for selecting respondents in each community were; - Ido-Osun 1 to 5 and Egbedi - 1 to 3 (HESSG); Ara, Ojo and Aro - 1 to 3 (HEG); Iragberi, Ikotun and Olope - 1 to 3 (CG). Balloting was used to pick a mother of under-five children in a household where they were more than one. Where there was no mother with under-five child in a house, the next house was visited and subsequent third and fifth house was calculated from the last one with an under-five child.

### Ethical Consideration

Approval was obtained from Ladoke Akintola University of Technology (LAUTECH) Teaching Hospital Osogbo, Osun state ethical committee.



Permission was also obtained from the chairman of Egbedore local government area and the head of the household. Written informed consent was obtained from the study participants.

#### *Data collection procedure*

Two instruments were used for data collection; questionnaire and checklist. The questionnaire was developed in English language, translated into local language (Yoruba) and back translated and pretested before use. The questionnaire was also subjected to congruence and test retest reliability tests, the coefficient of stability ( $r$ ) was 0.937 and  $p$ - 0.000 and the comparison of the Yoruba and English tests measured the coefficient of equivalence ( $r$ ) as 0.914 with its  $p$  -0.000. The reliability test in comparison of the two Yoruba versions gave ( $r$ ) as 0.971 and  $p$  - 0.000. It consisted of 46 questions grouped into nine sections; section A: name of nearest health facility in the community; section B: demographic characteristics of the mother and the household; section C: knowledge of causes, transmission and symptoms of malaria; section D: knowledge of home management of malaria; section E: knowledge of malaria preventive measures; section F: knowledge of complications of malaria; section G: practices of home management of malaria; section H: practices of malaria preventive measures section I: outcome of malaria management experiences

The checklist was used to assess the structure of home environment of the respondents to determine their suitability for prevention of malaria. It consisted of 11 questions and statements that were filled by research assistants on reaching the respondents' households. The respondents' scores for levels of knowledge and practices were converted to per cent, mean scores and standard deviation were also calculated for further analysis.

#### **Results**

The target number of 837 mothers of under-five children at 279 per group participated at first phase. Two hundred and eighty one (281) mothers in intervention group one (HESSG) and 269 mothers in intervention group two (HEG) attended the health education programme. Two hundred and fifty-nine (259) respondents in HESSG, 256 in HEG and 236 in the control group completed the study.

Table 1 shows the demographic characteristics of the respondents. The mean age of the mothers in the HESSG was 31.2 and the standard deviation was 7.0. In HEG, the mothers' mean age was 32.2 with standard deviation of 10. The mothers' mean age in the control group was 32.4 and the

standard deviation was 9.6. The mean size of the family of majority of the households in all the research groups ranged from 5.2 to 5.7 and the standard deviation was between 2.0 and 2.6. Most mothers (between 59.5 per cent and 68.1 per cent) in all the research groups had one under-five child.

#### *Calculation of knowledge and practice scores*

All the multiple responses were given "yes" and "no" options and the correct options were allocated one (1) each while the wrong ones was zero (0). The minimum mark obtainable for all types of knowledge and practice is zero (0) while the maximum marks obtainable (MMO) for each type of knowledge and practice assessed are:

Knowledge of causes, transmission and symptoms (knowledge one) – MMO = 39

Knowledge of home management (knowledge two) – MMO = 36

Knowledge of preventive measures (knowledge three) – MMO = 11

Total knowledge scores = 86

Practice of home management (practice one) – MMO = 38

Practice of preventive measures (practice two) – MMO = 20

Total practice scores = 58

The respondents' scores were converted to per cent, mean scores and standard deviation were also calculated for further analysis.

#### *Knowledge of causes, transmission and symptoms of malaria, home management and prevention of malaria*

At the three phases of post-intervention, there were improvements in the levels of knowledge of causes, transmission and symptoms of malaria, home management and prevention of malaria among the two intervention groups. The mean of total knowledge scores for HESSG significantly ( $p$ = 0.000) increased from 40.15±6.45 at pre-intervention to 73.32±5.15, 73.65±5.84 and 74.13±5.81 at post-intervention one, post-intervention two and post-intervention three respectively. For HEG, the mean of total knowledge score significantly ( $p$ = 0.000) increased from 37.90±5.03 at pre-intervention to 66.90±6.30, 74.65±4.78 and 71.04±6.75 at post-intervention one, post-intervention two and post-intervention three respectively. There was no significant difference in total knowledge's mean score within CG at post-intervention phases ( $p$ = 0.895,  $p$ = 0.951,  $p$ = 0.848). Details are found in Table 2.



**Table 1:** Demographic characteristics of the families of the respondents

Variable	HESGG (n = 279)	HEG (n = 279)	Control (n = 279)
<i>Age (years)</i>			
15 - 24	38 (13.6%)	46 (16.5%)	40 (14.3%)
25 - 34	153 (54.9%)	128 (45.5%)	140 (50.2%)
35 - 44	78 (27.9%)	78 (27.9%)	68 (24.4%)
45 - 54	7 (2.5%)	12 (4.3%)	20 (7.2%)
55 and above	3 (1.1%)	15 (5.7)	11 (3.9%)
Mean	31.2	32.2	32.4
Standard deviation	7.0	10	9.6
<i>Educational status</i>			
No formal schooling	18 (6.5%)	52 (18.6%)	75 (26.9%)
Primary school	64 (22.8%)	101 (36.2%)	87 (31.2%)
Junior secondary sch. 1-3	25 (9.0%)	48 (17.2%)	28 (10.0%)
Senior secondary sch. 1-3	127 (45.5%)	64 (22.9%)	76 (27.2%)
/Technical sch./ Grade 2			
Post-secondary school	45 (16.2%)	14 (5.0%)	13 (13%)
<i>Marital status</i>			
Married	264 (94.6%)	258 (92.5%)	254 (91.0%)
Single parent	15 (5.4%)	21 (7.5%)	25 (9.0%)
<i>Headship of the Household</i>			
Respondent	24 (8.6%)	35 (12.5%)	29 (10.4%)
Husband	255 (91.4%)	244 (87.5%)	250 (89.6%)
<i>Family structure</i>			
Nuclear	226 (81.0%)	187 (67.0%)	204 (73.1%)
Extended	53 (19.0%)	92 (33.0%)	75 (26.9%)
<i>Household characteristic</i>			
Monogamous	224 (80.3%)	192 (68.8%)	180 (64.5%)
Polygamous	40 (14.3%)	66 (23.7%)	74 (26.5%)
Single parent	15 (5.4%)	21 (7.5%)	25 (9.0%)
<i>Household size</i>			
3-6	216 (77.4%)	217 (77.7%)	194 (69.5%)
7 and above	63 (22.6%)	62 (22.3%)	85 (30.6%)
Mean	5.2	5.5	5.7
Standard deviation	2.0	2.3	2.6
<i>No of under-five children per mother</i>			
One	166 (59.5%)	178 (63.8%)	190 (68.1%)
Two	101 (36.2%)	84 (30.1%)	75 (26.9%)
Three	12 (4.3%)	17 (6.1%)	14 (5.0%)

#### *Practice of home management and prevention of malaria*

Home management of malaria by the respondents included what they did to reduce fever and treat malaria whenever their children had malaria fever, eight different actions (i.e. Expose the child and fan him/her; bath the child with lukewarm or tepid water; give the child enough fluid; give the child medicines to treat malaria; give herbal preparations (agbo); take the child to health facility immediately; take the child to pharmacy/patient medicine store and take the child to traditional healer) were listed from which they

were expected to choose. The respondents were also expected to mention the medicine used for treatment of malaria and describe administration of such medicines.

Practice of prevention of malaria were actions respondents usually take to protect their children from mosquito bites. They were expected to indicate which of the 10 listed preventive methods (i. e. Use of window and door nets; protecting oneself by wearing long sleeved clothes and full trousers; applying insect repellent creams; spraying the house with insecticide aerosol; using Long Lasting



**Table 2:** Mean and standard deviation of total knowledge and practice scores of the respondents

Variables	Intervention One (HESSG)*		Intervention Two (HEG)		Control	
P1	Pre-intervention					
	Mean	STD. Deviation	Mean	STD. Deviation	Mean	STD. Deviation
Total Knowledge	40.15	6.45	37.90	5.03	38.27	4.38
Total Practice	20.94	6.60	18.10	4.73	18.58	4.18
P 2	Post-intervention at one month					
Total Knowledge	73.32	5.15	66.90	6.30	45.82	7.65
Total Practice	39.80	5.56	36.98	4.11	25.15	5.57
P 3	Post-intervention at three months					
Total Knowledge	73.65	5.84	74.65	4.78	45.87	7.66
Total Practice	40.53	6.40	40.72	6.08	25.21	5.60
P 4	Post-intervention at six months					
Total Knowledge	74.13	5.81	71.04	6.75	45.85	7.55
Total Practice	40.84	5.05	38.91	5.61	25.12	5.60

Insecticidal Nets (LLINs) / Insecticide Treated Nets (ITNs) every day; destroying the breeding sites of mosquitoes around the house; throwing away containers, broken pots, unused tyres where water collect and mosquitoes breed; cutting grasses around the house and community; covering containers used to store water as well as filling up potholes and pools of water that do not flow) they used for their children and indicate how often they used it/them.

The study revealed that the majority of the respondents in HESSG and HEG fell in the category of good practices of home management and prevention of malaria throughout the post-intervention periods. At pre-intervention, the mean of total practice score of HESSG was  $20.94 \pm 6.60$ , it increased to  $39.80 \pm 5.56$  at post-intervention one,  $40.53 \pm 6.40$  at post-intervention two, and  $40.84 \pm 5.05$  at post-intervention three. The HEG had  $18.10 \pm 4.73$  at pre-intervention, which increased to  $36.98 \pm 4.11$  at post-intervention one,  $40.72 \pm 6.08$  at post-intervention two and  $38.91 \pm 5.61$  at post-intervention three. The difference in total practice scores of control group was not significant at post-intervention phases (post-intervention one =  $25.15 \pm 5.57$ , post-intervention two =  $25.21 \pm 5.60$  and post-

intervention three =  $25.12 \pm 5.60$ ). Table 2 presents details of the results.

#### *Factors associated with practice of home management and prevention of malaria*

One of the objectives of the study was to identify factors that were associated with home management and prevention of malaria among mothers of under-five children. Multinomial logit model was used to determine the relationship between the demographic data of the respondents and their practice of correct home management and prevention of malaria. The categories of scores for practice of home management and prevention of malaria were entered into multinomial logit equation as the dependent variables while the demographic data were entered as the independent variables. Cross tabulation analysis was also carried out to determine the association between the environmental variables on the checklist and their practices of correct home management and prevention of malaria. The categories of scores for practice of home management of malaria and prevention of malaria were entered into columns of the cross tabulation as the dependent variables. While the environmental variables were entered into the rows as independent variables.

The results revealed that practice of correct home management of malaria was significantly but negatively influenced by the head of household



**Table 3:** Independent sample t-test of difference between the Health Education and Supportive Supervision Group (HESSG) and Health Education Group (HEG) in the practice of home management and prevention of malaria

Phases of the study	Variable	Mean difference	Mean deviation	Standard	t-value	p-value
<b>Home management of malaria</b>						
Post-intervention one	Practice of home management of malaria	HESSG - 16.7 HEG- 13.1	3.58	HESSG- 5.9 HEG- 4.0	8.1	.000*
Post-intervention two	Practice of home management of malaria	HESSG - 15.1 HEG - 15.2	- 1.90	HESSG - 5.1 HEG- 2.7	- 0.307	.759
Post-intervention three	Practice of home management of malaria	HESSG - 16.2 HEG- 16.3	-1.90	HESSG- 4.6 HEG- 2.7	0.176	.861
<b>Prevention of malaria</b>						
Post-intervention one	Practice of prevention of malaria	HESSG- 14.2 HEG- 10.7	2.5	HESSG- 2.9 HEG- 3.0	13.6	.000*
Post-intervention two	Practice of prevention of malaria	HESSG- 13.0 HEG - 12.7	0.3	HESSG- 2.8 HEG- 3.2	1.0	.305
Post-intervention three	Practice of prevention of malaria	HESSG - 13.5 HEG- 12.8	0.7	HESSG- 2.4 HEG- 2.7	3.2	.001*

\*The mean difference was significant at the 0.05 level.

( $t = -2.779$ ;  $p = 0.005$ ) and family structure ( $t = -6.184$ ;  $p = 0.000$ ). This implies that practice of correct home management of malaria was poor in households headed by the respondents and extended families. Similarly, the findings of the study showed that family structure significantly influenced the respondents' practice of prevention in negative direction at both first level (movement from poor practice to fair practice ( $t = -4.583$ ;  $p = 0.000$ )) and second level (movement from fair practice to good practice ( $t = -3.975$ ;  $p = 0.001$ )) of probability. Implication of the finding is that extended families practiced prevention of malaria poorly while the practice was good in nuclear families. The respondents' educational status ( $t = 0.389$ ;  $p = 0.000$ ) significantly influenced their practice of prevention positively at second level of probability i. e. those who possessed higher qualification practiced prevention of malaria better than those with lower qualification.

In consideration of the environmental variables, the findings of the study revealed that majority (88.1%) of the respondents who lived in face-to-face houses had good practice of home management of malaria. The respondents' (74.3%) whose houses were plastered, those (92.3%) whose floors of houses were plastered, 81.7% of those whose ceilings of the houses were covered with asbestos and 93.1% of those whose surroundings were not bushy had good practice of home management of malaria. The results also revealed that the practice of prevention of malaria among all respondents was associated with type of house as majority (87.7%) of the respondents living in face-to-face houses had good practice of prevention of malaria. Similarly, the highest number of respondents whose walls of the houses were plastered (73.8%), floors of the houses were plastered (91.9%) and ceiling covered with asbestos (84.8%) had good practice of



prevention of malaria. All these are evidences of economic status of the respondents

*Comparison of the effects of health education with that of health education and supportive supervision on home management and prevention of malaria among mothers of under-five children post-intervention*

The findings of this study as presented in Table 3 revealed significant difference ( $t = 8.1$ ;  $p = .000$ ) between the HESSG and HEG in home management of malaria at post-intervention one but difference was not significant at post-interventions two and three phases respectively ( $t = -0.307$ ;  $p = .759$ ) ( $t = -0.176$ ;  $p = .861$ ). Independent t-tests revealed significant differences in practice of prevention of malaria between the HESSG and HEG at post-interventions one ( $t = 13.6$ ;  $p = .000$ ) and three ( $t = 3.2$ ;  $p = .001$ ) but the difference was not significant at post-intervention two. This implies that the significant difference in home management of malaria was strongly noted during the first month of the supportive supervision, while the significant difference in prevention was strongly noted during first and sixth month of the supportive supervision when the mothers were given free long lasting insecticidal nets freely by the state government.

## Discussion

At baseline of this study, the majority of the respondents had low level of knowledge of causes, transmission and symptoms of malaria as well as home management of malaria and poor knowledge of prevention of malaria. Sequel to intervention, there were improvements in the level of knowledge among the two intervention groups as they all had good knowledge of causes, transmission and symptoms of malaria, home management and prevention of malaria. This is consistent with similar studies [14-17] where respondents' level of knowledge of malaria significantly increased post-educational intervention. The higher levels of knowledge of the intervention groups over that of the control groups shows that mothers of under-five children were well disposed to health education to assist them in improving their level of knowledge on home management and prevention of malaria. This finding agrees with what obtained in many previous similar studies [16, 18].

The improvements in knowledge post-intervention appreciably translated to better practice of home management of malaria and this relationship was significant. The findings reflected significant relationship between levels of knowledge of causes, symptoms and transmission of malaria and correct home management of malaria among the

respondents' post-intervention. This could be explained by the fact that correct knowledge of the causes, symptoms and transmission of malaria has been reported to influence one's ability to institute appropriate action in treating malaria at the onset of the signs and symptoms [15, 19] The findings are also consistent with previous studies in sub-Sahara Africa [15-18,20] where health education and training had positive impact on mothers and other caregivers' home management of malaria.

The improved preventive practice of majority of respondents at post-intervention was likely to have been boosted by distribution of two long lasting insecticidal net (LLINs) per woman in the State at the sixth month of the intervention by the government of the State of Osun and the Federal Ministry of Health. This finding is consistent with similar studies [16, 21] where it was found that the strongest predictors of insecticide treated nets (ITNs) use were age less than five years and increasing number of ITNs in a household.

The increase in knowledge scores of the control group at post-intervention at one month could be the effect of different media jingles on malaria prevention and control that all the communities had experienced as well as the influence of improved communication technology (use of cell phones) on the respondents. This was a very prominent limitation beyond the researcher's control. However, the control group could not maintain the increase at post-intervention at three and six months because there was no significant increase in the knowledge and practice scores of the group. Similar finding was reported in Bhutan [16] where the number of respondents in control group who knew that their houses should not be plastered or whitewashed for at least six months after indoor residual spraying to retain chemical effectiveness increased from 1.5% at pre-intervention to 9.8% at post-intervention.

The finding of this study at post-intervention at one month revealed significant difference in the practices of home management of malaria between the health education and supportive supervision group (HESSG) and the health education only (HEG). This agrees with the finding of a study in Uganda [22] where there was an improvement in malaria diagnosis and fever case management, using rapid diagnostic test (RDTs) at primary health care (PHC) facilities, following supportive supervision they rendered to the study subjects. However, at post-intervention phases two and three, the differences in levels of practices found in the HESSG and HEG was not significant. This finding could be explained by the fact that the attendance of the participants at



the monthly supportive supervision meetings was not good enough, not up to 50.0% of the mothers who participated in the health education awareness programme attended the supportive meetings throughout the period of the supervision. This fair attendance by the mothers might be because the intervention is new and most mothers have not seen it as a forum for group therapy where their health challenges and problems could be resolved. The finding has significant implications for community health nurses as primary health care providers who should be making use of this model to sustain health promotion practices. Community health nurses need to be adequately trained on utilisation of supportive supervision among community health consumers now that there are dwindling human resources and logistic support for traditional home visit for sustainability of the health education strategy.

Majority of the respondents in the three research groups were married while few were either widows or single parents. Even though, marital status did not have direct significant association with good practice of home management and prevention of malaria, the findings revealed that female-headed households practiced home management and prevention of malaria poorly. The nuclear families were found to have practiced home management and prevention of malaria better than their counterparts from extended families. Probably their moderate family sizes made them to enjoy better socio-economic status that translated to better health status as it was stated in NDHS 2013 report that household composition usually determine the family's health status and well-being [23] Similarly, this finding might be explained by the fact that the role of head of household is the responsibility of men who are expected to provide financial support for the entire household members. Where women are playing this role, not all the responsibilities attached to the role will be fully achieved. Anyanwu commented that female-headed households have been observed in many recent studies to be poorer than male-headed households [24]. This might have been the reason for the poor practice of home management of malaria among the female-headed households in this study because they did not have opportunity of enjoying double income earnings. Obrist, Mayumana and Kessy quoting Hausmann *et al.* mentioned that female heads of households in Ifakara were at the risk of delaying treatment for their children due to inadequate resources [25].

Mothers' level of education was found to have influenced the practice of prevention of malaria, mothers with post-secondary school education had

good practice of prevention of malaria. People with higher level of education have tendency to build on the existing knowledge and be able to read and understand any reading materials on their phenomenon of interest. Copies of the health education manual and handbills on malaria control were distributed to the mothers at the end of the programme; this must have enhanced their understanding and practice. This finding is consistent with the finding of a study in Kenya [26] where there was significant low ITN ownership in households with non-educated parents or guardians and significant higher percentage of ITN ownership in households where at least a member had primary or secondary education. The low level of education must have had effect on the respondents' economic status as education has been documented to increase the stock of human capital with subsequent increase in labour productivity and wages [24]. The poor socio-economic related factors that were associated with poor practice of home management and prevention of malaria as well as financial constraint that was generally recorded during supportive supervision meetings could be associated with this low level of education.

The extended families in this study had poor practice of home management of malaria. The implication of this finding is that the more expanded the family, the lesser the ability of the mother in managing malaria at home correctly. The reason for this might also be attributed to inadequate resources for provision of adequate care that is usually found in expanded families. This finding corroborates a study in Kenya [27] where there was association between large household sizes and increased probability of being poor, which the author stated might be because of large demands by larger households. However, the finding was in contrast to the finding in Egypt [28] where it was found that women living with extended families were likely to utilise antenatal clinics more than women in nuclear family.

The respondents who had good practice of correct home management of malaria were those who were living in flat and face-to-face houses, whose houses were plastered, whose house floors were plastered and were roofed with asbestos and environments were not bushy. All these environmental factors are evidences of better socio-economic status that usually enhances good standard of living and compliance with health promotion actions.

## Conclusion

This study has demonstrated that improved malaria education is beneficial to the recipients; the health



education with supportive supervision significantly improved mothers of under-fives' knowledge and practice of home management and prevention of malaria in Egbedore LGA. Therefore, nurses should utilise these interventions to enhance and sustain mothers' malaria home management skills.

This study has been able to corroborate the existing fact that most of the barriers militating against effective treatment and prevention stem from poverty and lack of education. Therefore, it is imperative on the government to intensify efforts in improving economic empowerment, particularly among women, thus eradicating poverty.

### Recommendations

In view of the findings of this study, community health workers should ensure transmission of appropriate information on health promotion practices through adoption of multidisciplinary approach in planning, implementing and evaluating health promotion programmes for the communities. Utilization of supportive supervision among health care consumers for sustainability of health education programme should be embraced by the community health workers. Further research studies should also be done on these interventions.

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