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IMPACT OF HEALTH WORKSHOP ON KNOWLEDGE OF MALARIA AND ANTI-MALARIA DRUG PRESCRIPTION BY PATENT MEDICINE VENDORS IN SOUTHERN CALABAR DISTRICT, NIGERIA

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ABSTRACT
Close-to-client operation of Patent Medicine Vendors can play a significant role in the fight against malaria if their health knowledge of the disease and appropriate interventions are improved upon. The objective of this study was to assess the effect of health workshop on knowledge of malaria, anti-malaria drug prescription and intermittent preventive therapy by Patent Medicine Vendors.
Subjects were Patent Medicine Vendors who attended a Malaria Control Campaign Workshop in Women and Children Hospital, Calabar, Nigeria on 23rd June 2011. The workshop comprised a three-hour training session and two-hour focus group discussion using the national guideline on malaria case-management in Nigeria. Pre-and post-test questionnaires and a focus group discussion were used to obtain data before and after the training session. Results showed that 57 Patent Medicine Vendors (male 41[71.9%] and female 16[28.1%]) completed the pre- and post-workshop pair questionnaire and focus group discussion. Two-third of the respondents had secondary education and duration of practice was 11.7 ± 7.3 years. Knowledge of appropriate drug treatment for uncomplicated malaria was significantly higher after the workshop (pre-workshop test 40[70.2%] and post-workshop test 55[96.4%]) ($p = 0.024$) and there was improved knowledge on Artemisinin-based Combination Therapy than monotherapy as anti-malaria treatment of choice for uncomplicated malaria ($p = 0.0004$). Awareness of intermittent preventive treatment using sulphadoxine-pyrimethamine as component of malaria prevention in pregnant women was significantly higher post-workshop 51(89.5%) than observed in pre-workshop analysis 15(26.3%) ($p < 0.001$). There was a significant improvement in knowledge of the respondents on appropriate anti-malaria prescription for adults ($p = 0.001$), children ($p < 0.0001$) and intermittent preventive treatment in pregnancy ($p = 0.001$). Educational status of the respondents was significant predictor of improved performance of the respondents on appropriate prescription for intermittent preventive treatment only. Health workshop significantly improved the general knowledge of Patent Medicine Vendors on anti-malaria drug prescription for uncomplicated malaria in adults and children as well as in intermittent preventive treatment of malaria in pregnancy.

INTRODUCTION

Malaria poses an enormous public health burden worldwide,[1] with high disease burden in sub-Saharan Africa.[1] Malaria is stable in the southern part of Nigeria and is a major contributor of childhood mortality.[2] Early diagnosis and treatment within the first 24 hours of onset of symptoms as near to the home as possible have been found to have a better outcome.[1,2]

Patent Medicine Vendors (PMVs) are usually the first level health care providers regarding management of common diseases (including malaria) in Nigeria.[3] The PMVs are often the first source of health care for common diseases outside the home and are usually the source of health care delivery for the poor.[3,4] PMVs' practice in drug prescription and management of simple diseases (including malaria) can be deleterious to patients if the wrong drug and prescription are given.[2,4] Therefore, outcome of health delivery by PMVs is dependent on their health knowledge of diseases, making appropriate diagnosis of the disease, use of appropriate drug and appropriate prescription/dosage as well as implementation of prevention options of diseases. However, their close-to-client operation can play a significant role in the fight against diseases including malaria if their health knowledge of the disease and appropriate interventions are improved upon.

OBJECTIVE

To assess the effect of health education workshop on knowledge of malaria case-management, anti-malaria drug prescription for adults, children and intermittent preventive therapy (IPT) for malaria in pregnancy (MIP) by Patent Medicine Vendors in Southern Calabar district, Nigeria.

SUBJECTS AND METHODS

Subjects were PMVs seen during a Malaria Control Campaign Workshop (MCCW) in Women and Children Hospital in Southern Calabar District, Nigeria on 23rd June 2011. Southern Calabar district is made up of seven (7) Local Government Areas (Calabar Municipality, Calabar-south, Odukpani, Akamkpa, Biase, Akpabuyo, and Bakkassi) and there were 150 registered PMVs in the district. The geographical location is made up of urban, semi-urban and rural areas and the inhabitants are mainly civil servants and some farmers (fishing) in some of the rural areas. The MCCW was aimed at training health care providers including PMVs on community case-management and control of malaria. All PMVs within the district were invited by writing and phone calls through the State executive of the PMVs Association to the MCCW in Calabar Municipality where the workshop on malaria control held. The workshop involved a three-hour training sessions and a two-hour focus group discussion [FGD] (one hour each pre- and post- workshop). The workshop was conducted by one of the researchers who had received training from the World

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Health Organization [WHO][5] and National Malaria Control Certified Workshops using the national guideline on malaria case-management in Nigeria.[6] The key component of the training included causes of malaria, symptoms of malaria, appropriate drug treatment for malaria, appropriate dosage (respondents were asked to write correct dosage of anti-malaria for adults and children), and mention appropriate drug for IPT as well as different prevention options for malaria vector. Self-administered pre- and post-workshop questionnaires were used to obtain data before and after the training and pre-and post-workshop FGD sessions. Information in the pre- and post-workshop questionnaire were the same and contained key information as written in the National[6] and WHO guidelines.[5]

Data analysis: Eligible data for analysis included data obtained from participants who completed both pre- and post-workshop questionnaires and FGD. Data obtained from the pre- and post-workshop FGD were as summarized in pre- and post-workshop questionnaire paired data obtained and all data were entered into Statistical Package for Social Sciences (SPSS) version 16.0 spread sheet (Inc Chicago, Illinois, USA) and analysis was done using the same Software. Mean age and mean duration of practice in years of the respondents were obtained. Performance of the respondents pre- and post-workshop was assessed using simple proportion and assessment of improved performance was done by comparison of paired proportions from pre- and post-workshop data using Chi-Square and Fisher's exact (where appropriate) tests at 95% Confidence Levels (CL) for test of significance. The level of significance of each test was set at $p < 0.05$. Logistic regression models were used to identify independent predictors (educational status and duration of practice of the respondents in years) for improved performance of the respondents on such dependent variables such as knowledge of appropriate drug treatment for uncomplicated malaria, anti-malaria prescription for adults and children and prescription for IPT. The goodness-of-fit test for the regression model was the Hosmer-Lemeshow (HL) Test where $p > 0.05$ was accepted as well fitted model and level of significance of each model test was set at $p < 0.05$ at 95% CL.

RESULTS

Of the 104 PMVs that participated in the MCCW, 3 did not participate in the pre-workshop questionnaire and FGD (they arrived late to the venue of the MCCW) and 10 had incomplete data on their pre-workshop questionnaire. Ninety-one PMVs had complete and eligible data from the pre-workshop questionnaire/FGD. Of the 70 PMVs that participated in the post-workshop questionnaire and FGD, the 3 that did not take part in pre-workshop activities and the 10 that had incomplete data from their pre-workshop questionnaire were excluded from the final analysis. Nineteen participants left the venue of the MCCW before the end of the workshop, and there was no reason given for none participation of 15 in the post-workshop test. Data from 57 pre- and post-workshop questionnaire pair were eligible for analysis and consisted of PMVs (male 41[71.9%], female 16[28.1%]; mean age ±SD 36 ± 9.5 years (range 20 – 60 years) and mean year duration of practice of 11.7 ± 7.3 (range 1 – 30 years). Table I shows socio-demographic characteristics of the PMVs.

Prior to the workshop, 54(94.7%) of the PMVs mentioned that malaria is caused by

Table I: Socio-demographic characteristics of PMVs

Socio-demographic characteristics	n = 57 (%)
Gender	
Male	41 (71.9%)
Female	16 (28.1%)
Age Group (Years)	
20 – 29	16 (28.1%)
30 – 39	18 (31.6%)
40 – 49	18 (31.6%)
50 – 59	4 (7.0%)
60	1 (1.8%)
Duration of practice (Years)	
< 10	25 (43.9%)
10 – 19	20 (35.1%)
20 – 29	11 (19.3%)
30	1 (1.8%)
Educational status	
Primary	4 (7.0%)
Secondary	38 (66.7%)
Tertiary	15 (26.3%)

Table II: Pre-and post-workshop response of PMVs on common symptoms of malaria

Symptoms of malaria	Pre-workshop n = 57 (%)	Post-workshop n = 57 (%)
Fever	47(82.5)	45(78.9)
Loss of appetite	20(35.1)	24(42.1)
Vomiting	16(28.1)	21(36.8)
Bitter taste	19(33.3)	19(33.3)
Yellow eyes	10(17.5)	11(19.3)
Deep yellow urine	8(14.0)	12(21.1)
General weakness	12(21.1)	18(31.5)
Convulsion	7(12.3)	13(22.8)
Muscle ache	5(8.8)	12(21.1)

TABLE III: PMVs' knowledge of appropriate prescription of anti-malaria and intermittent preventive therapy (malaria in pregnancy) pre- and post-workshop

Prescription knowledge	Pre-workshop n - 57 (%)	Post-workshop n = 57 (%)
Adults		
Appropriate	23(40.4)	44(77.2)
Inappropriate	34(59.6)	13(22.8)
	$\chi2 = 14.48$, p = 0.001, OR = 5.0, 95CL = 2.23, 11.30	
Children		
Appropriate	17(29.8)	42(73.7)
Inappropriate	40(70.2)	15(26.3)
	$\chi2 = 20.24$, p < 0.0001, OR = 6.6, 95CL = 2.91, 14.94	
IPT (malaria in pregnancy)		
Appropriate	11(19.3)	34(59.6)
Inappropriate	46(80.7)	23(40.4)
	$\chi2 = 17.77$, p < 0.0001, OR = 6.2, 95CL = 2.66, 14.38	

TABLE IV: Educational status of the PMVs' and its relationship with pre- and post-workshop knowledge of appropriate prescription for anti-malaria drug and IPT

	Pre-workshop		Post-workshop				
	Yes (%)	No (%)	Yes (%)	No (%)	O.R	95CL	p-value
Appropriate prescription for adults							
Primary (n = 4)	2(50.0)	2(50.0)	4(100.0)	0(0.0)	0.1	0.003, 3.36	0.429
Secondary (n = 38)	14(36.8)	24(63.2)	27(71.1)	11(28.9)	0.2	0.09, 0.62	0.006
Tertiary (n = 15)	7(46.7)	8(53.3)	13(86.7)	2(13.3)	13.0	0.02, 0.82	0.050
Appropriate prescription for children							
Primary (n = 4)	2(50.0)	2(50.0)	4(100.0)	0(0.0)	0.1	0.003, 3.36	0.429
Secondary (n = 38)	11(28.9)	27(71.1)	26(68.4)	12(31.6)	0.2	0.07, 0.50	0.001
Tertiary (n = 15)	4(26.7)	11(73.3)	12(80.0)	3(20.0)	0.1	0.02, 0.50	0.009
Appropriate prescription for IPT							
Primary (n = 4)	0(0.0)	4(100.0)	1(25.0)	3(75.0)	0.4	0.01, 8.53	1.000
Secondary (n = 38)	6(15.8)	32(84.2)	21(55.3)	17(44.7)	1.6	0.05, 0.45	0.008
Tertiary (n = 15)	5(33.3)	10(66.7)	12(80.0)	3(20.0)	8.0	0.02, 0.66	0.025

Table V: Logistic regression models for factors (educational status and duration of practice) and improved performance in knowledge of PMVs on dependent variables such as appropriate anti-malaria and IPT drugs, anti-malaria drug prescription for adults, children and IPT.

Independent factors	β	OR	95CL	p-value
Appropriate anti-malaria drug				
Duration of practice	0.04	1.00	0.96, 1.13	0.33
Educational status	0.27	1.30	0.49, 3.53	0.59
Intercept (constant)	0.79	2.20		
Anti-malaria prescription for adults				
Duration of practice	0.02	1.00	0.97, 1.07	0.55
Educational status	0.13	1.10	0.57, 2.27	0.71
Intercept (constant)	-0.12	0.89		
Anti-malaria prescription for children				
Duration of practice	0.01	1.00	0.96, 1.06	0.83
Educational status	-0.16	0.85	0.43, 1.67	0.63
Intercept (constant)	0.37	1.44		
Appropriate drug for IPT				
Duration of practice	-0.00	1.00	0.96, 1.13	0.94
Educational status	0.66	2.00	0.49, 3.53	0.07
Intercept (constant)	-1.10	0.33		
Appropriate IPT prescription				
Duration of practice	0.01	1.00	0.96, 1.07	0.62
Educational status	0.96	2.60	1.24, 5.47	0.01
Intercept (constant)	-2.71	0.07		

β = measure of how strongly each predictor variable influences the outcome variables; OR = Odds Ratio; CL = confidence level; Hosmer-Lemeshow p-value was > 0.05 in all the regression analysis.

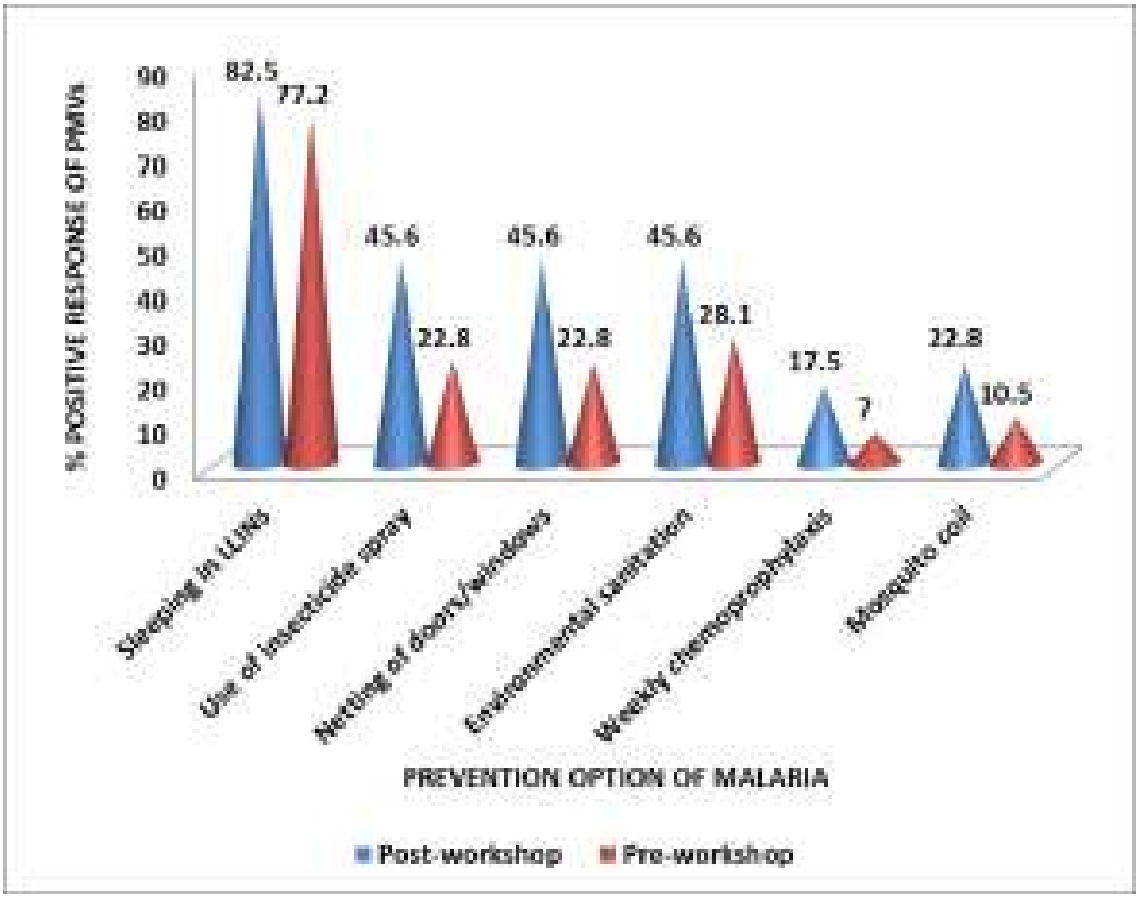

Figure 1: Pre-and post-workshop response of PMVs on common methods for prevention of malaria

bite of mosquito while 3(5.3%) said malaria results from eating too much oil. After the workshop only one (1.8%) of respondent still insisted that malaria results from eating too much. Table II showed percentage response of the PMVs on symptoms of malaria pre- and post-workshop. Fever was the most common symptoms of malaria identified by the PMVs.

Appropriate drug for treatment of uncomplicated malaria mentioned by the respondents pre-workshop analysis were Artemisinine-based Combination Therapy (ACT) in 43(75.4%), sulphadoxine-pyrimethamine (SP) in 5(8.8%), artesunate 2(3.5%), chloroquine 2(3.5%), halofantrine 1(1.8%) while 4(7.0%) did not mention any drug name. After the workshop, majority of the PMVs mentioned ACT as the drug of choice for treatment of uncomplicated malaria 55(96.4%), 2 respondents still mentioned artesunate 1(1.8%) and SP 1(1.8%) respectively as drug treatment of choice for uncomplicated malaria. Pre-workshop data showed that one-fifth of the PMVs prescribed monotherapy for treatment of uncomplicated malaria, however, knowledge of ACT as appropriate drug treatment for uncomplicated malaria rather than the monotherapies was significantly higher post-workshop and the PMVs were 9.0 times more likely to prescribe ACT than monotherapies after the workshop ($p = 0.002$, OR = 9.0, 95CL = 1.93, 41.55). In Table III, post-work analysis showed a significant improvement in knowledge of the PMVs on appropriate anti-malaria drug prescription for adults ($\chi2 = 14.48$, $p = 0.001$, OR = 5.0, 95CL = 2.23, 11.30) and children ($\chi2 = 20.24$, $p < 0.0001$, OR = 6.6, 95CL = 2.91, 14.94) than observed pre-workshop. PMVs with either secondary or tertiary education significantly had better knowledge of appropriate anti-malaria drug prescription for adults and children as shown in Table IV.

All the respondents agreed that malaria can be prevented. Figure 1 shows the pre- and post-workshop response of PMVs on common methods for prevention of malaria. Majority of the PMVs identified sleeping in long lasting insecticide-treated nets (LLINs) as component of malaria prevention.

Concerning control of malaria in pregnant women, significant proportion of the PMVs identified IPT as component of malaria prevention in pregnant women [pre-workshop 37(64.9%) and post-workshop 54(94.7%)] (Fisher's exact; $p = 0.0001$, OR = 9.7, 95CL = 2.70, 35.13) and as well identified SP as the drug of choice recommended by WHO for IPT [pre-workshop 16(28.1%) and post-workshop 50(87.7%)] (? 2 = 39.19, $p < 0.0001$, OR = 0.1, 95CL = 0.02, 0.15]. The PMVs significantly ($\chi2 = 17.77$, $p < 0.0001$, OR = 6.2, 95CL = 2.66, 14.38) had better knowledge of appropriate prescription for IPT; post-workshop 34/57(59.6%) than before the workshop 11/57(19.3%). Educational status of the PMVs significantly predicted appropriateness in prescription of IPT (H & L goodness-of-fit = 0.99, $\beta = 0.01$, $p = 0.01$) (Table V) but not in prescription for adults and children. The logistic regression model also showed that educational status of the PMVs were 2 times more likely to predict better knowledge of appropriate drug for IPT following the workshop.

Forty-one (71.9%) of the 57 PMVs had heard about the current National Guideline for malaria case-management before the workshop; while 31(54.4%) had possession of the National Guideline

booklet and 30(52.6%) had used the guideline booklet for management of malaria in their outlets. Proportion of the PMVs that would likely use the National Guideline for malaria case-management in their outlets post-training workshop 37(64.9%) was not statistically significant more than the proportion [31(54.4%)] before the workshop (?2 = 0.91, p = 0.34, OR = 1.5, 95CL = 0.73, 3.30).

DISCUSSION

In this study, one-fifth of the PMVs prescribed monotherapy as the treatment of choice for uncomplicated malaria prior to the workshop. Anti-malaria monotherapy has been found to contribute to decreased drug sensitivities.[5-8] The WHO recommended the use of anti-malaria combination therapy for treatment of malaria where Plasmodium falciparum (P. falciparum) is most prevalent.[6] This is due to the increased resistant of P. falciparum against the conventional chloroquine and other monotherapies.[1,5,6] ACT include use of artemisinin derivatives in combination with effective drug partners such as arthemeter + lumefantrine, artesunate + mefloquine, artesunate + amodiaquine, dihydroartemisin + piperaquine,[5,6] and so on. These combinations aim at ensuring high parasite clearance, high cure rates and delayed development of anti-malaria drug resistance.[1,5,6] Use of monotherapy for malaria case-management by PMVs has been observed by some authors.[7-10] This practice may continue unless actions are expedited on regular training and re-training of PMVs on current National anti-malaria policy as well as prompt implementation of policy guiding anti-malaria drug stocking and procurement in the country.

Although the PMVs are resources that could make significant contributions in achieving public commitments to improved malaria case-management at the community level in Nigeria, accessibility to affordable and effective anti-malaria drugs,[11] and readiness to implement treatment modalities in the National Malaria Treatment Guideline should be intensified.[6] Implementation of this policy, however, will largely depend on availability of this written guideline to PMVs, appropriate knowledge of content of the guidelines by health care providers (PMVs in this case) as well as their adherence to principle of practice in malaria case-management as outlined in the guideline.

Appropriate prescription for ACT for both adults (40.4%) and children (29.8%) was generally poor prior to the workshop. Inappropriate drug prescription would result in inadequate parasite clearance.[1,4] Malaria poses an enormous public health burden worldwide with high disease burden and mortality occurring in children.[1,5,6] Some authors had documented that case-management of malaria at the community with inappropriate anti-malaria drug dosage have been associated with a deleterious outcome.[2] PMVs are often the first source of health care for common diseases (including malaria) in most communities in Nigeria.[3,4,12] Therefore, regular training, monitoring and evaluation of performance of the PMVs on malaria case management (use of appropriate anti-malaria drug and appropriate drug prescription for case-management) may significantly assist in reduction in childhood morbidity and mortality from the disease.

In this study, most of the PMVs recognized IPT as integral component of malaria control in pregnancy. IPT of malaria in pregnant women using SP is cost-effective,

and the thrust lies on demonstrating SP's efficacy in causing decline in placental malaria infection, anaemia, and low birth weight in new born babies.[5,6] However, some studies in Nigeria had shown poor up-take and poor coverage of IPT of malaria in pregnant women in Nigeria since the promulgation of the IPT policy about a decade ago.[13-15] The reason for poor coverage was generally due to poor awareness of IPT at the community level. The recommended dose for IPT is 2 doses (3 doses for Human Immunodeficiency Virus [HIV] positive pregnant women) of IPT for malaria in pregnancy which usually should be commenced by the second trimester (after the first 13 weeks of pregnancy counted from the 1st day of the last menstrual period).[5,6] IPT should be given as directly observed treatment (DOT) by trained health personnel.[5,6] Since there was a significant improvement in IPT knowledge and prescription by the PMVs in this study, it could be postulated that similar workshops for training and re-training of PMVs could be used to scaling-up IPT up-take and coverage at the community level.

LIMITATION OF STUDY

The assessment of behavioural health practices of the PMVs was an on-the-spot assessment following a workshop. There is the need for assessment of the real attitudinal practices of the PMVs on malaria case-management as well as patient-exist study on case-management of malaria in patent medicine outlets at the community level.

CONCLUSION AND RECOMMENDATION

Health workshop significantly improved the general knowledge of PMVs on malaria case-management, appropriate anti-malaria drug prescription for adults, children and IPT irrespective of duration of practice of the PMVs. Similar workshops, training and re-training of the PMVs should be scaled-up for significant national impact on management and control of malaria by the PMVs in the country. Behavioural change communication materials which would include the National Guideline of Malaria Case-management, pre-packaged appropriate anti-malaria (ACT) for treatment of uncomplicated malaria and recommended pre-packaged SP for IPT should be made available to the PMVs.

AUTHORS' CONTRIBUTIONS

Category 1
Conception and design: DUN
Acquisition of data: DUN
Analysis and interpretation of data: DUN

Category 2
Drafting the manuscript: DUN, ACN
Revising the manuscript for intellectual content: MOI, MMM, ACN

Category 3
Final approval of the completed manuscript: All authors

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