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Effect of Free ACT and ITN Provision on Caregivers' Attitude and Practice of Home Management of Malaria in a Local Government Area of Anambra State

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Abstract
In Nigeria, only about 20% of malaria episodes are treated in the health centres, while care provided at home and community ranked first in the actions taken during illness in under fives. These treatments are usually incorrect or sub-optimal, sometimes due to poor accessibility to essential anti malarial drugs. The main purpose of this study is to test the effectiveness of health education with free supply of ITNs and ACTs in enhancing and improving the practice of home management of malaria among mothers in Dunukofia Local Government Area of Anambra State, Nigeria.
Two rural communities, Ifitedunu and Ukwulu in Dunukofia LGA were randomized into study (ACT, ITN and Health Education) and control groups (only Healthy Education). A total of 425 Caregivers with children aged 0-5 years were studied. Data was collected at baseline and 3 months after using an interviewer administered questionnaire. SPSS version 11 software package was used for data analysis with the hypotheses tested at 0.05 percent level of significance.
Caregivers who used ACTs in the study group increased markedly from 4.3% to 61.4% post-intervention and the same was true for ITN use (17.4% to 57.8%). Also window and door nets use increased from 44.1% to 66.8% at post intervention while patronage of drug stores reduced markedly from 25 (21.6%) to 6 (5.5%). No significant changes occurred in the control group. Provision of free ITNs and ACTs brought significant improvement in their usage.
Therefore, the availability of these products remains a sine-qua-non for their sustained appropriate utilization in the home management of malaria among Caregivers.
Key words: ACT, ITN, Caregiver, Practice of Home management of Malaria

Introduction

The home based management approach to the treatment of malaria is a simple and effective initiative that is revolutionizing the treatment of malaria, putting knowledge and essential drugs into the hands of mothers, other caregivers and neighbors who need them most.[1] According to Bellaway, Executive Director of UNICEF, getting the right drugs quickly to sick children would save many of the nearly one million lives lost each year to malaria. She said that for most African children who are the main victims of this devastating disease, the drugs are not available, not affordable or not effective. According to Jane-Frances Kengaya-Kayondo, the researcher who pioneered home management of malaria (HMM) at the Tropical Disease Research Programme (TDR) Geneva, earlier research had shown that in most countries 80% of malaria episodes, particularly in children, are dealt with at home using available resources, whether traditional, herbal, or medical of some nature.[2] Thus, it is believed that malaria control would also benefit from improved community based systems. Provision of adequate amounts of the effective anti-malarial drug ACT and treated bed nets, ITN could lead to improved HMM with its attendant positive impact on treatment and control.
In Nigeria, only about 20% of malaria episodes are treated in the health centres. A review of mothers' malaria treatment-seeking behaviour in rural south-western Nigeria revealed that more than 80% of malaria episodes received treatment outside of the existing government healthcare system.[3] Care provided at home and community ranked first in the actions taken during illness in under fives. Under-five caregivers visit a variety of sources such as patent medicine vendors, traditional healers, health centres, hospitals, private clinics, drug hawkers and diviners to obtain medications. Many who sought cares are normally satisfied with their first line of action, and do not seek further treatment.[4]
Reasons underlying this practice include difficulty with access to health centre, scarcity of affordable drugs including anti-malarial drugs, perceived deficiencies in the performance of formal health services including poor clinical skills, attitude of health personnel and cultural beliefs. These shortcomings encourage treatment of malaria at home with drugs bought from shops and herbal preparations. These treatments are usually incorrect or sub-optimal. Mothers and caregivers only usually visit a health centre or hospital after the illness has failed to respond to several drugs and ineffective self treatment. This practice increases morbidity and mortality in addition to contributing to possible emergence of drug resistance.[5]

In Nigeria, the strategies for combating malaria now focus on early diagnosis and prompt treatment. This is done through presumptive treatment of all fevers in children under five with anti-malarial drugs and is in line with World Health Organization (WHO) recommendation for endemic countries where the availability and use of laboratories are limited.[8] Uncomplicated malaria has fever as a key symptom, but can rapidly develop into a life-threatening condition if not managed quickly. Prompt diagnosis and appropriate treatment are known to be influenced by factors related to cost, availability and cultural beliefs about the causes and effective cures.[3]

The main purpose of this study is to test the effectiveness of free supply of ITNs and ACTs in enhancing and improving the practice of home management of malaria by Caregivers in Dunukofia Local Government Area of Anambra State. The specific objectives include determining the Caregivers' utilization of ACT and ITN which are provided them free of charge, to measure the interval between onset of malaria symptoms and treatment seeking action of Caregivers and to evaluate the effect of provision of ACT and ITN on proper home management of malaria.

Methodology:

Dunukofia Local Government Area is one of the twenty-one LGA's in Anambra State. It is rural and made up of six communities viz: Ifitedunu, Umudioka, Umunnachi, Ukpo, Ukwulu and Nagwu. It has a total population projected figure of 44,616 males and 48,210 females at 2007. The major sources of water supply are from rain water, local streams, shallow wells and a few boreholes. Open dumping is a very common method of refuse disposal. The LGA enjoys other social amenities like post offices, banks, markets, police stations and churches. Located in the LGA is one of the Primary Health Care (PHC) units of the Nnamdi Azikiwe University Teaching Hospital. Other health facilities include five PHC units run by the LGA, six private hospitals, six health posts and a maternity home. Numerous patent medicine stores as well as herbal homes are scattered all over the LGA. Malaria is one of the prevailing diseases in the area as there are many opportunities for the breeding of mosquitoes such as stagnant ponds during rainy season, littering empty cans among others in the area.

The study was a longitudinal, before and after study with control. Two communities selected by simple random sampling technique were randomized into study and control communities. There was a baseline collection of data, followed by an intervention and then a post- intervention data collection.

The target populations were the caregivers in the area of the study. The study population comprised only of Caregivers with children aged 0–5 years who consented to being studied.

The minimum sample size for each group: intervention and control was calculated using the sample size formula for comparison of groups[9] as follows: $n = \frac{2\,z^2\,p\,q}{d^2}$

n = Minimum Sample Size
z = the Standard normal deviate usually set at 1.96 which corresponds to 0.95% confidence level.
p = proportion of the target population estimated to have a particular characteristic. In this case percentage knowledge gain is assumed to be 90% or 0.90
q = 1 - p
d = degree of accuracy desired set at 0.05 level

$$\therefore n = \frac{(1.96)^2 \times 0.90\,(1 - 0.90)}{0.05^2}$$

$$= \frac{3.84 \times 0.09}{0.0025} = \frac{0.346}{0.0025} = 138$$

With anticipated response rate to be 65%, to compensate for attrition, sample size was calculated to be;

$$\frac{138}{0.65} = 212 \text{ multiplied by } 2$$

However, the sample sizes for control and intervention communities were 212 and 213 respondents respectively.

Using a two stage cluster sampling method, two communities Ifitedunu and Ukwulu were chosen by simple random sampling from a sample frame of all the six communities ie Ifitedunu, Umudioka, Umunnachi, Ukpo, Ukwulu and Nagwu in the LGA. In each of the two selected communities, one village was chosen by simple random sampling method from a frame of all the villages in each community. Akwa village in Ifitedunu was randomly chosen as the study group, while Etiti village in Ukwulu was chosen as the control group. All the households with under-fives in the two villages were recruited for the study.

The instrument for data collection was a structured, pre-tested interviewer administered questionnaire made up of four sections. Section A was on personal data of the subjects. Section B was on Caregivers' knowledge of the

mode of transmission of malaria and their criteria for diagnosing malaria. Section C was on Caregivers' choice of place for the treatment of malaria and the interval between onset of malaria symptoms and treatment. Section D was on their knowledge of appropriate drugs and dosages for home management of malaria. For effective data collection, eight research assistants were recruited and trained for three days on interview technique, vernacular translation and accurate interpretation of research questions. Baseline data was collected by the researchers who visited all eligible households and administered the questionnaire to the Caregivers. After three consecutive visits to selected households, Caregivers not seen were excluded from the study and replaced with the next eligible household. The baseline phase lasted for one month.

Health education was first delivered to both study and control communities in the form of workshops conducted by the researchers and the research assistants. The workshops took place on identified non major market day when the Caregivers were free from their economic activities. The duration of training was three weeks and it was carried out in three sessions in the study and control communities.

The contents of the training included; First week: Causes and effect of malaria, Symptoms and signs of malaria, Choice of provider for malaria management and Prevention of malaria by vector control. Second week: Dosages for first line anti malarial drugs in children and use of ITNs, How to recognize treatment failure, Importance of early medical advice and treatment, Posters and cardboard sheets with appropriate messages were used. Additionally in the third week of intervention, free supplies of one ITN and monthly ACT packs were given to each Caregiver in the study group. Correct usage of these commodities was reinforced at the time of supply. No such supplies were made to Caregivers in the control group.

Caregivers in both the study and control communities were assessed using the same pre-tested structured questionnaire three months after the intervention. This was to enable them practice what they have learnt and for the researcher to assess the effects of the intervention.

Direct observation of hung net in the households was also carried out to corroborate the responses given in the questionnaires by respondents. Data was analyzed using SPSS version 11 software package. Statistical mean score, chi-square test and percentages were generated and the results presented in tables to highlight the major findings. The confidence limit of this study is 95 percent. Therefore, the hypotheses were tested at 0.05 percent level of significance.

Ethical clearance was obtained from the UNTH, Enugu Ethics committee while Informed consents were sought and obtained from the Local Government Chairman, the Community leaders and participants in the study. Non consenting Caregivers were excluded from the study.

Result

Table 1: Socio demographic characteristics of the respondents

Demographic	Study Group Frequency	Control Group Frequency (%)	Statistics χ^2	p-value
Age Group (Years): ≤ 24 25 – 29 30 – 34 ≥ 35	 50 (23.5) 69 (32.4) 59 (27.7) 35 (16.4)	 32 (15.1) 78 (36.8) 60 (28.3) 42 (19.8)	7.198	0.206
Mean age	28.7 ± 5.4	29.7 ± 5.7	1.86	0.064
Marital Status: Married Single Others	 197 (92.5) 9 (4.2) 7 (3.3)	 187 (88.3) 9 (4.2) 16 (7.5)	5.281	0.260
Educational Status: Nil Primary Secondary Tertiary	 7 (3.2) 53 (24.9) 116 (54.5) 37 (17.4)	 6 (2.9) 45 (21.2) 117 (55.2) 44 (20.7)	1.338	0.720
Mean Parity	3.4 ± 2.2	3.4 ± 1.9	0.00	1.00
Household decision maker on children's issue Couple Spouse Self Others	 158 (73.8) 30 (14.6) 19 (8.9) 6 (2.7)	 123 (58.8) 55 (25.8) 25 (11.8) 9 (4.2)	13.128	0.004*
Total	213 (100.0)	212 (100.0)		

Table 1 summarizes the socio demographic characteristics of the respondents who were all females. Their age ranged from 24 to 35 years with the majority in the age group 25-29 years in both the study 69(32.4%) and in the control group 78(36.8). Majority of the respondents attained at least a secondary level of education in the study 116(54.5%) and control 117(55.2%) groups. Many respondents in both groups have had an average of three pregnancies. There was no significant difference in the age, marital status, educational level and parity between the study and control groups.

Table 2: Choice of place of management of malaria in children under the age of five years

Chosen place for management of malaria	Pre-intervention Frequency (%)	Post-intervention Frequency (%)	χ^2	p-value
Study Group:				
Home treatment	47 (40.5)	37 (33.6)	1.145	0.285
Primary health centers	31 (26.7)	41 (37.3)	2.894	0.089
Drug stores	25 (21.6)	6 (5.5)	12.361	0.0004*
Private clinic/hospitals	8 (6.9)	25 (22.7)	11.347	0.001*
Native healers	4 (3.4)	1 (0.9)	0.714	0.398
Total	116 (100.0)	110 (100.0)		
Control Group:				
Home treatment	53 (39.7)	55 (48.7)	2.072	0.150
Drug store	42 (31.4)	37 (32.6)	0.055	0.814
Primary health centre	17 (12.7)	15 (13.3)	0.019	0.891
Private clinic/hospital	15 (11.2)	15 (7.1)	0.249	0.618
Native healer	4 (3.0)	1 (0.9)	0.510	0.475
Total	134 (100.0)	113 (100.0)		

One hundred and sixteen (54.2%) and 110 (52.4%) children were reported to have had fever within the last one month pre-intervention and post-intervention respectively in the study community. Following intervention, table 2 shows that there was a significant decrease in the proportion of the women patronizing the drug store, from 25 (21.6%) to 6 (5.5%) and the proportion utilizing private clinics or hospitals for treatment of malaria increased significantly to 25 (22.7%). However, there was no significant statistical difference in the home treatment of malaria and the use of primary health centers after the intervention ($p>0.05$). The patronage of the native healer decreased from 4 (3.4%) to 1 (0.9%) after health education and free supply of ACT / ITN. In the control community, 134 (63.2%) children were reported to have had fever at least one month prior to the commencement of the study, while 113 (53.3%) had fever three months after. Home treatment of malaria was slightly commoner among Caregivers in the control arm and there was no significant change in the choice of place

Table 3**:** Interval between onset of malaria and treatment

Time interval	Pre-intervention Frequency (%)	Post-intervention Frequency (%)	χ^2	p-value
Study Group:				
0-24 hours	35 (30.2)	61 (55.5)	13.137	0.0003*
>24 hours	81 (69.8)	49 (44.5)	14.770	0.0001*
Total	116 (100.0)	110 (100.0)		
Control Group:				
0-24 hours	83(62.0)	66 (58.4)	0.87	1.263
>24 hours	51 (38.0)	47 (41.6)	0.320	0.572
Total	134 (100.0)	113 (100.0)		

Table 3 shows that the proportion of Caregivers in the study group who commenced treatment using anti malarials within twenty four hours of onset of malaria increased significantly post intervention from 35 (30.2%) to 61 (55.5%); while those that started treatment after 24hours significantly decreased from 81 (69.8%) to 49 (44.5%). There was no significant change in this regard among the control group during the pre and post intervention periods of study.

Table 4: Choice of drugs for home management of malaria in under five children

Chosen drug	Pre-intervention Frequency (%)	Post-intervention Frequency (%)	χ^2	p-value
Study Group:				
Paracetamol only	16 (34.0)	0 (0.0)		NS
Chloroquine	12 (25.5)	6 (16.7)	0.94	0.331
SP	4 (8.6)	5 (13.9)		NS
ACTs	2 (4.3)	22 (61.1)	6.61	0.04*
Quinine	2 (4.3)	0 (0.0)	32.02	0.0001*
Camoquine	2 (4.3)	2 (5.6)		NS
Unknown	2 (4.3)	1 (2.8)		NS
Total	47 (100.0)	36 (100.0)		
Control Group:				
Chloroquine	8 (25.8)	7 (13.2)	2.12	NS
ACTs	7 (22.6)	2 (3.7)	1.81	0.145
Paracetamol only	5 (16.1)	23 (43.4)	1.772	0.16
SP	5 (16.1)	6 (11.3)	0.40	0.183
Quinine	1 (3.2)	1 (1.9)		0.528
Camoquine	0 (0.0)	1 (1.9)		NS
Tetracycline	0 (0.0)	1 (1.9)		NS
No response	5 (16.1)	12 (22.6)		
Total	31 (100.0)	53 (100.0)		

Table 4 indicates that before intervention, majority 16 (34.0%) of the Caregivers in the study group who treated malaria at home used only an antipyretic agent (Paracetamol), followed by Chloroquine 12 (25.5%) and other antimalarial at baseline. After the intervention the use of ACTs significantly increased to 22 (61.1%) while the use of Chloroquine, SP, and quinine was not changed. For mothers in the control group, the use of ACTs and other antimalarial drugs did not change significantly after intervention.

Table 5: Malaria preventive methods used for under-fives

Preventive Methods	Pre-intervention Frequency (%) N=213	Post-intervention Frequency (%) N=211	χ^2	p-value
Study Group:				
Cleaning the surroundings	139 (65.3)	160 (75.8)	5.698	0.017*
Insecticidal spray	113 (53.1)	129 (61.1)	2.829	0.093
Windows/doors insect nets	94 (44.1)	141 (66.8)	22.095	0.000*
Mosquito coil	66 (30.9)	64 (30.3)	0.021	0.884
Untreated bed nets	45 (21.1)	28 (13.3)	4.591	0.032*
ITNs	37 (17.4)	122 (57.8)	73.995	0.000*
IPT (SP)	4 (1.9)	2 (0.9)	0.61	0.438
Control Group:	N=212	N=212		
Cleaning the surroundings	120 (56.6)	1 (55.7)	0.038	0.845
Windows/doors insect nets	86 (40.6)	95 (44.8)	0.010	0.921
Insecticidal spray	80 (37.7)	82 (38.7)	0.040	0.842
ITNs	57 (26.9)	56 (26.4)	0.012	0.913
Untreated bed nets	55 (25.9)	60 (28.3)	0.298	0.585
Mosquito coil	48 (22.6)	50 (23.6)	0.053	0.818
IPT (SP)	5 (2.4)	6 (2.8)	0.40	0.528

*Statistically significant, NS= Not significant

In table 5, environmental hygiene and insecticidal spray were the commonest measures adopted by Caregivers in the study group to prevent malaria at baseline. At post intervention, cleaning of surroundings, use of door/window nets and ITNs increased significantly as malaria prevention methods while the use of untreated bed nets declined.

However the use of insecticidal spray and mosquito coil did not change post intervention. No significant change was observed in the pattern of malaria preventive measures used by the control group.

Discussion

The socio demographic status of both the study and the control communities did not differ significantly from each other at baseline as their mean ages, marital status, educational level and mean parity were similar. Also, household decision making on health issues of under-fives were jointly made in both groups.

There was not much difference in the proportion of Caregivers who were engaged in home treatment of malaria in both arms before and after intervention. However, more of those in the study group patronized the private clinics/hospitals while fewer of them utilized drug stores after intervention. The proportion of the Caregivers engaged in home treatment of malaria was small compared to over 70% reported in rural town in Oyo State, [5] but higher compared to the percentage findings of another study in Ogun State.[3] The increased patronage of health facilities and less patronage of drug stores can be attributed to better health seeking practice following the provision of free health commodities ACT and ITN. The increased patronage of private clinics/hospitals is not unconnected with the increased role of private sector in health care delivery in South Eastern Nigeria because private health facilities are more convenient and less time consuming. Also, an appreciable number of the children may have had severe malaria thereby prompting the mothers to visit a health facility rather than commence treatment at home. Most Caregivers initiated treatment early after intervention.

The use of ACTs for the treatment of malaria increased significantly after intervention, unlike the finding in Ona-Ora LGA in Oyo State where the use of ACTs was not reported even after intervention.[5] In the case Ona-Ora, the Caregivers were taught the correct use of chloroquine for home treatment of malaria, while in this study they were taught on correct use of ACTs, which was also provided free to them in the course of intervention. It seems that only sustained availability of ACTs to the Caregivers will ensure its regular use for home treatment of malaria. The increased utilization of ACTs at pre-intervention for home treatment of malaria even among the control group was due to its ready availability at that time when Government distributed it free of charge through the health facilities in the state. It is little wonder then that at post intervention, the ACT utilization did not increase among the control but significantly increased among the study group who continued to receive regular free supplies from the researcher.

Environmental hygiene was the commonest method adopted for malaria prevention in both communities. Health education alone in the control group did not result in a significant increase in the practice of environental sanitation, use of ITNs, insect nets for windows and doors as measures adopted to prevent malaria. However the significant increase in these indices among study community is similar to result of studies done in Colombia and Thailand which indicated an even higher ITN usage (78%-83%)[10,11] post intervention as opposed to the 58% in this study. From this study antimalarial prophylaxis was a preventive measure used by some Caregivers against malaria. This could be due to the numerous uncensored advertisements of drugs through the mass media and unregulated drug market in the study area.[12] Similar effect of health education on malaria prevention practices was observed among Caregivers in the south western Nigeria study, although chemoprophylaxis was the predominant malaria prevention practice.[5] Routine use of prophylaxis as a means of malaria prevention is known to have serious health consequences especially in children in malaria endemic regions and the recommendation is that prophylaxis be given only to pregnant women, sickle cell disease patients, non-immune travelers and the immune-suppressed.[13,12]

Conclusion

The drug of choice for home-based treatment of malaria increased significantly in favor of ACTs after intervention among the study community. The use of ITNs among the Caregivers in the study community also increased significantly at post intervention. Such changes did not occur significantly in the control community despite the application of health education among them.

Therefore health education together with free anti malaria commodity supply intervention resulted in a significant use of ACTs for home treatment of malaria from 4.3% to 61.1% and increased ITN use for malaria prevention.

Environmental sanitation was the commonest malaria prevention measure adopted by the mothers in both communities prior to intervention, but significantly more Caregivers used ITNs while the use of untreated nets for doors and windows markedly reduced following intervention.

Recommendations

1. Much as sustained health education should be carried out in communities to improve use of ITNs, knowledge of malaria recognition and appropriate treatment based on the new malaria treatment guideline, such health education campaigns must be backed by the availability of affordable anti malaria commodity.

2. Similarly, ACTs should be made available on diagnosis of malaria, to encourage Caregivers to adopt the practice of home treatment of malaria using ACTs. The drug should at least be highly subsidized to increase its economic accessibility among the most at risk population such as children under the age of five years.

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