

Usage of insecticide treated mosquito nets among under-5 carer- health workers in Anambra east local government area, Southeast, Nigeria

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ABSTRACT

Background: Long lasting insecticide treated mosquito nets have been demonstrated as means of preventing malaria via mosquito bites. Community Directed Distributors of Key House Hold Practices are rural based health workers who also care for their children.

Aim: To assess the profile of this category of health workers, their knowledge, attitude and usage of long lasting insecticides treated mosquito nets in their households.

Method: A multi stage sampling technique was used and subjects were community directed distributors of key house hold practices in Anambra East Local Government Area in Anambra State, South-East Nigeria. One hundred and sixty one (161) questionnaires were distributed, returned and analysed. All data were analysed statistically using SPSS version 16.0 and where possible presented as mean± standard deviation. A one-way analysis of variance (ANOVA) and Chi Square were used to compare data. p-value, less or equal to 0.05 was taken as significant.

Result: There was a female predominance among the community directed distributors health workers with a mean age of 29.5±6.5 years. Their educational level was predominantly secondary while a few had no formal education. Usage of insecticide treated nets was 85% among the studied group and popular reason for usage included malaria and mosquito prevention as well a comfortable sleep. Children under the ages of 1-3years had the highest level of usage (54.0%). Other methods of mosquito prevention were used along with the insecticides treated mosquito nets. Educational level significantly (p<0.01) influenced their usage of insecticide treated nets.

Conclusion: There was good awareness and usage of insecticide treated mosquito nets among the studied category of health workers which is a good omen in thrive towards good health care practices especially in the rural communities. Improved education among this category of health workers is recommended as this will enhance increased performance of their contribution to rural health care.

Key words: Insecticides treated nets; Community Directed Distributors of Key Household Practices; Health Worker

1. INTRODUCTION

Community Directed Distributors (CDDs) are persons appointed or elected by the community, trained by institutionalized health systems to serve their communities in areas of dire health needs (APOC, 2009).

According to World Health Organization (2013), CDD was initially set up in the 90s to distribute ivermectin but, has now been integrated to take part in the effective implementation of Community Directed Interventions (CDI).

The people selected to become CDDs are generally perceived by the community as being honest and trustworthy, having good conduct, integrity and literacy. As volunteers, their motivation is mainly by gains in recognition, self-esteem and knowledge, rather than cash incentives (APOC, 2009).

Many simple, affordable and effective disease control measures have had limited impact due to poor access to health facility especially by the poorer populations (urban and rural) and inadequate community participation. A proven strategy to address the problem of access to health interventions is the Community Directed Interventions (CDI) approach, which has been used successfully in rural areas (Ajayi *et al.*, 2013).

Insecticides treated nets are nets that have been treated with insecticides such as pyrethroids to protect from mosquito bites during the night. Insecticide-treated nets require regular re-treatment while a long-lasting insecticidal net (LLIN) is a factory-treated mosquito net made with netting material that has insecticide incorporated within or bound around the fibres. The net must retain its effective biological activity without re-treatment for at least 20-WHO standard washes under laboratory conditions and three years of recommended use under field conditions (Roll Back Malaria, 2008).

Long lasting insecticidal nets (LLIN) are a primary method of malaria prevention and before new types of LLIN are approved they need to meet quality and efficacy standards set by the WHO Pesticide Evaluation Scheme (Townroe and Callaghan, 2014).

The process of evaluation has three phases. In Phase I the candidate LN must meet threshold bioassay criteria after 20 standardized washes (Townroe and Callaghan, 2014). In Phase II washed and unwashed LNs are evaluated in experimental huts against wild, free flying anopheline mosquitoes. In Phase III the LN are distributed to households in malaria endemic areas, sampled over three years of use and tested for continuing insecticidal efficacy (Townroe and Callaghan, 2014).

Dengue fever, a mosquito-borne viral disease, is now the fastest spreading tropical disease globally (Daley *et al.*, 2014). Previous studies indicate that climate and human behaviour interact to influence dengue virus and vector (*Aedes aegypti*) population dynamics; however, the relative effects of these variables depends on local ecology and social context making LLIN an invaluable preventive tool (Daley *et al.*, 2014).

Insecticide-treated nets (ITNs) are effective tools for malaria prevention and can significantly reduce severe disease and mortality due to malaria, especially among children under five in endemic areas. However, ITN coverage and use remain low and inequitable among different socio-economic groups in sub-Saharan Africa, particularly in Nigeria (Ajayi *et al.*, 2009).

Reducing entry of mosquitoes into houses by installing mosquito proofing in windows, ventilators and open caves, and closing windows and doors early in the evenings have shown some promising result in reducing the menace of malaria in Uganda and Kenya (CDC, 2009; Iperopolu *et al.*, 2008).

Current use of treated mosquito nets for the prevention of malaria falls short of what is expected in sub-Saharan Africa (SSA), though research within the continent has indicated that the use of these commodities can reduce malaria morbidity by 50% and malaria mortality by 20% (Afolabi *et al.*, 2009). But, mere possession and non usage is still a big factor in most part of Africa including Nigeria (Musoke *et al.*, 2013).

The Abuja target of increasing the proportion of people sleeping under insecticide-treated nets (ITNs) to 60% by the year 2005, as one of the measures for malaria control in Africa, has generated an influx of resources for malaria control in several countries in the region. A national household survey conducted in 2005 by the Malaria Control Programme in Nigeria assessed the progress made with respect to ITN ownership and use among pregnant women and children under-five years of age since 2000 (Ilechukwu *et al.*, 2010).

2. MATERIAL AND METHOD

Study area

Study area was Anambra East Local Area. Anambra East Local Government Area is one out of the 21 Local Government Areas in Anambra State. Anambra State is one out of the five States in South-Eastern Nigeria. Anambra East Local Government is made of ten major towns and many villages. The towns are Aguleri, Enugwu Aguleri, Eziagulu Otu Aguleri, Enugu Otu Aguleri, Otuocha, Umuoba Anam, Umuleri, Igbariam, Nando and Nsugbe. The Local Government Area has a population of 153,331 comprising 77,804 males and 75,527 females (NPC, 2013). The people are predominantly subsistence farmers and petty traders.

Study Population/Inclusion Criteria

Study population was Community Directed Distributors in Anambra East Local Government Area selected by their various communities and undergoing training or retraining as at the time of data collection.

Study Design

The survey employed a descriptive cross-sectional study among Community Directed Distributors selected by their various communities during their one week training or retraining in 2014.

Sampling Technique

A multistage sampling technique (Probability sampling) was adopted for the study (Korenromp *et al.*, 2003). The entire state was divided into 21 Local Government Area (Stage One). Out of the 21 Local Government Areas of the state (Clusters), Anambra East was chosen (Stage Two). Anambra East has about thirty communities with each community selecting between 4 and 7 CDDs (Stage Three). There were two towns with three classes each where CDDs were undergoing training at that period of data collection. Each class had about 30 CDDs making a total of one hundred and eighty (180) CDDs for the whole of the Local Government Area. One hundred and sixty one (161) questionnaires were then distributed.

Sample Size Calculation

The sample size formula was used to test the statistical suitability of the number of questionnaire thus
$$N = \frac{Z^2 PQ}{d^2}$$

Where:

N = Minimize Sample Size.

Z = Standard normal deviate (1.96) at 95% confidence limit,

P = Prevalence (10.6% hand washing among CDDs¹⁶),

Q = 1-P and d = Degree of precision at 5% (0.05).

Extrapolating therefore we have
$$\frac{(1.96)^2 \times 0.106 \times (1-0.106)}{(0.05)^2}$$

$$= \frac{3.85 \times 0.106 \times 0.894}{0.0025}$$

N = 145.936.

Adding 10% attrition to sample size (10% of 145.936 + 145.936) = 160.529.

Our desired sample size is therefore at least 160.529 and was taken as 161 CDDs.

Ethical Consideration

The study, its content and purpose were orally explained to the Director of Training of the CDDs at Awka and his consent granted. On the site/field permissions were obtained from Training Coordinator and Resource Persons before access to the CDDs was gained. The contents and purpose of the questionnaire were again explained to the CDDs in languages clearly understood by them and their consent granted before questionnaires were distributed.

Data collection

Umulaeri and Agulaeri towns in Anambra East Local Government Area were visited on the 19th day of February, 2014. The CDDs were located at Nneyi Development Hall (Umuleri) with three classes. Another three classes were located at Aguleri Civic Hall to make a total of six classes with total CDDs of 180. Typical and standard questionnaire from CDD/WHO initiative was downloaded and used as such. 161 questionnaires were distributed to the CDDs present at training sites on 19/02/2014. The assistance of their resource persons was solicited to read the questionnaire line after line for all the twenty three line questions and further explained to them in their local languages any clause that was not clear to any of them. There was however no influence on their choice of answer. Most questions required only "Ticking or marking" as sentences were avoided. Completed questionnaires were returned at will whenever completed. There were no given time frame but, all questionnaires were returned on the same day.

Statistical Analysis

All returned questionnaires were statistically analysed using Special Statistical Package for Social Sciences (SPSS) 16.0 version. Analysis of variance (ANOVA) was used and where possible presented as mean ± standard deviation. Pearson Chi-Square was used for comparative

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statistics to check for the influence of level of education on certain behavioural pattern. Probability value (p. Value) of less than or equal to 0.05 was taken as significant (Wayne, 2009).

Some limitations to this study

The work covered only those who were present at the scene of data collection. There were financial and transport challenges in reaching out to the villages to meet the CDDs. Some of the respondents had poor or no understanding in answering some aspects of the questionnaire.

3. RESULTS

All the 161 distributed questionnaires were returned. There was no questionnaire that was wholesomely uncompleted but, some specific questions were not answered in virtually all questionnaires. All unanswered questions were represented as "No Response" in the specific sub-segment.

Table 1

Gender distribution of CDDs

Variables	Frequency	Percentage
Females	109	67.7
Males	52	32.3
Total	161	100

Table shows the gender of CDDs. From the survey, there was a female predominance. Out of the 161 CDDs, 109 (67.7%) were females while 52 (32.3%) were males.

what is the age of the caregiver being interviewed?

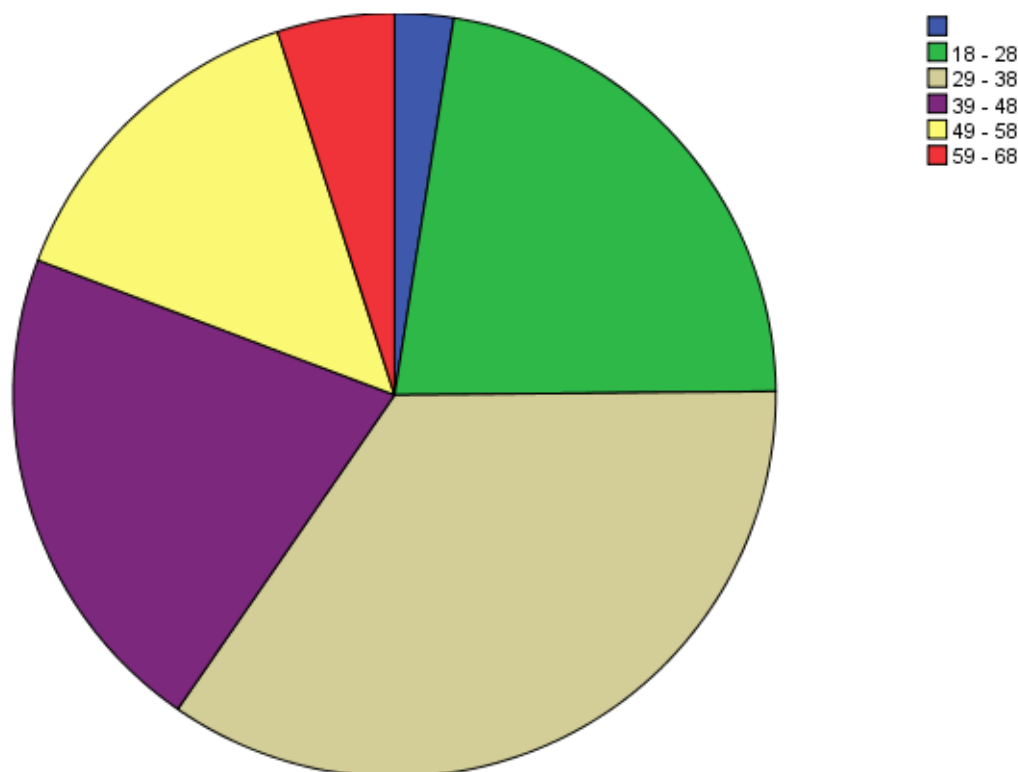


Figure 1

Shows age distribution of CDDs.

There was a predominance of ages 29-38 with a frequency of 62 (37.2%). This was followed by 18-28 with a frequency of 36 (22.4%). Then those between 39 and 48 took the third position with a frequency of 34(21.1%). The fourth in frequency was the age 49-58 with a frequency of 23(14.3%) while the oldest group, 59-68 had a frequency of 8(5.0%).

Table 2

Educational qualification of CDDs

Variables	Frequency	Percentage
No formal	8	4.9
Primary	22	13.7
Secondary	71	44.1
Tertiary	60	37.3
Total	161	100

Table 2, shows the educational qualification of the CDDs: Secondary education had predominance with a frequency of 71(44.1%), followed by tertiary education with a frequency of 60 (37.3%), then primary education with a frequency of 22 (13.7%). Those with no formal education had a frequency of 8 (4.9%).

Table 3

Frequency distribution of under-5 children per household

Variables	Frequency	Percentage
No Res.	28	17.4
1 – 3	75	46.6
4 – 6	43	26.7
7 – 9	15	9.3
Total	161	100.0

Table 3 shows frequency distribution of under-5 children per CDDs households. Among the CDDs household studied, 75 had 1-3 under-5 with the highest percentage of 46.6. This was followed by 4-6 under-5 living in 43 (26.7%) household. 15 household had 7-9 under-5 but, a whopping sum of 28 had no response or possibly no under-5 living in their household.

Table 4

Uses of treated and non-treated mosquito nets among CDDs household

Variables (User Age)	Frequency	Percentage	Treated	Frequency	Percentage
1 – 3	87	54.0	Yes	134	83.2
4 – 6	32	19.9	No	13	8.1
7 – 9	17	10.6	Doesn't know	3	1.9
No Res	25	15.5	No Res	11	6.8
Total	161	100.0	Total	161	100.0

Table 4 Shows uses of treated and non-treated mosquito nets among CDDs.

Ages 1-3 slept under mosquito nets in 87(54.0%) household to become the highest number of users. This was distantly followed by ages 4-6 that had 32(19.9%) CDDs households. Ages 7-9 had the least with 17(10.6%) CDDs households while a household had children in all age groups sleep under mosquito net. 134 (88.2%) used insecticide treated nets while 13(8.1%) did not. Twenty five CDDs did not respond to any option in the use of mosquito nets in their household. But, funny enough only 11 did not respond to whether the nets were ever treated. Then again 3(1.9%) did not know whether their nets were treated or not. There was significant (Chi Sq= 32.00) ($p < 0.01$) influence of educational qualification with the use of insecticide treated nets among CDDs households. Those with secondary education had the lead followed by tertiary education (Fig.2).

Bar Chart

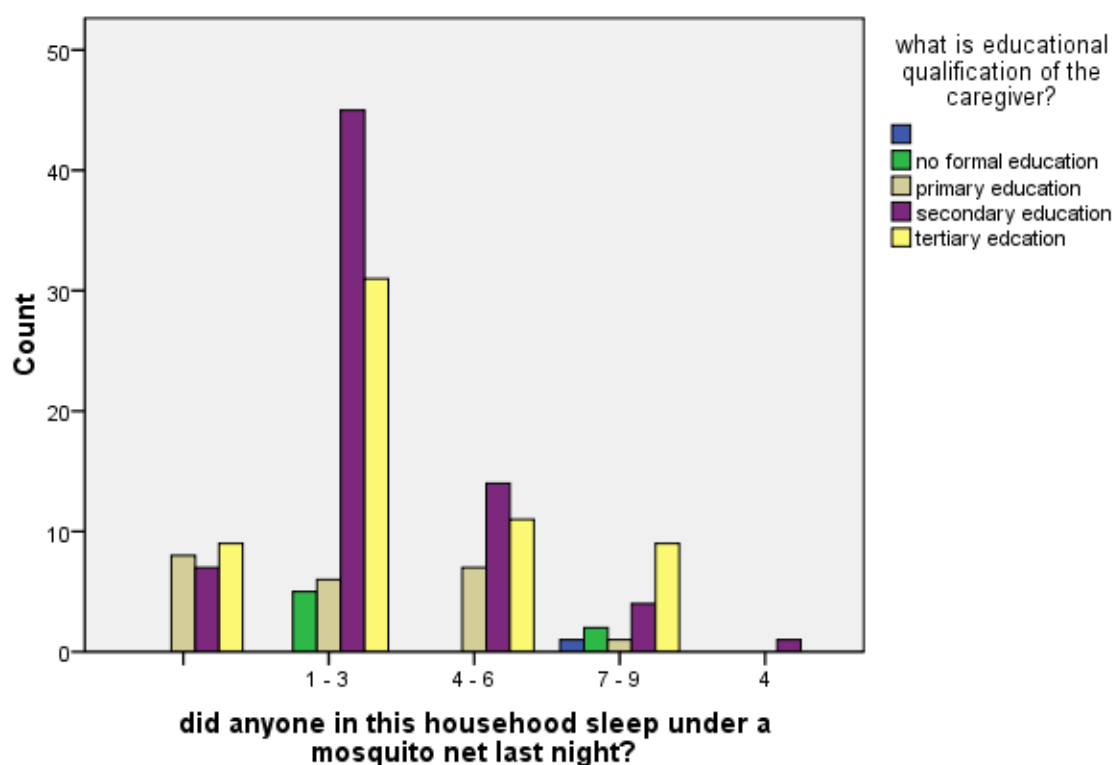


Figure 2
Educational level and insecticide treated nets

Figure shows a comparative bar chart on influence of educational levels on use of insecticide treated nets. A significant (Chi Sq= 32.00) ($p < 0.01$) difference was demonstrated based on educational level with secondary education taking lead and followed by tertiary.

Table 5
Uses of other anti-mosquito agents in addition to treated nets

Uses of other agent	Frequency	Percent	Type of agent used	Frequency	Percent
Yes	97	60.2	Mosquito repellent spray	57	35.4
No	56	34.8	Mosquito repellent cream or oil	1	.6
Doesn't know	4	2.5	Mosquito coils	16	9.9
No Response.	4	2.5	No Response.	69	42.9
Total	161	100.0	Insecticides	18	11.2
			Total	161	100.0

Table 5, shows uses of other anti-mosquito agents in addition to their treated nets among the CDDs. 97(60.2%) household used other anti-mosquito agents while 56(34.8%) did not. Mosquito repellent spray was the most popular with a frequency of 57 (35.4%) household users. But, 69 (42.9%) households however did not respond to the question. 4 (2.5%) household did not know whether they used other mosquito repellents or insecticides. The same number did not also affix to any given option. Mosquito repellent cream or oil was the least popular. Only one (0.6%) CDDs household used it. 16 (9.9%) and 18 (11.2%) households used mosquito coils and insecticides respectively.

Table 6
Reason for using insecticide treated nets

Variables	Frequency	Percentage
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To avoid mosquitoes	49	30.4
To avoid other insects	4	2.5
To prevent malaria	66	41.0
To sleep comfortably	3	1.9
Other	1	0.6
All	38	23.6
Total	161	100.0

Table 6, shows different reasons for use of insecticide treated mosquito nets by CDDs. This sub-question was well responded to. 66 (41.0%) households used mosquito nets to prevent malaria while 38 (23.6%) used the nets for all reasons as stated in the questionnaire. A household used mosquito net for other non specified reason but, 49 (30.4%), 4 (2.5%) and 3 (1.9%) households used mosquito nets for preventing other insects and for sleeping comfortably respectively.

4. DISCUSSION

The study found that there was training and retraining programme for the CDDs. Their direct trainers were all low or middle level health officers. Most CDDs were females with a predominant age bracket of 29-38 and a mean of 29.5±6 years. This finding is similar to that found among the CDDs in Pakistan (Agha *et al.*, 2007). Considering the tasking nature of their duty, this age group is most appropriate. Females also may show more commitment to the health needs of their children than their males' counterpart.

Educational level of CDDs gives a lot of reasons to worry about. Majority were secondary levels. Primary educational level and no formal education had 37.2% and 4.3% respectively. In Uganda, 3.5% CDDs had no formal education (Katarbawa *et al.*, 2002; Katarbawa and Habomugisha, 2001), Ibadan had 2% (Ajayi *et al.*, 2009) with no formal education while Pakistan had 8.8% CDDs with no formal education (Agha *et al.*, 2007). Poor educational qualification therefore seems a global problem. This category of health workers no doubt require some degree of literacy otherwise basic reading and understanding of health literature poses a big threat to their basic function. A typical setting was demonstrated by non completion of some aspect of our questionnaire which of course may be due to non comprehension or outright illiteracy.

The presence of an under-five child in the household, family size, education, presence of health facility in the community, gender of household head, region by residence and wealth index by education predicted ITN ownership (Ilechukwu *et al.*, 2010). Free ITN distribution campaigns should be sustained to increase equitable coverage. These campaigns should be supplemented with other ITN distribution to cover newborns and replace aging nets (Ajayi *et al.*, 2009).

Long lasting insecticidal nets (LLIN) are a primary method of malaria prevention (Afolabi *et al.*, 2009). Current use of treated mosquito nets for the prevention of malaria falls short of what is expected in sub-Saharan Africa but, the present study showed that the CDDs made good use of mosquito nets as a means of malaria prevention and also for a comfortable sleep.

Over 85% of the studied group used nets while over 88% of the figure had their nets treated. This is a good development and the influence of educational level was also a positive factor. Previous literature had indicated about 30% usage among rural communities in Ibadan Uneke *et al.*, 2010), South West Nigeria. The study also found out that over 87% of insecticides treated users also used other mosquito's repellents. The nets must have been bought years ago and did not go through any further treatment if they were even ever treated before. Our work did not involve getting the source of the nets but, cost may be a prohibiting factor to good and functional nets.

Mere possession and non usage is still a big factor in most part of Africa including Nigeria (Afolabi *et al.*, 2009). The present study did not separate possession from usage but, it is a good omen where 85% of the studied group used the commodity as no one can use what he/she does not possess. A study carried out in some African countries by Korenromomp *et al.*, (2003) also demonstrated that the highest users of insecticide treated nets were the ages 1-3. Our finding also supports their finding that this age group were the highest users among the under-5. This is the most vulnerable age group to the menace of malaria hence undoubtedly, the most protected by their careers.

5. CONCLUSION

There was good awareness and usage of insecticide treated mosquito nets among the studied category of health workers which is a good omen in thrive towards good health care practices especially in the rural communities. Improved education among this category of health workers is recommended as this will enhance increased performance of theirs.

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