International Journal of TROPICAL DISEASE & Health
4(9): 1001-1010, 2014

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Ownership of Bed Nets and Use by Children below 5 Years in Sagamu Local Government Area of Ogun State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author IRAT designed the study, wrote the protocol and wrote the first draft of the manuscript. Author DAA managed the analyses of the study. The two authors read through and approved the final manuscript.

Original Research Article

Received 19th June 2014
Accepted 20th July 2014
Published 1st August 2014

ABSTRACT

Aim: To document the level of ITNs ownership and utilization for children within the Sagamu Local Government Area in Ogun State three years after the commencement of major distribution exercise of this simple tool.
Study Design: A descriptive cross -sectional community based study.
Place and Duration of Study: Sagamu Local Government area in Nigeria. May 2009.
Methodology: Study involved one hundred and thirty one (131) children within the Local Government with fever or a 2 day history of fever prior to the day of the meeting following a 3 day community campaign. They were enrolled into the study using a systematic random sampling method. Pretested semi-structured questionnaire was administered by research assistants/investigators to obtain data on ownership of ITNs by the caregiver and their utilization by the index child. Factors that may affect ownership and utilization were also documented.
Frequency tables were generated for all the categorical variables and association between them tested using the chi-square test and logistic regression. Level of significance was set at p value <0.05.

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Result: The mean age of the study population was 47.3±50.6 months for the children and 28.8±5.9 years for the mothers. Among the 128 respondents, ITNs ownership was 9.2%, utilization was 4.6%.
House-types and mothers' occupation were positive predictors of use (r=0.97). There was a strong positive correlation between mother's educational level and ownership (r=0.96). Ownership was however limited by a combination of lack of awareness and knowledge of access point as well as cost.
Conclusion: While improving the awareness of the populace through radio jingles and social marketing as well as use of private health facilities as access points will aid in better ownership of ITNs, subsidizing the cost of ITNs rather than making it out rightly free may ensure better utilization.

Keywords: Malaria; insecticide treated net (ITNs); community based study.

1. INTRODUCTION

The scourge of malaria on child health remains a major issue in Sub Saharan Africa. This is in spite of moderate attempts at Malaria Control. In 2010, malaria caused an estimated 216 million clinical episodes, and 655,000 deaths [1]. About 90 per cent of these deaths occur in sub-Saharan Africa mostly among children less than 5 years of age.

In terms of morbidity, malaria remains the number one cause of hospital visit in the sub-region and one of the six leading causes of mortality [2]. Children and pregnant women constitute two of the vulnerable groups for malaria infestation with malaria in pregnancy being responsible for delivery of low birth weight babies, maternal anaemia and still birth amongst pregnant women [3-5].

Towards the end of the last decade it was classified as a re-emerging disease even in areas where it has been endemic [6]. This therefore led to an urgent need to look inwards at simple effective tools for the control of this disease. One of the major prongs adopted towards effective malaria control was the use of Insecticide Treated Nets (ITNs) since there were enough demonstrable evidence suggesting that ITNs are useful in reducing mortality and morbidity associated with malaria in the vulnerable groups [7-11]. Hence, an increase in global production, procurement, distribution, and use of insecticide-treated bed nets (ITNs) followed. UNICEF procurement increased roughly 20-fold between 2000 and 2005 as global production more than tripled from 30 million in 2004 to 100 million in 2008 [12].

In Nigeria, ownership of ITNs and its utilization have been reported to be low [13-16].A nationally representative study involving the 6 geopolitical zones of the country revealed household ownership was 23.9% and 10.1% for any net and ITNs respectively. Corresponding utilization by children under-five was 11.5% and 1.7% for any net and ITNs [17]. Even within the sub region, Nigeria had the lowest figures in awareness, ownership and use of ITNs amongst 4 countries surveyed by Net mark in 2004 [18].

Hence, in 2006, the Government of Ogun State, Southwest Nigeria, in its bid to increase access to ITNs and improve its coverage, commenced the distribution of free ITNs using Public Health institutions as avenues to reach the target population.

This study was therefore conducted with the following Aims:

1.1 General

To document the level of ITNs ownership and utilization by children within the Sagamu Local Government Area in Ogun State three years after the commencement of the exercise.

1.2 Specific

1. To determine the accessibility of ITNs by the caregivers of the under-five children in the local government area
2. To determine the level of ownership of ITNs by the caregivers of the under-five children in the local government area
3. To assess the utilization of ITNs by the under-five children within the Local Government
4. To document factors promoting/hindering access, ownership and utilization of ITNs among mothers in the local government area

1.3 Definition of Terms

The following definition of terms as described by Carol A Baume et al. [18] were adopted and further adapted for the purpose of this study:

- Bed Net: A net that can be hung for use while sleeping regardless of whether it has ever been treated.
- Ever-treated net: A net that has ever been treated, either when acquired (pre-treated) or since acquired, regardless of when the treatment was put on the net.
- ITNs or currently-treated net: A bed net that is hung for use and either "permanently treated" or long lasting insecticide-treated (a LLIN), or is pre-treated and has been purchased within the last 12 months, or has had insecticide put on it up to and including the last 12 months.
- Mosquito Net: Refers to untreated net on window or door frames designed to protect against mosquitoes.

2. METHODOLOGY

This was a part of a larger study aimed at determining the efficacy of three malaria diagnostic options [19].

2.1 Study Site

Ogun state is one of the thirty-six states of Nigeria, located in the South-Western (Rain-forest) part of the Federation, within 30 East and 70 North of the equator. The state consists of twenty (20) Local Government areas and has a population of about 3 million. Sagamu is one of these Local Government areas, with an estimated area of 68.4 square km, a projected population of 177,514 and an annual population growth rate of 2.28% [20]. Malaria in the region is hyper-endemic with its transmission being highest during the rainy season (May to October).

The Local Government has a Teaching Hospital, 1 General Hospital and 4 Primary Health care centres. These public health facilities are in addition to 60 private clinics and maternity homes.

2.2 Study Design

The study was a descriptive cross-sectional community-based survey conducted in Sagamu, Ogun State. Data for ownership and use of ITNs was collected as a part of the survey that was conducted in May 2009.

2.3 Sampling Technique

2.3.1 Determination of sample size

Using the formula:SS1=Z2(p)(1-p)/d2 [21], a total of 106 patients were estimated for recruitment for the malaria diagnostic study. However, all the children that were less than five years that were enrolled in order to attain the sample size for the main study were included for this study.

2.3.2 Sample selection and data collection

The authors approached the Chairman of the Local Government through the Medical officer of Health to seek his permission and cooperation to enter the community for the research activity. After this was granted, media vans of the local government were deployed into the community inviting mothers whose children (from birth up to primary school level) has fever to report at the town hall with their children. The campaign was for three successive days.

At the town hall, a register was opened to document the presenting complaints, and axillary temperature was measured using a digital thermometer by one of the authors and the research assistants. Only children with fever or history of fever in the last 48 hours and or temperature ≥37.5ºC were considered for enrolment. Recruitment of the children who fulfilled the inclusion criteria was done consecutively over three days. The samples were then selected using systematic random method until the desired sample size was reached.

The research tool was pretested in a neighbouring local government and research assistants were trained to effectively administer the questionnaire.

The pre-tested semi-structured questionnaire was designed to obtain the bio-data, ownership and use of bed nets (ever treated, untreated and ITNs). The investigators/ trained research assistants administered it on each consenting mother/caregiver.

2.4 Inclusion Criteria

Study subjects consisted of children less than five years, with fever (Axillary temperature >37.2ºC) or history of fever in the last two days prior to the meeting.

2.5 Data Analysis

Data entry, validation and analysis were done with the Epi-info 2006 software. Frequency tables were generated for all the categorical variables and association between them tested using the chi-square test and logistic regression. Level of significance was set at *P* value <.05.

2.6 Ethical Considerations

Approval to conduct the study was obtained from the Scientific and Ethical Review Committee of the Olabisi Onabanjo University Teaching Hospital to which the corresponding author is affiliated. In addition, written informed consent was obtained from the care-takers/mothers of the children prior to their enrolment in the study.

3. RESULTS

From the outreach programme 131 children were enrolled. All the children who enrolled in the process of reaching the desired sample size for the larger study were included. Male: Female ratio=63:68=1:1.08.

Majority of the mothers who brought their children for the meeting were determined to be of the lower socio-economic status [22].

Age range of the children was between 1 and 60 months, mean was 47.3±50.6 months Mother's ages ranged between 16 and 45 years, mean age was 28.8±5.9 years.

As shown in Table 1, less than a quarter of the mothers were educated beyond the secondary school level and the majority of them (95.3%) were junior civil servants/petty traders/artisans/unemployed. A greater majority of the mothers (85.2%) lived in room apartments.

Table 1. Socio-demographic characteristics of the respondents

Variables	Frequency N=128	Percentage of N
Age (years)		
<20	3	06.1
21-35	96	81.4
36-45	29	12.5
Total (n)	128	100.0
Education		
University/post-secondary	21	16.4
Secondary	70	54.7
Primary	29	22.7
Koranic/no formal	8	6.3
Total (n)	128	100.0
Occupation		
Senior civil servants	02	01.6
Middle civil servants	04	03.1
Junior civil servants	17	13.3
Artisans	97	75.8
Unemployed	08	06.3
Total (n)	128	100.0
Living quarters		
Flats	019	14.8
Rooms	109	85.2
Total (n)	128	100.0

**Figures in bracket are percentages of total "n"; *Information was incomplete in 3 of the respondents*

3.1 Ownership and Utilization of Bed Nets

Among the study population, a majority, 96 (74.6%) had mosquito nets around their homes and only 31 (24.2%) had bed nets. Out of those who had bed nets, 12 (38.7%) were ITNs, 11 (35.5%%) were untreated nets and 8 (25.8%) were uncertain. Ownership of bed nets in the study population was hence 9.2%.

In the 31 homes where there were bed nets, 16 children slept under the bed net the day prior to the meeting, 6 of the bed nets were ITNs (50%). Use of ITNs hence 4.6%

As shown in Table 2, the ages of the parents, their education and father's occupation did not seem to significantly affect bed net ownership. However, the type of household and mother's occupation both significantly affect bed net ownership.

Table 2. Socio-economic status of parents and ownership of bed net

	Variables	Ownership of bed net		Chi-square	P value	Df
		Yes	No			
Father's education	University/post-secondary	8	18	8.2	0.32	7
	Secondary	15	54			
	Primary	4	11			
	Koranic/non formal	1	6			
Father's occupation	Senior civil servant	4	1	9.7	0.05	4
	Middle level civil servant	2	4			
	Junior civil servant	5	19			
	Artisans/petty trader	16	63			
	Unemployed	1	4			
Mother's education	University/post-secondary	6	13	13.81	0.087	8
	Secondary	17	52			
	Primary	2	26			
	Koranic/non formal	3	4			
Mother's occupation	Senior civil servant	2	0	13.37	0.009	4
	Middle level civil servant	2	1			
	Junior civil servant	1	15			
	Artisans/petty trader	22	73			
	Unemployed	0	3			
House type	Flat	9	9	9.3	0.009	2
	Rooms	20	68			
	Others	2	20			

The number of children who slept under bed net in the night preceding the outreach was statistically significant in the household where any form of bed net was available (P=.009). Whether they do or not is also significantly affected by the level of education of the mother (P<.05). Of the patients that had ITNs, 9 out of 12 (75%) were given free at the hospital and the remaining 25% got theirs from other sources. Utilization of the ITNs was not significantly related to access point (P=0.12).

For those who bought theirs, cost of bed net was between 350-2,500 Naira (2.3-16.7 US$).

Majority (73.1%) were willing to pay up to 500 naira (US$3) whilst the rest will rather have it free.

For those who do not own ITNs, equal number, 31(26.1%) each, did not know what it is or how/where to get it, 25 (20.7%) felt it was too expensive and 32 (27.2%) did not own for various other reasons.

65 (51.6%) of the children had malaria in the last 3 months.

Sleeping under the bed-net did not seem to offer protection against the development of malaria in the children. *P*=0.28. Whilst House type and mothers' occupation were positive predictors of use (r=0.97), mothers' educational level was a predictor of ownership (r=0.96).

4. DISCUSSION

This study has further buttressed the fact that ITNs ownership and use in Nigeria remain lower than what obtains in other countries within the Sub-region. Ownership of ITNs in Kenya was over 71% [7] and in Eastern Ethiopia it was 62.4%, [23]. In 2009, Baume et al. [18] observed that all countries surveyed for ITN ownership and usage experienced considerable progress except Nigeria.

Whilst ownership in other areas ranged between 40 and 72% and usage between 30 and 40%, [7,18], this study found a dismal 9.2% ownership and 4.6% utilization among the study population for children. Just as in similar studies [13-16,24], the study population recorded lower usage when compared with ownership.

A value of 14.8% ownership of ITN was recorded amongst pregnant women in the same state around the same period [16]. In the study, utilization was 10.4%. Several studies have identified that ownership does not necessarily translate to use [14,16,24].

Whereas other studies reported wide gap between ownership and utilization, [18] in this study about a half of those who possess the bed-nets (ITNs inclusive) used them for their children the night before the study. Hence, it will appear that for an effective potential of the bed-nets to be achieved, ownership has to be improved.

Although the WHO malaria report [25] suggested that lack of ownership was a result of inadequate number of nets to go round the vulnerable groups, this study however revealed that lack of awareness about ITNs and knowledge about where to access them in those that were aware constituted the greatest barrier to ownership. A study had identified that awareness and knowledge about ITNs in this state were particularly poor [16]. In an attempt to achieve universal ITN coverage, there has been a rapid scale up of ITNs distribution throughout Africa [25-28] but then majority of these were probably not being used for the purpose for which they were meant [27,29].

Some scholars have reported the various uses that the insecticide treated nets are subjected to. These included its use as fishing nets, sponge, table covers etc. [30].

The majority of the respondents in this study got their ITNs free from the hospital. Giving it free as had been suggested in some other studies may just improve ownership and National coverage but as seen in this study, may not translate to utilisation.

Contrary to other reports where cost has been a limitation to ownership [31] majority of the respondents in this study will rather pay than have it free. Honjo Khave opined that misuse of ITNs may be related to individual and social rationality [30]. Among the Yorubas that constituted the majority of the respondents in this study, there is a general belief that any item that is important and effective, must cost something. This may have been responsible for the low utilization recorded in this study. Although the reasons for non- utilization was not determined in this study, an earlier study in the same area documented that majority of pregnant women did not use ITNs even when they own them because of the frequent power outages that make sleeping under an ITN uncomfortable especially during the dry season [32].

It is possible that the reported protective effect of ITNs was not found in this study because of the low utilization. The gap between ownership and utilization has to be closed for the full potential of ITNs to be felt in the prevention of malaria.

5. CONCLUSION

For ownership and utilization to improve in the state, the Government will have to step up its activities in provision of awareness and knowledge on the benefits of ITNs through radio jingles, social marketing, health education in clinics and hospitals etc. In addition, outlet through private health facilities too would have to be explored considering the fact that the State seems to have more private health facilities than public. It may also be helpful to subsidize the cost of ITNs rather than making it out rightly free. Improvement of social amenities like electric power supply may encourage mothers to use this important protective tool.

CONSENT

All authors declare that each consenting mother/caregiver signed or thumb-printed a written informed consent form to be enrolled into the study.

ACKNOWLEDGEMENTS

The Authors acknowledge the cooperation of Chairman and Members of staff of the Sagamu Local Government (Health division).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
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